Chapter 2

Alternatives Including the Proposed Action

2 Alternatives Including the Proposed Action

The BLM identified a range of alternatives based on issues, concerns, and opportunities raised in public comments to project scoping and the Draft EIS, interdisciplinary interaction between resource professionals, and collaboration with cooperating and interested agencies. The alternatives range from no action to the Proposed Action plus intensive reclamation. The Proposed Action and the alternatives are described in this section.

All possible activities associated with each alternative including the no action alternative are assumed to apply to BLM-administered lands only. All activities authorized for the Atlantic Rim Natural Gas Project must comply with the applicable RMP. The applicable RMP at this time is the Great Divide RMP (USDI-BLM 1990). Currently the BLM RFO is revising its RMP and, to date, has issued a Draft EIS in support of the RMP revision. Any future activity that may be authorized based on this EIS must conform to the RMP in effect at the time authorization is requested.

2.1 Introduction

The BLM developed alternatives to the proposed action based on the issues developed during the scoping period and comments to the Draft EIS (chapter 1, parts 1.7 and 1.8), Interdisciplinary team review, input from cooperating agency, and comments to the Draft EIS.

2.2 Alternatives Description

While numerous alternatives and specific actions were considered, four alternatives are studied in detail in this EIS: the Proposed Action, no action (Alternative A), and two additional action alternatives (Alternatives C and D). Alternative B from the Draft EIS has been dropped from further consideration in the Final EIS.

2.2.1 The Proposed Action

The goal for the proposed action is to maximize the economic recovery of gas resources while using best management practices (BMP) and mitigation to reduce effects upon the environment. The operators have submitted a detailed plan of development for the Atlantic Rim project, which is included in this document as appendix K. The following summarizes their proposal:

- The Proposed Action consists of drilling and developing approximately 2,000 new natural gas wells. Approximately 1,800 would be drilled to coal formations in the Mesaverde Group to develop CBNG resources. Up to 8 wells on 8 well pads per section (80 acre spacing) would occur. An additional 200 wells would be drilled to access conventional natural gas resources, generally expected to be located deeper than the coal formations in the Mesaverde Group. These wells would be co-located on CBNG pads within CBNG developed areas and spacing would be up to 4 well pads/section.

- The 2,000 proposed, new natural gas wells would be in addition to the approximately 116 existing exploration wells (as of the fall of 2005) developed under the Interim Drilling Policy.

- Proposed well spacing for the ARPA is eight wells per section (80-acre spacing). However, this may be reduced to four wells per section (160-acre spacing) depending on the geology and ability of the operators to remove the water and lower the pressure sufficiently to recover gas.

- Development and drilling would begin in 2007 within the ARPA 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 throughout the ARPA. The pace of drilling over the life of the project is illustrated on figure 2-1. The majority of the wells expected to be drilled is within the first 6 to 8 years following approval of the project.

- There would be approximately 4,500 acres of new short-term (initial or less than 3 years) surface disturbance from well pads; 1,000 miles (approximately 9,850 acres) of new roads, upgrades of existing roads, and pipeline construction; and 1,480 acres of ancillary facilities. The total new short-term (initial) disturbance resulting from the Proposed Action would be about 15,800 acres or 7.9 acres per well on average.

- Long-term (life-of-project) disturbances following interim reclamation would cover approximately 2,320 acres for wells pads, 3,636 acres for roads and utilities, and 285 acres for ancillary facilities for a total of 6,241 acres (3.1 acres per well on average). Interim reclamation would reduce the total acres of disturbance by about 9,600 acres.

