

impacts; see Section 4.2.4 for an evaluation of impacts to water resources from these materials.

Drilling Muds

Drilling muds may contain various contaminants such as mercury, cadmium, arsenic, and hydrocarbons, among others. Drilling mud is typically not removed from the site. Up to 2,000 cubic yards of drilling mud per well may be air-dried and buried at each drill pad. The mud pits are typically unlined, which would allow some seepage. However, to protect sensitive riparian and aquatic habitats within the Planning Area, all operations would be required to either line the burial pits and limit the disturbed area to the area of the pad, or haul the material offsite for disposal in an approved facility.

Produced Water

Produced water is highly saline and may contain other dissolved solids or contaminants. Tanks, wellheads, piping, other structures, evaporation ponds, and transport trucks have the potential to release produced water. This could occur as a result of an accident, tank or pipe failure, or pond breach or failure. To reduce these potential risks — including the presence of dissolved constituents at concentrations harmful to vegetation or above standards for aquatic life and stock watering — drilling operations in watersheds atop the plateau would be required to use a self-contained operation in which the produced water is reused onsite and either disposed onsite by reinjection or offsite by containerized transport to a regulated facility such as Black Mountain.

Other potential releases could result from leaking tanker trucks, onsite tanks, and evaporation ponds. The average wellhead condensate tanks typically hold 300 barrels per wellhead, and produced water tanks generally hold between 200 to 300 barrels per wellhead. Transport trucks range in capacity from 60 to 120 barrels. Produced water typically contains about 10 percent condensate. Tankers and/or ponds can contain more than 25 gallons of natural gas condensate at any given time. BLM

requires reporting of brine releases that exceed 100 barrels.

Refer to Section 4.2.4 (Water Resources) for a discussion of impacts of these types of spills.

Indirect, offsite, and cumulative impacts may result from hazardous materials spills occurring at facilities not regulated by BLM, including RCRA/Hazardous Waste Notifiers (see Table 3-34). Additionally, the EPA National Response Center (NRC) has been notified of 9 known releases in the study area. Impacts of spills are highly dependent on the type and amount of material, and the location of discharge (see Section 4.2.4 for an impacts analysis of spills).

4.5.13 Renewable Energy

No development of renewable energy is currently anticipated for the Planning Area. Section 3.5.13 includes a discussion of the low potential of the Planning Area for wind generation. However, thinning of timber for fire risk management or removal of timber in conjunction with construction of oil and gas well pads, pipelines, and new or widened access roads could be used as a fuel source if biomass energy generation becomes a reality during the life of this RMP Amendment.

4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Any project involving significant changes in land use and management results in the consumption of one or more resources — materials, fuel, and monies — during and after its implementation. Thus, the land use and management activities incorporated into the 5 alternatives analyzed as part of this RMPA/EIS would result in permanent loss of resources within or intricately related to the Planning Area. Potential irreversible and irretrievable commitments are noted throughout the appropriate sections of the impact analysis in this chapter and are summarized below.

Although the various resource-specific sections of Chapter 4 use quantitative measures to assess anticipated impacts, these are only estimates. The exact nature and extent of any irreversible and irretrievable commitment of resources cannot be defined due to uncertainties about its location, scale, timing, and rate of implementation, as well as its relationship to other actions and the effectiveness of mitigation measures. Therefore, the summary below is qualitative only.

- **Mineral Resources** – Future oil and gas development anticipated under all 5 alternatives would result in capture of a portion of the total reserves underlying Federal lands in the Planning Area. These captured resources are non-renewable and would be unavailable for extraction and use by future generations. Portions that would not be recovered during the 20-year period of analysis, given the surface and downhole spacing assumed in the RFD (Appendix H), the current recovery efficiency, and the limitations on leasing and surface occupancy, would remain available for future extraction.

Other energy resources within the Planning Area, including oil shale, coal, and coalbed natural gas, are not expected to be developed during the 20-year period of analysis of this RMPA/EIS (see Table 2-1). It is not known to what extent the construction of numerous (855 to 1,582) wells under Alternatives I through V would interfere with future (post-oil and gas) development of these other resources. It is expected that the presence of the wells would complicate but not prevent future development.

