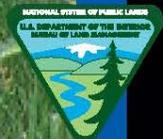


Appendix B

Best Management Practices and Conditions of Approval



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1.0 Introduction

Best management practices (BMPs) are land and resource management techniques designed to maximize beneficial results and minimize negative impacts of management actions. Best management practices are applied as Conditions of Approval (COA) or may be selected by an applicant and incorporated into their request of authorization approvals. The Bureau of Land Management (BLM) describes BMPs as “state-of-the-art mitigation measures applied to oil and natural gas drilling and production to help ensure that energy development is conducted in an environmentally responsible manner.” The objective of BMPs is to protect wildlife, air quality, landscapes and other natural resources as domestic energy sources are developed. Numerous oil and gas operators have developed and used BMPs. Best management practices are not “one size fits all.” The actual practices and mitigation measures best for a particular site are evaluated through the National Environmental Policy Act (NEPA) process and vary to accommodate unique, site-specific conditions and local resource conditions. Selection and implementation of any BMPs will be evaluated against the Colorado Public Land Health Standards (BLM, 1997b) to ensure progress toward public land health attainment. Best management practices include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. Best management practices can be applied before, during, and after pollution-producing or surface-disturbing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 Code of Federal Regulation 130.2(m), U.S. Environmental Protection Agency [EPA] Water Quality Standards Regulation) or to prevent unnecessary or undue degradation of resources.

Best Management Practices are identified as part of the NEPA process, with interdisciplinary involvement. Because the control of nonpoint sources of pollution and prevention of damage to other resources is an ongoing process, continual refinement of BMP design is necessary. This process can be described in five steps, which are:

- 1) Selection of design of a specific BMP;
- 2) Application of BMP;
- 3) Monitoring;
- 4) Evaluation; and
- 5) Feedback.

Data gathered through monitoring is evaluated and used to identify changes needed in BMP design, application, or in the monitoring program. For oil and gas operations, sundry notices will be used to convey BLM’s written approval for changes to operations and/or BMPs.

Best Management Practices described in this appendix are a compilation of existing policies and guidelines and commonly employed practices designed to assist in achieving the objectives for maintaining or minimizing water quality degradation from nonpoint sources; preventing the loss of soil productivity; providing guidelines for aesthetic conditions within watersheds; and mitigating impacts to soil, vegetation, or wildlife habitat from surface-disturbing activities. Best management practices are selected and implemented as necessary, based on site-specific conditions, to meet a variety of resource objectives for specific management actions. The oil and gas industry and the BLM are constantly developing and improving BMPs. Adjustments to BMPs are made as necessary to ensure that RMPA goals and objectives are being met as well as to conform to changes in the BLM regulations, policy, and direction or new scientific information. Therefore, this document does not provide an exhaustive list of BMPs, additional BMPs or modifications may be identified to minimize the potential for negative impacts when evaluating site-specific management actions through an interdisciplinary process.

In addition, implementation and effectiveness of BMPs need to be monitored to determine whether the practices are achieving resource objectives and accomplishing desired goals. Adjustments will be made as necessary.

Each of the following BMPs are a part of the coordinated development of the White River Field Office (WRFO) Proposed Resource Management Plan Amendment and Final Environmental Impact Statement (RMPA/EIS) for Oil and Gas Development, and may be updated as new information becomes available to ensure objectives are met and to conform with changes in the BLM regulations, policy, direction, or new scientific information. Applicants also may suggest alternative procedures that could accomplish the same result. These guidelines will apply, where appropriate, to all use authorizations, including BLM-initiated projects. Any BMP listed may be used in any program wherever it may be effective. Other sources for information on BMPs is the publication Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (commonly referred to as The Gold Book) which was developed to assist operators on the requirements for obtaining permit approval and conducting environmentally responsible oil and gas operations on Federal lands.

Planning criteria were established to provide focus for data collection efforts, achieve compliance with legal mandates, and facilitate decision making. General and specific criteria that pertain to the RMPA/EIS are described in Chapter 1 of the Draft RMPA/EIS.

2.0 Best Management Practices and/or Conditions of Approval

2.1 Air Resources

The operator/holder will limit unnecessary emissions from point or nonpoint pollution sources and prevent air quality deterioration from necessary pollution sources in accordance with all applicable Federal, State, and local air quality laws and regulations.

The operator/holder will limit air pollutant emissions in accordance with management actions established in Chapter two and Appendix J of this RMPA.

Dust abatement is required for all access routes and pipeline ROWs during construction and drilling activities so that there is not a visible dust plume behind vehicles. All vehicles will abide by company or public speed restrictions during all activities. If water is used as a dust suppressant, there should be no traces of oil or solvents in the water and it should be properly permitted for this use by the State of Colorado. Chemicals and/or treated produced water used as dust suppressants will require prior written approval by the Authorized Officer.

In the Mesaverde Play Area, proper road design, construction, and surfacing on resource roads (see BLM Manual Section 9113) would be required to achieve at least 80 percent reduction from uncontrolled fugitive dust emissions (using a combination of chemical suppression, watering, or other control measures). Resource roads in planning units other than the Mesaverde Play Area would be required to achieve at least 50 percent fugitive dust control effectiveness.

2.2 Heritage Resources

The operator/holder/applicant is responsible for informing all persons who are associated with the project that they will be subject to prosecution for knowingly disturbing archaeological sites or for collecting artifacts.

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If any archaeological materials are discovered as a result of operations under this authorization, activity in the vicinity of the discovery will cease, and the BLM WRFO Archaeologist will be notified immediately. Work may not resume at that location until approved by the Authorized Officer (AO). The operator/holder/applicant will make every effort to protect the site from further impacts including looting, erosion, or other human or natural damage until the BLM determines a treatment approach, and the treatment is completed. Unless previously determined in treatment plans or agreements, the BLM will evaluate the cultural resources and, in consultation with the State Historic Preservation Office (SHPO), select the appropriate mitigation option within 48 hours of the discovery. The operator/holder/applicant, under guidance of the BLM, will implement the mitigation in a timely manner. The process will be fully documented in reports, site forms, maps, drawings, and photographs. The BLM will forward documentation to the SHPO for review and concurrence.

Pursuant to 43 CFR 10.4(g), the operator/holder/permittee/applicant must notify the Authorized Officer (AO), by telephone and written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the operator/holder/permittee/applicant must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the AO.

Any new surface disturbance within the Canyon Pintado NHD would be required to be monitored by an approved and qualified archaeologist under the following conditions:

- Activity occurs in the vicinity of known resources.
- Activity occurs in the alluvial bottoms along Douglas Creek and its tributaries.
- Activity occurs in deep alluvial soils.

If any paleontological resources are discovered as a result of operations under this authorization, the operator/holder or any of his agents must stop work immediately at that site, immediately contact the BLM Paleontology Coordinator, and make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. Work may not resume at that location until approved by the AO. The BLM or designated paleontologist will evaluate the discovery and take action to protect or remove the resource within 10 working days. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (a) following the Paleontology Coordinators instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (b) following the Paleontology Coordinators instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

The operator/holder applicant assumes responsibility for the integrity of site [insert number] for the duration of the life or operation of [insert project/well pad name/number]. This includes, but is not be limited to, having an approved archaeological consultant conduct yearly monitoring of site [insert number] as well as any stabilization or data recovery necessitated by site degradation, whether resulting from construction and operation of [insert project/well pad name/number], vandalism, erosion, or any other cause.

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The operator/holder/applicant is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for disturbing or collecting vertebrate fossils, collecting large amounts of petrified wood (over 25 lbs./day, up to 250 lbs./year), or collecting fossils for commercial purposes on public lands.

Any excavations into the underlying native sedimentary rock must be monitored by a permitted paleontologist. The monitoring paleontologist must be present before the start of excavations that may impact bedrock.

2.3 Geophysical

In general, the BLM requires an examination of resource values and development of appropriate surface protection and reclamation measures. The BLM uses Manual 3150 (Onshore Oil and Gas Geophysical Exploration Surface Management Requirements) and Manual 3150-1 (Onshore Oil and Gas Geophysical Exploration Surface Management Requirements [Public]) to provide the guidelines for all Geophysical actions being conducted on federally administered surface. The BLM will solicit involvement from public land users (e.g., grazing permittees) to develop site-specific protection measures and reclamation specifications. Compliance monitoring should occur during and after seismic exploration activities when or if necessary. Compliance inspections during operations would ensure that requirements and guidelines are being followed. Compliance inspections upon completion of work would ensure that the lines are clean and drill holes are plugged properly.

Plugging of drill shot holes will conform to the Colorado Reclamation Standards Abandoned Drill Holes Act. Drill hole cuttings shall be placed back in the hole.

2.4 Oil and Gas

General

In conformance with Onshore Oil and Gas Order (Onshore Order) No. 1, operators would at a minimum prepare and submit individual comprehensive drill site design plans for the BLM approval however, comprehensive plans of development for areas and regions would aid in overall planning and implementation of Thresholds. These plans would show the drill location layout over the existing topography, dimension of the location, volumes and cross-sections of cut and fill, location and dimensions of reserve pits, existing drainage patterns, and access routes egress and ingress. Plans would be submitted and approved prior to initiation of construction.