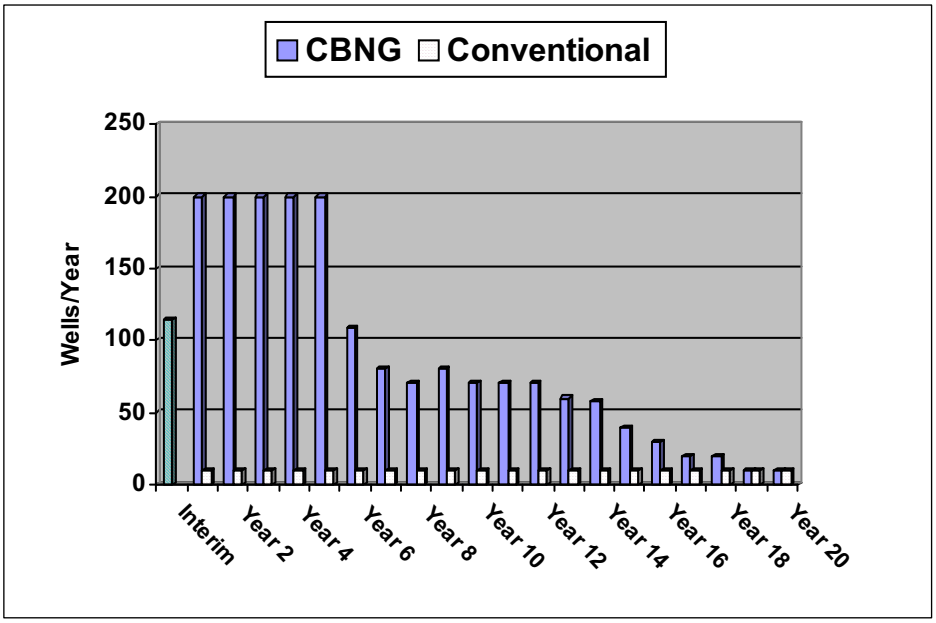
- Produced water from individual wells would be gathered and routed to centralized water handling and storage sites, which would serve as central injection facilities. Produced water would be disposed of through re-injection with two exceptions.

    1. One exception could occur when a proposal comes forward from a land owner or an agency with surface management responsibilities for water for livestock/ wildlife watering sites. This could result in the use of closed watering systems for stock and wildlife. These systems will be designed with no discharge of water onto the surface, will have appropriate state permits, and will not be a significant portion of the water disposal needs for the project.

    2. The second exception could occur when landowners or an agency with surface management responsibilities comes forward with a request for water to offset for the loss of current artesian water sources. De-watering of the coal seams has the possibility of drying up artesian water sources as detailed in chapter 4.

- The project proponents have voluntarily committed to a set of mitigation measures as part of the Proposed Action to avoid or reduce impacts from the proposed project. These are presented in appendix K, pages K-20 through K-24.

Figure 2-1. Proposed Action Annual Drilling Assumptions by Well Type.



Sources: AEPC 2004 and IMPLAN model outputs
Prepared by: Blankenship Consulting LLC (BCLLC)

2.2.2 Alternative A (No Action)

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 Code of Federal Regulations [CFR] 1502.14(d)). For this analysis, *no action* means that the BLM would reject the operators' proposal and the activities would not be approved or authorized. This alternative does not meet the purpose and need of the project which is to promote the development of natural gas resources on federal lands.

Due to the intermingling of federal, state, and private lands within the ARPA, rejection of the operators' proposal would not mean all oil and gas development in the project area would cease. It is reasonable to assume that subsequent development proposals could be received for access to state and private lands for mineral development, as the BLM does not approve or control development proposals upon these lands. Proposals for access across federal lands for oil and gas development and production-related activities could be received, processed, and approved (as appropriate) by the BLM at any time.

Individual proposals for exploration or development including rights-of-way and access across federal lands would be subject to site-specific analysis prior to approval or authorization.

2.2.3 Alternative C

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 would be approved to develop natural gas resource from the desired target formations, however all 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 to natural gas development activities. Resource protection measures would be applied based on the site-specific locations of the activity such as well development or construction of ancillary production facilities. Resource data, in the form of geographic information system (GIS) layers coupled with on-site reviews, would be used to identify specific areas of resource concern at the site-specific level. Examples of such resource concerns are sensitive wildlife and fish habitat and areas with sensitive soils. These resources are sufficiently unique to require additional protective measures beyond what is already provided by applying required BMPs (appendices H and J), lease stipulations, and conditions of approval (COA). As an end product, GIS layers would be available to operators for development of site-specific proposals for their annual work program during the Application for Permit to Drill (APD) process.

Below is a summary of development protection measures that would be implemented in some locations based on the presence of resources. A detailed description of protection measures is provided in appendix L, including references to maps (appendix M) depicting areas where the measures might be applicable and the rationale for the measure or resource concern that the measure would address or resolve.

