

APPENDIX A

SUMMARY OF SCOPING NOTICE COMMENTS AND BLM RESPONSES

The Scoping Notice was released for a 30-day public review period on October 17, 2004. Fifteen comment letters were received. The letters have been reviewed to determine whether the information they provided would warrant a determination other than a Finding of No Significant Impact (FONSI). Substantive comments with responses are summarized below (in italics) with the BLM responses to each immediately following the comment. The BLM would like to thank all commentors for taking the time to review the scoping notice and provide comments.

1. **Wyoming Game and Fish Department (WGFD)**

a. *Terrestrial Considerations:*

The project area lies primarily within the boundaries of the Bitter Creek antelope herd unit, south of Rock Springs mule deer herd unit, and the Petition elk herd unit.

Section 4.7.1.1.2 Big Game and page 5-17 section 5.3.7 discussed the Bitter Creek antelope herd and the elk herd unit. Activities associated with the construction phase would likely displace antelope and mule deer; however, once construction is completed they would likely habituate and return to pre-disturbance activity patterns.

b. *There are three (3) known sage grouse leks found within or adjacent to the project area.*

Section 4.8.2.1.2 and page 5-18 section 5.3.7 discusses the Greater sage-grouse and their leks. Greater sage-grouse within Lower Green River Basin Conservation Planning Unit would only be minimally impacted from the cumulative disturbance associated with the Proposed Action and other known foreseeable development provided the implementation of the NSO within ¼ mile of a lek, seasonal closures, reclamation, and committed mitigation measures are followed. Figure 5-6 shows sage grouse leks and a 2-mile buffer area in relation to the PRPA.

c. *Aquatic Conditions*

This project is adjacent to the North Fork of Vermillion Creek. The creek supports a population of Brook trout in the headwaters and a population of Mountain suckers and Speckled dace.

See section 2.2.11.2.6 and section 3.4 of the EA. All of the streams within the PRPA are ephemeral and, therefore, do not have

the potential to support BLM Wyoming state sensitive fish species on a year-round basis. Studies indicate that the non-game, native species may ascend ephemeral tributary streams to spawn. Thus, ephemeral drainages fed by runoff from the project area may provide habitat for sensitive fish on a seasonal basis only. No fisheries mitigation is needed beyond that indicated under Water Resources and Special Status Species Fish.

2. **Petroleum Association of Wyoming (PAW)**

- a. *Address socio-economic impacts and the positive affects the project will have for the State of Wyoming. A section should discuss the “local economy” significance criteria.*

Section 3.2 discusses the socioeconomics of the project. A detailed analysis of Sweetwater County population, employment, earnings and personal income trends through the year 2000 has been developed by the joint efforts of the Sonora Institute and the BLM. This is the most current information available. The socioeconomic technical support document will be made available for review at the Rock Springs Field Office.

- b. *Identify reasonable alternatives that should be evaluated once determined the level of analysis for the project.*

Two alternatives in chapter 2 were considered in detail; Proposed Action Alternative and No Action Alternative. The decision to include a description of other alternatives, section 2.1 page 2-1, were considered but not analyzed in detail, an option in an EA format (BLM Handbook H-1790-1) after preliminary investigation. In this case, the IDP does limit the range of reasonable alternatives considered, because its goal is to limit activity to only those areas where it is believed that significant adverse environmental impacts would not occur. The policy precludes the need for other development alternatives.

3. **Wyoming State Historic Preservation Office (SHPO)**

- a. *Assure the project is conducted in accordance with Section 106 of the National Historic Preservation Act and Advisory Council regulations 36 CFR Part 800. These regulations require survey, evaluation and protection of significant historic and archeological sites **prior** to any disturbance.*

Section 2.1.11.2.15 Cultural Resources page 2-31 addresses primary mitigation activities.

- b. *Provided the BLM follows the procedures established in the regulation, we have no objections to the project. Specific comments on the project's efforts on cultural resource sites will be provided to the BLM when we review the cultural resource documentation called for in 36 CFR Part 800.*

Thank you for your comments.