Activities occurring during preliminary investigations may include remote sensing; mapping of rock outcrops and seeps (either of which result in little or no surface disturbance); and seismic, gravity, and magnetic surveys.

The BLM WRFO requires notification to the AO's field representative concerning well development. Notification will be 24 hours prior to start for the following activities:

Activity	Method	AO's Field Representative
Construction ⁽¹⁾	Sundry Notice and either Email or Phone	NRS
Reclamation ⁽²⁾		NRS
Drilling Rig Moves on Location	Email and/or Phone	NRS and PET
Well Spud ⁽³⁾	Sundry Notice	PET only
Drilling Rig Leaves Location	Email and/or Phone	NRS and PET

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Activity	Method	AO's Field Representative
Completion Rig Moves on Location	Email and/or Phone	NRS and PET
Completion Rig Leaves Location	Email and/or Phone	NRS and PET
Work-Over Rig Moves on Location	Email and/or Phone	NRS
Work-Over Rig Leaves Location	Email and/or Phone	NRS

NOTES:

NRS = Natural Resource Specialist, PET=Petroleum Engineering Technician

⁽¹⁾Construction-related activities may include, but are not limited to, pad and road construction, pad expansion, clearing pipeline corridors, trenching, recontouring. The Sundry Notice will include the well pad name, location, and date of construction.

⁽²⁾Reclamation activities may include, but are not limited to, seed bed preparation that requires disturbance of surface soils, seeding, or constructing enclosures (e.g., fences) to exclude livestock from reclaimed areas.

⁽³⁾Breaking ground for drilling surface casing.

If applicable, the operator shall plan all activities and operations in a manner so as to avoid infringing on any timing limitations, without the need to apply for exceptions to the specified timing limitations.

Drilling, well completion, and workover lights would be shrouded and directed onto the drilling platform and/or well pad, to the extent allowed by safety requirements, so that lights/glare are not directed away from the well pad.

Permanent and temporary lighting fixtures on oil and gas facilities should be shrouded and directed to illuminate only the location needed for work or safety. Care should be taken to not distract driving on roads adjacent to facilities, unnecessarily disrupt wildlife with lighting or contribute to light pollution that is not in keeping with rural and natural environments.

Post-Construction GIS Data Submission:

In order to track reclamation of actions related to the development of Federal mineral resources, the operator shall provide the designated [*Natural Resource Specialist (NRS) or Realty Specialist*] with geospatial data in a format compatible with the WRFOs geographic information system (GIS) (i.e., point or polygon features). These data will be used to accurately locate and identify all geographic as-built (i.e., constructed and design implemented) features, recontouring, and seeding associated with this project and must be included in the Application for Permit to Drill (APD) or Sundry Notice (SN) as appropriate.

- These data shall be submitted within 60 days of construction completion. If the operator is unable to submit the required information within the specified time period, the operator shall notify the designated [*NRS or Realty Specialist*] via email or phone, and provide justification supporting an extension of the required data submission time period.
- GIS polygon features may include, but are not limited to:
 - Full well pad footprints (including all stormwater and design features);
 - Constructed access routes/widths, existing roads that were upgraded/widths; temporary use areas; and
 - Pipeline corridors.
- Acceptable data formats are: (1) corrected global positioning system (GPS) files with sub-meter accuracy or better; (2) ESRI shapefiles or geodatabases; or (3) AutoCAD .dwg or .dxf files. If possible, both (2) and (3) should be submitted for each as-built feature. Geospatial data must be submitted in UTM Zone 13N, NAD 83, in units of meters. Data may be submitted as: (1) an email attachment or (2) on a standard compact disk (CD) in

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compressed (WinZip only) or uncompressed format. All data shall include metadata, for each submitted layer, that conforms to the *Content Standards for Digital Geospatial Metadata* from the Federal Geographic Data Committee standards. Questions shall be directed to the WRFO BLM GIS staff at (970) 878-3800. If the operator is unable to send the data electronically, the operator shall submit the data on compact disk(s) to the designated [NRS or Realty Specialist].

- Internal and external review of the reporting process and the adequacy of the associated information to meet established goals will be conducted on an on-going basis. New information or changes in the reporting process will be incorporated into the request, as appropriate. Subsequent permit application processing may be dependent upon successful execution of this request, as stated above.

Reserve Pits, and Pits other Than Reserve Pits, and Drilling Muds

The BLMs preferred method for the handling of drilling fluids is those methods that result in limited impacts to human health and the environment. These would include the use of close-looped and semi-closed loop drilling systems. The use of closed and semi-closed loop systems aids in reuse and recycling of drilling fluids reducing the impacts to the environment. However, in situations where the use of pits is necessary the following BMPs and COAs will further aid in the limiting of impacts to human health and the environment.

- Reserve pits used for drilling will be fenced on three sides prior to drilling activity and closed off on the fourth side after drilling is finished unless drilling is delayed, in this case the operator would implement measures to prevent wildlife and livestock from entering the reserve pit area until the drill rig is in place or until the fence on the fourth side of the pit has been constructed in accordance with the BLM standards to reduce risk for wildlife and livestock mortality.
- All wire fence corners will be braced with an H-type brace (See Gold Book or BLM Manual H1741-1 for recommended construction standards).
- Within the wild horse range, the reserve pit fence shall be 48 inches high.
- In sheep allotments, the fence will have 48 inches of woven wire and cattle allotments will have four strands of barbed wire.
- Requests to use alternate fence materials must be preapproved by the Authorized Officer.
- Fences will be located at least four feet from the edge of the pit slope.

It is the operator's responsibility to design and construct a liner system to contain fluids in the pits that contain liquids without compromising the integrity of the liners. Liners must be installed over smooth fill subgrade that is free of pockets, loose rocks, or other materials that could damage the liner. The pit should be padded with material if necessary to reduce potential damage to the liner by sharp rock edges. Sand, sifted soil or bentonite are suggested.

Since all pits may receive fluids from completion and fracing activities (see Appendix C) and soluble materials left in pits may migrate into the shallow groundwater, all pits (including cuttings pits) shall be lined with 24 mil reinforced liner and closed as per Onshore Orders Nos. 1 and 7, The Gold Book, COGCC, and the CDPHE requirements. Liners will be of a high-density polyethylene, polypropylene, poly vinyl chloride, hypalon, or other synthetic material that is impervious, weather resistant, and resistant to deterioration when in contact with hydrocarbons, aqueous acids, alkali, fungi, or other substances in the produced water. The synthetic liners will also be resistant to deterioration by ultraviolet light, punctures and tearing, and shall be designed for the life of the pit. Pit liner disposal will be in accordance with all existing federal, state, and local laws. If the COGCC

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requires the removal of the pit liner, the method of removal and location of disposal for pit liners and pit solids must be submitted to the AO and approved before beginning the pit closure. If pit liners are to be left in place, the fluids from the pit must be removed and/or evaporated before closing. The pit liner should be cut or folded at the mudline and the pit should be buried with at least 3 feet from final grade before interim reclamation efforts are started.

The reserve pit will be allowed to dry through natural evaporation for up to six months after the drill rig has left the location. If a pit has not dried by the end of this period, all remaining fluids and/or mud must be removed and disposed of in an approved manner. Operators will construct, operate, and close reserve pits in accordance with federal, state, and local laws. Only dispose of RCRA exempted wastes within reserve pits. The concentration of hazardous materials within the reserve pit at the time of pit backfilling must not exceed the standards set forth in COGCC 900 Rules RCRA.

The operator is required to obtain authorization from the COGCC for pit fluid treatment by means other than natural evaporation. The operator shall submit a Sundry Notice for approval by the Authorized Officer before conducting any reserve pit evaporation by means other than natural evaporation. The Sundry Notice would provide a detailed description of the drying method.

Slope, grade, and other construction control stakes (e.g., exterior boundary centerline) would be placed, as necessary, to ensure construction in accordance with the surface use plan. The cut and fill slopes and spoil storage areas would be marked with a stake and/or lath at a minimum of 50-foot intervals. The tops of the stakes or laths would be painted or flagged in a distinctive color. All boundary stakes and/or laths would be maintained in place until final construction cleanup is completed. If stakes are disturbed, they would be replaced before proceeding with construction.

Reserve pits, evaporation ponds, or other oil and gas related pits will be designed and operated in a manner that deters or prevents access to birds, waterfowl, livestock and wildlife (WO-IM-2013-033 or current BLM requirement). The operator must prevent migratory bird access to facilities that store or are expected to store fluids which may pose a risk to such birds (e.g., toxicity, compromised insulation, drowning). Features that prevent access to such fluids must be in place and functional within 24 hours of the drilling rig moving off the location and shall remain effective until such pits are removed or incapable of storing fluids. Deterrence methods may include netting or other alternative methods that effectively prevent use of migratory birds and are approved by the BLM. It will be the responsibility of the operator to notify the BLM of the method that will be used to prevent use two weeks prior to when completion activities are expected to begin. All lethal and non-lethal events that involve migratory birds will be reported immediately to the FWS Special Agent in Grand Junction, Colorado.