- **Water and Soil Management**. In order to reduce salt and sediment loading in the Colorado River Basin, a resource management concern since the 1930s, no pad, compressor, or water transfer sites would be located in areas with steep slopes (>25%) or close to (within 500 feet) perennial waters or wetlands. Interim reclamation would be completed within 1 year of the spud date in areas with soils with excess salts and poor top soils, since these areas are more difficult to reclaim. Low-impact road design would be implemented in areas where soils have excess salts, high runoff potential, and severe road rating. Specifications for road construction and annual maintenance to reduce dust would be implemented in areas that have soils with excess salts and in areas with a severe road rating because these areas would generally have a higher clay or salt content in the soils and hence be more prone to dust problems. Special measures would be implemented in areas with high runoff potential to reduce surface water concentration, increase infiltration, and achieve reclamation success. Areas with high runoff potential would also have reduced surface disturbance (less than 20 acres and four well locations per section).

- **Vegetation Resources**. In difficult to reclaim vegetation communities with greater than 8-percent slopes, surface disturbance would be limited. Surface disturbance of more than 20 acres in size would not be allowed, and no more than 4 well pads per 640 acre section would be approved. In vegetation communities with high wildlife values or rare vegetation communities, no surface disturbance would be allowed. Silver sagebrush/bitterbrush communities would have limited areal extent of surface disturbance. All these communities within crucial winter range failed the Upper Colorado River Basin Standards and Guidelines Assessment (USDI-BLM 2002e). These areas would continue to fail standards without additional development protection measures.

- **Range Resources**. To protect range resources, operators would be required to ensure that their employees and subcontractors abide by speed limits and erect signs warning drivers of livestock concentration areas, such as lambing grounds and shipping pastures. Annual planning efforts would provide data to enable livestock

planning specific to pastures or allotment boundaries. Construction specifications would be put in place to reduce dust.

- **Wildlife Resource Management**. In grouse brood-rearing or nesting habitat and big game crucial winter range, the BLM would approve at the site-specific review level limited surface disturbance (less than 20 acres and four well locations per section) and roads would be limited to less than 3 miles/mile^2. No surface disturbance would be allowed in severe winter relief habitats for greater sage-grouse; these areas serve as refuges, which are small patches of high sagebrush that generally will not drift during severe winters. No surface disturbance would be allowed in identified wintering areas (serviceberry patches) for Columbian sharp-tailed grouse.

- **Visual Resources**. In Visual Resource Management (VRM) Class III areas visible from state, county, or BLM roads (map M-6):

    - Drilling pads would not be located on ridgelines;

    - Resource roads would not be located directly off roads assessable to the public, unless they are shown to be visibly less obtrusive than creating a new collector road;

    - Low-impact road design would be used in topography with less than 5 percent slope (See appendix L for a description of low-impact road design);

    - Pad sizes would be minimized by using pitless, shared pit, or closed-system drilling; and

    - Where topography or other conditions would allow, the operators would be required to reclaim pits and pads on an interim basis within one year of the date well drilling was initiated.

