CHAPTER 2

PROPOSED ACTION AND ALTERNATIVES

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CHAPTER 2

PROPOSED ACTION AND ALTERNATIVES

It is important for the reader to note that BLM is authorized to approve actions on BLM managed lands and federal minerals, however, analysis of the impacts to the human environment include effects upon all land ownership types.

Any authorizations for the Atlantic Rim Natural Gas Project must comply with the applicable Resource Management Plan (RMP). The applicable RMP at this time is the Great Divide Resource Management Plan. Currently the Rawlins Field Office is revising its RMP, and to date has issued a draft Environmental Impact Statement in support of the RMP revision. When the Rawlins RMP is approved the ARPA must and would comply fully with that plan.

2.0 ALTERNATIVE DEVELOPMENT

Based on issues, concerns, and opportunities identified from public scoping comments, interdisciplinary interaction between resource professionals, and collaboration with cooperating and interested agencies, the BLM identified a range of alternatives.

2.1 ALTERNATIVES

While numerous alternatives and specific actions were considered, four alternatives are studied in detail: proposed action, no action, and two additional “action” alternatives. Alternatives and specific actions considered and eliminated from detailed study are discussed in section 2.5 of this Chapter.

2.2 ALTERNATIVE DESCRIPTION

2.2.1 The Proposed Action

The Operators have submitted the following:

- The proposed action consists of drilling and developing approximately 2,000 new natural gas wells. Approximately 1,800 would be drilled to Mesaverde formations coals to develop CBNG resources. An additional 200 wells would be drilled to access conventional natural gas found in other formations, generally expected to be in deeper formations.

- The 2,000 proposed, new natural gas wells would be in addition to the approximately 116 ARPA exploration wells from the interim drilling period.

- Proposed well spacing is 8 wells per section (80 acre spacing) throughout the project area and may be reduced to 4 wells per sections (160 acre spacing) depending on the geology and ability of the operators to release the water and pressure sufficiently to release and recover the gas.

- Development and drilling would begin in 2006 within the ARPA and continue for

approximately 20 years, with a life-of-project (LOP) 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.

- Under the proposed action, there would be approximately 4,500 acres of new short term (initial, <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.

- Long term (LOP) disturbance following interim reclamation anticipated for the proposed action includes 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 LOP disturbance. Interim reclamation would reduce the total acres of disturbance by about 9,500 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 (Figure 2-1). Produced water would be disposed of through re-injection, with two exceptions. One exception being the closed system with limited use of livestock and wildlife watering systems, with appropriate State permits. The second exception would be offsets for current artesian water sources. The proponents anticipate that water produced from the 2,000 wells, if being dewatered simultaneously, would need approximately 166 injection wells for disposal.

2.2.2 Alternative A – No Action

NEPA regulations require that EIS alternative analyses in the EIS “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.”

2.2.3 Alternative B

This alternative proposes the same number and spacing of wells as in the proposed action. The entire project area would be developed over the course of 20 years, however, the drilling and development would occur in three phases. The first phase to be developed over 6 – 7 years would be within the vicinity of the Doty Mountain, Sundog/Cow Creek, and Blue Sky PODs.

During the first phase of development approximately 925 well locations would be developed. Once completed and in production the second phase of development is proposed to occur in the northern third of the project area, near and including the Jolly Roger and Red Rim PODs. The third and final phase of development would occur near and including Brown Cow and Muddy Mountain PODs (Alternative M: Alternative B Map - Phases of Drilling and Drilling PODs). Under this alternative previously authorized exploration and drilling activities would continue as described in the following EAs:

Sun Dog POD	Cow Creek POD
Red Rim POD	Jolly Roger POD
Doty Mountain POD	Blue Sky POD
Brown Cow POD	