Pits will not be constructed on known intermittent or perennial springs, seeps, or other near surface water features. If groundwater is encountered during pit construction activity, pit construction will cease and the location will be reclaimed. An alternate location or an alternate plan (e.g., disposing of pit contents offsite or use of a closed loop and/or semi-closed loop system) must be submitted via Sundry Notice and approved by the AO before resuming operations. Pits shall be constructed, monitored, and operated to provide for a minimum of two feet of freeboard at all times and maintain fluids in pits at the lowest practicable level, subject to the type of operation in process.

All produced liquids will be contained in a pit or tank, including the dehydrator vent/condensate line effluent. All production pits must have a livestock-proof fence. All pits must be bermed and designed to contain fluids so that leaking or breaching problems are minimized and reclamation potential is maximized. At least 50 percent of the pit capacity will be in cut material.

Operators will identify either during the APD or through a Sundry Notice describing how the oil based drilling muds will be used, stored, and disposed of. Any on location disposal sites for the oil contaminated drill cuttings would be lined with a 24-mil or stronger impervious liner compatible with oils and separate from other drill cuttings. A liner meeting this specification also would be placed under any temporary storage area for the oil contaminated cuttings.

Should an event occur, all oil from the surface of reserve pit will be removed within 24 hours.

All drilling fluids where the contents of the pit will be left in place will meet the concentration levels identified within COGCC's table 910-1 which recommends that operators use the latest version of EPA SW 846 analytical methods. The cost of the testing and disposal would be borne by the potentially responsible party.

Production Facilities

All storage tank batteries, including drain sumps and sludge holdings at compressor facilities, installed on location and designed to contain any oil, glycol, produced water, or other fluid that may constitute a hazard to public health or safety, would be surrounded by a secondary means of containment for the entire contents of the largest single tank in use plus 1 foot of freeboard for precipitation or 110 percent of the capacity of the largest vessel. The appropriate containment and/or diversionary structures or equipment, including walls and floor, to prevent discharged fluid from reaching ground, surface, or navigable waters, would be impervious to any oil, glycol, produced water, or other fluid for 72 hours and would be constructed so that any discharge from a primary containment system (e.g., tank or pipe) would not drain, infiltrate, or otherwise escape to ground, surface, or navigable waters before cleanup is completed.

Treaters, dehydrators, and other production facilities installed on location that have the potential to leak or spill oil, glycol, produced water, or other fluid that may constitute a hazard to public health or safety, would be placed on or within an appropriate containment and/or diversionary structure to prevent spilled or leaking fluid from reaching ground, surface, or navigable waters. The appropriate containment and/or diversionary structure would be sufficiently impervious to oil, glycol, produced water, or other fluid and would be installed so that any spill or leakage would not drain, infiltrate, or otherwise escape to ground, surface, or navigable waters before cleanup is completed.

All aboveground permanent structures (permanent means onsite for longer than 90 days) not subject to safety requirements would be painted by the operator to blend with the natural color of the landscape. New production facilities would be painted a noncontrasting color that is harmonious with the surrounding landscape as specified and approved by the BLM on a case-specific basis.

Well Plugging Standards

A. Open Hole: Cement plug shall be placed to extend at least from 50 feet below the bottom (except as limited by total depth (TD) or plugged back total depth (PBSD) to 50 feet above the top of (1) any zones encountered during drilling that contain fluid with a potential to migrate; (2) lost circulation zones; and (3) any potential valuable minerals, including noncommercial hydrocarbons, coal, and oil shale. Extremely thick sections may be secured by placing 100-foot plugs across the top and bottom of the formation. Lost circulation zones may require alternate methods. In the absence of productive zones or minerals that otherwise require placement of cement plugs, long sections of open hole shall be plugged at least every 3,000 feet. Such plugs shall be placed across in-gauge sections of the hole.

B. Cased Hole: Cement plug shall be placed opposite all open perforations and extend a minimum of 50 feet below (except as limited by TD or PBTD) to 50 feet above the perforated interval. In lieu of the cement plug, a bridge plug is acceptable, provided: (1) the plug is set as close as practical above the open perforations; (2) the perforations are isolated from any open hole below; and (3) the plug is capped-if cap is placed through tubing, a minimum of 50 feet of fill-up is required; if placed by bailer, a minimum of 35 feet of fill-up is needed. If production casing is cut and recovered, a cement plug shall be placed to extend at least 50 feet above and below the stub. An additional cement plug shall be placed to extend a minimum of 50 feet above and below the shoe of the surface casing (or intermediate string, as appropriate). The exposed hole resulting from the casing removal must be secured as required above.

C. Annular Space: No annular space that extends to the surface shall be left open to the drilled hole below. If this condition exists, a minimum of the top 50 feet of annulus shall be plugged with cement.

D. Testing: The first plug below the surface plug shall generally be tested by either tagging the plug with the working pipe string or pressuring to a minimum pump (surface) pressure of 1,000 psig with no more than a 10 percent drop during a 15-minute period (cased hole only). If the integrity of any other plug is questioned, it must be tested in the same manner. Also, any cement plug that is the only isolating medium for a fresh water interval or a zone containing a valuable mineral deposit should be tested by tagging with the drill string. Tagging the first plug below the surface plug will not be necessary where water flows or valuable mineral deposits have not been encountered.

E. Surface Plug: A cement plug of at least 50 feet shall be placed in the smallest casing that extends to the surface. The top of this plug shall be placed as near the eventual casing cut-off point as possible.

F. Mud: Each interval between the plugs shall be filled with mud of sufficient density to exert hydrostatic pressure exceeding the greatest formation pressure encountered while drilling such interval. In the absence of other information at the time plugging is approved, a minimum mud weight of nine pounds per gallon shall be specified.

G. Surface Cap: All casing shall be cut off at the base of the cellar or three feet below final restored ground level (whichever is deeper). The casing shall be filled from the cement plug to the surface with suitable material (e.g., cement, sand, gravel). The well bore must then be covered with a metal plate at least 1/4-inch thick, welded in place, or a four-inch pipe, extending four feet above the recontoured ground surface and embedded in cement as specified by the authorized officer. The well location and identity shall be permanently inscribed on the pipe or plate.

Surface Disturbance

Surface-disturbing activities may be moved to avoid visually sensitive areas or design and reclamation mitigation measures may be required, as appropriate, to protect scenic and natural landscape values and to reduce the visual effects. Design measures may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, removing surfacing material, using low-profile permanent facilities, and painting to minimize visual contrasts.

Transplanting of shrubs and the planting of native forbs or shrubs may be required during reclamation activities to increase the success of achieving final reclamation goals.

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Prior to approving surface-disturbing or potentially impacting activities within known or potential habitat for a listed, proposed or candidate plant species, a plant inventory conducted by a qualified botanist and an environmental analysis would be required for the Proposed Action. Based on the results of the plant survey, informal consultation with the FWS may be conducted during preparation of the environmental analysis. Formal consultation with the FWS would occur if the environmental analysis indicates a finding of possible impact to a listed species and the Proposed Action cannot be moved to avoid the impact.

All disturbed areas will be contoured to the original contours or at least to blend with the natural topography. Blending is defined as reducing form, line, shape and color contrast with the disturbing activity. In visually sensitive areas, all disturbed areas shall be contoured to match the original topography. Matching is defined as reproducing the original topography and eliminating form, line, shape and color caused by the disturbance as much as possible. See Appendix D (WRFO Surface Reclamation Plan) of the RMPA/EIS.

All construction activity shall cease when soils or road surfaces become saturated to a depth of three inches unless there are safety concerns or activities are otherwise approved by the AO.

Topsoil, those soils corresponding with the O, A, and sometimes B horizons that contain the greatest amount of organic matter, biological activity, and nutrients and that are the most favorable for establishment of seeded species and plant growth will be removed to a depth of 6-8 inches or as determined from submitted pre-disturbance site condition information identified in the Surface Reclamation Plan (see Appendix D Section 2.2 at No. 1) in areas of surface disturbance. To protect topsoil for future use during reclamation, topsoil piles will be covered, seeded, labeled, and stored unmixed with other soils.

Immediately after the road and pad construction is completed and before drilling begins, seed and apply a temporary protective surface treatment on all soils on disturbed areas not required for operation or production equipment during drilling and completion activities. Areas not required for operations include all cut/fill slopes on access routes and pads as well as stockpiled soils. Slopes dominated by rock of 4 inches and greater are not required to be seeded or treated. Surface treatments can vary depending on the local site conditions and changes in erosion control technology, but mulch, matting, netting, and/or tackifiers should be used after seeding the soil surface and soil amendments may be used with the BLM approval.

Any erosion features (e.g., rilling, gulying, piping, or mass wasting) located either on or adjacent to the surface disturbance will be addressed immediately after observation by contacting the Natural Resource Specialist/Realty Specialist and by submitting a plan to assure successful soil stabilization with BMPs to address erosion problems.

All areas where the topsoil has been removed and soils have become compacted will be ripped to a depth of 18 inches below the finished grade or to bedrock, or as appropriate for the site. Another suitable method of de-compaction may be used before topsoil is re-spread with approval of the BLM AO. Areas where the topsoil has not been removed, but have been compacted, must be de-compacted by disking or other methods to prepare the soils for reclamation.

