



U.S. Department of the Interior

Bureau of Land Management
Wyoming State Office

Buffalo Field Office

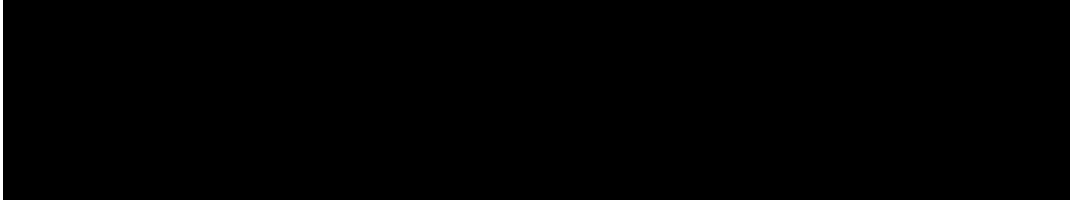
April 2003



Record of Decision and Resource Management Plan Amendments for the Powder River Basin Oil and Gas Project

(WY-070-02-065)





BLM/WY/PL-03/016+1310



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Wyoming State Office
5353 Yellowstone Road
Cheyenne, Wyoming 82009

Dear Reader:

This Record of Decision (ROD) approves the proposed amendments to the Buffalo and Platte River Resource Management Plans. The proposed plan amendments are described as the preferred alternative analyzed in the Final Environmental Impact Statement (FEIS) and Proposed Plan Amendments for the Powder River Basin Oil and Gas Project. The plan amendments provide guidance for managing BLM administered oil and gas activities within the Powder River Basin (PRB) in Campbell, Converse, Johnson, and Sheridan counties.

This ROD culminates a three-year process of a detailed analysis of the environmental effects of implementing the Powder River Basin Oil and Gas Project. On January 18, 2002, the Bureau of Land Management (BLM) released the Draft Environmental Impact Statement (DEIS) for the project. On January 17, 2003, BLM released the FEIS and Proposed Plan Amendments for the Powder River Basin Oil and Gas Project.

The FEIS was prepared pursuant to the National Environmental Policy Act and other regulations and statutes to fully disclose the potential environmental impacts that could result from implementation of the project and to solicit public comments and concerns. The EIS process was designed to inform the public of a proposal to develop oil and gas on the public lands in the PRB. BLM involved the public in the preparation of the FEIS by hosting numerous public meetings and accepting public comments during initial scoping and on the DEIS. BLM also provided information to the public through postings on web sites, news releases and mailings. The Medicine Bow - Routt National Forest, Thunder Basin National Grasslands (FS) and the State of Wyoming are cooperating agencies in this analysis. The FS will be issuing a separate ROD for FS administered lands.

The Proposed RMP Amendments were subject to a 30-day protest period that ended on February 18, 2003. The protests were reviewed by the BLM Assistant Director, Renewable Resources and Planning, in Washington DC. This Record of Decision includes information about the protests and BLM's findings. No significant changes to the proposed plan were made as a result of the protest.

This is a land use planning decision made in accordance with 43 CFR 1600. The regulations in 43 CFR 1610.5-2 do not provide for any additional administrative review of this decision. However, implementation of this decision through future authorization of Applications for Permits to Drill (APD), and other actions, may be administratively reviewed at the time such authorizations are made. Such review will be conducted in accordance with regulations in 43 CFR 3165.3, 43 CFR 3165.4, and 43 CFR 4.

A copy of the ROD has been sent to affected governmental agencies and to those persons who commented on the FEIS or otherwise indicated to BLM that they wished to receive a copy of the ROD. You may view the ROD and FEIS on the BLM web site at <http://www.wy.blm.gov/nepa>. Copies of the ROD are available to the public at the following locations:

Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
Cheyenne, Wyoming 82009

Bureau of Land Management
Buffalo Field Office
1425 Fort Street
Buffalo, Wyoming 82834

Bureau of Land Management
Casper Field Office
2987 Prospector Drive
Casper, Wyoming 82604-2968

BLM thanks all the individuals, organizations, businesses, and agencies who provided suggestions and comments on the Draft and Final EISs. Your help has been invaluable in preparing the EIS and this ROD.

Sincerely,

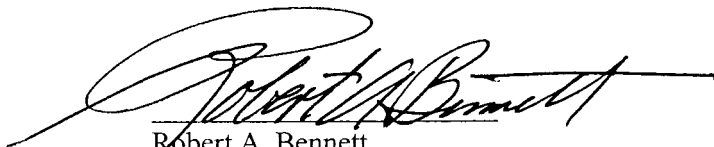
A handwritten signature in black ink, appearing to read "Robert A. Bennett", with a long horizontal flourish extending to the right.

Robert A. Bennett
State Director

Signature Page
for the
Powder River Basin Oil and Gas Project
Record of Decision

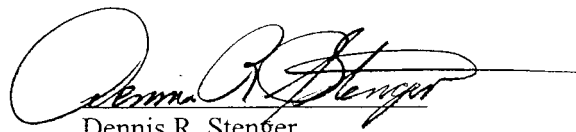
U.S. Department of the Interior
Bureau of Land Management

Approving Official:

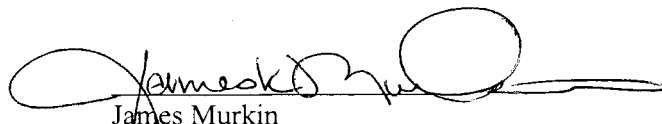

Robert A. Bennett
Wyoming State Director

4/30/03
Date

Concurring Officials:


Dennis R. Stenger
Field Manager
Buffalo Field Office

4/30/03
Date


James Murkin
Field Manager
Casper Field Office

4/30/03
Date

Contents

Record of Decision and Resource Management Plan Amendments.....	1
Introduction.....	1
Summary of Proposed Action and Alternatives.....	2
Decision.....	6
Goals, Objectives, and Management Actions.....	6
Operator Requirements.....	6
Air.....	7
Water.....	7
Water Well Agreement.....	7
Montana and Wyoming Powder River Interim Water Quality Criteria Memorandum of Cooperation.....	7
Water Management Plans.....	8
T&E.....	8
Sensitive Species.....	8
Cultural.....	8
Vegetation.....	9
Reclamation.....	9
Areas of Critical Environmental Concern.....	9
Operations on Spilt Estate Lands.....	10
Interagency Work Groups.....	11
Management Considerations.....	11
Air Quality.....	12
Water Quality.....	13
Summary.....	13
Mitigation Measures Accepted for Implementation.....	13
Standard Conditions of Approval.....	14
Programmatic Mitigation.....	14
Mitigation Measures Not Included in the RMP Amendments and the Rationale for Not Including Them.....	14
Monitoring.....	14
Land Use Plan Monitoring.....	14
Mitigation, Monitoring, and Reporting Plan.....	15
Public Involvement.....	15
Scoping.....	15
Review of the DEIS.....	16
Protest Period.....	17
Issue Summary/Main Issues.....	17
Protest Resolution.....	18
Consistency with Applicable Policies, Plans, and Programs.....	18
Roles, Responsibilities, and Regulatory Process.....	19
State of Wyoming.....	19
Air Quality.....	19
Water Quality.....	20
BLM.....	20

Figures

Figure 1	Project Location Map.....	3
----------	---------------------------	---

Appendices

Appendix A	Permit Authority, Management Actions, Standards Conditions of Approval and Programmatic Mitigation
Appendix B	Water Well Agreement
Appendix C	Montana–Wyoming Agreement
Appendix D	Water Management Plan
Appendix E	Mitigation Monitoring and Reporting Plan
Appendix F	Integrated Pest Management Plan
Appendix G	Mitigation Measures Not Included in the RMP Amendments and the Rationale for Not Including Them

Record of Decision and Resource Management Plan Amendments

Introduction

The Powder River Basin Oil and Gas Project is a proposal of a group of oil and gas companies with leases in the Powder River Basin (PRB). They include Lance Oil and Gas (Western Gas Company), Barrett Resources Corporation (Williams), Devon Energy Corporation, Yates Petroleum Corporation, Pennaco Energy (Marathon Oil Corporation), and CMS Oil and Gas (Perenco S.A.). The companies are collectively identified as the Powder River Basin Companies (Companies).

Upon receipt of the proposal the Bureau of Land Management (BLM) prepared a Reasonable Foreseeable Development (RFD) scenario for the planning area. BLM then initiated the Environmental Impact Statement (EIS) and Proposed Plan Amendments for the Powder River Basin Oil and Gas Project.

The Final EIS (FEIS) analyzes exploration and development of oil and natural gas, including coal bed methane (CBM), in the PRB and the anticipated impacts and environmental consequences associated with exploration and development of oil and natural gas, including CBM. The FEIS updates the scope and analysis of effects for oil and gas development originally presented in the 1985 Buffalo and Platte River RMPs to include CBM and includes mitigation measures that when applied would reduce the impacts of oil and gas development activities.

Prior to approval of individual Applications for Permit to Drill (APD) or Plans of Development (POD), site-specific environmental analyses will be conducted and will be tiered to the FEIS.

This document records the decision made by the BLM concerning the proposed plan amendments for managing oil and gas operations on BLM administered public lands and federal mineral estate in the Wyoming portion of the PRB as analyzed in the FEIS.

The planning area encompasses almost 8 million acres of federal, state, and private lands (Figure 1) in all or parts of Campbell, Converse, Johnson, and Sheridan counties. Of the total surface area, BLM administers 883,061 acres (11 percent of the Project Area) and the USDA Forest Service (FS) administers 261,009 acres (3 percent of the Project Area). In addition, BLM administers the federal minerals under 4,326,704 acres (68 percent of the Project Area). Thus, about 3,182,634 acres in the planning area (40 percent) are split estate (private surface and federal minerals). The FS and the State of Wyoming are cooperating agencies in this analysis. The FS will be issuing a separate Record of Decision (ROD) for FS administered lands.

Summary of Proposed Action and Alternatives

Three alternatives were analyzed in detail: (1) Proposed Action, (2) Proposed Action with Reduced Emission Levels and Expanded Produced Water Handling Scenarios, and (3) No Action.

Alternative 1 – The Companies’ proposed action was combined with BLM’s Reasonably Foreseeable Development (RFD) scenario. The RFD scenario is based primarily on geology (potential for oil and gas resources to occur) and past and present oil and gas development, with consideration of other significant factors such as economics, technology, and physical limitations on access, existing or anticipated infrastructure, and transportation.

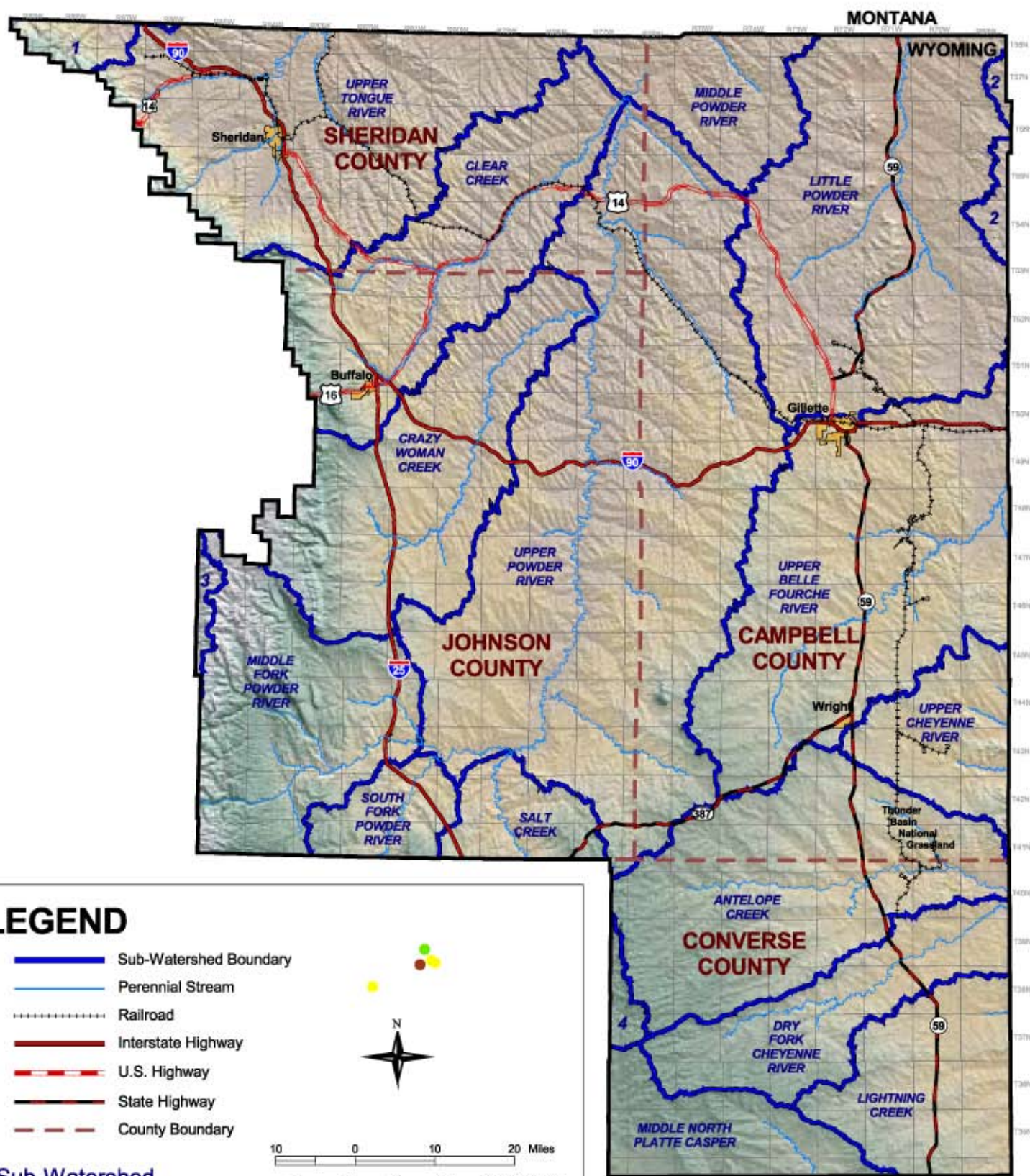
Along with industry’s proposed action, which relates only to CBM, BLM’s RFD scenario forecasts the continued drilling of an estimated 3,200 oil wells. The RFD scenario also forecasts an estimated 51,000 CBM wells in the EIS area over the next 10 years. About 25 trillion cubic feet (tcf) of CBM may be recoverable from coal beds in the PRB within Wyoming.

The Companies’ projections of CBM well drilling and production include various ancillary facilities. The ancillary facilities include access roads, pipelines to gather gas and produced water, electrical utilities, facilities to treat and compress gas and dispose of produced water, and pipelines to deliver gas under high pressure to transmission pipelines. Although the Companies would develop new wells throughout the 10-year period beginning in 2003, most drilling would occur during the first 8 years. Not all 51,000 wells would be drilled into a single coal seam. Wells drilled into different coal seams can be collocated on common well pads. The projected number of well pads is 35,589. The total numbers of wells and well pads is based on an 80-acre spacing pattern (eight pads per square mile). The 51,000 proposed CBM wells include an estimated 12,000 existing wells.

Under the Proposed Action, the Companies would construct, operate, and maintain wells and ancillary facilities in 10 of the 18 sub-watersheds that make up the Project Area. However, most of the new wells (63 percent) and facilities would be constructed in two sub-watersheds: the Upper Powder River and Upper Belle Fourche River. Sub-watersheds that would contain relatively high numbers of wells and facilities include Clear Creek, Crazy Woman Creek, Tongue River, and Little Powder River.

Overall, implementation of the Proposed Action could disturb as many as 212,000 acres, though requirements for reclamation will be imposed. This short-term disturbance would encompass about 3 percent of the Project Area, and most would be associated with construction of pipelines and roads. Long-term disturbance is projected to involve approximately 109,000 acres. Compressor stations would account for the smallest amount of the overall disturbance.

Construction of wells under the PRB EIS would begin during 2003. Generally, construction of most CBM wells would be completed over the first 8 years (by the end of 2011). The production lifetime of the wells is expected to be about 7 years, and final reclamation is expected to be completed during the 2 to 3 years after production ends.



Emphasis for water handling for Alternative 1 is untreated surface discharge. All compression would be powered by CBM.

Alternative 2 - proposes the same number of CBM and conventional wells as the Proposed Action. However, two additional water-handling methods are analyzed: A – emphasis on infiltration, and B – emphasis on treatment for beneficial use.

There are also two air quality options: A – 50 percent of booster compression would be electrically powered, and B – 100 percent of booster compression would be electrically powered.

Alternative 2A and applicable portions of Alternative 1, relative to use of natural gas fired compressors, was the preferred alternative analyzed in the FEIS.

Alternative 3 – No Action. This alternative would consist of no new federal wells. Wells would be developed only on state and private mineral ownership.

Alternative 3 was determined to be the environmentally preferred alternative because there would not be any oil and gas development on BLM administered public lands and federal mineral estate.

The Department of Interior’s authority to implement a “No Action” alternative that precludes development by denying the process is, however, limited. An oil and gas lease grants the lessee the “right and privilege to drill for, mine, extract, remove, and dispose of all oil and gas deposits” in the lease lands, “subject to the terms and conditions incorporated in the lease” (Form 3110–2).

Implementation of Alternative 3 would not:

- ¾ meet the Purpose and Need,
- ¾ accomplish the objectives of the National Energy Policy,
- ¾ prevent the financial loss of CBM through drainage, or
- ¾ provide an efficient option to recover the resource.

Through the analysis process the following alternatives were eliminated from detailed consideration. The reasons for dropping these alternatives can be found in chapter 2 of the FEIS.

- ¾ Return all produced water to aquifers.
- ¾ Capture and treat produced water for additional beneficial uses.
- ¾ Staged rate or phased development.
- ¾ No action on all lands.
- ¾ Discharge produced water to the surface, but ensure that water quality at the Wyoming-Montana border does not change enough to adversely affect the uses of water at and downstream of the border.
- ¾ Several environmental groups developed an alternative they identify as the “Conserving Wyoming’s Heritage Alternative.” This alternative is based primarily on phased development, alternative and innovative technologies, adaptive management, the “reopening” of permits, landowner

protections, injection and treatment of produced water, and minimizing adverse effects to the full range of resources present in the Project Area.

Decision

Based on the information contained in the FEIS, referenced supporting documentation, and other considerations described below, the decision is hereby made to approve the proposed plan amendments. The decision is to approve Alternative 2A (preferred alternative) for water and that portion of Alternative 1 regarding the use of natural gas fired compressors. Alternative 2A, and that portion of Alternative 1 relative to use of natural gas fired compressors, describes the management goals, objectives, management actions and conditions of use that will guide future management of oil and gas operations on public lands and federal mineral estate managed by BLM within the Buffalo and Platte River Resource Management Plan (RMP) areas.

This plan was prepared under the regulations implementing Federal Land Policy and Management Act (FLPMA) (43 CFR 1600). An EIS was prepared for the plan amendments in compliance with the National Environmental Policy Act (NEPA)

The RMP Amendments approved by this ROD do not change the decisions of the 1985 RMPs relative to the availability of lands for oil and gas development. All other aspects of the 1985 RMPs concerning management of oil and gas and related activities are hereby replaced with the provisions contained in the RMPs as amended. Approval of this amendment provides for the use of the BLM administered public lands and federal mineral estate under the conditions described and the level analyzed in the FEIS.

This ROD is not the final approval for the action associated with the PRB oil and gas project. BLM or FS must analyze and approve each component of the project that involves disturbance of federal lands on a site-specific basis. A separate authorization(s) from BLM or FS (and other permitting agencies) is required prior to approval of any APD, POD, Sundry Notice (SN), Right-of-way (ROW) Grant or Special-Use Permit before any construction can occur.

Goals, Objectives, and Management Actions

The preferred alternative describes the management goals and objectives and management actions that will guide future management of oil and gas operations on BLM administered minerals within the Buffalo and Platte River RMP areas. The decisions relative to the primary issues are as follows:

Operator Requirements

The Companies are responsible for obtaining all necessary federal, state, and county permits, and for implementing the PRB oil and gas project in an environmentally responsible manner (see Appendix A, Table A-1, Federal, State and Local Permits, Approvals, and Authorizing Actions Necessary for Construction, Operation, Maintenance and Abandonment of the PRB Oil and Gas Project).

Air

As part of the permit approval process, the air quality regulatory agencies will prepare additional analysis, conduct monitoring, and require mitigation as needed to ensure compliance with all applicable standards before permits could be approved.

Water

As part of the permit approval process, the water quality regulatory agencies will prepare additional analysis, conduct monitoring, and require mitigation as needed to ensure compliance with all applicable standards before permits could be approved.

Water Well Agreement

All operators on federal minerals are required to offer a Water Well Agreement as set forth in the Gillette South FEIS and the Wyodak FEIS. This agreement protects nearby water wells permitted by Wyoming State Engineer's Office (WSEO). The Companies generally offer the same agreement when they are drilling on fee and state lands (Appendix B)

Montana and Wyoming Powder River Interim Water Quality Criteria Memorandum of Cooperation

The Interim Memorandum of Cooperation (MOC) documents WDEQ's commitments and intent to protect and maintain water quality conditions in the PRB within Montana.

WDEQ's current permitting process incorporates the numeric water quality standards for electrical conductivity (EC) and sodium adsorption ratio (SAR) adopted for water bodies downstream in South Dakota, specifically drainages in the Upper Cheyenne and Upper Belle Fourche River sub-watersheds. Wyoming and Montana have entered into an interim MOC for waters downstream in Montana to protect the downstream water quality in the Powder and Little Powder River sub-watersheds while allowing for development of CBM in both states. This MOC is included as Appendix C. Interim thresholds are established for EC in the Powder River at the state line, based on monitoring data collected at the gauging station in Moorhead, Montana. The criteria for EC are expressed in monthly maximum values that are not to be exceeded. The two states are also concerned with SAR and bicarbonate, but lacked sufficient data to establish threshold criteria at the time of the MOC. Under the MOC, monitoring of the Little Powder River will include EC, SAR, and total dissolved solids (TDS) to evaluate whether levels of these constituents change appreciably from historical records. In the event that significant changes in baseline conditions are detected, the State of Wyoming would be required to investigate potential causes to determine if CBM discharges are responsible. Wyoming would be required to adjust its criteria for granting permits to ensure compliance with the spirit of the agreement.

WDEQ, through its current National Pollutant Discharge Elimination System (NPDES) permitting process, is restricting the amount of CBM discharge water that reaches the main stems to meet the short-term goal of the MOC. Discharges are limited through such mechanisms as impoundment storage, channel loss, and

other consumptive uses. Furthermore, as a matter of policy, WDEQ has elected to impose its antidegradation policy on all CBM discharges. This policy results in effluent limitations in NPDES permits for discharges of CBM produced water that equate to 20 percent of the available increment between low-flow pollutant concentrations and the relevant standards (assimilative capacity) for critical constituents. A separate antidegradation policy for barium, in which the assimilative capacity is basin-specific, is also applied to CBM discharges. Montana has accepted Wyoming's antidegradation policies to be protective of Montana's water quality.

Water Management Plans

A Water Management Plan (WMP), a comprehensive document that addresses the handling of produced water during the testing and production of CBM well(s) is required to be submitted with CBM APDs or PODs. The WMP must provide adequate information for the BLM to complete site-specific NEPA analysis and to ensure compliance with all state and federal requirements prior to approval. A CBM APD or POD will not be considered complete or processed by BLM unless it contains a WMP. For details on WMPs, see Appendix D.

T&E

The BLM will comply with the ESA by implementing on BLM administered minerals, when applicable, the measures prescribed in the U. S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) for the FEIS. These measures are included in the Programmatic Mitigation Section in Appendix A of the ROD.

Sensitive Species

BLM will take necessary actions to meet the policies set forth in sensitive species policy (BLM Manual 6849) for all sensitive species listed in the FEIS, including the greater sage grouse and black-tailed prairie dog. To help ensure BLM's activities do not contribute to the listing of the black-tailed prairie dog or greater sage grouse as threatened or endangered species (see Appendix A for mitigation measures that will be required and Appendix E for monitoring relative to these species). Protection of the prairie dog is provided for in mitigation for the black-footed ferret, primarily that "prairie dog colonies will be avoided whenever possible."

Cultural

At a minimum, all areas of proposed ground disturbing activity will be intensively inventoried for cultural resources in conformance with minimal BLM Class III survey standards at the APD, POD, or SN phase of each proposed Federal undertaking. For CBM well fields or PODs, a block survey of the entire project area early in the planning phase is highly recommended by the BLM and is required by the FS. All sites within the planning area must be evaluated for eligibility under the NRHP.

Specific plans for avoidance and protection or minimization of adverse direct or indirect effects would be recommended for any historic properties within the areas of potential effect of proposed project activities. Prior to implementation, these plans must be approved by the BLM or FS, as appropriate, State Historic

Preservation Office (SHPO), and, if applicable, by the private surface owner. Such plans might include, but are not limited to the following constraints, stipulations, or actions:

- ³/₄ Relocation, redesign, or constraint of project facilities and infrastructure to avoid or minimize earth disturbance within historic properties or contributing portions of historic properties or to avoid or minimize indirect effects or intrusions caused by vibration, dust, exhaust, or noise. This may include barricading or fencing of sensitive areas and buffer zones.
- ³/₄ Relocation, redesign, or constraint of project facilities and infrastructure to avoid or minimize visual intrusion on a sensitive historic, traditional, or religious setting. This might include low profile facilities, non-intrusive colors, landscaping, berms, screening with vegetation, or other measures to minimize visual impact.
- ³/₄ Stabilization of sediments, bedrock, or structures that could be destabilized, or could deteriorate, as a result of nearby project activities and identification of an appropriate buffer zone.
- ³/₄ Restriction or prevention of access to sensitive areas.
- ³/₄ Rehabilitation of buildings or structures, or protective screening of art work to minimize deterioration.
- ³/₄ Detailed documentation, possibly including archival photo documentation, of contributing structures, landscape features, or aspects of historic setting that cannot feasibly be avoided. In some cases it may be feasible to restore some of these contributing features after construction has been completed.
- ³/₄ Detailed recordation or data recovery of the essential contributing elements of a historic property that cannot be avoided or protected. Recordation may include archival, documentary, and contextual research related to the historic property in addition to site documentation. Data recovery is the systematic recovery of data important in history or prehistory for which the property is considered eligible. Data recovery for prehistoric or historic archaeological sites typically entails excavation of buried materials and detailed documentation of stratigraphic context.

Vegetation

An Integrated Pest Management Plan (IPMP) will be required to be submitted with the APD if the location of the well or POD falls within an area of identified noxious weeds. For details on the IPMP see Appendix F.

Reclamation

Phased reclamation plans will be submitted to the Buffalo Field Office (BFO) and Casper Field Office (CFO) for approval prior to individual CBM POD facility abandonment. These plans will be submitted as a Notice of Intent (NOI) SN for individual facilities, such as well locations, pipelines, discharge points, and impoundments, because they are no longer needed.

Areas of Critical Environmental Concern

The Sierra Club of Wyoming petitioned the BFO during the scoping process to nominate areas for designation as outlined in the BLM's 1617.8 Manual guide-

lines for Designation of Areas of Critical Environmental Concern, (ACEC). These designations apply only to public lands.

Before an area is nominated for ACEC designation the area must meet both the relevance and importance criteria (43 CFR 1610.7–2) and BLM Manual 1613, to become eligible for further consideration.