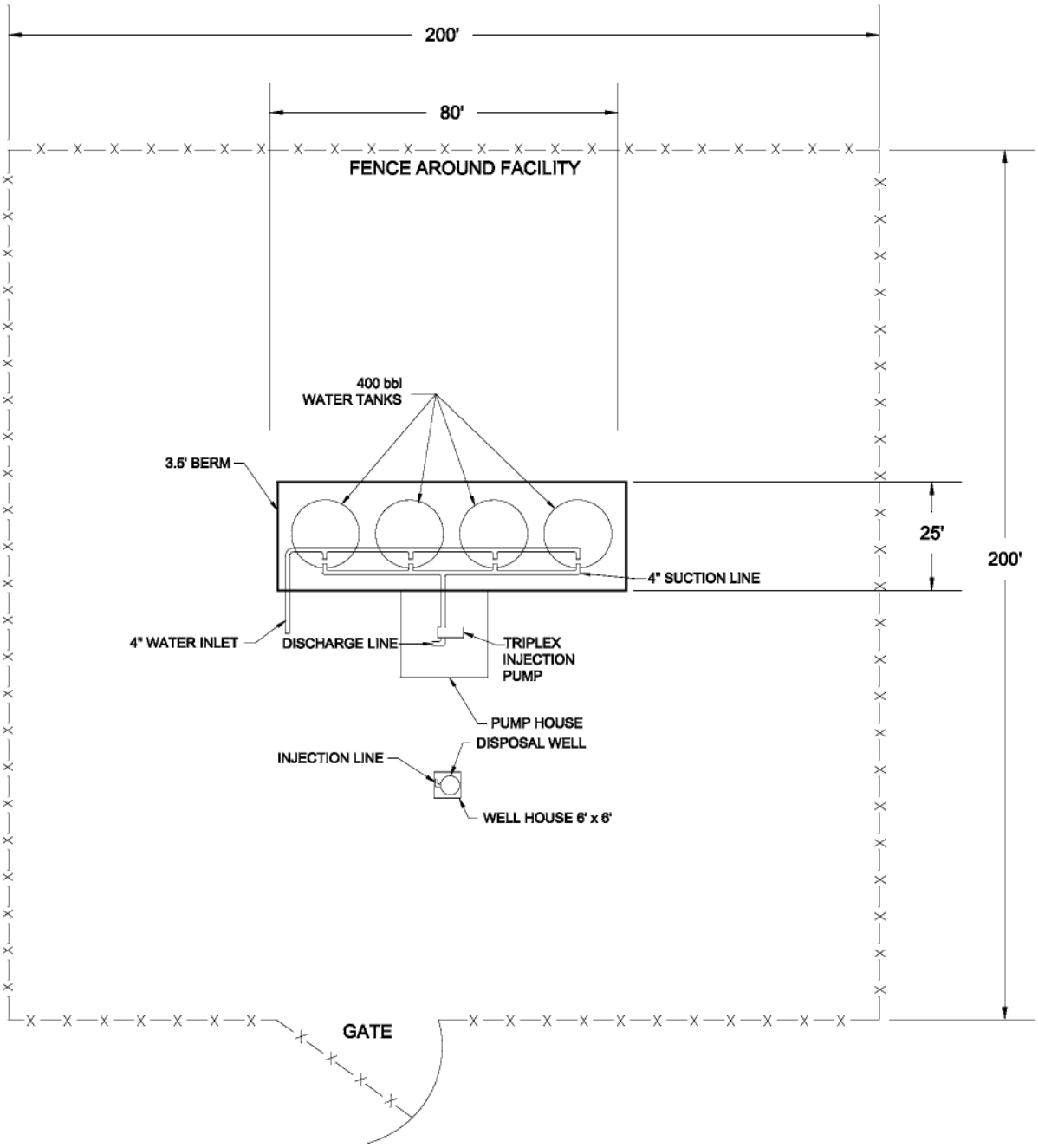

Figure 2-1. Typical Water Conditioning and Disposal Facility.

POD boundaries would remain the same as they exist and were originally proposed. No additional development would occur outside the POD boundaries in inactive zones. BLM would authorize suspensions of operations and production for all leases within the no-activity areas except for where existing oil and gas development has already occurred. Proposals to develop leases within non-active zones would be denied until the zone in which it is located becomes active for development under the Atlantic Rim ROD. For those leases suspended by the BLM no lease rental fees would accrue and the lease term would be tolled during the period the zone remained in a “no activity” status. Active status would last from 6-7 years per zone and would include completion of interim reclamation.

Gas production operations would begin and continue within an active zone as construction occurs. The extent of gas production facilities would continue to accumulate as time passes with ultimately the same level of operational (production) disturbance as the other action alternatives at completion. Once developed, production would continue throughout the project area.

2.2.4 Alternative

Development for natural gas would occur as in the proposed action, but would be conditioned with the application of required development protection measures in those areas with sensitive or crucial resource values (Appendix L). Generally, constraints would focus on surface disturbance limits, limited operating periods, modification of drilling and construction practices, and, in some cases, no surface occupancy. Resource data, in the form of GIS layers, would be used to identify specific areas of resource concern. Examples of such areas are sensitive wildlife and fish habitat, and areas with sensitive soils. These types of areas are unique enough to require additional protective measures beyond what is already provided by applying Required Best Management Practices (BMPs) (Appendices H and J), lease stipulations, and Conditions of Approval (COAs) (Appendix K). As an end product, geographic information system (GIS) layers would be available to operators for development of site specific proposals for their planning of the annual program of work 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. The detailed descriptions of protection measures are in Appendix L, including references to maps (Appendix M) showing areas where the measure would apply if applicable.