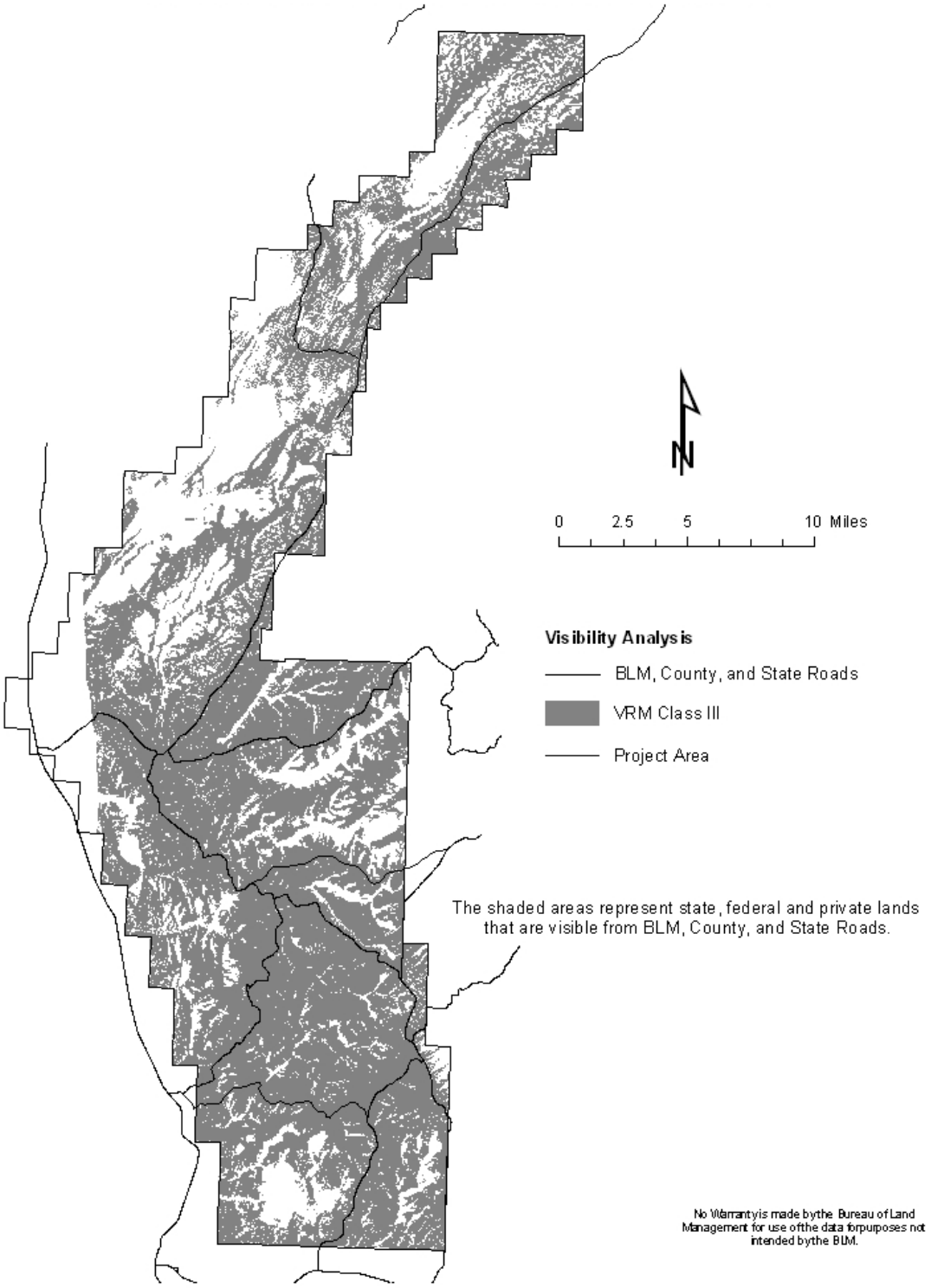
The Proposed Action predicts an overall maximum surface disturbance of 15,800 acres based on a disturbance rate of 7.9 acres per well (appendix K, table K-1). Alternative C would limit disturbance to 20 acres and a maximum of four wells per section on the majority of federal lands within the ARPA. Where Alternative C restrictions would be applied, there would be a 68.4-percent reduction in surface disturbance on federal lands compared to the Proposed Action. Disturbance is broken down as follows:

- Proposed Action disturbance per section:
    - 8 wells per section x 7.9 acres per well = 63.2 acres disturbance

- Alternative C disturbance per section:
    - Maximum disturbance = 20 acres

- Reduced disturbance:
    - Alternative C/Proposed Action = 20 acres/63.2 acres = 31.6 percent
    - 31.6 percent disturbance = a **68.4-percent disturbance reduction on federal lands**

Map M-6. ARPA Visible from Main Roads in VRM Class III.



This reduction in surface disturbance is based on a section-by-section comparison where Alternative C restrictions are applied rather than requirements under the Proposed Action. In terms of effects at a larger scale, this percentage would decrease based on the amount of lands not affected by Alternative C requirements in the assessment area. Alternative C surface disturbance limitations would not apply on privately and state-owned lands. As a result, this percentage reduction would be the highest on blocked federal lands and vary greatly where interspersed federal and private lands coexist, especially in the checkerboard ownership pattern (map M-3).

