APPENDIX I

SUGGESTED MANAGEMENT PRACTICES APPLICABLE FOR OIL AND GAS DEVELOPMENT, WITHIN LEASE RIGHTS

Suggested Management Practices (SMPs) Applicable for Oil and Gas Development, within Lease Rights

In addition to "GrSG Disturbance Guidelines" (Appendix B), and conservation strategies identified in this plan ("Conservation Strategy", pg. 306), this is a list of suggested management practices that may be applied to oil and gas operations, or other surface-disturbing activities, to aid in protecting GrSG and their habitat. These SMPs are not regulatory, but are options that could be applicable to all ownership situations; they are also *not* the BLM's Best Management Practices (BMPs) for public lands, which can be found at http://www.blm.gov/bmp. As new information becomes available, additional management practices will be developed.

1. Minimize impacts on habitat through road construction standards, design and placement in all occupied and vacant/unknown sage-grouse habitat (exploration, drilling and production).
    A. Minimize construction of new roads
    B. Utilize minimum construction and maintenance standards appropriate for the operation.
    C. Minimize visual/auditory impacts by placing roads below ridgelines or along topographic features.
    D. Place roads outside of riparian areas.
    E. Conduct exploration along existing roads where possible.
    F. Avoid construction of surface-disturbing activities within 0.6 miles of active leks.

2. Minimize impacts to sage-grouse through road use (patterns) and seasonal restrictions (exploration, drilling, and production).
    A. Sign roads to prevent off road travel.
    B. Set seasonal closures during critical sage-grouse use periods.
    C. Encourage remote monitoring.
    D. Develop travel plan to minimize vehicular traffic.
    E. Place speed bumps, dips etc. to slow traffic as needed.
    F. Construct or maintain any roads outside of critical seasonal use periods.
    G. Encourage road rehabilitation or realignment to minimize impacts to sage-grouse.

3. Overlay lease map with sage-grouse habitat to determine vacant and occupied leases (drilling and production).
    A. Add lease notice 'This lease may require a full development plan as determined by an interdisciplinary team.

4. Implement noise mitigation from research and/or state regulations.

5. Create an educational video about sage-grouse habitat and ecology to increase awareness for oil and gas employees (exploration, drilling, and production).

6. Avoid or minimize impacts to riparian, wetland, or wet meadow habitats to limit impacts to brood rearing areas (exploration, drilling, and production).

A. Locate equipment, facilities, and roads outside of riparian zones which may serve as late brood rearing habitat (1000-ft buffer where feasible).
B. Drive over woody vegetation at stream crossings rather than remove it wherever possible.
C. Bore pipeline crossings under perennial streams rather than trenching.

7. Avoid or minimize impacts to sagebrush habitats to limit impacts on GrSG breeding, summer/fall, and winter areas (exploration, drilling, and production.
    A. Site facilities in habitats other than sagebrush, wherever possible.

8. Use reclamation standards (interim and final) that are beneficial to restoring sage-grouse habitat. (drilling, and production)
    A. Incorporate sagebrush, desired forbs and grass species into seed mix. Use native species wherever possible or non-natives when approved via state or federal biologists.
    B. Replace soil manually for shot holes (exploration).
    C. Rip and/or recontour and reclaim operation sites, and access roads.
    D. Retain and "manage" topsoil as appropriate for reclamation.
    E. Reclaim riparian areas with native vegetation.
    F. Mimic vegetation patterns during reclamation.
    G. Develop a reclamation plan with CDOW and surface owner.
    H. Investigate opportunities to utilize suitable produced water in accordance with state water laws.

9. Prevent or minimize raptor perching on oil and gas facilities and structures in important sage-grouse habitat (drilling and production).
    A. Design power poles to discourage raptor perching, using the most current science.
    B. Minimize height of dry hole markers in SG habitat (flush with ground or < 1').

10. Components of a Comprehensive Development Plan (production).
    A. Map all road infrastructure for area to be developed.
    B. Map seasonal sage-grouse habitat within area of development.
    C. Consider cumulative habitat loss to date in determining future development opportunities.
    D. Consider topographic features when recommending areas to protect for sage-grouse.
    E. Delineate maximum wellpad spacing (e.g., "No more than 1 wellpad per 'xx' acres") for areas when research identifies that threshold.
    F. Establish incremental development thresholds where possible (e.g., no more than 10% breeding habitat impacted over 10 year period)
    G. Coordinate planning among companies operating in the same field.
    H. Cluster development where possible to minimize impacts.
    I. Encourage alternative drilling or production methods to minimize acres of habitat directly or indirectly affected (e.g., directional drilling).

J. Encourage remote monitoring of production sites to reduce disturbance to birds during critical seasons.

11. Consider oil and gas development fields in preparation of local fire response plans within sage-grouse habitat.

12. Monitor mosquito production in produced water and control mosquitoes as needed. Use BTI (*Bacillus thurgensis israelsis*) for mosquito control in water pits associated with oil and gas operations where appropriate (production).

13. Implement measures to ensure water quality is maintained, and hazardous spills are minimized in sage-grouse habitat and associated riparian areas (drilling and production).
    A. Encourage use of water tanks instead of open pits.
    B. Line open water pits.
    C. Minimize SG contact with produced water.

14. Design well pad, storage facilities, and site locations to minimize degradation of sage-grouse habitat and visual/actual obstructions in the area (production).
    A. Use low profile storage tanks.
    B. Paint wells to camouflage in background.

15. Minimize impacts on local watersheds and local water sources during local drilling and reclamation activities in sage-grouse habitat (e.g., surface and sub-surface water depletion impacts on sage-grouse habitat).

16. Transport water and condensate by pipeline rather than truck whenever possible to minimize vehicle traffic, dust, noise, and disturbance.