- **Water and Soil Management:** No pad, compressor or water transfer sites would be located in areas with predominately steep slopes, close to perennial waters or wetlands. Interim reclamation would be completed within one 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 soils with excess salts, high runoff potential, and severe road rating to reduce impacts from roads. This should reduce salt and sediment loading in the Colorado River Basin, of concern since the 1930s. Specifications for road construction and annual maintenance to reduce dust would be implemented in areas with soils with excess salts, and in areas with a severe road rating, since 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, reclamation success, and effective precipitation. Areas with high runoff potential would also have reduced surface disturbance (less than 20 acres and 4 locations per section).

- **Vegetation Resources:** In vegetation communities that would be difficult to reclaim and are in country with greater than 8% slopes, surface disturbance would be limited to less than 20 acres and 4 locations per section. In vegetation communities with high wildlife values or rare vegetation communities, no surface disturbance would be allowed (roughly 0.6% or 1,500 acres). Silver sagebrush/bitterbrush communities would have limited surface disturbance. All these communities within crucial winter range failed the Standards assessment for the Upper Colorado River Basin (BLM, 2002c). These areas would continue to fail standards without additional development protection measures.

- **Range Resources:** To protect range resources, operators shall 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 allow planning specific to pastures or allotment boundaries to facilitate livestock planning. Construction specifications will be put in place to reduce dust.

- **Wildlife Resource Management :** In grouse brood rearing or nesting habitat and big game crucial winter range, surface disturbance would be limited (less than 20 acres, 4 locations per section, and roads would be limited to <3 miles/mi^2), based on programmatic standards recommended by the Wyoming Game and Fish Department. No surface disturbance would be allowed in severe winter relief habitats for greater sage-grouse; these areas are refuges, small patches of high sagebrush that generally will not drift in 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 visible from State, County or BLM roads (Appendix M: Areas Visible from Main Roads in VRM Class III): Drilling pads would not be located on ridgelines; Resource roads would not be located directly off these public roads, unless it is 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% slope (see Appendix L, for a description of low impact road design); Also in these same areas, pad sizes would be minimized by using pitless, shared pit or closed system drilling; Where topography would allow, interim reclamation for pits and pads would occur within one year of the spud date.

- **Sand Hills SMA:** This area is a popular hunting spot and is generally isolated from development. There is currently an extensive road network in this area, mostly two tracks. The gently rolling terrain has stabilized sand dunes and unique vegetation communities contribute to high wildlife values. This area would need reduced road densities and restrict some public access conditions, especially on newly constructed roads. To develop additional roads, operators would need to reclaim mile for mile current roads in the area, plus do reclamation on existing roads to reduce road density to 3 mile/mi^2. Fences would be converted to BLM standards for improved wildlife passage. Surface disturbance would be limited in silver sagebrush/ bitterbrush communities in addition to those identified for vegetation resources. No surface disturbance would be allowed within the 18 acres surrounding the historical JO Ranch buildings.

- **Cow Butte/Wild Cow SMA:** This area is a popular hunting spot and is generally isolated from development. There is currently an extensive road network in this area, mostly two tracks and improved dirt roads. Terrain is generally steep, with highly erosive soils. The area has high wildlife values due to the vegetation communities. Road

densities would not exceed 3 miles/mi^2. Development protection measures would reduce pad density. Fences would be converted to BLM standards for improved wildlife passage.

- **Historic Trails SMA:** Historical trails are a unique cultural resource documenting the difficult journeys made in the early West. Three trails are eligible for the National Register of Historic Places in the ARPA . These areas would receive the following development protection measures: Low impact road design would be used and interim reclamation would be completed within one year of the spud date on the well; no surface disturbance would be allowed within ¼ mile of contributing segments; road or pipeline collocation would be required and trail crossings permitted only in areas of previous disturbance. Extensive efforts would be made to minimize the visual impact and surface disturbance.

- **Upper Muddy Creek Watershed/Grizzly SMA:** Muddy Creek contains critical habitat for BLM sensitive fish species. The area is generally isolated from development, with almost no legal public access. There is currently an extensive road network in this area comprised of mostly two tracks. In general it has poor soils and high wildlife values. Current road densities and public access conditions would be maintained. To develop additional roads, operators would need to reclaim mile for mile current roads in the area, plus do reclamation on existing roads to reduce road density to 3 mile/mi^2. Fences would be converted to BLM standards for improved wildlife passage. Detailed planning, specific to this area would be required, and roads in general would require more mitigation and design than in other areas. Where slopes are generally steeper than 8%, no surface disturbance would be allowed (44% of the SMA in the project area). No new road crossings of Muddy Creek would be allowed.