- **Paleontological Resources** – Future oil and gas development and other ground-disturbing activities could result in permanent destruction of some fossil resources. However, special stipulations to protect high-value resources, and monitoring and mitigation requirements outlined in this RMPA/EIS would reduce the potential extent of this impact and could bring additional fossil resources to light.

- **Vegetation Resources** – Some areas of essentially native vegetation would be lost or permanently altered during construction of roads, oil and gas wells, and other ground-disturbing activities. Special stipulations to protect high-value resources, and monitoring and mitigation requirements outlined in this RMPA/EIS, would be implemented to reduce these losses. However, any unavoidable losses would be essentially permanent, even with the best currently available revegetation technology, because of the long time period (many decades to centuries) required for full recovery of the natural assemblage of species, habitat components, and ecosystem functioning that make specific resource areas unique. Some of these impacts could never be reversed, especially those that eliminate genetically unique resources represented by local populations of rare or disjunct species.
- **Fish and Wildlife Resources** – Some areas of high-quality wildlife habitat would be lost or permanently altered during construction of roads and oil and gas wells, and other ground-disturbing activities. Special stipulations to protect high value resources, and monitoring and mitigation requirements outlined in this RMPA/EIS, would be implemented to reduce these losses. However, any unavoidable losses would be essentially permanent, even with the best currently available habitat restoration technology, because of the long time period (many decades to centuries) required to restore the natural assemblage of species, plant-soil and plant-animal interactions, and ecosystem functioning that make specific resource areas unique. Some of these impacts could never be reversed, especially those that eliminate genetically unique resources represented by populations of rare or disjunct species such as genetically pure Colorado River cutthroat trout.
- **Visual Resources** – Some high-quality scenery and views would be lost or permanently altered due to construction of roads and oil and gas wells, and other ground-disturbing activities. Removal of

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vegetation, creation of artificial lines, and dramatic changes in color, form, and texture would be unavoidable. Special stipulations and the mitigation requirements outlined in this RMPA/EIS would be implemented to reduce these losses. However, any unavoidable losses would be essentially permanent, even with the best currently available habitat restoration technology.

- **Cultural (Archaeological) Resources** – Future oil and gas development and other ground-disturbing activities could result in permanent destruction of some cultural resources. Special stipulations to protect high value resources, and the monitoring and mitigation requirements outlined in this RMPA/EIS would reduce the potential extent of this impact and could bring additional cultural resources to light.
- **Sociologic and Economic Resources** – Implementation of any of the 5 alternatives would result in a permanent commitment of monies, in both the public and private sectors, in pursuing the objectives of each alternative and providing the infrastructure needed to serve the resultant population growth. Once spent, these monies are not available for other uses.

Implementation of Alternatives II through V (and, to a lesser extent, Alternative I) would cause an irreversible and irretrievable change in aspects of the environment, affecting quality of life. The anticipated changes, including loss of solitude and rural character, are not viewed as uniformly “good” or “bad” by individuals interviewed as part of this RMPA/EIS. However, all

individuals contacted agreed that change would occur beyond that likely without the RMP Amendment. That is, the amendment would hasten quality-of-life impacts that are occurring anyway. Certainly the deferral of oil and gas leasing and development on top of the plateau under Alternative III would delay the onset of change in the portion of the Planning Area that is of greatest overall concern to most interviewees and local governments.

- **Wilderness Characteristics** – Future oil and gas development and other ground-disturbing activities could result in permanent loss of individual wilderness characteristics and would be a permanent loss of wilderness character as a whole. Roadless areas over 5,000 acres, naturalness, outstanding opportunities for solitude and primitive and unconfined recreation would be irretrievably compromised within the units analyzed in this RMPA/EIS. Any losses would be essentially permanent even with the best currently available restoration technologies.

Other types of impacts — both negative and positive — would result from implementation of one or a combination of the five alternatives. However, these other impacts would involve renewable resources such as air and surface water and would occur with or without the selected RMP Amendment (grazing, recreational use) or would not be permanent (e.g., precluding leasing for oil shale during the life of the plan).