New roads and pipelines should be located in existing pipeline or road corridors whenever possible.

Road Design and Maintenance

All road and well pad construction will adhere to Gold Book standards (DOI and USDA 2007) and to BLM Manuals 9112 and 9113 (BLM 1984, 1985), relating to culvert and road design and construction requirements.

Road designs must be the minimum requirements in terms of width and design to meet the intended use while providing for safety, maintenance and limiting adverse environmental impacts. Minimum standards for oil and gas resource roads are 14 feet with turn-outs based on the BLM Handbook without special designs.

An all-weather surface is required from [first location] to [second location] that will not rut when the road base is saturated. All-weather surfacing may include the use of road base and/or gravel and be maintained to a depth that will protect the integrity of the travel surface; location of surfacing+ materials should be stated in the proposed action or the surface use plan. Specifications for road surfacing are subject to the BLM approval and should be maintained as long as regular access is needed to the site. Gravel and surfacing should be removed and used somewhere else to the greatest extent possible during final reclamation.

Roads that use natural materials should not be traveled when the road surface is saturated such that ruts greater than three inches form consistently on the road surface. If travel is required during wet conditions, an all-weather surface should be implemented. Spot graveling in localized areas of poor soils or accumulated water should be employed as necessary on natural surface roads to allow travel without compromising the integrity of the road. Sources of materials for spot graveling should be specified in the surface use plan or the proposed action.

An engineering road design should be submitted for the BLM approval that illustrates road design features from [first location] to [second location], due to the complicated drainage features and/or difficult terrain in this road section. The engineering design should include plan view diagrams by mile marker with a topographic base layer and all relevant design features such as culverts, water-bars, run-out ditches etc. clearly illustrated. In addition to the plan view drawings, specifications such as road surfacing materials and thickness, profiles of road cross-sections, any peak flow analysis that was used for sizing drainage features, and along any other relevant design specifications or analysis that would be needed for evaluating the integrity of the proposed engineering design. Engineering designs must be approved and certified by a professional engineer licensed in the State of Colorado and approved by the BLM before construction begins.

General access to the following locations shall be restricted by means of a lockable gate (may require fence wings) placed along the proposed access at a point as close as possible to the intersection of the proposed and established access: [*List locations*]. The operator is responsible for constructing and maintaining these structures through the life of the project. The selected control point is subject to the approval of the AO with the objectives of effectively deterring all unauthorized vehicle use not associated with natural gas development and production (including other BLM permitted users, but excepting CPW District Wildlife Managers and BLM Rangers, [*others*]) and preventing bypass of the gate. These gates would be installed [*selected timeframe*] with signage, and are to remain closed and locked throughout the year, though they may remain open temporarily during well development or maintenance activities that require high traffic volumes.

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Base road design criteria and standards on road management objectives such as the Gold Book, BLM Handbook, traffic requirements of the proposed activity and the overall transportation plan, economic analysis, safety requirements, resource objectives, and minimizing damage to the environment.

Locate drainage crossings where channels are, stable, well-defined, unobstructed and straight. Design the road approach and crossings perpendicular to the prominent flow channels whenever possible. Design crossings to minimize their influence on surface runoff, wetland/riparian function. Install rip-rap as necessary to reduce erosion and protect the integrity of the crossings.

Drainage crossings will be designed to maintain the natural stream channel to the greatest extent feasible and support the normal stream sediment transport processes through the crossing. Crossings in fish habitat will allow unimpeded fish passage and consider fish habitat in the design.

Locate roads on stable positions (e.g., ridges, natural benches, and flatter transitional slopes near ridges and valley bottoms) to minimize heights of cutbanks. Avoid high, steeply sloping cutbanks in highly fractured bedrock. Implement extra mitigation measures when crossing areas of unstable or fragile soils.

When roads are located in low-lying areas, ensure that the road surface is constructed above the adjacent ground surface and the road base does not impede groundwater flow under the road base.

Construct roads surfaces for drainage by using outslopes, crowns, grade changes, drain dips, waterbars, and/or insloping to ditches as appropriate. Outsloping roads is recommended for local spurs or minor collector roads where low-volume traffic, long intervals between maintenance are expected, gradients do not exceed 10 percent, and lower traffic speeds are anticipated. Insloping can be considered on roads with greater than 10 percent gradient and where the underlying soil formation is not subject to erosion or failure. Drainage ditches and cross-drains should be employed with insloping and crowned roads at regular intervals so that runoff does not accumulate and cause erosion (See BLM Manual 9113). Cross-drains may include installation of 18-inch diameter or greater culverts and/or waterbars depending on the terrain.

Crown and ditching is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort are considerations. Gradients may range from two to 15 percent as long as adequate drainage away from the road surface and ditchlines is maintained.

Locate and design drainage dips immediately upgrade of stream crossings, providing buffers and sediment basins, to prevent sediment from entering surface water features.

Do not locate drainage dips where water might accumulate or where there is an outside berm that prevents drainage from the roadway.

Provide vegetative or artificial stabilization of cut and fill slopes in the design process.

Avoid sidecasting during road maintenance, where it will adversely affect water quality or weakens stabilized slopes.

Provide for erosion-resistant surface drainage prior to fall rain or snow.

Identify potential water problems caused by off-site disturbance and add necessary drainage facilities.

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Identify ditchline and outlet erosion caused by excessive flows and add necessary drainage facilities and armoring.

Add additional full-rounds, half-rounds, and energy dissipators as needed for drainage ditches.

Correct special drainage problems (e.g., high water table, seeps) that affect stability of subgrade by using perforated drains, geotextiles, or drainage bays.

Eliminate undesirable berms that retard normal surface runoff.

Roadside brushing should be done in a way that prevents disturbance to root systems (i.e., avoid using excavators for brushing).

Current locations and specifications of pre-disturbance roads should be identified in the surface use plan or proposed action. Final reclamation should restore the pre-disturbance road condition in a way that is maintainable, sustainable and minimized adverse environmental impacts, unless specified by the BLM Authorized Officer.

Culverts and Drainage Features

Culverts and waterbars should be installed according to BLM Manual 9113 standards and sized for the 10-year storm event with no static head and to pass a 25-year event without failing.

Keep road inlet and outlet ditches, catch basins, and culverts free of obstructions, particularly before and during spring run-off. Routine machine-cleaning of ditches should be kept to a minimum during wet weather. Leave the disturbed area in a condition that provides drainage with no additional maintenance.

Locate culverts or drainage dips in such a manner as to avoid discharge onto unstable terrain such as headwalls or slumps. Provide adequate spacing to avoid accumulation of water in ditches or road surfaces. Install culverts with adequate armoring of inlet and outlet. Operator/holder is responsible for maintaining the integrity of road beds as well as erosion control and drainage features.

Proper sized aggregate and rip rap should be used during culvert construction. Place rip rap at culvert entrance to streamline water flow and reduce erosion; provide aggregate for energy dissipations at culvert or drainage dip outlets.

Install cross drains for inside drainage ditches on roads according to the following: Percent Grade; Spacing (feet); 1-6; 300; 7-9; 200; 10-14; 150; 15-20; 90; 21-40; 50; Over 41; 25.

Place permanent stream-crossing structures on fishery streams before heavy equipment moves beyond the crossing area. Where this is not feasible, install temporary crossings to minimize stream disturbance.

Use 12 inches as the minimum recommended cover over a culvert, or one-half the diameter of the culvert, whichever is greater.

Compact fill in lifts during culvert installation with water or other soil material in such a way that the loads anticipated will not deteriorate the road base or fill above and around the culvert. Armor fill as described above to protect compacted fill.

Monitor culvert installations to ensure adequate armoring of inlet and outlet and no erosion of design. Patrol areas susceptible to road or watershed damage during periods of high runoff.

Bridges and Major Culverts

Bridges and major culverts should be designed and constructed according to the standards provided in BLM Manual 9112. The design, review, and evaluation of these crossings must be accomplished under the direct supervision of a registered professional engineer.

Road Maintenance and Abandonment

Locate and maintain roads to prevent their influence on riparian areas and surface waters, when stream crossing is necessary, design the approach and crossing perpendicular to the channel. Locate the crossing where the channel is well-defined, unobstructed and straight.

Perform maintenance to conserve existing surface material; retain the original crowned or outsloped, self-draining cross-section; and prevent or remove rutted berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid casting loose ditch or surface material past the shoulder where it can cause stream sedimentation or weaken slump-prone areas. Avoid undercutting backslopes.

Promptly remove slide material when it is obstructing road surface and ditchline drainage. Save all soil or material useable for reclamation and stockpile for future reclamation needs. Use remaining slide material for needed road improvement or place in a stable waste area. Avoid sidecasting of slide material where it can damage, overload, saturate embankments, or flow into downslope drainage courses.

When obliterating a road no longer needed, gravel or surfacing should be removed and reused to the maximum extent possible. Culverts and other drainage features should be removed, original contours should be reestablished, the road should be ripped or pitted to remove compaction and increase infiltration. On roads, topsoil will be spread where successful revegetation is likely (e.g., along appropriate cut and fill slopes or at the top edge of the borrow ditches) and where it will not be disturbed during regular road maintenance activities.