2.3 FEATURES COMMON TO ALL ACTION ALTERNATIVES

The Proposed Action, Alternative B, and Alternative C have numerous actions in common. The Proposed Action and Alternative B anticipate up to 1,800 natural gas wells to coal formations, and up to 200 natural gas wells to conventional formations with a combined number of wells at 2,000. While Alternative C also analyzes up to 2000 wells, the precise number that can be approved under the Alternative may be less depending on the specific locations at which development is proposed. If site specific development proposals are outside areas with development protection measures, then it is likely that 2,000 wells may be drilled. Conversely, if proposals are received for drilling in areas with development protection measures, a lower number of wells may be approved and drilled.

Another similarity between the action alternatives is the timing and rate of gas well development. The annual number of wells to be drilled is detailed in Figure 4-6 Proposed Action Annual Drilling Assumptions by Well Type. 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.

All three alternatives envision the same ultimate extent of development. Coalbed Natural Gas (CBNG) resources would be extracted from those areas found to have natural gas in feasible and economic quantities. Development of natural gas from conventional formations would be similar under all three alternatives. Construction, location, and operation of facilities would be similar under the Proposed Action and Alternative B.

Surface disturbance amounts, both long term and short term, are envisioned to be similar under the Proposed Action and Alternative B. Reclamation timing and amounts, including short term, interim, and long term would also be similar for both alternatives. The number of wells per section would be up to 8 for the two alternatives.

All three alternatives require the sub-surface re-injection of produced water as a disposal method, with a limited surface discharge under permits issued previously by the State of Wyoming. No addition surface discharges are proposed under any of the alternatives. If alternative uses of the produced water are identified and proposed for use, they can be considered and approved separately under another NEPA analysis and decision.

2.4 FEATURES UNIQUE TO ACTION ALTERATIVES

Compared to the Proposed Action and Alternative C, Alternative B has unique provisions. Alternative B proposes that development within the ARPA occurs in three distinct phases, with construction activities limited to one of the areas at a time. Each of the three areas would be developed separately, and in turn, after construction of oil and gas facilities and interim reclamation in the preceding area is completed.

Compared to the Proposed Action and Alternative B, Alternative C's unique provisions are the use of development protection measures 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. Another example of sensitive resource values is found in areas where reclamation is expected to be difficult such and areas of high run-off potential and soils with excess salts. In addition, the extent and scale of the various development protection measures would limit surface disturbance and pad locations to 4 or less across broad expanses of the ARPA.

Compared to Alternative B and Alternative C, the Proposed Action would not have the phased development provisions of Alternative B, nor would development be reduced by the development protection measures provided for in Alternative C.

2.5 ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED STUDY

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

2.5.1 3,880 Natural Gas Wells from 3,880 Well Locations

During the scoping process, which was initiated in June of 2001, the Operators believed that a maximum of 3,880 gas wells from 3,880 well locations would be required to fully develop the ARPA. During the timeframe between scoping and the preparation of this EIS, BLM authorized a limited amount of exploration wells to allow for the acquisition of data necessary to determine which coals are gas productive, what density of wells is needed, which drilling and completion techniques are economical, and if dewatering of coals can be achieved.

The information obtained during interim drilling has provided technical data that indicates it would no longer be necessary to drill 3,880 wells at individual locations to fully develop the potential gas resources within the ARPA.

Definitive predictions on the final number of wells and timing of drilling operations are not currently possible due to the fact that the technical information being gathered by the exploration drilling has not been completed to date and this information would play a significant part in the evaluation and determination of the number of wells needed to economically and efficiently develop this gas reservoir in the Atlantic Rim Natural Gas Project area.

2.5.2 Directional Drilling

Requiring that the operators use directional drilling as a technique was considered. In a June, 2005 memorandum, the Reservoir Management Group (RMG) of the Wyoming Bureau of Land Management stated that extensive directional drilling does not appear to be a viable technical or economic alternative for natural gas extraction in the Atlantic Rim EIS area. Requiring the operators to use directional drilling throughout the project area was suggested in comments to scoping from the public, based on the premise that reduced numbers of wells, and corresponding roads, pipelines and infrastructure would reduce habitat loss and wildlife disturbance.

The Atlantic Rim project area contains areas where the amount of surface disturbance would be limited due to resource concerns, such as proximity to known sage grouse leks or areas where the slopes are greater than 25%. Operators planning development activities would be able to anticipate, or would be advised by the BLM at site specific on-site reviews, the location of those areas with surface occupancy constraints and design their projects accordingly. 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.

