RECORD OF DECISION Environmental Impact Statement for the Atlantic Rim Natural Gas Field Development Project Carbon County, Wyoming



March 2007

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RECORD OF DECISION ENVIRONMENTAL IMPACT STATEMENT FOR THE ATLANTIC RIM NATURAL GAS FIELD DEVELOPMENT PROJECT CARBON COUNTY, WYOMING

U.S. Department of the Interior Bureau of Land Management Wyoming State Office Cheyenne, Wyoming

March 2007

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Table of Contents

SUMMARY1	1
DECISION1	1
REASONS FOR THE DECISION	4
SUMMARY OF PROPOSED ACTION AND ALTERNATIVES	1
Alternatives Considered in Detail 11	1
Proposed Action11	1
Alternative A: No Action 12	2
Alternative C: Special Protection of Sensitive Resources	2
Alternative D: Natural Gas Development with Disturbance Limitations (Agency Preferred Alternative)	2
ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS 14	4
DEIS Alternatives Not Carried Forward for Final Analysis	4
OTHER ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS	4
3,880 Natural Gas Wells from 3,880 Well Locations14	4
Directional Drilling14	4
Produced Water Disposal and Treatment Options15	5
ENVIRONMENTALLY PREFERRED ALTERNATIVE	6
PLAN, REVIEW, AND APPROVAL PROCESS	6
PERFORMANCE REQUIREMENTS21	1
PUBLIC INVOLVEMENT	1
APPEAL PROCESS	2
ERRATA	3

List of Figures

1.	Atlantic Rim Project Location, Carbon County, Wyoming	2
2.	Category A Mitigation Areas	.13
3.	Atlantic Rim Oil and Gas Development Proposal Submittal—Approval—Implementation Process	. 17

List of Appendices

- A. Atlantic Rim Natural Gas Project Reclamation Plan
- B. Atlantic Rim Natural Gas Project Performance-Based Monitoring and Best Management Practices
- C. Operator-Committed Practices
- D. Formal and Informal Consultation for the Atlantic Rim Natural Gas Field Development Project
- E. Summary of Public Comments on the Atlantic Rim Natural Gas Project Final Environmental Impact Statement

RECORD OF DECISION

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SUMMARY

This Record of Decision (ROD) documents the Wyoming State Director's decision to approve the preferred alternative as described in the Atlantic Rim Natural Gas Field Development Project (ARNG) Final Environmental Impact Statement (FEIS). The ARNG FEIS analyzes various options for oil and gas recovery and resource mitigation. The decision emphasizes limiting surface disturbance and performing interim reclamation, cooperative air quality monitoring with the state of Wyoming, and continued resource monitoring and consultation with federal and state agencies. The ROD provides the plan for future management of the federal surface and mineral estate in the Atlantic Rim Project Area (ARPA). The ARPA comprises approximately 270,080 acres, of which 173,672 acres are federal surface estate (64 percent of the ARPA), 14,060 acres are state surface estate (5 percent), and 82,348 acres are private surface estate (31 percent). The Bureau of Land Management (BLM) Rawlins Field Office (RFO) manages more mineral estate than surface estate within the ARPA: 179,438 acres federal mineral estate (66 percent), 12,384 acres state mineral estate (5 percent), and 78,258 private mineral estates (29 percent). Figure 1 shows the location of the ARPA. The findings in the ARNG FEIS and decisions of this ROD are based upon an open and collaborative public process. The state of Wyoming, Carbon County, individuals, stakeholders, and institutions shared their knowledge and insights about the proposed oil and gas field development with the BLM. Public involvement was solicited, and the BLM's analysis of major issues from public comments on the FEIS is presented in appendix E.

The ARNG project is consistent with the President's National Energy Policy and the Energy Policy Act of 2005 by increasing domestic energy supply and helping to reduce the country's dependence on foreign sources of oil and gas. The proposed project is expected to produce nearly 1,350 billion cubic feet (BCF) of natural gas, providing enough natural gas to heat 19.3 million homes for one year and generating approximately \$958 million in total taxes and royalties.

DECISION

The BLM selects Alternative D the agency's Preferred Alternative with modifications for the development of natural gas resources in the ARPA, as described in the FEIS. Modifications to Alternative D include use of Performance Goals as described elsewhere in this Decision, and the option to consider protective measures described in Alternative C that are not in conflict with this Decision. Alternative D involves drilling of approximately 2,000 gas wells within the ARPA to recover energy resources, while limiting total new surface disturbance from the drilling program across the ARPA (federal, state and fee minerals) to a maximum of 7,600 acres, at any given time, and a 6.5-acre/well site short-term (less than 6 years) disturbance goal. The estimated number of gas wells is not a cap or limitation, but an approximation to help establish



Figure 1. Atlantic Rim Project Location, Carbon County, Wyoming, 2006.

the surface disturbance limit. The 7,600-acre disturbance cap will be allocated to Operators on a prorated mineral leasehold basis. Natural gas development is limited to eight well sites per 640-acre section, which includes coalbed natural gas (CBNG), conventional, and injection wells. Operators may install multiple wellbores (e.g., CBNG, conventional, or injection) on a well site.

Operators will be required to initiate reclamation after completion of the drilling activities and before the next growing season. During the life of the project (30–50 years), total disturbance from natural gas development activities in the ARPA is estimated to be 13,600 acres. This includes acres of disturbance from existing wells and infrastructure added to the proposed new activities.

Disturbance acreage will be monitored using geospatial tracking methods. As detailed in appendix B, Operators are required to provide the BLM, within 30 days of approval of this ROD, a map of existing disturbance associated with activities authorized during the period of time when the interim drilling policy was in effect. In addition, "as-built" disturbance will be measured and reported and subsequent reclamation efforts will be monitored, documented, and provided annually to the BLM RFO Authorized Officer (AO). Adaptive management techniques will be used to correct any deficiencies and modify reclamation criteria as is necessary (Reclamation Plan, appendix A). When a site attains the interim reclamation vegetation cover and soil stability standards detailed in "Criteria for Reclamation Success" in the Reclamation Plan (appendix A), the reclaimed acreage will be deducted from an Operator's disturbance cap allocation and additional disturbance on federal lands leased for oil and gas development in the ARPA will be permitted by BLM. In the event an Operator reaches its disturbance cap allocation, further disturbance on federal minerals will not be permitted.

Drilling development and reclamation activities in the ARPA will be managed through a performance-based, adaptive management process as described in appendix B. The process includes a requirement for Operators to submit an annual operating plan to the BLM RFO AO. The overall purpose of this process is to meet resource management objectives and ensure Performance Goals are achieved to the greatest extent possible. A monitoring and mitigation process will be required, and its development will begin within 30 days of the effective date of the ROD. This process will be developed by the Review Team (BLM, cooperating and interested agencies, and Operators) and will provide quantifiable criteria to identify trends associated with the Performance Goals. The process will include the types of mitigation responses that will be considered in the event that monitoring data indicate a downward trend relative to the Performance Goals. Throughout the life of the project, monitoring data will be reviewed to determine if mitigation measures are effective and leading to the achievement of reclamation and Performance Goals. The monitoring data will be evaluated on a regular basis (at least annually) and best management practices (BMPs), conditions of approval (COAs), protective measures, reclamation criteria, and mitigation measures may be modified, as appropriate, based on the monitoring results. Target dates for annual plans and reclamation reporting may vary as needed and approved by the RFO AO.

Operators are responsible for demonstrating successful achievement of Performance Goals. Early efforts are to be made to collect or consolidate resource data to form a baseline against which future monitoring efforts and data would be compared to indicate trends. In the absence of sufficient data illustrating Operator achievement of Performance Goals, the BLM will use a conservative approach when considering additional approvals.

This decision is not the final review or approval for actions associated with ARNG development. The AO will review and consider each component of the project that involves federal lands or minerals on a site-specific basis. Other reviews or decision points include, but are not limited to, the review of annual or multi-year development plans (including transportation plans), Applications for Permit to Drill (APD), right-of-way (ROW) grants, Sundry Notices, or applications for Special Use Permits. To avoid duplicative installations, the transportation plan is required to include the location and size of power lines. All distribution power lines 12.5 kV or lower will be buried. The appropriate level of environmental review would be conducted prior to authorizing any of these applications or permits.

Consistent with 43 CFR Part 3160, this decision will be in full force and effect commencing with the date it is signed by the AO.

REASONS FOR THE DECISION

The ARNG EIS was prepared in response to leaseholders' requests to exercise the terms and conditions of their respective oil and gas leases in the project area. The environmental impacts of this decision are fully disclosed in the FEIS for the project. The decision to approve natural gas development as described by Alternative D with modifications is in conformance with the Great Divide Resource Management Plan for the Rawlins Field Office.

The Performance Goals and Requirements included in this ROD are designed to minimize surface disturbance while optimizing natural gas recovery. A performance-based management approach is being employed to ensure Performance Goals are achieved to the greatest extent possible. These Performance Goals and Requirements, in conjunction with the monitoring and mitigation process, will further assure that the intent of the performance-based management approach is achieved, and also allow flexibility to achieve these goals at a site-specific level. Implementation of this decision will result in production of nationally significant natural gas resources consistent with The National Energy Policy (May 2001) and the National Energy Policy Act of 2005. The proposed development and activities in Alternative D require surface-disturbing activities that are likely to result in major adverse impacts to certain resource values, as outlined in the FEIS. While the development is expected to adversely impact certain resource values and limit opportunities for other uses in the short-term, the long-term goal is to return these lands to a condition approximate to that which existed before developments proposed in Alternative D were implemented.

In reaching this decision, the following key issues, impacts as described in the FEIS, and the concerns and comments submitted during the EIS process were considered. Rationale for mitigation and actions to address each issue and reduce effects are presented below.

Surface Disturbance

The total area and distribution of surface disturbance associated with further development of the ARPA affects many resources (e.g., soils, vegetation, wildlife and wildlife habitat, and cultural resources). The extent and duration of surface disturbance can adversely affect management of these resources.

- Alternative D limits new, unreclaimed surface disturbance within the ARPA to 7,600 acres at any time to minimize resource impacts from surface disturbance. Disturbance limits encourage development and implementation of state-of-the-art technologies for both operational and reclamation activities.
- Alternative D was developed in response to comments received on the Draft EIS (DEIS). The BLM recognized that resource impacts can be reduced by limiting the amount of initial disturbance (goal of 6.5 acres/well site) combined with timely reclamation. The BLM's evaluation of exploratory activities that have occurred over the past 5 years determined that average initial and long-term disturbance could be reduced by approximately 18 percent from the Proposed Action (e.g., 60- vs.)

80-foot-wide roads) if Alternative D were implemented. While a conservative analysis of Alternative D and the Proposed Action indicates similar levels of impacts, the reduced initial surface disturbance, reduced disturbance at any time, and lower long-term disturbance outlined in Alternative D (See summary table below) provides the most practical alternative for mitigating environmental impacts while maximizing natural gas recovery (Purpose and Need for the Project).

 Managing the amount of allowable surface disturbance on a field-wide basis and requiring successful interim reclamation in exchange for allowing additional disturbance provides a strong incentive for Operators to employ new development and reclamation technologies while still reaching their total oil and gas resource recovery objectives. Reducing the operational footprint creates less overall disturbance, and accelerated reclamation would ensure vegetation is reestablished in the shortest time possible. The disturbance management philosophy of limiting the number of roads by transportation planning, smaller operational footprints, and accelerated reclamation efforts also benefits wildlife by limiting habitat fragmentation, reducing habitat loss, and returning habitat function in the shortest possible time.

Issue	Proposed Action	Alternative C	Alternative D
Disturbance			
Total acres of surface disturbance	16,400	13,886	13,600
Total acres disturbance at any given time	16,400	13,886	7,600
New long-term surface disturbance	6,200	6,200	5,000
Livestock Management			•
Initial loss - animal unit months (AUMs)	2,026	1,703	1,667
Loss from dust and weeds (AUMs)	3,588–5,588	3,000–6,000	3,588–5,588
Temporary non-use permits (AUMs)	20,000	5–10,000	20,000
Mineral Resource Recovery			
Natural gas (BCF)	1,350	87 / 850 / 1,100 ^{1, 2, 3}	1,350

1. Alternative C assumes successful development on federal minerals at 160-acre spacing. IDP data and evaluations by petroleum reservoir professionals indicate that economic gas volumes may not be recoverable at 160-acre spacing and that 80-acre spacing at the reservoir level is required.

- For comparison purposes, gas recovery under Alternative C assumes 670 CBNG wells on federal minerals at 160-acre spacing with 50 percent of the recovered gas volume compared to 80-acre spacing. Also see Note #1 (Max. state/fee minerals: 141 sections x 8 wells per 640-acre section = 1,130 wells; 1,800 CBNG wells– 1,130 state/fee = 670 CBNG well on federal minerals).
- Alternative C recovery, tax, and royalties estimates include (1) IDP production only, (2) development on state/fee minerals only (1,130 well or 63 percent of the 1,800 CBNG wells included in the Proposed Action), and (3) 1,130 wells on state/fee minerals at 80-acre spacing and 670 CBNG wells on federal minerals at 160-acre spacing.
 - The environmental analysis of Alternative D presented in the FEIS and the decisions made in this ROD are based on these disturbance limits applied across the ARPA. The BLM has approval authority over actions on federal minerals and lands. When evaluating development applications for affected federal minerals and lands, the

BLM will consider impacts and surface disturbance that occur on private and/or state lands relative to an Operator's disturbance cap allocation.

- The review and approval process prior to allowing a federal leaseholder to extract federal minerals will be subject to further environmental review. In some instances. further National Environmental Policy Act (NEPA) documentation will be prepared. In other instances, where certain criteria are met, the action may be categorically excluded from the requirements of NEPA and will be approved under the provisions of Section 390 of the Energy Policy Act of 2005. In all cases, the action will be subject to on-site investigation, cultural reviews, T&E consultation, and environmental reviews. In cases where development to access privately owned minerals is proposed on private or state lands, and access across public lands is requested, the BLM will conduct the appropriate level of NEPA analysis prior to granting a ROW. Environmental documents prepared under NEPA will consider cumulative impacts that may result from the private actions within the ARPA. Prior to approval of all oil-and-gas-related activities in the ARPA, the BLM will consider surface-disturbing activities associated with natural gas development that occur on private lands and include that information when estimating the acreage towards the 7,600 acres cap.
- Surface-disturbance impacts on cultural resources are mitigated through avoidance. Where avoidance is not possible, recovery of the cultural resource prior to allowing disturbance activities to occur will be considered on a site-specific basis (FEIS, appendix I).

Socioeconomic Effects

Another issue of concern is the influx of transient workers (those workers not maintaining permanent residence) and the ability of local government agencies to address infrastructure shortfalls, such as community support facilities, hospitals, medical clinics, emergency services, housing, and roads. Gas field employees express the desire to maintain permanent residence in the area, but are concerned about continued employment opportunities in the ARPA. Both the project proponents and local government agencies have identified potential revenues from taxes, royalties, higher employment and increased economic activity, and benefits associated with the proposed project to state, county, and local communities.

• The FEIS contains extensive analysis of potential socioeconomic impacts. To assist local government agencies in planning, BLM will provide relevant portions of the Operator's current and multi-year development plans to local government agencies to use in their community, county, and state planning efforts.

Air Quality

Concerns over potential adverse impacts to air quality from natural gas development and production operations were expressed during the EIS process. Specific interest in potential emissions from drilling rigs, ozone production, and the amount of dust and other particulate matter that might be generated by increased vehicle traffic and other surface-disturbing activities was identified.

Air quality continues to be of concern to Wyoming residents, cooperating agencies, and other interested parties. To address these concerns, the BLM, in cooperation with the United States

Environmental Protection Agency (USEPA), Wyoming Department of Environmental Quality–Air Quality Division (WDEQ–AQD), and United States Department of Agriculture-Forest Service (USDA-FS), conducted extensive analyses and reached conclusions as described below. Alternative D best addresses air quality concerns by including performance goals and mitigation measures. Diligent monitoring of several components that contribute to determining the quality of the air is essential. Because monitoring activities are integral to Alternative D, this alternative is most likely to ensure that Performance Goals will be met and the effectiveness of mitigation and BMPs measured.

When considered in the context of the state of Wyoming and its other natural gas fields where oil and gas development and production activities are more concentrated geographically and geologically, adverse impacts associated with implementation of Alternative D are expected to be short-term and minor. Any long-term change in air quality or visibility impairment is not likely to be significant.

The following is a summary of air quality analysis efforts and conclusions:

- Modeling predicts no significant impacts to public health for the air quality pollutants modeled. Worker health falls within the purview of the Occupational Safety and Health Administration.
- Potential air quality impacts from the Atlantic Rim project were estimated to be below applicable air quality standards. Potential O₃ concentrations were estimated by the Scheffe method, which was considered by the inter-agency air quality team to be a reasonable tool and an acceptable ozone estimation method at the time the air quality analysis was conducted.
- WDEQ established an air quality monitoring station near Wamsutter, Wyoming, in March 2006 to monitor concentrations of NOx, O₃, PM₁₀, and SO₂. In cooperation with WDEQ, the Operators will finance and operate additional air quality concentration monitoring, including O₃ monitoring, in the Rawlins Field Office (RFO) management area. The BLM will work cooperatively with WDEQ, USEPA, and the Operators to maintain and enhance concentration monitoring in the RFO management area, including monitoring required to represent impacts due to emissions from the Atlantic Rim field.
- If, in the future, air monitoring were to show O₃ exceedences that were attributable at least in part to sources in the Atlantic Rim field, the BLM would consult with WDEQ and USEPA to determine whether adaptive management is needed to mitigate impacts.

Wildlife

Issues focused on three areas: (1) potential impacts to sensitive wildlife species including fish, (2) potential impacts to listed threatened and endangered plant and wildlife species and those proposed for listing, and (3) impacts to wildlife habitat including big game crucial winter range and sage-grouse nesting and brood rearing habitat. Based on the significance criteria identified in section 4 of the FEIS, implementation of the ARNG project may result in adverse effects to pronghorn antelope, mule deer, elk, sage-grouse, Columbian sharp-tailed grouse, sagebrush-obligate songbirds, roundtail chub, bluehead suckers, and flannelmouth suckers. The overall wildlife mitigation strategy for the ARNG project is discussed below.

- The Wyoming Game and Fish Department (WGFD) "Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats" (December 6, 2004) makes some prediction of effects to wildlife populations from oil and gas development in Wyoming and provides some mitigation measures WGFD believes could reduce these effects. The BLM considered the WGFD report and recommendations during development of the FEIS and ROD.
- To address impacts within the ARPA, this decision implements four strategies as evaluated for Alternative D: (1) reduce the initial disturbance footprint as much as possible, (2) restore habitat function in the shortest time possible, (3) perform timely site reclamation and limit unreclaimed surface disturbance, and (4) institute a monitoring and adaptive management process to ensure reclamation and mitigation measures are effective and initiate corrective action when it is not.
- To restore habitat function as soon as possible, this decision implements a performance-based management approach that provides an incentive for rapid on-site interim and final reclamation while simultaneously allowing maximum flexibility in field development. As detailed in the Reclamation Plan (appendix A), the Operators will monitor and evaluate reclamation effectiveness and provide annual adaptive management recommendations as appropriate to the BLM for consideration.

Threatened and Endangered Species

Implementation of Alternative D would result in direct loss of habitat from surface disturbance associated with the construction of well sites, related facilities, access roads, and pipelines. In addition, some wildlife species would be indirectly impacted by displacement from habitats in the vicinity of the project area due to the presence of human activities associated with the construction and operation of wells. Small portions of potential black-footed ferret habitat may be disturbed. The potential for collisions between bald eagles and motor vehicles would also increase due to the construction of new roads and increased traffic levels on existing roads. The primary source of potential risks to the fish species is an increase in suspended sediments and sedimentation from land disturbance associated with project activities.

- The intensity of these impacts may decrease with the completion of the construction phase and with the onset of reclamation efforts on disturbed areas.
- None of the threatened and endangered species found downstream of the ARPA within the Colorado River system are known to occur in the ARPA; therefore, there would be no direct impacts to these species. Implementation of all mitigation measures for water and soils may reduce potential adverse impacts. No produced water from the ARPA would be discharged to the Little Snake River drainage; therefore, produced water discharges do not pose a risk to the species there.
- Any water depletion within the Colorado River system results in a "may affect, likely to adversely affect" determination for threatened and endangered species found in and along this river. Therefore, the BLM would initiate formal consultation with the United States Department of the Interior, Fish and Wildlife Service (USDI-FWS) for those species when an applicable proposal is received, and prior to approval.

• If any threatened or endangered fish species are identified within the ARPA, the BLM would consult with the USDI-FWS and develop a protection plan for the fish when an applicable proposal is received, and prior to approval.