Maintain roads in special management areas according to special management area guidance. Generally, retain roads within existing disturbed areas and side cast material away from the special management area.

2.5 Fire Management

When working on lands administered by the BLM WRFO, notify Craig Interagency Dispatch (970-826-5037) in the event of any fire.

- 1) The reporting party will inform the dispatch center of fire location, size, status, smoke color, aspect, fuel type, and provide their contact information.
- 2) The reporting party, or a representative thereof, should remain nearby, in a safe location, in order to make contact with incoming fire resources to expedite actions taken towards an appropriate management response.
- 3) The applicant and contractors will not engage in any fire suppression activities outside the approved project area. Accidental ignitions caused by activities such as welding, cutting, grinding, will be suppressed by the applicant only if employee safety is not endangered and if the fire can be safely contained using hand tools and portable hand pumps. If chemical

fire extinguishers are used the applicant must notify incoming fire resources on extinguisher type and the location of use.

- 4) Natural ignitions caused by lightning will be managed by Federal fire personnel. If a natural ignition occurs within the approved project area, the fire may be initially contained by the applicant only if employee safety is not endangered. The use of heavy equipment for fire suppression is prohibited, unless authorized by the Field Manager.

2.6 Forestry

In accordance with the 1997 White River RMP/ROD, all trees removed in the process of construction shall be purchased from the BLM. Trees should first be used in reclamation efforts and then any excess material made available for firewood or other uses.

- 1) Woody materials required for reclamation shall be removed in whole with limbs intact and shall be stockpiled along the margins of the authorized use area separate from the topsoil piles. Once the disturbance has been recontoured and reseeded, stockpiled woody material shall be scattered across the reclaimed area where the material originated. Redistribution of woody debris will not exceed 20 percent ground cover. Limbed material shall be scattered across reclaimed areas in a manner that avoids the development of a mulch layer that suppresses growth or reproduction of desirable vegetation. Woody material will be distributed in such a way to avoid large concentrations of heavy fuels and to effectively deter vehicle use.
- 2) Trees that must be removed for construction and are not required for reclamation shall be cut down to a stump height of 6 inches or less prior to other heavy equipment operation. These trees shall be cut in four foot lengths (down to 4 inches diameter) and placed in manageable stacks immediately adjacent to a public road to facilitate removal for company use or removal by the public.

Topsoil will be stored, stabilized and labeled as described in the WRFO Surface Reclamation Plan.

2.7 Health and Safety

Waste Management

All operators/holders will comply with all Federal, State and/or local laws, rules, and regulations, including but not limited to Onshore Orders and Notices to Lessees, addressing the emission of and/or the handling, use, transport, and release of any substance that poses a risk of harm to human health or the environment based on applicable laws, rules and/or regulations. Appendix C provides the overall hazardous material management plan, which provides additional guidance and identifies the types of hazardous or potentially hazardous materials that are common within exploration and development of oil and gas.

As a reasonable and prudent operator/holder acting in good faith, the operator/holder will report all emissions or releases that may pose a risk of harm to human health or the environment, regardless of a substances status as exempt or nonexempt based on applicable laws, rules and/or regulations, and regardless of fault, to the BLM WRFO (970) 878-3800.

As a reasonable and prudent operator/holder, acting in good faith, the operator/holder will provide for the immediate clean-up and testing of air, water (surface and/or ground), and soils contaminated by the emission or release of any substance that may pose a risk of harm to human health or the environment, and will provide for cleanup, based on applicable laws, rules, and regulations, regardless of that substances status as exempt or nonexempt. Where the operator/holder fails,

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refuses, or neglects to provide for the immediate clean-up and testing of air, water (surface and/or ground), and soils contaminated by the emission or release of any quantity of a substance that poses a risk of harm to human health or the environment, the BLM WRFO may take measures to clean-up and test air, water (surface and/or ground), and soils at the operators/holders expense plus additional fees based upon current standards as per 43 CFR 3163.1 (a)(4). Such action will not relieve the operator/holder of any liability or responsibility.

Where required by law or regulation to develop a plan for the prevention of releases or the recovery of a release of any substance that poses a risk of harm to human health or the environment, provide a current copy of said plan to the BLM WRFO.

With the acceptance of this authorization, the commencement of operations under this authorization, or within thirty calendar days from the issuance of this authorization, whichever occurs first, operator/holder and, and through the operator/holder, its agents, employees, subcontractors, successors and assigns, stipulate and agree to indemnify, defend and hold harmless the United States Government, its agencies, and employees from all liability associated with the emission or release of substances that pose a risk of harm to human health or the environment.

Construction sites and all facilities shall be maintained in a sanitary condition at all times; all waste must be stored in approved containers with appropriate controls and protections until it is collected by an approved waste disposal contractor and hauled off-site to an approved disposal facility. Waste materials shall be disposed of promptly at an appropriate waste disposal site. “Waste” means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

When drilling to set the surface casing, drilling fluid will be composed only of fresh water, bentonite, and/or a benign lost circulation material that does not pose a risk of harm to human health or the environment (e.g., cedar bark, shredded cane stalks, mineral fiber and hair, mica flakes, ground and sized limestone or marble, wood, nut hulls, corncobs, or cotton hulls).

Through all phases of oil and gas exploration, development, and production, the operator/holder shall employ, maintain, and periodically update to the best available technology(s) aimed at reducing:

- Emissions;
- Fresh water use; and
- Utilization, production, and release of any substance that poses a risk of harm to human health or the environment based on applicable regulations.

Portable pressure washing stations would be constructed and maintained within secondary containment with the ability to collect and dispose of hazardous materials at an approved disposal site.

Noise Management

Where sensitive receptors are identified the operators will utilize noise reduction mufflers, earthen berms, walls, sheds, distance or topographical features, consolidation of facilities, and limiting sound generating equipment to comply with identified noise standards to reduce impacts to sensitive receptors.

2.8 Range Management

The operator must coordinate with the livestock grazing permittee (enter name) authorized to graze livestock within the project area a minimum of 72 hours prior to construction activities associated with this permit. Livestock grazing permittee contact information may be found at www.blm.gov/ras/ or by contacting the WRFO Range staff (970-878-3800). The operator will provide the grazing permittee the location, nature, and extent of the anticipated activity being completed.

Any range improvement projects such as fences, water developments, cattleguards, gates, or other livestock handling/distribution facilities that are damaged or destroyed either directly or indirectly as a result of implementation of the Proposed Action shall be promptly (at least prior to the livestock grazing permittee's need to utilize the range improvement) repaired or replaced by the operator to restore it to at least its pre-disturbance functionality. If the operator damages any range improvement project(s) the operator will notify the Authorized Officer through sundry notice (Form 3160-5) and identify the actions taken to repair the feature(s).

All range improvements (e.g., stock water tanks, pipelines, corrals) would be avoided by 500 feet unless no other alternative is available and impacts can be mitigated as per the BLM AO.

Coordinate with livestock operators and/or the BLM Range staff to identify and develop mutually beneficial livestock management project proposals to include for analysis with development proposals. Some examples are vegetation treatment projects, water developments, maintenance of range projects, etc., to benefit reclamation success while improving livestock management.

When industrial use dominates an allotment to the point of making it unsuitable for livestock grazing, the BLM would consider granting special non-use so that livestock could be removed without penalty for a specified amount of time.

Where development is intense, operators would identify an employee to coordinate with grazing permittees on these issues.

Pipeline projects would be conducted to allow natural movement of livestock through the project area. Operator provided plans would identify appropriate methods (e.g., gaps in trenching) to accomplish this or project would be completed while livestock are not/will not be in the project area.

Facilities that could be hazardous to livestock would be fenced to keep livestock out and the fences maintained in functioning condition.

Compensation would be provided by operators for cattle lost to oil and gas activities (e.g., deaths from pits and animals struck on roads). This would be addressed in the same manner as a road maintenance agreement, with operators making payment based on their level of activity, not on the proximity to the dead animal except in cases where the specific operator causing the loss of cattle can be identified and an agreement reached between that operator and the owner of the livestock.

2.9 Recreation Management

During big game hunting season (generally mid-August through November) it is recommended that helicopter flights be limited to a critical, as needed basis only and no flights conducted on first two days of each big game hunting season. In <insert year>, the hunting seasons for deer, elk,

pronghorn, and bear in Game Management Unit (GMU) #, are as follows: <insert dates of applicable seasons.> For information about the dates of seasons for other years, please refer to the Colorado Parks and Wildlife Big Game Hunting Brochure or contact the BLMs Outdoor Recreation Planner.

2.10 Rights-of-Way

Use areas adjoining or adjacent to previously disturbed areas for rights-of-way and utility corridors whenever possible rather than traverse undisturbed vegetation communities.

All activities shall comply with all applicable local, State, and Federal laws, statutes, regulations, standards, and implementation plans. This includes acquiring all required Federal, State, and/or local permits, **implementing all applicable mitigation measures required by each permit, and** effectively coordinating with existing rights-of-way (ROW) holders.