The percentage of overall reduction in surface disturbance due to Alternative C restrictions is not predictable for the ARPA. Due to the variables inherent in a field development, it is not possible to predict specifically where optimal gas development will occur within the ARPA. Important variables in this percentage estimate are the number of wells proposed for siting in areas affected by development protection measures, the number of wells proposed on federal lands as opposed to private and state lands, and the amount of disturbance relocated to private lands to reduce effects on federal lands. Based on these uncertainties, total surface disturbance for the project could be similar under Alternative C as with the Proposed Action. Alternative C may shift disturbance from more sensitive resource areas to less sensitive areas. For the purposes of the EIS impact analysis, BLM developed an estimate of surface disturbance for Alternative C based on the following assumptions regarding potential development in the ARPA:

- All lands within the ARPA have an equal likelihood of producing natural gas.
- Development would be maximized on state and fee minerals by drilling 8 wells per section on all state and fee sections within the ARPA. Surface disturbance on these lands would average 7.9 acres/well (per the Detailed Proposed Action in appendix K).
- Development of the remainder of the 2,000 wells would occur on federal minerals at a density of 4 wells per section and 20 acres of disturbance per section. BLM assumed all federal minerals would be subject to the 4 well per section spacing requirement.

Based on these assumptions BLM estimated a maximum surface disturbance under Alternative C of 13,286 acres (table 2-1).

Under Alternative C, when annual site-specific development proposals are received, they will be reviewed on site by a team of IDT specialists. Based on the conditions found at the individual sites, development protection measures, BMPs, and COAs will be added to APDs before their approval.

2.2.4 Alternative D–the BLM's Preferred Alternative

The objective of this alternative is to minimize surface disturbance while optimizing natural gas recovery. Annual planning (as in the Proposed Action) between the operators and the BLM will be a key component of this alternative. Annual planning would require that each operator submit to the BLM their proposed plan of operation for the forthcoming year. The annual planning process would be used to discuss current and multi-year development plans with the intent of reducing disturbance within the ARPA. The BLM will then work with the operators and

interested agencies at a site specific level to minimize surface disturbance by applying the appropriate lease stipulations, COAs, BMPs, and any other measures deemed necessary to minimize surface disturbance and still allow for the full recovery of natural gas. The pace of development analyzed is the same as the Proposed Action (figure 2-1 of the Final EIS).

This alternative will limit initial site disturbance from all oil and gas development activities (resource roads, well sites, gas gathering pipelines, compressor stations, etc.) by establishing an average short term disturbance goal of 6.5 acres per well constructed. Limited disturbance per well would require less reclamation be completed by the operators and less land taken out of productivity. Natural gas development would be limited to 8 well sites per section, which includes CBNG, conventional, and injection wells. Operators could install multiple well bores (e.g. CBNG, conventional or injection) on a well site.