2.5.3 Produced Water Disposal and Treatment Options

Among the activities proposed by the operators is the re-injection of waste waters produced during development and operation of each gas well. Some of the produced water would be discharged in regulated tanks for the use of wildlife and livestock. Several alternatives to re-injecting water from coal and other geologic formations were considered. Alternatives to re-injecting the produced water include several disposal methods: Water treatment with discharge onto land surface; surface discharge without treatment; storage in evaporation / infiltration ponds; 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 waste water has varying concentrations of minerals and salts, and usually needs to be treated to make it usable or to meet water quality standards. For example under the Colorado River Salinity Pact, water discharged within the watershed must not add more than 1 ton per day of salts to the Colorado River system. If the local geology lends itself to re-injecting the produced water back into other geologic formations adjacent to or near the formations from which the gas was extracted then this is the preferred method of disposal. Other methods of disposal of produced water, especially when it must be treated or transported or both prior to disposal tend to be more costly and may have inherent logistical and engineering problems. Because of these reasons other alternatives for disposing of produced water were considered and eliminated from detailed study.

A portion of the proposed action for the ARPA is 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 State of Wyoming permits issued prior to the inception of the ARPA. Re-injection of produced water removes the water from coal seams and places it into geologic formations as permitted by the State of Wyoming. In this event surface impacts from the produced water are avoided, including in part 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 be come forward in the future. When and if such proposals come forward State of Wyoming approvals 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 the National Environmental Policy Act and the Federal Land Policy and Management Act.

A portion of the proposed action for the ARPA is 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 State of Wyoming permits issued prior to the inception of the ARPA. Re-injection of produced water removes the water from coal seams and places it into geologic formations as permitted by the State of Wyoming. In this event surface impacts from the produced water are avoided, including in part 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 be come forward in the future. When and if such proposals come forward State of Wyoming approvals 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 the National Environmental Policy Act and the Federal Land Policy and Management Act.

2.5.4 Powerlines and Electricification

The operators determined that it would not be economically feasible or practical at this time because of the lack of knowledge of exactly what lines and facilities would be needed and the exorbitant cost of construction of the infrastructure (powerlines, substations, etc.) to centralize facilities so this alternative was eliminated from detailed study. Any powerline proposals for above ground electrical distribution would require an additional NEPA analysis, either in the form of an EIS or EA, depending at least in part on the nature and extent of the proposal.

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Geology / Minerals / Paleontology				
Geology	Potential increased risk of mass movements, flooding, or accelerated erosion	Not significant	Same as PA	Similar to PA, but less due to steep slope restrictions
Minerals	Depletion of petroleum and CBNG reserves	Not significant	Same as PA	Same as PA
Paleontology	Potential for damage/destruction but also discovery of important fossils during construction	Not significant	Same as PA	Same as PA
Soils				
Potential for soil erosion, runoff, and sedimentation	Many areas would exceed significance criteria for soils	Impacts exceed significance criteria	Many areas would exceed significance criteria for soils	Some localized areas would exceed significance criteria.
Revegetation potential of disturbed soils	Low to moderate	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Removal/damage of biological soil crusts	Some crusts may be damaged/removed as a result of the Proposed Action	Some crusts may be damaged/removed	Same as Proposed Action	Fewer crusts may be damaged/removed
Water Resources				
Surface Waters				
Impacts to Waterbodies with Impairments or Threats on the State of Wyoming's 2004 303d list.	Increased sediment loads would lead to **significant** impacts to Muddy Creek west of State Hwy 789 and could lead to the relisting of many of the stream Muddy Creek segments.	Would **not** lead to significant impacts to waterbodies with impairments or threats.	Increased sediment loads would lead to **significant** impacts to Muddy Creek west of State Hwy 789 and could lead to the relisting of many of the stream Muddy Creek segments.	Due to development protection measures for SMAs and water resources, impacts to Muddy Creek listed segments would **not** likely be significant.

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Increased Salinity loads in the Colorado River System	Would increase salt loading above background conditions, impacts would be **significant**.	Salt loads would **not** increase measurably above background conditions	Would increase salt loading above background conditions, impacts would be **significant**.	Salt loads would be measurably higher, but are **not** likely to be significant.
Wetlands	Changes in hydrologic function in wetlands would occur, indirect impacts could be **significant**. Direct impacts would **not** be significant due standard mitigation to avoid these areas.	Would **not** lead to significant impacts to wetlands.	Changes in hydrologic function in wetlands would occur, indirect impacts could be **significant**. Direct impacts would **not** be significant due standard mitigation to avoid these areas.	Direct and indirect impacts are **not** likely to be significant due to development protection measures for water resources.
Stream Flow Characteristics	Changes in hydrologic function would occur, indirect impacts could be **significant**.	Would **not** lead to significant impacts to Streamflow characteristics.	Changes in hydrologic function would occur, indirect impacts could be **significant**, but are less likely than under the PA.	Impacts are **not** likely to be significant, since changes in hydrologic function are less likely to occur due to development protection measures for water resources
Changes in geomorphology due to increased surface runoff, erosion and increases in sediment loads.	Would occur in localized areas and cumulative impacts would be **significant**.	Would only occur in localized areas, impacts would **not** be significant.	Would occur in localized areas and cumulative impacts would be **significant**.	Due to development protection measures for SMAs and water resources, impacts would **not** likely be significant.