4. **Sweetwater County Board of County Commissioner**

- a. *Strongly support the development of the Pacific Rim Project. Strongly encourage Warren E&P, Inc. to obtain all necessary permits and to develop this project in an environmentally sound manner.*

Encourage the BLM to work with the State of Wyoming and the oil and gas companies to ensure that water quality, quantity and disposal issues are addressed in a manner that meet the present and future needs of Sweetwater County.

Section 2.2.1 Preconstruction Planning and Site Layout details permits and requirements necessary by the state and BLM for production within the PRPA.

- b. *Community Infrastructure*
Address socio-economic data related to the cumulative effects of the existing and the proposed oil and gas field developments within the Rock Springs and Rawlins BLM Resources Area.

Some of the socio-economic issues that need to be assessed include: workforce demographics, housing, education, emergency services, health care, child care and others.

Local government officials and community leaders in Sweetwater County and Rock Springs are currently working to identify current and future impacts of natural gas-related growth on housing resources, on local facilities and services and on local government fiscal conditions (Gordon 2004). They plan to enlist State government and the natural industry in an effort to plan for and accommodate the industry-related growth (p. 5-25).

Also see response 2a.

5. **U.S. Department of Interior Fish and Wildlife Service (USFWS)**

- a. *Bald Eagle*: *In order to reduce potential adverse effects to the bald eagle, a disturbance-free buffer zone of 1 mile should be maintained around eagle nests and winter roost sites. Activity within 1 mile of an eagle nest or roost may disturb the eagles and result in take. Activity should be conducted outside of February 15 through August 15 to protect nesting birds and November 1 through April 15 to protect roosting birds.*

Section 4.8.1.1.22 page 4-34 identifies a no effect to bald eagles. This type of habitat is not present on the project area, therefore, bald eagles are not expected to nest there. Bald eagles may utilize the project area during winter months when big game species are more concentrated on winter ranges. However, the area does not support concentrated use by bald eagles and bald eagle use of the project area is likely incidental. Therefore, the Proposed Action is not expected to impact bald eagles.

- b. *Black-footed Ferret: Surveys are recommended even if only a portion of the town or complex will be disturbed.*

Section 4.8.1.1.22 page 4-34 indicates it is estimated that 37.3 acres of white-tailed prairie dog colonies would be disturbed under the Proposed Action. This amount of disturbance to prairie dog colonies would be a minor impact and would not result in significant effects upon the value of the colonies as potential future reintroduction sites. No impacts to black-footed ferrets would occur provided avoidance and mitigation measures outlined in this document and the RMP are implemented. Included in Appendix G is a copy of the black-footed ferret survey performed by Haden-Wing.

- c. *Ute ladies'-tresses: A perennial, terrestrial orchid and blooms from late July through August, however, depending on location and climatic conditions, it may bloom in early July or still be in flower as late as early October. A survey should be conducted by a knowledgeable botanist.*

Section 4.8.1.1.4 page 4-35 addresses plant species. No suitable habitat for Ute ladies'-tresses occurs within the PRPS. The likelihood of Ute ladies'-tresses occurring on the PRPA is extremely low and no impacts to this species are expected under the Proposed Action.

- d. *Consultation: Determine if a biological assessment is necessary, if so be in compliance of section 102 of NEPA and incorporate into the NEPA document. The Service would appreciate the opportunity to review any such determination document. If necessary, a BA should be completed within 180 days of receipt of a species list.*

Consultation between FWS and BLM was conducted and it was determined that there was no effect to wildlife. A coordination and consultation letter is incorporated in Appendix D.

- e. *Interrelated/Interdependent Effects: BLM should develop measures to avoid or minimize impact to listed species on non-Federal lands that would occur as a direct or indirect result of the project.*

Section 4.7.1 page 4-28 discusses direct and indirect impacts from the proposed action. No long-term adverse impacts are expected.

