APPENDIX B
STANDARD PRACTICES AND MITIGATION MEASURES

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List of Acronyms

AHR	annual hydrology report
AO	Authorized Officer
AQCC	Colorado Air Quality Control Commission Regulations
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
BP	before present
CAL AD	calendar AD date
CCR	Code of Colorado Regulations
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CDPS	Colorado Department of Public Safety
CFR	Code of Federal Regulations
CMM	Coal Mine Methane
COE	U.S. Army Corps of Engineers
CR	County Road
CRS	Colorado Revised Statutes
CSP	Colorado State Parks
DEIS	Draft Environmental Impact Statement
DRMS	Division of Reclamation, Mining and Safety
ECSQG	Erosion Control and Stormwater Quality Guide
EIS	Environmental Impact Statement
EPCRA	Emergency Planning and Community Right-To-Know Act of 1986
ERRP	Erosion, Revegetation and Restoration Plan
F&L	Field & Laboratory
FRA	Federal Railroad Administration
GHG	greenhouse gas
GPS	global positioning system
MINER	Mine Improvement and New Emergency Response Act of 2006
MSDS	material safety data sheets

MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIFC	National Interagency Fire Center
NRCS	Natural Resources Conservation Service
NPDES	National Pollution Discharge Elimination System
OSHA	Occupational Safety & Health Administration
ORV	off-road vehicle
PPE	personal protective equipment
RA	reference area
RCRA	Resource Conservation and Recovery Act of 1976
ROD	Record of Decision
ROW	right-of-way
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Officer
SM	seed mix
SPCC	Spill Prevention, Control, and Countermeasures
SSPS	special-status plant species
su	standard units
SWPPP	Stormwater Pollution Prevention Plans
T&E	threatened and endangered
TDS	total dissolved solids
Trec	Total Recoverable
US	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VAM	ventilation air methane
VRM	Visual Resource Management

1.0 Introduction

Appendix B, Standard Practices and Mitigation Measures, contains a table (Table B-1, Applicable Legal and Policy Requirements and Mitigation Measures by Resource) listing all of the applicable laws, regulations, policies, additional U.S. Bureau of Land Management (BLM)/Cooperating Agency recommended mitigation and enhancements, and operator-proposed features to mitigate impacts by resource.

The *Laws and Authorities* column lists federal, state, and local government agency laws and regulations that must be followed. The *BLM Policies and Regulations* column describes BLM policies that must be adhered to. The *Limits or Controls Stipulated* column describes the *Laws and Authorities* and *BLM Policies and Regulations* columns in more detail.

The *Additional BLM/Cooperating Agency Recommended Mitigation and Enhancements* column includes mitigation measures proposed by BLM or a Cooperating Agency that are not backed by that agency's regulatory authority, but are proposed as potential mitigation. These mitigation measures are either proposed by BLM, a Cooperating Agency, or are current text in the Draft Environmental Impact Statement (DEIS). The agency proposing the mitigation measure is indicated in parentheses; otherwise the mitigation measure is current text in the DEIS.

The *Operator-Proposed Features to Mitigate Impacts* column includes facility design, construction and operation timing, reclamation, revegetation, noxious weed plan, monitoring, wildlife mitigation, and conservation. The rationale for these features is to mitigate potential impacts to less than significant. The term "operator" refers to the future operator of the mine, which would be the successful bidder for the lease area.

Neither the BLM/Cooperating Agency recommended mitigation and enhancements nor the operator-proposed features to mitigate impacts are finalized. These mitigation measures are not tied to any regulatory authority and are currently under discussion to determine if they are reasonable, feasible, and whether they relate directly to an impact of the proposed action. The Record of Decision (ROD) for this EIS will contain BLM's required mitigation measures. BLM does not have the authority to require mitigation on lands and resources outside BLM's jurisdiction, including the following: Mesa County roads, state and federal highways, private land under Mesa or Garfield county's jurisdiction, and Highline Lake State Park.

Following the table are the proposed Mine Reclamation Plan, Mine Revegetation Plan, Noxious Weed Control Plan, Revegetation Success Monitoring Plan, and Subsidence Monitoring Program. A Railroad Fire Mitigation Plan, adopted from an existing Field Guide, is also included. Also included are BLM's Standards and Guidelines, and Special Stipulations.

Table B-1
APPLICABLE LEGAL AND POLICY REQUIREMENTS AND MITIGATION MEASURES BY RESOURCE

Resource/Issue	Laws and Authorities	BLM Policies and Regulations	Limits or Controls Stipulated	Additional BLM/Cooperating Agency Recommended Mitigation and Enhancements	Operator-Proposed Features to Mitigate Impacts
Land Ownership and Use	Mine Safety and Health Administration (MSHA) Rules (30 CFR § 75.1700). Rules and regulations of the Colorado Mined Land Reclamation Board Pursuant to the Colorado Surface Coal Mining Reclamation Act – Section 2.05.4	See the Special Stipulations section in this appendix. Use of Federal lands would require the mine operator to obtain rights-of-way grants on these federal lands.	Some gas wells overlying the lease area may be plugged or "mined around" per Mine Safety and Health Administration (MSHA) Rules (30 CFR § 75.1700).	• New transmission lines would be constructed along existing county road easements on private lands, and new rights-of-way would be secured for construction of new transmission lines on BLM-administered lands. • All temporary construction areas would be reclaimed and revegetated per BLM policy. • Upon decommissioning of the mine, surface facilities would be removed and the land would be restored to its original vegetative cover per BLM policy. Access roads would be closed to the public, and the disturbed area would be reclaimed. • Upon project termination, the railroad would be removed, including bridges, cross warning devices, and gate systems at road intersections, and the area would be revegetated according to BLM policy. • For Transmission line Alternatives A and B, Grand Valley Power would need to acquire new easements on private lands.	The proposed postmining land use would be achieved by reclaiming the disturbed area and planting same in accordance with the reclamation plan presented in this appendix.
Grazing		See the Special Stipulations section in this appendix. BLM Guidelines for Livestock Grazing Management (BLM 1997)	See BLM's Standards and Guidelines in this appendix	• Fence repair or rebuilding would be done as required. • New water sources would be supplied. • Cattle guards may need to be installed to protect livestock from rail or vehicular traffic. • See Section 7.0, Railroad Fire Mitigation, in this appendix.	See Mine Reclamation Plan in this appendix.
Wilderness and Special Designations				No mitigation is required.	
Recreation		See the Special Stipulations section in this appendix.		• Within the North Fruita Desert SRMA, BLM would require that existing trails impacted by the mine facilities and the railroad be mitigated. One way in which this may be done would be for the Applicant to contract with the Colorado Off-Highway Vehicle Coalition to design and construct alternate trail routes for those that are closed by the mine facilities or railroad alignment. • Existing trails crossed by the rail line would need to be restored to be suitable for their original designation. (BLM)	
Socioeconomics				• Potential negative impacts on property values can be in part avoided by properly addressing some of the other concerns: safety, noise, deterioration in viewsheds, etc. Some uncertainties about future developments could be mitigated by providing quality land use planning and related information to the community, e.g., through an appropriate role being played by the responsible governmental entities, such as the Mesa County Planning Commission.	

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				• Landscaping measures could overcome some of the visual impact concerns. Horn noise mitigation could in part be addressed through grade separations and a "quiet crossing" for County Road (CR) M.8 and CR 10. The deeper social impacts on rural values could in part be addressed by working more closely with the community to enhance traditional social interactions, community cohesion, historic preservation, and rural fire protection and alleviate possible school crowding. • Recommendations by the community have been made for safer crossings, especially at CR 10 and CR M.8, by creating grade separations. Additional adaptations to the community's design suggestions about safety and road realignments would require additional public involvement in a collaborative mode in order to create satisfactory mitigation alternatives. • Some mitigation benefits could be provided through clearer and more transparent communications about associated land use restrictions, intentions, and objectives. In the long run the role and authority of local governments in guiding compatible land uses, working directly with the community residents, would be quite vital to maintaining the rural quality of life within the Mack-Loma community area. • Along with the other specific mitigation measures, a framework to improve community-company communications and relations is needed. This could take many forms, but should be based on an agreement between the parties to establish clearer expectations and open lines of communication about the mine and rail construction and operations phases. A commitment among all parties to establish a neighborly, working partnership would pay long term benefits for community sustainability, towards more effective mine operations, and for employee well-being.	
Transportation	Mesa County Road and Bridge Specifications Mesa County and Colorado Department of Transportation (CDOT) design and safety standards.		CR X would be designed to meet Mesa County Road and Bridge Standard requirements. Since this road lies with in the Grand Valley Airshed, the road surface would be asphalt or chip-n-seal to remain dust free. The intersection improvements would incorporate the latest	• Carpooling of workers should be employed to minimize transportation impacts. (Colorado Division of Wildlife [CDOW]) • Employees should be bussed to the mine site from a central location in the Fruita/Loma/Mack area. CDOW stated that it would lessen vehicle/animal collisions, and allow for a smaller parking lot. (CDOW) • County Road X should have a 35-mph speed limit during the day and 25-mph speed limit from 1 hour before sunset to 1 hour after sunrise. (CDOW) • A traffic management plan would be developed during the final design of the project to minimize disruption	

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			design and safety standards and be designed in accordance with Mesa County and CDOT standards.	to traffic flow. These plans would be designed in accordance with agency standards and would include maintenance of access to private property, minimizing disruption to local businesses, and provide detours or alternate routes as needed. • Construction activities would be coordinated with agency officials to avoid the need for night time construction in certain sensitive areas near residents.	
Utilities – Railroad	Title 49 Code of Federal Regulations (49 CFR) • Section 213.37 - Vegetation. • Section 230.204 - General precautions. Healthy Forests Restoration Act of 2003 • Sec. 102. Authorized Hazardous Fuel Reduction Projects. • Sec. 104. Environmental Analysis.		Any underground phone lines and small electric distribution lines within the railroad/pipeline right-of-way (ROW) would be replaced or moved in accordance with all applicable federal, state, and utility provider regulations and policies. In accordance with 49 CFR Part 659 and Colorado Revised Statutes (CRS) 40-18, the Colorado Public Utilities Commission has responsibility for the oversight of the safety and security of rail fixed guideway systems within the state.	• If county roads are built along proclamated ROW in the future that cross the railroad spur, an appropriate crossing would be constructed. (Mesa County) Weed control along the railroad corridor could be used to mitigate potential impacts of fire caused by the railroad. (CDOW) • Bond the company for reclamation costs in case of a fire caused by the railroad. (CDOW) • See Section 7.0, Railroad Fire Mitigation, in this appendix.	
Utilities – Water Pipeline		See the Special Stipulations section in this appendix.		• Hydrants would be installed on either side of the water pipeline to be used in case of fire. (BLM) • The water pipeline would be pressure-sensitive in case of leaks. (BLM)	
Utilities – Access Roads	Rules and regulations of the Colorado Mined Land Reclamation Board Pursuant to the Colorado Surface Coal Mining Reclamation Act (CRS Section 34-33-101) Regulations of the Colorado Mined Land Reclamation Board for Coal Mining (2 Code of Colorado Regulations [CCR] 407-2) Rule 4.03 Roads o Rule 4.03.1(2)(b) o Rule 4.03.1(6). o Rule 4.03.2(6).	BLM Manual Section 9113 – Road Standards See the Special Stipulations section in this appendix.	Roads would be constructed and maintained to BLM road standards (BLM Manual Section 9113). Road segment #2 crosses an ephemeral stream that drains a watershed of over 1 square mile so the restrictions of rule 4.03.1(2)(b) apply. The Division of Reclamation, Mining, and Safety (DRMS) must	• Immediate reclamation of all construction related roads, • Increased information/education and law enforcement. (CDOW)	• The combination of paving, dust control and sediment control comprised of drainage collection ditches located on each side of the road would assure the road crossing would not cause a violation of applicable water quality standards. During mining a culvert would be maintained under the road to assure water quality and quantity in the ephemeral channel is not adversely affected. After mining the road culvert would be removed and the stream channel restored so the water quality and quantity in the ephemeral channel is not adversely affected. • In the placement of embankment for the haul road, materials would be spread in layers approximately 12 inches deep, and such lifts made uniformly over long stretches and for the full width of the embankment. Each lift would be moistened or dried to a uniform moisture content suitable for maximum compaction. Hauling equipment would be routed both ways over the fill and routing varied sufficiently to achieve uniform compaction. Compaction would be carried to the edge of the fills so that the final slopes are firm. A sheepsfoot roller or other suitable equipment may be required to achieve compaction. Compaction of each lift would continue until the unit dry weight of the lift reaches a value not less than 90 percent of maximum unit dry weight attained in a laboratory compaction

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	Rule 4.05 Hydrologic Balance o Rule 4.05.18. Handbook of Steel Drainage & Highway Construction Products (1983).		specifically authorize this stream channel crossing under Rule 4.05.18. Culverts are designed in accordance with the Handbook of Steel Drainage & Highway Construction Products (1983). The haul roads on-site would be maintained in accordance with Rule 4.03.1(6). The access roads on-site would be maintained in accordance with Rule 4.03.2(6).		test in accordance with the specifications of American Society for Testing and Materials (ASTM) D 698, Method D. Where the embankment is placed against the existing slopes, the slopes would be benched and scarified down to a firm dense base as the new fill is being placed. Material so loosened would be mixed with the new fill and the resultant mix blended firmly into the slope. When rock or rocky material is used for embankment, placement shall be in layers not exceeding the maximum size of the rock present, and in no case shall lifts exceed 30 inches in depth. Rock layers shall be compacted by routing the spreading equipment and loaded hauling equipment over the entire width of the fill until compaction is obtained. Temporary erosion control measures would be implemented during the construction of the haul roads. Straw bales, riprap, check dams, vegetation or other alternative sedimentation control measures would be used to reduce overland flow velocity, reduce run-off volume, or trap sediment. After construction is complete the area disturbed would be seeded and mulched to reduce the rate and volume of run-off. • The minimum depth of cover for corrugated steel pipe, H-20 live load, 2 2/3 X 1/2 inch corrugations is 12-inches for diameters or spans of 12 to 96 inches. The depth of cover is measured from the top of pipe to the top of subgrade. Therefore all culverts would be covered by compacted fill to a minimum depth of 1 foot. The inlet end of all culverts would be protected by an end section or a rock or concrete headwall. • Acid or toxic forming substances would not be used in haul road surfacing. • The paved road surfaces would be patched as necessary and potholes would be filled. Gravel road surfaces would be periodically watered and maintained with a motor grader. Ditches along the roadways would be periodically cleaned with a motor grader and the road shoulders would be smoothed to conform to the paved surface. Cut and fill sections would be vegetated and gullies, if any, would be repaired at least annually. If the haul road is damaged by a catastrophic event such as a flood or earthquake, it would be repaired as soon as practicable after the damage has occurred. Gravel would be added to the road surfaces as necessary. • The haul road from State Highway 139 to the preparation plant area would not be totally reclaimed. Asphalt surfacing would be removed from the entire road surface. The waste asphalt would either be recycled or placed in the waste rock pile for final disposal. The road bed would be narrowed from a travel width of over 24 feet to a travel width of 14 to 16 feet. Culverts would be removed. The road is to be left in place so the light use roads on the property are re-established after reclamation. Reclamation of the remaining haul roads would involve returning the road to its pre-mining contours. Roads would be closed to vehicular traffic. Natural drainage patterns shall be restored. Bridges and culverts shall be removed. Roadbeds shall be ripped plowed or scarified. Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural drainage restoration standards. Cut slopes shall be shaped to blend with the natural contour. Terraces shall be constructed as necessary to prevent excessive erosion and to provided long term stability in cut and fill slope. The regraded area shall be covered with topsoil and revegetated. Road surfacing materials that are incompatible with the postminig land use and revegetation requirements shall be removed and disposed of in appropriate disposal areas as authorized by the DRMS. • Temporary erosion control measures would be implemented during the construction of the access roads. Straw bales, riprap, check dams, vegetation or other alternative sedimentation control measures would be used to reduce overland flow velocity, reduce run-off volume, or trap sediment. After construction is complete the area disturbed would be seeded and mulched to reduce the rate and volume of run-off. • Access roads would to the extent practicable, be located on ridges or on the most stable available slopes to minimize erosion.