Big Game Crucial Winter Range

Areas of overlapping big game crucial winter range are important because they provide crucial habitat for more than one species of big game. There are several areas of overlapping big game crucial winter range located within the ARPA. The combinations of overlapping big game crucial winter range include the following: elk/mule deer, 3,038 acres and mule deer/antelope, 22,637 acres. Forty percent of this habitat occurs on private and state lands where there are no protections against disturbance of animals during crucial time periods (See Surface Disturbance discussion for a description of surface disturbance management practices that may mitigate the impact to this habitat and BLM-sensitive species).

Wildlife Habitat

Implementation of the ARPA project would have adverse impact to suitable habitat for many wildlife species (e.g., BLM-sensitive species and sagebrush-obligate songbirds). Habitat loss was attributed to direct loss through surface disturbance, indirect loss through animal avoidance of areas near developments, and habitat fragmentation when habitat is no longer suitable for species dependent on intact habitat patches larger than what would be remaining if the project were constructed.

• The FEIS acknowledged that habitat impacts (big game crucial winter range and general wildlife habitat) would be significant due to ARPA field development. The mitigation strategy for limiting the allowable surface disturbance, accelerated reclamation by the Operators, remote monitoring (telemetry), timing stipulations, and other BMPs will reduce direct and indirect disturbance to wildlife, facilitating the long-term return of habitat function.

Rangeland and Grazing

Issues regarding rangeland and grazing that were identified by cooperators, grazing permit holders, and other respondents included: direct loss of livestock forage; the potential for a reduction in permitted livestock numbers; water quality impairment at existing livestock watering sources; livestock movement restrictions/alterations due to pipeline trenches, roads, and fences; livestock management problems associated with the inability to access required area two-track routes from project-developed roads; vehicle collisions; entrapment in pipeline trenches; and the increase in fugitive dust emissions potentially causing dust-induced pneumonia in livestock. Alternative D best resolves these issues for the following reasons:

 Though the project results in the loss of available livestock forage, any loss of animal unit months (AUMs) will be determined through rangeland monitoring and, if necessary, addressed through the adaptive management process. As discussed in the FEIS, other potential impacts (e.g., traffic, roads, and open trenches) on grazing operations can be predicted but not accurately quantified at this level of evaluation. The BLM assumes that some conflicts may continue to occur or may not be completely resolved or mitigated. Solutions to and mitigation of such conflicts will be addressed as they arise.

- The selected alternative has the lowest level of initial and long-term disturbance and corresponding lowest initial loss of AUMs (See table above).
- The Operators must coordinate annually, or more often as necessary, with affected livestock operators to discuss: (1) problems encountered during the past grazing season, (2) agreed-upon corrective actions, and (3) planned energy development and operations during the next grazing season. The BLM and Wyoming Department of Agriculture will participate as appropriate.

Cultural

Once implemented, some specific development and operation activities associated with Alternative D are likely to result in an adverse effect determination from the Wyoming State Historic Preservation Officer (SHPO). The potential for adverse impacts to historic properties, such as the Overland Trail and their settings, was identified in the FEIS and considered by the BLM. To mitigate these potential adverse effects, the BLM has worked closely with SHPO to develop protocols, as described below, to be followed over the course of the project.

- As prescribed in the Wyoming State Protocol between the Wyoming BLM and the SHPO, Memoranda of Agreements (MOAs) are required between SHPO, BLM, the proponent, and interested parties as part of the Section 106 of the National Historic Preservation Act (NHPA) consultation process when there are anticipated adverse effects to historic properties. Given the number of site-specific projects needed to implement Alternative D, handling the Section 106 consultation process through one programmatic agreement (PA) is preferable to multiple, individual MOAs when adverse effect situations are anticipated or multiple consultations when no adverse effect situations are expected.
- The Wyoming State Protocol provides the direction by which BLM will meet its responsibilities under Sections 106, 110 (f) and 111 (a) of the NHPA, rather than following the procedure set forth in the Advisory Council on Historic Preservation (ACHP) regulations (36 CFR part 800). Therefore, the BLM will pursue a programmatic agreement for this project prior to commencement of site-specific development activities that may result in "adverse" or "no adverse effects" determinations.

Maximize Natural Gas Recovery

Alternatives in the FEIS were developed to analyze a balance between development well spacing to effectively recover natural gas resources and protecting other resource values.

 To ensure effective recovery of natural gas and maximize protection of other resource values, natural gas development, as described for Alternative D with modifications, is limited to eight well sites per 640-acre section, which includes CBNG, conventional, and injection wells. Operators may install multiple wellbores (e.g., CBNG, conventional, or injection) on a well site. No more than 7,600 acres (2.8 percent) of the project area will be disturbed by oil and gas development at any time. For the overall Atlantic Rim area, there is a 6.5-acre/well site short-term disturbance goal. The BLM believes Alternative D provides a good balance between oil and gas recovery and resource protection and provides for long-term reclamation and re-establishment of native vegetation and wildlife communities. Alternative C was prepared to evaluate natural gas resource development while aggressively mitigating impacts to sensitive resource values using additional development protection measures (DPMs). Public comments received on the DEIS, results of interim exploration, and technical evaluations by the BLM Reservoir Management Group all indicated drilling on 160-acre spacing would not achieve maximum recovery of natural gas resources, was likely not economically feasible, and was likely an inefficient recovery of the natural gas resource in the ARPA. In addition, displacement of disturbance from federal lands to state and fee lands due to these aggressive protective measures may result in higher initial disturbance, disturbance at any time, and long-term disturbance compared to Alternative D (See summary table above), with uneconomical and inefficient natural gas recovery.

Alternative D increases domestic energy supplies and reduces the United States' dependence on foreign sources of energy, one of the primary goals of the President's National Energy Policy and the National Energy Policy Act of 2005. Development of these federal resources satisfies requirements of FLPMA and the Mineral Leasing Act. The leasing and subsequent production of federal oil and gas resources provides the United States, the state of Wyoming, and affected local counties with income in the form of lease royalty payments. Alternative D best meets the goals of the National Energy Policy and achieves the objectives of the federal oil and gas leasing program managed by the BLM. The State of Wyoming is satisfied that Alternative D meets its goals and objectives for oil and gas development and that it would best contribute to the state and local economies. The project will provide 1,350 BCF of natural gas for the country, sufficient to heat 19.3 million homes for a year.

This decision is made in full consideration of the public, local, state, and other federal agency input. No substantial issues raised by government agencies, industry, groups, or individuals within the scope of this proposal and FEIS remain unresolved.

SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

Alternatives Considered in Detail

The ARNG Project FEIS analyzed four alternatives. They were:

- 1. Proposed Action
- 2. Alternative A: No Action
- 3. Alternative C: Special Protection of Sensitive Resources
- 4. Alternative D: Natural Gas Development with Disturbance Limitations (BLM Preferred Alternative)

Proposed Action

The Operators proposed to drill and develop up to 2,000 new natural gas wells. Approximately 1,800 wells would be drilled to coals within the Mesaverde Group to develop CBNG resources. An additional 200 wells would be drilled to access conventional natural gas found in other formations, generally expected to be deeper than the Mesaverde coals. The 2,000 proposed

new natural gas wells would be in addition to the 116 ARPA interim exploration wells already drilled during the interim drilling period.

Proposed well spacing would be 8 well sites per 640-acre section (80-acre spacing) throughout the project area, but may be reduced to four well sites per 640-acre section (160-acre spacing) depending on the geology and ability of the Operators to recover the gas resource. Development and drilling would begin in 2007 and continue for approximately 20 years, with a life of project of 30–50 years. Various drilling and production related facilities (e.g., roads, pipelines, water wells, disposal wells, compressor stations, and gas processing facilities) would also be constructed within the ARPA.

Alternative A: No Action

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 CFR 1502.14(d)). For this analysis, "no action" means that the BLM would reject the proponents' proposal and the proposed activity would not take place. Development activities and operations approved under EAs during the interim drilling period would continue as approved.

Alternative C: Special Protection of Sensitive Resources

Under Alternative C the Operators would be approved to develop natural gas resources from the desired target formations but operations would be subject to DPMs in those areas with sensitive or crucial resource values (as detailed in FEIS appendix L), likely resulting in fewer acres of disturbance and reduced road density on federal lands. Generally DPMs focus on surface disturbance limits; selection of facility locations; drilling; construction practices; and, in some cases, no surface occupancy. Examples of such areas where DPMs would be applied are wildlife and fish habitat and areas with sensitive soils. Geographic information system (GIS) layers would be available to Operators for development of site-specific proposals for their planning of the annual program.

Alternative D: Natural Gas Development with Disturbance Limitations (Agency Preferred Alternative)

The goal of this alternative is to minimize surface disturbance while optimizing natural gas recovery. Annual planning between the Operators and the BLM would be a key component of this alternative. The annual planning would require the Operators to submit to the BLM their proposed plan of operation for the forthcoming year. The BLM would then work with the Operators at a site-specific level to minimize surface disturbance by applying the appropriate lease stipulations, conditions of approval, BMPs, and any other measures deemed necessary to minimize surface disturbance and still allow for the recovery of natural gas.

Coalbed and conventional natural gas resources would be developed, while reclamation activities would stabilize disturbed soils and vegetation communities. For the overall ARPA, no more than 7,600 acres (2.8 percent) of the project area would be disturbed by oil and gas development activities approved under this ROD and unsuccessfully reclaimed at any time. For the overall ARPA, there would be a 6.5-acre/well site short-term disturbance goal. Those areas designated as "Category A" in the FEIS would have a short-term disturbance goal of less than 6.5 acres per well pad. Category A, as depicted on figure 2, includes areas with sensitive fish populations, crucial wildlife habitats, and unique vegetation communities, and is about 72,200 acres in extent.





ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS

DEIS Alternatives Not Carried Forward for Final Analysis

In the DEIS, Alternative B proposed that natural gas development activities would be restricted to one of three zones within the ARPA boundary at any one time. Each zone would be open to construction and development of natural gas removal and processing facilities for seven years, at which time construction and development activities would cease. Gas extraction and processing would continue (i.e., operational activities), while construction and development activities would move to another zone. The intent of the alternative was to focus disturbance activities into a smaller area while the remainder of the project area would be less disturbed and less impacted than under the proposed action.

Major adverse effects were expected under this alternative upon several resources including wildlife, soils, and range. Comments received from the companies objected to the extended delay on their ability to develop their leases in those areas not open to development activities for 7 to 14 years. In addition, comments pointed out the implication that BLM would not approve ROW proposals for the development of private and state oil and gas development within the closed areas. Such an action conflicts with BLM policy (BLM Manual, Part 2800.06 "Policy" (D)) to allow owners of non-federal lands surrounded by public lands reasonable access to their holdings. A large portion of the project area is located in a so-called "checkerboard" ownership pattern of alternating federal and private/state lands where access to such lands requires federal ROW approval.

Alternative B was eliminated from further detailed study in the FEIS based on comments received on the DEIS, the effects of long delays to allowable oil and gas development on leaseholders and mineral rights, and the policy that the BLM will allow reasonable access across federal lands for mineral development on private and state lands.

OTHER ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS

Three alternatives were considered and eliminated from detailed study. The alternatives and the reasons for eliminating them are described below.

3,880 Natural Gas Wells from 3,880 Well Locations

During the scoping process, the Operators estimated that a maximum of 3,880 gas wells from 3,880 well locations would be required to fully develop the ARPA. Based on the exploration and development activities permitted between 2001 and 2006, the Operators have revised their original estimate of needing 3,880 gas wells to maximize the economic recovery of the natural gas resource to the current proposed number of wells.

Directional Drilling

Mandatory use of directional drilling was suggested in comments during the scoping process as a way to reduce habitat loss and wildlife disturbance by reducing the numbers of well pads and corresponding roads, pipelines, and infrastructure. In memoranda dated June 2005 and August 2006, the Reservoir Management Group of the Wyoming BLM stated that extensive directional drilling did not appear to be a viable technical or economic alternative for natural gas extraction in the ARPA.

Requiring the Operators to use directional drilling for all wells regardless of surface conditions, topography, or subsurface geology would not be reasonable. Using such a technique without regard for local conditions may deter or preclude an Operator from maximizing the recovery of the gas resource in the most economical and efficient manner. However, directional drilling is an option that can be considered by the BLM and the Operators where surface conditions and resource constraints make it reasonable to consider.

Produced Water Disposal and Treatment Options

The Operators proposed re-injecting wastewater produced during development and operation of each gas well. Some of the produced water would be discharged in regulated tanks for use by wildlife and livestock. Several alternatives to re-injecting water were considered:

- Water treatment with discharge onto land surface,
- Surface discharge without treatment,
- Storage in evaporation/infiltration ponds, and
- Transmission of produced water by pipeline from the Colorado River watershed to either the Great Divide Basin or North Platte River watershed with discharge onto land surfaces.

Produced wastewater has varying concentrations of minerals and salts, and usually needs treatment to make it usable or to meet water quality standards. For example, under a policy adopted on October 30, 2002, by the Colorado River Basin Salinity Control Forum, entitled "Policy for Implementation of Colorado River Salinity Standards through the NPDES Permit Program 1," water discharged within the watershed must not add more than 1 ton per day or 366 tons per year of salts to the Colorado River system. The preferred method of disposal would be re-injecting the produced water back into other geologic formations adjacent to or near the producing formation in places where the local geology lends itself to this method. Other methods of disposal, especially when the wastewater must be treated, transported, or both, tend to be more costly and might have inherent logistical and engineering problems. For these reasons, other wastewater disposal alternatives were eliminated from detailed study.

The Proposed Action includes re-injection of produced water, with the exception of limited closed water discharge into regulated troughs or tanks for livestock and wildlife drinking water, and a limited surface discharge under existing state of Wyoming permits. Re-injection of produced water removes the water from coal seams and places it into geologic formations as permitted by the state of Wyoming. Re-injection avoids surface impacts from the produced water including erosion, changes to vegetation communities, and salinity issues relating to water release within the Colorado River Basin. Additional uses of ARPA-produced water, while not identified or proposed at this time, may develop or arise in the future. When and if such proposals are made, state of Wyoming approval under the state's various permitting authorities would be required. In addition, the BLM would review and approve or disapprove any such proposal based on the specifics of the proposal and the BLM's authorities and responsibilities under NEPA and FLPMA.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with Council on Environmental Quality (CEQ) regulations (40 CFR 1505.2(b)), the environmentally preferred alternative must be identified in the ROD. BLM considers the environmentally preferred alternative for the ARNG Development Project to be the No Action Alternative, Alternative A. This alternative would result in the least amount of impact to a majority of resources within the ARPA. However, the No Action Alternative would also fail to effectively recover known oil and gas resources.

Comments from gas development companies suggest that the effect of Alternative C was the same as the No Action Alternative. The goal for Alternative C is to protect wildlife and other natural resources while allowing for the extraction of natural gas resources. Under Alternative C, the Operators' activities would be subject to resource development and protection measures intended to maintain or enhance resource values. Approximately 95 percent of the federal lands within the project area would be assigned one or more resource protection measures to be applied based on the site-specific locations of the activity. Comments from gas development companies highlighted the cost of implementing resource protection measures and the infeasibility of recovering natural gas resources at four well sites per section. Comments received from the BLM's Reservoir Management Group indicated that maximum recovery of natural gas resources was not feasible under Alternative C, resulting in the alternative not being responsive to the Purpose and Need for Action for this project. In addition, Alternative C predicted significant effects on natural resources within the ARPA including big game, greater sage-grouse, and recreation. Due in part to the adverse effects to natural resources from Alternative C, the BLM's Environmentally Preferred Alternative is the No Action Alternative. However, the No Action Alternative would also fail to effectively recover known oil and gas resources. Therefore, the Agency Preferred Alternative was selected.

PLAN, REVIEW, AND APPROVAL PROCESS

The planning, review, and approval process for project implementation is described below. This process will typically be initiated by the Operators through an annual planning meeting with the Rawlins Field Office Manager, where they will outline detailed development plans for the upcoming year and a conceptual multi-year plan. The BLM (including interdisciplinary team members), cooperating and interested agencies, and the Operators will make up a Review Team to evaluate annual and site-specific development proposals and monitoring reports. The review and approval process will include a site-specific visit by the Review Team, applicable environmental review and establishing required BMPs, conditions of approval, or other protective measures to mitigate potential environmental impacts. The review and approval process is illustrated on figure 3.

The Annual Planning Process

The April 1st date, as proposed by the Operators is open to modification based on results observed and problems encountered. Changes to the date may be proposed by any party, reviewed and commented upon by the companies and cooperators, and approved by the AO. Any date changes will not be effective until approved in writing by the AO. While described as an "annual" planning process, this concept is adaptive and open for modification and improvement, including more frequent planning meetings if necessary. The intent of the process is to have future, site-specific development plans for Atlantic Rim be

Figure 3. Atlantic Rim Oil and Gas Development Proposal Submittal—Approval—Implementation Process.



submitted to the BLM for review in a manner that will allow the BLM to capture economies of scale in planning, processing, approving, and involving other cooperating agencies. By receiving development proposals in groups, the Review Team will be able to develop a more holistic view of future development and reclamation progress and success, and more effectively apply mitigations and BMPs to reduce development effects. Proposals should span several years or stages of development and must include the entire proposal including well sites, compressor stations, utility and pipeline corridors, roads, status and success of reclamation efforts for a specific area, and any other disturbances planned and their timing.

This decision includes an unreclaimed disturbance cap of 7,600 acres at any time. All Operators must submit to the BLM within 30 days of the effective date of this decision a summary of their lease holdings and associated mineral acreage. The 7,600-acre disturbance cap will be allocated to Operators on a prorated, mineral leasehold basis. Existing surface disturbance from activities approved under the IDP will count against each Operator's disturbance cap allocation. Past oil and gas development surface disturbance within the ARPA will not count against the disturbance cap. Only new disturbance proposed by the ARPA lease holders or disturbance under the IDP would be eligible for disturbance cap allocation. Only successfully reclaimed acreage (See ROD appendix A, Criteria for Reclamation Success) that was disturbed during the implementation of activities associated with this decision or the IDP will be allocated back to the Operator based on their prorated disturbance cap. Regardless of the number of Operators within the ARPA, the total of all prorated disturbance cap allocations may not exceed 7,600 acres.

Cooperating Agencies and Interested Stakeholders

The Review Team members will be invited to participate in the annual planning process and site-specific review process based on their interest, time, and availability. Review Team member participation would be in addition to their separate and independent permitting and approval responsibilities under any other authorities. The BLM is the final decision authority and will set the schedule for meetings, site visits, review periods, etc. When appropriate, Memoranda of Understanding (MOUs) or other applicable inter-agency agreements may be prepared and utilized between the parties to document the extent of participation in the annual planning and site-specific review processes.

Site-Specific Reviews with Interagency and Operator Participation

Once the development plan is received, the BLM will schedule an "on-site" visit to review the areas included in the proposal for development. The purpose of the review is to familiarize the Review Team with the proposal; the location of disturbance; and the extent, timing, and other relevant factors. Generally there would be one team visit that may be followed up with individual reviews by team members, as necessary. Based on the site conditions found in the area, the BLM, in collaboration with cooperating agencies, will determine the necessary mitigation measures, BMPs, and conditions of approval necessary for processing the proposal. During its review of the proposal, BLM, in consultation with the Operator making the proposal, may require the submittal of additional information to address application deficiencies, application of BMPs and mitigation, site relocation, and other changes in the proposal. Modifications to a proposal will be based on site-specific factors, such as lek locations, raptor nests, crucial winter range, or any other relevant issues.

NEPA Review, Categorical Exclusion and Proposal Approval Process

The approval process will be conducted consistent with NEPA. When appropriate, environmental documents prepared under NEPA may be processed by the BLM, or a third-party contractor funded by the Operator may assist the BLM in meeting its NEPA requirements. The AO, in consultation with Operators, will determine the manner in which the BLM meets its NEPA obligations including determining whether a categorical exclusion pursuant to Section 390 of the Energy Policy Act of 2005 applies. The environmental document and its related decision document will specify required BMPs, COAs, or other protective measures as detailed in the paragraph above to be included in the authorization.

The BLM will use a performance-based management approach as part of the adaptive management process, which includes four primary elements.

- 1. Performance Goals: describes the conditions that the BLM and Operators will attempt to achieve (See Performance Goals in the following section).
- 2. Performance Requirements: an extensive array of BMPs (ROD, appendix B), COAs, and protective measures used to help achieve the Performance Goals.
- 3. Performance-Based Monitoring: monitoring efforts to measure the degree of success the Performance Requirements have in achieving Performance Goals (See Monitoring, Reporting and Adaptive Management).
- 4. Adaptive Management: additional mitigation or adaptive techniques to help achieve Performance Goals.