- f. *Yellow-billed Cuckoo: The Cuckoo is a candidate for listing as threatened or endangered and may occur in riparian area west of the continental divide in Wyoming.*

Section 4.8.1.1.2 page 4-35 addresses the Yellow-billed Cuckoo and due to the lack of adequate habitat on the project area and the fact that no records of yellow-billed cuckoo are documented within six miles of the project area (WGFD 2003a, WYNDD 2003) it is unlikely that the yellow-billed cuckoo occurs on the project area. No adverse impacts to this species are expected from implementation of the Proposed Action.

- g. *Migratory Birds: If nesting migratory birds are present on, or near the project area, timing is a significant consideration and needs to be addressed in the project planning.*

Consider sensitive species or species at risk in the project.

Section 4.7.1.1.4 page 4-33 indicates habitat for waterfowl and shorebirds is very limited in the project area. It is expected that the PRPA would not have significant impact.

Activity status of raptor nests will be checked prior to well development. If new raptor nest sites are located on the project area appropriate avoidance and mitigation measures would be taken to avoid significant impacts.

Although sensitive species have no legal protection under the ESA, the BLM and FWS still maintain an active interest under BLM Manual 6840.

- h. *Mountain Plover: The Service has withdrawn the proposal for listing and we will no longer be reviewing project impacts to the species. The BLM is encouraged to continue providing protection for this species as under the MBTA.*

Section 4.8.2.1.2 page 4-37 indicated no mountain plover were recorded within the 6-mile buffer of the project area. No mountain plovers were observed on the PRPA during the surveys in the fall of 2003. If the species is located, no impacts to mountain plovers are expected provided that avoidance and mitigation measures outlined in this document and the RMP are implemented. Although sensitive species have no legal protection under the ESA, the BLM and FWS still maintain an active interest under BLM Manual 6840.

- i. *Sage Grouse: Suggest BLM work with the local WY Game and Fish biologist to identify important sage grouse habitat with the project area, and appropriate mitigative measures to minimize potential impacts from the proposed project. No project activities that may exacerbate habitat loss or degradation should be permitted in important habitats.*

BLM and WGFD did consult on wildlife issues. During the comment period WGFD replied to the scoping notice and sent comments. Summary of those comments and reply are listed in Appendix A 1a – 1c.

If important breeding habitat (leks, nesting or brood rearing habitat) is present in the project area, the USFWS recommends delaying the project until after July 31.

Section 4.8.2.12 page 4-37 addresses sage grouse. Necessary steps and mitigation will be taken to ensure impacts to these areas, especially leks and nesting area are minimized. Informal consultation has been initiated between BLM and FWS. A no effect determination has been decided. Consultation letters are attached in Appendix D.

- j. *Wetland and Riparian Area: Plans for mitigation unavoidable impacts to wetland and riparian areas should include mitigation goals and objectives, methodologies, time frames for implementation, success criteria, and monitoring to determine if the mitigation is successful. The mitigation plan should also include a contingency plan to be implemented should the mitigation not be successful.*

Section 4.5.1.1.1 page 4-24 indicates the probability of well pads, roads, or pipelines impacting these resources are low. Permits under Section 404 of the Clean Water Act would be required for any activities in wetlands or waters of the United States. Warren would be required to demonstrate to the COE that there are no “practical alternatives” to placement of a well location in a wetland. The probability of impacting wetlands and other waters of the U.S. under the Proposed Action is low given the xeric nature of the PRPA and identified mitigation procedures as stated in Chapter 2 (Sections 2.2.11.2.5-6-7 & 8), Warren’s APD stipulations, the RMP, COE and BLM surface-disturbing guidelines.

6. **Biodiversity Conservation Alliance**

- a. *Propose project is slated for Roadless Lands Proposed for Wilderness Status. The propose project falls within the Kinney Rim North citizens*

proposed wilderness, which has wilderness qualities, recognized by the Citizens' Wilderness Inventory of the Kinney Rim North Unit.