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					• The road surfaces would be patched as necessary and potholes would be filled. Gravel road surfaces would be periodically watered and maintained with a motor grader. Ditches along the roadways would be periodically cleaned with a motor grader and the road shoulders would be smoothed to conform to the road surface. If the access road is damaged by a catastrophic event such as a flood or earthquake, it would be repaired as soon as practicable after the damage has occurred. Gravel would be added to the road surfaces as necessary. • All access roads would be reclaimed. Roads would be closed to vehicular traffic. Natural drainage patterns shall be restored. Bridges and culverts shall be removed. Roadbeds shall be ripped plowed or scarified. Fill slopes shall be rounded or reduced and shaped to conform the site to adjacent terrain and to meet natural drainage restoration standards. Cut slopes shall be shaped to blend with the natural contour. Terraces shall be constructed as necessary to prevent excessive erosion and to provided long term stability in cut and fill slope. The regraded area shall be covered with topsoil and revegetated. Road surfacing materials that are incompatible with the postminig land use and revegetation requirements shall be removed and disposed of in appropriate disposal areas as authorized by the DRMS.
Utilities – Sediment ponds	Regulations of the Colorado Mined Land Reclamation Board for Coal Mining (2 CCR 407-2) Rule 4.05 Hydrologic Balance • Rule 4.05.3 • Rule 4.05.4 • Rule 4.05.6 • Rule 4.05.9	See the Special Stipulations section in this appendix.	The sediment ponds are considered temporary ponds and are designed to meet the requirements of Rules 4.05.6 and 4.05.9. Collection ditches and diversion ditches have been designed to comply with the requirements of rules 4.05.3 and 4.05.4.		The following design specification for the sediment ponds is adapted from Rule 4.05.9(7): The embankment foundation area shall be cleared of all organic matter, all surfaces sloped no steeper than 1h:1v, and the entire foundation surface scarified. The fill material shall be free of sod, large roots, other large vegetation matter, and frozen soil, and in no case shall coal-processing waste be used in embankment construction. The placing and spreading of fill material shall be started at the lowest point of the foundation. Materials would be spread in layers approximately 12 inches deep, and such lifts made uniformly over long stretches and for the full width of embankment. Each lift would be moistened or dried to a uniform moisture content suitable for maximum compaction. The fill material shall be compacted until it attains at least 95 percent of the maximum dry density attained in a laboratory compaction test in accordance with ASTM D698. This compaction is necessary to achieve the strength parameters used in the embankment stability analyses. Compaction tests would be taken at a frequency and location of not less than one per every other layer, at random locations across the embankment. The embankment shall be constructed so the design height is achieved at all times, including the period after settlement. The combined upstream and downstream side slopes of the settled embankment shall not be steeper than 5h:1v, with neither slope steeper than 2h:1v. Faces of the embankments including the surrounding areas disturbed would be vegetated to enhance stability. Anti-seep collars would be installed to control seepage along conduits that extend through the embankment. The sediment ponds must be dewatered if they contain water above the maximum sediment level. Ponds A, D and E would be dewatered with a portable pump. Remaining ponds would be dewatered through their primary spillways which consist of six inch diameter pipes. All ponds have a standard emergency spillway with the inlet placed at the maximum water storage elevation. Dewatering events should occur within 48 hours after the storm event or mine discharge which caused the water accumulation. Sediment would be removed from all ponds no later than when the ponds are 75 percent full of sediment. Sediment ponds would be removed after the site has been reclaimed and the vegetation on the reclaimed site is adequate to control erosion. Pond removal must be authorized by the Division and the untreated drainage from the disturbed area ceases to contribute additional suspended solids above natural conditions. Mine discharge would be treated in underground sumps if required. Any discharge from the mine or mine facilities would be treated to meet Colorado Department of Public Safety (CDPS) discharge permit requirements.

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Utilities – Transmission Line				• Any displaced distribution lines would be replaced with underbuild lines. • Transmission lines shall be constructed in accordance to standards outlined in "Suggested Practices for Raptor Protection on Power Lines". See Section 9.3, Transmission Lines, in this appendix.	
Visual		BLM Visual Resource Management Guidance Temporary construction areas would be revegetated according to BLM policy, thus reducing visual impacts due to construction. Upon termination of the project, the aboveground mine facilities would be removed and the area would be revegetated in accordance with BLM policy. See the Special Stipulations section in this appendix.	Mine facilities would be painted colors that would blend with the background colors as required by the Standard Design Practices in the Grand Junction RMP (BLM 1987) (unless prevented by safety or permitting requirements).	• Full-cutoff lighting at the mine facilities could be used to reduce nighttime light impacts. • Mine facilities would be painted colors that would blend with the background colors.	
Noise	The Colorado General Assembly has established statewide standards for noise level limits during various time periods in various areas (25-12-101). FTA Transit Noise and Impact Assessment Manual	See the Special Stipulations section in this appendix.	If the sound levels of a noise are above the given limit when heard 25 feet away, then the noise is a public nuisance. For industrial zones, noises cannot exceed 80db(A) between the hours of 7am and 7pm and cannot exceed 75db(A) between 7pm and 7am. The criteria to mitigate severe railroad horn noise impacts states that mitigation should be considered when there is a 5 dBA increase in Ldn or Leq, and the total noise level exceeds 65 dBA.	• Noiseless crossing at CR 10 is considered mitigation. (Mesa County) • CR M.8 crossing would be a quiet zone. (Mesa County) • Mitigation measures include tall earth berms or noise walls to reduce noise to acceptable FTA levels. Other noise mitigation measures can include insulating the home or structure, installing noiseless crossing traffic control devices at the grade crossing to create 'quiet zones', or purchasing and moving the residential property. • Noise mitigation is required for receptor R10 at the CR 10 grade crossing location. Noise mitigation at this location should consider an earth berm, or a concrete noise wall, or a combination earth berm/concrete wall, or insulating the building with sound proof material, or installing a noiseless crossing traffic control device at the grade crossing, or purchasing & moving the residence. • The operator would take appropriate measures to reduce noise from construction equipment; this would include the installation and maintenance of engine	

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				mufflers. To avoid noise impacts at night, night-time construction may be curtailed in certain sensitive areas near residents.	
Hazardous Materials	Solid and Hazardous Waste Commission Regulations (6 CCR 1007-3) • Part 260- Hazardous Waste Management System: General • Part 261- Identification and Listing of Hazardous Waste • Part 262- Standards Applicable to Generators of Hazardous Waste • Part 263- Standards Applicable to Transporters of Hazardous Waste • Part 266- Financial Requirements • Part 267- Standards for the Management of Specific Hazardous Waste and Specific Types of Hazardous Waste Management Facilities • Part 268- Land Disposal Restrictions • Part 100- Permit Regulations • Part 6-Hazardous Waste Commission Fees • Part 262-Standards Applicable to Generators of Hazardous Waste Regulations of the Colorado Mined Land Reclamation Board for Coal Mining (2 CCR 407-2) • Rule 4.05 Hydrologic Balance • Rule 4.09 Disposal of Excess Soil • Rule 4.10 Coal Mine Waste Banks • Rule 4.11 Coal Mine Waste • Rule 4.14 Backfilling and Grading	See the Special Stipulations section in this appendix.	All waste rock would be analyzed to determine if it is an acid or toxic-forming material. If the rock is determined to be non-acid or non-toxic forming, it would be stockpiled within the waste rock pile as described in the associated surface facilities section of Chapter 2 in accordance with applicable state regulations (2 CCR 407-2.2.04.09 through 2 CCR 407-2.2.04.11). If it is determined to be acid or toxic forming, waste would be stored, handled and disposed of in accordance with applicable state (2 CCR 407-2.4.05.8, 2 CCR 407-2.4.10.1 and 2 CCR 407-2.4.14.3) and federal regulations. The facility would have a Spill Prevention, Control, and Countermeasures (SPCC) Plan (40 CFR Part 112) addressing the accidental release of materials to the environment. Section 303 of the Emergency Planning and Community Right-To-Know Act of 1986 (SARA Title III) (EPCRA) requires the preparation of Emergency Response Plans for rail emergencies.	• Permitting, reporting, transportation, management, and disposal of all hazardous substances, petroleum products, and/or solid waste materials produced must comply with all state and federal regulations. Such regulations should include spill prevention and response plans for all components of the coal mining operations. (CDOW) • Hazardous substances, petroleum products, and/or solid waste materials produced must be stored such that heavy rains would not flush these materials into nearby waterways. Containment areas should be constructed to allow for maximum storage of the above materials, with the potential for an increase in volume due to heavy precipitation. (CDOW) • The operator would implement a program to reduce, reuse, and recycle materials to the extent practicable at facility locations.	

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	40 CFR Part 112 - Requirements for Preparation and Implementation of Spill Prevention Control and Countermeasure Plans. Section 303 of the Emergency Planning and Community Right-To-Know Act of 1986 (SARA Title III) (EPCRA) 4 Code of CCR 723-7 Part 7 Rules Regulating Railroads, Rail Fixed Guideways, Transportation by Rail, and Rail Crossings Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601 et seq.)		Under 4 Code of Colorado Regulations (CCR) 723-7 Part 7, the Public Utilities Commission requires every transit agency to establish and maintain a written system safety program plan. The holder shall comply with the Toxic Substances Control Act of 1976, as amended with regard to any toxic substances that are used, generated by, or stored on the ROW. See Section 9.9, Hazardous Materials, of this appendix.		
Health and Safety	Rules and regulations of the Colorado Mined Land Reclamation Board Pursuant to the Colorado Surface Coal Mining Reclamation Act – • Rule 4.02.6 Blasting Signs • Rule 4.08.2 Pre-blasting Survey 30 CFR 75.1711 Sealing of Mines 40 CFR Part 112 - Requirements for Preparation and Implementation of Spill Prevention Control and Countermeasure Plans. MSHA Rules (30 CFR § 75.1700) Occupational Safety & Health Administration (OSHA) regulations (29 CFR part 1926 Safety and Health Regulations for Construction) OSHA publication for Hearing Conservation (OSHA 3074)		Blasting signs would be erected on all roads leading to the blast site as required by Rule 4.02.6. Rule 4.08.2 requires the operator to provide written notification to all residents or owners of dwellings or other structures located within one-half mile of the permit area which explains how to request a pre-blast survey. Such notice is to be given 30 days before initiation of blasting. The mine portals would be sealed in accordance with 30 CFR 75.1711. The facilities would have a SPCC Plan (40 CFR Part 112). The SPCC Plan would include spill prevention, containment as well as response and	• Dust from roads and earthwork – Dust from earth moving machinery would be controlled by water and dust suppression chemicals. • Traffic incidents on-site – Construction workers operating vehicles, as well as personnel working around vehicles on-site would be trained and licensed where applicable, so that these vehicles are operated in a safe and appropriate manner. • Construction equipment hazards – Construction vehicles and equipment would be operated within the manufacturers specifications. All vehicles and equipment would be maintained and serviced on a regular basis. Maintenance 'lock-out/tag-out' safety systems would be implemented. • Cold and heat stress – Personnel training, monitoring, and correct personal protection can help mitigate the effects of temperature extremes. • Slips, trips and falls – Identifying and eliminating or minimizing hazards, use of proper footwear and implementing behavioral based training would help reduce injuries associated with slips, trips and falls. • Confined space entry and excavation and trench hazards – Personnel would be trained and/or knowledgeable about applicable OSHA safety training and regulations. • Rock and roof falls – Best Practices have been developed through experience and research to reduce these risks. They combine engineering design, roof support, equipment, mining methods, and human	• A sign would be placed on the road on each side of the blast site. The signs would be placed about one half mile from the blast site. Since blasting activities would be sporadic, the signs would be displayed at least 10 days before any blasting activity. The blasting signs would be removed shortly after the blasting activities have concluded. A public notice of surface blasting schedule would be published in a newspaper of general circulation in the locality of the blasting site at least ten days but no more than twenty days before initiating any blasting program. • Since this surface blasting plan is applicable to surface blasting activities incident to underground mining activities, the written notification would only be given to all residents or owners of dwellings or other structures located within one-half mile of the blast site. • The contractor responsible for the construction of the site would have a temporary explosive storage area or would haul and remove explosives from the site after each blast.