Performance Goals

The BLM will attempt to achieve the following Performance Goals in collaboration with other state and other federal agencies:

ltem	Performance Goal
Migration Routes	maintain functional migration routes through or around development
Big Camo Crucial	areas
Winter Range	range for big game animals
Sage and Sharp-	provide well-dispersed sage-grouse breeding, nesting, brood
Tailed Grouse	rearing, and winter habitat
Muddy Creek	maintain adequate water quality, water quantity, species distribution,
Sensitive Fish	and aquatic habitat components
Shrub-Dependent	assure occupied habitat for shrub-dependent song birds is well
Song Birds	distributed throughout the project area
Riparian	ensure no net loss of native riparian habitat/vegetation
Grazing	maintain adequate and sustainable food and habitat for domestic animals
Range Condition	maintain range condition or improve range condition towards
	potential for the ecological site
Livestock Safety	minimize deaths and injuries of livestock due to development and operational activities

ltem	Performance Goal
Range Improvements	minimize damage to range improvements, gates, cattle guards, water sources, and other livestock grazing management improvements
Standards and Guidelines	manage to meet Wyoming Healthy Rangeland Standards
Sites	maintain viable, site-stabilizing native plant growth
Species	maintain a range of species composition, diversity, cover, and
Composition	production equal to pre-disturbance levels
Weeds	maintain weed-free sites

Operators are responsible for demonstrating successful achievement of Performance Goals. Early efforts are to be made to collect or consolidate resource data to form a baseline against which future monitoring efforts and data would be compared to indicate trends. In the absence of sufficient data illustrating Operator achievement of Performance Goals, the BLM will use a conservative approach when considering additional approvals.

Monitoring, Reporting, and Adaptive Management

The monitoring, reporting, and adaptive management processes made part of this decision are its key components. As part of the annual planning process, a monitoring and mitigation process will be required, and its development will begin within 30 days of the effective date of the ROD. This information should be reviewed at least annually with development plans modified based on trends. The purpose of monitoring is to assess the status of the Performance Goals, measure and detect trends, or detect any other undesired effects. Monitoring will also be used to assess the effectiveness of reclamation efforts and any approved mitigation measures.

The adaptive management process is iterative and can be summarized as:

- Disturbance Action
 - monitoring for trend and effectiveness
 - o identification of areas requiring modification
 - o implementation of adapted techniques and/or mitigation
 - o repeat process

In most cases, monitoring must occur for several years to detect trends and establish that successful mitigation has occurred. Identification of areas requiring additional work can occur anytime during the monitoring and mitigation process. To ensure success, any change in or addition of mitigation measures should be adapted to address the conditions or resolve problems observed during monitoring. If additional mitigation measures do not produce the desired effects or conditions, continued monitoring and data collection may be used to further identify or clarify the problem. As a result, further adaptation of mitigation techniques would be tested and monitored for success.

Funding for wildlife and habitat monitoring may be obtained from BLM appropriations, in collaboration with cooperating or interested agencies, from the voluntary participation of the Operators, or from outside sources that may have an interest or desire to participate or contribute, or from a combination of these sources. As noted above in Monitoring, Reporting, and Adaptive Management, Operators are responsible for demonstrating successful

achievement of Performance Goals. The Review Team, the BLM, or both, will identify the level of effort required for performance-based monitoring and develop associated monitoring plans.

The Operators are responsible for reclamation monitoring and reporting costs.

PERFORMANCE REQUIREMENTS

The FEIS lists an extensive array of possible BMPs and protective measures that may be required by the BLM to mitigate the effects of a proposal. Protective measures summarized in appendix L of the FEIS will be considered based on site-specific conditions, where such measures are not in conflict with this decision. Consistent with its responsibilities under FLPMA and with the authority found in the mineral lease, including stipulations, the BLM will, as necessary and appropriate, work with the Operators and cooperating or interested agencies to determine any actions that need to be taken to approve the proposal. The formulation and application of mitigation measures and BMPs will be based on the site-specific conditions found at the areas for which disturbance is proposed at the time the proposal is submitted or authorization requested and the rationale for their application clearly disclosed.

Appendix B of this decision presents performance-based requirements and monitoring that will be considered during site-specific, environmental review. Operator-committed practices, which become mandatory requirements with publication of this decision, are included in appendix C.

This decision incorporates a requirement for Operators to prepare development plans as outlined in the Reclamation Plan (appendix A). These development plans must include a Transportation Plan, Reclamation Plan, and a Hazardous Materials Management Summary. Monitoring to evaluate compliance with Performance Requirements and achieving Performance Goals will be as outlined above.

PUBLIC INVOLVEMENT

The BLM announced its intent to prepare an EIS for this project in the *Federal Register* on June 26, 2001, and initiated scoping. The state of Wyoming, federal agencies, state and local government representatives, municipalities, Native American Tribes, grazing permittees, lease and ROW holders, landowners within the ARPA, local media, and other agencies, industry representatives, individuals, and organizations were sent a scoping notice and other information by mail. Two public meetings were held in July 2001 at Baggs and Rawlins, Wyoming. Fifty-seven comments were received in the form of letters, emails, and faxes from the public including citizens; interested federal, state, and local agencies; advocacy groups; and various corporations. These comments were used to identify key issues, potential resource conflicts and concerns, possible alternatives, and the scope of the analysis. Interested agencies were invited to participate as cooperating agencies. The state of Wyoming, Little Snake Conservation District, and the Carbon County Commissioners requested and received Cooperating Agency status.

The Draft Atlantic Rim EIS was released in December 2005. The 60-day comment period resulted in over 59,400 individual responses, including approximately 59,100 electronic messages and 300 hard copy comments. Comments were received from state, federal, and local agencies; environmental advocacy groups; landowners; leaseholders; oil and gas companies; and the general public. All responses were reviewed for content. The BLM identified substantive comments and developed responses. A detailed description of the

comments made on the DEIS and the process by which they were analyzed by BLM is included with the FEIS.

Comments were used to develop Alternative D and to modify, clarify, and correct the FEIS, as appropriate.

The FEIS was released to the public and a Notice of Availability (NOA) published in the *Federal Register* on November 30, 2006. Comments were accepted on the FEIS through January 4, 2007. Approximately 85 responses, including those from cooperating agencies and interested parties, were received by BLM. Some comments on the ARPA FEIS raised specific concerns regarding use of mitigation measures; avoidance of cultural sites; groundwater and wildlife impact analysis; wildlife, habitat and reclamation monitoring; rationale for selection of the preferred alternative; opportunities for future public input; surface disturbance reclamation; air quality analysis; and paleontological condition and classification. A summary of these concerns and comments and BLM's responses are contained in appendix E of this ROD.

APPEAL PROCESS

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR 3165.4. If an appeal is filed, your notice of appeal must be filed in this office (Bureau of Land Management, State Director, P.O. Box 1828, Cheyenne, Wyoming 82003) within 30 days of the date BLM publishes its notice of the decision in the *Federal Register*. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition pursuant to 43 CFR 3165.4(c) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed in 43 CFR 3165.4(c). If you request a stay, you have the burden of proof to demonstrate that a stay should be granted. Copies of the notice of appeal and petition for a stay must also be submitted to the Interior Board of Land Appeals and to the Rocky Mountain Regional Office of the Solicitor at the same time the original documents are filed with this office.

AUTHORIZED OFFICER:

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Robert A. Bennett Wyoming State Director

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ERRATA

Modifications and Corrections to the Final Environmental Impact Statement for the Atlantic Rim Natural Gas Field Development Project

The section describes changes to the FEIS to correct errors or omissions and identify modifications.

Modifications

- 1. Appendix H, title, delete the word "Required" from the title of appendix H. The revised title is Required "Best Management Practices".
- Appendix H, page 1, first paragraph, the words "as appropriate" have been added and the text now states, "These Best Management Practices (BMPs) will be applied, <u>as</u> <u>appropriate</u>, under all alternatives as Conditions of Approval where proposals result in conflicts with identified resources".
- 3. Appendix H, page 1, insert the following text as a fifth bullet under "Additional mitigation measures are also identified in:".
 - <u>"The most current version of Onshore Oil and Gas Operations Orders 1 7 (Code of Federal Regulations 43 CFR 3160)."</u>
- 4. Appendix H, page H-4, Reducing Impacts from Fluid Mineral Construction, Operation, and Reclamation; delete items #1 and #2 (1) Directional Drilling; (2) Drill multiple wells from a single pad). These items are deleted to reflect that these measures are not required Best Management Practices. However, these measures can be used at the discretion of the Operators with BLM approval.
- 5. Appendix H, page H-6, under Protection Measure, numbers two and three, the word "primary" has been deleted and replaced with state, county or BLM". The revised text states,
 - "2.) Avoid locating pads in areas visible from primary state, county or BLM roads." and
 - "3.) Avoid locating facilities on or near ridgelines use subsurface or low-profile facilities to prevent protrusion above horizon line when viewed from any primary state, county or BLM roads."
- 6. Appendix H, page H-6, under Protection Measure, item numbers ten and eleven have been deleted. The revised Protection Measure has thirteen items. The deleted items were;
 - "10.) Design and construct all new roads to a safe and appropriate standard, "no higher than necessary" to accommodate their intended use." and

"11.) Locate roads far enough off the back of ridgelines so they aren't visible from state, county or BLM roads."

- 7. Appendix H, page H-7, Avoidance Areas, under Protection Measure, number one, second bullet, the word "water" has been added and the text now states, "Areas within 500—feet from perennial waters, springs, <u>water</u> wells and wetland riparian areas; and,".
- 8. Appendix H, page H-12, Water Used for Construction, Maintenance, and Drilling Activities, under Protection Measure, number one, the revised text states "1) All water used for drilling, completion and testing activities will <u>be free of hydrocarbons and</u> come from <u>existing</u> CBNG wells, or <u>be</u> re-used from other drilling sites, <u>and/or come from sources approved by the BLM and</u>, subject to state permitting <u>requirements</u>. <u>Only fresh water would be allowed for drilling to surface casing setting depth</u>. New water sources would be considered for potential depletions to the Platte or Colorado River Basins as <u>necessary</u>." The modified text is necessary to conform to drilling regulations.
- 9. Appendix O, page O-243, response to comment #671-73-1; delete the following phrase from the response: "None are known to outcrop in the ARPA." This correction is made to remove a statement erroneously included in the FEIS.

Appendix A

Atlantic Rim Natural Gas Project Reclamation Plan

APPENDIX A

ATLANTIC RIM NATURAL GAS PROJECT RECLAMATION PLAN

TABLE OF CONTENTS

1	Reclamation	A-1
	1.1 Management of Soil for Restoration	A-2
	1.2 Seed Mixtures	A-2
	1.3 Reclamation Standards and Principles	A-3
	1.3.1 At Any Time	A-3
	1.3.2 First Growing Season	A-4
	1.4 Monitoring and Reporting Disturbed Sites	A-5
2	Criteria for Reclamation Success	A-6
3	References Cited	A-8

LIST OF TABLES

Table A-1.	Reclamation Monitoring Reporting Data	A-7

LIST OF ATTACHMENTS

Attachment A-1.	Standard Seed Mixtures	A-	-9
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This appendix presents a programmatic reclamation plan for the Atlantic Rim Natural Gas Project Area (ARPA). It gives general guidelines for completing reclamation in lieu of specific actions to take at each disturbance. Current Bureau of Land Management (BLM) policy recognizes that there might be more than one correct way to achieve successful reclamation. A variety of methods may be appropriate to varying circumstances. BLM will continue to encourage Operators to use their expertise in recommending and implementing reclamation projects. However, the Operators are responsible for attaining final reclamation standards of performance as outlined in the USDI-BLM (1990a) reclamation policy. All reclamation must conform to BLM reclamation policy (USDI-BLM 1990a). Further guidance for reclamation can be found in the BLM/Forest Service "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (Gold Book) found at:

http://www.blm.gov/bmp/gold%20book/FinalGoldBook%20-%202006%20Edition.pdf

1 Reclamation

BLM reclamation goals emphasize ecosystem reconstruction, which means returning the land to a condition approximate to or better than that which existed before it was disturbed. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal. As such, two types of reclamation are envisioned at the ARPA:

- 1. **Interim Reclamation.** Stabilization of soil by revegetation on sites that will likely be further disturbed in the future. This includes sites where re-contouring is needed where periodic disturbance may occur due to operation and maintenance activities.
- 2. **Final Reclamation.** Reclamation of an area that is not planned for further disturbance including re-contouring, stabilization of soil by revegetation, and restoring the ecosystem function originally found at the site.

Among items to be emphasized in achieving these goals are:

- Stabilization of disturbed soils until the first growing season;
- Soil stabilization through establishment of a vegetative ground cover on disturbed sites during the first growing season following disturbance;
- Restoration of the native plant community disturbed or removed, or restoration of an alternate vegetative regime in consultation with and approval by the BLM's Rawlins Field Office (RFO);
- Minimal disturbance of the existing environment and avoidance of riparian areas;

- Annual monitoring and control of invasive and noxious weeds beginning the first season of disturbance;
- Monitoring and management of reclamation sites to evaluate weed populations, reclamation success, and to plan and report on the program annually; and
- Affirmative efforts to resist the spread of weeds including refraining from cleaning out equipment including filters on the site, and power washing machinery and equipment between work sites consistent with the Rawlins Weed Prevention Plan (USDI-BLM 1999).

1.1 Management of Soil for Restoration

Topsoil should be handled separately from subsoil materials. At all construction sites, topsoil should be stripped to provide for sufficient quantities to be re-spread to a depth of at least 4 to 6 inches over the disturbed areas during reclamation. In areas where deep soils exist (such as floodplains and drainage channel terraces), at least 12 inches of topsoil should be salvaged. Where soils are shallow or where subsoil is stony, as much topsoil should be salvaged as possible.

Topsoil should be stockpiled separately from subsoil materials. Topsoil salvaged from drill sites and stored for more than 1 year should be bladed to a specified location, seeded with a prescribed seed mixture, and covered with mulch for protection from wind and water erosion and to discourage the invasion of weeds. Topsoil stockpiles anticipated to be stored for more than 1 year will be re-spread so as not to exceed a depth of 2 feet. Topsoil should be stockpiled separately from other earth materials to preclude contamination or mixing, marked with signs, and identified on construction and design plans. Runoff should be diverted around topsoil stockpiles to minimize erosion of topsoil materials.

In most cases, disturbances will be reclaimed within 1 year. Therefore, it is unlikely that topsoil stockpiling for more than 1 year will be required. Salvaged topsoil from roads and drill sites will be respread over cut-and-fill surfaces not actively used during the production phase. Upon final reclamation, topsoil spread on these surfaces will be used for the overall reclamation effort.

1.2 Seed Mixtures

On all areas to be reclaimed, seed mixtures are required to be free of noxious weeds, composed of the same native species as were disturbed, and required to include species-promoting soil stability. A predisturbance species composition list must be developed for each site if the project encompasses an area where there are several different plant communities present. Livestock palatability and wildlife habitat needs must be considered in seed mix formulation. Variation of seed mixtures can be proposed and approved based on availability, climatic conditions, or variables. BLM guidance for native seed use is the BLM Manual 1745 (USDI-BLM 1992) and Executive Order 13112 (Invasive Species, 64 Federal Register 6183).

Alternate Seed Mixtures. The seed mixtures identified in attachment A-1 may vary on a site-specific basis. Variations may be proposed and approved by the BLM before final reclamation. An example for the ARPA would be the addition of green needlegrass

(*Stipa viridula* var. *Lodorm*) on clayey sites associated with the southern portion of the ARPA (e.g., Muddy Mountain area).

Temporary Seed Mixtures. Depending on BLM authorization, the following seed mixtures may be considered for erosion and weed control on sites that will be disturbed again before final reclamation. Seed mixtures contain annual cereal grasses that are not suitable for establishing a reclaimed vegetative community, but offer a temporary option to prevent halogeton invasion and establishment.

Seed should be broadcast at a rate necessary to reestablish vegetation equivalent to the surrounding areas. Another viable option is the use of a sterile triticale hybrid such as Quickguard[®] (Granite Seed) to stabilize the disturbed area. The use of a non-sterile plant species such as wheat is not recommended as a cover crop because of its ability to reseed itself.

During reclamation within areas of important wildlife habitat (crucial winter range, sage-grouse nesting habitat, etc.), consideration shall be given for the restoration of native shrubs and forb species. Follow-up seeding or corrective erosion control measures will be required on areas of surface disturbance that fail to meet reclamation success standards.

Any mulch used must be certified free from mold, fungi, or noxious or invasive weed seeds. Mulch may include hay, small-grain straw, wood fiber, live mulch, cotton, jute, or synthetic netting. Straw mulch should contain fibers long enough to facilitate crimping and provide the greatest cover.

1.3 Reclamation Standards and Principles

One of the most important principles for successful restoration is to <u>limit initial disturbance</u> through the use of planning, construction control, and adaptive management. Restoration planning should start before disturbance and be an integral part of the operational plan. Consideration of the processes necessary for successful reclamation is important. Predisturbance surveys, site stabilization, weed control, and maintenance of healthy soils are important considerations. Revegetation that considers vegetative succession to pre-disturbance vegetative conditions, with annual monitoring and reporting, will allow tracking of success and adaptive management of problem areas. Annual monitoring and reporting, will allow tracking of success and adaptive management of problem areas.

1.3.1 At Any Time

For each discrete site where ground-disturbing activities are planned or occur under the Operators' activities, a site-specific reclamation plan shall be prepared, submitted, and approved by the BLM before the Operators disturb the environment. Guidance and requirements for this plan can be found in program-specific direction (USDI-BLM 1983). A project-wide reclamation plan may be considered if it addresses discrete site disturbances individually. The collection of photo reference points is essential.

With the exception of active work areas, disturbed areas anticipated to be left bare and exposed will be stabilized to prevent soil erosion. In addition, mulch, silt fencing, waddles, hay bales, and other erosion control devices will be used on areas at risk to soil movement away from disturbed

areas including fill slopes. Variation and use of the cover percentage and the use of other stabilizing materials can be proposed and used with BLM approval consistent with the relevant site-specific reclamation plan. For areas anticipated for further disturbance, use of the seed mixtures detailed in Temporary Seed Mixes on page A-3 would be acceptable in the interim.

1.3.2 First Growing Season

Reclamation actions will be implemented before the first growing season following disturbance with the goal of returning the land to a condition approximate to or more productive than that which existed before disturbance or to a stable and productive condition compatible with that described in the land use plan (USDI-BLM 1990b). One strategy could include consideration of using all grasses for the first seeding so that it survives any weed-controls used. Subsequent seeding will be required to promote the establishment of desired shrubs and forbs.

Consistent with the reclamation plan, the operator will ensure the following during the first growing season:

- 1. Prior to the beginning of the growing season,
 - Stabilize disturbed site soils until they are revegetated with no hindrance to germination and growth of seed and
 - Properly prepare the site by
 - Recontouring for permanent reclamation;
 - Completing soil preparation activities, such as ripping and straw crimping/seedbed preparation for planting including drilling and broadcast methods;
 - Planting the approved seedling/seed mixtures using site-specific methods for successful revegetation with locally adapted species; and
 - Ensuring that weed treatments are compatible with seed mixtures and plantings.
- 2. Starting the first growing season,
 - Monitor germination and growth of plants in the area being reclaimed;
 - Work with the BLM and surface leasees to detect and control weeds in all areas;
 - Use adaptive management to correct establishment and growth problems;
 - Put up temporary fencing to avoid adverse effects to reclamation;
 - Build snow fencing, if requested, to increase the capture of precipitation and aid in the re-establishment of vegetation and control wind scour.

- 3. Following each growing season,
 - Review and complete a site-specific vegetation monitoring report for areas being reclaimed (table A-1) and
 - As necessary, prepare a written, site-specific prescription for actions to be implemented, which might include:
 - o Reseeding areas not attaining reclamation success,
 - o Soil stabilization,
 - Weed control needs, and
 - Mulching/fertilization or other practices prescribed for the following season.

If the treatment area is found to be successfully reclaimed, the site will be checked for reclamation success at least annually for at least five seasons. The site will also be checked for additional management needs including weed infestations and control needs.

If the treatment area is not successfully reclaimed or otherwise requires further management activities, the actions prescribed will be implemented as planned and further monitoring will occur as detailed beginning with item 1 above.

1.4 Monitoring and Reporting Disturbed Sites

The operator will provide the BLM with an annual report before December 1st for all sites disturbed. The report will include:

- Copies of the completed individual site review forms or a BLM-approved electronic report.
- A summary of monitoring data and results that include:
 - o Identification of monitoring by year;
 - Individual site reclamation monitoring reporting data (table A-1);
 - Identification of sites successfully reclaimed by reclamation years (starting with the first growing season);
 - o Identification of sites needing additional work/more reclamation activities;
 - Sites proposed for the end of monitoring, i.e., sites that were successfully reclaimed.
- A BLM-useable shapefile(s) or Geographic Information System (GIS) layer(s) that details location, name, type, and extent of:
 - New disturbances,
 - Unreclaimed disturbances,
- New reclamation,
- Failed or unsuccessful reclamation,
- o Locations of noxious/invasive weed infestation, and
- Further vegetation treatments planned (e.g., mulching, matting, and weed control).