Two response letters were sent to Erik Molvar of Biodiversity Conservation Alliance (BCA) concerning this proposal, July 22, 2002 and January 2, 2003, of the Kinney Rim North Unit. In summary it stated that in February of 2002 the Rock Springs Field Office (RSFO) received two reports from BCA. The first report was titled *A Citizens Wilderness Inventory of Kinney Rim South* and the second report was titled *A Citizen's Wilderness Inventory of Kenney Rim North* (citizen's report). We updated our inventory and added these reports to our permanent files.

The public lands you included in your citizen's reports for both Kinney Rim North and Kinney Rim South were reviewed in 1980 for wilderness characteristics and were considered *not* suitable for further wilderness study. In years since, these public lands have been managed in accordance with the requirements and guidance contained in the applicable land use plans, most recently the Green River Resource Management Plan (GRRMP, 1997) for the RSFO administrated lands. These areas are still considered not suitable for further wilderness study. On-going oil and gas development in the PRPA remains in conformance with the GRRMP.

A copy of the Wilderness Inventory and Study Procedures of the Kinney Rim North unit has been made available in Appendix F.

- b. *Comment on project design, including but not limited to exact well locations, which in fact determine the overall environmental impact on various other lands uses and/or resources.*

Section 2.2.1 page 2-2 details the project preconstruction plan. These are detailed plans and instructions to prevent any significant impacts to the environment.

Exact well location can not be identified at this time but all procedures, practices, and mitigations will be utilized for less environmental infractions.

- c. *Specific Concerns:*
Cumulative impacts taking into consideration the oil and gas development on surrounding lands.

Yes. Chapter 5: Cumulative Impact Analysis analyzed the potential impact of surrounding projects including a map identifying locations of other developments in the area (page 5-10 Figure 5-1). Table 5-1 page 5-2 estimates approximate acreage of surface disturbance on federal lands.

This analysis should address habitat fragmentation on a landscape scale, taking into account the overall ranges of individual wildlife populations (i.e., antelope herd population from the Bitter Creek Herd, sage grouse populations in the entire Red Desert).

Section 4.7 and 4.8 addresses Wildlife, Special Status Wildlife, Fish and Plant Species including No Action Alternative, Mitigation and Residual Impacts.

The initial development disturbance is approximately 497.5 acres of general wildlife habitat. Including reclamation and the life-of-the project, disturbance is reduced to approximately 153 acres. Grasses and forbs are expected to become established within the first several years following reclamation. More time would be required to achieve reestablishment of shrub communities. Consequently, disturbance of shrub communities, particularly mixed shrub communities that big game utilize during winter, would result in a longer recovery period (page 4-28).

Total disturbance associated with big game seasonal ranges are estimated on page 4-31 Table 4-14.

Under the Proposed Action, approximately 194 acres of habitat located within two miles of active sage grouse leks would be disturbed. This equates to approximately 0.6 percent of available sagebrush habitat in the PRPA, or 3.6 percent of the likely nesting area (section 4.8.2.1.2 page 4-37).

The effect the water withdrawals will have on the 4 species (?) of endangered fishes downstream in the Colorado River system.

Section 4.8.1.1.3 page 4-35 addresses water depletions and Colorado River. It is estimated that 4,500 barrels of water would be needed to drill and complete each well. For conservation purposes, water used to drill one well may also be reused for drilling subsequent wells.

The FWS has determined that progress made under the *Recovery and Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (RIP)* has been sufficient to merit a waiver of the mitigation fee for depletions of 100 acre-feet per year or less (Memorandum dated March 9, 1995 to Assistant Regional Director, Ecological Services, Region 6, from Regional Director 6, "Intra-Service Section 7 Consultation for Elimination of Fees for Water Depletions of 100 acre-feet or Less from the Upper Colorado River Basin"). The Proposed Action would deplete approximately 69.6 acre-feet of water during the 2-4 year

development period, and thus a mitigation fee waiver would be applicable. According to FWS this minor level of water depletion would not result in impacts to the endangered fish found downstream of the PRPA.