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APPLICABLE LEGAL AND POLICY REQUIREMENTS AND MITIGATION MEASURES BY RESOURCE

Resource/Issue	Laws and Authorities	BLM Policies and Regulations	Limits or Controls Stipulated	Additional BLM/Cooperating Agency Recommended Mitigation and Enhancements	Operator-Proposed Features to Mitigate Impacts
	Federal Mine Safety & Health Act of 1977, Public Law 91-173 (as amended by Public Law 95-164)		clean-up to an accidental spill or leak. Noise – Appropriate hearing protective equipment would be utilized by construction workers as required by MSHA and OSHA regulations. Employers must provide hearing protectors to all workers exposed to 8-hour time weighted average (TWA) noise levels of 85 dB or above. This requirement ensures that employees have access to protectors before they experience any hearing loss. The OSHA publication for Hearing Conservation (OSHA 3074) provides guidance for monitoring and appropriate Personal Protective Equipment (PPE) for construction workers. Health standard provision of the Federal Mine Safety & Health Act of 1977, Public Law 91-173 (as amended by Public Law 95-164) would be strictly adhered to.	factors to create safer workplaces and work practices (NIOSH 2008). • Underground air quality – Ventilation to supply fresh air and remove/ dilute contaminants and pollutants would be a component of the mining design. • Blasting – Blasting experts would utilize safe blast design, control of access and evacuation warnings before blasting. Personnel in the vicinity of a blast would wear PPE and all personnel would observe safe distances during blasting activities. Safety procedures would be strictly adhered to. • Fire in coal storage and handling facilities – A fire suppression system would be an element of the engineering design. Relevant site staff would complete fire safety training. An Emergency Response Plan inclusive of a local trained fire crew and proper containment and shutdown procedures would be implemented. • Accidents related to use of tools and machinery – Equipment and machinery would be operated within the manufacturer's specifications. All equipment and machinery would be maintained and serviced on a regular basis. Employees would be trained and have current licenses where necessary. Maintenance 'lock-out / tag-out' safety systems would be implemented. • Birds and bats – Cleaning up affected areas would help to prevent the spread of infection. Ventilation to supply fresh air and remove/dilute contaminants and pollutants as well as proper PPE use would be a component of the mining design. • Traffic incidents on-site – Miners operating vehicles on-site would be trained and licensed, so that these vehicles are driven in a safe and appropriate manner. • Chemical release to atmospheric or ground systems – Personnel would be trained in appropriate storage and handling and incident response. Material safety data sheets (MSDS) would be available on-site. Chemical incidents would be included in the Emergency Response Plan. • Contact with high voltage electricity – Construction and operation of this transmission line would adhere to all approved codes of practices and procedures. Qualified electricians and secured access and isolation procedures would reduce risks associated with high voltage. • Failure to provide adequate emergency treatment and response – The federal government recently initiated the Mine Improvement and New Emergency Response (MINER) Act of 2006, signed into law on	

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				June 15, 2006 by President Bush. In addition to additional emergency air supply regulations, the MINER Act calls for a plan of post-accident communication between underground and surface personnel via a wireless, two-way medium, and for an electronic tracking system, permitting surface personnel to determine the location of any persons trapped underground. The new federal standards are mandated to be implemented by June 2009.	
Air Quality	Clean Air Act (42 USC 7401 et seq.) Colorado Air Quality Control Commission Regulations (AQCC) 1001 • Regulation 1- Particulates, Smokes, Carbon Monoxide, and Sulfur Oxides • Regulation 3- Stationary Source Permitting and Air Pollutant Emission Notice Requirements • Regulation 5- Generic Emissions Trading and Banking • Regulation 7- Emissions of Volatile Organic Compounds • Regulation 8- Control of Hazardous Air Pollutants • Regulation 12- Reduction of Diesel Vehicle Emissions	See the Special Stipulations section in this appendix.		• Dust generated by vehicle travel and construction activities should be minimized near waterways to reduce increased sedimentation. (CDOW) • Concentrations of nitrogen (including ammonium) and sulfur compounds should be reduced through Best Available Control Technology (BACTs) to reduce the potential impacts of dry and wet deposition. (CDOW) • Mitigation measures / controls are planned to be implemented to control particulate fugitive dust emissions during production and construction activities. • Most of the coal transfer points and processing actions during coal production would be enclosed and therefore limit the amount of "fugitive" emissions. • Storage piles are planned to be watered as necessary to limit wind erosion potential. • All vehicle travel emissions for production and construction on non-paved surfaces would be controlled utilizing dust suppression chemicals. .	
Climate Change/ Greenhouse Gases		BLM Oil & Gas Leasing Regulations 43 CFR 3100		Methane emission estimates from the underground mine ventilation and degasification systems are based on the total methane ventilated from the mine plus the methane liberated from degasification systems, less any methane that would be recovered. **Construction** Potential mitigation measures to decrease GHG emissions during construction include: • Use of alternative fuel construction equipment • Use of local building materials • Recycling of demolished construction material **Operation** Methane mitigation would include methods to reduce emissions from both the ventilation air and degasification systems.	

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				Mitigation measures to decrease methane (GHG) emissions from coal mines include: • Methane liberation from the mine may be reduced through mine planning, sealing previously mined areas, and degasification efforts. Coal Mine Methane (CMM) mitigation would include methods to reduce emissions from both the ventilation air (VAM) and degasification systems. As part of the Proposed Action, an adaptive management plan for methane recovery and control or beneficial use from the mine is proposed. Some or all of these methods may not be feasible at the proposed mine. Potential methane recovery and control or beneficial use options include: • VAM — The low methane concentration in VAM (typically 0.5 percent by volume) complicates methane control by oxidation/combustion or beneficial use. The low heat content of VAM and the potential for moisture or dust in VAM are limiting factors and generally restrict VAM emission reduction scenarios to non-beneficial uses since it is not a quality fuel. VAM can be destroyed in special types of thermal or catalytic oxidizers, or it can sometimes be used as combustion air for engines or turbines. In some cases, the methane concentration of VAM can be increased to make beneficial use more feasible. • Methane from Degasification Systems — Emissions from methane degasification systems have relatively high methane concentrations (above 30 percent by volume) and, depending on the type of degasification system, can be nearly pure methane. Methane from degasification systems can be controlled using flares or other oxidation technologies, or can be put to beneficial use. Examples of typical beneficial uses of degasification methane include the following: o Inject the gas into a nearby natural gas pipeline (if the methane concentration of the gas exceeds 95 percent and meets other criteria) involving the recovery of methane gas streams and collection into pipelines for sale to pipeline companies; o Fuel power-generating equipment such as internal combustion engines or turbines (either at the mine or at nearby facilities); o Fuel mine or nearby facility heaters, furnaces, or dryers; and/or o Fuel for coal mine vehicles. See Section 4.2.1, Air Quality, for additional information.	

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Cultural Resources	National Historic Preservation Act (16 USC 470 et seq.) National Register of Historic Places (36 CFR 60.1-60.15) Archaeological Resources Protection Act (16 USC 470aa-mm) 43 CFR Part 10 Native American Graves Protection and Repatriation Act (NAGPRA) Regulations; Final Rule CRS 24-65.1/HB-1041 Colorado Land Use Act CRS29-20/HB-1034 Local Government Land Use Control Enabling Act of 1974 CRS24-80.1, 101-108- Register of Historic Places Statue and 8CCR 1504-5- State Register of Historic Places, Rules and Procedures 8CCR 1504-7- Historical, Prehistorical, and Archaeological Rules and Procedures CRS 30-11.101 as Amended/HB 90-1104- Powers of Counties CRS 38-30.5-101-111- Conservation Easements CRS 24-80-501-502- State Historical Monuments	See the Special Stipulations section in this appendix.	Pursuant to 43 CFR 10.4(g), the AO must be notified immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Work in the vicinity of the discovery must stop. See Section 9.5, Cultural Resources, in this appendix.	• Site 5GF3880 requires monitoring during conveyor construction. If the waste rock disposal area changes in this area of the mine project and facilities cannot avoid the site, a testing plan to determine if any remaining cultural deposits are present would be developed and submitted for review through additional consultation with the SHPO. • Access to one eligible site, 5ME15398, would be limited by fencing potential access points. The fencing would have to prevent any access to the ridge where the site is located. The fence would be gated and locked to allow administrative access for any maintenance on the existing transmission line. The fence would be constructed prior to any construction activity. Site 5ME15398 would be avoided by direct impacts from the mine project but because of its location it may be affected by secondary impacts associated with off highway vehicle use or changes in the current BLM transportation plan in this area of the North Fruita Desert Planning Area. If the road is not closed as a result of the mine development, secondary impacts would be avoided by fencing the road along the site boundary. • There would be an approved subsidence monitoring plan in place prior to the commencement of mining that would proactively address any potential subsidence impacts to cultural resources prior to their occurrence. • When a transmission line alternative is selected, a cultural resources survey would be conducted. If new information is provided by Native Americans during the NEPA process, additional or edited terms and conditions for mitigation may have to be negotiated or enforced, such as the following: • If new information is brought forward any site-specific Native American mitigation measures suggested during notification/ consultation would be considered during the implementation of the Proposed Action. • Strict adherence to the confidentiality of information concerning the nature and location of archeological resources would be required of Company and their subcontractors (Archeological Resource Protection Act, 16 U.S.C. 470hh). • Inadvertent discovery: The NHPA, as amended, requires that if newly discovered cultural resources are identified during the Proposed Action implementation, work in that area must stop and the BLM Authorized	• Sites 5GF3878, 5GF3879, 5GF3880, and 5ME15398 were field evaluated as eligible for listing on the National Register of Historic Places. These should be protected and preserved. • Site 5GF3880, a slab-lined hearth feature, was tested for eligibility and was dated 1150±40 BP (CAL AD 780 – 990). Although that test removed the significant, scientific data from the cultural feature and determined the surrounding soils were deflated by about 15cm, monitoring in its vicinity is advised because early and middle Holocene deposits are exposed in that area. The Operator would assure a qualified person is present during any operations that may disturb the area surrounding the slab-lined hearth feature. • The other sites determined "field eligible" would apparently be avoided by the projected impact areas; however, final determinations of effect must be made by the BLM in consultation with the State Historic Preservation Officer.

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				Officer (AO) notified immediately (36 CFR 800.13). The Native American Graves Protection and Repatriation Act (NAGPRA) requires that if inadvertent discovery of Native American Remains or Objects occurs, any activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice be made to the BLM AO, as well as the appropriate Native American group(s) (IV.C.2). Notice may be followed by a 30-day delay (NAGPRA Section 3(d)). On private lands, laws for Historic, Prehistoric, and Archaeological Resources, and for unmarked Human Graves (CRS 24-80-401 and CRS 24-80-1301) would be adhered to by Company and their subcontractors. These state statutes require that the federal Authorizing Officer be notified immediately of any historic or prehistoric finds or human grave. The find must be protected until the authorizing officer indicates the action may proceed. (BLM)	
Geology/Subsidence	DRMS Section 2.05.06(6) Subsidence Survey, Subsidence Monitoring, and Subsidence Control Plan. DRMS Section 4.20 Subsidence Control DRMS Rule 8 Mine Subsidence Protection Program	See the Special Stipulations section in this appendix.	Section 2.05.06(6) establishes survey, monitoring and control requirements for subsidence. Section 4.20 establishes requirements to prevent subsidence from causing material damage to the surface, public notification requirements, and buffer zones. Rule 8 provides the detailed specifications for carrying out the Colorado Mine Subsidence Protection Program.	**Subsidence** • Mitigation of subsidence impacts can best be done by appropriate design of the mine plan. It is possible to somewhat mitigate the adverse impacts by varying panel width, by designing gateroad pillars between panels to yield when the first of two adjacent panels is mined and crush after the face of the second panel is mined past and by positioning longwall panels with respect to a particularly important surface feature. Normally, if landslides or rockfalls are present in an area, constraints on design and construction may be necessary to minimize risk. • Longwall panels should not be completed in overburden conditions of less than 200 feet. The 200-foot overburden contour extends approximately 360 feet upstream from the outcrop line in Big Salt Wash and approximately 550 feet upstream from the outcrop line in Garvey Canyon. Long-term protection from chimney subsidence to the overlying ground surface can be provided in such shallow overburden by partially backfilling the entries in these two areas upon final closure of the Red Cliff Mine. • The potential for draining surface water into the Red Cliff Mine is low, but probably precludes longwall mining under stream courses and water impoundments when the bedrock overburden thickness is less than 95 feet. Big Salt Wash is particularly at risk because it also contains a road and has agricultural uses. No longwall panels will be completed beneath Big Salt	See Subsidence Monitoring Program in this appendix.

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				Wash. Because there is no available depth of alluvium below any of the deeply incised canyons and the absence of any data on the potential fault control of the nearly trellis drainage pattern in the project area, conservatism must be used and a minimum of 200 feet of overburden required to positively prevent water loss from longwall mining under even intermittent stream courses. • It is possible to at least partially mitigate tilting hazards and similar potential major toppling hazards in Big Salt Wash, Garvey Canyon, and along Munger Creek by designing the longwall panels to retreat toward these drainages from the north and from the south. Retreating toward these drainages would slightly flatten the slope of the canyon walls as opposed to advancing away from Big Salt Wash which would slightly steepen the canyon walls. • A conceptual mine plan has been proposed that would mitigate potential subsidence impacts in the project area. The goals of the conceptual plan were to maximize safety, then mitigate to the extent possible subsidence impacts and finally to maximize resource recovery. • The mine operator would also be required to comply with state and federal regulations regarding subsidence impacts as they prepare their mine plan and permit application. **Rockfall Hazards** • Based on project plans to date, a conveyor and mine portal access road would cross the boundary of the rockfall hazard area. Constructing these facilities would undoubtedly change the existing natural conditions. Therefore, site-specific engineering designs and rockfall mitigation measures would be necessary to ensure the safety of both infrastructure and personnel in these areas. Slope stability studies and, where appropriate, rockfall stability analyses should be completed for structures proposed in the rockfall hazard area. **Landslide Hazards** • If the practice of avoidance is adopted for the proposed construction, risks associated with future movement of the landslide deposit are considered low. **Accelerated Erosion** • Project plans should be guided by an engineering firm qualified in geotechnical engineering design. • During periods of isolated heavy precipitation or rapid snowmelt accelerated erosion is exaggerated. Site specific engineering designs and mitigation measures	

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				should be developed to control the flow of surface water away from the upstream headward erosion scars of the two zones. **Other Geologic Hazards** • Although the anticipated loadings from the proposed Red Cliff Mine facilities would be relatively large, foundation designs should be based on results of laboratory swell/consolidation testing. • Foundation designs should be guided by results of swell/consolidation laboratory testing. **Other** • See Subsidence Monitoring Program in this appendix.	
Paleontology	8CCR 1504-7- Historical, Prehistorical, and Archaeological Rules and Procedures	See the Special Stipulations section in this appendix.		• If any surface disturbing activities (e.g., vent shafts) are planned on areas underlain by the Wasatch Formation, the site should be surveyed by a qualified paleontologist prior to construction. This would significantly decrease the possibility of fossil destruction. • A survey would not be required prior to the BLM authorization for any activities not immediately underlain by the Wasatch Formation. However, if any fossils are noticed at anytime, the AO must be notified so the resource can be recorded, evaluated, stabilized, or mitigated. • All persons associated with operations under this authorization shall be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered the operator shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM authorized officer of the findings. The discovery must be protected until notified to proceed by the BLM authorized officer. • As feasible, the operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM authorized officer of any finds. The BLM authorized officer would, as soon as feasible, have a BLM-permitted paleontologist check out the find and record and collect it if warranted. If ground-disturbing activities cannot be immediately suspended, the operator shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.	