Of the eight areas reviewed, the BLM administered lands on two areas were found to not meet the criteria and were dropped from further consideration. The BLM administered lands on 6 proposed ACECs were found to meet the criteria and were retained for further consideration (FEIS Appendix R).

The six areas that met the criteria for relevance and importance are being deferred for designation until such time as an amendment specific to their designation or revision of the Buffalo RMP is conducted. Any future land use planning process addressing these areas will provide an opportunity for the public to provide comments on the findings in this evaluation. A decision to not designate part or all of the proposed area as an ACEC does not require the preparation of a plan amendment and is exempt from NEPA.

As determined in the analysis, no interim management was determined to be needed for the six areas in order to maintain the relevance or importance criteria considerations. It was determined that the existing lease stipulations, COA and programmatic mitigation would provide adequate mitigation. However, when APDs are received that encompass these areas, mitigation measures will be re-evaluated and/or additional site-specific mitigation would be implemented to ensure protection of values for meeting the relevance and importance criteria.

Operations on Spilt Estate Lands

The BLM, under FLPMA, must identify how the federal mineral estate will be managed, including identification of lease stipulations. To meet the consistency requirements of FLPMA, the same standards used for environmental protection of Federal surface are also applied to the federal mineral portion of split estate lands (private surface underlain by federal minerals).

The impacts to surface resources and surface uses from BLM-authorized mineral development must be considered not only on BLM administered public lands but also on split-estate lands.

The BLM also has the authority and responsibility to impose restrictions deriving from applicable law and regulation; implement stipulations developed through the Land Use Planning process; enforce lease terms and provisions of on-shore orders and take reasonable measures to avoid or minimize adverse environmental impacts that may result from federally authorized lease activities regardless of surface ownership.

The analysis documented in the FEIS and the decisions made in this ROD are pertinent to all Federal oil and gas lease lands, including split estate, and are subject to all applicable statutes. This includes all of the identified mitigation and Standard COA in the ROD. It is important to understand that BLM only imposes mitigation and COA on the Companies as a result of site-specific environmental

analyses of APDs, PODs, and SNs. These measures are not applied to dictate to the surface owner how to manage his or her property, but are only applied to the Company to ensure environmentally sound oil and gas development in conformance with BLM's statutory responsibilities. BLM specialists consult with private landowners on split-estate situations during the APD, POD, and SN review and approval process to ensure their involvement. Private landowner views, in addition to the effect that implementing possible mitigation and COA might have on the use of their surface, are always carefully considered by BLM in the approval of split-estate federal lease actions.

BLM cannot approve APDs, PODs, or subsequent SNs on federal leases until all applicable federal statutory requirements have been met. In some instances, a COA may be applied to meet a statutory requirement.

Interagency Work Groups

The BLM and WDEQ will work with the Montana Department of Environmental Quality, EPA, National Park Service, FS, and other federal, state, and tribal authorities to establish interagency working group(s) for CBM development in the PRB. The working group(s) will be responsible for guiding and designing the monitoring to validate the accepted mitigation measures and to ensure each agency's actions achieve compliance with applicable air and water quality standards across jurisdictional boundaries. In order to ensure consistency, the interagency work group will also coordinate with other work groups established to address CBM development in Montana.

The interagency working group(s) will, of necessity, depend upon the regulatory and management policies of the WDEQ as the agency with air and water quality primacy. Each agency within the working group(s) will maintain their regulatory authorities throughout the process.

Management Considerations

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

The FEIS considers the use and/or protection of the full extent of the resources managed by BLM, including important energy and natural resources available in the planning area. While the plan amendments support the development of oil and gas resources, they also include the application of mitigation measures to minimize or avoid impacts to resources or land uses from oil and gas activities and prevent unnecessary or undue degradation. In addition to the mitigation measures included in the plan amendments, lease stipulations may be applied to protect critical resource values. Other protective measures may be required at the APD stage to mitigate site-specific impacts when not inconsistent with lease rights granted or specific provisions of the lease.

The decision to approve the plan amendments for the Buffalo and Platte River RMPs takes into account statutory, legal, and national policy considerations. The analysis in the DEIS and FEIS was based on evaluation of the planning areas for

oil and gas development and the identification of sensitive natural and cultural resources. The FEIS evaluated the effects of surface disturbance on these resources, and identified protective measures for consideration on a case-by-case basis to avoid or reduce impacts on important land uses and other resource values. 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 also was based on input provided by and received from the public, industry, as well as other federal and state agencies. Through the review process many practicable methods to reduce environmental harm, without being overly restrictive to oil and gas exploration and development, were incorporated into these plan amendments.

Impacts identified for the preferred alternative 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 developed by President Bush; 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 that our country has an adequate supply of energy necessary for the safety and security of our families, our communities and our Nation; 6) CBM is available on public lands and BLM has a multiple use mission under FLPMA; 7) the preferred alternative is an environmentally sound alternative; and 8) the approved alternative complies with laws and regulations.

In addition, the decision to allow development as described in the selected alternative facilitates protection of the financial interest of the United States by preventing drainage of federal minerals.

Based on the amount of public interest in air and water quality issues the following management considerations were additional factors in the decision.

Air Quality

For Alternative 1, (natural gas fired compression engines) the analysis documents that the benefits to air quality and visibility from electrifying half or all of the booster compressors is negligible and would be insufficient to justify the additional costs of requiring the Companies to use electric booster compressors. Additionally, construction of new power generation sources to provide electricity to these compressors and associated distribution lines would be required. Also, the Companies would build relatively few booster compressors on surface owned by the federal government and BLM does not have the ability to require electrification of compressors constructed off federal surface. The State of Wyoming is responsible for permitting the compressors. The need for electrical compression as a condition of approval is best developed based on a case by case review of the emissions permit applications to be issued by the WDEQ. Choosing this option does not preclude the WDEQ from requiring the use of electric compression if determined to be necessary during its permitting process. This gives the WDEQ

maximum flexibility to permit facilities in the most economical way that complies with applicable national and state air quality standards.

Water Quality

Although implementation of Alternative 2A for water may disturb more land and cost more than Alternative 1, BLM selected Alternative 2A with the emphasis on infiltration of produced water because Alternative 2A involves separate water management strategies for each sub-watershed that align with Wyoming Department of Environmental Quality's (WDEQ) current approach to permitting; the water management plans required under Alternative 2A would minimize the volume of water that reaches the main-stems in the sub-watersheds of the Little Powder River, Powder River, and Tongue River, reducing the potential for adverse effects on the water quality in the sub-basins most sensitive to potential changes in water quality, and most heavily used by irrigators; Alternative 2A would maximize local beneficial use of the produced water rather than discharging the water downstream where the state and surface owners get no benefit from this resource; Alternative 2A maximizes infiltration and storage of the produced water into the shallow aquifers of Wyoming, rather than having this resource pumped into surface waters that leave the state. This infiltration also would help with deeper aquifer recharge in the PRB; Alternative 2A encourages treatment of produced water, where feasible and practicable.

Summary

Because the benefits to the nation from development of oil and gas resources in the PRB are substantial, and can be developed through careful planning, coordination and consultation with federal and state agencies and tribes and in an environmentally sensitive manner, amending the RMPs as described above will best balance the need for energy with environmental protection.

Mitigation Measures Accepted for Implementation

The mitigation measures adopted for implementation are described in detail in Appendix A. These mitigation measures, as identified to date, represent all practicable means to avoid or minimize environmental harm from the approved alternative. Some of the mitigation measures identified in Chapter 4 of the FEIS, in the Standard COA (Appendix C of the FEIS), Programmatic Mitigation Measures Brought Forward (FEIS Appendix M) and in the Water Management Plan FEIS Appendix I, have been revised. This was done, based on comments in protest and comment letters received on the FEIS, and to help clarify requirements and eliminate ambiguity. Some measures shown in the mitigation section of Chapter 4 of the FEIS were determined to be monitoring and have been moved to Appendix E of the ROD.

The Companies shall implement all the standard Conditions of Approval (COA) and programmatic mitigation measures as determined applicable, for surface disturbing activities. These COA and mitigation measures are found in Appendix A.

Standard Conditions of Approval

Standard COA are those measures that apply to all oil and gas development. These COA are applied to APDs, and SNs when they are not specifically addressed in those plans by the Companies. There are standard COA that apply only to CBM activities and others that apply to both conventional oil and gas and CBM activities. They are addressed separately in Appendix A, A-4. New mitigation measures in FEIS Chapter 4 were included in this section if they were determined to be Standard COA.

Programmatic Mitigation

Programmatic mitigation measures are those determined through analysis that may be appropriate to apply at the time of APD, SN, and ROW approval if site-specific conditions warrant. The FEIS, Appendix M, shows programmatic mitigation measures that were brought forward from previous NEPA documents relative to CBM development. As stated in Appendix M, “any new mitigation resulting from analysis in this EIS will be disclosed in the Record of Decision and will be added or will replace or revise the mitigation measures already identified in Appendix M. Adopted programmatic mitigation measures are shown in Appendix A, A-5. These mitigation measures can be applied by BLM, as determined necessary, following the site-specific NEPA on APD, POD, SN, or ROW, as COA and will be in addition to stipulations applied at the time of lease issuance and any Standard COA.

It is important to note that site-specific mitigation measures are also developed by the BLM authorized officer, as needed, on a case-by-case basis at the onsite inspection to address special, unanticipated issues not addressed by a programmatic mitigation or Standard COA (e.g., erosive soils, steep slopes, proximity to existing improvements, etc.).

Mitigation Measures Not Included in the RMP Amendments and the Rationale for Not Including Them

These mitigation measures were included in the FEIS as additional actions that could reduce the impacts of CBM operation on certain resource values. These mitigation measures were not accepted for incorporation into the RMPs for a variety of reasons as outlined in Appendix G.

Monitoring

This section describes the monitoring that will be conducted during implementation of the approved RMP amendment.

Land Use Plan Monitoring

Land use plan monitoring will be conducted by BLM. 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.

Mitigation, Monitoring, and Reporting Plan

Resource condition monitoring is conducted to ensure the effectiveness of mitigation measures and whether or not the mitigating measures and COA are achieving desired outcomes for resource conditions. Information gathered from this monitoring will guide mid-course corrections in adapting to the inevitable changes that will occur because of the new information. A comprehensive monitoring program has been outlined and will be further developed and implemented in accordance with the guidelines provided in Appendix D (FEIS) and incorporated into the ROD as Appendix E. The MMRP process will function as an oversight working group(s) for the implementation, monitoring, and enforcement programs adopted for the PRB to assure that the decisions and required measures are carried out; to inform cooperating agencies on progress in carrying out mitigation measures; and to make available to the public the results of relevant monitoring. This MMRP process is provided for under the Council of Environmental Quality Regulations 40 CFR 1505.2(c); 1505.3.

The MMRP process will involve the participation of technical agency personnel (for example, the USFWS, FS, National Park Service, EPA, WDEQ [Air Quality and Water Quality Divisions], Wyoming State Engineers Office, and others as necessary).

Specific monitoring plans that will be developed by the technical agency groups are:

- ¾ Air Quality
- ¾ Water – to include ground water, surface water, wetlands, and riparian
- ¾ Wildlife
- ¾ Aquatics
- ¾ Surface disturbance/revegetation/noxious weed spread

Soil gas probe monitoring will continue and results will be documented annually.

All GIS information will be posted and available to the public at <http://www.cbmclearinghouse.info>. These electronic coverages will be updated as new information is obtained.

Public Involvement

The public was provided with three specific opportunities for involvement in the analytical and decision-making process. These opportunities included scoping for the NEPA analysis, review of the DEIS, and protesting of the FEIS. The following sections discuss each opportunity.

Scoping

The BLM first informed the public of its intent to conduct an environmental impact analysis of oil and gas development in the PRB during May and June 2000. In May, the agency prepared and mailed 900 copies of a Scoping Letter that so-

licited comments to assist the BLM in identifying the specific issues and concerns the agency should address in the analysis and should document in the EIS.

On June 21, 2000, formal scoping for the analysis began with publication in the *Federal Register* of a Notice of Intent (NOI) to prepare an EIS. BLM published additional notices in the *Federal Register* to correct mistakes in the first NOI and to invite the public's participation in the analysis and potential amendments to the RMPs for Buffalo and Platte River.

BLM also sent a news release to more than 60 media outlets (newspapers, radio stations, and television stations) in Wyoming and Montana. This news release announced the intent of the agencies to prepare an EIS and identified times and locations for the public meetings. Additionally, several newspapers prepared stories on the project.

In addition to the publications and mailings, the agencies held four public meetings to discuss the proposal and receive comments from the public. The first meeting was held in Sheridan, Wyoming, on June 6, 2000. The second and third meetings were held on June 7, 2000 in Buffalo, Wyoming, and on 8 June 2000 in Gillette, Wyoming. The final meeting was held in Douglas, Wyoming, on June 12, 2000. The proposal was described and participants were provided the opportunity to ask questions and submit comments at all meetings.

Finally, BLM has kept the public informed of the status of the analysis through a periodic newsletter and a project-specific web site (www.prb-eis.org). BLM also included project information on its Wyoming web site.

Review of the DEIS

In mid-January 2002, the DEIS was distributed to the public. The distribution list included the agencies, companies, organizations, and individuals that had expressed an interest in the project during scoping. It also included several agencies and elected officials to whom BLM commonly send EISs.

The DEIS was available for public review and comment from January 18, 2002, through May 15, 2002. The BLM encouraged reviewers to submit written comments on the document during this period. In addition, the BLM held public meetings on the draft EIS on 18 through 21 March 2002, to provide the public with the opportunity to submit verbal and written comments in person.

Reviewers of the DEIS submitted a variety of comments. Most of the comments were contained in 17,940 letters. However, 28 individuals provided verbal comments at the public meetings. Overall, the comments focused on the issues identified in the DEIS and the NEPA process. FEIS Appendix S contains a summary of the comments received on the DEIS and the BLM responses to those comments.

In response to the comments, BLM made a variety of changes throughout the document. The discussion of the alternatives in Chapter 2 was revised to address errors in some calculations, update information in response to WDEQ's changes in its procedures for permitting disposal of water produced from CBM wells, and to expand and clarify information on the alternatives. For example, a graph showing the cumulative number of CBM wells producing by year was added and

WDEQ revised the distributions of methods for handling water produced from CBM wells. Certain assumptions changed to reflect conditions more accurately. The cumulative analysis for air and surface water was coordinated with BLM Montana and cooperators and was combined for this EIS and the Statewide Montana EIS. Discussion of the affected environment in Chapter 3 was expanded to provide at least some of the additional information requested in the comments, particularly the description of biological resources. Throughout Chapter 4, the discussion of environmental consequences was revised and expanded to provide a clearer perception of the likely effects of the alternatives. Because of the variety of changes made throughout the document in response to comments, BLM printed the EIS in its entirety rather than printing it as an abbreviated FEIS.

Protest Period

Any person who participated in the planning process and had an interest which may be adversely affected could protest. A protest could only raise those issues which were submitted for the record during the planning process. The protest had to be filed within 30 days from the date the EPA published the Notice of Availability of the FEIS for the PRB Oil and Gas Project and Proposed Plan Amendments in the Federal Register. The protest period began on January 17, 2003 and closed on February 18, 2003.

Issue Summary/Main Issues

The following is a summary of the protest issues raised in the protest letters received by the Director:

Impacts not properly assessed: The following impacts were stated as not being properly addressed; air and water quality, ranchers, split estate owners, infiltration ponds, wildlife (sage grouse, prairie dogs, big game), recreation, Fortification Creek WSA, noxious weeds, fire, noise, socio-economics, habitat fragmentation, cumulative effects, T&E species, irrigation uses, outfitters, West Nile Virus, tax base.

Impact assessment methodology flawed: Protestors cited the following elements as assessment methodology flaws; faulty assumptions, impact analysis deferred to APD stage, did not consider phased development, new and innovative technologies and directional drilling, scope of analysis too broad.

Document inadequate: Protestors felt the document was inadequate because; no "hard look" was taken, a DEIS supplement was not prepared, the range of alternatives and purpose and need was too narrow, changes to preferred alternative occurred, BLM failed to look at leasing and effects on other RMP decisions, of a conflict of interest in employing a NEPA contractor who also does work for companies, there was insufficient time to comment, the document was misleading, agency and public comments were not considered.

Other: Other issues that were raised included; existing leases are not valid, WOC IBLA case not considered, inadequate reclamation practices and bonding, mitigation inadequate, new mitigation measures unfounded, inadequate inventories, monitoring plans not described, inadequate management of ACECs.

Protest Resolution

The resolution of protests is the responsibility of the Assistant Director for Renewable Resources of the BLM whose decision is the final decision of the Department of the Interior. The Assistant Director received 132 protest letters. Of these 132 letters, 23 were determined to have standing by previously participating in the planning process. The Assistant Director also received approximately 400 facsimiles and 18,000 e-mails. The BLM did not consider a fax letter or an e-mail a valid protest because they did not meet the filing requirements.

Letters from protestors whom BLM determined to have standing were reviewed and protest issues and comments were identified. Each of the protest issues were responded to and those responses were included in return letters to each protestor. The Assistant Director also sent return letters to those who sent protest letters but were determined not to have standing. Letters that identified comments rather than protest issues also will be sent a letter of response after issuance of this ROD.

In addition to the letters, facsimiles, and e-mails received by the Assistant Director, the BFO also received a variety of comments. These comments were submitted in 22 letters, 1,005 comment cards, and more 600 e-mails in support of the preferred alternative. Substantive comments from these letters were considered in the decision.

Because of the reviews of the protest letters, one additional mitigation measure has been included relative to West Nile Virus.

- ¾ The BLM will consult with appropriate state and county agencies regarding West Nile Virus. If determined to be necessary, a condition of approval would be applied at the time of APD approval to control for mosquitoes where CBM discharge waters that become stagnant.

The Assistant Director has determined that approval of the proposed plan amendment is consistent with the BLM's policy guidance, is based upon valid and complete information and complies with applicable laws, regulations, policies, and planning procedures.

Consistency with Applicable Policies, Plans, and Programs

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

Throughout the process, several consultation meetings regarding the proposal were held with interested tribes attending. Federal, state, and local agencies were requested to review the amendment and to inform the BLM of any inconsistencies. The agencies and tribes did not identify any inconsistencies with other re-

source related plans. Alternative 2A is fully consistent with all applicable policies, plans and programs of other federal agencies, state, local, and tribal governments. 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. Of special concern is how the plan amendments will meet the applicable federal, state and tribal air and water quality requirements. The procedures for satisfying the air and water quality requirements are described in the following section.

Roles, Responsibilities, and Regulatory Process

State of Wyoming

Air Quality

Air pollution impacts are limited by state, tribal, and federal regulations, standards, and implementation plans established under the Clean Air Act (CAA) and administered by the applicable air quality regulatory agencies (including the WDEQ – Air Quality Division [WDEQ-AQD] or the U.S. Environmental Protection Agency [EPA]). Although not applicable to the development alternatives, the Departments of Environmental Quality for Montana, South Dakota, and Nebraska have similar jurisdiction over potential air pollutant emission sources in their respective states, which can have a cumulative impact with WDEQ-AQD approved sources. Air quality regulations require proposed new, or modified existing air pollutant emission sources (including coal bed methane [CBM] compression facilities) to undergo a permitting review before their construction can begin. Therefore, the applicable air quality regulatory agencies have the primary authority and responsibility to review permit applications and to require emission permits, fees, and control devices prior to construction and/or operation. The U.S. Congress (through the CAA Section 116) also authorized local, state, and tribal air quality regulatory agencies to establish air pollution control requirements more (but not less) stringent than federal requirements. Additional site-specific air quality analysis would be performed, and additional emission control measures (including a BACT analysis and determination) may be required by the applicable air quality regulatory agencies to ensure protection of air quality.

The WDEQ has delegated responsibilities to enforce the federal Clean Air Act that requires the State to operate an approved ambient air quality monitoring network for the purpose of evaluating compliance with the NAAQS, to report air quality monitoring information to EPA, and to prepare plans for controlling air pollution.

In addition, under both the Federal Land Policy and Management Act (FLPMA) and CAA, BLM cannot authorize any activity that does not comply with all applicable local, state, tribal, and federal air quality laws, statutes, regulations, standards, and implementation plans.

The extensive air quality model includes an up-to-date inventory of existing monitoring data for the region, a concise record of pertinent weather information for future analysis, and an up-to-date emission inventory for sources permitted

since 1994 within the entire modeling domain (Air Quality Impact Assessment Technical Support Document (Argonne 2002)). The Wyoming BLM committed to work cooperatively with the National Park Service in a memorandum and with the U.S. Forest Service in a letter, both dated December 20, 2002, to address concerns regarding air quality impacts. The Montana BLM also intends to work cooperatively with both the National Park Service and the US Forest Service during implementation of this plan amendment.

Water Quality

The WDEQ has responsibility under the federal Clean Water Act to monitor and assess the quality of Wyoming surface waters for pollutants, to prepare plans to control pollution, to assess water quality conditions and trends, to report them to EPA and Congress, and to identify impaired or threatened stream segments and lakes. Furthermore, the State administers a program for the prevention, abatement, and control of water pollution by issuing National Pollutant Discharge Elimination System (NPDES) permits.

Limits in NPDES permits or significance determinations will be set so that water quality standards of the receiving waters are not exceeded.

When site-specific CBM 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 WDEQ for management, treatment, or discharge of produced water.

The NPDES permitting process will be used by WDEQ to analyze discharges at the project level for CBM activities and to develop necessary permit conditions. Operations that would violate State water quality requirements will not be permitted by BLM or the State.

BLM

The BLM has primary 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, POD or Sundry Notice that must be approved according to (1) lease stipulations; (2) onshore oil and gas orders; and (3) regulations and laws. All actions must also conform or be consistent with the Buffalo and Platte River RMPs. The steps required to obtain approval to drill and conduct surface operations are as follows.

BLM will require that CBM projects be submitted as a POD. A POD is a group of wells and their supporting infrastructure (such as roads, pipelines, power lines, water discharge points, booster stations, and compressor stations) for a geographic area or sub-watershed. The POD helps the operators develop a logical, economical, environmentally-sound CBM project that the BLM can efficiently process and approve.

Before drilling an oil or gas well on federal minerals, a Notice of Staking (NOS) APD or POD must be filed by the lessee or operator for approval with the appro-

priate BLM office. The operator may file a NOS to notify BLM that a proposed well site has been staked and signals the need for a site inspection. Filing of a NOS starts the required 30 day public posting period. A NOS is not accepted for CBM PODs.

An APD or POD must be submitted following submission of the NOS. The APD or POD includes the proposed drilling and surface use plans, maps, statement of bond coverage, operator statements of certification, and, if CBM development, a water management plan. An APD can be submitted without filing an NOS, and posting of the APD or POD begins the 30-day public posting period.

As part of the APD or POD processing, BLM conducts a site inspection, reviews the APD or POD for completeness and accuracy, and conducts an environmental analysis of the proposal which is documented in the appropriate NEPA document. When the proposed action is on split estate, BLM invites the surface owner to attend the site inspection and provide information or requirements which can be used in the environmental analysis. BLM approves the APD or POD after completion of the environmental analysis and determining that the APD or POD 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.

These approved applications/plans will serve as the Operator's field operations guide, a copy of which will be kept on-site and in the office of the Operator. The applications/plans are as follows:

- ¾ Application for Permit to Drill/Plan of Development,
- ¾ Right-of-way Application, and
- ¾ Cultural Clearance Reports (Class I/III).

BLM Buffalo Field Office (BFO) has prepared a CBM-APD and POD preparation guidebook designed to help operators with their submittal of PODs. This guidebook will be available at the BFO and CFO and on the BLM BFO web site, <http://www.wy.blm.gov/bfo/index.htm>.

Appendix A

**Permit Authority, Mitigation
Measures, Management Actions,
Standards Conditions of Approval,
and Programmatic Mitigation**

Appendix A — Permit Authority, Mitigation Measures, Management Actions, Standards Conditions of Approval, and Programmatic Mitigation

This appendix contains details about authorities for permitting various aspects of the PRB Oil and Gas Project (Section A.1), mitigation measures (Section A.2, management actions for implementing the project (Section A.3), standard COAs (Section A.4) and programmatic mitigation (Section A.5).

A.1 Permit Authority

Table A–1 identifies the major federal and state permits, approvals, and consultations potentially required for the PRB Oil and Gas Project.

Table A–1 Major Federal and State Permits, Approvals, and Consultations Potentially Required for the PRB Oil and Gas Project

Issuing Agency/Permit Approval Name	Nature of Regulatory Action	Applicable Project Component
<i>Federal Permits, Approvals, and Authorizing Actions</i>		
<i>USDI – Bureau of Land Management</i>		
Permit to Drill, Deepen, or Plug Back (APD), CBM Plan of Development (POD), and Sundry Notice, produced water disposal, plugging and abandonment, venting, and flaring	Controls drilling and production for oil and gas on federal onshore leases.	Wells, roads, on lease impoundments, production facilities, and all surface disturbing activities.
Rights-of-Way Grant and Temporary Use Permit	Right-of-way grant on BLM-managed lands.	Oil and gas pipelines, roads, facilities, and ancillary structures on off-lease BLM-managed lands.
Cultural Resource Use Permit	Archaeological surveys and limited testing on public lands. Archaeological data recovery (excavation) of sites on public lands.	All surface-disturbing activities.
Pesticide Use Permit	Control of pests.	Wells, roads, and ancillary facilities.
National Noxious Weed Act Compliance	Controls noxious weeds.	Any occurrence of noxious weeds on or near project facilities.
Material Sales	Sales of sand, gravel, and riprap.	Construction activities
<i>USDA – Forest Service</i>		
Special Use Permit, Surface Use Program of APD	Surface disturbance on FS-managed lands.	Wells, roads, pipelines, and facilities on FS-managed lands.
Special Use Permit (Cultural Resources)	Archaeological surveys and limited testing on public lands. Archaeological data recovery (excavation) of sites on public lands.	All surface-disturbing activities.
<i>USDI Fish and Wildlife Service</i>		
Endangered Species Act Compliance (Section 7)	Protects threatened and endangered species.	Any activity potentially affecting species listed as or proposed for listing as threatened or endangered.
Migratory Bird Treaty Act	Protects migratory birds.	All surface-disturbing activities.
Bald Eagle Protection Act	Protects bald and golden eagles.	All surface-disturbing activities.
<i>Advisory Council on Historic Preservation</i>		
Cultural Resource Compliance (Section 106)	Protects cultural and historic resources. Coordinated with the Wyoming State Historic Preservation Officer (SHPO).	All surface-disturbing activities.
<i>U.S. Department of Army Corps of Engineers</i>		
Permit to Discharge Dredged or Fill Material (Section 404 Permit) ¹	Authorized placement of dredged or fill material in waters of the United States or adjacent wetlands.	All surface-disturbing activities.
<i>U.S. Department of Transportation</i>		
Construction and operation of natural gas pipelines.	Prescribes minimum safety requirements for pipeline facilities and the transportation of gas, including pipeline facilities.	Natural gas pipelines.