On these shapefiles or GIS layers, *location* shall be given as the legal location and georeferenced location of the site; *name*, as the BLM Application for Permit to Drill (APD), lease, or other BLM file name for the site; and *extent*, as the amount of area and location of the item.

2 Criteria for Reclamation Success

Reclamation will be considered successful if the following Interim Reclamation criteria are met.

- 80 percent of predisturbance ground cover,
- 90 percent dominant species*,
- No noxious weeds present in the seeding, and
- Erosion features equal to or less than the surrounding area.

*The vegetation will consist of species included in the seed mix and/or occurring in the surrounding natural vegetation or as deemed desirable by the BLM in review and approval of the reclamation plan. The goal is no single species will account for more than 30 percent total vegetative composition. Vegetation canopy cover production and species diversity shall approximate the surrounding undisturbed area.

Section 1.3.1 of this appendix indicates that reclamation success will be tracked by each discrete site for which an individual reclamation plan was prepared. A site can be nominated for successful reclamation status by the Operators or the BLM any time it meets the criteria for reclamation success as outlined above. A site will be considered reclaimed and the Atlantic Rim disturbance acreage count reduced by the extent of the reclaimed acreage when a BLM authorized officer accepts the written nomination. Partially reclaimed discrete sites will not have any reclaimed acreage subtracted from the disturbance acreage count. The Atlantic Rim disturbance cap is 7,600 acres at any one time.

The BLM RFO will maintain a running count of the extent of surface disturbance acres based on the "as built" geo-spatial monitoring data submitted by the companies annually for the preceding year in December after construction. An annual summary report of the disturbance acreage count will be available to the companies and the public upon written request. For a project-wide-type reclamation plan (per section 1.3.1 of this appendix), each individual site disturbance included in the plan will be managed as a discrete site and disturbance acreage will be tracked as detailed above.

When determining the extent of successful reclamation, a site covered under an individual reclamation plan will be evaluated as follows. If, for example a site is determined to have 4.2 acres of total disturbance based on the "As-Built" survey, the disturbance acreage count for that discrete site will be 4.2 acres. However, if one-half acre remains disturbed in the long-term

(e.g., roadway) then the disturbance count for that site would be reduced by 3.7 acres when accepted as successfully reclaimed by the BLM. It should be noted that "partial credit" would not be given until all of the 3.7-acre portion is successfully reclaimed and accepted.

General	WYW# (Oil & Gas Lease or Right-of-Way)
	Project Name
	Project Type (Well, Access Road, Pipeline, Facility, etc.)
	Qtr/Qtr Sec, T, R, County, State
Disturbance	Disturbance Dates
	Start-End
Reclamation	Reclamation Type (Interim/Final)
	Earthwork Contractor Name
	Earthwork & Topsoil Completion Date
	Soil Preparation Ripping Depth
	Area (Acres or Square Feet (Sq. Ft.))
Seeding	Seeding Contractor Name
-	Seeding Date
	Seedbed Preparation Methods (Disc, Harrow, Depths)
	Seeding Method (Drill, Broadcast, Depths)
	Copy of Seed Tag (Species%, Purity%, Germination%)
	Actual Seeding Rate Lbs/Acre
	Area Seeded (Acres or Sq Ft)
Other	Soil Amendments Used (Describe)
	Mulching/Erosion Netting/Tackifier
	Fenced Location
	Snow Fencing
Weeds	Type(s) of Weeds Treated
	Weed Contractor Name
	Contractor License #
	Weed Treatment Date
	Weed Treatment Type (Chemical, Mechanical)
	Chemicals Used and Rates Applied
	Area Treated (Acres or Sq Ft) (GIS Extent and Location)
Inspection	Inspector's name, Company, ID
-	Inspection Date
	Time after Seeding
	Seedlings/Sq. Ft Growing
	% and Extent of Bare Soil
	% Ground Cover (Describe)
	% Desirable Species (Describe)
	% Noxious/Invasive Weeds (Describe)
	Erosion Features Present? (Describe)
	Evidence of Livestock Grazing (Describe)
	Reclamation Successful (Yes/No)
Reporting	Completed Spreadsheet or Database
	GIS Layer with Attribute Table with Site Data as Detailed
	Detail Disturbance Extent and Location
Monitoring	Permanent Reference Point
U U	Reference Photos
	Close-up Photos

Table A-1. Reclamation Monitoring Reporting Data.

Table A-1. Reclamation Monitoring Reporting Data.

Future Management	Reseeding
Prescription	Weed Control Needed
	Erosion Control Needed
	Grazing / Predation Issues
	Other Cultural or Mechanical Needs

3 References Cited

- USDI-BLM 1983. Onshore Oil and Gas Order No. 1: Approval of Operations on Onshore Federal and Indian Oil and Gas Leases, Section III(G)(10). 43 CFR 3160. United States Department of Interior, Bureau of Land Management. October 1983.
- USDI-BLM 1990a. *Wyoming Policy on Reclamation.* Cheyenne, Wyoming: United States Department of Interior, Bureau of Land Management, Wyoming State Office. Instruction Memorandum No. WY-90-231. February 1990.
- USDI-BLM 1990b. Great Divide Resource Area Record of Decision and Approved Resource Management Plan. Rawlins, Wyoming: United States Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area. 74 pp.
- USDI-BLM 1992. Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants, BLM Manual 1745. United States Department of the Interior, Bureau of Land Management. March 1992.
- USDI-BLM 1999. *Rawlins Field Office Noxious Week Prevention Plan, Rawlins, WY.* United States Department of the Interior, Bureau of Land Management. April 1999.

ATTACHMENT A-1

STANDARD SEED MIXTURES RAWLINS FIELD OFFICE

The following list contains seed mixes recommended by resource specialists with years of local knowledge. Care and planning must be taken to choose mixes and amounts that will benefit under site-specific conditions. Planning and thought must also go into selecting successful planting and site preparation techniques. All sites must be planted with a diverse mix of grasses, forbs, and shrubs to be considered successful. Industry is ultimately responsible for successful restoration of disturbed sites. Alternate seed mixes can be proposed by industry to the BLM for approval prior to use. The final goal is to restore disturbed sites so that they closely resemble pre-disturbance native plant communities.

<u>DRY LOAMY/CLAY SITES</u> - characterized as a sagebrush/wheatgrass community with <u>less</u> than 10 inches precipitation

Species of Seed	Variety	Lbs. PLS*
Grasses	-	
Streambank wheatgrass (Elymus lanceolatus)	Sodar	1
Thickspike wheatgrass (Elymus macrourus))	Critana (Bannock)	1
Western wheatgrass (Agropyron smithii)	Rosana	1
Indian ricegrass (Oryzopsis hymenoides)	Rimrock (Nez Par)	2
Bottlebrush squirreltail (Elymus elymoides)	Sand Hollow	2
Slender wheatgrass (Elymus trachycaulus)	Pyror (San Luis)	4
Little bluegrass "Sandbergh" (Poa secunda)	High plains	0.5
*Bluebunch wheatgrass (Pseudoroegneria spicata)	Secor	2
Shrubs		
*Big sagebrush (Artemisia tridentata wyomingensis)		0.5
*Gardner's saltbush (Atriplex gardneri)		1
*Fourwing saltbush (Atriplex canescens)	Wytana	1
* Shadescale (Atriplex confertifolia)		0.5
*Rubber rabbitbrush (Ericamerica nauseosas) "green"	Chrysothamnus	1
	viscidiflorus "Gray"	
*Winterfat (Krascheninnikovia lanata)	Open Range	0.5
<u>Forbs</u>		
*Scarlet globemallow (Sphaeralcea coccinea)		0.5+
*Lewis' flax (Linum lewsii)	Appar	0.5+
*Rocky Mountain beeplant (Cleome serrulata)		0.5+
*Western yarrow (Achillea millefolium L. var. occidentalis)	Yakima	0.5
*Firecracker Penstemon (Penstemon eatonii)	Richfield	1

<u>DRY SANDY SITES</u> - characterized as a sagebrush/bunchgrass community with <u>less</u> than 10 inches precipitation

Species of Seed	Variety	Lbs. PLS*	
Grasses	-		
Indian ricegrass (Achnatherum hymenoides)	Rimrock (Nez Par)	3	
Needleandthread needlegrass (Stipa comata)		4	
Slender wheatgrass (Agropyron trachycaulum)	Prior	4	
*Sandhill muhly (Muhlenbergia pungens)		0.5	
Western wheatgrass (Agropyron smithii)	Rosana	1	
*Threadleaf sedge (Carex filafolia)		2	

Species of Seed	Variety	Lbs. PLS*
Shrubs	-	
*Rubber rabbitbrush (<i>Ericamerica nauseosas</i>) "green"	Chrysothamnus viscidiflorus "Gray"	1
*Wyoming Big sagebrush (<i>Artemisia tridentata wyomingensis</i>)	-	0.5
*Spiny hopsage (Atriplex spinosa)		1
*Fourwing saltbush (Atriplex canescens)	Wytana	1
*Winterfat (Krascheninnikovia lanata)	Open Range	0.5
<u>Forbs</u>		
*Scarlet globemallow (Sphaeralcea coccinea)		0.5+
*Lewis' flax (<i>Linum lewsii</i>)	Appar	0.5+
*Rocky Mountain beeplant (Cleome serrulata)		0.5+

LOAMY/CLAY-LOAM SITES - characterized as a sagebrush/wheatgrass community with 10 inches or <u>greater</u> precipitation

Species of Seed	Variety	Lbs. PLS*
Grasses	2	
Western wheatgrass (Agropyron smithii)	Rosana	1
Thickspike wheatgrass (Elymus macrourus)	Critana	1
Indian ricegrass (Oryzopsis hymenoides)	Rimrock (Nez Par)	1
Green needlegrass (Stipa viridula)	Lordon	3
Prairie Junegrass (Koeleria cristata)		1
Bottlebrush squirreltail (Sitanion hystrix)	Sand Hollow	1
Mutton bluegrass (Poa fendleriana)		0.5
Streambank wheatgrass (Elymus lanceolatus)	Sodar	1
Bluebunch wheatgrass (Pseudoroegneria spicata)	Secor	2
Basin wildrye	Trailhead	2
Shrubs		
*Big sagebrush (Artemisia tridentata wyomingensis)		0.5
*Big sagebrush (Artemisia tridentata vaseyana) at sites above 7	7,000'	0.5
*Fourwing saltbush (Atriplex canescens)	Wytana	1
*Antelope bitterbrush (Purshia tridentata)	Maybell	1
*Snowberry (Symphoricarpos oreophilus) and/or (Sym. Albus)		1
*Winterfat (Krascheninnikovia lanata)	Open Range	0.5
<u>Forbs</u>		
*Lewis' flax (<i>Linum lewsii</i>)	Appar	0.5+
*Scarlet globemallow (Sphaeralcea coccinea)		0.5+
*American vetch (Vicia americana)		0.5+
*Lupine (Lupinus sericeus)		0.5+
*Blanketflower (Gaillardia aristata)		0.5+
*Western yarrow (Achillea millefolium L. var. occidentalis).	Yakima	0.5+
*Firecracker Penstemon (Penstemon eatonii)	Richfield	0.5+
*White sage atrtemesia ludiciciana		0.5

<u>SANDY SITES</u> - characterized as a sagebrush/bunchgrass community with 10 inches or <u>greater</u> precipitation.

Species of Seed	Variety	Lbs. PLS*	
Grasses	-		
Western wheatgrass (Agropyron smithii)	Rosana	1	
Indian ricegrass (Oryzopsis hymenoides)	Rimrock (Nez Par)	2	
Green needlegrass (Stipa viridula)		3	
Needleandthread (Stipa comata)		2	
Slender wheatgrass (Agropyron trachycaulum)	Prior (Revenue)	2	

Species of Seed	Variety	Lbs. PLS*
Grasses (cont. from previous page)	-	
Mutton bluegrass (Poa fendleriana)		0.5
Sand dropseed (Sporobolus cryptandrus)	Borden County	0.5
Canby Bluegrass (Poa Secunda)	Canbar	0.5
<u>Shrubs</u>		
*Silver sagebrush (Artemisia cana)		0.5
*Fourwing saltbush (Atriplex canescens)		1
*Antelope bitterbrush (Purshia tridentata)		1
*Winterfat (Krascheninnikovia lanata)	Open Range	0.5
*White sage (atrtemesia ludiciciana)		0.5
<u>Forbs</u>		
*Firecracker Penstemon (Penstemon eatonii)		
*Lewis' flax (Linum lewsii)	Appar	0.5+
*Rocky Mountain beeplant (Cleome serrulata)		0.5+
* Western yarrow (Achillea millefolium L. var. occidentalis DC.)		0.5+
WET ALKALINE/SALINE SITES - characterized as a greasewo	ood community in a lowl	and location

Species of seed	Variety	Lbs. PLS**
Grasses	-	
Western wheatgrass (Agropyron smithii)	Rosana	3
Slender wheatgrass (Agropyron trachycaulum)	Pryor (Revenue)	4
Alkali sacaton (Sporobolus airoides)		0.5
Inland saltgrass (Distichlis spicata)		2
Basin wildrye (Leymus cinereus)	Trailhead	2
Shrubs		
*Fourwing saltbush (Atriplex canescens)	Wytana	1
Greasewood (Sarcobatus vermiculatus)	-	0.5

<u>MOUNTAIN SHRUB SITES</u> - characterized as shrub community with deep loamy soils and <u>greater</u> than 14 inches of precipitation

Species of Seed	Variety	Lbs. PLS**
Grasses	-	
Idaho fescue (Festuca idahoensis)		2
Green needlegrass (Stipa viridula)		4
Mountain brome (Bromus carinatus)	Garnet	2
*Oniongrass (Melica bulbosa)		2
Basin wildrye (Leymus cinereus)	Trailhead	2
Bluebunch wheatgrass (Pseudoroegneria spicata)	Goldar, Secor	2
Shrubs		
*Wyoming Big sagebrush (Artemisia tridentata wyominge	ensis)	0.5
* Mountain Big sagebrush (Artemisia tridentata vasevana	a) at sites above 7,000'	0.5
* Silver sage (Artemisia cana)	,	0.5
*Antelope bitterbrush (Purshia tridentata)	Maybell	1
*Serviceberry (Amelanchier alnifolia)	,	1
*Chokecherry (Prunus virginianna)		1
*Winterfat (Krascheninnikovia lanata)	Open Range	0.5
Forbs		
*Arrowleaf balsamroot (Balsamhoriza sagittata)		
*Lewis' flax (Linum lewsii)	Appar	0.5+
*Scarlet globemallow (Sphaeralcea coccinea)		0.5+
*American vetch (Vicia americana)		0.5+

Species of Seed	Variety	Lbs. PLS**
Forbs (cont. from previous page)		
*Lupine (Lupinus sericeus)		0.5+
*Blanketflower (Gaillardia aristata)		0.5+
* Western yarrow (Achillea millefolium L. var. occidentalis).	Yakima	0.5+
*Firecracker Penstemon (Penstemon eatonii)	Richfield	0.5+

Notes:

Total Lbs. PLS - Seed mixtures should total approximately 12-14 lbs. of pure live seed.

** Pure Live Seed, drill seeded. For broadcast seeding, double the above rates.

* These species can be used as alternatives to fulfill shrub and forb requirements, site-specific choices, or species required to fulfill a particular value (e.g., critical wildlife habitat).

Appendix B

Atlantic Rim Natural Gas Project Performance-Based Monitoring and Best Management Practices

This appendix to the Atlantic Rim Record of Decision (ROD) lists the requirements that will be imposed, as appropriate, by the Bureau of Land Management (BLM), Rawlins Field Office (RFO) on all oil and gas development actions approved on federal lands and minerals within the Atlantic Rim Project Area (ARPA). These requirements include mitigation identified in specific resource mitigation subsections of chapter 4 of the Final Environmental Impact Statement (FEIS) for the ARPA. Other conditional requirements may also be imposed by the BLM pending site-specific review and may include Conditions of Approval (COAs), administrative requirements, and mitigation requirements found in the following appendices in the FEIS for the ARPA:

- Appendix B Reclamation Plan
- Appendix C Hazardous Materials Management Plan
- Appendix E Wildlife Monitoring and Protection Plan
- Appendix H Best Management Practices
- Appendix I Cultural Resources Management
- Appendix J Best Management Practices for Reducing Non-Point Source Pollution
- Appendix K Plan of Development / Detailed Proposed Action (See section K.1.3.7, Applicant Voluntarily Committed Measures)

These appendices to the FEIS contain the tools available to the BLM for mitigating impacts of the development in the ARPA. These tools will be applied, as appropriate, upon approval of Applications for Permits to Drill (APDs) and based on site-specific review. Protective measures summarized in appendix L of the FEIS will be considered based on site-specific conditions, where such measures are not otherwise in conflict with this ROD. The remainder of this appendix to the ROD contains those requirements that will be imposed on APDs on federal lands and minerals within the ARPA.

Authorizing Actions

ARPA Operators are responsible for adhering to all applicable federal, state, and local laws and regulations and for obtaining all necessary federal, state, and county permits. Absent specific revisions in this ROD, Operators will comply with the management objectives, COAs, and mitigation measures identified in the BLM Great Divide Resource Management Plan (RMP) ROD (USDI-BLM 1990) to the extent feasible and practicable.

Performance-Based Management

The Atlantic Rim project will use a performance-based management approach that includes four primary elements, as outlined below:

- 1. Performance Goals: describes the conditions that the BLM and Operators will attempt to achieve.
- 2. Performance Requirements: an extensive array of best management practices (BMPs), COAs and protective measures that may be used to achieve the Performance Goals.
- 3. Performance-Based Monitoring: monitoring efforts to measure the degree of success the performance requirements have in achieving Performance Goals.
- 4. Adaptive Management: application of additional mitigation or adaptive techniques to help achieve Performance Goals where needed.

Implementation of the performance-based approach is described below. The BLM will attempt to achieve the following Performance Goals in collaboration with other state and federal agencies:

ltem	Performance Goal
Migration Routes	maintain functional migration routes through or around development
	areas
Big Game Crucial	provide an adequate amount of suitable undisturbed crucial winter
Winter Range	range for big game animals
Sage and Sharp-	provide well-dispersed sage-grouse breeding, nesting, brood
Tailed Grouse	rearing, and winter habitat
Muddy Creek	maintain adequate water quality, water quantity, species distribution,
Sensitive Fish	and aquatic habitat components
Shrub-Dependent	assure occupied habitat for shrub-dependent song birds is well-
Song Birds	distributed throughout the project area
Riparian	ensure no net loss of native riparian habitat/vegetation
Grazing	maintain adequate and sustainable food and habitat for domestic
	animals
Range Condition	maintain range condition or improve range condition towards
	potential for the ecological site
Livestock Safety	minimize deaths and injuries of livestock due to development and
	operational activities
Range	minimize damage to range improvements, gates, cattle guards,
Improvements	water sources, and other livestock grazing management
	improvements
Standards and	manage to meet Wyoming Healthy Rangeland Standards
Guidelines	manage to meet wyoming heating Nangeland Standards
Sites	maintain viable site-stabilizing native plant growth
Species	maintain a range of species composition, diversity, cover, and
Composition	production equal to pre-disturbance levels
Weeds	maintain weed-free sites

Adaptive Management

The BLM will implement a performance-based, adaptive management process for the ARPA whereby incremental adjustments will be made to mitigation and management restrictions

based upon how the environment responds to future development and performance requirements. The potential value of adaptive management to the National Environmental Policy Act (NEPA) process is discussed by Carpenter (1997) and is strongly supported by a number of agencies at the national level, including BLM, United States Environmental Protection Agency (USEPA), and United States Department of Agriculture-Forest Service (USDA-FS). Carpenter summarized, "It is increasingly recognized that human interventions into natural systems seldom proceed as originally planned. Scientific uncertainties prevent environmental impacts from being reliably or precisely predicted. Thus, the style of management must provide for monitoring to guide mid-course corrections in adapting to inevitable surprises." Council on Environmental Quality (CEQ) NEPA regulations require continual monitoring.

Throughout the life of the project, monitoring data will be reviewed to determine if mitigation is leading to the achievement of reclamation and performance goals. The adaptive management process will use this data to enable the development of management changes. Following submission of development plans (APDs, Sundry notices, etc.) specific COAs, BMPs, and other mitigations will be determined and applied for each specific site during on-site reviews. These on-the-ground reviews offer BLM resource specialists the opportunity to anticipate the potential effects of development and apply those measures judged necessary to reduce the adverse effects of development at the site. The specific measures (COAs, BMPs, etc.) that are best suited for reducing adverse effects will vary by site, based on conditions found at the specific site, such as the presence of sensitive soils, wildlife issues, aspect, slope, nature of the specific action proposed, and many other factors.