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Soils	USDA Natural Resources Conservation Service (NRCS) suggested reseeding mix	Reclamation standards for disturbance BLM Standards for Public Land Health (BLM 1997) See the Special Stipulations section in this appendix.	See Standard 1 in BLM's Standards and Guidelines in this appendix.	**Reclamation and Revegetation** • Soils suitable to support plant growth would be salvaged for use in reclamation. Soil stockpiles would be protected from disturbance and erosional influences. Soil material that is not suitable to support plant growth would not be salvaged. Soil or overburden materials containing potentially harmful chemical constituents would need to be specially handled. After soil is replaced on reclaimed surfaces, revegetation would reduce erosion. The mine would construct sediment control structures as needed to trap eroded soil. • Vegetation growth should be monitored on reclaimed areas to determine if soil amendments are needed. These measures are required by regulation and are therefore considered to be part of the proposed action. • Follow the U.S. Department of Agriculture (USDA) recommended re-seeding mix. • Re-seed according to alternatives listed for erosion control and stabilization of disturbed areas (e.g., roadsides, construction sites, mine sites, and spoils) for salt desert shrub. **Erosion and Sedimentation** • In order to mitigate erosion and sedimentation on construction sites, adding mulch and seeding may protect the soil from erosion. Straw bales, silt fences, gravel bags, narrow grass strips or buffers, vegetative barriers, and terraces and diversions catch sediment and shorten the length or the erosive surface. Combinations of cover and structural practices help to control erosion and sedimentation and improve soil quality. Some temporary measures, such as a silt fence at the base of the slope, do not reduce the hazard of erosion on the slope but trap some of the sediment leaving the slope. • Soils would be exposed during construction. It is essential that the exposed area is minimized and that a protective cover is established. Conservation practices that provide immediate permanent cover or provide intermittent cover are very effective in controlling erosion and runoff. Other practices, such as diversions and terraces, also help to control erosion and runoff. They provide temporary protection until vegetation becomes established, and they provide permanent protection for the site (NRCS 2004). • Reduction of sediment (and the salts it contains) is an ongoing concern, and BLM management of the Mancos shale areas would continue to receive scrutiny, particularly in view of the effects salinity on	• All topsoil would be salvaged from the areas to be disturbed after vegetation cover that would interfere with the use of the topsoil is cleared. Sagebrush, forbs and grasses would not be cleared prior to topsoil salvage. Oak brush and Pinyon and Juniper trees would be cleared from areas prior to topsoil salvage. • Since the area would be reclaimed as rangeland and wildlife habitat and there is no prime farmland in the proposed mining area, all suitable topsoil horizons would be salvaged together. • Additionally, subsoil would be salvaged and placed in stockpile and later used for cover material for the coal mine waste disposal area. The stockpiles are located on a stable surface area within the permit area, where they would not be disturbed by mining operations and would be protected from wind and water erosion, unnecessary compaction, and contamination which would lessen the capability of the material to support vegetation. • An effective cover of non-noxious, quick-growing annual and perennial plants, would be seeded or planted during the first appropriate growing season after removal. • A berm would be constructed around the base of stockpiles where necessary to prevent loss of topsoil from the stockpiles. Straw bales or a silt fence would be installed in the low point of the berm. • Stockpiled topsoil and other materials shall not be moved until required for redistribution on a regraded area unless approved by the Division. • Selected overburden materials are not planned to be used for or as a supplement to topsoil. • Topsoil would be removed by rubber tired scrapers with the assistance of tracked dozers or a track mounted backhoe and truck equipment spread. • Reseeding mix: o Streambank wheatgrass (*Agropyron riparium*) o Galleta grass (*Pleuraphis jamesii*) o Alkali sacaton (*Sporobolus airoides*) o Indian ricegrass (*Achnatherum hymenoides*) o Thickspike wheatgrass (*Elymus lanceolatus*) o Western wheatgrass (*Pascopyrum smithii*) o Green needlegrass (*Nassella viridula*) o Prairie junegrass (*Koeleria macrantha*) o Rocky Mountain penstemon (*Penstemon strictus*) o Four-wing saltbrush (*Atriplex canescens*) • Seeding alternatives listed for erosion control and stabilization of disturbed areas (e.g., roadsides, construction sites, mine sites, and spoils) for salt desert shrub include: o Crested wheatgrass (*Agropyron cristatum*) o Russian wildrye (*Psathyrostachys juncea*) o Thickspike wheatgrass (*Elymus lanceolatus*) o Streambank wheatgrass (*Agropyron riparium*) o Indian ricegrass (*Achnatherum hymenoides*) o Lewis flax (*Linum lewisii*) o Palmer penstemon (*Penstemon palmeri*) o Four-wing saltbrush (*Atriplex canescens*) o Forage kochia (*Kochia americana*) • See Mine Revegetation Plan, Noxious Weed Plan, and Revegetation Success Monitoring Plan in this appendix.

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				water quality regarding threatened or endangered fish species, agricultural use, and drinking water (NFDMP 2004). • A maintenance and emergency plan would be developed for slope stabilization. (BLM) **Saline Soils** • Given that saline sediment and increased water runoff is one of the key pollutants in the Colorado River basin, significant investments in stormwater control and upkeep would be necessary and would help minimize erosion if properly chosen and installed. • Adding mulch, seeding, and providing sod protects the soil from erosion. Straw bales, silt fences, gravel bags, narrow grass strips or buffers, vegetative barriers, and terraces and diversions catch sediment and shorten the length of the erosive surface. • Combinations of cover and structural practices help to control erosion and sedimentation and improve soil quality. • Some temporary measures, such as a silt fence as the base of the slope, do not reduce the hazard of erosion on the slope but trap some of the sediment leaving the slope. The following are some basic principles of erosion and water-runoff control on construction sites (Muckel 2004): o Divide the project into smaller phases, clearing smaller areas of vegetation. o Schedule excavation during low-rainfall periods when possible. o Fit development to the terrain. o Excavate immediately before construction instead of exposing the soil for months or years. o Cover disturbed soils with vegetation or mulch as soon as possible and thus reduce the hazard of erosion. o Divert water from disturbed areas. o Control concentrated flow and runoff, thus reducing the volume and velocity of water from work sites and preventing the formation of rills and gullies. o Minimize the length and gradient of slopes (e.g., use bench terraces). o Prevent the movement of sediment to offsite areas. o Inspect and maintain all structural control measures. o Install windbreaks to control wind erosion.	

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				o Avoid soil compaction by restricting the use of trucks and heavy equipment to limited areas. o Break up of till compacted soils prior to vegetating or placing sod. o Avoid dumping excess concrete or washing trucks onsite. • Conservation practices that provide immediate cover (sod) or provide intermittent cover (mulching and seeding) are very effective in controlling runoff and erosion. Other practices, such as diversions and terraces, also help to control runoff and erosion. **Expansive/Shrink-Swell Soils** • The potential for structural damage can often be minimized or the damage avoided altogether by following certain practices. With expansive soils, the main goal is to minimize fluctuations in soil water content. Proper surface drainage, plant species choices, and long-term maintenance are all important. In more arid areas, as is the climate within the project area, excess moisture should be kept several feet away from structures and foundations (NRCS 2004). **Landslides/Slope Failure** • Geotechnical engineers should be brought in to remediate a slope failure. Any remediation work should involve skilled and experienced geologists and engineers. **Important Farmlands** • There are several soil series south of the Highline Canal classified as prime farmland if irrigated. Efforts to minimize human impacts should be made by concentrating traffic and activities within confined areas. **Biological Soil Crusts** • Efforts to minimize human impacts to biological soil crusts should be made by concentrating traffic and activities within confined areas. **Soil Compaction** • If compaction occurs in the top six to eight inches of the soil, tillage tools such as a chisel plow or moldboard plow can be used to shatter the compacted layer. However, if compaction is below eight to 10 inches, tillage tools such as a subsoiler, ripper, or paraplow may be needed. • The following are preventative measures that could be taken to minimize soil compaction: o Reduce traffic, especially under wet conditions – Traffic is the major cause of excessive soil compaction. The more often equipment travels	

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				across a site, the greater the opportunity for soil compaction. Reduce the number of passes. o Reduce tire pressure to reduce surface compaction – While reduced tire pressure would not reduce subsurface compaction, it would reduce surface compaction. Low pressure tires or dual wheels would reduce the degree of surface soil compaction but may increase the area compacted. The soil must support the weight of the equipment. Duals or low pressure tires simply spread out the weight. o Reduce traffic under wet condition – Soil is more compressible when wet. Traffic during high moisture conditions may compact soil, whereas the same traffic under dry conditions would not. As the soil dries, it has a higher soil strength, making it less susceptible to compaction. A dry soil supports traffic more readily than a wet soil. In addition, compaction stresses generated from the same wheel would be transmitted deeper in wet soils. o Control traffic – Whenever possible, restrict all equipment to specific tracks or traffic lanes through the field, leaving the rest of the site essentially uncompacted. This requires some equipment management but may be well worth the effort.	
Groundwater	Clean Water Act (33 USC 1251 et seq.)	See the Special Stipulations section in this appendix.		• Appropriate mitigation measures would be required if data from the monitoring wells showed adverse impacts to groundwater. • Use BMP's related to groundwater production during the construction phase and throughout the operational life of the mine. (CDOW)	

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Surface Water	Clean Water Act (33 USC 1251 et seq.) State Stormwater Discharge Permit (5 CCR 1002-61) National Pollutant Discharge Elimination System (NPDES) guidelines for stormwater quality (33 USC 1342) Section 107.25 (Water Quality) and Section 208 (Erosion Control) of the CDOT Standard Specifications for Road and Bridge Construction. Erosion Control and Stormwater Quality Guide (ECSQG), CDOT, 2002 5 CCR 1002-8 Surface Water Standards	See BLM Standards for Public Land Health (BLM 1997) See the Special Stipulations section in this appendix.	Stormwater discharges must comply with all state and federal regulations. Discharge from the package sewage treatment plant would have to meet water quality standards in order to meet discharge permit requirements. See Standard 5 in BLM's Standards and Guidelines in this appendix. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act NPDES guidelines for stormwater quality, including obtaining a stormwater construction permit, would be followed during construction. All work performed on the project within the CDOT ROW would conform to Section 107.25 (Water Quality) and Section 208 (Erosion Control) of the CDOT Standard Specifications for Road and Bridge Construction. A Stormwater Management Plan would	**Construction** • Prior to construction of the mains or tunnels under Big Salt Wash, the rock would be drilled and tested, and the competent rock overburden measured. There would be a minimum of 200 feet of competent bedrock overburden over the mains under Big Salt Wash. • Install and implement temporary BMPs for construction, including re-establishment of native vegetation. • Temporary BMPs would be implemented to reduce selenium concentrations and selenium loading in waterways and wastewater containment areas to downstream tributaries and ultimately the Colorado River. Sediment ponds should be designed to settle out sediment, for a specific water quality capture volume, as specified in the City of Grand Junction and/or Mesa County drainage criteria manuals. • Construction access to the site, for items such as haul roads, crane paths, and concrete washout areas, would be planned to minimize or avoid impacts to sensitive habitats. • To ensure water quality is maintained in streams when construction vehicles need to cross a waterway, temporary stream crossing would be designed and constructed. Construction of any specific crossing method shall not cause a significant water level difference between upstream and downstream water surface elevations. Construction shall also not disturb or create a barrier in the stream channel during fish migration and spawning periods. • Temporary clear-water diversion structures would be implemented where appropriate permits have been obtained to perform work in a running stream or waterbody. Diversion structures would be constructed with minimal water quality impacts. The construction impacts of diversion structures on streams shall be minimized by scheduling operations during low-flow periods and avoiding fish migrations and spawning periods. • Concrete washout area applicable to highway improvements would be constructed at the improvement site(s) with the following specifications: o Suitable locations within the ROW would be set aside for a concrete truck wash-out area. o A pit with sufficient capacity to hold all anticipated wastewaters would be constructed at least 50 feet away from any	• The mining operation could impact the surface drainage system by increasing the sediment load in the streams. This impact would be mitigated by passing runoff through sediment ponds or some other form of alternative sediment control. Mine water discharge could impact the surface drainage system by mixing mine water with surface water. Mine water is typically high in total dissolved solids (TDS) relative to surface water so mixing mine water with surface water would be expected to increase the TDS of the resultant mix. However, the surface water in the permit and adjacent area has elevated TDS so mine water discharge may not elevate TDS concentration in the surface water. In the event that contamination, diminution, or interruption in the underground or surface water supplies result from coal mining operations, the following protective measures would be followed. 1. Adequate protection of water rights would be monitored. The Operator has designed and implemented a complete hydrologic monitoring program. 2. Adequate protection of water rights is ensured by regular monitoring and quick repair of subsidence induced problems. 3. Possible alternative sources of water would be utilized, if required. The Operator has a 3.0 cfs absolute water right for industrial and domestic uses on Mack Wash near the town of Mack. The Operator would pump water from Mack Wash to the mine site. Excess water from the Mack water right can be used as an alternative water supply. The above discussion indicates three ponds may be affected by the mine operation. Therefore, the excess water from the mine should provide an adequate quantity of alternative water. The table showing the quality of water from Mack Wash is presented in Volume III, Tab 3. Mack Wash near Mack shows perennial flow during the period of record. Mean monthly conductivity measurements vary between 1,410 umhos/cm in September to 3,920 umhos/cm in November. Based on conductivity measurements alone, this water supply is similar to the surface water in East Salt Creek and Big Salt Wash. Thus, the alternative water supply is of a quality similar to the water being replaced. • The East Salt Wash and Big Salt Wash alluvium would be protected from the effects of subsidence. Coal Gulch alluvium would be protected.