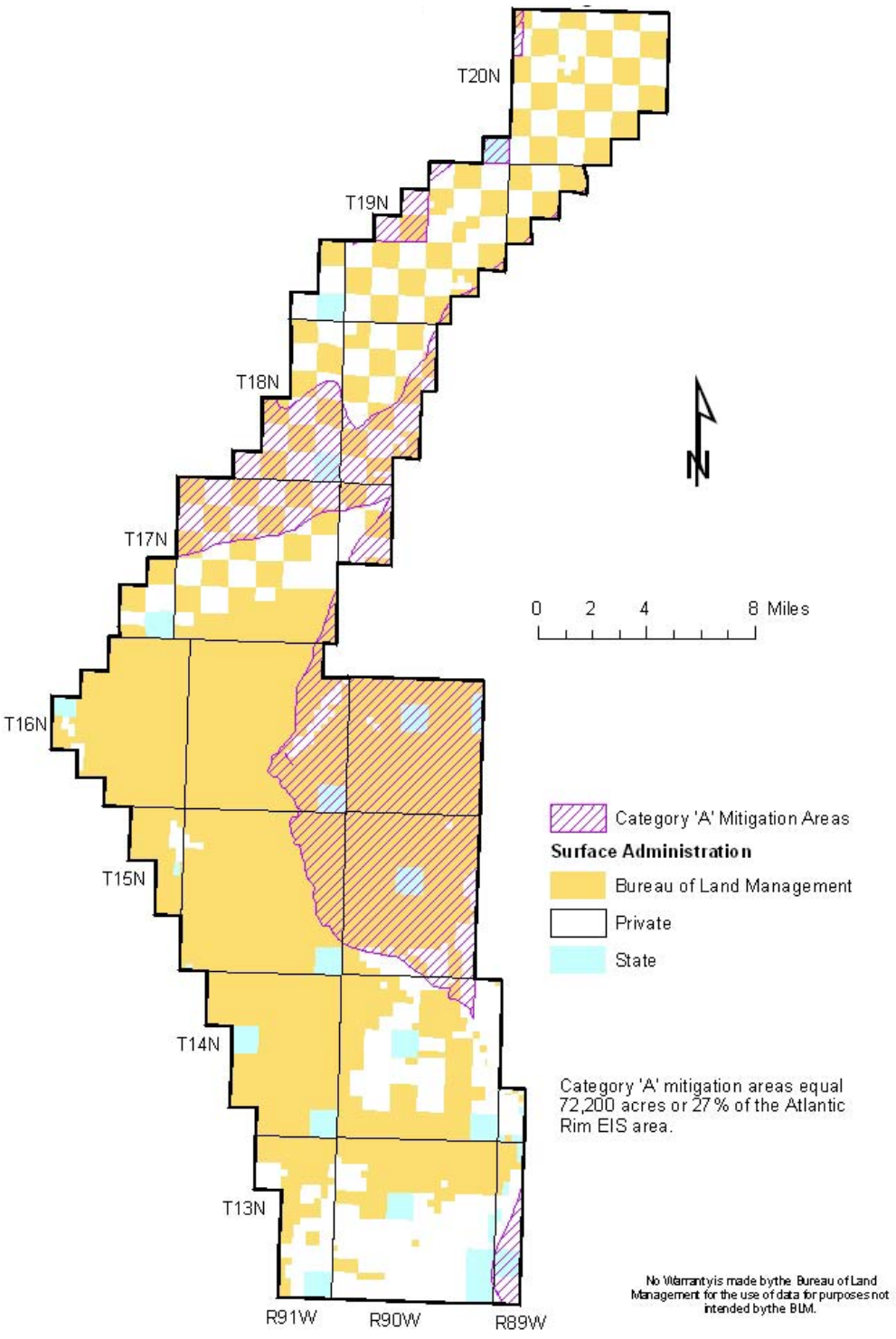
Total surface disturbance under Alternative D would be approximately 13,600 acres (2,000 wells x 6.5 acres/well, plus approximately 600 acres existing disturbance under the Interim Drilling Policy). For the overall Atlantic Rim area, no more than 7,600 acres (2.8% of the project area) would be disturbed and unreclaimed at any time. If the disturbance limit should be reached, further disturbance activities would be halted pending successful reclamation. Upon reclamation success further natural gas development proposals would be considered and approved without exceeding the disturbance limit. The standard for “reclamation success” is defined in the Final EIS Reclamation Plan (appendix B) under “Criteria for Reclamation Success”.

A map of the existing disturbance associated with activities authorized as part of the interim drilling policy would be prepared. This map will serve as the baseline level of disturbance and would be updated annually. The BLM would track both the planned versus actual disturbance on an annual basis as well as the cumulative, un-reclaimed surface disturbance.

Within Atlantic Rim those areas designated as “Category A” would be managed more intensely (utilizing appropriate lease stipulations, COAs and BMPs) to reduce the extent of disturbance below an average of 6.5 acres / well. Reduced disturbance below 6.5 acres / well, coupled with successful reclamation within Category A will be considered when evaluating development proposals outside the area. Category A, as depicted on map M-7, includes management areas with sensitive fish populations, and crucial wildlife habitats, including areas of critical environmental concern, special management areas (SMA), elk crucial winter range and silver sage/bitterbrush communities. Category A is about 72,200 acres in extent.