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Healthy Rangeland Standards for Water Resources	Wetland areas, water quality and watershed function would fail in areas due to indirect project impacts, impacts would be **significant**.	Could contribute to the failure of some areas, **not** likely to be significant.	Impacts would be focused and greater in individual areas, but for less time. Better planning may reduce impact, but is still likely lead to **significant** impacts.	Could contribute to the failure of some areas, **not** likely to be significant due to development protection measures for vegetation and water resources.
Ground Water				
Springs, seeps and artesian wells	**Not** likely to be significantly impacted some short-term reduction in flow in artesian wells.	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted some short-term reduction in flow in artesian wells.	**Not** likely to be significantly impacted some short-term reduction in flow in artesian wells.
Groundwater quality diminished	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted.
Depth to groundwater in permitted wells.	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted.	**Not** likely to be significantly impacted.
Range and Other Land Uses				
Range – Change in AUMs, animal death loss and disturbance to operations and management facilities	Increases in death loss; disturbance to management operations and facilities; reduced forage from dust and reduced productivity on a 1/3 of the area; increased erosion from roads that reduces productivity; likely reductions in livestock use, operators may suspend use; significant impacts	Impacts similar to PA but such small scale; not significant	Impacts sequential by regions; would initially affect specific operations at different times, but long-term impacts similar to PA, except operators likely to suspend use due to the intensity of development in the active area; significant impacts	Approximately 64 percent less disturbance to forage than PA; impacts from reclamation similar to PA, but mitigation for dust and erosion and overall less disturbance would reduce these impacts, mitigation would reduce animal death loss and require consultation; likely reductions/suspended use in pastures or small regions; long-term impacts would not be significant

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Vegetation				
Vegetation – erosion impacts from 1/3 ARPA with slopes > 8%, alkali sage sites	41% of ARPA affected by increased erosion from roads on moderate to steep slopes and alkali sage community prone to erosion; long-term loss of productivity cover and composition; significant impacts	Impacts similar to PA but such small scale; not significant	Impacts similar to PA; suspended grazing would lead to more rapid reclamation, greater ratio of grasses to shrubs; significant impacts	Reduced surface disturbance and additional mitigation for roads on these sites would create low impacts to vegetation; suspended grazing would lead to more rapid reclamation, greater ratio of grasses to shrubs; not significant
Riparian/wetland communities	Indirect affects from erosion and altered runoff patterns from adjacent uplands; significant impacts	These communities not impacted by IDP	Impacts similar to PA, significant impacts	Reduced surface disturbance and additional mitigation for roads on upland sites would reduce impacts to riparian/wetland vegetation; not be significant
Vegetation – direct loss due to disturbance and indirect impacts from dust	Long-term loss of shrubs on Wyoming and alkali sagebrush sites; 20 to 35% of forage lost or unusable do to dust; shifting antelope use and lead to long-term loss of plants and canopy cover; significant impacts	Impacts similar to PA but such small scale; not significant	Impacts similar to PA; significant impacts	Approximately 64 percent less disturbance to vegetation; construction and treatment of roads to reduce dust would create low impact to vegetation; may not be significant if overall browse use rate remains at moderate levels

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Vegetation – aspen and mountain shrub communities that failed Rangeland Health Standards	Additional disturbance from development would exacerbate the failed standard; increased difficulty in meeting this Standard in the future; long-term significant impacts	These communities not impacted by IDP	Impacts similar to PA; significant impacts	These communities would be avoided on public land with potential disturbance on private/State lands; significant impacts
Spread of weeds	Potential for spread or new infestation on disturbed sites is high to very high; impacts would not exceed significance criteria	Weed infestation has occurred on existing PODs and roads. Impacts exceed significance criteria	Potential for spread or new infestation on disturbed sites is high to very high and disturbed acreage is same as Proposed Action; Impacts would not exceed significance criteria	Potential for spread or new infestation on disturbed sites is high to very high, but development protection measures would reduce surface disturbance acreage by approximately 64 percent and reduced road densities would reduce acreage susceptible to infestation. Impacts would not exceed significance criteria.