Table B-1
APPLICABLE LEGAL AND POLICY REQUIREMENTS AND MITIGATION MEASURES BY RESOURCE

Resource/Issue	Laws and Authorities	BLM Policies and Regulations	Limits or Controls Stipulated	Additional BLM/Cooperating Agency Recommended Mitigation and Enhancements	Operator-Proposed Features to Mitigate Impacts
			be developed that would detail the BMPs to be used for construction. Practices from the Erosion Control and Stormwater Quality Guide (ECSQG), CDOT, 2002 are outlined below. The City of Grand Junction and Mesa County have Drainage Criteria Manuals addressing similar BMPs can also be referenced. • Adjacent disturbed slopes would be revegetated with native plant species to protect exposed soils from erosion. • Where temporary or permanent seeding operations are not feasible due to seasonal constraints, mulch or other CDOT-approved methods of stabilization would be applied to protect soils from erosion. • Erosion control blankets and ditches would be used as appropriate on newly seeded slopes to control erosion and promote the establishment of vegetation. • Temporary berms would be given priority consideration for protecting the sensitive areas in the project area. Additional erosion control measures,	state waters, and the bottom of the pit would be at least 5 feet higher than groundwater. o The area would be signed as a concrete wash-water clean-out area and the access road leading to a paved road or highway shall have a stabilized construction entrance as detailed in the Erosion Control and Stormwater Quality Guide. • Non-structural BMPs, such as pesticide and fertilizer application guidelines, anti-icing and de-icing guidelines, would be employed to improve water quality in conjunction with BMP implementation. Other non-structural BMPs such as water quality signage adjacent to the receiving streams and irrigation ditches, are examples of other tools that shall be considered for implementation. • To mitigate recreation impacts within the project area, heavy equipment from the construction of the railroad spur could be used to dredge out Mack Mesa, and to potentially construct a sediment-settling pond between the Government Highline Canal and the inlet to Mack Mesa Lake. (CDOW) • A storm water permit and storm water pollution prevention plan detailing BMPs is required for surface disturbance greater than one acre, (BLM) • Stream crossings by the proposed railroad spur and transmission lines would require the use of BMPs to reduce erosion, sedimentation, and loading of selenium and salts to waterways. (CDOW) **Surface Water Quality** • Permanent BMPs would be used where practical for use during the construction phase to improve the water quality control at the site to minimize erosion, sedimentation, and loading of selenium and salts to waterways. • Permanent BMPs would be implemented to reduce selenium concentrations and selenium loading in waterways and sediment ponds to prevent increased concentrations to downstream tributaries and ultimately the Colorado River. Diversion ditches and sediment ponds should be designed to control runoff and prevent the release of high concentrations of selenium to the receiving water bodies. • Bridges would be installed to decrease further aquatic and riparian impairment created by stream crossings. Diversion ditches and sediment ponds would be designed to control runoff and prevent the release of	

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			such as silt fences and erosion bales, can be implemented, but with care and not as the sole erosion control system at the construction site. • Erosion logs and bales would be certified weed-free of noxious weeds. • Erosion logs and bales can be used as sediment barriers and filters along the toe-of-fills adjacent to water surface waterways and drainages, and at the cross-drain inlets where appropriate with additional reinforcement and in conjunction with other erosion control measures, such as temporary berms. • Where appropriate, silt fences can be used to intercept sediment-laden runoff before it enters a water body, such as a wetland, only when they are used in conjunction with other erosion control measures such as temporary berms. • Where appropriate, slope drains would be used to convey concentrated runoff from the top to the bottom of disturbed slopes. Slope and cross-drain outlets would be constructed to trap sediment.	high concentrations of selenium to the receiving water bodies. • Under the federal regulations, rail tracks are not required to be covered by a stormwater permit, and are not required to implement BMPs. However, the UPRR has emergency response procedures to address spills and derailments.. • BMPs to reduce/prevent increased selenium concentrations to downstream tributaries during temporary construction and long-term, permanent operations of the mine by stabilizing severely eroding stream channels, limiting surface-disturbing activities to the extent practicable, protecting municipal watersheds, and installing bridges with proper drainage features (e.g., downspouts with riprap at the end that daylights) for project stream crossings to decrease aquatic and riparian impairment. • Inlet and outlet protection would be considered as part of the long-term mitigation for culverts. • BMPs should be implemented to reduce selenium concentrations and selenium loading in waterways and wastewater containment areas. (CDOW) • Implement BMPs such as the use of silt fences, berms, catch basins, seeding, mulching, and erosion control netting to minimize construction run-off. (CDOW) • Surface water quality from waters that may be impacted from any activities associated with the project should be monitored and assessed to develop baseline criteria for future comparison. (CDOW) • The wash bay/coal wash plant/ washout area should be located at least 300 feet from any waterway. (CDOW) **Other** • No subsidence would occur under Big Salt Wash and other perennial waters and springs. (DRMS)	

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			• Check dams would be used where appropriate to slow the velocity of water through roadside ditches and swales.		
Water Rights	Colorado Division of Water Resources (Office of the State Engineer)		CAM's existing water rights on Mack Wash are administered in the Colorado Division of Water Resources (Office of the State Engineer) priority system, in accordance with the Prior Appropriation Doctrine of first-in-time, first-in-right.	If CAM needs to utilize water out of priority, it would file an application with the Water Court, Water Division 5 (Colorado River and White River Basins) explaining exactly where the water would be obtained, where water would be used, what it would be used for, how much would be used, the source of augmentation water, when and where augmentation water would be required, and how the augmentation plan would be operated (Colorado Division of Water Resources 2008).	• Map Code 2, non-jurisdictional dam. Located southwest of permit boundary. Sediment ponds located on the mine site could reduce the amount of water available for this pond. Operator may need to supplement flow to this pond. • Map Code 19, non-jurisdictional dam. Located south of permit boundary. Sediment ponds located on the mine site could reduce the amount of water available for this pond. Operator may need to supplement flow to this pond. • Map Code 20, non-jurisdictional dam. Located within the permit boundary. Sediment ponds located on the mine site would reduce the amount of water available for this pond. Operator may need to supplement flow to this pond. • The United States Fish and Wildlife Service (USFWS), considers any consumptive use of water by the mine to deplete the flow in the Colorado River. Water depletions in the Upper Colorado River Basin have been recognized as a major source of impact to endangered fish species (USFWS 2/93). The Operator would implement the conservation measures that the USFWS believe are necessary to offset this impact.
Floodplains	Colorado Conservation Board Colorado Department of Natural Resources *Rules and Regulations for Regulatory Floodplains in Colorado*	See the Special Stipulations section in this appendix.	Colorado Conservation Board Colorado Department of Natural Resources *Rules and Regulations for Regulatory Floodplains in Colorado* provides standards for activities that may impact regulatory floodplains in Colorado	• Temporary impacts from construction could be mitigated through the use of Best Management Practices (BMPs) and other mitigation measures described for Surface Water, as well as following local floodplain management regulations. By implementing specific temporary and permanent best management practices for construction activities and long-term facility operations, impacts to floodplains would be minimized. • No longwall or full extraction mining would occur under Big Salt Wash under the Proposed Action. • By implementing specific temporary and permanent BMPs for construction activities and long-term facility operations, impacts to floodplains and alluvial valley floors would be minimized.	
Vegetation		Reclamation standards for disturbance Impacts to vegetation would be reduced by implementing a reclamation plan that includes, among other best management practices, seeding native herbaceous and woody species immediately after the most intense disturbances have been completed. The	See Standard 3 in BLM's Standards and Guidelines in this appendix.	• Because of the predominance of weedy species in much of the study area, it is likely that construction equipment would pass through weed-infested areas on the way to work sites. In the short term, weeds along any potential access route should be controlled prior to entry of work-related equipment and all equipment should be regularly power-washed when moving between sites. For the longer term, the proponent would need to provide a long-term Integrated Weed Management plan to address weed issues on both private and federal surfaces. This plan should include periodic inventories, prompt treatment of discovered weeds, and long-term maintenance control. The proponent would need to coordinate with the BLM	• An effective cover of non-noxious, quick-growing annual and perennial plants, would be seeded or planted during the first appropriate growing season after removal. • See Mine Revegetation Plan, Noxious Weed Plan, and Revegetation Success Monitoring Plan in this appendix.

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		existing abundance of exotic invasive species throughout much of the study area means that any surface disturbing activity would likely be colonized first by these exotics, absent any measures to reduce this risk. If weed colonization and dominance results, it may reduce the effectiveness of any plan for restoring these disturbed areas to healthy stands of native vegetation. BLM Standards for Public Land Health (BLM 1997) See the Special Stipulations section in this appendix.		Weed Management Specialist to help develop the plan for federal surfaces within the project area. For project areas on private surface, the mitigation measures such as monitoring and treatment would fall within the jurisdiction of Mesa County. Mesa County suggests that weed-free seed mixes be used to control noxious weeds. Coordination among all three entities would ensure that effective and collaborative weed management took place as a result of implementation of the proposed action. The plan would also ensure compliance with local, state and federal regulations. • An aggressive reclamation plan for reestablishing desirable vegetation would help mitigate the establishment of undesirable species. As an example of one component of such a plan, an approved seed mix of desirable species should be applied immediately after an access road has been developed. The verges and center of the access road, as well as any areas of cut-and-fill, should be treated with this seed mix. In this manner, if weather conditions arise that are conducive to seed germination and establishment, there would be seeds of desirable species in place at this time. In addition to promoting establishment of native species, vegetated roadside verges would aid in controlling runoff and erosion. • Re-seeding and weed control should be continued as necessary, and at least annually, until the dominant species of each vegetation association in restored areas reaches 80 percent of the pre-disturbance condition of desirable species for the site. Reclamation standards on private surface should conform to the wishes of the landowner. • Reclamation may be enhanced by off-site weed control and native species seeding practices prior to any surface disturbing activities. Such practices may further help to reduce the threat of weeds becoming the dominant vegetation within the project development areas. A unique seed mix should be identified for each vegetation association impacted by project activities. • In areas with abundant well-developed soil biological crusts (i.e., those dominated by lichens), in particular along the route of the railroad spur north of the Highline Canal, these crusts should be removed, stored and kept dry prior to any surface disturbing activities. A survey to clearly demarcate these areas should be performed prior to any surface disturbing areas. It is estimated that the area of well-developed crusts comprises not more than 1 acre in total area.	

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				As soon as the soils within these identified project areas have been recontoured and stabilized, the salvaged crusts should be redistributed on the affected surfaces, perhaps simultaneously with an appropriate native seed mix. • Traditional land recontouring and topsoil redistribution can result in soil homogenization that is not conducive for successful reestablishment of many native species. Thus, reclamation practices that promote soil heterogeneity at the meter-scale should be included in any reclamation plans. Such practices may include small pits, surface armoring and other types of features that result in localized capture of nutrients and water. • Weed-free seed mixes would be used to control noxious weeds. (Mesa County) • Include Wyoming big sage, greasewood, shadscale saltbush, and gardner saltbush in the seed mix and remove crested wheatgrass from the seed mix. CDOW generally believes crested wheatgrass should be used because this is a harsh site and crested is more likely to compete with cheatgrass than a native-only seed mix. (CDOW)	
Wetlands and Riparian	Section 404 of the Clean Water Act (33 USC 1344)	• See the Special Stipulations section in this appendix. • BLM Standards for Public Land Health (BLM 1997)	See Standard 2 in BLM's Standards and Guidelines in this appendix. Mitigation would be provided in accordance with U.S. Army Corps of Engineers (USACE) standards. Temporary impacts would be mitigated by application of standard erosion/ sedimentation control measures. Wetland mitigation and monitoring would be performed in accordance with an approved USACE permit, not yet submitted. It is likely that the project would qualify for Nationwide Permit (NWP) #12, Utility Line Activities, since fill would be limited to less than the 0.5 acres allowed under NWP #12.	• Degradation of both jurisdictional and non-jurisdictional wetland habitats should be mitigated. (CDOW) • The aggressive application of reclamation and weed management plans that include the above suggestions should result in at least partial mitigation of vegetation losses directly caused by the proposed project. Off-site weed control and native plant seeding could result in enhanced native vegetation cover and productivity compared to current vegetation status. BMPs should be adhered to in wetland and riparian areas that may be impacted through project construction activities, i.e., water diversion structure construction, and the construction of transmission lines and pipeline corridors. (CDOW) • Installation of the diversion structure should consider bank stabilization to prevent further riparian and stream bank degradation, and erosion. (CDOW) • A vegetation and treatment plan should be considered to minimize further invasion and spread of noxious weeds. (CDOW) • Any riparian or upland disturbance should be revegetated with native plants and grasses. (CDOW) • Post-project monitoring surveys of macroinvertebrates and fishes should be completed to evaluate impact of the diversion structure. (CDOW)	• An effective cover of non-noxious, quick-growing annual and perennial plants, would be seeded or planted during the first appropriate growing season after removal.