Disturbance levels would be determined through geo-spatial information regarding areas actually disturbed provided annually by the operators in conjunction with the Final EIS Reclamation Plan (appendix B). Reclamation would be reviewed, at a minimum, annually. For those areas needing further work, adaptive management using appropriate BMPs would be implemented to ensure subsequent reclamation success. Developers would propose and implement reclamation measures that would be used for both areas with reclamation problems and newly disturbed areas.

Map M-7. Alternative D with Category A Mitigation Areas.



2.3 Comparison of Alternatives

The four alternatives evaluated in this EIS are compared in this section, first by the features they have in common and then by features unique to each one. Table 2-1 provides a brief comparison of potential impacts to project issues across alternatives. Greater detail is provided in the detailed impact assessments provided in chapter 4.

2.3.1 Features Common to All Action Alternatives

The Proposed Action, Alternative C, and Alternative D have numerous features in common. The Proposed Action and Alternative D anticipate up to 1,800 CBNG wells and up to 200 conventional natural gas wells with a total of 2,000 wells. Each of the alternatives would utilize annual planning for approval of the following years' development activities, as detailed in "Preconstruction Planning and Site Layout" in appendix K and elsewhere in this document. Annual planning will provide for the receipt, processing, and approval of development proposals in such a manner that allows for economies of scale, provides for a more thorough appraisal of the work to be performed, and allows for the effective involvement of interested agencies and cooperators.

Another similarity between the action alternatives is the timing and rate of gas well development. The maximum annual number of wells to be drilled is detailed on figure 2-1. While economic conditions, drill rig and construction equipment availability, weather, and other conditions could lower the actual number of wells drilled, any such effect is expected to be similar across all the alternatives.

CBNG resources would be extracted from those areas found to have natural gas in feasible and economic quantities. Construction, location, and operation of facilities would be similar under the Proposed Action and Alternative D. Development of natural gas from conventional formations would be similar under all three alternatives.

All action alternatives would include a reclamation plan and process dependent on geo-spatial tracking, annual monitoring and adaptive management. The timing of reclamation, including interim and final, would be similar for all alternatives. The number of wells per section would be up to eight for all action alternatives, but would be reduced in many areas for Alternative C.

All three alternatives propose the subsurface re-injection of produced water as a disposal method, with a limited surface discharge under permits issued previously by the State of Wyoming. If alternative uses of the produced water are identified and proposed, they can be considered and approved separately under another NEPA analysis and decision.

2.3.2 Features Unique To Action Alternatives

Compared to the Proposed Action and Alternative D, Alternative C has unique provisions; namely, the use of development protection measures on federal lands that are designed to reduce adverse impacts to important resource values, such as crucial winter range, sage-grouse nest and brood-rearing habitats, and areas of sensitive visual and cultural resources. Areas of high runoff potential or soils with high levels of salinity or that are alkaline, and areas where reclamation is expected to be difficult are also considered "sensitive resources". In addition, the extent and scale of the various development protection measures would limit surface disturbance and well pad locations to four or less across broad expanses of the ARPA.

While Alternative C analyzes up to 2,000 wells, the precise number that can be approved under the alternative could be less depending on the specific locations at which development is proposed. Development could be limited to four well locations per section in up to 95 percent of the federal lands within ARPA. The exact degree of constraint would depend on the site-specific locations proposed annually for development by the operators. Comments to the Draft EIS and from internal BLM sources indicates that this limited amount of development might render the project unfeasible.

The Proposed Action and Alternative D would not reduce development using development protection measures. Compared to the Proposed Action, Alternative D would limit unreclaimed disturbance to 7,600 acres.

2.4 Alternatives Considered and Eliminated from Detailed Study

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

2.4.1 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.

2.4.2 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 a June 2005 memorandum, the RMG 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. Mandatory use of directional drilling was suggested in scoping and comments to the Draft EIS as a way to reduce habitat loss and wildlife disturbance by reducing the numbers of well pads and corresponding roads, pipelines, and infrastructure.

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.

2.4.3 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. Because of 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. Beneficial uses of ARPA-produced water, while not identified or proposed at this time, may come forward 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.

2.4.4 Alternative B

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 7 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.