How will produced water be disposed of?

Produced water from individual wells would be collected and re-injected in approved and permitted disposal wells located in the project area (WDEQ/WQD). Produced water would be injected into water disposal wells, therefore, produced water is not expected to have any impacts upon the endangered species found downstream from the PRPA. The water disposal wells would be drilled through the Lance, Lewis shale, Almond, Ericson, and Rock Springs Formations, stopping at the top of the Blair Formation. (section 2.2.6.1 page 2-15 and section 4.8.1.1.3 page 4-35). A typical water disposal facility is shown on Figure 2-7.

d. *Impacts on Wildlife:*

Vehicle traffic with associated noise and dust.

Transportation impacts would occur primarily on WYO 430 and SCR 4-21, 4-77 and 4-19. Impacts would also occur on operator-maintained roads within the PRPA increasing average-annual daily traffic over a six-month day drilling cycle. On Federal lands, Warren would initiate immediate abatement of fugitive dust by application of water, chemical dust suppressants, or other measures to lessen the effect (page 2-25).

Noise impacts can modify animal behavior (see Section 4.7 for a discussion of the potential noise impacts to wildlife resources). The magnitude of noise impacts are contingent on a number of factors including the intensity and pitch of the source, air density, humidity, wind direction, screening/focusing by topography or vegetation, and distance to the observer. Noise impacts created by these activities are short term, lasting as long as drilling, construction or field maintenance activities are performed at well sites, access roads, pipelines, and ancillary facilities (Section 4.15 Noise, page 4-62).

Impacts on habitat use:

Sage Grouse and lek sites: *Survey the project area for sage grouse leks, nesting and brood-rearing habitat occurs in the immediate vicinity of lek sites. No construction activities should be allowed within 2 miles of a lek site.*

Response 5i addresses sage grouse – Thank you.

Survey for sage grouse wintering habitats: Stipulations prohibiting all human activities and noises (such as working pumps) during the winter seasons.

This is not a year round project. Section 4.8.2.1.2 addresses sage grouse with mitigations in Appendix B and Appendix C
Response 5i also addresses sage grouse.

Compressor stations: Facilities should not be built no closer than 2 miles from lek site.

No construction activities would be allowed within .25 miles of existing sage grouse leks.

Raptor nesting: Potential habitat for Ferruginous hawks, Golden eagles, Prairie falcons, and others.

See section 4.7.1.1.5 Raptors page 4-33.

Raptor nesting needs to be documented, and human activities must not occur within 2 miles of active nests during the nesting season.

Activity of raptor nest within one mile of the PRPA was not recorded in 2003, but will be determined prior to well development. Figure 5-7 shows raptor nests and a one-mile buffer area in relation to the PRPA. Protective measures will be implemented to limit disturbance (page 5-18).

Mountain Plover: Survey for nesting habitat during the brief period in spring when plovers are visible.

No mountain plover were recorded within the 6-mile buffer of the PRPA nor were they observed during the surveys in the fall of 2003 (WGFD 2003a or WYNDD 2003). Impacts to mountain plovers would be minimized by avoiding construction activities in suitable plover nesting habitat during the nesting period from April 10 -July 10, and/or avoiding surface disturbance within areas of potential mountain plover habitat the remainder of the year.

No impacts to mountain plovers are expected provided that avoidance and mitigation measures outlined in this document and the RMP are implemented (section 4.8.2.1.2 page 4-37).

White-tailed prairie dogs: The impacts of the proposed project on prairie dogs and direct effects on the latter species must be studied.

Section 4.8.1.1.1 page 4-34 addresses White-tailed prairie dog with Black-footed Ferrets. Prairie dog towns within the PRPA were

mapped during the fall of 2003. Where possible, project developments should avoid white-tailed prairie dog colonies.

Must consider impacts to other wildlife that may be found in the project area: Short-horned lizard, Pygmy rabbit, rare and declining shorebirds.