Stabilize disturbed areas within road rights-of-way and utility corridors by implementing vegetation practices designed to hold soil in place and minimize erosion as described in the WRFO Surface Reclamation Plan (Appendix D).

At least 90 days prior to termination of the rights-of-way, the holder shall contact the Authorized Officer to arrange a joint inspection of the rights-of-way. This inspection will be held to agree to an acceptable termination and rehabilitation plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, and surface material (e.g., gravel or concrete), as well as final recontouring, spreading of topsoil, and seeding. The Authorized Officer must approve the plan in writing prior to the holder's commencement of any termination activities.

Any proposal involving additional surface disturbance outside of the authorized ROW requires an application to the BLM for analysis and authorization. New stipulations for construction would be applied to projects subject to the regulations and policies existing at the time of authorization.

The holder shall conduct all activities associated with the construction, operation, and termination of the ROW within the authorized limits of the ROW.

The holder of the ROW grant shall not convey, assign, or otherwise transfer, in whole or in part, without prior written approval by the AO.

The holder of the ROW grant shall notify the Authorized Officer of any changes in the holder's status, such as changes in legal mailing address, financial condition, business or corporate status, and alien ownership.

For the purpose of determining joint maintenance responsibilities on shared access, the holder shall make road use plans known to all other authorized users of the common access road. Upon request, the AO shall be provided with copies of any maintenance agreement entered into.

Retention and maintenance of a permanent travel lane is not authorized in the following corridor segments: [list by milepost or legal]. On these segments, the [operator/holder] will be responsible for installing physical controls to effectively deter unauthorized vehicle use along the rights-of-way, continuous maintenance of the controls (through project life), and, at a minimum, [interval] monitoring to assess the controls' efficacy. Monitoring reports and documentation of maintenance activity will be sent to the [Natural Resource Specialist/Realty Specialist] by September 30 of each year.

During pipeline construction, the width of the disturbed area shall be kept to a minimum. Only the amount of soil and vegetation necessary for construction of the pipeline shall be disturbed and removed. Topsoil material must be segregated and not mixed or covered with subsurface material.

Under no circumstances will topsoil, soil material below or adjacent to the trench spoils, or subsoil excavated from the trench down to the effective rooting depth (refer to the WRFO Surface Reclamation Plan) be used as padding in the trench, to fill sacks for trench breakers, or for any other use as construction material.

The holder shall notify the authorized officer at least 60 days prior to non-emergency activities that would cause surface disturbance in the right-of-way. A “Notice to Proceed” shall be required prior to any non-emergency activities that would cause surface disturbance on the right-of-way. Any request for a “Notice to Proceed” must be made to the authorized officer, who will review the Proposed Action for consistency with resource management concerns such as wildlife, big game winter range, paleontology, special status species, and cultural resource protection. The authorized officer may require the completion of special status species surveys or other resource surveys. Additional measures may be required to protect special status species or other resources.

2.11 Sodium Resources

Conditions of approval would be applied to permits for oil and gas drilling in areas available for sodium and multi-mineral leasing and/or on existing sodium leases to protect sodium resources throughout the Green River Formation as follows:

- Utilized flooded reverse circulation drilling techniques from surface to 100 feet into the Wasatch Formation to minimize fluid loss to the formation;
- Cement the surface casing with high temperature cement (e.g., Class ‘G’ cement plus 35 percent silica flour) through the saline interval;
- Add a fluorescent dye fluid, other than Rhodamin WT, to drilling fluids used from surface to 100 feet into the Wasatch Formation;
- Take a drilling fluid sample every 100 feet during drilling from surface to 100 feet below the dissolution surface and analyze for pH and conductivity;
- Document any fluid losses during drilling, from the surface, to 100 feet into the Wasatch Formation; and
- Make available a tracer log survey of the upper most frac to demonstrate in-zone penetration and total vertical height growth achieved.

2.12 Soil and Water Resources

Soil

Disturbance across unstable or fragile soils would be allowed only after all other options have been exhausted, and the WRFO Authorized Officer has approved an engineered construction and reclamation plan for the proposed location.

Oil and gas activities in areas exhibiting accelerated soil erosion or degraded soil conditions would be allowed only after all other options have been exhausted, and the WRFO Authorized Officer has approved an engineered construction and reclamation plan for the proposed location.

Any erosion features (e.g., rilling, gullying, piping, or mass wasting) that are the result of the Proposed Action and are located either on or adjacent to the surface disturbance will be addressed

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immediately after observation by contacting the Natural Resource Specialist/Realty Specialist and by submitting a plan to assure successful soil stabilization with BMPs to address erosion problems.

Soil storage areas will be clearly marked to restrict vehicle and equipment use. Metal fence posts, construction fencing, construction barriers or other physical barriers will be placed at regular intervals between the working surfaces and soil storage areas when necessary.

No slopes planned for revegetation will be steeper than a 3(horizontal):1(vertical) slope before topsoil is placed. After spreading topsoil and seeding, the operator/holder will spread stored woody debris, hydromulch the location, or crimp in straw to stabilize the soil surface in seeded areas.

If salt is observed on the surface of soils during reclamation activities the Natural Resource Specialist/Realty Specialist will be notified and a plan will be developed with approval of the AO to improve reclamation on the site.

Construct sediment barriers when needed to slow runoff, allow deposition of sediment, and prevent transport from the site. Employ straining or filtration mechanisms as needed for the removal of sediment from runoff.

Water

Any stormwater management BMPs that would result in additional surface disturbance beyond what is shown in the diagrams for the project must be submitted via Sundry Notice and approved by the AO before installation.

Surface casing shall be set to a depth below all potential sources of usable or potable drinking water. All surface casing shall be cemented from total depth back to surface. In the event surface casing cannot be set to this depth, the subsequent casing string shall be cemented from its total depth to at least 100 feet above the surface casing shoe. In the event surface casing cementing does not reach the surface, that casing shall be remedially cemented by squeeze or top cementing as approved by the AO.

Operators would construct reserve pits with 2 feet of freeboard in cut areas or in compacted and stabilized fill. Reserve pits would not be located in areas in which groundwater is less than 50 feet from the surface. A closed system would be required if water shows in the conductor hole.

To ensure the timely review of the water quality data, the operator is required to have a BLM approved firm contracted to conduct water samples and to send a copy of water quality test results to the BLM WRFO at the same time that they are sent to the operator.

Pursuant to Onshore Order No. 7, a permanent disposal method for produced water must be approved by the BLM and in operation, 90-days after well completion. The reserve pit may not be used for produced water disposal after these 90-days except with prior written permission of the BLM AO.

Prior to starting drilling operations, the operator will submit a Sundry Notice describing the point(s) of diversion for industrial water rights used for freshwater supply and the backflow preventer or other method used to protect water quality at the diversion site.

2.13 Special Status Species – Plants

Prior to approving surface-disturbing or potentially impacting activities within known (occupied), suitable, or potential habitat for federal listed, proposed, candidate species, and BLM sensitive species a plant inventory conducted by a qualified botanist and an environmental analysis would be required for the Proposed Action. Based on the results of the plant survey, Section 7 consultation with FWS may be necessary, and appropriate conservation measures may be required to avoid or minimize impacts on federally listed species.

Field botanical surveys for special status plants should be completed within a distance specified by BLM around the project disturbance area. In some cases the topographic setting or land ownership patterns may impede covering the full recommended survey area. Field botanical surveys should be conducted at a time when the plant species of concern can be detected and accurately identified. In some cases multi-year surveys are necessary. For example, in dry years some ephemeral annuals may not germinate and produce plants, but they are still present at the site in the seed bank. Surveys should also include areas where direct or indirect effects may impact hydrology. Surveys should be floristic and provide complete GIS data and all data collected should correspond with the Colorado Natural Heritage Program field data forms. Negative survey data should also be reported. Botanical surveys are considered valid for three years (i.e., growing seasons).

Maintenance of existing and planned roads and/or rights-of-way within occupied and/or suitable habitat for federally listed, proposed, and candidate species would be limited to the existing disturbance; maintenance would be performed in accordance with specifications provided by the BLM during site specific environmental analysis. Maintenance of county roads as a result of oil and gas development within these same specified plant habitats will be performed in communication and coordination with the respective county's road and bridge department and the BLM.

Non-native or invasive species monitoring and control will follow the most current WRFO Integrated Weed Management Plan (IWMP) which has BMPs related to monitoring and controlling weeds near special status plant species habitat.

Intensive control of fugitive dust within 330 feet from edge of occupied, suitable, and/or potential special status plant species (federally listed species, proposed species and candidate species) habitat would be achieved using the BLM approved dust suppression methods (preferably water) to be determined on a case by case basis. The goal of this measure would be to reduce and control the dust plumes created during the construction, drilling and well completion, and maintenance stages of a project.

Prevent plumes of dust and particulate matter from impacting plants of concern. While new roads should not be built within 660 feet of the plants of concern, preexisting roads with an expected increase in traffic should be graveled in these areas. The operator is encouraged to apply water for dust abatement to such areas during the flowering period. If possible, dust abatement applications should be comprised of water only, with minimal use of chemical dust suppressants.