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Fish and Wildlife	Colorado Division of Wildlife *Guidelines: Wetland Wildlife Conservation Program* - Wetland Wildlife Conservation Statewide Goals and Strategy	See the Special Stipulations section in this appendix.		• Avoiding construction during the prairie dog breeding season between March 1 and June 15 would reduce impacts to prairie dogs inhabiting railroad spur crossings or adjacent areas. Young and adults would be more mobile after June 15 and able to relocate themselves to avoid construction equipment. • By avoiding construction within 150 feet of prairie dog colonies inhabited by burrowing owls from March 15 to August 31, disturbance to potential nesting owls would be minimized and consequently would reduce impacts to burrowing owl populations (CDOW 2008). • The CDOW recommends no surface occupancy within 0.25 mile of active golden eagle nests, and no human disturbance within 0.5 mile of an active golden eagle nest from December 15 to July 15 (CDOW 2008). • The CDOW recommends no surface occupancy within 0.33 mile of active red-tailed hawk nests, and no human disturbance within 0.5 mile of an active red-tailed hawk nest from February 15 to July 15 (CDOW 2008). • Wildlife-vehicle collisions could be reduced by placing speed limits of 35 mph on all access roads and restricting use of roads traversing winter range areas to essential personnel. • By implementing proper drainage and sediment control measures, avoiding construction during the spawning and immediate post spawning season (March 1 to July 31) and timing construction activity during the low flow period, the effects on macroinvertebrates and native fishes would be minimized. • Construction of water diversion structures that do not impede fish movement and placement of 0.25 inch screens on water intake devices to preclude entrainment of fish would reduce impacts to the native fishery. • Limiting access to winter range areas between December 1 and March 1 could reduce impacts to wintering deer, elk and pronghorn. • Losses to vegetative communities could be partially mitigated through the use of effective reclamation of disturbed areas and habitat enhancements. Immediate reclamation of all temporary access roads and staging areas used during construction in sagebrush habitats could help alleviate impacts to existing big game winter range. Habitat enhancements done in adjacent off-site areas could further offset winter range habitat	• Wildlife use of water in the permit and adjacent areas is for subsistence. Wildlife use the perennial streams and ponds. It is possible the mine could impact some of the ponds. If this impact occurs, the Operator would mitigate this water loss by constructing or repairing pond(s) and augmenting the flow with water from the mine water supply line. • A large portion of the coal mine waste disposal area would be constructed on and against a steep Mancos shale slope. Revegatation of this area would improve the wildlife habitat since a nearly bare Mancos shale slope would become vegetated area capable of producing food and forage for wildlife. • There would be a waterline that runs from Mack to the mine site. The Operator agrees to work with the CDOW to build waterholes at strategic locations. • See Mine Reclamation Plan in this appendix.

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Resource/Issue	Laws and Authorities	BLM Policies and Regulations	Limits or Controls Stipulated	Additional BLM/Cooperating Agency Recommended Mitigation and Enhancements	Operator-Proposed Features to Mitigate Impacts
				lost during project construction. With adequate reclamation for disturbed areas and off-site habitat enhancement, loss of sagebrush habitat is not likely to affect the total population numbers of wintering deer, elk and pronghorn in this area. • Mitigation for wildlife corridors or bottlenecks. (BLM) • Winter range improvements. (BLM) • Netting would be placed over open wastewater containment areas to preclude exposure of migratory birds to increased selenium concentrations, as well as any hazardous materials, especially petroleum products. (CDOW) • Screens of 0.25 inch aperture should be placed on water intake devices to preclude entrainment of native fishes. (CDOW) • BMPs should be adhered to during construction of the diversion structure. (CDOW) • Water depletion and any construction in-channel or within the riparian zone should occur during the irrigation season, when surplus water from upstream irrigation practices and releases from Highline Lake are maximized. (CDOW) • Within this irrigation season (usually April 1 – November 1), water depletion and/or construction activities should be avoided during the native fishes spawning and immediate post-spawning seasons (March 1 through July 31). (CDOW) • Increased sedimentation from construction activities and/or water depletion should be minimized. (CDOW) • BMPs for sediment control should be implemented during construction. (CDOW) • Continue with seasonal restriction on construction as proposed. (CDOW) • Actions to minimize the adverse impacts of project development to these species [Northern leopard frog, longnose leopard lizard, and midget-faced rattlesnake] and other sympatric amphibians and reptiles should be implemented. (CDOW) • Transmission line poles should be raptor-safe and raptor-proof. Install raptor perch deterrents on power poles. (CDOW) • CDOW raptor standards should be followed: No surface disturbance within 1/4 mile of golden eagle nests, and no human disturbance within 1/2 mile of an active nest form Dec 15 to July 15 (CDOW 2008). For red-tailed hawk nests no surface occupancy within 1/3 mile of the nest year round and no human	

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				encroachment within 1/3 mile of active nests from February 15 through July 15 (CDOW 2008). For northern harriers 1/4 mile buffer from April 15 to August 15. (CDOW) • In areas where the railroad spur would be elevated above ground level place culverts at ground level to facilitate safe movement of kit fox and their prey including prairie dogs, place in areas where the railroad spur would intersect prairie dog towns in addition to other areas. (CDOW) • Include two crossing areas for deer and elk to cross the coal conveyer line. (CDOW) • Water should be distributed for pronghorn use. (CDOW) • The railroad should be bermed for pronghorn crossings. (CDOW) • Shift the railroad spur to the western periphery of the prairie dog town that includes burrowing owl colony #11. (CDOW) • For burrowing owl colony #12 do not place any amenities within ½ mile of the location. (CDOW) • Additional water sources should be provided for wildlife. Create 3 water developments on the north and 3 water developments on the south of the rail line for pronghorn use. Create a pond to replace the pond near the load-out facility for bat use, locate it within the same radius from the Bookcliff front as the current pond. Place a water guzzler between the Mesa/Garfield County line and waste rock area to mitigate the impacts to chukar. (CDOW) • Pre-construction surveys of the selected transmission line route would be conducted in order to apply mitigations and avoidance on federal lands. Surveys would be conducted for federal listed, BLM sensitive, and CDOW listed species. • BLM would require the Applicant to provide signs or construct gates if they are needed to discourage unauthorized travel along the transmission line route. BLM would require raptor perch deterrents on transmission line structures. • BLM would stipulate surveys and mitigation for wetland, surface water, and riparian areas as part of the coal lease. • Natural spawning of flannel-mouth suckers occurs in Salt Creek (Martin 2007). Activities that could adversely impact the flannel-mouth spawn would be avoided from March 1 to July 31.	

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Threatened and Endangered Species	Endangered Species Act (16 USC 1531-1544)	BLM Standards for Public Land Health (BLM 1997) See the Special Stipulations section in this appendix.	See Standard 4 in BLM's Standards and Guidelines in this appendix.	**Endangered and Sensitive Fish Species** • Because the project involves water depletions to the Upper Colorado River system, formal consultation would be required under Section 7 of the Endangered Species Act for impacts to the four endangered Colorado River fishes. Mitigation would be governed by the programmatic biological opinion for minor water depletions in the Upper Colorado River Basin, #ES/GJ-6-CO-94-F-017 (June 13, 1994) and would involve a one-time payment to the Upper Colorado River Recovery Program. • Best Management Practices to contain and reduce sediment discharge into Mack Wash and other drainages would minimize impacts to aquatic species. Netting would be placed over open wastewater containment areas to preclude exposure of migratory birds to increased selenium concentrations, as well as any hazardous materials, especially petroleum products. Bridges would be installed to decrease further aquatic and riparian impairment created by stream crossings. • Construction of water diversion structures that do not impede fish movement and placement of 0.25 inch screens on water intake devices to preclude entrainment of fish would reduce impacts to the native fishery. • Withdrawing water during the irrigation season at high flows and storage of water for later use during low flows periods and during fish spawning would reduce water depletion impacts to the fishery. **Grand Buckwheat** • Given the lack of definitive evidence that there would be, or would not be, significant project impacts on Grand buckwheat, a number of practices should be implemented in order to minimize and/or mitigate these potential impacts. These practices include: o Collect seeds each fall prior to and during the project, to be stored and used during reclamation and revegetation following project completion. o Separate and reserve the top 1 to 3 inches of soil from areas of Grand buckwheat density at the initiation of ground disturbing activities. This volume of soil would contain the seed bank. Since the longevity and viability of Grand buckwheat seeds is unknown, this practice may result in more useful seeds. Separating and reserving the top 12 inches of soil dilutes the seedbank and thus does not serve as an adequate mitigation practice.	• Prairie dog towns should be surveyed on two consecutive mornings for burrowing owl presence if a prairie dog town is to be disturbed between March 1 and October 31. • The revegetation plan would establish a diverse, effective and permanent vegetative cover of similar seasonal variety as that native to the area The final reclamation plan is designed to enhance habitat through the establishment of shrubs on all reclaimed acreage. However, because erosion control would be of paramount importance on steeper slopes, grasses would be encouraged in these areas. Water depletions in the Upper Colorado River Basin have been recognized as a major source of impact to endangered fish species. The Operator agrees to implement the conservation measures that the USFWS believes are necessary to offset the water depletion impact. • See Mine Reclamation Plan in this appendix.

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				o Aggressively control weeds in areas of potential habitat. During the baseline study it was found that Grand buckwheat was absent from plots with greater than 50 percent cover of cheatgrass or where two or more weeds each comprised over 3 percent cover. o Investigate whether Grand buckwheat individuals tolerate disturbance and regenerate from broken branches as do some other species in the genus. o Investigate whether Grand buckwheat individuals can be successfully transplanted by digging up and moving some individuals that are found within the proposed project disturbance area. o Perform follow up monitoring adopting the sampling protocols of the baseline study (WestWater 2007). Those study plots should be relocated and sampled periodically to identify trends in the population numbers. It may be necessary to identify additional plots if an objective is to assess whether trends in abundance in the fragmented areas differs from trends in the larger, intact occupied habitat areas. **Other Species** • Impacts that could affect potential prey base for the black-footed ferret could be reduced by avoiding construction during the prairie dog breeding season between March 1 and June 15. This would reduce impacts to prairie dogs inhabiting railroad spur crossings or adjacent areas. Young and adults would be more mobile after June 15 and able to relocate themselves to avoid construction equipment.	

2.0 Mine Reclamation Plan

The areas disturbed by the mine facilities will be returned to a rangeland and wildlife habitat land use. This will be accomplished by restoring the area to the approximate original contour. Surface areas will be covered with topsoil and seeded with the approved seed mix.

Reclamation work will be initiated when the mine reserves are depleted or when the operator, with approval from BLM deems the mine to no longer be an economically viable operation. Reclamation of the site might take four years. The first year would be set aside to salvage and sell assets. The second year would involve the removal of buildings and structures from the site. The third and fourth year would be used to grade the disturbed area to approximate original contours, place topsoil on the regraded area and seeding the area with the approved seed mix.

A detailed estimate of the cost of reclamation of the proposed mine and mine facilities are presented in Section 3.05 Performance Bond Requirements.

The mine facilities area, haul road and utility corridor were designed using a proximate balanced cut and fill technique. To reclaim the areas to approximate original contour, the fill placed on the outslopes must be returned to the cut slopes.

Reclaimed areas will be compacted to at least 95 percent of the maximum dry density attained in a laboratory compaction test in accordance with American Society for Testing Materials (ASTM) D698 with moisture content +/-2 percent of optimum. Reclaimed slopes constructed of weathered shale will be stable (FS >1.5) at slope inclinations of up to 1.5H:1V. Reclaimed slopes constructed of overburden (non weathered shale will be stable) (FS >1.5) at slope inclinations of up to 1.75H:1V.

The 65.2 acre phase I coal mine waste pile has 3.7 inches of topsoil available to be replaced. There are 140,000 cubic yards of subsoil available in stockpile. This subsoil stockpile will be used to finish to top of the coal mine waste pile. Subsoil for the remainder of the pile will be salvaged contemporaneously. As each 50 foot (ft) lift is complete it will be plated with 44.3 inches of subsoil obtained from subsoil map unit E. This material will be salvaged from the founding of the coal mine waste pile.

The slopes and benches on the coal mine waste pile are 43.4 acres in aerial extent. A total of 248,000 cubic yards will need to be salvaged contemporaneously over the 51 acres of subsoil map unit E and placed on the slopes and benches of the pile. This equals an average depth of 36.2 inches that needs to be salvaged contemporaneously from the coal mine waste pile founding.

The top of the coal mine waste pile will be covered with the material from the coverfill stockpile to finish the reclamation work. The coverfill stockpile will have approximately 65,000 cubic yards of good quality Map Unit A material and 75,000 cubic yards of lesser quality material. The coverfill material will be placed in two layers on top of the pile. The first layer will be approximately comprised of the lesser quality material. The second layer will be comprised of the good quality Map Unit A material. The top of the coal mine waste pile encompasses 21.8 acres. The subsoil in the coverfill stockpile will plate the top of the pile 47.8-inches deep. Thus there is a little extra coverfill to supplement the slopes. Since the coal mine waste pile founding slopes to the south, the founding will be exposed on the north end of the pile as coal mine waste is placed on the south end of the pile. This will facilitate the salvage of subsoil north of the

active area as the coal mine waste pile is being constructed. The Postminig Topography Map 17 series is presented in Volume II along with the Postmining and Premining Cross Sections Map Nos. 19-1 & 19-2. The slope inclinations of the reclaimed surfaces shown on the postmining cross sections are typically flatter than 1.5H:1V. Therefore, the reclaimed area should have a factor of safety greater than 1.5.

There are numerous areas where steep slopes will be backfilled during the operational phase of the project. The integrity of the steep slopes will not be affected by the backfilling and removal of the backfill during reclamation.

The steep slopes do not need to be restored during reclamation. The steep slopes only need to be uncovered to establish previously stable configurations.

Large rocks and rock piles will be randomly placed throughout the reclaimed areas to provide small wildlife habitat.

During reclamation operations topsoil will be placed on regraded areas in an approximate uniform, stable thickness.

Topsoil stockpile 2 contains 82,180 cubic yards and will be spread over 129.4 acres which will provide an approximate uniform stable thickness of 4.7- inches. Topsoil stockpile 2 contains 32,860 cubic yards and will be spread over the 65.2 acre coal mine waste pile which will provide an average replacement depth of approximately 3.7-inches.

The self-sustaining vegetation is appropriate for the postmining land use of rangeland and wildlife habitat. The regraded and topsoiled surface will reestablish the surface water drainage system by returning the area to the approximate original contours.