While the activities planned for the ARPA, including most mitigation measures, are common and their effects generally well known, variations in site and climatic conditions, unknown conditions, and other factors can result in variations in reclamation success. Therefore, new techniques and technology to reduce oil and gas development impacts can and will be implemented as they become available. For those sites where known mitigations are not as effective as desired, monitoring and application of adaptive management will be used to change the mitigation approach using different or new techniques that provide the BLM with a mechanism to increase the success of reclamation in the ARPA.

As information is gained about how area resources are reacting to reclamation activities and mitigations, the adaptive management process allows for changes in management without further NEPA analysis, unless development thresholds, such as the number of wells and disturbance limits, are reached. The process enables managers to rapidly adjust mitigation and management restrictions for unanticipated impacts or reclamation successes. The adaptive management framework has several continuous, looping steps:

- Implement the decision;
- Monitor impacts;
- Evaluate monitoring data;
- Recommend modifications to mitigations or management restrictions based on monitoring data;
- Develop and implement adaptive management decision;

• Monitor impacts of adaptive management decision and further evaluate monitoring data, etc.

The overall purpose of this adaptive management process is to ensure that impacts of development and production are monitored, and the information from that monitoring is evaluated and incorporated, on a regular basis, into future mitigation and management decisions. Specific performance-based monitoring requirements and BMPs are summarized by discipline in the following sections.

Land Use/Surface Disturbance

- 1. Surface disturbance in the ARPA is limited to 7,600 acres (2.8 percent of the project area) at any given time. Total surface disturbance through the life of the project is estimated to be 13,600 acres. Initial site disturbance from oil and gas development activities (resource roads, well sites, gas gathering pipelines, compressor stations, etc.) will be limited to a short-term disturbance goal of 6.5 acres per well site. In Category A areas (ROD, figure 2) initial site disturbance will be further limited to less that 6.5 acres per well site (FEIS, section 2.2.4). Well sites are defined as the relatively flat, contiguous work area containing equipment and facilities used to drill one or more wells used in oil and gas production.
- 2. Once the surface disturbance limit is reached, further development will cease until disturbed land has been reclaimed according to the reclamation standards established by the BLM for the ARPA (appendix A, Reclamation Plan).
- 3. Natural gas development is limited to eight well sites per 640-acre section. Operators can install multiple well-bores (e.g., coalbed natural gas (CBNG), conventional, or injection) on a single well site (FEIS, section 2.2.4).
- 4. Operators will track surface disturbance acreage (including total disturbance and successful interim reclamation) and provide BLM with Federal Geographic Data Committee (FGDC)-compliant metadata and geographic information system/global positioning system (GIS)/(GPS) showing the "as-built" location data for all newly developed facilities and reclaimed areas annually no later than December of each year based upon successful reclamation (appendix A, Reclamation Plan).
- 5. Within 30 days of approval of this ROD, Operators will provide BLM with a map of the existing disturbance associated with activities authorized as part of the interim drilling policy. This map will serve as the baseline level of disturbance and will be updated annually.
- 6. By April 1 of each year, Operators will provide the BLM RFO annual operating plans for the following year that include the following information:
 - a. All previous year activity to include number of wells drilled; total new surface disturbance by well pads, roads, and pipelines; and current status of all reclamation activity and

- b. Plan of Development for the upcoming year, along with conceptual, multi-year development plans to include planned number of wells to be drilled and an estimate of new surface disturbance and reclamation activity.
- 7. Operators will remove/vacuum fluids from reserve pits and complete backfill and reclamation within 180 days from well completion or they must notify the BLM's Authorized Officer. In all cases, fluids will be removed as soon as practical.

Paleontological Values

- 1. Each proposed facility located in areas with known and/or potentially significant paleontological resources (Paleontology Condition 1 and 2 areas and Probable Fossil Yield Class 4 and 5 areas) will be surveyed by a BLM-approved paleontologist prior to surface disturbance (FEIS appendix H).
- Any significant fossils or localities previously known or discovered during the survey will be avoided by the permitted activity, or fully mitigated prior to allowing the activity to proceed (FEIS appendix H).
- If paleontological resources are discovered at any time during construction, all construction activities will halt and BLM personnel will be immediately notified. Work will not proceed until paleontological materials are properly evaluated by a qualified paleontologist. In addition, the site will be protected from further damage or looting (FEIS appendix H).

Air Quality/Dust

- 1. In cooperation with Wyoming Department of Environmental Quality, Air Quality Division (WDEQ-AQD), Operators will finance and operate air quality monitoring in the RFO area including NOx, O₃, PM₁₀ and SO₂ (FEIS, chapter 4).
- 2. The BLM will work cooperatively with state and other federal agencies, and with industry, to track emissions in the BLM RFO area (FEIS, chapter 4).
- 3. If future air monitoring shows ozone exceedances attributable at least in part to sources in the ARPA, BLM will consult with WDEQ-AQD, USEPA, USDA-FS, and NPS to determine whether adaptive management will be needed to mitigate impacts (FEIS, chapter 4).
- 4. Operators may use any and all approved, practical, and effective methods to control fugitive dust. This may include, but is not limited to:
 - Operators may use water or chemicals to control dust in the demolition of structures, in construction operations, grading of roads, or clearing of land (FEIS appendix J).
 - Operators may use water for dust abatement on a case-by-case basis. The water should meet state standards for this use and be permitted by the state of Wyoming. Only the water needed for abating dust should be applied; this

method will not be used as a water disposal option under any circumstances. There will be no traces of oil or solvents in water used for dust abatement (FEIS appendix J).

- Operators will use all-weather surfacing on roads (gravel or asphalt paving) and will apply water or suitable chemicals to keep dust in place on roads or material stockpiles (FEIS appendix J).
- Operators will use appropriate road design including shape, drainage, and surface material to protect road bed from being eroded (FEIS appendix J).
- When an air quality, soil loss, or safety problem is identified as a result of fugitive dust, Operators will initiate immediate abatement (FEIS appendix K).

Soils/Water

- 1. The Atlantic Rim operator responsible for new development around existing pods will submit a Water Management Plan as part of the Annual Work Plan submittal in April. This plan will have the following information (FEIS appendix H):
 - 12-digit hydrologic unit code (HUC) number and name;
 - All GIS—compatible information included in the Annual Work Plan (FEIS appendix K);
 - Surface water assessment of the current road network in the area including future plans for maintenance;
 - Average daily water production per well at current pod wells;
 - Average daily injection volumes of current injection wells, by well;
 - Unused injection well capacity;
 - Estimated water production from proposed wells;
 - Location, name, and estimated capacity of new injection wells;
 - Special Protection Measure for each well location, if applicable;
 - Any water quality sampling results; and
 - Anticipated permit requirements, and copies of existing permits for water-related activities required from Army Corps of Engineers (ACOE), other federal agencies, and/or the state of Wyoming.

- Plans should be submitted and approved by BLM for surface disturbance in areas with slopes greater than 25 percent. Only those areas that cannot be avoided could be approved (FEIS appendix H).
- 3. Culverts or low-water crossings will be installed for all ephemeral and intermittent drainage crossings. All drainage crossing structures and culverts will be designed to pass, at a minimum, the 25-year discharge events, or as otherwise directed by the BLM. Downstream armoring will be installed when necessary (FEIS appendix H).
- 4. The design of channel crossings will minimize changes in channel geometry and subsequent changes in flow hydraulics. Disturbed channel beds will be regraded to the original geometric configuration with the same or very similar bed material. Downstream armoring will be installed when necessary (FEIS appendix H).
- 5. Construction of drainage crossings will be limited to no-flow periods or low-flow periods (FEIS appendix H).
- 6. Channel crossings for buried pipelines will be constructed using trenching techniques such that the pipe is buried a minimum of 4 feet below the channel bottom. To stabilize stream banks, appropriate—sized riprap will be placed from the channel bottom to the top of the normal high water line at all stream crossings. When excavating the crossing, separate the top 1-foot of stream bottom substrate from deeper soil layers and reconstruct the original layers by replacing deeper substrate first (FEIS appendix H).
- 7. Adequate drainage control devices and measures will be included in the road design and maintenance (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipaters) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid concentrated flows (FEIS appendix H).
- Locations for these features will be proposed in Annual APD approval master plans submitted by the operator and will be identified specifically in construction plans after BLM on-site inspections (FEIS appendix H).
- Erosion control devices will also be used in conjunction with the surface runoff and drainage control devices, such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. A revegetation program will be implemented as soon as possible to re-establish the soil protection afforded by a vegetal cover (FEIS appendix H).
- 10. When an existing road, improved for travel, will reduce environmental impacts compared with a new route, it will be used and identified during annual planning and on-site inspections (FEIS appendix H).
- 11. Culverts should be installed in road crossings for small ephemeral channels. All drainage and erosion mitigation should be designed for at least the 25-year discharge events, and should use, at a minimum, 18-inch culverts (with armored entrances and exits as necessary). Waterbars, waddles or haybales, and silt fences

can be used as needed to reduce surface runoff velocity and deposit sediment in the uplands to protect riparian areas, wetlands, and surface waters (FEIS appendix H).

- 12. All potentially affected landowners having properly permitted water wells with the Wyoming State Engineer's Office (SEO) within each proposed well's circle of influence (one-half mile radius) were offered a water well agreement. If a water well agreement is not reached with the landowner, the responsible Atlantic Rim Operator will mitigate the impacts in accordance with state of Wyoming water laws. Some examples of mitigation will be drilling an additional supply well or provide CBNG water as an offset (FEIS appendix H).
- 13. Completely reclaim all disturbed areas not needed for production activities including (FEIS appendix H):
 - Pipeline right-of-way (ROW),
 - Portion of road ROW not needed in the function of the road, and
 - The portion of the drill pad not needed during production.

Reclamation of disturbed areas is specified in the Reclamation Plan presented in appendix A. Reclamation may generally include (FEIS appendix H):

- Completing cleanup of the disturbed areas;
- Restoring of topographic contours that existed prior to construction;
- Ripping disturbed areas to a depth of 12 to 18 inches;
- Replacing of topsoil or suitable plant growth material over all disturbed surfaces;
- Seeding reclaimed areas with the seed mixture prescribed in the Surface Use Plan or Plan of Development for the proposed development; and
- Mulching or adding soil amendments, if considered necessary by the BLM officer.
- 14. All water used for drilling, completion, and testing activities will be free of hydrocarbons and come from CBNG wells, be re-used from other drilling sites, and/or come from sources approved by the BLM and subject to state permitting requirements. Only fresh water would be allowed for drilling to surface casing setting depth. New water sources would be considered for potential depletions to the Platte or Colorado River Basins as necessary (FEIS appendix H).
- 15. All water used for construction, dust abatement, or hydrostatic testing will come from CBNG wells or sources with sufficient quantities and through appropriation permits approved by the State of Wyoming. Surface water and shallow groundwater sources for these uses and located in the Colorado River Basin and has been consulted on with the Fish and Wildlife Service (See FEIS, appendix G). Under no circumstances are these methods to be used for water disposal, only volumes appropriate for the use will be approved (FEIS appendix H).

- 16. Hydrostatic test water will be discharged in a controlled manner onto an energy dissipater and within existing ROWs. The water is to be discharged onto undisturbed land that has vegetative cover and with energy dissipation such as using a rock armored apron or gated pipe. Prior to discharge, water should be tested and treated or filtered if necessary to reduce pollutant levels or to settle out suspended particles if necessary. Operators will coordinate all discharge of test water with the SEO, WDEQ, and the BLM (FEIS appendix H).
- 17. Avoidance areas for surface-disturbing and disruptive activities and linear crossings include the following (FEIS appendix H):
 - Identified 100-year floodplains;
 - Areas within 500 feet from perennial waters, springs, water wells, and wetland riparian areas, and
 - Areas 100 feet from the inner gorge of ephemeral channels.
- 18. To minimize long-term surface disturbances within the vegetated sand dunes or other sensitive soils, options such as directional drilling, smaller well pads, and surface lines should be considered. To enhance reclamation success through surface stability, techniques to reduce wind erosion should be considered. These methods could include snow fences, soil tackifiers, and erosion control matting (FEIS appendix J).
- 19. Identification of critical erosion condition areas during site-specific project analysis, and activity plan development for the purpose of avoidance and special management (FEIS appendix J).
- 20. Temporary disturbances which do not require major excavation (e.g., small pipelines and communication lines) may be stripped of vegetation to ground level using mechanical treatment, leaving topsoil intact and root mass relatively undisturbed (FEIS appendix J).
- 21. The Operators will minimize construction activities in areas of steep slopes and other sensitive soils, and apply special slope stabilizing structures if construction cannot be avoided in these areas (FEIS appendix K).
- 22. Design cut slopes in a manner that will allow retention of topsoil, surface treatment such as mulch, and subsequent revegetation (FEIS appendix K).
- 23. Selectively strip and salvage topsoil or the best suitable medium for plant growth from all disturbed areas on all well pads (FEIS appendix K).
- 24. Include adequate drainage control devices and measures in the road design (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipaters) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff

or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. Implement a revegetation program as soon as possible to re-establish the soil protection afforded by a vegetal cover (FEIS appendix K).

- 25. Upon completion of construction activities, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites. Replace topsoil or suitable plant growth material over all disturbed surfaces, and apply fertilizer as needed, and seed (FEIS appendix K).
- 26. In accordance with the monitoring requirements for rangeland heath, depletions to the Colorado River Basin, and methane seep detection (section 4.4.5), the following shall be required in addition to initial drilling obligations and before any CBNG wells can be drilled in the unit/POD. The Unit Operator shall be responsible for drilling, completing, and equipping one set of three shallow groundwater-monitoring wells completed in water-bearing sandstone units stratigraphically above the principle producing coal beds in the upper Mesaverde Group. Specific surface locations, depths, and completion zones for each of the three groundwater monitoring wells in the set shall be determined in consultation with the RFO AO, and may only be drilled at a location where the oil and gas mineral estate is owned by the Federal Government. The groundwater monitoring well requirements are summarized as follows:
 - a. Each well in the three well set will be completed in a stratigraphically different water-bearing sandstone. The sandstone strata should be a minimum of 10 feet thick.
 - b. For each well in the three well set, the sandstone strata in which it is completed will typically be above the principal coal-bearing strata of the upper Mesaverde (e.g., typically above the coal-bearing strata of the Pine Ridge Sandstone).
 - c. Completion interval(s) in the water-bearing sandstone units for each well will be identified by the RFO Authorized Officer (AO) in consultation with the Unit Operator from wireline logs for each well in the set.
 - d. The minimum acceptable wire-line log suite for this purpose shall consist of calibrated and properly scaled (according to industry standards) high-resolution resistivity with spontaneous potential, gamma-ray curves, a high-resolution neutron density with photoelectric, and caliper curves. The density curve logging speed through the coals shall be no greater than 30 feet per minute. Digital las format logs shall be submitted to the WSO-RMG and the RFO; paper copies shall be submitted to the RFO.
 - e. Each groundwater monitoring well shall be drilled, cased, and completed in accordance to BLM RFO specifications.
 - f. Because the pressure gradient may be greater than 0.433 psia per foot and the rocks penetrated may contain natural gas, the Unit Operator shall drill the groundwater monitoring wells in accordance to Onshore Order #2 and all applicable regulations in a manner to prevent the possibility of a blowout.

- g. The groundwater monitoring wells shall be equipped with the appropriate monitoring equipment and shelters approved by the RFO's AO in consultation with the Unit Operator before any CBNG wells can be produced in the unit/POD.
- h. Additional information regarding the drilling and completion of the groundwater monitoring wells, the standard equipment required for the completed groundwater monitoring wells, and information on additional requirements for the groundwater monitoring wells can be obtained from the AO, Rawlins Field Office, Rawlins, Wyoming.

Reclamation

BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to or better than that which existed before it was disturbed. Final reclamation measures are used to achieve this goal. Interim reclamation measures are used to achieve the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Specific guidance on reclamation within the ARPA is presented in appendix A. The following sections summarize the key goals and requirements for reclamation activity within the ARPA:

- One of the most important principles for successful restoration is to limit initial disturbance. Restoration planning should start before disturbance and be an integral part of the operational plan. Consideration of the processes necessary for successful reclamation is important. Pre-disturbance surveys, site stabilization, weed control, and maintenance and health of soils are important considerations. Revegetation that considers vegetative succession to pre-disturbance vegetative conditions, with annual monitoring and reporting, will allow tracking of success and adaptive management of problem areas (appendix A). The Operators are responsible for reclamation monitoring and reporting costs.
- For each discrete site where ground-disturbing activities are planned or occur under the Operators, a site-specific reclamation plan shall be prepared, submitted, and approved by the BLM before the Operators disturb the environment. Guidance and requirements for this plan can be found in program-specific direction (USDI-BLM 1983). A project-wide reclamation plan may be considered if it addresses discrete site disturbances individually (appendix A).
- 3. With the exception of active work areas, disturbed areas anticipated to be left bare and exposed will be stabilized to prevent soil erosion. In addition to mulch, silt fencing, waddles, hay bales, and other erosion control devices will be used on areas at risk to soil movement away from disturbed areas including fill slopes (appendix A).
- 4. Reclamation actions will be implemented before the first growing season following disturbance with the goal of returning the land to a condition approximate to or more productive than that which existed before disturbance or to a stable and productive condition compatible with that described in the land use plan. During subsequent seeding for final vegetation reclamation, the project shall consider using desired shrubs and forbs. The reclamation plan will specify steps to be taken by the

Operators prior to the beginning of the growing season, during the first growing season, and following each growing season (appendix A).

- If the treatment area is found to be successfully reclaimed, the site will be checked for reclamation success at least annually after the growing season for at least five seasons. The site will also be checked for additional management needs including weed infestations/control needs.
- If the reclamation area is not successfully reclaimed or otherwise requires further management activities to establish vegetation, the actions prescribed above will be implemented with appropriate modifications and further monitoring will occur until reclamation is found to be successful.
- 5. The Operators will provide BLM with an annual report before January 31st for all sites disturbed which will include copies of the completed individual site review forms or a BLM-approved electronic report, a summary of monitoring data and results, a BLM useable shapefile(s) or GIS layer(s) that details location, name, type, and extent of (appendix A):
 - New disturbances,
 - Unreclaimed disturbance,
 - New reclamation,
 - Failed or unsuccessful reclamation,
 - Locations of noxious/invasive weed infestation, and
 - Further vegetation treatments planned (e.g., mulching, matting, and weed control).
- 6. Reclamation will be considered successful if the following Interim Reclamation criteria are met (appendix A):
 - 80 percent of predisturbance ground cover,
 - 90 percent dominant species*,
 - No noxious weeds present in the seeding, and
 - Erosion features equal to or less than surrounding area.

*The vegetation will consist of species included in the seed mix, and/or occurring in the surrounding natural vegetation or as deemed desirable by the BLM in review and approval of the reclamation plan. The goal is no single species will account for more than 30 percent total vegetative composition. Vegetation canopy cover production and species diversity shall approximate the surrounding undisturbed area.

Livestock Grazing/Range Management

- 1. Operators and their contractors will observe and promote adherence to speed limits in the project area, and erect signs in lambing/calving areas, shipping pastures, or adjacent to working corrals to warn vehicle Operators (FEIS, section 4.6.5.4).
- 2. The Operators will coordinate annually or more often when necessary with affected livestock operators to discuss (1) problems encountered during the past grazing

season, (2) agreed-upon corrective actions, and (3) planned energy development and operations during the next grazing season. This meeting needs to occur on a date early enough to allow grazing permittees sufficient time to make decisions and allocate their resources for the upcoming grazing season (FEIS, section 4.6.5.4).

- 3. The Operators will report damage to livestock and livestock facilities as quickly as possible to BLM and affected livestock operators (FEIS, section 4.6.5.4).
- 4. Operators will develop and employ prevention measures to avoid damaging fences, gates, and cattleguards (FEIS appendix H).
- 5. Operators will report and correct any damage that occurs to rangeland improvement projects (FEIS appendix H).
- 6. Prior to drilling, Operators will upgrade cattleguard gate width and load-bearing requirements to meet BLM Road Standards (BLM Manual 9113) (FEIS appendix H).
- For the protection of livestock, all pits and open cellars shall be fenced. Fencing shall be in accordance with BLM specifications (BLM Handbook 1741-1) (FEIS appendix H).

Wildlife

The Review Team (defined in the ROD as comprised of BLM (including interdisciplinary team members), cooperating and interested agencies, and the Operators) or BLM will identify the level of effort required for performance-based monitoring and develop a wildlife monitoring and protection plan (FEIS appendix E) for development in the ARPA. The goal of the plan is to avoid and/or minimize adverse impacts to wildlife by monitoring wildlife population trends and developing appropriate mitigation during the course of project development and operation. Implementation of the plan will allow land managers and project personnel opportunities to achieve and maintain desired levels of wildlife productivity and populations in the ARPA (e.g., at pre-project levels) by minimizing and/or avoiding potential adverse impacts to wildlife species. In addition, the implementation of this plan will facilitate the maintenance of a diverse assemblage of wildlife populations in the ARPA simultaneously with development of natural gas reserves.