Significant effects were expected under this alternative upon several resources including wildlife, soils and range. Comments received from the companies objected to the extended delay to 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 rights-of-way proposals for the development of private and state oil and gas development within the closed areas conflicts with BLM policy (BLM Manual, Part 2800.06 “Policy” (D)) to allow

owners of non-federal lands surrounded by public lands managed under FLPMA that would provide for the reasonable use and enjoyment of the non-federal land. 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 rights-of-way approval for access.

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

Table 2-1. Brief Comparison of Impacts to Key Issues across Alternatives.

Key Issue	Proposed Action	Alternative A (No Action)	Alternative C	Alternative D
Disturbance				
Initial acres of new surface disturbance (IDP)	15,800 (600)	(600)	13,286 (600)	13,000 (600)
Total acres new disturbance (at any given time)	15,800	0	13,286[1, 2]	[3]
New long-term surface disturbance	6,200	0	6,200[2]	
Total Well Pads (IDP)	2,000 (116)	(116)	1,130[5] – 2,000 (116)	2,000 (116)
New Roads (miles)	1,000	-	1,000[2] 7,600	1,000
Average Daily Traffic Volume (round trips to and from the ARPA per day)	350–430		350–430 5,000	350–430
Project Duration/Pace/Economics				
Life of project (years)	30–50	10–30	30–50	30–50
Wells developed per year	200 (max)	-	200 (max)	200 (max)
Peak project-related employment (year 5)	1,488	-	937[8]–1,488	1,488
Total taxes and royalties (millions)	958	62[7]	62 / 603[6]/ 776	958
Carbon county share (millions)	105	7[7]	7 / 66[6]/ 85	105
Livestock management				
Initial Loss (AUMs)	2,026	150-200	1,703	1,667
Loss from Dust and Weeds (AUMs)	3,588–5,588		3–6,000	3,588–5,588
Temporary Non-Use Permits (AUMs)	20,000		5–10,000	20,000
Air Quality/Visibility per Year				
Additional days of visibility impairment per year at nine sensitive PSD Class I and Class II areas	0	0	0	0
Number of lakes sensitive to atmospheric deposition impacts above identified limits of acceptable change	0	0	0	0

Table 2-1. Brief Comparison of Impacts to Key Issues across Alternatives.

Key Issue	Proposed Action	Alternative A (No Action)	Alternative C	Alternative D
Mineral Resource Recovery				
Natural Gas (billion cubic feet)	1,350[4]	87[4]	87 / 850 / 1,100[5, 6]	1,350[4]

Habitat Loss All Species

- *Direct habitat loss for greater sage-grouse, pronghorn antelope, and other wildlife would be related to surface disturbance and project duration as listed above. Most wildlife species would likely avoid development areas under all alternatives.*
- *Indirect habitat loss for greater sage-grouse, pronghorn antelope, and other wildlife would be related to total surface disturbance (and its location), volume of human presence (worker-years), and project duration, as listed above.*
- *An overall surface disturbance reduction percentage for the ARPA from Alternative C was predicted based on the assumptions discussed in section 2.2.3, Alternative C. Alternative C may shift disturbance from more sensitive resource areas to less sensitive areas and from federal lands to state and fee lands.*

Notes:

AUM - animal unit month

1. Alternative C estimates assume 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.
2. Protective measures included in Alternative C may shift surface disturbance from higher sensitivity areas on federal minerals to lower sensitivity areas. These protective measures may also shift surface disturbance from federal minerals to state and fee minerals.
3. Unreclaimed surface disturbance under Alternative D is limited to 2.8 percent of the ARPA (7,600 acres); and more intensive management of the Category A areas through a goal of less than 6.5 acres per well average surface disturbance.
4. Estimated natural gas recovery is for 1,800 CBNG wells only, at 0.750 mmcf / well. Estimated gas recovery for conventional wells was not provided by the applicant (section 4.12).
5. 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 section = 1,130 wells; 1,800 CBNG wells–1,130 state/fee = 670 CBNG well on federal minerals).
6. 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 (also see Note #5).
7. No Action estimate assumes 116 wells producing from the IDP with average gas recovery of 0.750 mmcf / well (e.g. equivalent to 6.4 percent of the Proposed Action).
8. Alternative C project related employment reflects a range from drilling on state and fee minerals only (1,130 wells or 63% or the Proposed Action, also see Note #6) to drilling 2,000 wells.