The regraded surfaces will be ripped if necessary to relieve compaction and to provide for root penetration. Topsoil will be placed and spread with either scrapers or a front end loader and truck equipment spread. The topsoil will be spread with a track dozer. Handling topsoil in such a manner will minimize deterioration of the biological, chemical, and physical properties of the topsoil and will prevent excess compaction and contamination of the topsoil. Topsoil will not be handled when saturated either during the initial stripping, spreading or final grading. Handling sticky or plastic soils in a saturated state will reduce the quality of the topsoil by degrading the physical characteristics.

3.0 Mine Revegetation Plan

Schedule of Revegetation

The schedule of revegetation for the majority of the disturbed areas is not possible to predict. When the mine is no longer an economically viable operation, it will be reclaimed and revegetated. The time frame for the revegetation could vary from as little as five years to more than fifty years.

Topsoil stockpiles, cut slopes and other disturbed surfaces associated with the mine construction will be revegetated during the first available planting season typically October 15th to November 15th.

Seed Mix

The revegetation objective is to establish on all disturbed land within the mine plan area a diverse, effective and permanent vegetative cover of similar seasonal variety as that native to the area. The seeded vegetative cover will be comprised of native species that are desirable and necessary to achieve the approved postmining land use.

Three seed mixes will be used for the revegetation work, one for temporary soil stabilization and two for final reclamation purposes. The first seed mix (SM-1) will be a soil stabilization mix used for the interim reclamation of topsoil stockpiles, cut and fill slopes and other disturbed surfaces associated with the mine construction. As indicated by the two proposed permanent seed mixes, (SM-2 & SM-3) the establishment of shrubs will be attempted on all reclaimed acreage. However, because erosion control will be of paramount importance on steeper slopes, grasses will be encouraged in these areas and relief from a restrictive woody plant density standard will be necessary. Seeding rates that are listed are drill seed rates which will be increased for areas that must be broadcast seeded.

The three seed mixes are as follows:

Table SM-1
STABILIZATION (TEMPORARY) SEED MIX

Species	Common Name	Rate PLS/AC	Seeds/Lb -1000	Seeds per Sq Ft	Percent GRP
GRASSES					
Elymus lanceolatus ssp. *psammophilus*	Streambank Wheatgrass (Sodar)	4	156	14.33	26.94
Pascopyrum smithii	Western Wheatgrass (Arriba)	4	110	10.1	19.00
Elymus lanceolatus ssp. *lanceolatus*	Thickspike Wheatgrass (Critana)	4	154	14.14	26.60
Elymus trachycaulus ssp, *trachycaulus*	Slender Wheatgrass (Primar)	4	159	14.6	27.46
Rates listed above are for drill seeding; for broadcast seeding rates should be doubled		16		53.17	100.00

Table SM-2
RED CLIFF PROJECT – SUGGESTED REVEGETATION SEED MIX FOR TOPSOILED AREAS TARGETING GRAZINGLAND LAND USE – 2007 *

No.	Common Name	Scientific Name	Preferred Variety	PLS / lb.	PLS lbs/ac	PLS / ft^2	% PLS by Seeds/ft^2	Comment
1	Western Wheatgrass	*Agropyron smithii*	*Arriba*	110,000	2.00	5.1	5.4	Native - Fair Performer
2	Great Basin Wildrye	*Elymus cinereus*	*Trailhead*	95,000	1.50	3.3	3.5	Native - Fair Performer
3	Salina Wildrye	*Elymus salinus*	***Site Collected***	254,500	2.00	11.7	12.4	Collect from site, not commercially avail.
4	Galleta	*Hilaria jamesii*	*Viva*	159,000	1.00	3.7	3.9	Native - Fair Performer
5	Indian Ricegrass	*Oryzopsis hymenoides*	*Paloma*	188,000	0.50	2.2	2.3	Native - Fair Performer

Table SM-2
RED CLIFF PROJECT – SUGGESTED REVEGETATION SEED MIX FOR TOPSOILED AREAS TARGETING GRAZINGLAND LAND USE – 2007 *

No.	Common Name	Scientific Name	Preferred Variety	PLS / lb.	PLS lbs/ac	PLS / ft^2	% PLS by Seeds/ft^2	Comment
6	Sandberg Bluegrass	*Poa secunda*		925,000	0.50	10.6	11.3	Native - Adapted to Skeletal Soils
7	Alkali Sacaton	*Sporobolus airoides*	*Salado*	1,758,000	0.75	30.3	32.1	Native - Fair Performer
	Forbs	**Subtotal**			**8.25**	**66.7**	**70.8**	
8	Western Yarrow	*Achillea millefolium*		2,770,000	0.10	6.4	6.7	Native - Fair Performer
9	Annual Sunflower	*Helianthus annuus*		58,500	0.50	0.7	0.7	Native
10	Lewis Flax	*Linum lewisii*		293,000	0.25	1.7	1.8	Native - Proven Performer
11	Palmer Penstemon	*Penstemon palmeri*		610,000	0.30	4.2	4.5	Native - Showy, Proven Performer
12	Rocky Mtn. Penstemon	*Penstemon strictus*		592,000	0.25	3.4	3.6	Native - Proven Performer
13	Scarlet Globemallow	*Sphaeralcea coccinea*		500,000	0.25	2.9	3.0	Native - Fair Performer
	Shrubs	**Subtotal**			**1.65**	**19.2**	**20.4**	
14	Wyoming Big Sagebrush	*Artemisia tridentata var wyo.*		2,500,000	0.10	5.7	6.1	If Conditions Correct, Will Respond
15	Fourwing Saltbush	*Atriplex canescens*		52,000	0.75	0.9	1.0	Native - Excellent Performer
16	Shadscale	*Atriplex confertifolia*		64,900	0.50	0.7	0.8	Native - Fair Performer
17	Winterfat	*Krascheninnikovia lanata*		56,700	0.75	1.0	1.0	Performance under correct conditions
		Subtotal			**2.10**	**8.4**	**8.9**	
		Total			**12.00**	**94.24**	**100**	
Alternative species which may be used as substitutes for secondary or tertiary species:								
Grasses								
	Bottlebrush Squirreltail	*Sitanion hystrix*		192,000	0.25	1.1	1.2	

Table SM-2
RED CLIFF PROJECT – SUGGESTED REVEGETATION SEED MIX FOR TOPSOILED AREAS TARGETING GRAZINGLAND LAND USE – 2007 *

No.	Common Name	Scientific Name	Preferred Variety	PLS / lb.	PLS lbs/ac	PLS / ft^2	% PLS by Seeds/ft^2	Comment
Forbs								
	Rocky Mtn. Beeplant	*Cleome serrulata*		65,900	0.50	0.8	0.8	
	Showy Evening Primrose	*Oenethera speciosa*		2,500,000	0.10	5.7	6.1	
	Prairie Coneflower	*Ratibida columnifera*		1,230,000	0.10	2.8	3.0	
Shrubs								
	Mat Saltbush	*Atriplex corrugata*		60,000	1.00	1.4	1.5	Native - Fair Performer
	Gardner Saltbush	*Atriplex gardnerii*		111,500	1.00	2.6	2.7	Native - Fair Performer
	Rubber Rabbitbrush	*Chrysothamnus naseousus*		400,000	1.00	9.2	9.7	Native - Fair Performer
	Green Mormon Tea	*Ephedra viridis*		25,000	0.50	0.3	0.3	Native - Fair Performer
	Spiny Hopsage	*Grayia spinosa*		166,800	0.50	1.9	2.0	Native - Fair Performer
	Greasewood	*Sarcobatus vermiculatus*		210,000	1.00	4.8	5.1	Native - Fair Performer

Primary Species - Should not be substituted for.
Secondary Species - Should be in mix unless unavailable, or an alternate is more desirable for a given area.
Tertiary Species - Recommended to be in mix as indicated, but may be substituted if desired.

* The 12 lb/ac mix is designed for drill seeding (of grasses) and broadcasting (of forbs and shrubs) at Red Cliff. When broadcast or hydroseeding methods are used for all lifeforms, the rate for grasses should be increased 1.5 times and the seed must be placed prior to mulching.

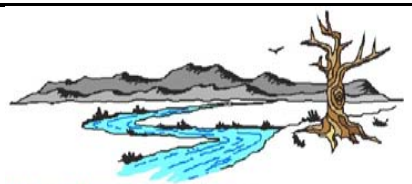

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Table SM-3
RED CLIFF PROJECT – SUGGESTED REVEGETATION SEED MIX FOR TOPSOILED AREAS TARGETING WILDLIFE HABITAT LAND USE – 2007 *

No.	Common Name	Scientific Name	Preferred Variety	PLS / lb.	PLS lbs/ac	PLS / ft^2	% PLS by Seeds/ft^2	Comment
	Grasses							
1	Western Wheatgrass	*Agropyron smithii*	*Arriba*	110,000	0.40	1.0	1.1	Native - Fair Performer
2	Great Basin Wildrye	*Elymus cinereus*	*Trailhead*	95,000	0.40	0.9	0.9	Native - Fair Performer
3	Galleta	*Hilaria jamesii*	*Viva*	159,000	0.40	1.5	1.5	Native - Fair Performer
4	Indian Ricegrass	*Oryzopsis hymenoides*	*Paloma*	188,000	0.40	1.7	1.8	Native - Fair Performer
5	Sandberg Bluegrass	*Poa secunda*		925,000	0.40	8.5	9.0	Native - Adapted to Skeletal Soils
	Forbs	**Subtotal**			**2.00**	**13.6**	**14.4**	
6	Western Yarrow	*Achillea millefolium*		2,770,000	0.10	6.4	6.7	Native - Fair Performer
7	Annual Sunflower	*Helianthus annuus*		58,500	0.50	0.7	0.7	Native
8	Lewis Flax	*Linum lewisii*		293,000	0.50	3.4	3.6	Native - Proven Performer
9	Palmer Penstemon	*Penstemon palmeri*		610,000	0.30	4.2	4.5	Native - Showy, Proven Performer
10	Rocky Mtn. Penstemon	*Penstemon strictus*		592,000	0.25	3.4	3.6	Native - Proven Performer
	Shrubs	**Subtotal**			**1.65**	**18.0**	**19.1**	
11	Wyoming Big Sagebrush	*Artemisia tridentata var wyo.*		2,500,000	0.35	20.1	21.3	If Conditions Correct, Will Respond
12	Fourwing Saltbush	*Atriplex canescens*		52,000	1.50	1.8	1.9	Native - Excellent Performer
13	Shadscale	*Atriplex confertifolia*		64,900	2.00	3.0	3.2	Native - Fair Performer
14	Gardner Saltbush	*Atriplex gardnerii*		111,500	1.50	3.8	4.1	Native - Fair Performer
15	Rubber Rabbitbrush	*Chrysothamnus naseousus*		400,000	0.50	4.6	4.9	Native - Fair Performer

Table SM-3
RED CLIFF PROJECT – SUGGESTED REVEGETATION SEED MIX FOR TOPSOILED AREAS TARGETING WILDLIFE HABITAT LAND USE – 2007 *

No.	Common Name	Scientific Name	Preferred Variety	PLS / lb.	PLS lbs/ac	PLS / ft^2	% PLS by Seeds/ft^2	Comment
16	Winterfat	*Krascheninnikovia lanata*		56,700	1.50	2.0	2.1	Performance under correct conditions
17	Greasewood	*Sarcobatus vermiculatus*		210,000	1.00	4.8	5.1	Native - Fair Performer
		Subtotal			**8.35**	**40.1**	**42.5**	
		Total			**12.00**	**71.62**	**76**	
Alternative species which may be used as substitutes for secondary or tertiary species:								
Grasses								
	Salina Wildrye	*Elymus salinus*		254,500	1.00	5.8	6.2	Preferred but Not Currently Available
	Alkali Sacaton	*Sporobolus airoides*	*Salado*	1,758,000	1.00	40.4	42.8	Native - Fair Performer
	Bottlebrush Squirreltail	*Sitanion hystrix*		192,000	0.25	1.1	1.2	
Forbs								
	Rocky Mtn. Beeplant	*Cleome serrulata*		65,900	0.50	0.8	0.8	
	Showy Evening Primrose	*Oenethera speciosa*		2,500,000	0.10	5.7	6.1	
	Scarlet Globemallow	*Sphaeralcea coccinea*		500,000	0.25	2.9	3.0	Native - Fair Performer
	Prairie Coneflower	*Ratibida columnifera*		1,230,000	0.10	2.8	3.0	

Table SM-3
RED CLIFF PROJECT – SUGGESTED REVEGETATION SEED MIX FOR TOPSOILED AREAS TARGETING WILDLIFE HABITAT LAND USE – 2007 *

No.	Common Name	Scientific Name	Preferred Variety	PLS / lb.	PLS lbs/ac	PLS / ft^2	% PLS by Seeds/ft^2	Comment
Shrubs								
	Mat Saltbush	*Atriplex corrugata*		60,000	1.00	1.4	1.5	
	Green Mormon Tea	*Ephedra viridis*		25,000	0.50	0.3	0.3	
	Spiny Hopsage	*Grayia spinosa*		166,800	0.50	1.9	2.0	

Primary Species - Should not be substituted for.

Secondary Species - Should be in mix unless unavailable, or an alternate is more desirable for a given area.

Tertiary Species - Recommended to be in mix as indicated, but may be substituted if desired.

* The 12 lb/ac mix is designed for drill seeding (of grasses) and broadcasting (of forbs and shrubs) at Red Cliff. When broadcast or hydroseeding methods are used for all lifeforms, the rate for grasses should be increased 1.5 times and the seed must be placed prior to mulching.

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Planting and Seeding

The seed mixture(s) will be drilled on level areas and on slopes which will permit machine work along the contour. On slopes which prevent safe or adequate machine work, the surface will be hydroseeded or broadcast seeded.

Broadcast seeding will also be used for small isolated areas. Dozer tracking up and down steep slopes or other roughening techniques will be used before seeding to establish a better seedbed. On predominantly south and west facing steep slopes, the surface will be extensively roughened to provide for increased moisture retention and favorable micro sites for plant establishment.

Seeding will be done in the fall after October 15th.