Where avoidance is not feasible and development is allowed within 660 feet of plant populations, impacts to the plants of concern can be reduced by placing temporary fencing or other barriers around the footprint of the project so that vehicles don't go any further than needed and the sensitive habitat is avoided as much as possible. To avoid working in rare plant habitat and drawing attention to the plants, the edge of disturbance should be fenced, not the nearby plant population. Communication of the importance of rare plant habitat protection with those working on the project is vital to the success of fencing or barriers.

Ex-situ techniques such as transplanting are not recommended. However, an operator could support research to investigate the long-term feasibility of transplanting. If transplanting efforts are undertaken, the following efforts are minimally needed to develop new populations:

- Consider the genetic effects of moving the species around on the landscape (genetic research may be needed);
- Research and identify the best germination and transplanting techniques;
- Ensure enough individuals are established to ensure long-term success; and
- Include long-term monitoring (at least 20 years).

Construction should take place down slope of plants of concern where feasible. Down slope ground disturbing activities should be conducted in such a way as to avoid as much as is reasonably possible undercutting and sloughing of the slopes where rare plant habitat occurs. If well pads and roads must be sited upslope, buffers of 660 feet minimum between surface disturbances and plants of concern should be incorporated.

Perform frequent and timely inspections of development sites and plants of concern occurrences to ensure that BMPs are being followed, and to identify areas of potential conflict. Inspections of plant occurrences should be performed by a botanist or other qualified personnel.

Reclamation of suitable habitat of special status plant species, would include replicating the existing soil horizons and subsoil dynamics (i.e., replace soil and sub-soil to their pre-disturbance order) to allow for increased potential in possible occupation of these sites by special status plant species as well as achievement of late seral vegetation conditions. Restrict motorized travel to designated roads and trails. Routes should be designated and marked prior to implementation.

The operator will appoint a qualified, Independent Third-Party Contractor (Contractor) to provide general project oversight, assure compliance with the terms and conditions of the approval, and perform monitoring. The Contractor will be present during all surface disturbing operations that occur until reclamation is completed. Prior to the initiation of construction, pre-work meetings will be held between the BLM, the operator, and the Contractor to discuss required procedures associated with the conditions of approval.

All vegetation within a specified proximity of ROW corridors shall be brush-hogged and left in place. The maximum allowable roadside disturbance in ACECs is brush hogging the ROW.

Any authorized use of padding machines to lay pipe within a ROW corridor that is within proximity of special status plant habitat shall include the use of necessary apparatus to prevent the generation of fugitive dust and methods to prevent topsoils from percolating through large diameter spoils (see Appendix D Section 6.2).

Any contractor or agent hauling earthen material, in association with a project near special status plant species, will cover all of their loads.

2.14 Vegetation, Noxious and Invasive Species

General

All disturbed areas shall be promptly (at the first appropriate seeding window) seeded with an approved seed mix, or Native or Standard Seed Mix <insert seed mix number> (see below). The elevation and vegetation community for this location are: <insert appropriate vegetation community and elevation>. It is recommended that this site be seeded in accordance with the WRFO Surface

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Reclamation Plan (Appendix D). If an alternate date of seeding is requested, contact the designated Natural Resource Specialist/Realty Specialist prior to seeding for approval. Seed mixture rates are Pure Live Seed (PLS) pounds per acre. Drill seeding is the preferred method of application and drill seeding depth shall be no greater than ½ inch. If drill seeding cannot be accomplished, seed should be broadcast at double the rate used for drill seeding, and harrowed or raked into the soil.

Use seed that is certified and free of noxious weeds. All seed tags will be submitted via Sundry Notice (SN)/<letter for Realty> to the designated Natural Resource Specialist/Realty Specialist within 14 calendar days from the time the seeding activities have ended. The notification will include the purpose of the seeding activity (i.e., seeding well pad cut and fill slopes, seeding pipeline corridor). In addition, the notification will include the well or well pad number or right of way case file number associated with the seeding activity, if applicable, the name of the contractor that performed the work, his or her phone number, the method used to apply the seed (e.g., broadcast, hydro-seeded, drilled), whether the seeding activity represents interim or final reclamation, the total acres seeded, an attached map that clearly identifies all disturbed areas that were seeded, and the date the seed was applied.

The operator/holder will be required to meet with the WRFO reclamation staff in March or April of each calendar year and present a comprehensive work plan. The purpose of the plan is to provide information pertaining to reclamation activities that are expected to occur during the current growing season. Operators/holders shall also provide a map that shows all reclamation sites where some form of reclamation activity is expected to occur during the current growing season.

A Reclamation Status Report will be submitted to the WRFO annually according to the WRFO Surface Reclamation Plan (Appendix D) for all actions that require disturbance of surface soils on BLM administered lands.

Consult the BLM Integrated Vegetation Management Handbook, H1740-2 to reach BLM objectives of maintaining and restoring native plant community diversity, resiliency, and productivity (BLM 2008). This handbook addresses renewable resource management and provides BMPs that can be used for energy development related projects.

Noxious and Invasive Weeds

All weed management proposals will be developed within an Integrated Pest Management format that is consistent with the current WRFO Integrated Weed Management Plan.

Herbicide Application

Application of herbicides shall comply with the WRFO Integrated Weed Management Plan.

Pesticide Use Proposals (PUPs) shall be submitted to and approved by the BLM before applying herbicides on BLM lands. The PUP will include target weed species, the herbicides to be used, application rates and timeframes, estimated acres to be treated, as well as maps depicting the areas to be treated and known locations of weeds.

Application of herbicides must be under field supervision of an EPA-certified pesticide applicator. Herbicides must be registered by the EPA and application proposals must be approved by the BLM.

Use of off-highway vehicles (OHVs) for access to weed treatment areas along the pipeline/power line ROW will be considered on a case-by-case basis, provided that access is limited and will not create visible tracks, and will require prior written approval from the AO.

2.15 Visual Resource Management

Special location, design and reclamation measures may be required to protect scenic and natural landscape values and achieve the minimum adverse impact on visual quality. These design measures may include a variety of landscaping treatments and construction guidelines intended to minimize visual contrasts with surrounding landscapes. Surface disturbing activities may be moved up to 600 feet to avoid sensitive areas or to reduce the visual effects of the proposal. These measures would be applied to the following VRM Class II and Class III areas but may also be applied to other areas on a case by case basis:

- Canyon Pintado National Historic District;
- State Highways 13, 40, 64 and 139 corridors;
- Viewsheds in the Blue Mountain/Moosehead GRA;
- White River Corridor;
- Douglas and Baxter Pass divide;
- Cathedral Bluffs; and
- VRM Class II areas around Meeker.

All above ground facilities shall be painted to blend in with the surrounding environment. The chosen paint color will be selected from the BLM Standard Environmental Color Chart in consultation with the BLM Visual Resource Specialist.

In areas of high visual sensitivity, the use of digital camouflage painting of above ground facilities, in consultation with the BLM Visual Resource Specialist, may be required.

In consultation with the BLM Visual Resource Specialist, the site design (including above ground facilities) will be integrated with the surrounding landscape in such a way that minimizes visual contrast. This may include the use of vegetative and topographic screening, vegetation preservation, proper siting, minimize hill cuts, minimize the number of facility structures, utilization of low profile tanks, and using existing disturbance where practical.

Other best management practice design features that may be applied to reduce contrast, mitigate impacts to visual resources values, and/or meet visual resource management objectives include but are not limited to:

- Avoiding siting linear features in the centers of valley bottoms and on ridge tops;
- Bury underground utilities along roads;
- Use round road cut slopes;
- Use of non-reflective materials, coatings, paint, or surface treatments to reduce contrast with surrounding landscapes;
- Use of full cutoff luminaries;
- Use amber instead of bluish-white lighting;
- Use vehicle mounted lights for nighttime maintenance activities instead of permanent lighting structures;
- Do not allow applying paints or permanent discoloring agents to rocks or vegetation for survey markers;
- Dust, sediment, and wind erosion control;
- Feather the edges of vegetation clearings;

- Design vegetation openings to mimic natural openings;
- Re-vegetate using salvaged or transplanted vegetation;
- Salvage and replace rocks, brush, and woody debris, sculpt or re-shape bedrock landforms;
- Remove or bury gravel or other surfaces; and
- Use fabric covered fences to conceal storage yards.

2.16 Wild Horse Management

Should the Proposed Action occur simultaneously with a wild horse gather, all project-related traffic, including helicopters, would need to be coordinated with the BLM and the gather contractor.

To minimize incidents where young foals become separated from their mares, helicopters should avoid flights over wild horses observed in the area. Drilling and receiving crews are required to slow down or stop when wild horses are encountered, allowing bands to move away at a pace slow enough so that foals can keep pace and are not separated.

A “horseproof” cattle guard shall be installed and maintained at the following locations: [describe location or give legal description]. To reduce the potential for injuries to wild horses, sucker rod or rebar should be tack welded (centered between the equally spaced rails) to each cross member for the entire length and width of the cattle guard. “Horseproof” cattle guards shall be painted a dark color to help with snow melt.