Funding for wildlife and habitat monitoring may be obtained from BLM internal sources, in collaboration with cooperating / interested agencies, from the voluntary participation of the Operators, or from outside sources that may have an interest or desire to participate and/or contribute, or from a combination of these sources. Operators are responsible for demonstrating successful achievement of Performance Goals. Early efforts are to be made to collect or consolidate resource data to form a baseline against which future monitoring efforts and data would be used to indicate trends. In the absence of sufficient data illustrating operator achievement of performance-based goals, the BLM will use a conservative approach when considering additional approvals. The following sections summarize the key requirements to monitor and protect wildlife in the ARPA from FEIS appendix E:

 In part to meet their responsibility to demonstrate achievement of Performance Goals, Operators will compile all resource data collected under the wildlife monitoring and protection plan (FEIS appendix E) and submit this data to the Review Team by October 15 of each calendar year.

- 2. Operators will complete draft annual reports for submittal to the Review Team by November 15 of each year. Annual reports will summarize annual wildlife inventory and monitoring results, note any trends across years, identify and assess protection measures implemented during past years, specify monitoring and protection measures proposed for the upcoming year, recommend modifications to the existing wildlife monitoring/protection plan based on the successes and/or failures of past years, and identify additional species/categories to be monitored.
- 3. Operators will issue a final annual report to all potentially affected individuals and groups by early February of each year.
- 4. A one day meeting will be organized by the Review Team and held in December (or as determined by the Review Team) of each year to discuss and modify, as necessary, proposed wildlife inventory, monitoring, and protection protocol for the subsequent year.

Inventory & Monitoring

Inventory and monitoring for wildlife and plant species within the ARPA will be conducted at a frequency dependent upon the level of development activity with increased frequency generally associated with increased levels of development. The following species or categories of species will be inventoried and monitored in the ARPA (FEIS appendix E):

- 1. Black-Footed Ferret: BLM biologists will determine the presence/absence of prairie dog colonies at each proposed development site during APD and ROW application field reviews. Prairie dog colonies in the project area will be mapped and burrow densities determined by a BLM-approved, operator-financed biologist, as necessary and in association with proposed development plans. Colonies that meet the United States Department of the Interior, Fish and Wildlife Service (USDI-FWS) criteria as potential black-footed ferret habitat (USDI-FWS 1989) in non-block cleared areas will be surveyed for black-footed ferrets by a USDI-FWS-certified, operator-financed surveyor prior to BLM authorizing disturbance of these colonies.
- 2. Bald Eagle, Peregrine Falcon, and Ferruginous Hawk: Inventory and monitoring protocol for bald eagle, peregrine falcon, and ferruginous hawk will be as described for raptors.
- 3. Greater Sage-Grouse & Columbian Sharp-Tailed Grouse: Greater sagegrouse/Columbian sharp-tailed grouse lek inventories will be conducted by the BLM and Wyoming Game and Fish Department (WGFD) or by a BLM-approved operator-financed biologist on the project area and a two mile/one mile buffer to determine lek locations every 5 years, or as deemed appropriate by the BLM.
- 4. Mountain Plover: Mountain plover habitat will be mapped within proposed disturbance areas (as identified in annual reports) prior to development of these areas by the BLM or a BLM-approved operator-financed biologist. In addition, these areas will be surveyed annually by the BLM or a BLM-approved operator-financed biologist to detect the presence of plovers.

- 5. Western Burrowing Owl: Prairie dog colonies and other suitable burrowing owl nesting areas on and within 0.75 miles of existing and proposed disturbance areas will be searched for western burrowing owls by the BLM or a BLM-approved, operator-financed biologist or during June through August to determine the presence or absence of nesting owls.
- 6. **Other TEC&SC Species:** Surveys for other threatened, endangered, candidate, and other species of concern (TEC&SC) species will be conducted by the BLM or a BLM-approved, operator-financed biologist/botanist in areas of potential habitat within one-half mile of proposed disturbance sites prior to disturbance.
- 7. Raptors: Raptor inventories will be conducted by the BLM or a BLM-approved, operator-financed biologist at least every five years or prior to development of proposed disturbance areas (as identified in annual reports) to determine the location of raptor nests. Raptor nest monitoring will be conducted by the BLM or a BLM-approved, operator-financed biologist annually at known nest locations between April and July in order to ascertain nest activity status.
- 8. **Big Game Crucial Winter Range:** Data on big game use of crucial winter ranges on the project area and an adjacent one-mile buffer will be requested annually by the BLM from the WGFD, as deemed necessary by the BLM.
- Other Inventory and Monitoring Measures: Additional inventory and monitoring measures may be applied for other wildlife and plant species as specified in annual reports. Surveys will be conducted in adherence with protocols to be established by the BLM, other agencies, and Operators. Operators may provide financial assistance for these investigations.
- 10. **General Wildlife:** BLM staff will be responsible for maintaining records of selected wildlife species observed during the course of their activities on the project area.

Wildlife Protection Measures

Wildlife protection measures were developed from past measures identified for oil and gas developments in Wyoming. Additional measures may be included and/or existing measures may be modified in any given year as allowable and as deemed appropriate by BLM in consultation with other agencies, Operators, and interested parties (FEIS appendix E).

- Black-Footed Ferret: In general, all prairie dog colonies on the project area will be avoided, where practical. If prairie dog colonies, in non-block-cleared areas of sufficient size and burrow density for black-footed ferrets are scheduled to be disturbed, black-footed ferret surveys of these colonies will be conducted pursuant to BLM and/or USDI-FWS decisions made during informal consultations.
 - If black-footed ferrets are found on the project area, the USDI-FWS will be notified immediately and formal consultations will be initiated to develop strategies that ensure no adverse effects to the species.

- Before ground-disturbing activities are initiated in black-footed ferret habitat, authorizations to proceed must be received from the BLM, in consultation with the USDI-FWS.
- 2. Bald Eagle, Peregrine Falcon, and Ferruginous Hawk: Protection protocol for these species will be the same as described for raptors.

3. Greater Sage-Grouse & Columbian Sharp-Tailed Grouse:

- Surface disturbance or occupancy will be prohibited within one-quarter mile of the perimeter of occupied leks;
- Human activity will be avoided between 6:00 p.m. and 9:00 a.m. from March 1 to May 20 within one-quarter mile of the perimeter of occupied leks;
- Surface disturbance and other actions that create permanent and high-profile structures, such as buildings, storage tanks, and overhead power lines, will not be constructed within 0.25 to 1.0 mile of the perimeter of leks, as determined on a case-by-case basis;
- Surface disturbing and disruptive activities will not be allowed within two miles of an occupied greater sage-grouse lek or in nesting and early brood-rearing habitat associated with individual leks (when identified and delineated) from March 1 to July 15;
- Surface disturbing and disruptive activities will not be allowed within one mile of an occupied Columbian sharp-tailed grouse lek or in nesting and early brood-rearing habitat associated with individual leks (when identified and delineated), from March 1 to July 15;
- Surface disturbing and disruptive activities will not be allowed between November 15 and March 14 in delineated winter concentration areas. In order to minimize noise disturbances to strutting or dancing grouse, compressor stations and generators will be muffled with hospital-style mufflers.

4. Mountain Plover:

- Mountain plover habitat will be avoided where practical.
- All surface-disturbing activities will be restricted from April 10 to July 10 in mountain plover habitat.
- 5. **Western Burrowing Owl:** Protection protocol for this species will be as described for raptors as well as avoidance of prairie dog colonies, where practical.
- TEC&SC Species: If crucial features for any TEC&SC species are found during surveys of areas within one-half mile of proposed disturbance sites, avoidance of these features will be accomplished in consultation and coordination with the BLM, USDI-FWS, and WGFD.

- 7. **Raptors:** The primary protection measure for raptor species on the project area will be avoidance of nest locations during the breeding season.
 - All surface-disturbing activities will be restricted from February 1 through July 31 within a 0.75 to 1.0 mile radius of raptor nests, depending upon the species. In addition, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be constructed within 825 feet of raptor nests, except ferruginous hawk, where the restriction will be 1,200 feet (restrictions will generally exclude surface disturbance).
 - Operators will notify the BLM immediately if raptors are found nesting on or within 1,200 feet of project facilities and assist the BLM as necessary in erecting artificial nesting structures (ANSs), as appropriate. The use of ANSs will be considered as a last resort for raptor protection. If nest manipulation or a situation requiring a "taking" of a raptor nest becomes necessary, a special permit will be obtained from the Denver USDI-FWS Office, Permit Section, and will be initiated with sufficient lead time to allow for development of mitigation. Required corresponding permits will be obtained from the WGFD in Cheyenne. Consultation and coordination with the USDI-FWS and WGFD will be conducted for all protection activities relating to raptors.
 - Any power line construction will follow the recommendations of the Avian Power Line Interaction Committee (APLIC 1994; 1996) and Olendorff et al. (1981) to avoid collisions and electrocution of raptors.

8. Big Game Species:

- No construction activities or prolonged maintenance actions will be conducted within big game crucial winter range during the crucial winter periods of November 15–April 30.
- If ROW fencing is required, it will be kept to a minimum, and the fences will meet BLM/WGFD approval for facilitating wildlife movement. Wildlife-proof fencing will be used only to enclose areas that are potentially hazardous to wildlife species or reclaimed areas where it is determined that wildlife species are impeding successful vegetation establishment.
- Snow fences, if used, will be limited to segments of one-quarter mile or less. In addition, escape openings will be provided along roads in big game crucial winter ranges, as designated by the BLM, to facilitate exit of big game animals from snowplowed roads.
- 9. **General Wildlife:** Unless otherwise indicated, the following protection measures will be applied for all wildlife species:
 - All roads on and adjacent to the project area that are required for the proposed project will be appropriately constructed, improved, maintained, and signed to minimize potential wildlife/vehicle collisions and facilitate wildlife (most notably big game) movement through the project area.

- Appropriate speed limits will be adhered to on all project roads, and Operators will advise employees and contractors regarding these speed limits.
- To protect important habitat in portions of the project area (i.e., ephemeral draws dominated by basin big sagebrush) areas with sagebrush greater than 3 feet tall will be avoided where possible.

10. Additional non-species-specific wildlife mitigations include the following:

- Reserve, work-over, flare pits, and other locations potentially hazardous to wildlife will be adequately protected by netting or fencing, as directed by the BLM, to prohibit wildlife access.
- If dead or injured raptors, big game, migratory birds, or unusual wildlife are observed on the project area, operator personnel will contact the appropriate BLM and WGFD offices. Under no circumstances will dead or injured wildlife be approached or handled by operator personnel.
- Employee and contractor education will be conducted regarding wildlife laws. If
 violations are discovered on the project area, Operators will immediately notify
 the appropriate agency. If the violation is committed by an employee or
 contractor, said employee or contractor will be disciplined and may be dismissed
 by the operator or prosecuted by the WGFD or USDI-FWS.

Operators will implement policies designed to control off-site activities of operational personnel and littering, and will notify all employees (contract and company) that conviction of a violation can result in disciplinary action including dismissal.

Visual Resource Management

For areas within the ARPA that are visible from state, county, and BLM roads (Visual Resource Management (VRM) Class III) the following protection measures (FEIS appendix H) will be applied, as appropriate:

- 1. Gravel road surfacing shall be similar in color to adjacent dominant soil colors.
- 2. Avoid locating pads in areas visible from state, county or BLM roads.
- Avoid locating facilities on or near ridgelines use subsurface or low-profile facilities to prevent protrusion above horizon line when viewed from any state, county or BLM road.
- 4. Avoid routing well access roads directly from state, county, or BLM roads.
- 5. Co-locate wells when possible.
- 6. Locate facilities far enough from the cut and fill slopes to facilitate re-contouring for interim reclamation.

- 7. Do not locate wells adjacent to prominent features such as rock outcrops.
- 8. Repeat elements of form, line, color, and texture to blend facilities and access roads with the surrounding landscape.
- 9. Complete annual transportation plan for the entire area before beginning construction— make layout that will minimize disturbance and visual impact.
- 10. Use remote monitoring to reduce traffic and road requirements.
- 11. Remove unused equipment, trash, and junk immediately.
- 12. Reclaim unnecessary access roads as soon as possible.
- 13. All above-ground structures, production equipment, tanks, transformers, and insulators not subject to safety requirements shall be painted to blend with the natural color of the landscape (except for structures that require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements (FEIS appendix K)). The paint used shall be a non-reflective "Standard Environmental Color" approved by the BLM VRM specialist.
- 14. Do not create unnecessary cut and fill. Design and construct all new roads to a safe and appropriate standard "no higher than necessary" to accommodate their intended use.

Cultural/Historic Resources Protection

The following mitigation measures will be incorporated into an agreement or agreements to be established under the Wyoming state cultural resources protocol between the BLM, the State Historic Preservation Office (SHPO), project proponents, and interested parties to address site-specific impacts and mitigation measures for all sites where setting contributes to National Register of Historic Places (NRHP) eligibility:

- 1. Brush hog all ROWs (FEIS chapter 4 and appendix H).
- 2. Allow no surface disturbance within a quarter mile of contributing segments of historic trails or trail-associated sites (FEIS chapter 4 and appendix H).
- 3. Limit trail crossings to existing disturbance corridors or non-contributing segments, unless otherwise determined by BLM in consultation with SHPO (FEIS chapter 4 and appendix H).
- 4. Use matting on ROWs during construction to minimize surface disturbance and visibility (FEIS chapter 4 and appendix H).
- 5. If a site is considered eligible for, or is already on the NRHP, avoidance is the preferred method for mitigating adverse effects to that property (FEIS appendix K).

FEIS appendix I, Cultural Resources Management, describes BLM's program to inventory, evaluate, and manage cultural resources on BLM-administered public land and other areas of BLM responsibility. This appendix also includes further discussion of standard protective measures, BMPs, and mitigation for cultural resources sites. BLM's program includes a specific requirement to conduct cultural resource inventories for actions with federal responsibility to identify cultural resources prior to any ground disturbing activity.

Socioeconomic

- Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This would include scheduling project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling (FEIS appendix K).
- As part of the annual planning process, Operators will provide multi-year field development forecasts to the BLM. These forecasts will be made available to local government agencies to assist in local community/county/state planning efforts (FEIS section 2.2.4).

Transportation

A coordinated transportation plan will be developed for the ARPA as part of the annual planning process to minimize construction of new roads, foster proper sizing of roads, and assign road maintenance responsibilities. Transportation planning would continue to occur on an annual basis.

 Operator responsibilities for preventive and corrective maintenance of roads in the ARPA would extend throughout the duration of the project and include blading; cleaning ditches and drainage facilities; dust abatement; control of noxious and invasive species; maintenance of fences, gates, and cattle guards; and other requirements as directed by the BLM, Wyoming Department of Transportation (WYDOT), Carbon County, and private landowners (FEIS chapter 4).

Noise

1. In any area of operations where noise levels may exceed federal OSHA safe limits, the Operators and their contractors would provide and require the use of proper personnel protective equipment by employees (FEIS chapter 4).

References

- APLIC 1994. *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994.* Avian Power Line Interaction Committee. Edison Electric Institute, Washington, D.C. 78 pp. + appendices.
- APLIC 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Avian Power Line Interaction Committee. Edison Electric Institute/Raptor Research Foundation, Washington, D.C. 125 pp. + appendices.
- Carpenter, R.A. 1997. "The Case for Continuous Monitoring and Adaptive Management Under NEPA." In *Environmental Policy and NEPA*. R. Clark and L. Canter, eds. Boca Raton, FL: St. Lucie Press.
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- USDI-BLM 1990. Great Divide Resource Area Record of Decision and Approved Resource Management Plan. Rawlins, Wyoming: U.S. Department of the Interior, Bureau of Land Management, Rawlins District Office, Great Divide Resource Area. 74pp.
- USDI-BLM 2006. Final Environmental Impact Statement for the Atlantic Rim Natural Gas Development Project, Carbon County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Rawlins Field Office. November 2006.
- USDI-FWS 1989. *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act.* Denver, Colorado, and Albuquerque, New Mexico:U.S. Fish and Wildlife Service. April 1989. 10 pp. + appendices.

Appendix C

Operator-Committed Practices

The Final EIS for the Atlantic Rim Natural Gas Project (ARNG) contains best management practices and other environmental protection measures that would be implemented to protect the environment during the development and operation of the Atlantic Rim Project Area (ARPA). Many of these environmental protection measures would be included as Conditions of Approval (COAs) in this ROD. However, by additionally including them as Operator-committed practices, the various Operators have made a commitment to implement them throughout the life-of-project (LOP), and the impact analyses provided in the Final EIS take into consideration the implementation of these measures based on this commitment.

In addition to Operator-committed environmental protection practices, the various ARPA leases often contain one or more stipulations that obligate the leaseholder. These lease stipulations are mandatory and address a number of issues, and may include but not be limited to seasonal and area restrictions for raptor nests, greater sage-grouse leks and nesting habitat, unstable soils, steep slopes, and controlled surface occupancy. These lease-specific stipulations may be duplicated by the more general measures listed below.

To assure compliance with the Operator-committed practices stipulated in the FEIS, this ROD, and in site-specific APDs and ROWs, each Operator will provide qualified individuals to oversee construction and drilling operations and to consult with the BLM on a case-by-case basis, as necessary, during field development. Development activities on all lands would be conducted in accordance with all appropriate federal, state, and county laws, rules, and regulations.

PRECONSTRUCTION PLANNING AND SITE LAYOUT

Development activities proposed on fee and State of Wyoming surface lands would be approved by the Wyoming Oil & Gas Conservation Commission (WOGCC). The WOGCC permitting procedures require filing an APD with the WOGCC and obtaining an ROW from the surface owner.

The Operators would follow the procedures outlined below to gain approval for proposed activities on BLM-administered lands or minerals within the ARPA. The procedures described below are applicable to CBNG drilling and production activities (1,800-well program) and the deeper conventional natural gas drilling and production activities (200-well program) unless otherwise noted.

 Annual work plans for each developing or operational POD will be used instead of piecemeal individual APD filings. Each year on April 1, the Operators will submit to the BLM Rawlins Field Office comprehensive annual work plans for the following year, including APD packages and other appropriate permit application materials for the construction and development activities. The BLM, in conjunction with the Operators, will perform the usual on-site reviews and perform the other tasks necessary to prepare the program of work for site specific analysis under NEPA and permitting approval prior to the next drilling season. This procedure will allow for economies of scale with the NEPA process and provide a more comprehensive appraisal of the proposed action and their effects on the environment. This program should also reduce processing time for APDs. The Operators and the BLM will also assess and decide the method of analysis, including how the NEPA related work will be performed (either in-house or through third party contractors). Otherwise unplanned construction needs that arise during the course of the year and outside of the annual plan may be brought forward and proposed by operators and will be dealt with by the BLM appropriately, however the intent is to normally avoid individual APD submission and consideration.

Annual work or site specific plans for developing or operational PODs will include geo-referenced information compatible with ArcMap that details pad and well locations; pipeline routes; water transfer stations; road locations (resource, collector or local); road construction techniques (including gravel type and source); wing ditch, water bar and culvert placement, any closed system livestock watering facilities, any potential fence modification or cattle guard installations, injection well locations; and any existing infrastructure (wells, roads, pipelines etc.) in the townships receiving new development.

- The proposed facilities would be staked by the Operators and inspected by an interdisciplinary team and/or an official from the BLM to ensure consistency with the approved RMP and oil and gas lease stipulations.
- More detailed descriptions of the proposed activity or construction plans would be submitted to the BLM by the Operators when required for the proposed development. The plans would address concerns that may exist concerning construction standards, required mitigation, etc. Negotiation of these plans between the Operators and the BLM, if necessary to resolve differences, would be based on field inspection findings and would take place either during or after the BLM onsite inspection. Submissions of maps will include the associated GIS geo-referenced information.
- The Operators and/or their contractors would revise APD/ROWs, as necessary, per negotiations with the BLM. The BLM would complete a project-specific environmental analysis that incorporates agreed upon construction and mitigation standards as detailed above. The BLM would then approve the annual proposal and attach the Conditions of Approval to the permit. The Operators must then commence the proposed activity within one year.

APPLICANT VOLUNTARY COMMITTED MEASURES

Following are applicant committed measures to avoid or mitigate resource or other land use impacts. An exception to a mitigation measure and/or design feature may be approved on a case-by-case basis when deemed appropriate by the BLM or in conjunction with the surface owner. An exception would be approved only after a thorough, site-specific analysis determined that the resource or land use for which the measure was put in place is not present or would not be significantly impacted. The Operators committed to implementing resource-specific mitigation measures on all lands within the ARPA including federal, State and private (fee) surface ownership.