Table A–1 Major Federal and State Permits, Approvals, and Consultations Potentially Required for the PRB Oil and Gas Project

Issuing Agency/Permit Approval Name	Nature of Regulatory Action	Applicable Project Component
<i>State Permits, Approvals, and Authorizing Actions</i>		
<i>Wyoming State Engineer's Office</i>		
Permit to Appropriate Ground Water	Registering groundwater rights for all uses, except stock and domestic.	Wells.
Permit to Construct a Reservoir ¹	Ensures the safety and structural integrity of water storage facilities.	Water storage facilities.
Certification by a Wyoming-licensed professional engineer	Required for dams greater than 20 feet in height with a storage capacity of 50 acre-feet or more.	Water storage facilities.
Permit to Appropriate Surface Water	Applications for any request for putting surface waters of the state to a beneficial use.	Facilities to transport or store surface waters.
Permit for Land Application of Produced Water ¹	Authorizes the application of produced water to lands for disposal.	Land Application Disposal facilities.
Permit to Appropriate By-product Water for Additional Beneficial Uses	Authorizes the use of by-product water for beneficial uses.	Facilities to dispose of produced water when used for additional beneficial uses, such as stock watering.
<i>Wyoming Department of Environmental Quality</i>		
National Pollutant Discharge Elimination System (NPDES) Individual Coal Bed Methane Permit	Authorizes discharge of produced water to surface waters of the state.	Any point-source surface discharge.
NPDES General Permit for Storm Water Discharges	Controls discharge of storm water pollutants associated with industrial and construction activities.	Construction that disturbs 5 or more surface acres of land and gas production facilities that have had a discharge of a reportable quantity
New Source Review (NSR) Permit	Controls emissions from new or modified sources.	All polluting emission sources, including compressor engines and portable diesel and gas generators.
Fugitive Dust Control	Control fugitive dust emissions to comply with Wyoming Air Quality Standards and Regulations Chap. 3, Sec. 2(f).	Construction of facilities and vehicle traffic.
<i>Wyoming Department of Transportation</i>		
Access Permit	Authorizes access roads tying into state or federal highways.	All project roads
<i>Wyoming Oil and Gas Conservation Commission</i>		
Permit to Use and Construct Earthen Pit for Temporary Use or for Reserve Pit	Authorizes the construction and use of an earthen pit for oil and gas wells.	Oil and gas wells.
Permit to Drill/Deepen/Plug Back	Authorizes the drilling, deepening, or plugging of oil and gas wells.	Oil and gas wells.
Permit to Use and Construct Earthen Pit for Retention of Produced Water	Authorizes the construction and use of an earthen pit for the storage and evaporation of produced water.	Oil and gas wells.

Table A–1 Major Federal and State Permits, Approvals, and Consultations Potentially Required for the PRB Oil and Gas Project

Issuing Agency/Permit Approval Name	Nature of Regulatory Action	Applicable Project Component
<i>Wyoming State Historic Preservation Office</i> Section 106 Cultural Resource Consultation	Determines significance of cultural resources potentially affected by surface-disturbing activities.	All surface-disturbing activities.
Note:		
1. BLM also has authority for these approvals on federal leases through APDs/PODs ensure compliance with regulations and on-shore order #7.		

A.2 Mitigation Measures

Table A–2 displays the possible mitigation measures as they appeared in Chapter 4 of the FEIS. This table has been included here to help the public understand who has the authority to apply these measures. There is overlapping authority between agencies on many of these measures. State of Wyoming is not issuing a ROD. Therefore, the mitigation measures shown with Wyoming authority/responsibility may or may not be required by the State but could be applied if they determine them to be necessary.

Mitigation measures in Table A-2 that have not been adopted are shown with an asterisk, the remainder have been adopted. The numbering in the Table corresponds to the numbering in Chapter 4 of the FEIS. Some of those adopted, have been clarified based on comments received during the protest period. Some of the adopted mitigation measures shown in Table A-2, have been determined to be either Standard COA, Management Actions or Programmatic Mitigation. The clarified adopted measures are segregated into two sections and are found under the headings: A.4 Standard Conditions of Approval and A.5 Programmatic Mitigation. The numbering in sections A.4 and A.5 does not correspond with the numbering in Table A-2.

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
1. Concerns exist about the interaction between reservoirs and shallow groundwater. At impoundment locations, it may be necessary to conduct investigations at representative sites around the basin to quantify impacts of water infiltration and lateral movement. Shallow groundwater wells will be installed and regularly sampled in areas where it has been determined during pre-construction that class 1 groundwater may be affected by infiltration or potential for lateral movement exists.	✓	✓	✓	
2. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.	✓	✓		
3. Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.	✓	✓		
4. *Disturbed channel beds will be reshaped to their approximate original configuration and stabilized by appropriate means.	✓	✓	✓	

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
5. *Areas where natural springs are present, operators will be required to identify, inventory, and monitor these springs as part of their water management plan development.	✓	✓	✓	
6. Concerns regarding the quality of the discharged CBM water for irrigation use may require operators to increase the amount of storage of CBM water during the irrigation months and allow more surface discharge during the non-irrigation months.			✓	✓ ¹
7. *Concerns regarding the potential for discharges of CBM water to reach the main stems will be minimized by locating discharge outfalls higher in ephemeral and intermittent drainages or near the drainage divide.	✓	✓	✓	
8. *Land application of produced water has the potential to produce negative, long term impacts to soil physical and chemical properties if not properly managed. Proposals to land apply CBM produced water on federal projects must include the following information as part of the exploratory and/or permanent water management plans:	✓	✓		
<i>Site characterization:</i> The site characterization must include field investigations of soils and vegetation. The site will be described in detail, and soil samples will be collected and analyzed to determine important soil chemical and physical properties. Site descriptions will include maps, vegetation descriptions, soils descriptions, laboratory analysis and location of proposed application sites. Photo documentation of the site will be included. Laboratory analysis of produced water will also be included with the site characterization study.	✓	✓		
<i>Project description:</i> The project description must include the proposed method(s) of water application, application rates and schedules and physical layout of application areas. Complete maps of the application infrastructure will be included. Details on any soil or water amendments that will be used or physical soil manipulations that will be planned. Project descriptions will demonstrate that land application is feasible given the results of the site characterization.	✓	✓		
<i>Monitoring Plan:</i> Periodic monitoring of soils and vegetation will be required of the operator to assure that negative impacts are not occurring, or are being remediated. Monitoring must include soil sampling and laboratory analysis.	✓	✓		
<i>Winter operations:</i> Detail practices that will be used to prevent the buildup of ice on the soil surface during sub freezing temperatures.	✓	✓		

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
<p><i>Mitigation Plan:</i> A plan must be developed which outlines mitigation measures that will be implemented by the operator in the event negative soils or vegetation impacts are detected during routine monitoring. Potential mitigation measures might include, but not be limited to, soil or water amendments, physical manipulation or vegetative treatments.</p> <p>These criteria are general in nature, and must be adjusted to site-specific conditions. Detailed soil sampling criteria have not yet been developed, so project proposals will be evaluated on a case-by-case basis during the interim. More specific guidance/requirements may be forthcoming as the result on ongoing research and coordination.</p>	✓	✓		
9. *The Companies will segregate soil horizons during excavation of all project facilities and avoid mixing of soil horizons during stockpiling and redistribution of soils.	✓	✓		
10. The Companies will test sediments deposited in impoundments before reclaiming the impoundments. Tests will include the standard suite of cations, ions, and nutrients that will be monitored in surface water testing and any trace metals found in the CBM discharges at concentrations exceeding detectable limits.	✓	✓	✓	
11. The Companies will conduct development in and around the Crazy Woman Battlefield in a way that preserves the eligibility of the site for nomination to the National Register of Historic Places. Approvals of APDs and PODs will require prior coordination with the SHPO and BLM's archaeologists.	✓		✓	
12. For development within 0.25 mile either side of the Bozeman Trail, companies will conduct evaluation of segments to determine their eligibility to the National Register of Historic Places. Mitigation of adverse impacts to segments of the trail that contributes to its eligibility for the NRHP will be determined on a case-by-case basis.	✓		✓	
13. *Should human remains be unearthed during construction, procedures outlined in the human remains plan (Appendix L) will be followed.	✓	✓	✓	
14. *At a minimum, all areas of proposed ground disturbing activity will be intensively inventoried for cultural resources in conformance with minimal BLM Class III survey standards at the APD, POD or Sundry Notice phase of each proposed Federal undertaking. For CBM well fields or PODs, a block survey of the entire project area early in the planning phase is highly recommended by the BLM and is required by the FS. All sites within the proposed project area must be evaluated for eligibility to the NRHP.	✓	✓	✓	

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
Specific plans for avoidance and protection or minimization of adverse direct or indirect effects will be recommended for any historic properties within the areas of potential effect of proposed project activities. Prior to implementation, these plans must be approved by the BLM or FS, as appropriate, SHPO, and, if applicable, by the private surface owner. Such plans might include, but are not limited to the following constraints, stipulations, or actions:	✓	✓	✓	
➤ Relocation, redesign or constraint of project facilities and infrastructure to avoid or minimize earth disturbance within historic properties or contributing portions of historic properties, or to avoid or minimize indirect effects or intrusions caused by vibration, dust, exhaust, or noise. This may include barricading or fencing of sensitive areas and buffer zones.	✓	✓	✓	
➤ Relocation, redesign, or constraint of project facilities and infrastructure to avoid or minimize visual intrusion on a sensitive historic, traditional, or religious setting. This might include low profile facilities, non-intrusive colors, landscaping, berms, screening with vegetation, or other measures to minimize visual impact.	✓	✓	✓	
➤ Stabilization of sediments, bedrock, or structures that could be destabilized, or could deteriorate, as a result of nearby project activities and identification of an appropriate buffer zone.	✓	✓	✓	
➤ Restriction or prevention of access to sensitive areas.	✓	✓	✓	
➤ Rehabilitation of buildings or structures, or protective screening of art work to minimize deterioration.	✓	✓	✓	
➤ Detailed documentation, possibly including archival photodocumentation, of contributing structures, landscape features, or aspects of historic setting that cannot feasibly be avoided. In some cases it may be feasible to restore some of these contributing features after construction has been completed.	✓	✓	✓	
➤ Detailed recordation or data recovery of the essential contributing elements of a historic property that cannot be avoided or protected. Recordation may include archival, documentary, and contextual research related to the historic property in addition to site documentation. Data recovery is the systematic recovery of data important in history or prehistory for which the property is considered eligible. Data recovery for prehistoric or historic archaeological sites typically entails excavation of buried materials and detailed documentation of stratigraphic context.	✓	✓	✓	

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
15. *Companies will be required to submit an integrated pest management plan (Appendix N) as a component of the APD and POD approval process. The components of the integrated pest management plans are outlined in the BFO CBM APD and POD Preparation Guide. Companies will need to contact County Weed and Pest offices to ascertain information about weeds in the area of their APD or POD. Mitigation will be determined on a site-specific basis and may include such measures as spraying herbicides before entering areas and washing vehicles before leaving infested areas.	✓	✓		
16. *Any mulch and seed used for reclamation needs to be certified weed free and current year's tested.	✓	✓	✓	✓
17. Weed educational material will be reviewed with operators during pre-construction on-site meetings with operators, subcontractors, and landowners and will also be attached to approved APDs and PODs.	✓	✓		
18. To protect the biological and hydrologic features of riparian areas, woody draws, wetlands, and floodplains, all well pads, compressors, and other non-linear facilities will be located outside of these areas.	✓	✓		
19. Where riparian areas and special habitat types e.g. cottonwoods have the potential to be inundated with water on a continuous basis, measures will be taken to prevent continual inundation . This may include the use of facilities to handle the water discharged from CBM wells.	✓	✓		
20. Crossings of wetland/riparian areas by linear features, such as pipelines, roads, and power lines will be avoided to the extent practicable. Where crossings cannot be avoided, impacts will be minimized through use of the following measures:	✓	✓		
➤ Site-specific mitigation plans will be developed during the APD, POD, or Sundry Notice approval process for all proposed disturbance to wetland/riparian areas.	✓	✓		
➤ Crossings will be constructed perpendicular to wetland/riparian areas, where practical.	✓	✓		
➤ For power lines, the minimum number of poles necessary to cross the area will be used.	✓	✓		
➤ Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.	✓	✓	✓	✓ ²
➤ No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.	✓	✓	✓	✓ ²
➤ The lower edge of soil or other material stockpiles will be located outside the active floodplain.	✓	✓	✓	✓ ²
➤ Drilling mud pits will be located outside of riparian areas, wetlands, and floodplains, where practical.	✓	✓	✓	✓ ²

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
➤ Disturbed channels will be re-shaped to their approximate original configuration or other geomorphological configuration and properly stabilized.	✓	✓	✓	✓ ²
➤ Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.	✓	✓	✓	✓ ²
21. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.	✓	✓		
22. The Companies will locate compressor stations so that noise from the stations at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.	✓	✓		
23. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.	✓	✓		
24. The Companies will locate aboveground power lines, where practical, at least 0.5 mile from any sage grouse breeding or nesting grounds to prevent raptor predation and sage grouse collision with the conductors. Power poles within 0.5 mile of any sage grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.	✓	✓		
25. The Companies will locate impoundments to avoid sagebrush shrublands, where practical.	✓	✓		
26. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.	✓	✓		
27. The Companies will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.	✓	✓		
28. In ponds developed where the primary objective is as a fishery, water quality will be sampled by the Companies on an annual basis for selenium, TDS, salinity, temperature, pH, dissolved oxygen, and sodium bicarbonate.	✓	✓		
29. The Companies will fence impoundments in areas that are developed for fisheries to exclude livestock, if agreed upon with the landowner.	✓	✓		

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
30. *Stream channel monitoring for erosion, degradation, and riparian health will be conducted on an annual basis. Surveys will include no less than one stream reach above all CBM discharges and several stream reaches below CBM discharges. Where monitoring occurs, a station will be placed above all CBM outfalls and one below all CBM outfalls, at least on main stems.				
31. *Sub-watersheds that will receive CBM produced waters and will be monitored for macroinvertebrates and fish populations include: Upper Tongue River, Upper Powder River, Salt Creek, Crazy Woman Creek, Clear Creek, Middle Powder River, Little Powder River, Antelope Creek, Upper Cheyenne River, and Upper Belle Fourche River. Sampling sites will be established at existing flow and water quality monitoring stations where possible. Sampling will occur on an annual basis during low-flow periods, and all data collected will be entered into a central database. Collected data may include species occurrence, species count, population demographics, and water quality and quantity measures. Fish samples may be collected and submitted for chemical analysis. Results of this analysis could be used to evaluate specific analyte concentrations in fish tissues and appropriate toxicological benchmarks. At least two sampling locations per stream or river will be established in these watersheds:				
➤ Upper Tongue River – (1) between the Wyoming/Montana border and below all CBM discharge points; and (2) above CBM discharge points.				
➤ Upper Powder River – (1) above Clear Creek at confluence; (2) above Crazy Woman Creek at confluence; (3) below Salt Creek at confluence; and (4) below other tributaries that may contribute flow to the Upper Powder River.				
➤ Salt Creek – (1) above Upper Powder River at confluence; and (2) above CBM discharge points.				
➤ Crazy Woman Creek – (1) above Upper Powder River at confluence; (2) above CBM discharge points; and (3) below other tributaries that may contribute flow to Crazy Woman Creek.				
➤ Clear Creek – (1) above Upper Powder River at confluence; (2) above CBM discharge points; and (3) below other tributaries that may contribute flow to Clear Creek.				
➤ Middle Powder River – (1) between the Wyoming/Montana border and below all CBM discharge points; and (2) below confluence of Upper Powder River and Clear Creek.				
➤ Little Powder River – (1) between the Wyoming/Montana border and below all CBM discharge points; (2) above CBM discharge points; and (3) below other tributaries that may contribute flow to the Little Powder River.				

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
<ul style="list-style-type: none"> ➤ Antelope Creek – (1) between eastern boundary of the Project Area and below all CBM discharge points; (2) above CBM discharge points; and (3) below other tributaries that may contribute flow to Antelope Creek. ➤ Upper Cheyenne River – (1) between eastern boundary of the Project Area and below all CBM discharge points; (2) above CBM discharge points; and (3) below other tributaries that may contribute flow to the Upper Cheyenne River. ➤ Upper Belle Fourche River – (1) between Campbell/Crook County line and below all CBM discharge points; (2) above CBM discharge points; and (3) below other tributaries that may contribute flow to the Upper Belle Fourche River. ➤ A minimum of 21 sites (as above) will need to be sampled on an annual basis to monitor aquatic health within the Project Area. 				
32. The Companies will conduct clearance surveys for threatened, endangered or other special-concern species at the optimum time. Inventory for special concern species is contingent upon landowner concurrence. This will require coordination with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters.	✓	✓		✓ ³
33. In the event that a bald eagle (dead or injured) is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.	✓	✓		✓ ³
34. Site-specific project areas will be evaluated for suitable bald eagle nesting and roosting habitat prior to permit approval. Suitable nesting habitat is any mature stand of conifer or cottonwood trees in association with rivers, streams, reservoirs, lakes or any significant body of water. Suitable roosting habitat is defined as any mature stands of conifer or cottonwood trees.	✓	✓		✓ ³

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
35. The BLM will monitor all take of bald eagle habitat associated with the preferred alternative. The actual measurement of disturbed habitat is the responsibility of BLM but can be delegated to BLM' agent (consultant, contractor, etc.) A written summary will be provided to the USFWS' Wyoming Field Office semi-annually. The semi-annual report will include field survey reports for endangered, threatened, proposed and candidate species for all actions covered under the <i>Environmental Impact Statement (EIS) for the Powder River Basin Oil and Gas Project</i> and ROD. The semi-annual reports will include all actions completed up to 30 days prior to the reporting dates. The first report will be due 6 months after 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.	✓	✓		✓ ³
36. The BLM will monitor all road-associated carcasses, jackrabbit sized and larger, along project (operator-maintained) roads.	✓	✓		✓ ³
37. All power lines will be built to protect raptors, including wintering bald eagles, from accidental electrocution using methods detailed by the Avian Power Line Interaction Committee (1996).	✓	✓		✓ ³
38. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of the APD/POD or Sundry Notices.	✓	✓		✓ ³
39. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM approved biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion.	✓	✓		✓ ³
40. A minimum disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all bald eagle nest sites. A seasonal minimum disturbance-free buffer zone of one mile will be established for all bald eagle nest sites (February 15 – August 15).	✓	✓		✓ ³
41. A seasonal minimum disturbance-free buffer zone of 1 mile will be established for all bald eagle winter roost sites (November 1 – April 1). These buffer zones and timing may be adjusted based on site-specific information through coordination with, and written approval from, the USFWS.	✓	✓		✓ ³
42. Within ½ mile of bald eagle winter roost sites additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 and 3:00 may be necessary to prevent disturbance (November 1 – April 1).	✓	✓		✓ ³
43. Maximum design speed on all operator constructed and maintained roads will not exceed 25 miles per hour to minimize the chance of a collision with a bald eagle, other wildlife, or livestock.	✓	✓		✓ ³

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
44. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.	✓	✓		✓ ³
45. Site-specific project areas will be evaluated for suitable black-footed ferret habitat prior to permit approval. Suitable habitat consists of a black-tailed prairie dog town or complex greater than 80 acres (USFWS 1989). A prairie dog town is a group of intact prairie dog holes whose density exceeds 8 burrows/acre; a complex consists of two or more neighboring prairie dog towns each less than 4.34 miles (7 kilometers) from the other (USFWS 1989).	✓	✓		✓ ³
46. Prairie dog colonies will be avoided wherever possible.	✓	✓		✓ ³
47. If suitable prairie dog colonies cannot be avoided, surveys will be conducted in compliance with the USFWS guidelines (USFWS 1989). The entire colony or colony complex affected will be surveyed, even if part of the colony has a burrow density below eight per acre.	✓	✓		✓ ³
48. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.	✓	✓		✓ ³
49. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat.	✓	✓		✓ ³
50. Site-specific project areas will be evaluated for suitable mountain plover nesting habitat prior to permit approval. Flat areas of short-grass prairie or low shrubs with a prevalence of bare ground characterize suitable mountain plover nesting habitat. Typically the vegetation height is less than 4 inches, and bare ground is greater than 30 percent. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.	✓	✓		✓ ³
51. The BLM will monitor all take of mountain plover habitat associated with the preferred alternative. The actual measurement of disturbed habitat is the responsibility of BLM but can be delegated to BLM' agent (consultant, contractor, etc.) A written summary will be provided to the USFWS' Wyoming Field Office semi-annually. The semi-annual report will include field survey reports for endangered, threatened, proposed and candidate species for all actions covered under the <i>Environmental Impact Statement (EIS) for the Powder River Basin Oil and Gas Project</i> and ROD. The semi-annual reports will include all actions completed up to 30 days prior to the reporting dates. The first report will be due 6 months after 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.	✓	✓		✓ ³

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
52. No ground-disturbing activities will occur in suitable nesting habitat prior to surveys for nesting mountain plovers conducted in compliance with the USFWS' Mountain Plover Survey Guidelines (USFWS 2002). A BLM approved biologist will conduct the surveys. Once occupied mountain plover nesting habitat is located, the BLM will reinitiate section 7 consultation with the USFWS on any project-related activities proposed for such habitat. The amount and nature of ground-disturbing activities will be limited within identified nesting areas in a manner to avoid the abandonment of these areas.	✓	✓		✓ ³
53. Operators and the BLM will be provided by the USFWS with educational material illustrating and describing the mountain plover, its habitat needs, life history, threats, and gas development activities that may lead to incidental take of eggs, chicks, or adults with requirements that these materials be posted in common areas and circulated in a memorandum among all employees and service providers.	✓	✓		✓ ³
54. A disturbance-free buffer zone of 0.25 mile will be established around all mountain plover nesting locations between March 15 and July 31.	✓	✓		✓ ³
55. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ¼ mile of known mountain plover nest sites.	✓	✓		✓ ³
56. Construction of ancillary facilities (for example, compressor stations, processing plants) will not be located within ½ mile of known nesting areas. The threats of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.	✓	✓		✓ ³
57. Where possible, roads will be located outside of plover nesting areas. Maximum allowed travel speed on roads within ½ mile of identified plover nesting areas will not exceed 25 mph from March 15 and July 31.	✓	✓		✓ ³
58. Maximum design speed on all operator-constructed and maintained roads will not exceed 25 miles per hour.	✓	✓		✓ ³
59. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.	✓	✓		✓ ³
60. The BLM will monitor all road-associated carcasses, jackrabbit sized and larger, along project (operator-maintained) roads. The presence of carrion could attract mountain plover predators.	✓	✓		✓ ³
61. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying powerlines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.	✓	✓		✓ ³

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
62. When above ground markers are used on capped and abandoned wells they will be identified with markers no taller than four feet with perch inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.	✓	✓		✓ ³
63. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.	✓	✓		✓ ³
64. Site-specific project areas will be evaluated for suitable Ute ladies'-tresses orchid habitat prior to permit approval. Suitable habitat is characterized by moist soils near springs, lakes, or perennial streams; most occurrences are in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows in the floodplains of perennial streams (USFWS 1995).	✓	✓		✓ ³
65. Suitable habitat will be avoided wherever possible.	✓	✓		✓ ³
66. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.	✓	✓		✓ ³
67. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.	✓	✓		
68. Companies operating in areas identified with weed infestations or suitable Ute ladies'-tresses orchid habitat will be required to submit an integrated pest management plan prior to APD approval. The components of the integrated pest management plans are outlined in the CBM APD and POD Preparation Guide. Mitigation will be determined on a site-specific basis and may include such measures as spraying herbicides prior to entering areas and washing vehicles before leaving infested areas. Infestation areas of noxious weeds have been identified through the county Weed and Pest Districts and are available at the Buffalo BLM office.	✓	✓		✓ ³
69. The Companies will use gravel, water, or other dust suppressors, as needed, to reduce dust associated with facility access roads. Companies will contact the counties to ascertain the procedures to be followed.	✓	✓		✓ ⁴
70. The Companies will provide georeferenced spatial data depicting as-built locations of all facilities, wells, roads, pipelines, power lines, reservoirs, discharge points, and other related facilities to the BLM upon completion of POD construction and development.	✓			

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
71. Companies will contact the counties to pursue development of maintenance agreements to ensure county roads are adequately maintained for the projected increase in use.				✓ ⁴
72. The Companies will complete the following measures, where practical: use existing well pads where feasible, use vegetative and topographic screening when siting well locations and avoid highwall cuts.	✓			
73. Within the designated VRM Class II corridors along Interstate 90 and State Highway 14, all project facilities on BLM surface will be screened completely from these highways or camouflaged to retain basic elements of form, line, color and texture of the landscape.	✓			
74. The Companies will mount lights at compressor stations on a pole or building and direct them downward to illuminate key areas within the facility while minimizing the amount of light projected outside the facility.	✓			
75. *Increase the distance between a CBM facility and an existing noise-sensitive receptor (residences, schools, medical facilities, and recreational areas). As shown in the analysis, noise decreases by 6 dBA with every doubling of distance from a source. For instance, if the noise were 65 dBA at 100 feet from a CBM source, the noise will decrease to 59 dBA at 200 feet from the source and to 47 dBA at 800 feet from the source.				
76. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.	✓			
77. Where noise impacts to existing sensitive receptors are an issue, noise levels will be required to be no greater than 55 decibels measured at a distance of one-quarter mile from the appropriate booster (field) compressor. When background noise exceeds 55dBA, noise levels will be no greater than 5dBA above background. This may require the installation of an electrical compressor motors at these locations.	✓			
78. *Noise can be reduced by construction of obstacles in the direct path from the noise source to a receiver. These obstacles can be tightly spaced wood fences (no gaps in the wood panels), concrete fences, earth berms, structures, or naturally occurring hills. Care must be taken even with a tightly spaced wood fence. Even with a small opening between the individual slats on a fence can allow a pathway for noise to propagate through the opening. In fact, the noise can actually be enhanced through a small opening because the noise energy is channeled through the opening. To mitigate this problem, wood fences are generally constructed with two faces with the slats on one face overlapping the adjacent face.				

Table A–2 Potential Mitigation Measures from the FEIS, Agency Authorities, and Responsibilities

Mitigation Measure	Authority/Responsibility			
	BLM	FS	Wyoming	Other
79. During construction, emissions of particulate matter from well pad and resource road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing materials, non-saline dust suppressants, and water) could be used as necessary on unpaved collector, local and resource roads that present a fugitive dust problem. The use of chemical dust suppressants on BLM surface will require prior approval from the BLM authorized officer.	✓	✓	✓	
➤ A variety of potential emission reduction measures (BLM 1999d) are available to further limit NO _x and other air pollutant emissions. The evaluation was not intended to rank or identify a required emission reduction measure; the appropriate level of control will be determined and required by the applicable air quality regulatory agencies during the pre-construction permit process.			✓	
80. Table A–3 and Table A–4 below present mitigation options for particulate matter and nitrogen oxide emissions.			✓	
Notes:				
1 – Montana DEQ				
2 – U.S. Army Corp of Engineers				
3 – U.S. Fish and Wildlife Service				
4 – Campbell, Sheridan, Johnson and Converse Counties				
* Mitigation measures not accepted. For rationale, see that section.				

A.3 Management Actions

Authorization of multiple or single oil and gas related actions (for example, road construction, well pad construction and drilling, pipeline construction, and production facility installation) will require the responsible Operator to prepare and submit various applications/plans to the BLM Buffalo or Casper Field Managers. The application/plan may cover planned multiple field actions (for example, PODs or cover a single field action for one well pad or access road. BLM will require that CBM projects be submitted as PODs. A POD is a group of wells and their supporting infrastructure (such as, roads, pipelines, power lines, water discharge points, booster stations, and compressor stations) for a geographic area or sub-watershed. The POD helps the operators develop a logical, economical, environmentally sound CBM project that the BLM can efficiently process and approve.