Section 4.8.2 page 4-37 address Sensitive Wildlife, Fish, and Plant Species, including those with potential habitat within the PRPA. Habitat for waterfowl and shorebirds is very limited on the project area. Given mitigation measures for water resources identified in the EA and in the RMP, it is expected that the Proposed Action would not have significant impacts upon waterfowl or shorebirds.

Wild Horses: Effects the project has on the horse and their area.

Surface disturbing activities associated with the construction of well pads, reserve pits, and roads could adversely affect wild horses. BLM standards for reclamation of disturbed sites are adequate to mitigate any potential adverse effect on wild horses due to vegetation removal. Effects of the Proposed Action would be temporary, as the vegetative conditions on most sites are ultimately reclaimed and return to pre-existing levels.

Indirect impacts of the proposed project on wild horses may result from increased human and vehicle activity that may increase the potential for horse/vehicle collisions. However, if Warren advises project personnel regarding appropriate speed limits on designated access roads as specified in Chapter 2, and these instructions are complied with, the likelihood of horse/vehicle collisions would be minimized.

Game Animals:

Mule deer

Antelope

Crucial winter range; must be identified, on permanent facilities (roads or drilling pads) should be built. All human activities must be prohibited on such lands between November 15 through April 15.

See section 4.7.1.1.2 which addresses Big Game and Crucial Range. It is estimated that 1 or 2 wells may occur within this area of crucial big game overlapping habitat, resulting in disturbance of 3.5 - 7 acres of habitat (0.5% - 1%). Table 4-14 page 4-31 displays percentages of each type disturbed with a summary of the acres impacted. BLM standard seasonal stipulation according to the GRRMP will be upheld.

Increase in salinity and sodicity associated with well-water discharge possibly damage to plant and animal life in the area.

No test water would be discharged unless such water meets Section 404 and the CWA standards. Test water not needed for drilling operations that meets water quality standards would be disposed of onto undisturbed land having vegetative cover or into an established drainage channel in a manner as to not cause accelerated erosion. Site erosion and off-site sedimentation would be controlled by promptly revegetating surface disturbance in the first appropriate season (fall or spring) after drilling, and providing surface water drainage controls, such as berms, sediment collection traps, diversion ditches, and erosion stops as needed. These measures would be described in the individual APD/ROW (pages 4-17 and 4-18).

Effects of the dewatering of aquifers must be adequately addressed.

The areal extent of drawdown within the coal aquifer due to the removal of water for the shallow gas project was estimated using an aquifer analysis model that is based on equations describing transient flow to pumping wells developed by Theis (1935). This model provides a conservative prediction of the potential drawdown resulting from groundwater pumpage at a well or group of wells. The assumptions used with this model are that the aquifer is isotropic (aquifer properties do not vary with direction), homogeneous (aquifer properties do not vary with location), of infinite areal extent, and lies horizontally. In order to present a conservative estimate, the model simulated these 120 wells pumping five gpm continuously for a period of 20 years. The resulting average extent of drawdown was then contoured, as shown in Figure 4-1 (pages 4-19 and 4-20).

Will the dewatering of the target aquifer affect the season during which Vermillion Creek carries water over the long term?

Section 4.4.1.1.1 discusses surface water and section 4.4.1.1.2 discusses ground water. Well drilling and completion should not have an adverse effect on groundwater quality.

Area should be surveyed for rare native plants and mitigation measures.

No federally listed threatened, endangered, or candidate plant species are known to occur on the project area, therefore there would be no impacts to these species. Although no suitable habitat for Ute ladies'-tresses occurs on the PRPA, the proximity of known populations in Utah requires field surveys for the plant in Sweetwater County to meet FWS and ESA Section 7 requirements

for Environmental Assessments (Glennon 2004). The nearest BLM sensitive species (Nelson's milkvetch) population is located about 10 miles from the project area. Potential impacts to plant species of special concern would be minimized assuming construction, maintenance and operation of well pad sites and associated disturbances are in accordance with Chapter 2 of this EA, Warren's APDs stipulations, and FWS/BLM requirements.