PRECONSTRUCTION PLANNING AND DESIGN MEASURES

The Operators and the BLM would make on-site Interdisciplinary (ID) reviews of each proposed and staked facility site (e.g., well sites), new access road, access road

reconstruction, and pipeline alignment projects so that site-specific recommendations and mitigation measures can be developed.

- New road construction and maintenance of existing roads in the ARPA would be accomplished in accordance with BLM Manual 9113 standards unless private landowners or the State of Wyoming specify otherwise on their lands.
- Consistent with the annual work planning described in FEIS section K.1.1, The Operators would prepare and submit an APD for each drill site on federal leases to the BLM for approval prior to initiation of construction. Also prior to construction, the Operators or their contractors would submit a Sundry Notice and/or ROW application for each pipeline and access road segment on federal leases. The APD would include a Surface Use Plan that would show the layout of the drill pad over the existing topography, dimensions of the pad, volumes and cross sections of cut and fill, location and dimensions of reserve pit, and access road egress and ingress. The APD, Sundry Notice, and/or ROW application plan would also itemize project administration, time frame, and responsible parties. In addition, a reclamation plan would be developed by the operators for each facility in consultation with the BLM. APD packages would be submitted annually on April 1, including GIS data specified in FEIS section K.1.1, for planning and analysis for the upcoming work year.

RESOURCE-SPECIFIC REQUIREMENTS

GEOLOGY / MINERALS

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

AIR QUALITY

- The Operators would not burn garbage or refuse at the drill sites or other facilities.
- When an air quality, soil loss, or safety problem is identified as a result of fugitive dust, immediate abatement would be initiated.

SOILS and WATER RESOURCES

- Reduce the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of personnel. The Operators would prohibit off-road vehicle activity.
- Generally, buried pipelines would be located immediately adjacent to roads to avoid creating separate areas of disturbance and in order to reduce the total area of disturbance.

- The operators would avoid using frozen or saturated soils as construction material.
- The operators would minimize construction activities in areas of steep slopes and other sensitive soils, and apply special slope stabilizing structures if construction cannot be avoided in these areas.
- Design cut slopes in a manner that would allow retention of topsoil, surface treatment such as mulch, and subsequent revegetation.
- Selectively strip and salvage topsoil or the best suitable medium for plant growth from all disturbed areas on all well pads.
- Where possible, minimize disturbance to vegetated cuts and fills on existing roads that are improved.
- Install runoff and erosion control measures such as water bars, berms, and interceptor ditches if needed.
- Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Maintain a buffer strip of natural vegetation where possible (not including wetland vegetation) between all construction activities and ephemeral and intermittent drainage channels.
- Include adequate drainage control devices and measures in the road design (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipaters) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. Implement a revegetation program as soon as possible to reestablish the soil protection afforded by a vegetal cover.
- Upon completion of construction activities, restore topography to near preexisting contours at the well sites, along access roads and pipelines, and other facilities sites. Replace topsoil or suitable plant growth material over all disturbed surfaces, and apply fertilizer as needed, and seed.
- When feasible, limit construction of drainage crossings to no-flow periods or low-flow periods.
- Minimize the area of disturbance within ephemeral and intermittent drainage channel environments.
- Avoid construction of well sites, access roads, and pipelines within 500 feet of surface water and/or riparian areas. Exceptions to this would be granted by the BLM based on an environmental analysis and site-specific mitigation plans.

- Design channel crossings to minimize changes in channel geometry and subsequent changes in flow hydraulics.
- Construct channel crossings for buried pipelines such that the pipe is buried a minimum of four feet below the channel bottom.
- Regrade disturbed channel beds to the original geometric configuration with the same or very similar bed material.
- Case wells during drilling, and case and cement all wells in accordance with State, and/or Federal regulations to protect accessible high quality aquifers. High quality aquifers are aquifers with known water quality of 10,000 ppm TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Further, wells would adhere to the appropriate BLM or WOGCC cementing policy.
- Reserve pits would be constructed so that a minimum of one-half of the total depth is below the original ground surface on the lowest point within the pit. To prevent seepage of fluids, drilling mud gel or poly liners would be used as needed to line reserve pits in areas where subsurface material would not contain fluids. Liners would be of sufficient strength and thickness to withstand normal installation and use. The liner would be impermeable (i.e., having a permeability of less than 10⁻⁷ cm/sec) and chemically compatible with all substances which may be put in the pit.
- Maintain 2 feet of freeboard on all reserve pits to ensure the reserve pits are not in danger of overflowing. Shut down drilling operations until the problem is corrected if leakage is found outside the pit.
- Extract hydrostatic test water used in conjunction with pipeline testing and all water used during construction activities from sources with sufficient quantities and through appropriation permits approved by the State of Wyoming.
- Discharge hydrostatic test water in a controlled manner onto an energy dissipator. The water is to be discharged onto undisturbed land that has vegetative cover, if possible, or into an established drainage channel. Prior to discharge, treat or filter the water to reduce pollutant levels or to settle out suspended particles if necessary. If discharged into an established drainage channel, the rate of discharge would not exceed the capacity of the channel to safely convey the increased flow. Coordinate all discharge to test water with the SEO and the BLM.
- Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for storm water runoff at drill sites as required per WDEQ storm water NPDES permit requirements.
- The Operators must coordinate with the Corps of Engineers (COE) to determine the specific Clean Water Act (CWA) Section 404 Permit requirements and conditions (including the potential requirement of compensatory mitigation) for

each facility that occurs in Waters of the U.S. to prevent the occurrence of significant impact to such waters.

- Exercise precautions against pipeline breaks and other potential accidental discharges of toxic chemicals into adjacent streams. If liquid petroleum products storage capacity exceeds criteria contained in 40 CFR Part 112, a Spill Prevention Control and Countermeasures (SPCC) plan would be developed in accordance with 40 CFR Part 112.
- The project must comply with all applicable requirements of the CWA, including the requirement to obtain an WYPDES permit.

VEGETATION and WETLANDS

- Seed and stabilize disturbed areas with mixtures and treatment guidelines prescribed in the approved APD, ROW, or surface landowner requirements.
- Evaluate all project facility sites for occurrence and distribution of waters of the U.S., special aquatic sites, and jurisdictional wetlands. All project facilities would be located out of these sensitive areas. If complete avoidance is not possible, minimize impacts through modification and minor relocations. Coordinate activities that involve dredge or fill into wetlands with the COE.
- Conduct site-specific surveys for federally listed threatened and endangered (T&E) and candidate plant species prior to any surface disturbance in accordance with the Endangered Species Act.

RANGE RESOURCES AND OTHER LAND USES

• The Operators would coordinate with the affected livestock operators to ensure that livestock control structures remain functional during drilling and production operations.

WILDLIFE

- During reclamation, establish a variety of forage species that are useful to resident herbivores by specifying the seed mixes in the approved APD, ROW or surface landowner requirements.
- Discourage unnecessary off-site activities of operational personnel in the vicinity of the drill sites.

VISUAL RESOURCES

• Paint all structures with non-reflective colors that blend with the adjacent landscape, except for structures that require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements.
CULTURAL RESOURCES

• If a site is considered eligible for, or is already on the National Register of Historic Places (NRHP), avoidance is the preferred method for mitigating adverse effects to that property.

SOCIOECONOMICS

• Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This would include scheduling of project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.

HEALTH AND SAFETY/HAZARDOUS MATERIALS

The operators will establish and maintain an appropriate safety program for the intended work which will comply with all applicable Federal, State and local regulations, including but not limited to, RCRA, SPCC, SARA, Hazardous Substance Management.

Appendix D

Formal and Informal Consultation for the Atlantic Rim Natural Gas Field Development Project



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services 5353 Yellowstone Road, Suite 308A Cheyenne, Wyoming 82009

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In Reply Refer To: ES-61411/W.02/WY06F0204

Memorandum

То:	Mark Storzer, Field Manager, Bureau of Land Management, Rawlins Field Office, Rawlins, Wyoming
From:	Brian T. Kelly, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming
Subject:	Formal and Informal Consultation for the Atlantic Rim Natural Gas Field Development Project

Thank you for your letter of July 24, 2006, received in our office on July 25, with the biological assessment (BA) for the Final Environmental Impact Statement for the Atlantic Rim Natural Gas Field Development Project located in T13-20N, R89-92W, in Carbon County, Wyoming (Atlantic Rim FEIS). You requested consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*) for your determinations of effects to listed species in the BA.

The letter and BA state that the preferred alternative for the Atlantic Rim FEIS consists of Anadarko Petroleum Corporation (APC) and other operators drilling 1800 coal bed natural gas (CBNG) wells and 200 deep conventional gas wells on approximately 270,000 acres of combined federal, state and private lands. The wells are proposed at eight wells per section (80-acre spacing) and will be developed over a 20-year period beginning in 2007 with an estimated life of project of 30 to 50 years. Well spacing may be reduced, where appropriate. Various drilling and production related facilities (*i.e.*, roads, pipelines, water wells, disposal wells, compressor stations, and gas processing facilities) will also be constructed throughout the project area.

In the BA, the Bureau of Land Management (Bureau) determined that project-related water depletions to the Colorado River system are "likely to adversely affect" Colorado River fish species. The Bureau also issued "not likely to adversely affect" determinations for the project's potential effects to the bald eagle (*Haliaeetus leucocephalus*), black-footed ferret (*Mustela nigripes*), blowout penstemon (*Penstemon haydenii*), and Ute-ladies' tresses (*Spiranthes diluvialis*).

The Service concurs with the Bureau's effects determination for the bald eagle because adverse effects are extremely unlikely to occur based on the Bureau's commitment to implement the conservation measures and the limited use of the area by bald eagles. Conservation measures include (1) not installing overhead electric power lines, (2) training drivers how to minimize vehicle collisions with raptors, and (3) removing vehicle-killed carcasses from road areas to limit attraction of raptors.

The Service concurs with the Bureau's effects determination for the black-footed ferret because white-tailed prairie dog colonies that are not included in the block clearance will be surveyed for black-footed ferrets adhering to the *Black-Footed Ferret Survey Guidelines* (USFWS 1989). If the species is found, the Service will be notified within 24 hours and no project-related disturbance will occur within the prairie dog complex. Based on implementation of these commitments, adverse effects to the black-footed ferret are expected to be discountable.

The Service concurs with the Bureau's effects determinations for the blowout penstemon and Ute-ladies' tresses because (1) both species have low probabilities of being present in the action area and (2) surveys and avoidance measures will be implemented to protect the species. Frank Blomquist, Bureau biologist, clarified, on August 9, 2006, that very little of the Sand Hills habitat for blowout penstemon is included within the proposed project area, and any area with potential habitat will be surveyed prior to development. He also clarified that the probability of Ute-ladies' tresses being present in the project area is extremely low based on clayey soils and elevation (Pers. Comm. 2006). Based on these considerations, effects of the proposed action on these two species are discountable.

To clarify water use for this project, the Service contacted Bob Lange and Frank Blomquist, of your office, on August 8, 2006. They stated that the Bureau determined that the produced water within the action area is not connected to the Colorado River system so that specific action would have no effect to Colorado River fish species. Service concurrence for no effect determinations is not required under the Act. They also clarified that the proposed action will cause an average annual depletion of 10.3 acre-feet from the Colorado River system due to surface water use for dust abatement and road/pad construction (Pers. Comm. 2006). A Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) was initiated on January 22, 1988. The Recovery program was intended to be the reasonable and prudent alternative to avoid jeopardy to the endangered fish by depletions from the Upper Colorado River.

In order to further define and clarify the process in the Recovery Program, a section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan (Plan) which identifies actions currently believed to be required to recover the endangered fish in the most expeditious manner in the Upper Colorado River Basin.

A part of the Recovery Program was the requirement that if a project was going to result in a depletion, a depletion fee would be paid to help support the Recovery Program. On July 5, 1994, the Service issued a biological opinion determining that the fee for depletions of 100 acre-feet or less would no longer be required. This was based on the premise that the Recovery Program has made sufficient progress to be considered the reasonable and prudent alternative avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification

of their critical habitat by depletions of 100 acre-feet or less. Therefore, the depletion fee for this project is waived.

Permits or other documents authorizing specific projects, which result in depletions, should state that the Bureau retains discretionary authority over each project for the purpose of endangered species consultation. If the Recovery Program is unable to implement the Plan in a timely manner, reinitiation of section 7 consultation may be required so that a new reasonable and prudent alternative can be developed by the Service.

This concludes consultation pursuant to the regulations implementing the Act, 50 C.F.R. § 402.14 and § 402.13. This project should be re-analyzed if new information reveals effects of the action that may affect listed species or designated or proposed critical habitat (1) in a manner or to an extent not considered in this letter, (2) if the action is subsequently modified in a manner that causes an effect to a listed species or designated or proposed critical habitat that was not considered in this consultation, and (3) if a new species is listed or critical habitat is designated that may be affected by this project.

The Bureau made "no effect" determinations for the Canada lynx (*Lynx candensis*), Preble's meadow jumping mouse (*Zapua hudsonius preblei*), Wyoming toad (*Bufo baxteri*), Colorado butterfly plant (*Gaura neomexicans spp. coloradensis*), and Platte River species. Service concurrence for no effect determinations is not required under the Act; however, we do appreciate receiving information as to the status of these species in the project area.

If you have further questions regarding your responsibilities under the Act, please contact Dan Blake of my staff at 1300 N. Third St., Rawlins, WY 82301 or phone (307) 328-4333.

cc: FWS, Fish and Wildlife Biologist, Rawlins Field Office, Rawlins, WY (D. Blake)
WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (V. Stelter)
WGFD, Non-Game Coordinator, Lander, WY (B. Oakleaf)

References

- *Pers. Comm.* 2006. Phone calls between Blomquist, F. and B. Lange, Bureau of Land Management, Rawlins Field Office and K. Erwin and D. Blake, U.S. Fish and Wildlife Service, Ecological Services, Wyoming.
- U.S. Fish and Wildlife Service. 1989. Black-footed ferret survey guidelines for compliance with the Endangered Species Act, April 1989. U. S. Fish and Wildlife Service, Denver, Colorado and Albuquerque, New Mexico. 15pp.

Appendix E

Summary of Public Comments on the Atlantic Rim Natural Gas Project Final Environmental Impact Statement

The Final Environmental Impact Statement (FEIS) for the Atlantic Rim Natural Gas Project (ARNG) was released for public review on December 1, 2006. The comment period closed on January 4, 2007. Organization and individuals who submitted comments on the ARNG FEIS during this time are identified in table E-1.

Issue Summary

Comments on the Atlantic Rim Project Area (ARPA) FEIS raised a variety of issues including use of mitigation measures, avoidance of cultural sites, the groundwater and wildlife impact analysis, wildlife, habitat and reclamation monitoring, rationale for selection of the preferred alternative, future public input, surface disturbance reclamation, air quality analysis and palentological condition and classification. A summary of significant comments and Bureau of Land Management (BLM) responses categorized by issue are summarized below.

Mitigation Measures - Best Management Practices and Protective Measures

Comment Summary: Several comments suggested the need for additional, modified or fewer Best Management Practices (BMPs) and protective measures to mitigate resource impacts and to help direct development practices. Comments also suggested involvement of state and federal wildlife agencies in the project planning process.

Response: Drilling, development, and reclamation activities in the ARPA will be managed through a performance-based, adaptive management process as described in appendix B (Performance-Based Monitoring and Best Management Practices). The process includes a requirement for Operators to submit an annual operating plan to the BLM RFO AO. The overall purpose of this process is to meet resource management objectives and ensure that the Performance Goals are achieved to the greatest extent possible. A mitigation and monitoring process will be required, and its development will begin within 30 days of the effective date of the Record of Decision (ROD). This process will be developed by the Review Team (BLM, cooperating and interested agencies and Operators) and will provide quantifiable criteria to identify trends associated with the Performance Goals. The process will include the types of mitigation responses that will be considered in the event that monitoring data indicates a downward trend relative to the Performance Goals. Throughout the life of the project, monitoring data will be reviewed to determine if mitigation is effective and leading to the achievement of reclamation and Performance Goals. The monitoring data will be evaluated on a regular basis (at least annually) and BMPs, conditions of approval (COAs), protective measures, reclamation criteria, and mitigation measures may be modified, as appropriate, based on the monitoring results.

While described as an "annual" planning process, this concept is adaptive and open for modification and improvement, including more frequent planning meetings if necessary. The intent of the process is to have future, site-specific development plans for Atlantic Rim be submitted to the BLM for review in a manner that will allow the BLM to capture economies of scale in planning, processing, approving, and involving other cooperating agencies. The BLM (including interdisciplinary team members), cooperating and interested agencies, and the Operators will make up a Review Team to evaluate annual

and site-specific development proposals and monitoring reports. By receiving development proposals in groups, the Review Team will be able to develop a more holistic view of future development and reclamation progress and success, and more effectively apply mitigations and BMPs to reduce development effects. Proposals should span several years or stages of development and must include the entire proposal including well sites, compressor stations, utility and pipeline corridors, roads, status and success of reclamation efforts for a specific area, and any other disturbances planned and their timing. The review and approval process will include a site specific visit by the Review Team, NEPA or Categorical Exclusion (pursuant to section 390 of the Energy Policy Act of 2005) evaluation, as appropriate, and establishing required BMPs, COAs or other protective measures to mitigate environmental impacts. (See ARNG ROD: *Plan, Review and Approval Process*; and *Mitigation Measures*)

Cultural

Comment Summary: Some comments suggested that BLM should consider avoidance of cultural areas as a first course of action prior to use of a mitigation plan.

Response: The FEIS states in appendix I, Cultural Resource Management, "Avoidance, through modification of the proposed undertaking, is the primary and preferred measure used to protect cultural resources. This can be accomplished at the project planning stage." Surface-disturbance impacts on cultural resource are mitigated through avoidance. Where avoidance is not possible, recovery of the cultural resource prior to allowing disturbance activities to occur will be considered on a site-specific basis.

Impact Analysis

Groundwater Impacts

Comment Summary: Several comments questioned the efficacy of produced water reinjection, especially given reports of mud pots and geysers associated with current operations.

Response: BLM is looking into reports of mud pots and geysers and how they may be related to current operations. Given that produced water is injected into geologic formations below the coal seams being dewatered, BLM currently speculates that the mud pots and geysers are not likely related to injection of produced water.

Wildlife Impacts

Comment Summary: Several comments asked that BLM include current data from other studies (specifically, the Baggs Mule Deer Study) into the ROD. One comment suggested referencing the WGFD recommendations for oil and gas development as potential mitigation measures to be used in the ARPA.

Response: Data collected from wildlife studies in areas near the ARPA may prove useful in determining mitigation needs for the ARPA. This information will be evaluated and incorporated, as appropriate, into the wildlife monitoring and mitigation process described in appendix E of the FEIS.

The WGFD recommendations for oil and gas development will be considered for potential mitigation in the ARPA within the process of wildlife monitoring and mitigation

APPENDIX E.

SUMMARY OF PUBLIC COMMENTS ON THE ATLANTIC RIM NATURAL GAS FIELD DEVELOPMENT PROJECT FINAL EIS AND BLM'S RESPONSES

described in appendix E of the FEIS, where such measures are not in conflict with this ROD.

Monitoring

Roles and Responsibilities, Annual Planning and Review Team

Comment Summary: Many comments indicated the importance of identifying who has responsibility for reclamation, wildlife, and habitat monitoring and inspection, and that state agencies need to be part of a Review Team to evaluate monitoring results and development plans. Some comments stated that the Rawlins Field Office (RFO) needs to take an active role in monitoring, inspection and compliance.

Response: As stated above, the BLM, cooperating and interested agencies and the Operators will make up a Review Team to evaluate annual and site specific development proposals and monitoring reports. Review Team members will be invited to participate in the annual planning process and site-specific review process based on their interest, time, and availability. Review Team member participation would be in addition to their separate and independent permitting and approval responsibilities under any other authorities. The BLM is the final decision authority and will set the schedule for meetings, site visits, review periods, etc. When appropriate, Memoranda of Understanding (MOUs) or other applicable inter-agency agreements may be prepared and utilized between the parties to document the extent of participation in the annual planning and site-specific review processes.

The initial monitoring plan will be based on the Wildlife Monitoring and Protection Plan (FEIS appendix E) but may be modified annually, as necessary, based monitoring results. A mitigation plan will be developed with the state cooperators (e.g., the Review Team) with the intent of monitoring the Performance Goals. This information should be reviewed at least annually with development plans modified based on trends. The purpose of monitoring is to assess the status of the Performance Goals, measure and detect trends, or detect any other undesired effects. Monitoring will also be used to assess the effectiveness of reclamation efforts and any approved mitigation measures.