These approved applications/plans will serve as the Operator's field operations guide, a copy of which will be kept on-site and in the office of the Operator. The applications/plans are as follows:

- ¾ Application for Permit to Drill;
- ¾ Right-of-way Application;
- ¾ Cultural Clearance Reports (Class I/III);

At a minimum, all areas of proposed ground disturbing activity would be intensively inventoried for cultural resources in conformance with minimal BLM Class III survey standards at the APD, POD or Sundry Notice phase of each proposed Federal undertaking. For CBM well fields or PODs, a block survey of the entire project area early in the planning phase is highly recommended by the BLM and is required by the FS. All sites within the proposed project area must be evaluated for eligibility to the NRHP.

Specific plans for avoidance and protection or minimization of adverse direct or indirect effects would be recommended for any historic properties within the areas of potential effect of proposed project activities. Prior to implementation, these plans must be approved by the BLM or FS, as appropriate, SHPO, and, if applicable, by the private surface owner. Such plans might include, but are not limited to the following constraints, stipulations, or actions:

- ¾ Relocation, redesign or constraint of project facilities and infrastructure to avoid or minimize earth disturbance within historic properties or contributing portions of historic properties, or to avoid or minimize indirect effects or intrusions caused by vibration, dust, exhaust, or noise. This may include barricading or fencing of sensitive areas and buffer zones.
- ¾ Relocation, redesign, or constraint of project facilities and infrastructure to avoid or minimize visual intrusion on a sensitive historic, traditional, or religious setting. This might include low profile facilities, non-intrusive colors, landscaping, berms, screening with vegetation, or other measures to minimize visual impact.

- ¾ Stabilization of sediments, bedrock, or structures that could be destabilized, or could deteriorate, as a result of nearby project activities and identification of an appropriate buffer zone.
- ¾ Restriction or prevention of access to sensitive areas.
- ¾ Rehabilitation of buildings or structures, or protective screening of art work to minimize deterioration.
- ¾ Detailed documentation, possibly including archival photodocumentation, of contributing structures, landscape features, or aspects of historic setting that cannot feasibly be avoided. In some cases it may be feasible to restore some of these contributing features after construction has been completed.
- ¾ Detailed recordation or data recovery of the essential contributing elements of a historic property that cannot be avoided or protected. Recordation may include archival, documentary, and contextual research related to the historic property in addition to site documentation. Data recovery is the systematic recovery of data important in history or prehistory for which the property is considered eligible. Data recovery for prehistoric or historic archaeological sites typically entails excavation of buried materials and detailed documentation of stratigraphic context.

Water Management Plan

A WMP is required to be submitted with CBM APDs or PODs. The operator shall provide a comprehensive WMP that addresses the handling of produced water during the testing and production of CBM well(s). The WMP must provide adequate information for the BLM to complete site-specific NEPA analysis and to ensure compliance with all state and federal requirements prior to approval. A CBM APD/POD will not be considered complete by BLM unless it contains a WMP. For details on WMP's see Appendix D.

Integrated Pest Management Plan

The Integrated Pest Management Plan (IPMP) will be required to be submitted with the APD/POD if wells/facilities fall within an area of identified noxious weeds. For details on IPMP's see Appendix F.

Reclamation Plan

Phased reclamation plans will be submitted to the BFO and CFO for approval prior to individual POD facility abandonment. These plans will be submitted as a notice of intent (NOI) Sundry Notice for individual facilities, such as well locations, pipelines, discharge points, impoundments, as they are no longer needed. Details are contained under Section A.4.1 of Appendix A, Standard Condition of Approval # 7.

Surface use Data Summary Form

Companies must submit a Surface Use Data Summary form as part of every POD Master Surface Use Plan and subsequent Sundry Notices involving surface disturbing activities. This form is available in the CBM guidebook.

A.4 Standard Conditions of Approval

Standard Conditions of Approval are those measures that apply to all oil and gas development. These conditions are applied to both APD and SN when they are not specifically addressed in those plans by the Companies. There are standard conditions of approval that apply only to CBM activities and others that apply to both conventional oil and gas and CBM activities. Section A.4.1 identifies standard conditions of approval applicable to development involving only coal bed methane. Section A.4.2 identifies standard conditions of approval that are pertinent to all federal oil & gas lease development. Not all of the conditions in this second section are applicable to development of CBM.

It is important to note that site-specific mitigation measures are also developed by the BLM authorized officer, as needed, on a case-by-case basis at the onsite inspection to address special, unanticipated issues not addressed by a programmatic mitigation measure or standard conditions of approval (e.g., erosive soils, steep slopes, proximity to existing improvements, etc.).

A.4.1 Section 1 — Applicable to Coal Bed Methane Well Development Only

1. A pre-construction field meeting shall be conducted prior to beginning any dirt work approved under this POD. The operator shall contact the BLM Authorized Officer (responsible NRS @ 307-684-1100) at least 4-days prior to beginning operations so that the meeting can be scheduled. The operator is responsible for having all contractors present (dirt contractors, drilling contractor, pipeline contractor, project oversight personnel, etc.) including the overall field operations superintendent, and for providing all contractors copies of the approved POD, project map and BLM *Conditions of Approval* pertinent to the work that each will be doing.
2. Reserve pits will be adequately fenced during and after drilling operations until pit is reclaimed so as to effectively keep out wildlife and livestock. Adequate fencing, in lieu of more stringent requirements by the surface owner, is defined as follows:
 - x Construction materials will consist of steel or wood posts. Three or four strand wire (smooth or barbed) fence or hog panel (16-foot length by 50-inch height) or plastic snow fence must be used with connectors such as fence staples, quick-connect clips, hog rings, hose clamps, twisted wire, etc. Electric fences will not be allowed.
 - x Construction standards: Posts shall be firmly set in ground. If wire is used it must be taut and evenly spaced, from ground level to top wire, to effectively keep out animals. Hog panels must be tied securely into posts and one another using fence staples, clamps, etc. Plastic snow fencing must be taut and sturdy. Fence must be at least 2-feet from edge of pit. 3 sides fenced before beginning drilling, the fourth side fenced immediately upon completion of drilling and prior to rig release. Fence must be left up and maintained in adequate condition until pit is closed.

3. Reserve pits will be closed as soon as possible, but no later than 90 days from time of drilling/well completion, unless the BLM Authorized Officer gives an extension. Squeezing of pit fluids and cuttings is prohibited. Pits must be dry of fluids or they must be removed via vac truck or other environmentally acceptable method prior to backfilling, recontouring and replacement of topsoil. Mud and cuttings left in pit must be buried at least 3-feet below recontoured grade. The operator will be responsible for recontouring any subsidence areas that develop from closing a pit before it is sufficiently dry.
4. The operator shall complete wells (case, cement and under ream) as soon as possible, but no later than 30 days after drilling operations, unless an extension is given by the BLM Authorized Officer.
5. If in the process of air drilling the wells there is a need to utilize mud, all circulating fluids will be contained either in an approved pit or in an above-ground containment tank. The pit or containment tank will be large enough to safely contain the capacity of all expected fluids without danger of overflow. Fluid and cuttings will not be squeezed out of the pit, and the pit will be reclaimed in an expedient manner.
6. The operator shall restrict travel on unimproved two-track roads during periods of inclement weather or spring thaw when the possibility exists for excessive surface resource damage (e.g., rutting in excess of 4-inches, travel outside two-track roadway, etc.).
7. Phased reclamation plans will be submitted to BLM for approval prior to individual POD facility abandonment via a Notice of Intent (NOI) Sundry Notice. Individual facilities, such as well locations, pipelines, discharge points, impoundments, etc. need to be addressed in these plans as they are no longer needed. Individual items that will need to be addressed in reclamation plans include:
 - x Pit closure (Close ASAP after suitably dry, but no later than 90 days from time of drilling unless an extension is given by BLM Authorized Officer.) BLM may require closure prior to 90 days in some cases due to land use or environmental concerns.
 - x Configuration of reshaped topography, drainage systems, and other surface manipulations
 - x Waste disposal
 - x Revegetation methods, including specific seed mix (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix.
 - x Other practices that will be used to reclaim and stabilize all disturbed areas, such as water bars, erosion fabric, hydro-mulching, etc.
 - x An estimate of the timetables for beginning and completing various reclamation operations relative to weather and local land uses.
 - x Methods and measures that will be used to control noxious weeds, addressing both ingress and egress to the individual well or POD.
 - x Decommissioning/removal of all surface facilities

- x Closure and reclamation of areas utilized or impacted by produced CBM water, including discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc
8. The first well drilled to each targeted coal zone will be designated as the POD reference well. Designated reference wells must have the ability to be sampled at the wellhead. Water quality samples will be collected by the operator and submitted for analysis using WDEQ NPDES criteria within 30-60 days of initial water production. Results of the analysis will be submitted to the BFO-BLM Authorized Officer as soon as they become available.

A.4.2 Section 2 — Pertinent to All Oil and Gas Well Development

A.4.2.1 General

1. If any cultural values [sites, artifacts, human remains (Appendix L FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized BLM officer (AO). Within five working days the AO will inform the operator as to:
 - x whether the materials appear eligible for the National Register of Historic Places;
 - x the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
 - x a time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.
2. If paleontological resources, either large or conspicuous, and/or a significant scientific value are discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological values. Operations within 250 feet of such a discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The applicant

will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operation.

3. Please contact (pertinent NRS), Natural Resource Specialist, @ (307) 684-1100, Bureau of Land Management, Buffalo, if there are any questions concerning the following surface use COAs.

A.4.2.2 Construction

1. The operator will limit vegetation removal and the degree of surface disturbance wherever possible. Where surface disturbance cannot be avoided, all practicable measures will be utilized to minimize erosion and stabilize disturbed soils.
2. Construction and drilling activity will not be conducted using frozen or saturated soil material during periods when watershed damage or excessive rutting is likely to occur.
3. Remove all available topsoil (depths vary from 4 inches on ridges to 12+ inches in bottoms) from constructed well locations including areas of cut and fill, and stockpile at the site. Topsoil will also be salvaged for use in reclamation on all other areas of surface disturbance (roads, pipelines, etc.). Clearly segregate topsoil from excess spoil material. Any topsoil stockpiled for one year or longer will be signed and stabilized with annual ryegrass or other suitable cover crop.
4. The operator will not push soil material and overburden over side slopes or into drainages. All soil material disturbed will be placed in an area where it can be retrieved without creating additional undue surface disturbance and where it does not impede watershed and drainage flows.
5. Construct the backslope no steeper than ½:1, and construct the foreslope no steeper than 2:1, unless otherwise directed by the BLM Authorized Officer.
6. Maintain a minimum 20-foot undisturbed vegetative border between toe-of-fill of pad and/or pit areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.
7. With the overall objective of minimizing surface disturbance and retaining land stability and productivity, the operator shall utilize equipment that is appropriate to the scope and scale of work being done for roads and well pads (utilize equipment no larger than needed for the job).
8. To minimize electrocution potential to birds of prey, all overhead electrical power lines will be constructed to standards identified by the Avian Power Line Interaction Committee (1996).
9. The operator shall utilize wheel trenchers or ditch witches to construct all pipeline trenches, except where extreme topography or other environmental factors preclude their use.
10. A flare pit will be constructed on the well pad for use during drilling operations. It will be located at least 125 feet from the well head and will be located down-wind from the prevailing winds.

11. Reserve pit will be adequately fenced during and after drilling operations until reclaimed so as to effectively keep out wildlife and livestock. This requires that it be fenced on the three nonworking sides prior to drilling and on the remaining side immediately following rig release. Fencing will be constructed in accordance with BLM specifications. (Plastic snow fence is not acceptable fencing material for conventional wells.)
12. The reserve pit will be oriented to prevent collection of surface runoff. After the drilling rig is removed, the operator may need to construct a trench on the uphill side of the reserve pit to divert surface drainage around it. If constructed, the trench will be left intact until the pit is closed.
13. The reserve pit will be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having a permeability less than 10^{-7} cm/sec. The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.
14. The reserve pit will be constructed so that at least half of its total volume is in solid cut material (below natural ground level).
15. Culverts will be placed on channel bottoms on firm, uniform beds, which have been shaped to accept them, and aligned parallel to the channel to minimize erosion. Backfill will be thoroughly compacted.
16. The minimum diameter for culverts will be 18 inches. However, all culverts will be appropriately sized in accordance with standards in BLM Manual 9113.
17. Construction and other project-related traffic will be restricted to approved routes. Cross-country vehicle travel will not be allowed.
18. Maximum design speed on all operator constructed and maintained roads will not exceed 25 miles per hour.
19. Pipeline construction shall not block nor change the natural course of any drainage. Pipelines shall cross perpendicular to drainages. Pipelines shall not be run parallel in drainage bottoms. Suspended pipelines shall provide adequate clearance for maximum runoff.
20. Pipeline trenches shall be compacted during backfilling. Pipeline trenches shall be routinely inspected and maintained to ensure proper settling, stabilization and reclamation.
21. During construction, emissions of particulate matter from well pad and road construction would be minimized by application of water or other non-saline dust suppressants with at least 50 percent control efficiency. Dust inhibitors (surfacing materials, non-saline dust suppressants, and water) will be used as necessary on unpaved roads that present a fugitive dust problem. The use of chemical dust suppressants on public surface will require prior approval from the BLM Authorized Officer.
22. Operators are required to obtain a National Pollution Discharge Elimination System (NPDES) Storm Water Permit from the Wyoming DEQ for any pro-

jects that disturb five or more acres (changing to one acre in March 2005). This general construction storm water permit must be obtained from WDEQ **prior** to any surface disturbing activities and can be obtained by following directions on the WDEQ website at <http://deq.state.wy.us>. Further information can be obtained by contacting Barb Sahl at (307) 777-7570.

23. The operator shall submit a Sundry Notice (Form 3160-5) to BLM for approval prior to construction of any new surface disturbing activities that are not specifically addressed in the approved APD or POD Surface Use Plan.

A.4.2.3 Operations/Maintenance

1. Confine all equipment and vehicles to the access road(s), pad(s), and area(s) specified in the approved APD or POD.
2. All waste, other than human waste and drilling fluids, will be contained in a portable trash cage. This waste will be transported to a State approved waste disposal site immediately upon completion of drilling operations. No trash or empty barrels will be placed in the reserve pit or buried on location. All state and local laws and regulations pertaining to disposal of human and solid waste will be complied with.
3. Rat and mouse holes shall be filled and compacted from the bottom to the top immediately upon release of the drilling rig from the location.
4. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of Interior. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.
5. All permanent above-ground structures (e.g. , production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors." The color selected for this (site, project), is (name and Munsell Soil Color Number).
6. Sewage shall be placed in a self-contained, chemically treated porta-potty on location.
7. The operator and their contractors shall ensure that all use, production, storage, transport and disposal of hazardous and extremely hazardous materials associated with the drilling, completion and production of this well will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project-related activities involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. In accordance with OSHA requirements, a file will be maintained onsite containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds and/or substances

which are used in the course of construction, drilling, completion and production operations.

8. Produced fluids shall be put in test tanks on location during completion work. Produced water will be put in the reserve pit during completion work per On-shore Order #7.
9. The only fluids/waste materials which are authorized to go into the reserve pit are RCRA exempt exploration and production wastes. These include:
 - drilling muds & cuttings
 - rigwash
 - excess cement and certain completion & stimulation fluids defined by EPA as exempt

It does not include drilling rig waste, such as:

- spent hydraulic fluids
- used engine oil
- used oil filter
- empty cement, drilling mud, or other product sacks
- empty paint, pipe dope, chemical or other product containers
- excess chemicals or chemical rinsate

Any evidence of non-exempt wastes being put into the reserve pit may result in the BLM Authorized Officer requiring specific testing and closure requirements.

10. Operators are advised that prior to installation of any oil and gas well production equipment which has the potential to emit air contaminants, the owner or operator of the equipment must notify the Wyoming Department of Environmental Quality, Air Quality Division (phone 307-777-7391) to determine permit requirements. Examples of pertinent well production equipment include fuel-fired equipment (e.g., diesel generators), separators, storage tanks, engines and dehydrators.
11. If this well is drilled during the fire season (June-October), the operator shall institute all necessary precautions to ensure that fire hazard is minimized, including but not limited to mowing vegetation on the access route(s) and well location(s), keeping fire fighting equipment readily available when drilling, etc.

A.4.2.4 Dry Hole/Reclamation

1. All disturbed lands associated with this project, including the pipelines, access roads, water management facilities, etc will be expediently reclaimed and reseeded in accordance with the surface use plan and any pertinent site-specific COAs.
2. Disturbed lands will be recontoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.
3. The fluids and mud must be dry in the reserve pit before recontouring pit area. The operator will be responsible for recontouring of any subsidence areas that develop from closing a pit before it is completely dry. The plastic pit

liner (if any) will be cut off below grade and properly disposed of at a state authorized landfill before beginning to recontour the site.

4. Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling platform and access road on the contour, to a depth of at least 12 inches. The rippers are to be no farther than 24 inches apart.
5. Distribute the topsoil evenly over the entire location and other disturbed areas. Prepare the seedbed by disking to a depth of 4-to-6 inches following the contour.
6. Waterbars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to ensure drainage, and extended into established vegetation. All waterbars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial waterbar should be constructed at the top of the backslope. Subsequent waterbars should follow the following general spacing guidelines:

Slope (percent)	Spacing Interval (feet)
2	200
2 – 4	100
4 – 5	75
5	50

7. The operator will drill seed on the contour to a depth of 0.5 inch, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

SPECIES-CULTIVAR LBS PLS/ACRE
(To be determined at the site-specific onsite inspection)

Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed. Complete fall seeding after September 15 and prior to prolonged ground frost. To be effective, complete spring seeding after the frost has left the ground and prior to May 15.

8. BLM will not release the performance bond until the area has been successfully revegetated (evaluation will be made after the second complete growing season) and has met all other reclamation goals of the surface owner and surface management agency.
9. A Notice of Intent to Abandon and a Subsequent Report of Abandonment must be submitted for abandonment approval.
10. For performance bond release approval, a Final Abandonment Notice (with a surface owner release letter on split-estate) must be submitted prior to a final abandonment evaluation by BLM.

11. Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.
12. Any mulch utilized for reclamation needs to be certified weed free.

A.4.2.5 Producing Well

1. Landscape those areas not required for production to the surrounding topography as soon as possible. The fluids and mud must be dry in the reserve pit before recontouring pit area. The operator will be responsible for recontouring and reseeding of any subsidence areas that develop from closing a pit before it is completely dry.
2. Reduce the backslope to 2:1 and the foreslope to 3:1, unless otherwise directed by the BLM Authorized Officer. Reduce slopes by pulling fill material up from foreslope into the toe of cut slopes.
3. Production facilities (including dikes) must be placed on the cut portion of the location and a minimum of 15 feet from the toe of the back cut unless otherwise approved by the BLM Authorized Officer.
4. A dike will be constructed completely around the production facilities (i.e. production tanks, water tanks, and heater-treater). The dikes for the production facilities must be constructed of impermeable soil, hold 110% of the capacity of the largest tank plus 1-foot of freeboard, and be independent of the back cut.
5. Any chemicals used in treating the wells (e.g., corrosion inhibitor, emulsion breaker, etc.) will be in a secure, fenced-in area with appropriate secondary containment structure (dikes, catchment pan, etc.).
6. The load out line coming from the oil/condensate tank(s) will have a suitable containment structure to capture and recycle any oil spillage that might occur.
7. Individual production facilities (tanks, treaters, etc.) will be adequately fenced off (if entire facility not already fenced off).
8. Any spilled or leaked oil, produced water or treatment chemicals must be reported in accordance with NTL-2A and immediately cleaned up in accordance with BLM requirements. This includes clean-up and proper disposition of soils contaminated as a result of such spills/leaks.
9. Distribute stockpiled topsoil evenly over those areas not required for production and reseed as recommended.
10. Upgrade and maintain access roads and drainage control (e.g., culverts, drainage dips, ditching, crowning, surfacing, etc.) as necessary and as directed by the BLM Authorized Officer to prevent soil erosion and accommodate safe, environmentally-sound access.
11. Prior to construction of production facilities not specifically addressed in the APD/POD, the operator shall submit a Sundry Notice to the BLM Authorized Officer for approval.
12. If not already required prior to constructing and drilling the well location, the operator shall immediately upgrade the entire access road to BLM standards

(including topsoiling, crowning, ditching, drainage culverts, surfacing, etc.) to ensure safe, environmentally-sound, year-round access.

14. Waterbars shall be installed on all reclaimed pipeline corridors per the guidelines in A.4.2.4 #6...

A.5 Programmatic Mitigation

Programmatic mitigation measures are those, determined through analysis, which may be appropriate to apply at the time of APD approval if site specific conditions warrant. These mitigation measures can be applied by BLM, as determined necessary at the site-specific NEPA APD stage, as *Conditions of Approval* (COAs) and will be in addition to stipulations applied at the time of lease issuance and any standard conditions of approval.

A.5.3 Groundwater

1. Concerns exist about the interaction between reservoirs and shallow groundwater. At impoundment locations, it may be necessary to conduct investigations at representative sites around the basin to quantify impacts of water infiltration and lateral movement. Shallow groundwater wells will be installed in cooperation with the operator and regularly sampled in areas where it has been determined during pre-construction that class 1 groundwater may be affected by infiltration or potential for lateral movement exists.

A.5.4 Surface Water

1. Locate discharge points in areas that will minimize erosion and impacts to the receiving channel, existing improvements, and downstream users.
2. Locate discharge points in stable, low gradient drainage systems and below active headcuts, when possible. If discharge is located above a Headcut, mitigation measures will be required by the BLM Authorized Officer on a site specific basis. Some mitigation measures will require engineering design.
3. All discharge points will require energy dissipation measures.
4. Discharge points may not be authorized by BLM regardless of NPDES status or previous use. Sites may be moved or otherwise mitigated by the BLM Authorized Officer during onsite inspections where environmental issues exist.
5. Cumulative produced water discharge must not exceed the naturally occurring 2 year peak flow of the receiving channel.
6. Discharge Points will not be located in playas or enclosed basins unless it can be demonstrated that it can be done without resulting in adverse impacts. Discharges into valley bottoms with no defined low-flow channel will generally not be allowed, but will be reviewed on a site-specific basis.
7. Channel Crossings:
 - x Minimize channel disturbance as much as possible by limiting pipeline and road crossings.

- x Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
 - x Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
 - x Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
8. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.
 9. Concerns regarding the quality of the discharged CBM water on downstream irrigation use may require operators to increase the amount of storage of CBM water during the irrigation months and allow more surface discharge during the non-irrigation months.
 10. The BLM will consult with appropriate state agencies regarding West Nile Virus. If determined to be necessary, a condition of approval will be applied at the time of APD approval to treat mosquitoes for any CBM discharge waters that become stagnant.

A.5.5 Soils

1. The Companies, on a case by case basis depending upon water and soil characteristics, will test sediments deposited in impoundments before reclaiming the impoundments. Tests will include the standard suite of cations, ions, and nutrients that will be monitored in surface water testing and any trace metals found in the CBM discharges at concentrations exceeding detectable limits.
 - x Areas of highly erosive soils will be avoided when drill sites, two-track access routes, and pipeline routes are surveyed and staked in order to substantially reduce the amount of soil loss.
2. Where feasible, gas and water pipelines and electrical cables will be installed in disturbance corridors. Disturbance corridors combine two or more utility lines (water, gas, electric) in common trenches, usually within access roadways.

A.5.6 Cultural Resources

1. The Companies will conduct development in and around the Crazy Woman Battlefield in a way that preserves the eligibility of the site for nomination to the National Register of Historic Places. Approvals of APDs and PODs will require prior coordination with the SHPO and BLM's archaeologists.
2. For development within 0.25 mile either side of the Bozeman Trail, companies will conduct evaluation of segments to determine their eligibility to the

National Register of Historic Places. Mitigation of adverse impacts to segments of the trail that contribute to its eligibility for the NRHP will be determined on a case-by-case basis.

A.5.7 Vegetation

1. Weed educational material will be reviewed with operators during pre-construction on-site meetings with operators, subcontractors, and landowners and will also be attached to approved APDs and PODs.
2. Temporarily fence reseeded areas, if not already fenced, for at least two complete growing seasons to insure reclamation success on problematic sites (e.g. close to livestock watering source, erosive soils etc.).

A.5.8 Wetland/Riparian

1. To protect the biological and hydrologic features of riparian areas, woody draws, wetlands, and floodplains, all well pads, compressors, and other non-linear facilities will be located outside of these areas.
2. To reduce adverse effects on existing wetlands and riparian areas, water discharge should not be allowed if increased discharge volumes or subsequent recharge of shallow aquifers will inundate and kill woody species, such as willows or cottonwoods.
3. For any jurisdictional wetlands identified that may be impacted, a detailed mitigation plan will be developed during the APD/POD or sundry notice approval process. Federal requirements to replace all impacted wetlands will mitigate this loss, so environmental impacts will occur only during the life of the project (including reclamation).
4. Any fences used in wetland areas should be placed well back from the wetlands to prevent waterfowl mortalities and should be constructed to standards that allow big game movement.
5. Crossings of wetland/riparian areas by linear features, such as pipelines, roads, and power lines will be avoided to the extent practicable. Where crossings cannot be avoided, impacts will be minimized through use of the following measures:
 - ³/₄ Site-specific mitigation plans will be developed during the APD, POD, or Sundry Notice approval process for all proposed disturbance to wetland/riparian areas.
 - ³/₄ Crossings will be constructed perpendicular to wetland/riparian areas, where practical.
 - ³/₄ Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance can't occur, the minimum number of poles necessary to cross the area will be used.
 - ³/₄ Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.

- $\frac{3}{4}$ No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.
- $\frac{3}{4}$ The lower edge of soil or other material stockpiles will be located outside the active floodplain.
- $\frac{3}{4}$ Drilling mud pits will be located outside of riparian areas, wetlands, and floodplains, where practical.
- $\frac{3}{4}$ Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
- $\frac{3}{4}$ Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

A.5.9 Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will locate compressor stations so that noise from the stations at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.
3. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.
4. The Companies will locate aboveground power lines, where practical, at least 0.5 mile from any sage grouse breeding or nesting grounds to prevent raptor predation and sage grouse collision with the conductors. Power poles within 0.5 mile of any sage grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
5. The Companies will locate impoundments to avoid sagebrush shrublands, where practical.
6. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
7. The Companies will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.

A.5.10 Aquatics Species

1. In ponds developed where the primary objective is as a fishery, water quality will be sampled by the Companies on an annual basis for selenium, TDS, salinity, temperature, pH, dissolved oxygen, and sodium bicarbonate.

2. The Companies will fence impoundments in areas that are developed for fisheries to exclude livestock, if agreed upon with the landowner.

A.5.11 Threatened, Endangered, or Sensitive Species

1. The Companies will conduct clearance surveys for threatened, endangered or other special-concern species at the optimum time. Inventory for special concern species, other than federally listed species below, is contingent upon landowner concurrence. This will require coordination with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters.