In wild horse use areas, open trenches for burial of gathering pipelines should be inspected daily to reduce the potential for horses to become trapped should they fall into a trench. If a horse has fallen into the trench the BLM Range Staff shall be notified immediately.

No motorized or surface-disturbing activities would be permitted within a 2,000-foot radius around water sources in the Piceance-East Douglas Herd Management Area.

2.17 Wildlife Management

The operator shall prevent migratory bird access to facilities that store or are expected to store fluids which may pose a risk to such birds (e.g., toxicity, compromised insulation). Features that prevent access to such fluids must be in place and functional within 24 hours of the drilling rig moving off the location and shall remain effective until such pits are removed or incapable of storing fluids. Deterrence methods may include netting or other alternative methods that effectively prevent use and that meet the BLM approval (the use of “bird balls” is discouraged). It will be the responsibility of the operator to notify the BLM of the method that will be used to prevent use two weeks prior to when completion activities are expected to begin. The BLM approved method will be applied within 24 hours after completion activities have begun. All lethal and non-lethal events that involve migratory birds will be reported to the AO immediately.

Surface disturbance and vegetation clearing associated with project construction should generally be located to avoid vegetative types in most limited supply, those less conducive to successful reclamation, or those representing greater site-specific value for wildlife, as determined during the NEPA process. Examples of these vegetative types are juniper stands in a predominant sagebrush type, sagebrush in a predominant woodland type, mature tree stands rather than younger growth, and woodlands with well-developed understory rather than with barren understory.

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Vehicular access by the public on important wildlife habitats and/or during sensitive functional use periods (e.g., big game severe winter range, critical summer use areas, raptor nesting areas, sage grouse reproductive habitats) would be subject to restrictions as directed by the Area Manager. Use of restricted road segments by authorized personnel (e.g., BLM personnel, law enforcement, permitted land users) may be allowed for administrative and operational purposes. Methods used to restrict vehicular access may include:

- Installing lockable gates, barricades or other forms of deterrents;
- Signing, or reclaiming and abandoning roads or trails no longer necessary for management; and/or
- Other methods prescribed by the Field Manager.

Woodland treatments will be designed and located where possible to replicate natural patterns of forest succession and distribution. Efforts will be made to minimize community fragmentation, including structural and age class components. In general, no point within a cleared opening will be more than 200 yards from equal or greater intervals of cover.

Power lines shall be constructed in accordance with most current avian protection standards, for example, those designs presented in “Suggested Practices for Avian Protection on Power Lines, The State of the Art in 2006,” Avian Power Line Interaction Committee, Edison Electric Institute and California Energy Commission (2006) (www.aplic.org). The holder shall assume the burden and expense of proving that pole designs deviating from those shown in the above publication provide effective electrocution and line-strike protection for birds. Such proof shall be provided by a subject-matter expert approved by the AO. The BLM reserves the right to require modifications or additions to all power line structures placed on this ROW, should they be necessary to ensure the safety of large birds. Such modifications and/or additions shall be made by the holder without liability or expense to the United States.

Encourage oil and gas operators to develop Avian Protection Plans that are similar to those voluntary partnerships formed between the utility industry and FWS to identify and implement practices that reduce the risk of bird mortality and the operators’ liability under the Migratory Bird Treaty Act.

A raptor nest survey will be required in habitats potentially influenced by the Proposed Action, including suitable woodland habitat within [990] feet of project-related disturbance, and suitable cliff/rock outcrops within [1,320] feet of project-related disturbance. Surveys must be consistent with the most current WRFO raptor survey protocol (available upon request) and survey results must be analyzed by the WRFO prior to project initiation. Depending on specific project circumstances and nest status, nest sites documented through these surveys would be subject to siting constraints and timing limitations.

In areas of concentrated development (e.g., the geography encompassing acute/collective activity), vehicle use on BLM vehicle access networks (including existing roads, trails, and ways), where logistically practicable, would be temporarily limited to that associated directly with oil and gas development, production, and maintenance. Use by other BLM permittees could be considered, as determined by the Authorized Officer, consistent with big game management objectives. To be effective, this mitigation should control the use of vehicle access networks in areas of concentrated development rather than controls applied to individual well access routes.

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Road abandonment and use limitations would be used to limit effective road densities in the long term to an average maximum 1.5 miles per square mile in higher value big game habitat (i.e., defined severe winter range, severe winter range/winter concentration areas and summer ranges) and 3 miles per square mile on other big game ranges.

The design of utility corridors would be required to avoid the need for regular vehicular access for inspection by the ROW grantee/lessee and would be conditioned by the grantee/lessee to effectively preclude all subsequent vehicular travel throughout the term of the grant/lease. In the event continued access is required, the corridor would remain closed to public vehicular access and the grant/lease holder would be responsible for installing and maintaining effective vehicle deterrents that would be functional beyond final abandonment of the grant/lease.

In areas under an existing lease, a program would be developed in cooperation with current leaseholders, to apply (where appropriate) the most current reclamation standards and practices to existing well pads, roads, and pipelines. These standards and practices would be applied in annual increments that would allow for completed interim or final reclamation of active and inactive ROW corridors and producing, plugged, and abandoned wells and access routes within 20 years. This action would be most relevant to the Douglas/Evacuation Creek, Coal Oil Basin, Indian Valley, Crooked Wash, and White River Dome areas.

On a case-by-case basis and in addition to standard interim and final reclamation measures, special reclamation components or techniques may be prescribed to restore or provide supplemental forage species that would aid in meeting wildlife objectives (e.g., deciduous browse for big game). While these additional forage species could be non-native species, species used could not be invasive or have a demonstrated tendency to persist as a dominant constituent on reclaimed lands for extended timeframes (e.g., more than 10 years) or disperse beyond the treatment area.

Well access routes would be unavailable for public vehicular access (e.g., public access not expressly associated with natural gas facility development and maintenance), including the BLM permittees not expressly associated with oil and gas development, production, monitoring, and maintenance. Exceptions would be evaluated on a case-by-case basis in the context of disturbance thresholds established for each seasonal range and leaseholding.

Access developed for well and facility access would generally be subject to complete abandonment once its intended use is complete.

Avoid subjecting sage-grouse priority and, where appropriate, general habitat to development-related noise that exceeds ambient predisturbance levels by 10 dBA or more (based on default background levels of 20-22 dBA). In those instances where avoidance is not possible, minimize the noise levels and/or area affected by noise to the extent practicable, particularly from vehicle traffic, during the lekking and nesting seasons (March 1-May 15). These noise levels should not be exceeded at the margin of active leks and, where reoccupation is being promoted, inactive leks. Noise measurement protocols should be based on guidelines presented in Patricelli et al. (2012).

Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use.

Restrict the construction of tall facilities, distribution powerlines, and fences to the minimum number and amount needed.

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Design or site permanent structures to minimize impacts to sage-grouse, with emphasis on locating and operating facilities that create movement (e.g., pump jacks) or attract frequent human use and vehicular traffic (e.g., fluid storage tanks), in a manner to minimize disturbance of sage-grouse or interference with habitat use.

As a means of reducing the risk of physical disruption and sediment-related effects on fish reproduction and spawning habitat (e.g., smothering of eggs, fungal exposure), timing limitations will be applied, as appropriate, to authorizations that involve channel feature disturbances or sediment release to occupied habitats during species-specific incubation timeframes recommended by CPW, as follows:

Species	Avoidance Period
Bluehead sucker	May 1 – July 31
Roundtail chub	May 1 – July 31
Flannelmouth sucker	March 15 – July 1
Mountain sucker	May 15 – July 31
Colorado River cutthroat trout	June 1 – September 1
Rainbow/brook/brown trout, mountain whitefish	Applicable to White River upstream of Rio Blanco Lake. Timeframes negotiated in coordination with CPW.

To reduce the risk of inadvertent introduction and contamination of area streams with invasive aquatic plants and animals and aquatic pathogens/parasites, any equipment to be used in contact with waters that contribute to or directly involve occupied aquatic habitats must comply with the most current disinfection practices endorsed by CPW. The most current practices provided by CPW at this time follow:

Heavy equipment (e.g., excavation, construction, and water transport equipment), hand tools, boots, water suction hoses, water tanks or other equipment that was previously used in a river, stream, lake, pond, or wetland must be cleaned and disinfected prior to the equipment being moved to and contacting other water bodies. The disinfection practice should follow these guidelines:

- Remove all mud and debris from equipment (e.g., tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with a 1:15 solution of disinfecting solution comprised of the following:
 - Dialkyl dimethyl ammonium chloride (5-10% by weight);
 - Alkyl dimethyl benzyl ammonium chloride (5-10% by weight);
 - Nonyl phenol ethoxylate (5-10% by weight);
 - Sodium sesquicarbonate (1-5%);
 - Ethyl alcohol (1-5%);
 - Tetrasodium ethylene diaminetetraacetate, 1-5%; and
 - Water.
- The equipment must be kept moist with this solution for at least 10 minutes. Manage and dispose of the rinsate as a solid waste in accordance with local, county, state, or federal regulations;

Or

- Remove all mud and debris from equipment and spray/soak equipment with water greater than 140 degrees F for at least 10 minutes.