Funding for wildlife and habitat monitoring may be obtained from BLM appropriations, in collaboration with cooperating or interested agencies, from the voluntary participation of the Operators, or from outside sources that may have an interest or desire to participate or contribute, or from a combination of these sources. Operators are responsible for demonstrating successful achievement of Performance Goals. Early efforts are to be made to collect or consolidate resource data to form a baseline against which future monitoring efforts and data would be compared to indicate trends. In the absence of sufficient data illustrating Operator achievement of Performance Goals, the BLM will use a conservative approach when considering additional approvals. The Review Team, or the BLM, or both, will identify the level of effort required for Performance-Based Monitoring and develop associated monitoring plans.

Preferred Alternative

Rationale

Comment Summary: Some comments questioned BLM's selection of the Preferred Alternative (Alternative D) over Alternative C and the Proposed Action.

Response: Alternative D was developed in response to comments received on the Draft EIS (DEIS). The BLM recognized that resource impacts can be reduced by limiting the amount of initial disturbance (goal of 6.5 acres/well site) combined with timely reclamation. The BLM's evaluation of exploratory activities that have occurred over the past five years determined that average initial and long-term disturbance could be reduced by approximately 18 percent from the Proposed Action (e.g., 60-ft. wide roads vs. 80-ft. width) if Alternative D were implemented. While a conservative analysis of Alternative D and the Proposed Action indicates similar levels of impacts, the reduced initial surface disturbance, reduced disturbance at any time, and lower long-term disturbance outlined in Alternative D provides the most practical alternative for mitigating environmental impacts while maximizing natural gas recovery (Purpose and Need for the Project).

Alternative C was prepared to evaluate natural gas resource development while aggressively mitigating impacts to sensitive resource values using additional development protection measures. Public comments received on the DEIS, results of interim exploration, and technical evaluations by the BLM Reservoir Management Group, all indicated drilling on 160-acre spacing would not achieve maximum recovery of natural gas resources, was likely not economically feasible, and was likely an inefficient recovery of the natural gas resource in the ARPA. Additionally, displacement of disturbance from federal lands to state and fee lands due to these aggressive protective measures may result in higher initial disturbance, disturbance at any time, and long-term disturbance compared to Alternative D, with uneconomical and inefficient natural gas recovery. Protective measures used in Alternative C (FEIS, appendix L) will be considered based on site-specific conditions, where such measures are not otherwise in conflict with the ROD.

Public Input

Comment Summary: Several comments noted that the process for review and approval of annual development plans defers important decisions on field development to a process that does not provide for meaningful public input. The use of APDs or Categorical Exclusions for approval of specific development activities does not provide for a sufficient level of site-specific NEPA analysis. Others questioned BLM's authority under the annual planning process to actually reduce surface disturbance in the ARPA.

Response: As noted in the ROD, the annual review and planning process will include cooperating agencies as well as the BLM (See Review Team discussion under Mitigation Measures, above). Public input will be provided through the NEPA evaluation process for site specific proposals, unless Categorical Exclusions (pursuant to Section 390 of the Energy Policy Act of 2005) are used, if appropriate, for the approval of site-specific development activities. APDs will be posted in the RFO and available for public review. This ROD gives BLM the authority to make decisions that limit surface disturbance in the ARPA.

Reclamation

Bank Process

Comment Summary: Several comments requested a description of the disturbance cap "banking process", including how disturbance will be allocated among Operators and how reclaimed acreage will return to the bank, and flexibility in the disturbance cap due to unforeseen circumstances. Some comments questioned BLM's authority to impose the disturbance cap on state and fee lands. Another comment suggested an alternative standard for linear disturbance features, such as pipelines, to facilitate reclamation success. Comments included an inquiry about the use, and process, of waivers and exceptions.

Response: This decision includes an unreclaimed disturbance cap of 7,600 acres at any time. Disturbance acreage will be monitored using geospatial tracking methods. Operators are required to provide the BLM a map of existing disturbance associated with activities authorized during the period of time when the interim drilling policy was in effect. The 7,600-acre disturbance cap will be allocated to Operators on a prorated, mineral leasehold basis. Existing surface disturbance from activities approved under the Interim Drilling Policy (IDP) will count against each Operators disturbance cap allocation. Past oil and gas development will not count against the disturbance cap, and those lease holdings are not eligible for disturbance cap allocation. In addition, "as built" disturbance will be measured and reported and subsequent reclamation efforts will be monitored, documented, and provided annually to the BLM RFO AO. Adaptive management techniques will be used to correct any deficiencies and modify reclamation criteria as is necessary (Reclamation Plan, appendix A).

The 7,600-acre disturbance cap will be allocated to Operators on a prorated, mineral leasehold basis. Only successfully-reclaimed acreage (See ROD appendix A, Criteria for Reclamation Success) that was disturbed during the implementation of activities associated with this decision or the IDP will be allocated back to the Operator based on their prorated disturbance cap. Regardless of the number of Operators within the ARPA, the total of all prorated disturbance cap allocations may not exceed 7,600 acres.

When a site attains the interim reclamation vegetation cover and soil stability standards detailed in "Criteria for Reclamation Success" in the Reclamation Plan (appendix A), the reclaimed acreage will be deducted from an Operators disturbance cap allocation and additional disturbance on federal lands leased for oil and gas development in the ARPA will be permitted by BLM. In the event an Operator reaches their disturbance cap allocation, further disturbance on federal minerals will not be permitted. When successful interim reclamation by an Operator reduces disturbance on their leases to below their disturbance cap allocation across the ARPA, additional activities on federal lands may be approved.

The environmental analysis of Alternative D presented in the FEIS and the decisions made in this ROD are based on these disturbance limits applied across the ARPA. The BLM has approval authority over actions on federal minerals and lands. When evaluating development applications for affected federal minerals and lands, the BLM will consider impacts and surface disturbance that occur on private or state lands, relative to an Operator's disturbance cap allocation.

Appropriate seed mixtures should be selected based on site-specific needs (soil type, linear disturbance, etc.). Operators should propose in their reclamation plan for a site/area the most appropriate seed mixture and include their rationale for selecting that mix.

Exceptions, waivers or modifications of requirements must be based upon environmental analysis of proposals (e.g., activity plans, plan of development, plans of operations, applications for permit to drill, etc.) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

Disturbance Cap

Comment Summary: Comments requested that BLM explain the basis for the 6.5 acre per well site goal, and 7,600 acre disturbance cap. Operator comments question BLM's authority to impose the disturbance cap on state and fee land. One Operator noted that the air monitoring station required by WDEQ should not count against the disturbance cap. Another Operator noted that disturbance associated with existing conventional fields (e.g., Cherokee Creek in the Category A area) should not be included in the disturbance cap.

Response: BLM used multiple lines of data to establish a 6.5 acre well site goal. These lines of data included the proponents Proposed Action (FEIS, appendix K), information provided by Anadarko E&P Company, LP (AEPC) during a presentation on May 11, 2006, and field observations by BLM staff.

The Proposed Action included an estimated average disturbance per well site of 7.9 acres (well pad, resource roads, utilities, pipelines and ancillary facilities), composed of 4.8 acres per well site in short-term (reclaimable) disturbance and 3.1 acres of long-term disturbance.

The May 11, 2006 presentation by AEPC to BLM and cooperators of the Doty Mountain project was to provide "an example of how (AEPC) can address environmental issues at the APD level". Total surface disturbance at Doty Mountain was estimated to be 5.7 acres per well site, with 3.8 acres of reclaimable acreage and 1.9 acres of long-term disturbance. While these estimates did not include the entire infrastructure assumed in the Proposed Action, there is a significant reduction in disturbance from key construction elements such as buried utilities under roadways and 25 percent narrower roadways. BLM recognizes the Doty Mountain example may be an aggressive estimation to use across the ARPA due to conversion of two-track trails to resource roads, but it does indicate that it is reasonable and achievable to reduce surface disturbance below levels recommended in the Proposed Action. Based on field observations, Proponent input (Proposed Action and Doty Mountain overview) and professional judgment BLM established an **average goal** (not a cap) of 6.5 acres per well site (2.5 acres per well site long-term disturbance) across the ARPA.

BLM established a surface disturbance cap for the ARPA to encourage reduced initial disturbance and timely reclamation, resulting in reduced environmental impacts on resources. The 7,600 acre disturbance cap was derived using the following assumptions.

- 2.5 acres per well site long-term disturbance
- Initiate reclamation (e.g., grading, seeding, etc.) year 1 after disturbance
- Reclamation success per year: 0% 0% 0% 40% 60% (five growing seasons after initial seeding)

Peak disturbance at any time occurs after six years, at approximately 7,600 acres (includes existing estimated disturbance from the interim drilling policy), as shown in Alternative D – Acreage Disturbance Profile below.



Figure 1. Atlantic Rim Gas Project Location, Carbon County, Wyoming 2006.

The environmental analysis of Alternative D presented in the FEIS and the decisions made in this ROD are based on these disturbance limits applied across the ARPA. The BLM has approval authority over actions on federal minerals and lands. When evaluating development applications for affected federal minerals and lands, the BLM will consider impacts and surface disturbance that occur on private or state lands, relative to an Operator's disturbance cap allocation.

Many of the subsequent actions in the ARPA project may be eligible for categorical exclusion under the Energy Policy Act of 2005. The review and approval process prior to allowing a federal leaseholder to extract federal minerals will be subject to further environmental review. In some instances, further NEPA documentation will be prepared. In other instances, where certain criteria are met, the action may be categorically excluded from the requirements of NEPA and will be approved under the provisions of section 390 of the Energy Policy Act of 2005. In all cases, the action will be subject to onsite investigation, cultural reviews, T&E consultation, and environmental reviews. In cases where development to access privately-owned minerals is proposed on private or

state lands, and access across public lands is requested, the BLM will conduct the appropriate level of NEPA analysis prior to granting a right-of-way. Environmental documents prepared under NEPA will consider cumulative impacts that may result from the private actions within the ARPA. Prior to approval of all oil-and-gas-related activities in the ARPA, the BLM will consider surface-disturbing activities associated with natural gas development that occur on private lands and include that information when estimating the acreage towards the 7,600 acres "cap."

Surface disturbance associated with the air monitoring station is anticipated to be minimal, and will not count against the ARPA disturbance cap.

Future disturbance on federal minerals subsequent to the date the ARPA ROD is approved is subject to the disturbance cap. Operators are required to submit a summary of their mineral lease holdings to BLM to receive their disturbance cap allocation. Past oil and gas development (approval prior to the IDP) will not count against the disturbance cap, and those lease holdings are not eligible for disturbance cap allocation.

Performance Standards

Comment Summary: A number of comments observed that the ROD should include desired conditions, monitoring methods, potential mitigation considerations, and a clear identification of who is responsible for monitoring and reporting. Some reviewers commented that the reclamation standards should be achievable, with flexibility to adapt to unforeseen circumstances, while others noted that the reclamation standards were appropriate and should be adhered to strictly. Still others noted that the reclamation criteria were not consistent and requested clarification, particularly for the interim reclamation criteria which will be used to return disturbed land into the "disturbance bank." Several commenter's suggested that a working group be convened to deal with unforeseen reclamation issues.

Response: As noted in the ROD, drilling, development, and reclamation activities in the ARPA will be managed through a performance-based, adaptive management process as described in appendix B (Performance-Based Monitoring and Best Management Practices). A mitigation and monitoring process will be developed by the Review Team (BLM, cooperating and interested agencies, and Operators) and will provide quantifiable criteria to identify trends associated with the Performance Goals. The process will include the types of mitigation responses that will be considered in the event that monitoring data indicates a downward trend relative to the Performance Goals. Throughout the life of the project, monitoring data will be reviewed to determine if mitigation is effective and leading to the achievement of reclamation and Performance Goals. The monitoring data will be evaluated on a regular basis (at least annually) and BMPs, COAs, protective measures, reclamation criteria, and mitigation measures may be modified, as appropriate, based on the monitoring results.

Please refer to appendix A of this ROD for a revised version of the ARPA Reclamation Plan. This plan has been revised to clarify the difference in reclamation success criteria for interim versus final reclamation.

BLM considers the Reclamation Plan to be an "evergreen document" that will be revised as necessary and appropriate through an adaptive management process. For instance,

monitoring of reclamation efforts may reveal a need to adjust reclamation criteria, thereby providing flexibility in the reclamation approval and disturbance banking process.

The Review Team described in the ROD, consisting of BLM, cooperating and interested agencies, and the Operators is responsible for evaluating monitoring plans and reports, including reclamation, and can serve as a working group to manage unforeseen reclamation issues.

Air Quality

Comment Summary: One comment noted that use of the Scheffe method to predict ozone impacts is not scientifically valid. Another comment noted a discrepancy in background concentrations for ozone between the affected environment section (table 3-6) and the impact analysis section (table 4-2). In addition, table 4-1 has some negative numbers which are confusing. Still another comment noted that BLM should consider and abide by critical nitrogen deposition loads recently developed for Rocky Mountain National Park. And finally, one comment notes that BLM should recognize the recent change in the particulate standard for PM 2.5 from 65 ug/m3 to 35 ug/m3.

Response: BLM recognizes that the Scheffe method for estimating ozone impacts is no longer used for the intended purpose, and BLM is no longer using the method for projects currently undergoing analysis of air impacts. However, as noted on page 4-15 of the FEIS, the Scheffe method was considered by the inter-agency air quality team to be a reasonable tool for estimating ozone impacts at the time the air quality analysis was conducted.

The background ozone concentrations presented in table 3-6 are maximum 8-hour values (specifically, the fourth highest daily 8-hour value), whereas the ozone concentrations presented in table 4-2 are average hourly values. Hence, the average numbers are lower than the maximum values.

The values in table 4-1 represent the change in emissions over the period for which the regional emissions inventory was conducted (January 1, 2001 through March 31, 2004). The negative values represent a reduction in emissions over the inventory period.

Nitrogen deposition impacts on PSD Class I and Sensitive PSD Class II areas, including Rocky Mountain National Park, were estimated for the proposed Atlantic Rim project and for other regional sources. The estimated nitrogen deposition impacts were below levels of concern established at the time the analysis was conducted.

The BLM anticipated the change in the PM 2.5 standard by inserting text in the FEIS recognizing the change and how the change does not change the analysis in the document. Please refer to text on page 3-19 of the FEIS for a description of the change in the standard, and to text on page 4-12 for a statement that the predicted impact is below the new standard.

Paleontology

Comment Summary: One comment noted BLM's assertion (response to DEIS comments) that there are no known occurrences of localities meeting the Condition 1 determination is incorrect. Another noted that the FEIS does not contain definitions of "paleontological condition" or "probable fossil yield classification" or a reference to BLM's original documents containing at least the paleontological condition definitions. Finally, the FEIS does not contain reliable quantitative estimates of probable fossil yield classification (PFYC).

Response: As stated in FEIS appendix H, Best Management Practices, paleontological category 1 and category 2 areas will be managed in the same manner; therefore, identification of specific localities or quantification of PFYC is not necessary. Please refer to the errata section of this ROD for a correction to our response to DEIS comment 671-73-1.

Definitions for "paleontological condition" and "probable fossil yield classification" may be found in the two following sources:

- 1) BLM Handbook H-8270-1 (GENERAL PROCEDURAL GUIDANCE FOR PALEONTOLOGICAL RESOURCE MANAGEMENT)
- 2) BLM Draft Policy for Paleontological Resource Management

Table E1.Individuals and Organizations Submitting Comments on the Atlantic Rim
Natural Gas Development Project Final EIS

Date	
Received	Individual, Agency or Organization
40/44/2022	
12/11/2006	
12/26/2006	John and Clara Blair
12/26/2006	Katny Morarty, PhD
12/26/2006	Brian A. Rutledge, Audubon Wyoming
12/27/2006	Heath Van Eaton, Heartland BioComposites, LLC
12/28/2006	Larry Svoboda, USEPA, Region 8
12/28/2006	Shelley and John Ellis
1/3/2007	Mike Zancanella
1/3/2007	Barbara Parsons
1/3/2007	Tom Clayson, Anadarko E&P Company, LP
1/3/2007	Nada Culver The Wildnerness Society:
1,0,2001	Joy Owens, Friends of the Red Desert
1/3/2007	Scott Hedlund, Warren E&P, Inc.
1/4/2007	Jason Begger, Petroleum Association of Wyoming
1/4/2007	Tyler H. Vanderhoer, Gene R. George & Associates
1/4/2007	Linda Guthrie, Devon Energy Corporation
1/4/2007	Chuck Mollica
1/5/2007	Erik Molvar, Biodiversity Conservation Alliance, et al.
1/5/2007	Vern Stelter for John Emmerich, State of Wyoming, Wyoming Game and Fish Department
1/5/2007	John Etchepare, State of Wyoming, Department of Agriculture
1/5/2007	Richard L. Currit, State Historic Preservation Office, Wyoming State Parks and Cultural Resources,
1/5/2007	D. Steven Degenfelder, Double Eagle Petroleum and Mining Company
1/8/2007	Todd Parfitt, State of Wyoming, Department of Environmental Quality
1/8/2007	Dave Freudenthal, State of Wyoming, Office of the Governor
1/8/2007	Martha Christensen
1/8/2007	Lisa Eadens for Michael A. Saul and Mark Winland, Wyoming Wildlife Federation
12/30/2006	Scott Hedlund, Warren E&P, Inc.
1/4/2007	Eileen Caryl
1/4/2007	D. Steven Degenfelder, Double Eagle Petroleum and Mining Company
1/4/2007	Todd Parfitt, State of Wyoming, Department of Environmental Quality
1/5/2007	Jason A. Lillegraven
1/5/2007	Richard M. Garrett, Jr.
1/5/2007	Tom Ritter
1/5/2007	Teresa Davidson
1/5/2007	Alexis Dale
1/5/2007	Patrick W. Gonzales, Rawlins-Carbon County Chamber of Commerce
1/9/2007	Asa S. Nielson, Environmental Preservation Foundation
1/8/2007	Brian T. Kelly, USFWS, Wyoming Field Office

Table E1.Individuals and Organizations Submitting Comments on the Atlantic Rim
Natural Gas Development Project Final EIS cont.

Date Received	Individual, Agency or Organization
	Email
12/7/2006	Bob Laybourn
12/17/2006	Jean Public
12/17/2006	Carol Rothrock
12/18/2006	Asa Nielson, Environmental Preservation Foundation
12/20/2006	Lowell Wade, Flying X Ranch
12/20/2006	Dinda Evans
12/20/2006	Dinda Evans
12/21/2006	Bart Geerts
12/21/2006	Jana Weber
12/22/2006	Robert Anthony
12/23/2006	Jane Warren
12/23/2006	Lydia Garvey
12/24/2006	Sidney Peters
12/26/2006	Mike Evans
12/26/2006	Lynne Berg
12/28/2006	Mark Jenkins
12/29/2006	Jan Leopold
12/29/2006	Tom Clayson, Anadarko E&P Company, LP
12/30/2006	Scott Hedlund, Warren E&P, Inc.
12/31/2006	Alyson Hagy
1/1/2007	Paul Moss
1/1/2007	Paul Taylor
1/2/2007	Chuck Mollica
1/2/2007	Jason Begger, Petroleum Association of Wyoming
1/2/2007	Daniel Dale
1/2/2007	Aaron McCallister
1/2/2007	Robyn Morrison
1/2/2007	Richard Spotts
1/3/2007	Christian Rudolph
1/3/2007	Sigrid Mayer
1/3/2007	Richard M. Garrett
1/3/2007	Hannah Griscom
1/3/2007	Linda Guthrie, Devon Energy Corporation
1/3/2007	Jerry Goodbody
1/3/2007	Charlie Wymer
1/3/2007	Debbie Ritter
1/3/2007	Bobby Johnson
1/3/2007	Dave Roberts
1/3/2007	Jason A. Lillegraven,

Table E1.Individuals and Organizations Submitting Comments on the Atlantic Rim
Natural Gas Development Project Final EIS cont.

Date		
Received	Individual, Agency or Organization	
Email cont.		
1/4/2007	Dani Sullivan, DSULLI1@state.wy.us	
1/4/2007	Lisa Eadens, PLIntern@nwf.org	
1/4/2007	George R. Salisbury submitted via Sharon O'Toole, sharonsotoole@gmail.com	
1/4/2007	Sharon O'Toole, sharonsotoole@gmail.com	
1/4/2007	Steve Belinda, sbelinda@trcp.org	
1/4/2007	John D. Adamson, info@geopinion.com	
1/4/2007	Asa Nielson, acenielson@gmail.com	
1/4/2007	Erik Molvar, erik@voiceforthewild.org	
1/5/2007	Patrick O'Toole, h2otoole@hotmail.com	
12/30/2006	Michael Ockinga, ockinga48@msn.com	
1/5/2007	Vern Stelter, Wyoming Game & Fish Department, Vern.Stelter@wgf.state.wy.us	
1/9/2007	Don Christianson, Department of Agriculture, DCHRIS@state.wy.us	