A.5.11.6 Bald Eagle

1. In the event that a bald eagle (dead or injured) is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.
2. Site-specific project areas will be evaluated for suitable bald eagle nesting and roosting habitat prior to permit approval. Suitable nesting habitat is any mature stand of conifer or cottonwood trees in association with rivers, streams, reservoirs, lakes or any significant body of water. Suitable roosting habitat is defined as any mature stands of conifer or cottonwood trees.
3. The BLM will monitor all take of bald eagle habitat associated with the preferred alternative. The actual measurement of disturbed habitat is the responsibility of BLM but can be delegated to BLM' agent (consultant, contractor, etc.) A written summary will be provided to the USFWS' Wyoming Field Office semi-annually. The semi-annual report will include field survey reports for endangered, threatened, proposed and candidate species for all actions covered under the *Environmental Impact Statement (EIS) for the Powder River Basin Oil and Gas Project* and ROD. The semi-annual reports will include all actions completed up to 30 days prior to the reporting dates. The first report will be due 6 months after 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.
4. The BLM will monitor all road-associated carcasses, jackrabbit sized and larger, along project (operator-maintained) roads.
5. All power lines will be built to protect raptors, including wintering bald eagles, from accidental electrocution using methods detailed by the Avian Power Line Interaction Committee (1996).
6. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of the APD/POD or Sundry Notices.
7. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM approved biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion.

8. A minimum disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all bald eagle nest sites. A seasonal minimum disturbance-free buffer zone of one mile will be established for all bald eagle nest sites (February 15 – August 15).
9. A seasonal minimum disturbance-free buffer zone of 1 mile will be established for all bald eagle winter roost sites (November 1 – April 1). These buffer zones and timing may be adjusted based on site-specific information through coordination with, and written approval from, the USFWS.
10. Within ½ mile of bald eagle winter roost sites additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 and 3:00 may be necessary to prevent disturbance (November 1 – April 1).
11. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

A.5.11.7 Black-footed Ferret

1. Site-specific project areas will be evaluated for suitable black-footed ferret habitat prior to permit approval. Suitable habitat consists of a black-tailed prairie dog town or complex greater than 80 acres (USFWS 1989). A prairie dog town is a group of intact prairie dog holes whose density exceeds 8 burrows/acre; a complex consists of two or more neighboring prairie dog towns each less than 4.34 miles (7 kilometers) from the other (USFWS 1989).
2. Prairie dog colonies will be avoided wherever possible.
3. If suitable prairie dog colonies cannot be avoided, surveys will be conducted in compliance with the USFWS guidelines (USFWS 1989). The entire colony or colony complex affected will be surveyed, even if part of the colony has a burrow density below eight per acre.
4. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.
5. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

A.5.11.8 Mountain Plover

1. Site-specific project areas will be evaluated for suitable mountain plover nesting habitat prior to permit approval. Flat areas of short-grass prairie or low shrubs with a prevalence of bare ground characterize suitable mountain plover nesting habitat. Typically the vegetation height is less than 4 inches, and bare ground is greater than 30 percent. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

2. The BLM will monitor all take of mountain plover habitat associated with the preferred alternative. The actual measurement of disturbed habitat is the responsibility of BLM but can be delegated to BLM' agent (consultant, contractor, etc.) A written summary will be provided to the USFWS' Wyoming Field Office semi-annually. The semi-annual report will include field survey reports for endangered, threatened, proposed and candidate species for all actions covered under the *Environmental Impact Statement (EIS) for the Powder River Basin Oil and Gas Project* and ROD. The semi-annual reports will include all actions completed up to 30 days prior to the reporting dates. The first report will be due 6 months after 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.
3. No ground-disturbing activities will occur in suitable nesting habitat prior to surveys for nesting mountain plovers conducted in compliance with the USFWS' Mountain Plover Survey Guidelines (USFWS 2002). A BLM approved biologist will conduct the surveys. Once occupied mountain plover nesting habitat is located, the BLM will reinitiate section 7 consultation with the USFWS on any project-related activities proposed for such habitat. The amount and nature of ground-disturbing activities will be limited within identified nesting areas in a manner to avoid the abandonment of these areas.
4. Operators and the BLM will be provided by the USFWS with educational material illustrating and describing the mountain plover, its habitat needs, life history, threats, and gas development activities that may lead to incidental take of eggs, chicks, or adults with requirements that these materials be posted in common areas and circulated in a memorandum among all employees and service providers.
5. A disturbance-free buffer zone of 0.25 mile will be established around all mountain plover nesting locations between March 15 and July 31.
6. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ¼ mile of known mountain plover nest sites.
7. Construction of ancillary facilities (for example, compressor stations, processing plants) will not be located within ½ mile of known nesting areas. The threats of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.
8. Where possible, roads will be located outside of plover nesting areas.
9. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
10. The BLM will monitor all road-associated carcasses, jackrabbit sized and larger, along project (operator-maintained) roads. The presence of carrion could attract mountain plover predators.
11. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.

12. When above ground markers are used on capped and abandoned wells they will identified with markers no taller than four feet with perch inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.
13. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

A.5.11.9 Ute Ladies'-tresses Orchid

1. Site-specific project areas will be evaluated for suitable Ute ladies'-tresses orchid habitat prior to permit approval. Suitable habitat is characterized by moist soils near springs, lakes, or perennial streams; most occurrences are in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows in the floodplains of perennial streams (USFWS 1995).
2. Suitable habitat will be avoided wherever possible.
3. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.
4. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.
5. Companies operating in areas identified with weed infestations or suitable Ute ladies'-tresses orchid habitat will be required to submit an integrated pest management plan prior to APD approval. The components of the integrated pest management plans are outlined in the CBM APD and POD Preparation Guide. Mitigation will be determined on a site-specific basis and may include such measures as spraying herbicides prior to entering areas and washing vehicles before leaving infested areas. Infestation areas of noxious weeds have been identified through the county Weed and Pest Districts and are available at the Buffalo BLM office.

A.5.12 Transportation

1. The Companies will provide georeferenced spatial data depicting as-built locations of all facilities, wells, roads, pipelines, power lines, reservoirs, discharge points, and other related facilities to the BLM upon completion of POD construction and development.
2. Companies will contact the counties to pursue development of maintenance agreements to ensure county roads are adequately maintained for the projected increase in use.

A.5.13 Visual Resources

1. The Companies will complete the following measures, where practical: use existing well pads where feasible; use vegetative and topographic screening when siting well locations; avoid highwall cuts.
2. Within the designated VRM Class II corridors along Interstate 90 and State Highway 14, all project facilities on BLM surface will be screened completely from these highways or camouflaged to retain basic elements of form, line, color and texture of the landscape.
3. The Companies will mount lights at compressor stations on a pole or building and direct them downward to illuminate key areas within the facility while minimizing the amount of light projected outside the facility.
4. Use buried power lines to each well, where feasible, to reduce the linear element in the landscape.

A.5.14 Noise

1. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.
2. Where noise impacts to existing sensitive receptors are an issue, noise levels will be required to be no greater than 55 decibels measured at a distance of one-quarter mile from the appropriate booster (field) compressor. When background noise exceeds 55dBA, noise levels will be no greater than 5dBA above background. This may require the installation of electrical compressor motors at these locations.

Two measurements commonly used to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the average day/night noise level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on the length of exposure and the time of day. The L_{dn} takes into account the duration and time the noise is encountered. An additional 10 decibels on the A-weighted scale (dBA) are added to late night and early morning (10:00 p.m. to 7:00 a.m.) noise exposure levels to account for people's greater sensitivity to sound during the nighttime hours. After adjustment, the 24 hourly values are averaged to determine the L_{dn} .

Existing literature concludes an L_{dn} of 55 dBA is equivalent to a continuous noise level of 48.6 dBA for facilities that operate at a constant level of noise (FERC 2003).

Noise can be reduced by construction of obstacles in the direct path from the noise source to a receiver or by increasing the distance between a CBM facility and an existing noise-sensitive receptor.

A.5.15 Air Quality

A number of mitigation options for CBM are part of WDEQ's normal regulatory procedure. For instance, in the permitting of compressors, the agency always requires the application of BACT. The theory here is simply that given the air resource available, within technological and financial feasibility, the number of operations that can be allowed is maximized.

1. During construction, emissions of particulate matter from well pad and resource road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing materials, non-saline dust suppressants, and water) could be used as necessary on unpaved collector, local and resource roads that present a fugitive dust problem. The use of chemical dust suppressants on BLM surface will require prior approval from the BLM authorized officer.

^{3/4} A variety of potential emission reduction measures (BLM 1999d) are available to further limit NO_x and other air pollutant emissions. The evaluation was not intended to rank or identify a required emission reduction measure; the appropriate level of control will be determined and required by the applicable air quality regulatory agencies during the pre-construction permit process.

BLM will also continue to cooperate with existing visibility and atmospheric deposition impact monitoring programs. The need for, and the design of, additional monitoring could include the involvement of the EPA Region 8 Federal Leadership Forum and applicable air quality regulatory agencies. Based upon future recommendations, operators could be required to cooperate in the implementation of a coordinated air quality monitoring program. Oil and gas lease terms (Section 6) require the lessee, within the lease rights granted, to take measures deemed necessary by the lessor for the conduct of operations in a manner that minimizes adverse impacts to air quality, as well as other resources.

2. Table A-3 and Table A-4 below present mitigation options for particulate matter and nitrogen oxide emissions.

A.5.16 Geology

Inadvertent release to the atmosphere of the methane resource will be controlled through WOGCC requirements and APD conditions of approval that address well control, casing, ventilation, and plugging procedures appropriate to site-specific CBM development plans.

Table A–3 Fugitive Dust Mitigation Measures (PM10), Effectiveness and Cost

	Dust Sources					
	Disturbed Areas	Unpaved Roads ¹				
Mitigation Options	Establish plant cover for all disturbed lands by certain time (re-vegetation)	Water roads to attain certain percent moisture ²	Apply soil stabilizer	Set and enforce speed limit	Gravel roads	Paved road
Effectiveness	Level proportional to percentage of land cover	0 – 50% reduction in uncontrolled dust emissions	33 to 100% control efficiency	80% for 15 mph 65% for 20 mph 25% for 30 mph ³	30% reduction	90% reduction
Estimated Cost	\$/acre	\$4000/mile	\$2,000 to \$4,000/mile per year	Unknown	\$9,000/mile	\$11,000 to \$60,000/mile

Note:

1. Improved and County roads
2. Wetting of construction roads during the construction period. Wetting of construction roads not required for once a month maintenance trips to well pads.
3. Reductions assume 40 mile per hour base speed.

Table A–4 Nitrogen Oxides (NO_x) Mitigation Measures Efficiency

	NO _x Emissions Sources			
	Field Compressors	Sales Compressors	Temporary Diesel Generators ¹	Heavy Equipment
Mitigation Options/ Efficiency	Implement Best Available Control Technology ² Typically results in a NO _x emission rate of about 1 g/bhp-hr	Implement Best Available Control Technology ² Typically results in a NO _x emission rate of about 1 g/bhp-hr	Register with State; will regulate as appropriate	Voluntary use of diesel engines

Notes:

1. Wyoming is currently registering these generators to determine if NO_x emissions are significant.
2. BACT could include electric compression

A.5.17 Areas of Critical Environmental Concern

1. When APDs are received that may effect the relevance and importance criteria for potential ACEC's, the need for interim management measures will be re-evaluated and/or additional site-specific mitigation would be implemented to ensure protection of values meeting the relevance and importance criteria, FEIS Appendix R.

Appendix B
Water Well Agreement

This agreement is made and entered into this _____ day of _____, _____ by and between _____, hereinafter referred to as "Landowner" and _____, with offices at _____, hereinafter referred to as "Producer."

WHEREAS, Landowner(s) have existing water wells within their property boundaries, providing Landowner(s) water for domestic and agricultural/livestock water,

AND WHEREAS, Producer has acquired leases for the development of Coal Bed Methane Gas (CBM) and intends to drill and complete wells for the production of CBM,

AND WHEREAS, the development and production of CBM usually requires the production of water in conjunction with CBM and may require the localized reduction of water levels within certain individual strata of the Fort Union Coals,

AND WHEREAS, Producer has advised Landowner that the production of water in association with gas could adversely affect the productive capacity of Landowner's existing water wells which draw water from the Fort Union aquifer.

NOW THEREFORE, as consideration for the mutual covenants herein, in order to facilitate the multiple usage of the natural resources consistent with sound environmental practices, to mitigate potential adverse effects on the Landowner's water wells, to assure prompt and effective remediation, and to reduce the need for regulatory intervention by State and Federal agencies, the Landowner and Producer agree as follows:

DEFINITIONS:

Fort Union Coals: The Fort Union Coals, as used herein, shall mean those individual coal beds or several coal beds contained within the Tongue River member of the Fort Union Formation, bounded above by the Wasatch Formation of Eocene, and below by the Lebo Shale Member.

Circle of Influence (COI): The area that falls within the circle, the center of which is the location of a producing CBM well, which has a radius of one-half mile (2,640 feet) and contains approximately 502.66 acres.

Impaired Water Well: Any water well properly permitted with the Wyoming State Engineer's Office existing on the Landowner's property within the COI, existing at the time of the CBM development, that experiences a significant reduction of capacity to deliver water in quantity and/or quality sufficient to support the ordinary and customary use of the well.

Strat Test: Any test well that is drilled with the purpose of obtaining geologic information that is not completed for production and is subsequently plugged and abandoned. Strat Tests may produce water and/or gas for a period not to exceed thirty (30) days without creating a COI.

CSM Well: Any well drilled and completed for the production of coal bed methane that withdraws water and/or gas and water from the aquifer for a period exceeding sixty (60) days,

AGREED:

1. Upon establishment of a COI, the Producer, at its sole cost and risk will measure, or cause to be measured, the static water level and productive capacity (the baseline measurement) of properly permitted water wells within the COI and will attempt to determine the depth and configuration of these wells through consultation with the Landowner and from the records of the State Engineer of the State of Wyoming. The Producer shall also test for the presence of methane in the water wells. Tests shall be performed in accordance with test procedures attached hereto.
2. Landowner shall, upon reasonable notice, allow the testing of water wells within the COI, including a static water level test which may require the cessation of withdrawals of water from the well for a period not to exceed twenty four (24) hours.
3. Producer shall establish a continuing water well monitoring program, the intent of which is to enable the Producer to identify changes in the capacity of the Landowner's water wells within the COI. The Landowner shall allow continued periodic testing of the water wells within the COI for this purpose. Producer shall, upon request of the Landowner, provide all test data, both "baseline data" and monitoring data to the Landowner.
4. If a water well within the COI becomes an "Impaired Water Well" as defined herein, Landowner shall first take reasonable steps to verify that the impairment is not due to mechanical, electrical, down hole integrity, or pump problems and, if none of these problems appear to be the cause of the impairment, Landowner shall notify Producer of the impairment. Notice shall be made by phone and by writing, delivered by hand or by registered mail to the Producer at the noted address.
5. Within sixty (60) days of receipt of Notice of Impairment, Producer shall restore the Landowner's access to water of sufficient quantity and quality to offset such impairment by reconfiguring, redrilling the well, the drilling of a new well, or by other means. It is recognized that additional power costs may be associated with any reconfiguration of an impaired water well. The specific site of the well or water access may be changed by mutual agreement of Producer and Landowner.
6. Producer agrees that upon notice of impairment and during the curative period, to provide and make available water for domestic and livestock usage in quantity, quality, and location required for the maintenance of normal and customary domestic, grazing, and livestock operations. Producer shall develop emergency procedures for immediate delivery of water to any such effected Landowner within twenty-four (24) hours of notice. Producer shall notify all Landowners within any COI of the Producer's representative appointed to handle such matters, providing a local contact and a twenty-four (24) hour emergency contact. Landowner shall make a good faith effort to inform Producer by phone, fax, or

other expedient method of communicating of any impending loss or damage to livestock, allowing Producer a reasonable opportunity to mitigate such damage.

7. In the event it is determined that there is an Impaired Water Well, as defined above, in any COI, that COI shall be expanded based on the location of the impaired well or wells. The COI shall be divided into equal quadrants (NE, NW, SW, SE) and based upon which quadrant the impaired water well is located in, that quadrant shall be expanded by the area include within an arc one eighth of a mile wide (660 feet) outside the existing COI. Likewise, should it be determined that there is an impaired water well within the expanded quadrant of the COI, the quadrant shall be again expanded by another 660 feet increment. This expansion approach shall be used to expand any COI in any direction where impairment is determined during the life of the CBM well. Notwithstanding the above, if no water well exist within any COI or quadrant thereof, the arcs and associated quadrants not containing a water well shall be expanded to include the nearest water well.
8. At any time that the Lessee undertakes activities to enhance Landowner's water well capacity or to restore Landowner's impaired water well capacity, and should such activities require permits from regulatory agencies or permissions from third parties for surface-entry, Landowner shall aid and assist Producer in the obtaining of permits and permissions necessary to conduct the operations. All costs of the operations, including fees for obtaining permits and permissions, shall be borne by the Producer.
9. An Arbitration Board shall be formed for the purpose of arbitrating disputes between . Producer and Landowner under this Agreement. The Board shall consist of five (5) members, each member shall be appointed for a two (2)-year term with two (2) members being selected by vote of those Landowners within the various COIs and two (2) members being selected by vote of the Producers that are party of this Agreement and one (1) member being representative of the Wyoming State Engineer's Office.
10. In instances where a water well has become an Impaired Water Well as defined herein, and Landowner and Producer have not been able to agree on the cause of the damage, the Arbitration Board shall determine the cause of the impairment and decide which of the parties shall ultimately be responsible for bearing the cost of remediation. The Arbitration Board shall have the right to apportion and divide the cost among the parties in the event that both mechanical elements, the responsibility of the Landowner, and aquifer drawdown, the responsibility of the Producer, are both factors in causing the water well to become impaired.
11. In the event that the interpretation or enforcement of this Agreement results in legal action, the cost of such action, including reasonable attorney's fees, shall be borne by the individual parties, except in the event that the Landowner is the Prevailing party, in which case the Producer shall bear the costs.
12. The terms and provisions contained herein shall run with the land and shall be binding on the heirs, successors, and assigns of Landowner and Producer. This agreement shall terminate upon the expiration of the last Oil and Gas Lease or the plugging and

abandonment of the last CBM well to which this Agreement applies, whichever is the later date.

This Agreement may be executed in any number of counterparts, each of which shall be considered an original.

AGREED AND ACCEPTED THIS

_____ Day of _____, _____

PRODUCER:

BY: _____

(Name)

(Title, if applicable)

(Company Name)

(Mailing Address)

(Telephone Number)

AGREED AND ACCEPTED THIS

_____ Day of _____, _____

LANDOWNER:

BY: _____

(Name)

(Title, if applicable)

(Land/Company Name)

(Mailing Address)

(Telephone Number)

Appendix C
Montana and Wyoming
Powder River Interim Water Quality
Memorandum of Cooperation

**MONTANA AND WYOMING POWDER RIVER
INTERIM WATER QUALITY CRITERIA
MEMORANDUM OF COOPERATION**

WHEREAS, the State of Montana and the State of Wyoming recognize a responsibility and an opportunity to cooperate work collaboratively to protect water quality in the Powder River Basin and to facilitate the development of Coal Bed Methane (CBM) activities in the respective states, and

WHEREAS, the State of Montana and the State of Wyoming will pursue a process that would establish respective responsibilities for managing and controlling salinity, SAR and other pollutants of concern; and

WHEREAS, the States of Montana and Wyoming have met in several meetings to work out the technical details of this cooperative approach; and

WHEREAS, the State of Montana and State of Wyoming realize that an interim effort is necessary until more stream flow and water quality data can be collected and analyzed to determine the assimilative capacity of waters in the Powder River drainage, and until the effects of CBM development are better known, and Montana completes the development and adoption of water quality standards, an EIS and a Total Maximum Daily Load (TMDL) plan for the basin; and

WHEREAS, the State of Wyoming recognizes Montana's downstream interests and has committed to apply certain limits on the development of CBM activities, during the term of this cooperative effort; and

WHEREAS, the State of Montana has recognized Wyoming's desire to continue to cautiously grant NPDES permits during this interim period; and

WHEREAS, the State of Wyoming has will work with and support Montana's efforts to develop long-term water quality standards and an equitable allocation of the assimilative capacity if one exists.

NOW THEREFORE, the parties enter into this Memorandum of Cooperation (MOC).

I. Parties.

The parties to this MOC are the signatories as set forth on Page 4. The director of the Wyoming Department of Environmental Quality is entering into this MOC to further the purposes of the Wyoming Environmental Quality Act W.S. 35-11-109(a)(ii). The director of the Montana Department of Environmental Quality is entering into the MOC to further the purposes of the Montana Water Quality Act , Title 75, Chapter 5, Montana Code Annotated.

II. Purpose of MOC

The purpose of this MOC is to document the parties' commitments and their intent to protect and maintain water quality conditions within Montana during an interim period while new CBM discharges in Wyoming are cautiously allowed. At the conclusion of this interim period, the parties shall negotiate a final MOC that will include recognition of protective water quality standards and allocation of any assimilative capacity.

III. Interim Threshold Criteria for Salinity and Sodium

1. Powder River

The two states will use the highest sampled monthly values of electrical conductivity (EC) from 1990 through 1999 for the Powder River at the Moorhead gauging station as interim upper threshold criteria. Montana shall monitor the Moorhead data and report to Wyoming the average monthly EC and its comparability to the appropriate monthly value. If in any given month the average EC exceeds the threshold criteria, as listed herein, Wyoming will use its ongoing monitoring of sodium levels to determine the potential source and cause of the exceedance. The results of this investigation will be reported to Montana in a timely manner. If the exceedance is found to be attributable to CBM discharges, Wyoming will initiate appropriate steps through its regulatory mechanisms to return salinity levels into conformity with this MOC.

The Upper Threshold Salinity Monthly Values (EC in $\mu\text{mhos/cm}$) for the Powder River at the Moorhead, Montana gauging station, based on the data from the 1990's are:

January	2200
February	2300
March	2300
April	1700
May	2100
June	2200
July	2800
August	2400
September	2600
October	1900
November	2000
December	1800

The two states recognize that sodium levels and the Sodium Adsorption Ratio (SAR) may have an effect on water uses. However, at this time no clear threshold can be developed due to a lack of data. The State of Wyoming will, through its monitoring program, track sodium concentrations in the Powder River above the state line, evaluate the source of changes through various modeling techniques and report the results of these evaluations to Montana.

2. Little Powder River

The states will use statistical step tests and 90th percentile, 90% confidence limits (90/90) for EC, SAR, and Total Dissolved Solids (TDS) derived from monthly flow weighted historic data as threshold criteria to indicate whether a change has occurred. Montana shall monitor the data from the Little Powder above Dry Creek, near Weston, and report the flow-weighted results to Wyoming. The step tests and 90/90 criteria will be based on a continuous and cumulative evaluation of available data from 1985 forward. Pre-1985 data will not be used because baseline conditions delineated by the older data sets differ from post-1984 conditions. If a step test shows a significant difference or the 90/90 confidence limit is exceeded, Wyoming will conduct an evaluation as to the possible source of the trend or exceedance and report the results to Montana in a timely manner. If the difference or exceedance is found to be attributable to CBM discharges, Wyoming will initiate appropriate steps through its regulatory mechanisms to return salinity levels into conformity with this MOC.

IV. Other Pollutants of Concern

Montana accepts Wyoming's antidegradation policy as protective of Montana's water quality standards. However, should Wyoming consider an application to degrade, Montana will be included as a participant in the waiver review process so that the states may equitably allocate any assimilative capacity.

V. Monitoring Program

Wyoming and Montana are committed to the development of a monitoring program to implement this MOC and to the development of a final MOC.

VI. Standard Frequency of Data Review and Evaluation

The parties will meet periodically and review the results of their respective monitoring programs, to promptly report evaluations and results, and review the overall success of the program.

VII. Term of MOC

It is the intent of the parties that this interim MOC is for a period of 18 months from its' effective date. During the fall of 2002 the parties anticipate re-negotiating a final MOC that will address meeting downstream standards for the Powder and Little Powder Rivers and TMDLs.

VIII. Public Participation

Opportunity for public participation was provided during the technical sessions that led up to this MOC. The parties are committed to keeping the public informed about the implementation and success of this MOC. All technical information and evaluations resulting from this MOC will be available to the public.

IX. Dispute Resolution

The parties agree that disputes that arise as a result of this MOC shall be resolved through communication and cooperative problem solving involving the parties

X. Amendment

This MOC may be amended or modified at any time upon the consent of all parties.

XI. Vacating MOC

Any party may withdraw from this MOC by providing written notice to the other parties.

XII. Effective Date

This MOC is effective upon the last date of signature by a party, as listed below.

1. MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

	(September 5, 2001)
_____ Jan Sensibaugh, Director	_____ Date

2. WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

	(September 7, 2001)
_____ Dennis Hemmer, Director	_____ Date

Appendix D
Water Management Plan

Appendix D — Water Management Plan

The following section describes the requirements for a Water Management Plan, which is needed for individual coal bed methane (CBM) well APDs or multiple well PODs. Additional technical support information for WMPs is currently being developed by BLM as part of the revision of the *Buffalo Field Office CBM APD and Project POD Preparation Guide*.

The operator shall provide a comprehensive water management plan (WMP) that addresses the handling of produced water during the testing and production of coal bed methane (CBM) well(s). The WMP must provide adequate information for the BLM to complete NEPA analysis and to ensure compliance with all state and federal requirements prior to approval. A CBM APD/POD will not be considered complete or processed by BLM unless it contains a WMP.

REQUIREMENTS FOR WMPs:

1. The WMP must include a statement that the operator will comply with all laws, standards and criteria set forth by all appropriate Federal, State and Local authorities including Wyoming State Engineers Office (WSEO), Wyoming Department of Environmental Quality (WDEQ), Wyoming Oil and Gas Conservation Commission (WOGCC), BLM, Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (Corps).
2. The WMP will be submitted concurrently as an addendum to the APD/POD or as a section within the POD Surface Use Plan under item No. 12. *Other Information*.
3. A WMP map will be required. For the map identify discharge points, watershed boundaries, reservoirs, infiltration pits, low water crossings, head-cuts and other erosion features, land application disposal areas, water and gas pipelines, spring locations, wells, roads, POD boundary, and other info necessary to adequately evaluate the WMP.
 - x Submit Four copies of the Water Management Plan Map. If changes are made as a result of the onsite or because of operator revisions, four copies of each of final maps will be required.
 - x For smaller PODs or where clutter is not an issue, maps may be combined into one master map (four copies needed)
4. A representative water quality analyses, performed within the last six months, will be included for each targeted coal zone on lease. Samples should be from the closest source possible within the Township and Range of the proposed action (maximum distance 6 miles).

Constituents analyzed in the water quality analyses will be the same as those required by the Wyoming Department of Environmental Quality (DEQ) for the National Pollutants Discharge Elimination System (NPDES) permit using approved Environmental Protection Agency (EPA) test procedures (40 CFR 136 or 40 CFR136.5). The list of constituents and detections limits can be found following in Appendix WMP 1.

The first well drilled to each targeted coal zone will become the designated reference well. Designated reference wells must have the ability to be sampled at the wellhead. Water samples will be collected for analysis within 30-60 days of initial pumping. Results of the analysis will be submitted to the BLM Authorized Officer as soon as they become available.