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Wildlife				
Impacts to general wildlife habitat	Impacts on shrub dependant songbird nesting and foraging habitats would exceed the significance criteria. The impact to small mammals would not exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action; However development would be concentrated within one third of the project area at any one time during the construction phase.(5 to 6 Years)	Impacts would not exceed the significance criteria for small mammals and songbirds.
Impacts to greater sage-grouse and Columbian sharp-tailed grouse	The proposed action activities would exceed the significance criteria	The impacts would not exceed the significance criteria.	Same as the proposed action	Impacts would exceed the significance criteria
Impacts to pronghorn	This level of development would exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action	Direct and indirect impacts would not exceed the significance criteria.
Impacts to mule deer	This level of development would exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action	Indirect and direct impacts would exceed the significance criteria.
Impacts to elk	This level of development would exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action	Impacts would exceed the significance criteria.
Impacts to raptors	Impacts are not expected to exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action	Same as the Proposed Action

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Impacts to T&E, Proposed, and Candidate species	The impacts would not exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action	Same as the Proposed Action
Impacts to Sensitive species, except grouse, raptors, sagebrush-obligate songbird species above	The impacts would not exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as the Proposed Action	Same as the Proposed Action
Impacts to T&E fishes occurring downstream of ARPA	Project-related impacts are not anticipated.	Same as PA	Same as PA	Same as PA
Impacts to BLM sensitive fishes	Would exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as PA	The impacts would not exceed the significance criteria.
	Impacts would exceed the significance criteria.	The impacts would not exceed the significance criteria.	Same as PA	The impacts would not exceed the significance criteria.
Recreation				
Hunting and wildlife viewing	Displacement of wildlife and loss of a natural-appearing setting would make the ARPA undesirable for hunting or wildlife viewing. These visitors would be displaced and impacts would exceed significance criteria.	Not significant	Same as PA	Same as PA

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Camping	Impacts to scenery, noise, dust and human activity would reduce the ARPA's desirability as a place to camp; Impacts would be significant	Not significant	Same as PA	Same as PA
Access to ARPA	Impacts would be significant	Not significant	Same as PA	Same as PA
Traffic	Impacts would be significant	Not significant	Same as PA	Same as PA
Noise, dust and human activity	Impacts would be significant.	Not significant	Same as PA	Impacts would not be significant
Visual Resources				
Hunting, wildlife viewing, pleasure driving, mountain biking	Impacts would be significant	Not significant	Same as PA	Impacts would not be significant
Management Objectives for VRM Class III	Impacts would be significant	Not significant	Same as PA	Impacts would not be significant
Cultural				
Impacts to cultural resources as a result of construction activities	Estimate that 126 sites could be affected as a result of 15,803 acres of new surface disturbance.	None expected beyond those identified in the current POD EAs	Same as Proposed Action (over time)	Approximately 167 sites could be indirectly protected as a result of the elimination from development of the ¼ mile trail buffer. Limited access resulting in reduction of unauthorized site collection.

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Impacts to setting where it contributes to site eligibility	Estimate that a maximum of about 142,763 acres between the ¼ mile avoidance area and the 2 mile view shed buffer would be affected and subject to extensive mitigation measures.	None expected beyond those identified in the current POD EAs	Same as Proposed Action (over time)	Reduced surface disturbance would result in a reduction of visual impacts. Limited access resulting in reduction of unauthorized site collection.
Socioeconomics				
Compliance with RMP	YES	YES	YES	YES
Drilling/Field Development	2000 wells/20 years		Same as PA[a]	Could potentially be lower than PA if some areas are precluded from drilling because of environmental constraints
Economic Effects				
Direct Expenditures for Drilling/Field Development	$981 Million	None	Same as PA	Drilling expenditures could be higher for some wells depending on mitigation measures.
Total SW Wyoming Economic Impact Related to Drilling/Field Development	$1.25 Billion	None	Same as PA	Could be less than PA if fewer wells are drilled
Average Annual Jobs (Annual Job Equivalents) Direct, Indirect and Induced	578		Same as PA	Could be less than PA depending on reductions in wells and production
Total Economic Impact Related to Production	$ 6.4 Billion	None	Same as PA	Could be less than PA if fewer wells are drilled Same as PA

[a] Same as Proposed Action

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Impacts to other economic activities within the ARPA	Potential for reductions in grazing economy resulting from disturbance and resultant reductions in AUMs	None	Same as PA	Reductions in grazing could be lower than PA if total number of wells is reduced
	Potential for reductions in recreation/hunting economy.	None	Same as PA, except somewhat localized during activity in each zone.	Diminished potential for reductions in recreation/hunting associated with success of impact avoidance/mitigation measures
Employment, Population and Housing				
Peak Year Drilling & Production Employment	1,488	None	Same as PA	Could be lower than PA if fewer wells are drilled
Peak Year Population Impact	1,092	None	Same as PA	Could be lower than PA if fewer wells are drilled
Peak Year Housing Demand	441 Units (228 Temporary, 213 Longer-term)	None	Same as PA	Could be lower than PA if fewer wells are drilled
Local Government Facility and Service Demand				