Shoshone, Comanche, and Ute tribes should be consulted regarding potential cultural and/or sacred significances of the project area.

Tribal chairmen have been notified of the Pacific Rim project by way of the initial scoping notification. Advisory Council regulations for Historic Preservation (36 CFR 800.9) are used by the BLM to assess effects to sites deemed eligible for nomination to the National Register. Avoidance is preferred and is achieved through redesign of a project, elimination of the project, or minimizing impacts. Tribes are consulted to verify significance of findings. Mitigation of adverse effects to properties would be accomplished by the documentation of physical remains.

EA should include all possible measures to prevent adverse environmental impacts due to toxic substances used and/or disposed.

Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), would be transported and /or disposed of in accordance with all applicable federal, state, and local regulations. Chemical and hazardous materials would be inventoried and reported in accordance with the Superfund Amendments and Reauthorization Act Title III and 40 CFR 335. The appropriate Section 311 and 312 forms would be submitted at the required times to the State and County Emergency Management Coordinators and local fire department.

***Reclamation;** the use of native species for reseeding purposes. Soil potential for revegetation must be evaluated.*

Appendix E identifies the RSFO standard seed mix required.

Effects of the project on biological soil crusts. These soil crusts, consisting of bryophytes, cyanobacteria, fungi and lichens, and mosses, fulfill a role in desert ecosystem.

The amount of cumulative impact upon the soil resources would be minimal, provided that all mitigation and avoidance measures are implemented. Regulations require that certain permits/authorizations be obtained for project implementation including a NPDES permit (needed for surface discharge);

development of a surface runoff, erosion, and sedimentation control plan; oil spill containment and contingency plan; as well as CWA Section 404 permits. Given these conditions, adverse sedimentation is not expected to occur as a result of the implementation of the Proposed Action (section 4.3.1.1 and section 4.4.1.1.1).

Require a 500-foot buffer for vegetation, between surface disturbances and drainage channels, playas, and wetlands. Requirements to avoid stream channels and riparian vegetation need to be ironclad.

Identified in Appendix C-4 under section 4.4.

All reserve pits must always be lined with impermeable fabric, because they will contain hazardous chemicals.

Reserve pits would be lined as needed with impermeable liner to prevent seepage. Bentonite or synthetic lining would be used where appropriate as defined during the APD review (page 4-17).

***Alternative:** The use of "pitless drilling" techniques, which entail closed-loop systems for drilling fluids and therefore don't require reserve pits, should be analyzed in detail; we urge their use for all wells.*

The costs associated with contracting, operating and transporting a "closed loop" system render it uneconomical for our proposed coal bed methane gas wells. Warren E&P utilize a small reserve pit lined with an impervious (plastic/vinyl) liner in order to prevent drilling water loss through seepage.

The need to employ directional drilling technologies to reduce environmental impacts of mineral development is a high priority of the Bush administration.

Cluster drilling from a single well pad (French Oil and Gas Association 1990) can reduce the footprint of oil and gas development on the landscape by concentrating the activity and impacts of many wells at a few widely dispersed sites.

Directional drilling, in its several forms, has been shown to be remarkably versatile as an alternative to conventional vertical drilling in recovery.

Directional drilling is also applicable to coalbed methane production, but drilling rig placement may be constrained by rock jointing and fracture patterns (Moore and Moore 1999). O'Rourke et al. (1997) found horizontal drilling of paired wells to be effective in gas production using steam injection techniques.

Directional drilling is proven as an effective alternative to vertical drilling in Wyoming. Even if the costs of directional drilling are higher for the project, the BLM should require the project proponent to employ this method.

These alternatives were discussed in section 2.1 pages 2-1, 2-2. Horizontal or directional drilling might allow the clustering of surface facilities; however, this alternative has not been considered and not analyzed in detail with reasons indicated in the EA.