5. Plans and designs for the erosion control and stabilization measures for minor head-cuts, eroding channel sections, etc., must be provided. In-channel mitigation measures must be designed to

accommodate existing and proposed discharges, in addition to naturally occurring flow. Engineering diagrams for erosion control and stabilization measures for major areas of improvement will be required, at BLM's discretion, on a site-specific basis. BLM may require notification prior to any activity crossing a waterway of the state, in order to ensure compliance with USCOE General Permit 98-08.

6. All WMPs must include a Lessee's or Operator's Representative and Certification as follows:

I hereby certify that I, or persons under my direct supervision, have inspected the watershed area(s) affected by our coal bed methane drilling and production plans; that I am familiar with the conditions which currently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with operations proposed herein, including construction, monitoring and reclamation activities will be performed by _____ and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Date _____ Name and Title _____

If the WMP is prepared by the same entity and submitted as part of the POD Master Surface Use Plan or APD Surface Use Plan, then the Certification Statement already required under APD Item 13 of the Surface Use Plan will suffice.

7. A completed *Hydrologic Watershed Field Analysis Summary Sheet* for each watershed evaluated for the POD area will be submitted with the WMP. This information must be based on field reconnaissance and must include the following:
- a. Watershed area
 - b. Average watershed slope
 - c. Existing channel (average slope, width, depth, condition, etc.) and calculation of mean annual flow
 - d. Peak flow analysis (2-, 10-, and 25-year return interval at a minimum)
 - e. Destination (i.e., tributary to the Belle Fourche River)
 - f. Description of the existing watershed including:
 - i) Existing wells (location, depth, water level, use, condition)
 - ii) Existing impoundments (location, size, volume, use, condition, description of outlet works and spillway)
 - iii) Road crossings (crossing type - culvert, low water crossing, bridge, etc. and condition)
 - iv) Water related uses (irrigation, livestock, industrial uses, etc.)
 - v) Potential down stream concerns (on- channel impoundments, hay meadows, coal mine reclamation and sediment structures, unimproved channel crossings, etc.) and plans to mitigate impacts caused by discharge of produced water.

Hydrologic Watershed Field Analysis Summary Sheet

POD Name:
Company:
Watershed involved
Watershed Area :
Average Watershed Slope, ft./mi.:
<u>Existing Channel information</u>
Average Bank Full Width, ft.
Average Channel Slope, feet/foot
Average Channel Width, ft. and Depth, ft.
General Channel Condition: Stable/Unstable (potential erosion areas of concern)
<u>Proposed Channel Improvements</u>
Area of Headcut Modification, square feet: acres:
Area of Pipeline or utility corridor channel crossing, square feet: acres:
Area of Low Water Crossings, square feet: acres:
Area of other channel modifications (describe by type): acres:

Channel Vegetative Cover/ Dominant Species:

Peak Flow Analysis (Describe methods used for calculations and provide values used as variables)

Recurrence Interval (Years)	Exceedence Probability(%)	<u>Peak Flow</u>	Peak Flow for Complete Basin (CFS)
2	50		
5	20		
10	10		
25	4		

8. Include in either the WMP or item # 3 of the surface use plan for the POD, a list of all the wells permitted through the WSEO within a one-mile radius of the producing wells and water management structures in the project area.
9. A table listing the culverts (existing and proposed) in the development area, including the location (GPS coordinates (Latitude/Longitude, or Northing/Easting)), size (diameter and length), area of in-channel disturbance, drainage area above the culvert, condition of existing culverts and the anticipated maximum flow, including CBM discharge, through the culvert based on a 10-year flood without development of static head at the entrance.
10. A table listing the low water crossings (existing and proposed) in the development area, including the location (GPS coordinates (Latitude/Longitude, or Northing/Easting)), area of in-channel disturbance, drainage area above the crossing and the anticipated maximum flow, including CBM discharge, through the crossing based on a 10-year flood.
11. A table listing the CBM water discharge points (existing and proposed), including location (GPS coordinates (Latitude/Longitude, or Northing/Easting)), all wells contributing to discharge at each point, estimated maximum flows, and NPDES number as available. Access routes to discharge points must be described in the project WMP and identified on the map.
12. A table listing the headcuts, sidecuts or other erosional features in the development area, including the location (GPS coordinates (Latitude/Longitude, or Northing/Easting)), size (diameter and length), area of in-channel disturbance, and proposed mitigation.
13. A table listing reservoirs (existing and proposed), including the location, capacity, embankment-height, top width, crest length, upstream and downstream slope, condition, description of low-level outlet (agri-drain), spillway, hydrologic characteristics and an accounting of the disturbed area. Access routes to reservoirs must be described in the project WMP and identified on the map.
14. If part of the water management strategy includes Land Application Disposal (LAD), additional information regarding the site location, application rate and method, soil chemistry and characteristics, and monitoring program will be required. For additional information, refer to the Land Application Guidance in Appendix WMP 3.
15. The description of the proposed maintenance and monitoring program. Include monitoring frequency and maintenance plans for discharge points, reservoirs, culverts, channel crossings, other water control structures, erosional features (including headcuts) and stream channels. Additional information regarding a monitoring plan is found Appendix WMP 4.
16. All potential downstream concerns or impacts will be identified, documented and mitigation proposed.
17. Prior to abandonment of facilities associated with the WMP, the operator will submit, via Sundry Notice (Form 3160-5) site-specific reclamation plans for BLM review and approval. Phased reclamation (i.e., reclaim individual facilities as they are no longer necessary) will be expected. Any activities outside the approved proposed actions will require authorization by the BLM Authorized Officer.
18. Some investigations required for WMP preparation may require on-site data collection for the proposed project area. Operator should contact the Buffalo Field Office of the BLM for authorization prior to commencement of any activities associated with data collection.

19. Documentation that all proposed new and modifications to existing on-channel CBM water containment structures will be done in conformance with and are properly permitted (or are in the process of being permitted) through the WSEO (and the USCOE if necessary). If the structure is on Federal surface, it must also meet criteria set forth by the BLM State Engineer. For additional guidance regarding on-channel containment structures, please refer to Appendix WMP 4.
20. Documentation that all proposed off-channel CBM water containment structures meet the siting criteria as outlined in the Guidelines for Off-Channel CBM Water Containment Structures located in Appendix WMP 5 and Appendix WMP 6. If the structure is constructed on Federal surface, it must also meet design criteria set forth by the BLM State Engineer.
21. A bond will be required for each off-channel water containment structure associated with a Federal Lease, the details of which will be based on site-specific conditions.
22. Operators will be requested to submit project maps electronically using geographic information system (GIS) software.

General Guidance

- x Consult private surface owner(s) early in the planning process and throughout the development of water management plans WMPs.
- x Develop WMPs on a sub-watershed basis, coordinating with other companies within the same sub-watershed.
- x Consider all upstream contributions (natural flow, runoff and other discharges) and determine through sound hydrologic analysis if the produced CBM water from the wells (based on known or anticipated water production rates) will adversely impact downstream improvements, uses, and users (reservoirs, hay ground, etc.).
- x Depending on the water quality and quantity, it may be beneficial to consider centralizing the water discharge to localize the associated disturbance.
- x Consider innovative methods of using produced CBM water. Any method recommended will be evaluated and authorized on a case-by-case basis.
- x Locate discharge points and reservoirs in readily accessible areas for ease of installation and monitoring. Also, consider access options which involve the least surface disturbance in any erosion feature modification design.
- x Select designated reference well locations so that they will be easily accessible year-round for sampling.

Discharge Points

- x Locate discharge points in areas that will minimize erosion and impacts to the receiving channel, existing improvements, and downstream users.
- x Do not locate discharge points on hilltops or upland areas unless discharge is to an approved water containment structure. Insure that they are located in stable, low gradient drainage systems and below active head cuts.
- x Locate discharge points below any potentially active headcuts whenever possible. If discharge must be made above a headcut, mitigation will be required by the BLM Authorized Officer, including engineered remediation on a site-specific basis.
- x Design proper energy dissipation measures for discharge outlets (e.g., vertical culvert with rip-rap, splash pad, laydown pipe with French drain on rip-rap pad, etc.)
- x Discharge locations will not be authorized by BLM unless they are in an environmentally sound location, regardless of NPDES status or previous use. Sites may be moved or otherwise mitigated by the BLM Authorized Officer during onsite inspections where environmental issues exist.

- x Cumulative produced water discharge must not exceed the naturally occurring mean annual peak flow of the receiving channel.
- x Do not locate discharge points in playas or enclosed basins unless it can be done in an environmentally sound manner without resulting in adverse impacts. Discharges into valley bottoms with no defined low-flow channel will generally not be authorized, but will be reviewed on a site-specific basis.
- x Minimize channel disturbance as much as possible by limiting pipeline and access crossings. Avoid running pipelines and access roads within floodplains, parallel to the channel.

Water Containment Structures

- x Reservoirs must be designed in accordance with WSEO standards to accommodate the proposed as well as potential upstream development. For on-channel reservoirs, refer to the guidance located in Appendix WMP 4.
- x Locate off-channel pits so that there will be no negative impact on the adjacent surface, surface water or groundwater. Refer to Appendix WMP 5.
- x Discharges to existing and proposed impoundments must be in compliance with all WSEO, COE and BLM requirements.
- x Reservoirs: See Appendix 4 and 5 in the following section for specific guidance regarding both on-channel reservoirs and off-channel pits.
- x If passage of water through a spillway is to be frequent, the spillway must be reinforced and designed for continual flow (regular flows on earthen spillways will not be allowed).

Appendix WMP 1 – Water Quality Analysis Criteria

Constituent	Detection Limits
Expected Flow volume from each well:	gallons per day
Total dissolved solids:	5 mg/l (milligrams per liter)
pH:	0.1 standard units
Sulfates:	10 mg/l
Chlorides:	5 mg/l
Specific conductance:	5 micromhos/cm
Total radium 226:	0.2 pCi/l (picoCuries/liter)
Total petroleum hydrocarbons ¹ :	1 mg/l
Total ² Aluminum:	50 µg/l (micrograms per liter)
Total Antimony:	5 µg/l
Total Arsenic:	0.1 µg/l
Total Barium:	100 µg/l
Total Beryllium:	0.03 µg/l
Dissolved ³ Cadmium:	0.1 µg/l
Dissolved Chromium:	1 µg/l
Dissolved Copper:	1 µg/l
Total Cyanide:	5 µg/l
Dissolved Iron	30 µg/l
Dissolved Manganese:	10 µg/l
Dissolved Nickel:	10 µg/l
Dissolved Lead:	2 µg/l
Dissolved Mercury:	0.06 µg/l
Phenol:	10 µg/l
Total Selenium:	5 µg/l
Dissolved Silver:	3 µg/l
Total Thallium:	10 µg/l
Dissolved Zinc:	10 µg/l
Total Hardness:	10 mg/l as CaCO ₃
Dissolved Sodium:	1 mg/l
Dissolved Magnesium:	1 mg/l
Dissolved Calcium:	1 mg/l
Dissolved Boron:	0.1 mg/l
Bicarbonate:	1 mg/l
Dissolved Fluoride:	0.1 mg/l
Dissolved Potassium:	1 mg/l
Total Alkalinity:	1mg/l as CaCO ₃
Sodium Adsorption Ratio:	not applicable

¹Acceptable methods for analyzing total petroleum hydrocarbons are 418.1 in the latest edition of Standard Methods for the Examination of Water and Wastewater and EPA SW846 Method 8015 (modified) for Total Extractable Petroleum Hydrocarbons.

²Value is expressed in terms of total recoverable metal in the water column.

³Volume is based on the dissolved amount, which is the amount that will pass through a 0.45 µm filter prior to acidification to pH 1.5 - 2.0 with nitric acid.

NOTE: Except for the aquatic life values for metals and where otherwise indicated, the values given refer to the total recoverable (dissolved plus suspended) amount for each substance. For the aquatic life values for metals, refer to the dissolved amount.

Appendix WMP 2 – Monitoring Plan Requirements

Monitoring Plans must include the following as a minimum:

- x The operator will be responsible for monitoring discharge point(s) on a monthly basis for the first year of operation. Inspectors will note the condition of each discharge point, check for evidence of erosion, and schedule any necessary mitigation work. Records of the inspections will be made available to the BLM Authorized Officer upon request.
- x Dam outlets (spillways and pipes) and culvert outlets will be inspected quarterly, or after major storm events for the first year of operation. Inspectors will note the condition, check for evidence of erosion, and schedule any necessary mitigation work. A reservoir maintenance program will be included to address storage capacity management. Records of the inspections will be made available to the BLM Authorized Officer upon request.
- x Erosion stabilization measures (head cut repairs, etc.) will be inspected on a monthly basis for the first year of operation, for signs of erosion or structure failure. Inspectors will note condition and schedule any necessary mitigation work. Records of the inspections will be made available to the BLM Authorized Officer upon request.
- x Downstream channels (below the well(s)/project area) will be inspected on a monthly basis for signs of accelerated erosion due to the continuous flow of produced water for the first year of operation, which includes low water crossings. Records of the inspections will be made available to the BLM Authorized Officer upon request.
- x Any mitigation work, repairs or other maintenance which involves actions or surface disturbance outside the scope of the initially authorized action will require approval by the BLM Authorized Officer prior to the initiation of any work. The proposed actions will be submitted as a Sundry Notice to the Buffalo Field Office of the BLM.
- x An access agreement for BLM monitoring will be included with the WMP for the lease area.
- x After the first year of operation, inspections will occur annually unless specific sites have required mitigation action, then inspections will continue at the previous intervals until no action has been required for a full year. Records of the inspections will be made available to the BLM Authorized Officer upon request.

Appendix WMP 3 – Land Application Disposal Guidance

The consideration of LAD as a beneficial use of CBM produced water can only be determined after an extensive evaluation of the land application operation has been completed. Many environmental factors must be assessed to determine both the potential risk and potential benefits for land application to be considered a viable option for disposal of discharge water. The best management practices for land application will be an evolving process as new research, data, and processes become available. The operator is strongly encouraged to consult with the BLM specialists early in the development of the water management plan.

Land application disposal of produced water has the potential to produce negative, long term impacts to soil physical and chemical properties if not properly managed. Proposals to land apply CBM produced water of federal projects must include the following.

1. Site selection: Should include a general description including, but not limited to, slope, aspect, elevation and local climatic limitations. Detailed existing vegetation composition and canopy cover by species, percent bare ground, and any erosion or soil compaction features.
2. Site Characterization: The site characterization must include comprehensive field investigations of soils and vegetation. The site will be described in detail and soil samples will be collected and analyzed to determine important soil chemical and physical properties. Site descriptions should include maps, vegetation descriptions, detailed soil profile descriptions, laboratory analysis and location of proposed application disposal sites. Photo documentation of the site should be included. Laboratory analysis of the produced water should also be included with the site characterization study.
3. Project description: The project description must include the proposed method(s) of water application disposal, application rates and schedules and physical layout of application disposal areas. Complete maps of the application infrastructure should be included. Detail any soil or water amendments which will be utilized or physical soil manipulation which are planned. Project descriptions should demonstrate that land application disposal is feasible given the results of the site characterization.
4. Monitoring Plan: Periodic monitoring of soils and vegetation will be required to assure that negative impacts are not occurring or are being remediated. Monitoring must include soil sampling and laboratory analysis.
5. Winter Operations: Detail Practices which will be used to prevent the buildup of ice on the soil surface during sub freezing temperatures.
6. Mitigation Plan: A plan must be developed which outline mitigation measure which will be implemented in the event negative soils or vegetation impacts are detected during routine monitoring. Potential mitigation measures might include soil or water amendments, physical manipulation or vegetative treatments.

These criteria are general in nature, and must be adjusted to site specific conditions. Detailed soil sampling criteria have not yet been developed, so project proposals will be evaluated on a case by case basis during the interim.

The effectiveness of a LAD system will depend on many things including. The soil types involved and there associated physical and chemical properties. The method of application will help identify the site, water delivery efficiency, leaching requirements and surface salt accumulations. The water quality of the CBM produced water will determine the feasibility of application but also the predicted environmental effects as well as determine the effectiveness of chemical and organic amendments need for mitigation.

Appendix WMP 4 - On-Channel CBM Water Containment Structures

For on-channel CBM water containment structures on BLM surface lands that are proposed as part of the WMP, the operator must provide the following information for review by the BLM State Engineer:

1. For each on-channel (CBM) water containment structure smaller than 20 acre-feet capacity and with a dam height of less than 20' (20/20), the operator must include in the WMP the information that would normally be required by the SEO for a stock water reservoir permit. This information would need to clearly show that each on-channel CBM water containment structure is being constructed using BLM specifications for earthwork placement and principle spillway configuration. After a case-by-case consideration of the factors below (a. and b.), BLM would either approve or disapprove each on-channel CBM water containment structure. Upon approval by the BLM, the operator would then need to have each on-channel CBM water containment structure permitted by the SEO.
2. For on-channel (CBM) water containment structures greater than 20/20, the permit application must be submitted to the BLM as part of the WMP with the information that would be normally required for permitting by the SEO. If approved by the BLM State Engineer at the Wyoming State BLM office, the operator would then be required to submit an application to the SEO for approval under the Safety of Dams program.

On-channel CBM water containment structures on BLM surface will be approved or disapproved on a case-by-case basis after considering the following factors:

- a. Proper siting and design.
- b. Existing resource uses/needs and multiple-use management principles.

Please be advised that BLM will apply special *Conditions-of-Approval* to authorized on-channel CBM water containment structures depending upon case-by-case consideration of the above-factors. Construction monitoring by BLM Authorized Officers would also be required on a case-by-case basis.

3. Water production rates (for each discharge point and CBM flows into the water containment structure) must be disclosed including discharge schedule (initial, intermediate, and final rates and duration) and maximum, mean, and minimum anticipated rates.

Appendix WMP 5 - Off-Channel CBM Water Containment Structures

Guideline approved by Water and Waste Advisory Board Page 1

October 1, 2002

Wyoming Department of Environmental Quality

Water Quality Division

August 6, 2002

“Off-channel, Unlined CBM Produced Water Pit

Siting Guidelines for the Powder River Basin, Wyoming”

BACKGROUND AND OBJECTIVES

The WDEQ/Water Quality Division has worked with other state and federal agencies to develop recommendations to be implemented through various regulatory mechanisms for evaluating and siting CBM produced water pits. The recommendations call for CBM operators to collect hydrogeologic information at each site to determine the following:

- 1) The classification of shallow, unconfined groundwater (where present) as determined from existing use or ambient quality, or both, in accordance with Chapter 8 of WDEQ's Water Quality Rules and Regulations.
- 2) Ability of the produced water to diminish the use (i.e. suitability) of shallow, unconfined groundwater (where present).
- 3) Ability of the produced water to re-surface, or reach surface waters.
- 4) Ability of the produced water pit to infiltrate into the subsurface.

The evaluation of the placement of the unlined CBM produced water pits should be conducted before the construction of the pits. Any questions about the final placement of the unlined CBM produced water pits should be clarified with the WDEQ/WQD before submitting a permit application to the WDEQ/NPDES program or Wyoming Oil and Gas Conservation Commission.

In addition to the evaluations listed below, more information and assessment may be needed when attempting to evaluate potential impacts from large (e.g. 5 acres) or deep infiltration pits, or pits proposed in potentially vulnerable areas. Examples of these areas would include: environmentally sensitive areas such as wetlands, areas with multiple domestic wells such as a rural subdivision, wellhead protection or source water protection areas, and areas near public drinking water supply wells. In some situations, monitoring programs may be needed to measure and assess the movement and fate of leachate from infiltration pits and/or the effects, if any, upon groundwater and surface water quality. Where unlined pits cannot be allowed operators should consider the use of alternative disposal methods. Surficial geology data on the Powder River Basin is available from the Wyoming State Geological Survey and will aid in siting unlined CBM produced water pits.

PROXIMITY TO “SURFACE WATERS OF THE STATE”

Discussion:

Surface waters of the state means all perennial, intermittent, and ephemeral defined drainages, lakes, reservoirs and wetlands which are not man-made retention ponds used for the treatment of municipal, agricultural or industrial waste; and all other bodies of surface water, either public or private, which are wholly or partially within the boundaries of the state as defined in Water Quality Rules and Regulations, Chapter 1 Because the off channel produced water pits may be allowed to leak into the subsurface, there must be reasonable assurance that there is no direct subsurface hydrologic connection between the produced water pits and surface waters of the state.

In order to protect the surface waters of the state, produced water pits should be located one-quarter mile (1320 feet) from the outermost alluvium (and adjacent mixtures) of any current stream system and, at a minimum, five hundred (500) feet from the edge of any bank-to-bank stream channel, pond, reservoir, wetland or lake.

Note: 1:100,000 scale surficial geology maps produced by the Wyoming State Geological Survey and the USGS are available for some areas of the Powder River Basin (see attached list) and are to be used in

identification of alluvial deposits. In unmapped areas alluvial deposits must be identified by field investigation. USGS 1:24000 scale topographic maps can be used to aid in determining off channel pit locations. Solid blue lines illustrate perennial streams; dashed blue lines illustrate intermittent streams. Ephemeral streams are not uniquely defined on USGS topo maps, however, major ephemeral drainages are included with the intermittent drainages. The dashed blue lines may suffice for illustrating ephemeral streams with a bank to bank channel; however, additional field investigation may be necessary to determine if the map symbol accurately depicts field conditions. For any pit proposed to be located within one-quarter mile (1320 feet) from the outermost alluvium (and related mixtures) of any current stream system and/or within five hundred (500) feet from the edge of any bank-to-bank stream channel, pond, reservoir, wetland, or lake evidence should be presented that demonstrates that there will be no direct hydrologic connection from the unlined CBM produced water pit to surface waters of the state, or to areas outside of the pit. The evidence may be in the form of a subsurface investigation, modeling that utilizes site specific parameters, or other evidence (e.g., groundwater gradient) that protects surface waters of the state.

PROXIMITY TO DOMESTIC WATER SUPPLY WELL (PROTECTION OF GROUNDWATER WHERE THERE IS DOMESTIC USE)

Discussion:

Groundwater is classified by either the current use (i.e. domestic, agricultural, livestock, etc.) or the ambient quality of the groundwater (where there is no use). Where groundwater is being used for domestic purposes it will be protected to Class I standards. That is, concentrations of inorganic, metal, and other analytes within the groundwater must remain within the domestic class of use suitability standard. Groundwater can be Class I “by use” even when concentrations of one or more analytes within it exceeds Class I suitability standards. In this case, concentrations of analytes within the groundwater cannot exceed the domestic class of use suitability standard unless the ambient concentration is greater than that standard. For those analytes whose ambient concentrations are less than the domestic class of use suitability standard, limited degradation is allowed but only to the point that concentrations do not exceed the standard. Groundwater classifications are discussed in Water Quality Rules and Regulations, Chapter 8.

Unlined CBM Produced Water Pits Located Within 1/4 Mile of Any Domestic Use Well:

In order to provide protection for an aquifer that is currently being used for a domestic water supply, the department recommends that the operator should not attempt to locate an unlined CBM produced water pit within 1/4 mile of a domestic use well. If an unlined CBM produced water pit is to be located with 1/4 mile of a domestic use well, the following information should be developed:

- 1) The operator should demonstrate that the water quality being discharged into the unlined CBM produced water pit is of equal or better quality than the groundwater being utilized in the domestic use well. (Please see discussion above regarding groundwater class of use and protection.)
- 2) The operator should demonstrate that the domestic use well will not be impacted (i.e., the domestic use well is located upgradient or cross-gradient from the unlined CBM produced water pit) and that the class of use of groundwater will not be impaired.
- 3) The operator should demonstrate that the aquifer in which the domestic use well is screened is of sufficient depth or confinement such that any water infiltrating from the unlined CBM pit will not reach the aquifer. Information about the construction details of the domestic use well should be presented to ensure that a proper annular seal exists to prevent vertical migration of water down the well bore.

If none of these three conditions can be met, the unlined CBM produced water pit should not be located within 1/4 mile of a domestic use well.

PROXIMITY TO STOCK AND IRRIGATION WELLS (PROTECTION OF GROUNDWATER WHERE THERE IS NON-DOMESTIC USE)

Discussion:

In order to protect groundwater that may be suitable for domestic use, any stock and irrigation well that is within 1/4 mile of the produced water pit shall be sampled for Table 1 parameters in order to determine ambient quality of the shallow aquifer, unless it can be shown by State Engineer's Office records or field measurements that the well is not completed within the shallow aquifer.

Groundwater from stock and irrigation wells may be classified as Class I (i.e., domestic) by ambient quality and must be protected as such. If the groundwater is designated as Class I by ambient quality, the recommendations of the following section on siting pits within areas of potentially high quality groundwater should be applied.

If the ambient quality of the groundwater from a non-domestic well is equal to, or less than the quality of the CBM produced water, no restrictions would apply.

LOCATION OF PITS WITHIN AREAS WITH POTENTIALLY HIGH QUALITY SHALLOW AQUIFERS (PROTECTION OF GROUNDWATER WHERE THERE IS NO USE)

Discussion:

*In order to protect groundwater that may be suitable for domestic use, where a CBM produced water pit is proposed to be located within areas where Total Dissolved Solids (TDS) concentrations of groundwater within the Wasatch/Fort Union formations are depicted as < 500 mg/L, the groundwater shall be sampled for Table 1 parameters in order to determine ambient quality of the shallow aquifer.**

If the groundwater is designated as Class I by ambient quality an unlined CBM produced water pit may be allowed if it can be demonstrated that the water quality being discharged into the unlined CBM produced water pit is of equal or better quality than the groundwater.

If this condition cannot be met, the unlined CBM produced water pit should not be located within that area, or an acceptable, alternative disposal method used. If the ambient quality of the groundwater is equal to or less than the quality of the CBM produced water no restrictions would apply.

- x **Note:** WDEQ recommends the use of *Dissolved Solids Map of Wasatch/Fort Union Aquifer System Water, Powder River Basin, Wyoming* from Volume I-B, *Occurrence and Characteristics of Ground Water in the Powder River Basin, Wyoming*, Water Resources Research Institute, University of Wyoming, 1981. An updated, similar map is currently under development by the Wyoming State Geological Survey and USGS and should be used when completed.

PROXIMITY TO CLINKER/SCORIA DEPOSITS

Discussion:

Large clinker deposits are present in various areas of the Powder River Basin. The clinker deposits can be a highly permeable deposit with high groundwater flow velocities due to fracture flow. Clinkers deposits are known to contain high quality aquifers in some areas. 1:100000 scale surficial geology maps illustrating locations of clinker deposits are available from the Wyoming State Geological Survey. Site specific analysis may be needed in potentially vulnerable areas.

In order to protect groundwater and surface water quality, no unlined pit should be located on or within 500 feet of a clinker deposit without consideration of the following information:

- 1) Analysis of the clinker groundwater aquifer or any existing springs associated with the clinker should be classified according to Table 1 groundwater parameters and;
- 2) Surface and subsurface extent of clinker deposit, groundwater flowpaths, and the ability of infiltrated pit water to migrate to "surface waters of the state".

Pits can be located on a clinker deposit or within 500 feet of a clinker deposit only if:

- 1) Analysis of groundwater demonstrates that the aquifer is of equal or lesser quality than the CBM water discharged into the pit, **and**
- 2) It can be demonstrated that the water infiltrating through the clinker will not reach “surface waters of the state”.

PROXIMITY TO SPRINGS

Discussion:

Springs shall be afforded the same protection as groundwater. In order to protect waters of the state, no produced water pit should be sited within 1/4 mile of any spring unless the following can be documented:

- 1) The water quality of the spring is determined to be of equal or lesser quality than the CBM water being discharged into the pit. This determination is based upon groundwater classification parameters in Table 1; or
- 2) The spring is determined to be up-gradient or cross gradient from the pit.