Local Government Facility and Service Demand				
Local Government Facility and Service Demand	Most local government facilities have excess capacity.	None	Same as PA	Same as PA
	Some services may need to expand to accommodate Proposed Action-related growth.	None	Same as PA	Same as PA
	Carbon County should have adequate revenue to offset cost of increased service demand, but revenues may lag demand.	None	Same as PA	Same as PA

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
	Municipalities may not receive direct project-related revenues in sufficient amounts to offset costs of needed expansion	None	Same as PA	Same as PA
Federal, State and Local Revenues				
LOP[b] Property Taxes	$349 Million	None	Same as PA	Could be lower than PA if fewer wells are drilled
LOP County & Special District Share	$96 Million	None	Same as PA	
LOP Schools Share	$253 Million	None	Same as PA	
LOP Federal Mineral Royalties	$320 Million	None	Same as PA	
LOP State Wyoming Share FMR	$160 Million	None	Same as PA	
LOP Wyoming Severance Tax	$296 Million	None	Same as PA	
Drilling and Filed Development Sales and Use Tax	$10 Million	None	Same as PA	
LOP Total Property /Mineral Royalty / Severance / Sales and Use Tax	$975 Million	None	May delay revenue for those entities outside of active zones	
Local Attitudes Opinions and Lifestyles				
Change in attitudes/lifestyles for county residents and users of the ARPA	General support in county for development of resources but concern about change in relatively undeveloped landscape and resultant effects on grazing operations, recreation opportunities and change in character of the area.	None	Concern more localized during development of each zone.	Potential for reduced concern and dissatisfaction based on success of impact avoidance and mitigation measures

[b] Total over the life of the project

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Environmental Justice	ASK MARY! Economic benefits for poor agricultural communities median income improvement, infrastructure improvements			
Transportation				
Peak Year AADT[c] Carbon County Roads	Increased Traffic	None	Focused around active Zone	Could be lower than PA if fewer wells are drilled
CCR 605N (20 Mile Road)	184			
CCR 608 (Wild Cow Road)	230			
CCR 501 (Cherry Grove Road)	4			
Peak Year AADT Affected Highways	Increased Traffic	None	Focused around active Zone	Could be lower than PA if fewer wells are drilled
I-80 (Junction WY 789)	213 (96 trucks)			
WY 789 (Creston Jct. - Baggs)	240 (108 trucks)			
WY 70 (Dixon west)	42 (19 trucks)			
Impacts on County Roads	Additional maintenance costs to the county, offset by property tax revenues from production, but may be a lag between the time maintenance demand occurs and production-related revenues flow.	None	Same as PA except that maintenance demand would be localized around active zones	Same as PA
Coordinated Transportation Planning	Operators would participate in a coordinated transportation planning process, updated annually	None	Same as PA except that the transportation network would be more intensively planned for each zone, possibly resulting in a smaller road footprint.	Same as PA, except that the transportation network would be specifically designed to avoid areas with high environmental values

[c] Average Annual Daily Travel

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Health and Safety				
Occupational Hazards	Potential for accidents primarily involving project workers	None	Increased risk of occupational accidents associated with concentrations of activity in smaller area.	Could be lower than PA if fewer wells are drilled
Hazardous Materials	Increased potential for incidents involving hazardous materials accruing primarily to project workers	None	Same as PA	Could be lower than PA if fewer wells are drilled
Other Risks & Hazards	Increased potential for vehicle accidents involving both project workers and visitors, weather-related incidents involving project workers and wildfire incidents, and fire-arms related incidents associated with hunting near project activities	None	Increased risk of vehicle accidents associated with concentrations of activity in smaller area.	Could be lower than PA if fewer wells are drilled

Resource	Proposed Action	Alt A: No Action	Alternative B	Alternative C
Noise				
Construction	Drilling and field development activities would temporarily exceed 55 dBA threshold at drilling and construction sites. Exposure limited to project workers who are protected by noise regulations and, temporarily, to other visitors to the Project area.	None	Noise impacts would be focused within Active Zone	Same as PA
Production Operations	Workovers and other maintenance activities would temporarily exceed 55 dBA threshold, project workers would be the primarily group exposed other than brief exposure to visitors. Compressor stations would also exceed 55 dBA threshold, no compressor stations would be located near residences.	None	Same as PA	Same as PA