APPENDIX 5—FLUID MINERAL BEST MANAGEMENT PRACTICES

Best management practices (BMP) are innovative, dynamic, and economically feasible mitigation measures applied on a site-specific basis to reduce, prevent, or avoid adverse environmental or social impacts. BMPs are applied to management actions to aid in achieving desired outcomes for safe, environmentally sound resource development by preventing, minimizing, or mitigating adverse impacts and reducing conflicts. Please refer to the biological assessment for BMPs specific to Special Status Species in the planning area. For each proposed action, a number of BMPs may be applied as necessary to mitigate expected impacts. The following lists BMPs that may be applied to mitigate impacts of fluid mineral activities. This list is not all inclusive and may be modified over time as conditions change and new practices are identified.

REDUCING IMPACTS ON BIG GAME CRUCIAL WINTER RANGE

- Directional drilling of oil and gas wells
- Drilling of multiple wells from a single pad
- Closed drilling systems
- Flareless completions
- Remote well monitoring
- Piping of produced liquids to centralized tank batteries offsite to reduce traffic to individual wells
- Transportation planning (i.e., to reduce road density and traffic volumes)
- Cluster development
- Habitat enhancement
- Seasonal restriction of public vehicular access
- Limitation of disturbances and activities within operating well fields during crucial winter periods
- Monitoring of wildlife populations during drilling operations
- Using BLM standard wildlife fences
- Compensation mitigation

REDUCING IMPACTS ON SAGE-GROUSE HABITAT

- Directional drilling
- Drilling multiple wells from a single pad
- Closed drilling systems
- Flareless completions
- Remote well monitoring
- Seasonal restriction of public vehicular access
- Reduce truck traffic via car-pooling or transportation planning within sage grouse habitats to reduce human disruptive activities
- Noise reduction techniques and designs
- Installation of raptor anti-perch devices
- Habitat enhancement
- Monitoring of wildlife populations during drilling operations
- Avoidance of surface disturbance or occupancy within one-quarter mile of the perimeter of occupied sage-grouse leks

- Avoidance of human activity between 8:00 p.m. and 8 a.m. from March 1 through May 15 within one-quarter mile of the perimeter of occupied sage-grouse leks
- Avoidance of surface disturbing and disruptive activities in suitable sage-grouse nesting and early brood-rearing habitat within 2 miles of an occupied lek, or in identified sage-grouse nesting and early brood-rearing habitat outside the 2-mile buffer from March 15 through July 15.
- Avoidance of disturbance and disruptive activities in sage-grouse winter habitat from November 15 through March 14.

REDUCING IMPACTS ON WILDLIFE HABITAT

- Seasonal restriction of public vehicular access
- Noise reduction techniques and designs
- Installation of raptor anti-perch devices
- Reclamation of unused well pads within 1 year
- Monitoring of wildlife populations during drilling and production operations
- Limiting pipeline crossings to 1 corridor to limit habitat fragmentation for pygmy rabbits
- Avoiding known white-tailed prairie dog, burrowing owl, and pygmy rabbit burrowing systems
- Habitat enhancement
- Drilling multiple wells from a single pad
- Transportation planning to reduce road density
- Closed drilling systems
- Piping of produced liquid

REDUCING IMPACTS ON VISUAL RESOURCE MANAGEMENT CLASS II, III, AND IV AREAS

- Closed drilling systems
- Burying of distribution power lines and flow lines in or adjacent to access roads
- Repetition of elements of form, line, color, and texture to blend facilities with the surrounding landscape
- Painting of all new facilities a color, or colors that best allow the facility to blend with the background, typically a vegetated background
- Final reclamation recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography
- Avoidance of facility placement on steep slopes, ridge tops, and hilltops
- Screening of facilities from view
- Reclamation of unused well pads within one year
- Following of the contours of the land to reduce unnecessary disturbance
- Recontour and revegetation of disturbances to blend with the surrounding landscape
- Reclamation of unneeded roads to the original contour
- Thinning and feathering of vegetation to disrupt linear lines created by clearing activities.
- Reduce pad size
- Site selection adjustment to minimize visibility
- Collocation of wells and tank batteries out of view
- Other BMPs as applicable from Gold Book and Bureau of Land Management (BLM) BMP website

REDUCING IMPACTS ON AIR QUALITY

- Use water and dust suppressant on roads to achieve 50% control of road dust on 90% of BLM resource roads
- Consider air quality levels in the approval of current actions
- Post speed limits on roads
- Implement transportation planning to reduce/vehicle traffic

REDUCING IMPACTS FROM FLUID MINERAL CONSTRUCTION, OPERATION, AND RECLAMATION

- Directional drilling
- Drilling multiple wells from a single pad
- Closed drilling systems
- Transportation planning (i.e., to reduce road density and traffic volumes)
- Remote well monitoring
- Piping of produced liquids to centralized tank batteries offsite to reduce traffic to individual wells
- Submersible pumps
- Belowground wellheads
- Bussing of workers (i.e., to reduce traffic volume)
- Flareless well completions
- Hard-line fracing
- Burying of distribution power lines and flow lines in or adjacent to access roads
- Design and construction of all new roads to a safe and appropriate standard, "no higher than necessary" to accommodate their intended use
- Reuse of the old roads or pads
- Interim reclamation of well locations and access roads soon after the well is put into production
- Avoidance of facility placement on steep slopes, ridge tops, and hilltops
- Storage of chemicals within secondary containment in case of a spill
- Onsite bioremediation of oil field wastes and spills
- Removal of trash, junk, waste, and other materials not in current use
- Use treated produced water rather than surface waters or Class I, II or III ground waters for drilling, completion, stimulation, dust suppression, and reclamation.
- Set and cement surface casings to sufficient depths to protect fresh water bearing zones.