If a pit is to be placed within 1/4 mile of a spring that has been determined to be of better quality water than the CBM discharge water evidence must be presented to demonstrate that the spring will not be impacted, or a monitoring program approved by WDEQ must be implemented.

Table 1: Classification Analytes¹

Arsenic	Calcium	Chromium	Iron
Fluoride	Barium	Sodium	Lead
Cadmium	pH	Boron	Chloride
Potassium	SAR2	Sulfate	Dissolved Solids
Magnesium	Total Selenium	Copper	Zinc

1 The listed parameters shall be analyzed in the laboratory for “total” concentrations.

2 Sodium Absorption Ratio (SAR): SAR is a calculated number involving the ratio of sodium, calcium and magnesium ions. The number is derived to predict the degree to which irrigation water tends to enter into cation exchange reaction with soil. High values of SAR can be damaging to soil structure. The Class II (agricultural) standard for SAR is eight (8). There is no Class I (domestic) or Class III standard for SAR. Therefore, if the producing groundwater is classified as a Class I or Class III aquifer, the concentrations of sodium, calcium, and magnesium (components of SAR) will not be allowed to degrade an underlying Class II aquifer beyond its class of use.

WYOMING STATE GEOLOGICAL SURVEY GEOLOGIC HAZARDS SECTION DIGITAL MAPS (HSDM)

PUBLISHED DIGITAL SURFICIAL GEOLOGIC MAPS

HSDM 98-1 Preliminary 1:500,000-scale digital surficial geology map of Wyoming

HSDM 98-3 Preliminary digital surficial geologic map of the Casper 30' x 60' Quadrangle, Natrona and Converse Counties, Wyoming

HSDM 98-4 Preliminary digital surficial geologic map of the Cheyenne 30' x 60' Quadrangle, southeastern Wyoming, western Nebraska, and Northern Colorado

HSDM 98-5 Preliminary digital surficial geologic map of the Laramie 30' x 60' Quadrangle, Albany and Laramie Counties, Wyoming

HSDM 98-6 Preliminary digital surficial geologic map of the Rawlins 30' x 60' Quadrangle, Carbon and Sweetwater Counties, Wyoming

HSDM 99-2 Preliminary digital surficial geologic map of the Douglas 30' x 60' Quadrangle, Converse and Platte Counties, Wyoming

HSDM 99-3 Preliminary digital surficial geologic map of the Powell 30' x 60' Quadrangle, Bighorn and Park Counties, Wyoming, and southern Montana

HSDM 99-4 Preliminary digital surficial geologic map of the Rock Springs 30' x 60' Quadrangle, Sweetwater County, Wyoming

HSDM 99-5 Preliminary digital surficial geologic map of the Sheridan 30' x 60' Quadrangle, Sheridan, Johnson, and Campbell Counties, Wyoming, and southeastern Montana

HSDM 99-6 Preliminary digital surficial geologic map of the Torrington 30' x 60' Quadrangle, Goshen and Platte Counties, Wyoming, and western Nebraska

HSDM 00-2 Preliminary Digital Surficial Geologic Map of the Buffalo 30' x 60' Quadrangle, Johnson and Campbell Counties, Wyoming

HSDM 00-3 Preliminary Digital Surficial Geologic Map of the Cody 30' x 60' Quadrangle, Park County, Wyoming

HSDM 00-4 Preliminary Digital Surficial Geologic Map of the Kaycee 30' x 60' Quadrangle, Johnson and Campbell Counties, Wyoming

HSDM 00-5 Preliminary Digital Surficial Geologic Map of the Newcastle 30' x 60' Quadrangle, Weston and Niobrara Counties, Wyoming, and Western South Dakota

HSDM 00-6 Preliminary Digital Surficial Geologic Map of the Worland 30' x 60' Quadrangle, Big Horn, Washakie, and Johnson Counties, Wyoming

HSDM 01-2 Preliminary Digital Surficial Geologic Map of the Burgess Junction 30' x 60' Quadrangle, Big Horn and Johnson Counties, Wyoming, and Southeastern Montana

HSDM 01-3 Preliminary Digital Surficial Geologic Map of the Devils Tower 30' x 60' Quadrangle, Crook County, Wyoming, Western South Dakota, and Southeastern Montana

HSDM 01-4 Preliminary Digital Surficial Geologic Map of the Lance Creek 30' x 60' Quadrangle, Niobrara and Converse Counties, Wyoming, Southwestern South Dakota, and Northwestern Nebraska

HSDM 01-5 Preliminary Digital Surficial Geologic Map of the Lusk 30' x 60' Quadrangle, Niobrara, Goshen, and Platte Counties, Wyoming, and Northwestern Nebraska Guideline approved by Water and Waste Advisory Board Page 6 October 1, 2002

HSDM 01-6 Preliminary Digital Surficial Geologic Map of the Sundance 30' x 60' Quadrangle, Crook and Weston Counties, Wyoming, and Southwestern South Dakota

PUBLISHED DIGITAL BEDROCK GEOLOGIC MAPS

HSDM 98-2 Digital geologic map of the Cheyenne 30' x 60' Quadrangle, southeastern Wyoming, western Nebraska, and Northern Colorado

HSDM 99-1 Digital geologic map of the Gillette 30' x 60' Quadrangle, Campbell, Crook, and Weston Counties, northeastern Wyoming

HSDM 00-1 Digital Geologic Map of the Laramie 30' x 60' Quadrangle, Albany and Laramie Counties, Wyoming

HSDM 01-1 Digital Geologic Map of the Sheridan 30' x 60' Quadrangle, Sheridan, Johnson and Campbell Counties, Wyoming, and Southeastern Montana

USGS SURFICIAL GEOLOGIC MAPS

The US Geological Survey has published surficial geologic maps for the Recluse 30' x 60' Quadrangle (Reheis and Williams, 1984), the Reno Junction 30' x 60' Quadrangle (Reheis and Coates, 1987), and the Gillette 30' x 60' Quadrangle (Reheis, 1987). Those maps were slightly modified by the Wyoming State Geological Survey to be consistent with the HSDM surficial map series.

Reheis, M.C., 1987, Surficial geologic map of the Gillette 30' x 60' Quadrangle, Campbell and Crook Counties, Wyoming: U.S. Geological Survey Coal Investigations Map C-105, scale 1:100,000.

Reheis, M.C., and Coates, D.A., 1987, Surficial geologic map of the Reno Junction 30' x 60' Quadrangle, Campbell and Weston Counties, Wyoming: U.S. Geological Survey Coal Investigations Map C-106, scale 1:100,000.

Reheis, M.C., and Williams, V.S., 1984, Surficial geologic map of the Recluse 30' x 60' Quadrangle, Wyoming and Montana: U.S. Geological Survey Coal Investigations Map C-81-F, scale 1:100,000.

Wyoming State Geological Survey
P.O. Box 3008
Laramie, WY 82071-3008
(307) 766-2286
(307) 766-2605 FAX

USGS
2617 E. Lincolnway, Suite B
Cheyenne, WY 82001
(307) 778-2931
(307) 778-2764 FAX
/pjb 2-3328-doc

Additional BLM Guidance

Off-channel CBM water containment structures will be designed to meet the following requirements and minimum standards:

1. As much as practical, the off-channel containment structure shall be located on level ground and away from established drainage patterns, including intermittent/ephemeral drainage ways, and unstable ground or depressions in the area.
2. The off-channel containment structure shall have adequate storage capacity for safe containment of all produced water, even in those periods when evaporation rates are at a minimum. Bottom dimensions must be large enough to accommodate construction equipment. The design shall provide for a minimum of two (2) feet of freeboard.
3. Depth shall be a minimum of 10 feet based on soil classification, surface terrain, evaporation, and storage requirements.
4. The containment structure levees are to be constructed so that the inside grade of the levee is no steeper than 3 (horizontal):1 (vertical), and the outside grade no steeper than 2:1¹.
5. The top of the levees shall be level and at least 12 feet wide¹.
6. The containment structure location shall be reclaimed pursuant to the requirements and standards of the surface management agency (BLM). On a split estate (private surface, Federal mineral) a surface owner's release statement or form is acceptable.
7. Fencing may be required on a case-by-case basis, determined through the pre-approval on-site inspection and NEPA analysis or if there is no beneficial use.

Notes:

¹ Design criteria may be changed by BLM Civil Engineer.

Operators must include as part of the WMP, detailed evidence that any off-channel CBM-produced water containment structure will function in a manner that will facilitate the containment, infiltration, and evaporation of the Federally-produced CBM water and resulting in minimal environmental impact.

Required data will include, but is not limited to: Depth to nearest confining layer; depth to uppermost shallow aquifer and aquifer water quality; average monthly evaporation and precipitation; and evidence that impounded water will not enter 'waters of the state'.

Off-channel containment structures will be sited in accordance with the criteria required by the WDEQ. If the off-channel containment structure is located on fee or state leases it will be regulated by the WOGCC. If the off-channel containment structure is constructed on Federal surface or on private surface/Federal mineral, the BLM is the regulating agency.

A hydrologic watershed analysis, based on field reconnaissance, must be Completed.



Appendix WMP 6



The State
of Wyoming

Department of Environmental Quality

Jim Geringer, Governor

Herschler Building • 122 West 25th Street • Cheyenne, Wyoming 82002

ADMIN/OUTREACH (307) 777-7758 FAX 777-3610	ABANDONED MINES (307) 777-6145 FAX 777-6462	AIR QUALITY (307) 777-7391 FAX 777-5616	INDUSTRIAL SITING (307) 777-7369 FAX 777-6937	LAND QUALITY (307) 777-7756 FAX 777-5864	SOLID & HAZ. WASTE (307) 777-7752 FAX 777-5973	WATER QUALITY (307) 777-7781 FAX 777-5973
--	---	---	---	--	--	---

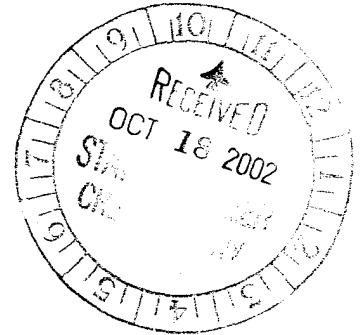
MEMORANDUM

TO: Dennis Hemmer, DEQ Director
Pat Tyrrell, SEO
Don Likwartz, WOGCC
Dennis Stenger, Buffalo BLM Office

FROM: Gary Beach, WQD Administrator *GB*

DATE: October 14, 2002

SUBJECT: Guidance for permitting Off-channel containment pits for CBM discharges.



There are multiple agencies that permit the discharge, location and construction of off-channel containment pits associated with coalbed methane discharges. Don Likwartz suggested that we develop a permitting guidance document between the four agencies. This document would help operators understand who they needed a permit from and what permits are needed. Collectively we have developed this document, along with a flow chart, and it is ready for your signature. Please sign all four copies of the signature page.

Once you have signed the documents, will you please circulate it to the next entity that needs to sign it. We have included addressed envelopes with the package. Please return the originals to Patti Burns at DEQ/WQD, who will distribute copies to all signatures and will post a copy of this document on our web page.

Thank you.

/pjb
2-3324-ltr

PERMITTING REQUIREMENTS ASSOCIATED WITH OFF-CHANNEL CONTAINMENT PITS

October 14, 2002

Background

This document was developed as an interagency cooperative effort to provide guidance to the CBM industry on the permitting requirements associated with the development and construction of off-channel reservoirs, ponds or pits. This guidance is applicable to any man-made reservoirs, ponds or pits created to contain CBM discharge water that are located in upland areas outside of natural waterways. This guidance is not applicable to reservoirs and ponds constructed within the channels of natural waterways. This document is also intended to implement a companion document titled Off-Channel, Unlined CBM Produced Water Pit Siting Guidelines for the Powder River Basin, attached hereto. Representatives of the Wyoming Department of Environmental Quality (DEQ), the Wyoming Oil and Gas Conservation Commission (WOGCC), the Bureau of Land Management (BLM) and the Office of the State Engineer (SEO) jointly developed these recommendations. These guidelines were heard and approved by the DEQ Water and Waste Advisory Board on October 1, 2002.

Purpose

This document will briefly describe the permitting requirements of four separate regulatory entities that have some level of jurisdiction over the discharge to and the construction of off-channel containment pits. These structures, referred to as "pits" in this document may also be called ponds, containment units, or reservoirs by the SEO and DEQ.

Wyoming DEQ Permitting Requirements

1. If there are designated uses of the water discharge to or contained in the off-channel containment pit, an NPDES discharge permit must be obtained before discharge begins. This permit authorizes the discharge and ensures the quality of the discharge will protect the designated uses and other waters of the state. Designated uses may include livestock watering, wildlife use, irrigation, etc. The NPDES permit is not for the construction of the off-channel containment pit, although the permit limits rely on the discharge water being fully contained in the containment pit and not entering other surface waters of the state. The discharge can be authorized through a general permit created specifically for this unique type of discharge or through an individual permit which is site-specific. Authorization under the general permit should take less than 45 days for approval, while an individual permit may take 60 to 90 days for approval. These ponds must be designed and constructed so that there is no direct subsurface hydrologic connection to other surface waters of the state.
2. If there is a threat that the containment pit may degrade higher quality groundwater aquifers, DEQ may require a Chapter 3 construction permit. Generally, however, DEQ will rely on the WOGCC and BLM siting and permitting requirements to ensure that groundwater resources are adequately protected. See the later discussions under WOGCC and BLM and the attached Off-channel, Unlined CBM Produced Water Pit Siting Guideline for the Powder River Basin document.

Wyoming SEO Permitting Requirements

1. If there are beneficial uses of the water contained in the off-channel containment pit, a reservoir permit is required from the State Engineer's Office before construction of the off-channel containment pit begins. Beneficial uses can include inactive uses such as stock, wildlife, and/or wetlands and/or active uses such as land application, leach fields, irrigation, and/or dust abatement.
2. If the reservoir/pit is constructed with an embankment which is 20 feet or higher or more than 50 acre-feet will be stored against a man-made embankment, then safety-of-dams requirements may apply.

Wyoming Oil and Gas Commission Permitting Requirements

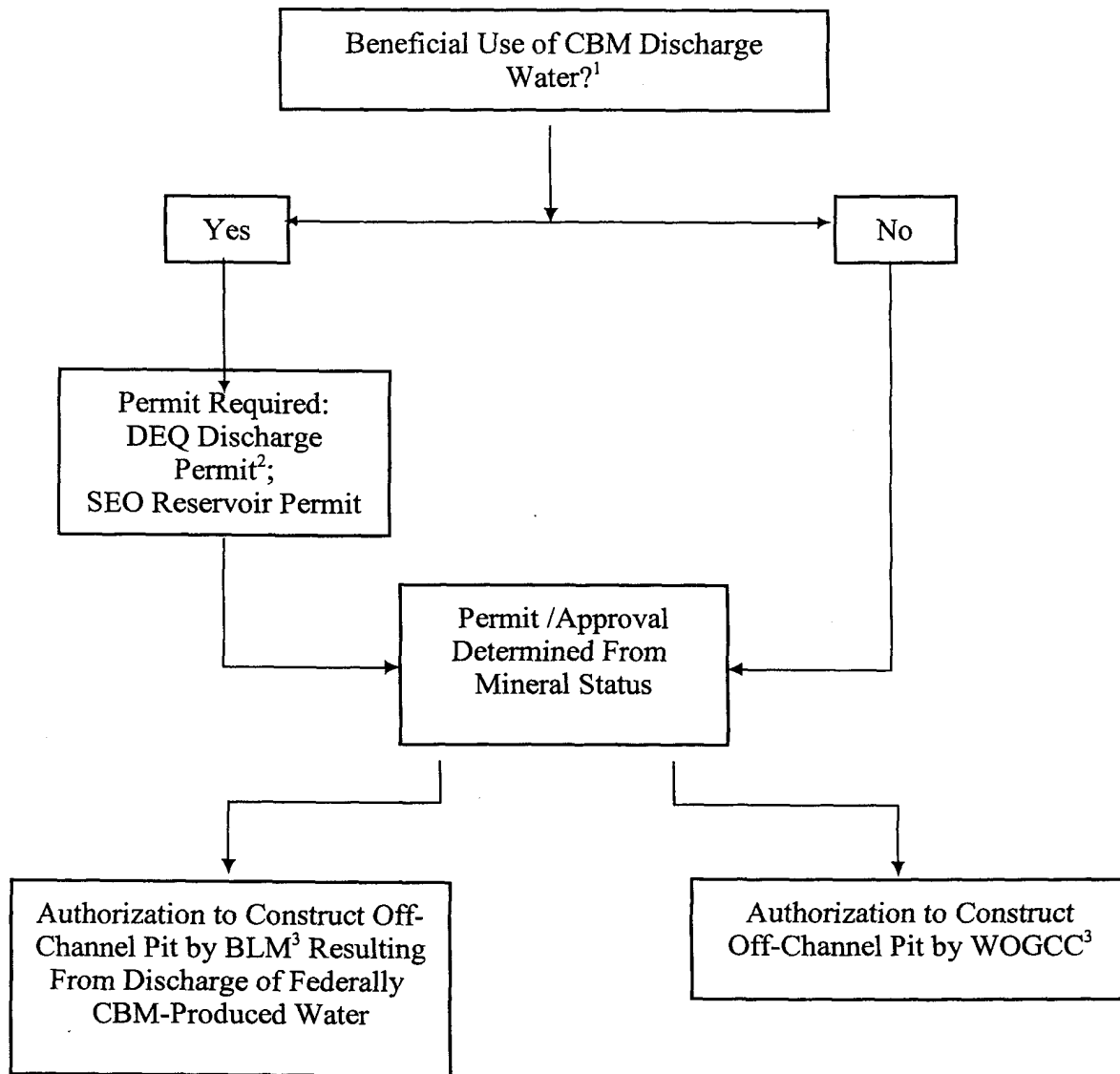
1. Form 14A must be submitted and approved prior to construction of off-channel produced water pits built on fee or state leases. The Supervisor may request information in addition to what is required on Form 14A. Pits proposed to be constructed in the Powder River Basin for percolation of water produced in association with recovery of coalbed methane gas into shallow sands or aquifers may be considered if the applicant can demonstrate their operation will comply with water quality standards of the DEQ. A siting guideline for off-channel, unlined CBM produced water pits has been drafted to assist operators. Approval for pit construction is handled administratively and Commission staff routinely pre-sites pit locations prior to taking action on applications.
2. The Commission may require a bond from the owner/operator of a pit conditioned for the workmanlike operation of the pit and that its closure be done in accordance with the agency's rules. Separate bonding amounts for the pits are set by the Supervisor following evaluation of site-specific conditions and circumstances. *The owner/operator should provide a written cost estimate prepared by a Wyoming registered professional engineer with expertise in surface pit remediation for closure of the pit and reclamation of the surface and access areas closely adjacent to the pit. The surface landowner must receive a copy of the cost estimate from the owner/operator.*

Because the produced water retention pits used by the methane industry in the Powder River Basin may be of use to the landowner, the Supervisor may waive bonding and allow such pits to remain open after the cessation of production. In this instance, a notarized statement of acceptance signed by the landowner must accompany the Form 14A when it is submitted to the agency. Specifics of that letter of acceptance are included in Chapter 3, Section 4.

Bureau of Land Management Approval Requirements

1. The Bureau of Land Management (BLM) Buffalo Field Office will approve, bond, inspect, and enforce compliance on all off-channel pits resulting from a federal action for the discharge of produced water from a CBM well into these containment structures. The off-channel pits must meet the attached siting criteria and BLM's guidance as referenced in BLM's updated Coal Bed Methane Well APD and POD Preparation Guide Book.
2. Information required in the application for an off-channel pit approval, includes but is not limited to, a representative onsite standard water analysis (DEQ'S NPDES analytical

Figure 1
CBM OFF-CHANNEL CONTAINMENT / INFILTRATION PITS
PERMITTING DECISION TREE




- ¹ Will CBM water in the containment pit be used for livestock watering, wildlife, irrigation or other beneficial uses?
- ² May be authorized through General Permit for discharges to off-channel containment pits.
- ³ May request DEQ to review proposed location if there are questions concerning potential for adverse impacts to the groundwater.

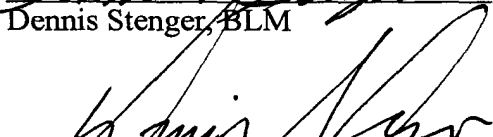
suite) for CBM produced water, size of containment pit, freeboard capacity, method of disposal of produced fluids (i.e., land application, etc.), maximum fluid level above cut (native soil) on downgradient side, % compaction, slope of inside and outside face of berm/dam, distance to nearest drainage, soil characteristics, and depth to shallow groundwater (with collection of shallow groundwater sample during subsurface investigation). The subsurface investigation will provide adequate information to insure that the shallow aquifer will not be degraded below its existing class of use and that infiltration will be primarily downward and not migrate laterally entering "surface waters of the state". Off-channel pits are designed to be full containment with water loss only to infiltration and evaporation, which precludes the use of a drop-pipe or spillway.

Recommended Permitting Process

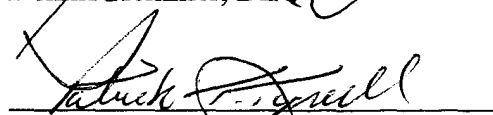
The following figure is a decision tree to help the reader understand which permits must be obtained based upon site-specific conditions. It is recommended that the operator first obtain the authorization for construction of the off-channel pit before obtaining the NPDES permit, so that when the operator seeks the DEQ discharge permit, he can be confident that the siting of the off-channel pit is acceptable.


Dennis Stenger, BLM

Date: 10/24/02


Dennis Hemmer, DEQ

Date: 10-17-02


Pat Tyrrell, SEO

Date: 10-18-02


Don Likwartz, WOGCC

Date: 10-22-02

Attachment, Off-channel, Unlined Produced Water CBM Pit Siting Guideline for the Powder River Basin, August 6, 2002.

Appendix E
Mitigation Monitoring
and Reporting Plan

Appendix E — Mitigation Monitoring and Reporting Plan

This Appendix outlines the planning process for the Mitigation Monitoring and Reporting Plan (MMRP) for the Powder River Basin Oil and Gas Project Area. This document describes the basic components of the plan and steps involved in its implementation.

The PRB Oil and Gas Project FEIS contains a detailed description of the nature of exploration and development of coal bed methane in the Powder River Basin. It is speculative to predict how future development will proceed. There is uncertainty about the specifics of future development. Because of this uncertainty, a number of assumptions were necessary to predict the impacts associated with future development. Those assumptions may or may not be correct. Therefore, mitigation measures may need to be modified as development evolves.

Purpose and Need

The effects of the proposed action on the environment as identified in this analysis are based on a series of assumptions. Because the development may not occur exactly as portrayed in the FEIS, it will be important to monitor effects as development progresses over time. It will also be important to assess the effectiveness of the mitigation measures adopted. For instance, will adopted mitigation and best management practices be adequate to prevent water quality degradation in the Tongue, Powder and Little Powder Rivers? Will operating within decibel level thresholds be sufficient to protect grouse breeding integrity? These questions are particularly relevant given our current ability to predict cumulative effects on the ecosystem. Predictions regarding the severity of the impacts are complicated further by the fact that some of the development may occur on private and state lands where protective measures (such as seasonal restrictions to protect big game and raptor nests, no surface occupancy stipulations) are not typically applied. Will effects on private lands increase density on Federal lands resulting in deteriorating quality of habitat?

The uncertainties as to where and at what level development will proceed as well as uncertainties associated with the assumptions that were used to predict impacts suggest that the one-time determination of impacts that is included in the EIS may not occur as projected. A MMRP would help to continually assess the effects of the project and the adequacy of the mitigation. Such a plan/process would provide a mechanism for continuously modifying management practices in order to allow development while continuing to protect the environment. CEQ regulations provide for appropriate application of continual monitoring and assessment. Section 102(2)(B) of NEPA calls for “*methods ... which will insure that presently unquantified environmental amenities and values may be given appropriate consideration,*” CEQ regulations (40 CFR 1505.2(c); 1505.3(c) and

(d)) state “a monitoring and enforcement program would be adopted and summarized, where applicable, for any mitigation” and that agencies “may provide for monitoring to assure that their decisions are carried out and should do so in important cases.” The lead agency must “upon request, inform cooperating or commenting agencies on progress in carrying out mitigation measures which they have proposed, and which were adopted in the decision.” And, “upon request, make available to the public the results of relevant monitoring.”

Goals and Objectives

The goals and objectives of the MMRP are to develop resource-monitoring plans for specified resources to:

- ¾ Determine the effects of development on these resources;
- ¾ Determine the effectiveness of the mitigation measures contained in the Record of Decision (ROD);
- ¾ Modify the mitigation measures as deemed appropriate to achieve the stated goal/objective. . Proposed changes that may arise as a result of monitoring will need to be assessed to determine whether public review comment is required. Generally, minor changes that do not impose additional constraints can be enacted as maintenance to the Resource Management Plan. Proposed changes that would impose additional constraint beyond that currently in the RMP would require amending the RMP and public involvement.;
- ¾ Assure that non-oil-and-gas related BLM decisions (such as grazing, recreation, etc.) regarding, are coordinated with oil and gas-related development;
- ¾ Provide a rapid response to unnecessary/undue environmental change;
- ¾ Validate predictive models used in the EIS and revise the models/projections as necessary based on field observations and monitoring;
- ¾ Accurately monitor and predict cumulative impacts through BLM maintenance of a Geographic Information System (GIS) on Federal and non-Federal lands and how they are affecting resources;
- ¾ Provide guidance for monitoring (surveys) upon which the need to initiate Section 7 consultation with the USFWS will be determined.

Resource Monitoring Plans and Objectives

Monitoring Plans will be prepared for the following resources and activities. Determination of the on-the-ground monitoring will be made by the BLM and cooperating agencies that carry out the monitoring programs. . Key indicators or triggers will be identified during individual plan development, when possible. These triggers would be used as a “need for additional action” indicator. If triggers are reached, documented decisions will be required regarding the need to change associated mitigation.

Wildlife Resource

Sage grouse/sharp-tailed grouse

1. Clearance surveys for sage grouse breeding activity would be documented in a database. Document changes, if any, in breeding distribution, associated with oil and gas development.
2. Loss of sagebrush shrublands and their reclamation success would be documented in a database. Weed infestation would also be documented so appropriate treatment can occur.

Raptors

1. Monitor and document raptor nesting activity and locations within the PRB.
2. Document changes, if any, in nesting locations, active nest sites, and effects from oil and gas development.

Threatened, Endangered, or Sensitive Species

1. A written summary will be provided to the USFWS' Wyoming Field Office semi-annually. The semi-annual report will include field survey reports for endangered, threatened, proposed and candidate species for all actions covered under the *Environmental Impact Statement (EIS) for the Powder River Basin Oil and Gas Project* and ROD. The semi-annual reports will include all actions completed up to 30 days prior to the reporting dates. The first report will be due 6 months after 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.

Bald Eagle

1. A database would be maintained tracking bald eagle deaths or injuries encountered in the field related to this action.
2. Suitable nesting and winter roosting habitats inventoried would be identified and mapped.
3. All take of bald eagle habitat associated with implementation of the action would be documented.
4. A carcass monitoring program would be implemented.

Black-footed Ferret/Black-tailed prairie dog

1. Suitable black-footed ferret habitat would be identified and mapped.
2. All take of prairie dog habitat associated with implementation of the action would be documented.

Mountain Plover

1. All take of mountain plover habitat associated with implementation of the action would be documented.
2. A carcass monitoring program would be implemented.
3. The success of reclamation of areas of previously suitable mountain plover habitat would be monitored. Reclamation would be considered complete

when ground cover with seeded species is similar to pre-disturbance percentages. Weed infestation would also be documented so appropriate treatment can occur.

Ute ladies'-tresses orchid

1. Suitable orchid habitat would be identified and mapped.
2. The success of reclamation of areas of previously suitable orchid habitat would be monitored. Reclamation would be considered complete when ground cover with seeded species is similar to pre-disturbance percentages. Weed infestation would also be documented so appropriate treatment can occur.

Aquatics

1. Water quality in ponds developed for fisheries would be sampled on an annual basis for selenium, TDS, and sodium bicarbonate, at a minimum.
2. Stream channel monitoring for erosion, degradation, and riparian health would be conducted on an annual basis and after major storm events to determine the storm event's effects (non-CBM related effects). Surveys would include no less than one stream reach above all CBM discharges and several stream reaches below CBM discharges. Where monitoring occurs, a station would be placed above all CBM outfalls and one below all CBM outfalls, at least on main stems.
3. Sub-watersheds that will receive CBM produced waters and would be monitored for macroinvertebrates and fish populations include: Upper Tongue River, Upper Powder River, Salt Creek, Crazy Woman Creek, Clear Creek, Middle Powder River, Little Powder River, Antelope Creek, Upper Cheyenne River, and Upper Belle Fourche River. Sampling sites would be established at existing flow and water quality monitoring stations where possible. Monitoring of salinity by electric conductance in discharged water would be performed to assess the potential for adverse effects. Sampling would occur on an annual basis during low flow periods, and all data collected would be entered into a central database. At least two sampling locations per stream or river would be established in these watersheds.

Water

Groundwater

1. The effects of infiltrated waters on the water quality of existing shallow groundwater aquifers are not well documented at this time. Potential impacts will be highly variable depending on local geologic and hydrologic conditions. It may be necessary to conduct investigations at representative sites around the basin to quantify these impacts, and provide site-specific guidance on the placement and design of CBM related impoundments. Shallow groundwater wells would be installed and monitored where necessary.
2. A battery of 35 new groundwater monitoring well locations would be installed throughout the project area.

Surface Water

BLM, in cooperation with the WDEQ, WSEO, USGS and others fund an extensive network of surface water monitoring sites in the project area. Approximately 47 stations are currently operated to continuously record stream flow on major rivers and streams in the area. Over half of these sites include periodic water quality analysis as well. This analysis typically includes major cations and ions (calcium, magnesium, sodium, bicarbonate, chloride, and sulfate), selected nutrients (nitrate and phosphorus), and trace metals (arsenic, barium, iron, manganese, and selenium). The PAW also contracts water quality sampling at 26 sites on tributary streams in the region. Continued monitoring by BLM in conjunction with federal, state, and local agencies at existing sites on tributaries and main-stems in the Project Area would be incorporated into the monitoring plans described below.

All parties involved are currently developing a comprehensive, basin wide surface water-monitoring plan that will integrate the efforts of all cooperators into a single monitoring effort. All data from this monitoring network will be compiled at a single depository and will be available to all interested parties.

Discharges of CBM

Proposed CBM produced water discharges would initially be characterized in accordance with the requirements of WDEQ's NPDES general or individual permit application. Once surface discharge is authorized, under a WDEQ-issued NPDES permit, if required by the permit, initial monitoring of the discharge from each outfall would include Total Petroleum Hydrocarbons (TPH), pH, Specific Conductance (EC), Total Dissolved Solids (TDS), sulfate, chloride, Radium 226, Total Iron (Fe), Total Manganese (Mn), Total Barium (Ba), and Flow Volume. Following initial monitoring, routine monitoring at specified intervals would include flow (monthly), TPH, pH, EC (every 6 months), and Radium 226, Fe, Mn, Ba, Chloride (annually). During monthly flow monitoring, a visual inspection of erosion control measures would take place, to assure that no significant damage or erosion of the receiving water channel at the point of discharge has occurred. This monitoring describes the minimum requirements of WDEQ's general permit for CBM produced water discharges; additional or more stringent monitoring requirements may be imposed at the discretion of the WDEQ.

Bicarbonate is one constituent of interest that may require additional monitoring because of its potential toxicity to aquatic life. Discharges of CBM produced water are typically higher in sodium bicarbonate, which could have adverse effects on local populations of fish in selected drainages of the Project Area. The need for routine monitoring for bicarbonate would be evaluated during the NPDES permit process, based on the initial characterization of the CBM produced water discharge and aquatic resources specific to the drainage receiving the discharge.

If surface discharge of CBM produced water is proposed in receiving drainages where there are existing irrigation activities taking place, WDEQ permitting procedures may require operators to include an irrigation use protection plan with the NPDES permit application that specifies necessary measures to prevent violating the narrative standards for the protection of irrigated agriculture in the drainage. If the water quality of the proposed discharge is not of equal or better

quality than the ambient quality of the main stem and/or SAR/EC limits established for individual tributaries of the mainstem, operators would be required to demonstrate that a poorer water quality with respect to EC and SAR values would not result in a measurable reduction in crop yield and soil quality and permeability. In addition to initial characterization of the CBM produced water proposed for surface discharge (i.e. irrigation use), baseline soils monitoring that may be required to make this determination would include soil type, texture, and permeability, as well as analyses for SAR, EC, sodium (Na), calcium (Ca), magnesium (Mg), and exchangeable sodium percentage (ESP). Subsequent monitoring to gauge changes in water and soil quality would include the list of analytes listed above, and would need to occur at monthly intervals during the irrigation season to facilitate adjustments before measurable decreases in crop productivity result.

Natural Springs

Before CBM development occurs, existing springs within ½ mile of the proposed development would be inventoried. Initial flow rates would be measured, and a water quality sample to be analyzed for the same list of constituents required by WDEQ's NPDES general permit application would be obtained. The springs would be re-sampled every spring and fall to monitor any changes in the quantity or quality as a result of CBM development. These subsequent samples would be analyzed for the same list of constituents required by the monitoring specified in the WDEQ-issued NPDES permit.

Impoundments

CBM produced water discharges to off-channel containment impoundments would be subject to the requirements of WDEQ's NPDES general permit for these structures. Routine monitoring at specified intervals at the end-of-pipe discharge to the impoundment would include flow and TPH (monthly), pH, EC, chloride, and Total Selenium (Se) (every 6 months), and Radium 226 (annually). During monthly monitoring, a visual inspection of the impoundment would take place, to assure that no significant seeps or springs has occurred. In addition to the discharge to the impoundment, monitoring for Total Se, EC, chloride, and sulfate in the water contained in the impoundment would be required every 6 months, to evaluate the effects of evaporation on the water quality in the impoundment. This monitoring describes the minimum requirements of WDEQ's general permit for CBM produced water discharges to off-channel containment impoundments; additional or more stringent monitoring requirements may be imposed at the discretion of the WDEQ.

Land Application Disposal Areas

Routine monitoring of the water quality and soils at LAD areas would need to occur to assure that adverse effects are not occurring, or if so, can be mitigated. Monitoring of the CBM produced water proposed for LAD would include analysis for SAR, EC, major cations (Ca, Mg, Na), pH, and bicarbonate on a monthly basis, and monthly soils monitoring including the above constituents in addition to ESP and cation exchange capacity (CEC). Soil samples would be taken from each soil profile, and, while the number of samples would be determined based on site-specific topography, climate, and soil conditions, approximately one sample for every 5 acres of LAD area would be included.

Wetlands/Riparian

1. Any disturbed wetlands and/or riparian areas would be documented and tracked in a database.
2. The success of reclamation of disturbed areas would be monitored. Reclamation would be considered complete when ground cover with seeded species is similar to pre-disturbance percentages. Weed infestation would also be documented so appropriate treatment can occur.
3. Monitoring of salinity, by electric conductance in discharged water, would be performed to assess the potential for adverse effects to riparian vegetation. For each POD where salinity of discharged water is likely to reach a stream or wetland, one or more monitoring stations would be installed to assess effects to vegetation.

Reclamation/Best Management Practices

Surface Disturbance Revegetation

1. Annually monitor disturbed site reclamation/revegetation success and noxious weed occurrences.

Soils

1. Compile data related to LAD operation and mitigation to determine best management practices under various soil/water parameters.
2. BLM has installed 31 soil gas probes in 12 clusters. The probes are mainly in the Gillette area and the Thunder Basin National Grassland east of Wright. Probes have been installed in areas that may be potential conduits for methane to migrate to the surface, near the coal burn line where highly permeable clinker may allow gas to migrate, near drill holes or old wells to check for improper sealing, and near inactive mine faces and old mine fires.

The scope of the program will probably remain at a low level unless an incident occurs that would warrant an expanded network. Gillette has also installed over 30 probes within the city limits and measures them on a quarterly basis.

Air Quality

1. Continue to cooperate in the implementation of existing visibility and atmospheric deposition impact monitoring programs.

WDEQ detects changes in air quality through monitoring and maintains an extensive network of air quality monitors throughout the state. Particulate is most commonly measured as particles finer than 10 microns or PM₁₀. The eastern side of the Powder River Basin has one of the most extensive networks of monitors for PM₁₀ in the nation due to the density of coal mines. In addition to the network associated with the mines, there are also monitors in Sheridan and Gillette, Wyoming. To better monitor particulate related to coal

bed methane, Wyoming is currently installing monitors in Arvada and Wright, Wyoming.

WDEQ uses monitoring located throughout the state to anticipate issues related to air quality. These monitoring stations are located to measure ambient air and not located to measure impacts from a specific source. Monitors located to measure impacts from a specific source may also be used for trends. This data is used to pro-actively arrest or reverse trends towards air quality problems. When WDEQ became aware that particulate readings were increasing due to increased coal bed methane activity and exacerbated by prolonged drought, the DEQ approached the counties, coal mines and coal bed methane industry. A “coalition of the counties”, coal companies and coal bed methane operators have made significant efforts towards minimizing dust from roads. Measures taken have ranged from the implementation of speed limits to paving of heavily traveled roads.

Monitoring is also used to measure compliance. Where monitoring shows a violation of any standard, the WDEQ can take a range of enforcement actions to remedy the situation. Where a standard is exceeded specific to an operation, the enforcement action is specific to the facility. For many facilities, neither the cause nor the solution are simple. The agency normally uses a negotiated settlement in those instances.

There are also monitors for nitrogen oxides (NO_x) in spread along the east side of the Basin. WDEQ has also sited two visibility monitoring stations in the Basin. One of these sites is 32 mi north of Gillette and includes a Nephelometer, a Transmissometer, an Aerosol Monitor (IMPROVE Protocol), instruments to measure meteorological parameters (temp., RH, wind speed, wind direction), a digital camera, instruments to measure Ozone and instruments to measure Oxides of Nitrogen (NO , NO_2 , NO_x).

The other visibility monitoring station is located 14 miles west of Buffalo and includes a Nephelometer, a Transmissometer, an Aerosol Monitor (IMPROVE Protocol), instruments to measure meteorological parameters (temp., RH, wind speed, wind direction), and a digital camera.

Noise

Where compressors are built a distance of one-quarter mile from sensitive receptors, monitoring devices would be installed so that noise levels would not exceed 50 decibels above background noise.

Transportation

Access roads and sales pipelines

1. Monitor construction to ensure design and use standards are met and maintained.
2. GIS will be updated at least semi-annually based on companies' submittals of as built geo-referenced POD maps.

Mitigation, Monitoring and Reporting Planning Process Implementation

The BLM Buffalo Field Manager will implement the MMRP by establishing the *Powder River Basin Working Group* (PRBWG). The PRBWG will function as a resource working group consisting of BLM, cooperating agencies and other agencies who have expertise and regulatory authority in the area. The structure of the PRBWG will be as follows:

The PRBWG may include representatives from the following federal and state agencies:

- ¾ Bureau of Land Management [Buffalo and Platte Field Offices and personnel with special expertise from other BLM offices]
- ¾ U.S. Fish and Wildlife Service
- ¾ U.S. Army Corps of Engineers
- ¾ USDA Forest Service
- ¾ State of Wyoming agencies [Wyoming Game and Fish Department, Wyoming Department of Transportation, Wyoming Department of Environmental Quality - Air and Water Quality Divisions, State Historic Preservation Office, State Engineers Office, Wyoming Oil and Gas Conservation Commission, etc.]
- ¾ U.S. Environmental Protection Agency
- ¾ National Park Service
- ¾ U.S. Geologic Survey
- ¾ Johnson, Sheridan, Campbell and Converse County government as outlined in the state cooperating agency agreement.

An MMRP will be initiated after the approval of the PRBO&G ROD. The primary function of the PRBWG will be to:

- ¾ Review the development and implementation of monitoring plans for the PRB oil and gas development;
- ¾ Meet at a minimum once a year or more often as needed;
- ¾ Keep written record of meetings and disseminate to members and interested public;
- ¾ Conduct field inspections as needed to review the implementation of construction and rehabilitation operations; Review status quo and any new information since last meeting (e.g., monitoring results of impact mitigation effectiveness);
- ¾ Synthesize monitoring plan activities/expectations for the coming year, based upon operator input and new information;
- ¾ Review recommendations from the Task Groups and submit a recommendation to BLM (e.g., management practices and monitoring needs for upcoming field season);
- ¾ Oversee implementation of monitoring.

The PRBWG may establish Task Groups. The individual Task Groups would be initiated as needed.

The BLM would implement and coordinate the MMRP Process. BLM would have the sole authority for decisions and reporting relative to this process, while each member agency in the PRBWG would exercise its own regulatory authority while implementing the MMRP. The leadership for the coordination will be located in the BLM Buffalo Field Office. Meetings of the PRBWG and TG's would be held at a minimum, annually. Minutes of the meetings would be made available to the public upon request.

Function of PRBWG at First Meeting:

Explain Purpose and Need for MMRP process;

- $\frac{3}{4}$ Explain organizational structure and functional responsibilities of PRBWG and TGs;
- $\frac{3}{4}$ Establish and select PRBWG representatives;
- $\frac{3}{4}$ Review draft Memorandum of Understanding;
- $\frac{3}{4}$ Establish and select TG members;
- $\frac{3}{4}$ Set date, time, and place for next PRBWG meeting.

Function of PRBWG at Subsequent Meetings:

- $\frac{3}{4}$ Review minutes from previous meeting;
- $\frac{3}{4}$ Reports presented from the TG's on monitoring results;
- $\frac{3}{4}$ Review recommendations from TG's;
- $\frac{3}{4}$ Develop any changes to mitigation measure recommendations if necessary;
- $\frac{3}{4}$ Submit recommendations and monitoring results to BLM;
- $\frac{3}{4}$ BLM specify any new directives, set date, time, and place for next PRBWG meeting.

Task Group Functions.

Separate resource or activity Task Groups (TG's) would be established if necessary to complete the following:

- $\frac{3}{4}$ Recommend implementation of specified resource/activity monitoring plans;
- $\frac{3}{4}$ Keep written record of meetings and disseminate to PRBWG members and interested public;
- $\frac{3}{4}$ Implementation protocol including proposed fund sources;
- $\frac{3}{4}$ Annual monitoring report needs and meeting frequency;
- $\frac{3}{4}$ Resource concerns (e.g., based upon current conditions, drilling plans, etc.)
- $\frac{3}{4}$ Preparation of the monitoring plan and for evaluation of monitoring results, review, evaluate and summarize past/present data pertaining to the resource;
- $\frac{3}{4}$ Annual survey/inventory, monitoring, etc. that needs to be completed;

- $\frac{3}{4}$ Evaluation of mitigation measure(s) effectiveness;
- $\frac{3}{4}$ Results of monitoring and evaluation of the effect of project development on the resource;
- $\frac{3}{4}$ Implement monitoring plan as approved by BLM.
- $\frac{3}{4}$ Review and evaluate monitoring data collected;
- $\frac{3}{4}$ Present and submit monitoring results annually to PRBWG;
- $\frac{3}{4}$ Review and evaluate current monitoring plan;
- $\frac{3}{4}$ Modify monitoring plan and implement as approved by BLM;
- $\frac{3}{4}$ Recommend modifications to the development and monitoring plan to the PRBWG and BLM;
- $\frac{3}{4}$ If necessary, recommend modification to mitigation as needed.

The TG leadership for the coordination among the group and for the development, implementation, and reporting results of the monitoring plans will be as determined by group members. Meetings of the TG's will be held as often as deemed necessary but at least annually. TG meetings will be held during work hours. The agenda will be developed by the TG leader to address the necessary items as defined under the TG Functions above.

MMRP Implementation

The PRBWG will work with the other agencies and O&G industry to implement the monitoring programs specified. Agencies and cooperators will work with industry in corporate funding of monitoring to the extent that budget allocations permit.

Appendix F
Integrated Pest Management Plan

Appendix F — Noxious Weeds and Integrated Pest Management Plan

Wyoming is experiencing rapid introduction and spread of noxious weeds throughout the state. The increased operations and surface disturbance associated with CBM development in the Powder River Basin have the potential for exacerbating this problem if not addressed. As such, an integrated pest management (IPM) plan is necessary within identified areas of infestation.

The IPM plan will encompass energy development and production activities and will include the following:

- x A plan to control noxious weeds and weeds of concern within specific project areas
- x Preventive practices to avoid the transport and spread of weeds and weed seed
- x A strategy to educate field employees and contractors in noxious weed identification and awareness.

Noxious weed infestations can occur both directly and indirectly from energy and related development. Weeds and weed seed can be transported and spread with road surfacing and other construction and reclamation materials. Weed and weed seed can also be attached to equipment and vehicles and spread over great distances. Physical soil disturbance such as the construction of pipelines, access roads, well locations and water management structures, as well as the soil moisture and chemical alterations from produced water discharge, stream flow, and storage, create numerous opportunities for the introduction, infestation and spread of noxious and other weeds of concern.

To determine if an IPM plan is required for your APD or POD, consult the website, www.clearinghouse.info, to view identified areas of: (1) noxious weeds, (2) other weeds of concern and (3) biological agents insectaries in the area encompassed by the APD or POD. Additional data about noxious weeds and weeds of concern and their biological agents can be obtained from:

- x Landowner, if not BLM surface
- x County weed board data base and weed location information
- x Inventory by knowledgeable person
- x Bureau of Land Management, Natural Resources Conservation Service or other federal/state agency

Prevention and control of noxious weeds and weeds of concern should be incorporated into the design, layout and construction of access roads, pipelines, well locations and other facilities. It is important to note weeds are more commonly found along drainages and streams, areas with deeper, more productive soils, and in areas previously disturbed or overgrazed. Also, pipelines, access roads and drainages with flowing produced water can create corridors/conduits for weed spread and produced water storage structures (discharge points, reservoirs, off-channel containment structures, etc.) can harbor weeds and invasive plants.

Guidelines for IPM plan development are as follows:

- A. Control noxious weed and weeds of concern during construction, production and reclamation using an integrated approach. Determine the best methods to treat weed(s), as they pertain to the specific situation; consider landscape, soils, desirable vegetation present, distance to open water/water table, land use and other pertinent factors using the most effective combination of the following methods.

x Cultural

- a. The prompt reseeding and revegetation of areas of disturbed soils with certified weed-free seed.
- b. Encourage the cleaning of equipment and vehicles prior to entering and leaving each worksite.
- c. Minimize soil disturbance, where possible.
- d. Use certified weed-free mulch for erosion control.

x Physical

- a. Consider mowing newly revegetated areas during the first season of establishment, prior to seed formation on the weeds of concern.
- b. Hand pulling of plants is encouraged if areas are small or infestations are new.

x Biological

- a. Use of domestic animals and approved biological agents may be utilized noting that biological agents are species specific and can take up to five years before any results may be detected. Considerations for use of domestic livestock include, but is not limited to, livestock kind, target weed species, necessary management of the livestock (fencing, water, herding, etc).

x Chemical

- a. Consider weed species, the site on which herbicide will be applied, and desired result when selecting appropriate herbicide for noxious weed control.
- b. Ensure selected herbicide is approved for weed(s) to be controlled, for type of application and that herbicide label is otherwise consistent with intended use.
- c. All herbicides must be applied by certified commercial applicator(s).

1. On BLM administered public lands, an approved Pesticide Use Permit (PUP) is required to apply chemical herbicide and an approved Biological Release Permit (BRP) is required for the release of biological agents. The necessary forms and direction will be included with the approved POD or APD and/or may be obtained from your local BLM office (see attached PUP and BRP forms). All herbicide applications must be applied by a certified commercial applicator(s).

- x See current list of herbicides approved for application on Bureau of Land Management administered lands. Contact the BLM office.

2. On private lands consult the private surface owner as to the desired method(s) for the control/treatment of noxious weeds/invasive plants.

B. Incorporate weed prevention and control measures into environmental restoration and infrastructure maintenance activities.

1. Use only certified weed-free hay, straw and/or other organic mulches used for erosion control and other environmental restoration activities.
2. Use only road surfacing and other earthen materials for construction/maintenance that are certified weed-free.
3. Encourage the cleaning of all vehicles and equipment used in construction, drilling, restoration and maintenance activities by pressure washing, or other effective means. This will ensure that all equipment/vehicles are weed-free prior to transporting into new areas of development.
4. Reseed all areas not utilized for production/maintenance immediately following construction and restoration activities.
5. Use only certified weed-free seed for the reclamation/restoration of areas disturbed by coal bed methane or related development/activities.

C. Initiate a weed education policy to assist contractors and field employees in the identification of noxious weeds and to create an awareness of the impacts that noxious weeds and invasive plants have on the environment.

1. Develop cooperative education and awareness programs with county weed districts, state and federal agencies and educational institutions.
2. Encourage contractors and employees to report new noxious weed infestations to company representative responsible for weed management and the appropriate county weed board/supervisor.
3. Distribute and review weed education material at onsite inspections and pre-construction conferences.

Appendix G

**Mitigation Measures Not Included
in the RMP Amendments and the
Rationale for Not Including Them**

Appendix G — Mitigation Measures Not Included in the RMP Amendments and the Rationale for Not Including Them

These mitigation measures were included in the FEIS as additional action which could reduce the impacts of CBM operation on certain resource values. These mitigation measures were not accepted for incorporation into the RMPs for a variety of reasons as outlined below.

Reference numbers apply to those in Chapter 4 of the FEIS.

4. Disturbed channel beds would be reshaped to their approximate original configuration and stabilized by appropriate means.

Rationale: This measure was redundant with #20 and was already covered in the SCOA brought forward from previous NEPA Appendix C, C-7 #2.

5. Areas where natural springs are present, operators would be required to identify, inventory, and monitor these springs as part of their water management plan development.

Rationale: This is not a mitigation measure but is required as part of the WMP and springs are addressed in the Mitigation, Monitoring and Reporting Plan (MMRP).

7. Concerns regarding the potential for discharges of CBM water to reach the main stems would be minimized by locating discharge outfalls higher in ephemeral and intermittent drainages or near the drainage divide.

Rationale: Guidelines for placement of water discharge points are provided in the WMP. BLM has the authority through Onshore Order #7 to control the placement of water discharge points based on their physical effects on the land and land uses. The placement of water discharge points would also be addressed by WDEQ in the issuance of the NPDES permit to meet water quality standards. Therefore, these concerns will be addressed as appropriate prior to approval of permits.

8. Land application of produced water has the potential to produce negative, long term impacts to soil physical and chemical properties if not properly managed. Proposals to land apply CBM produced water on federal projects must include the following information as part of the exploratory and/or permanent water management plans:

Site characterization: The site characterization must include field investigations of soils and vegetation. The site will be described in detail, and soil samples will be collected and analyzed to determine important soil chemical and physical properties. Site descriptions will include maps, vegetation descriptions, soils descriptions, laboratory analysis and location of proposed

application sites. Photo documentation of the site will be included. Laboratory analysis of produced water will also be included with the site characterization study.

Project description: The project description must include the proposed method(s) of water application, application rates and schedules and physical layout of application areas. Complete maps of the application infrastructure will be included. The description will include details on any soil or water amendments that will be used or physical soil manipulations that will be planned. Project descriptions will demonstrate that land application is feasible given the results of the site characterization.

Monitoring Plan: Periodic monitoring of soils and vegetation will be required of the operator to assure that negative impacts are not occurring, or are being remediated. Monitoring must include soil sampling and laboratory analysis.

Winter operations: Detail practices that will be used to prevent the buildup of ice on the soil surface during sub freezing temperatures.

Mitigation Plan: A plan must be developed which outlines mitigation measures that will be implemented by the operator in the event negative soils or vegetation impacts are detected during routine monitoring. Potential mitigation measures might include, but not be limited to, soil or water amendments, physical manipulation or vegetative treatments.

These criteria are general in nature, and must be adjusted to site-specific conditions. Detailed soil sampling criteria have not yet been developed, so project proposals will be evaluated on a case-by-case basis during the interim. More specific guidance/requirements may be forthcoming as the result on ongoing research and coordination.

Rationale: This is not mitigation but an administrative requirement and is incorporated into the WMP.

9. The Companies would segregate soil horizons during excavation of all project facilities and avoid mixing of soil horizons during stockpiling and redistribution of soils.

Rationale: This measure was already covered in the SCOA brought forward from previous NEPA Appendix C, C-3 #3.

13. Should human remains be unearthed during construction, procedures outlined in the human remains plan (Appendix L of the FEIS) would be followed.

Rationale: This measure was already covered in the SCOA brought forward from previous NEPA Appendix C, C-4, #15, and has been edited to include the direction in Appendix L of the FEIS.

14. At a minimum, all areas of proposed ground disturbing activity would be intensively inventoried for cultural resources in conformance with minimal BLM Class III survey standards at the APD, POD, or SN phase of each proposed Federal undertaking...

Rationale: This is not mitigation but is already an administrative requirement.

15. Companies would be required to submit an integrated pest management plan (Appendix F) as a component of the APD and POD approval process.

Rationale: This is not mitigation but an administrative requirement.

16. Any mulch and seed used for reclamation needs to be certified weed free and current year tested.

Rationale: This measure was already covered in two COAs brought forward from previous NEPA Appendix C, C-8 #7 and C-9 #18. They have also been edited for clarification.

30. Stream channel monitoring for erosion, degradation, and riparian health would be conducted on an annual basis. Surveys would include no less than one stream reach above all CBM discharges and several stream reaches below CBM discharges. Where monitoring occurs, a station would be placed above all CBM outfalls and one below all CBM outfalls, at least on main stems.

Rationale: This is monitoring and has been incorporated into the MMRP for implementation.

31. Sub-watersheds that would receive CBM produced waters and would be monitored for macroinvertebrates and fish populations.

Rationale: This is monitoring and has been incorporated into the MMRP for implementation. BLM only has the authority to conduct this monitoring on federal mineral development.

75. Increase the distance between a CBM facility and an existing noise-sensitive receptor. As shown in the analysis, noise decreases by 6 dBA with every doubling of distance from a source. For instance, if the noise were 65 dBA at 100 feet from a CBM source, the noise would decrease to 59 dBA at 200 feet from the source and to 47 dBA at 800 feet from the source.

Rationale: This is redundant and is covered by a revised measure #77.