Mulching Techniques

The Operator currently does not plan to mulch except for steep slope embankments (such as road cuts/fills). Chisel plowing, terracing and/or contour furrowing would be utilized to stabilize, reduce compaction and increase the moisture retention capacity of regraded topsoiled areas. Spoil will be regraded to minimize long, uninterrupted slopes. Respreading of topsoil will be followed by chisel plowing and contour furrowing (as necessary).

Irrigation and Weed Control

Use of the planting and mulching methods specified above will result in satisfactory plant establishment, barring abnormally dry conditions. There are no plans to irrigate the reclaimed areas.

4.0 Noxious Weed Control Plan

The baseline vegetation survey presented in Volume III, Exhibit 5 identified two noxious weeds on-site. They are Salt Cedar (Tamarisk) and Jointed Goatgrass. Garfield County lists both Salt Cedar and Jointed Goatgrass as noxious weeds. Mesa County does not list Jointed Goatgrass as a noxious weed. Mesa County lists Salt Cedar as a noxious weed "preferred to be controlled" rather than mandatory.

If noxious weed infestations occur at levels which may interfere with successful revegetation or are detrimental to stand quality, weed control using herbicides will be implemented. If cheat grass invades topsoil piles or other disturbed areas it will be controlled with Roundup. Spraying will be done by use of a backpack spray system or an ATV-mounted spray tank.

Salt Cedar will be controlled by mechanical removal or by cutting the stem and applying herbicide (known as the cut-stump method). Individual tamarisk plants will be cut as close to the ground as possible and herbicide will be applied immediately thereafter to the perimeters of the cut stems. The herbicides used will be triclopyr (e.g., Garlon4 or PathfinderII) or imazapyr (Arsenal). Fall treatments are believed to be most effective because the plants are translocating materials to their roots.

Jointed Goatgrass will be controlled with the chemical Glyphosate sulfometuron+chlorsulfuron (Landmark) spayed in accordance with the manufacture's recommendation.

In permanently vegetated areas where cheatgrass is a detriment to successful vegetation, the cheatgrass will be treated with a mix of 6 ounces of Plateau and 2 ounces of Roundup per acre in the fall. This treatment will be repeated the following year without using Roundup. The treated areas will then be interseeded with a permanent seedmix after the soil is scarified by using an ATV mounted spike tooth harrow if required to ensure minimal damage to the mature shrub overstory.

Additional weed control may include control of any type of vegetation which may grow around substations, buildings, conveyors, within 100 feet of mine portals, and other areas where vegetation may present a fire hazard.

The Operator commits to performing aggressive weed control during the operations and reclamation phases of the operation.

Persons who perform weed control on BLM managed lands will be licensed.

5.0 Revegetation Success Monitoring Plan

Initially, revegetation success will be qualitatively evaluated during routine inspections of the reclaimed sites. These evaluations shall include assessments of noxious weeds, species diversity and the general health of the vegetation. Results of these evaluations will be included in the annual reports.

5.1 Determining Revegetation Success: General Requirements and Standards

The success of revegetation at the Red Cliff project shall be determined by comparison to established reference areas (RA) as allowed by Rule 4.15.7 (3).

During the summer of 2006, four reference areas were selected to represent the four major vegetative communities to be disturbed. These communities included: Salt Desert Shrub (933 acres or 49.5 percent of the study area), Juniper Scrub (437 acres or 23.2 percent of the study area), Sagebrush (355 acres or 18.8 percent of the study area), and Greasewood (126 acres or 6.7 percent of the study area).

The remaining 1.8 percent of the study area was due to minor, disclimactic communities. The four reference areas are 12.7, 6.8, 11.4, and 7.0 acres in size, respectively.

These reference areas were sampled for herbaceous cover, herbaceous production, and woody plant density in 2006. Species diversity was determined utilizing herbaceous cover data from the premining baseline inventories of the various communities. Sample adequacy testing was performed on both the pre-mine and reference area data to insure that representative cover and production data had been obtained at the appropriate confidence level. Where necessary, the mean, variance and number of observations for the pre-mine and reference area data were used to perform *t*-tests on the cover and production data to insure that there were no significant differences at the 90 percent level of confidence between the respective sets of cover and production data. However, in certain instances (primarily due to the influence of annual vegetation such as cheatgrass and Russian thistle), such testing became problematic. Therefore, an alternate procedure as explained below was utilized to compensate. This alternate procedure is excerpted directly from the vegetation baseline evaluation (Volume III, Exhibit 5 Section 6.0).

Section 6.0 – Discussion & Recommendations for Bond Release Standards

A total of six vegetation communities were identified from the pre-disturbance Red Cliff Mine permit area: 1) Salt Desert Shrub, 2) Juniper Scrub, 3) Sagebrush, 4) Greasewood, 5) Annual Grassland, and 6) Perennial Grassland. Of these, only the first four occupy significant acreage within the permit area and are late seral communities. Both grassland areas are small representations of early seral or disclimactic stages of late seral types. The Annual Grassland area is a strongly disclimactic early seral subtype of the Salt Desert Shrub community. The small area of Perennial Grassland exists because of a reasonably recent fire that removed the overstory (greasewood and/or sagebrush) of the late seral community. Given these circumstances, reference areas were established for each of the four major vegetation communities to facilitate future revegetation evaluations and bond release efforts.

As indicated in previous sections, the extreme variability of the project area vegetation resources (primarily due to the influence of annual taxa) has complicated the selection of these four reference areas. However, it is recommended in this baseline report that despite the

complications due to annual taxa, the current quartet of selected reference areas should still be utilized for revegetation performance comparisons. These comparisons, however, must necessarily reflect non-standard techniques for documenting successful revegetation.

In this regard, it is Cedar Creek's recommendation that for performance criteria for the variable of ground cover, each reference area may be used individually or in an acreage-weighted manner for testing purposes, however, only ground cover due to perennial vegetation shall be utilized for comparison.

The contribution due to annual species shall be deleted from the final comparison set of statistics (following collection of a statistically adequate sample where necessary) for both reference areas and revegetated areas. Rationale for this action is readily apparent when reviewing the reference area validation testing on Table E5-1 for total ground cover vs. perennial ground cover. Three of the four reference areas fail the validation test for Total Ground Cover due to the influence of the highly variable annual plant contribution. All four reference areas pass testing when only Perennial Ground Cover is utilized.

With regard to current annual production, it is again Cedar Creek's recommendation that each reference area may be used individually or in an acreage-weighted manner for testing purposes, however, "baseline-adjusted" herbaceous perennial vegetation production shall be utilized for comparison. The contribution due to annual species shall be deleted from the final comparison set of statistics (following collection of a statistically adequate sample where necessary) for both reference areas and revegetated areas. Once the future perennial herbaceous production has been identified, the "adjusted reference area" mean will be determined by multiplying each future reference area perennial mean value by the ratio of pre-mining baseline versus reference area as follows:

- For all future measurements of the Salt Desert Shrub Reference Area, mean Perennial Herbaceous Production shall be "adjusted" downward by the multiplication factor of 0.541.
- For all future measurements of the Sagebrush Reference Area, mean Perennial Herbaceous Production shall be "adjusted" upward by the multiplication factor of 1.272.
- For all future measurements of the Juniper Scrub Reference Area, mean Perennial Herbaceous Production shall be "adjusted" downward by the multiplication factor of 0.736.
- For all future measurements of the Greasewood Reference Area, mean Perennial Herbaceous Production shall be "adjusted" upward by the multiplication factor of 2.879.

In effect, this procedure will facilitate a "comparison" or "control" area style evaluation whereby the original baseline data are utilized to adjust the reference area mean (given the aforementioned ratios), and differences over time due to climatic influences will still be accounted for by changes in reference area data. This procedure is recommended for use because the next best alternative (standards developed from NRCS data) would result in standards ranging from 3 to 10 times too great a value.

This would effectively preclude any opportunity for future release of liability and/or financial assurances. To help avoid confusion, the following example is provided to demonstrate the determination of a single acreage-weighted value that herbaceous perennial revegetation area production might have to meet.

Parameter/Adj. Factor/Etc.	Pre-Mine Community			
	Salt Desert Shrub	**Juniper Scrub**	**Sagebrush**	**Greasewood**
Pre-Mine Ref. Area / Baseline Ratio	0.541	1.272 0	736 2	879
Post-Mine Ref. Area Perennial Production (Hypothetical)	100	75	175	150
Baseline Ratio Adjusted Ref. Area Total Perennial Herb. Prod.	54.10	95.40	128.80	431.85
Weighting Factor based on Study Area Acreage	0.504	0.236	0.192	0.068
Acreage Wtd. Herb. Perennial Prod. (Pounds/Acre) by Type	27.27	22.53	24.71	29.31
Total Target Wtd. Perennial Prod. (Pounds/Acre) For Year XXXX (or Success Criterion)	**103.8**			

As indicated in Rule 4.15.7 (5) the 10-year liability period will begin following the last year of augmented seeding, fertilization, irrigation, or related revegetation work. To facilitate bond release, revegetation success criteria must be met for two of the last four years of the liability period excepting that sampling for final success determination cannot occur prior to year 9 of this period. The liability period will be reinitiated for augmentation work excepting work associated with normal management activities as defined under Rule 4.15.7 (5) (a-g).

5.2 Revegetation Success Criteria

The Operator will meet the requirements of this Subsection to insure that the postmining vegetation will be adequate for final bond release. The Operator will utilize established reference areas for the purpose of comparing vegetation information between the reclaimed area and the undisturbed area for the variables of ground cover and production. For the variables of woody plant density and species diversity, the Operator shall compare revegetated area parameters against defined standards detailed later in this section. Data to be used in these comparisons must be from statistically adequate sampling (where necessary) as indicated in Rule 4.15.11.

5.3 Herbaceous Cover

Herbaceous cover of the revegetated area will be considered adequate for final bond release if the perennial herbaceous cover is not less than 90 percent of the perennial herbaceous cover as determined from the reference area(s) with a 90 percent statistical confidence utilizing one of the three methods detailed under Rule 4.15.11 (2) [(a), (b) or (c)]. As allowed by Rule 4.15.7 (4), either weighted-average or individual protocols will be followed. Preference will first be given to testing using the weighted average approach (Rule 4.15.7 (4) (b)) where reference area data and revegetated area data are "weighted" (each combined into a single value for comparison) based on the acreage of premine communities within the disturbance area footprint. Testing for either approach will then follow procedures detailed under Rule 4.15.11 (2) with preference being given first to subsection (a) [direct comparison], second to subsection (c) [reverse-null testing], and third subsection (b) [classic *t*-test].

5.4 Herbaceous Production

Herbaceous production of the revegetated area will be considered adequate for final bond release if the perennial herbaceous production is not less than 90 percent of the perennial herbaceous production as determined from the reference area(s) with a 90 percent statistical confidence utilizing one of the three methods detailed under Rule 4.15.11 (2) [(a) (b) or (c)]. As allowed by Rule 4.15.7 (4), either weighted-average or individual protocols will be followed. Preference will first be given to testing using the weighted average approach (Rule 4.15.7 (4) (b) where reference area data and revegetated area data are "weighted" (each combined into a single value for comparison) based on the acreage of pre-mine communities within the disturbance area footprint. Testing for either approach will then follow procedures detailed under Rule 4.15.11 (2) with preference being given first to subsection (a) [direct comparison], second to subsection (c) [reverse-null testing], and third subsection (b) [classic *t*-test].

Furthermore, as detailed above, production testing requires adjustment for baseline conditions (to eliminate the impact due to annuals). In this regard, each reference area mean utilized in the comparison will need to be adjusted as follows:

- For all future measurements of the Salt Desert Shrub Reference Area, mean Perennial Herbaceous Production shall be "adjusted" downward by the multiplication factor of 0.541.
- For all future measurements of the Sagebrush Reference Area, mean Perennial Herbaceous Production shall be "adjusted" upward by the multiplication factor of 1.272.
- For all future measurements of the Juniper Scrub Reference Area, mean Perennial Herbaceous Production shall be "adjusted" downward by the multiplication factor of 0.736.
- For all future measurements of the Greasewood Reference Area, mean Perennial Herbaceous Production shall be "adjusted" upward by the multiplication factor of 2.879.
- These adjustments, either individually or on an acreage-weighted basis, will allow use of the existing set of reference areas established in 2006 for comparison. The selected reference areas were the only tenable examples of each community present within reasonable proximity of the study area. Since no other usable reference areas were present, this "adjustment" was the only logical alternative for success criteria establishment.

5.5 Woody Plant Density

The variable of woody plant density is largely associated with the land use of wildlife habitat, therefore, the application of such a success criterion must be qualified in this regard. Reclamation will specifically target both livestock grazing and wildlife habitat in combination, both of which are the two primary components of the Pre- and Post-mining Rangeland Land Use. Accounting for the proportion of each land use that should be targeted by reclamation efforts can be a difficult process, however, livestock grazing in the project area tends to be a more significant and dominant use of the rangeland with wildlife habitat being subordinate. In addition, preliminary evaluations of post-mining topography, indicate that about 35 percent of the reclaimed landscape will afford flat or gently sloping surfaces with reduced exposure to erosion. It is on these less exposed more gentle slopes where development of wildlife conducive shrubland habitats such as sagebrush steppe can be encouraged with minimal risk of excessive erosion. Therefore, the Operator proposes that stronger efforts encouraging woody plants be

limited to the flat or more gently sloping surfaces (thereby targeting wildlife habitats), and only weak efforts applied to the more erosion prone slopes (thereby targeting livestock grazing). This approach will encourage a reasonable distribution and proportion of revegetated communities that target the respective post-mining land uses without overly compromising the primary need for controlling erosion.

However, no commitment is made to the establishment of any specific percentages of either land use targeted reclaimed community within the permit area.

As indicated by the two proposed seed mixes, the establishment of shrubs will be attempted on all reclaimed acreage. However, because erosion control will be of paramount importance on steeper slopes, grasses will be encouraged in these areas and relief from a restrictive woody plant density standard will be necessary. To the contrary, grasses can be more restricted on flatter slopes (less prone to erosion) to help encourage shrubs, and as such a woody plant success criterion can be utilized for any shrub patches that develop within these areas.

As shrublands evolve on these "shrub community attempts", they will be segregated into "core" areas and "ecotonal" areas (as is typically evident in nature), each with a separate woody plant density success criterion.

Furthermore, it has been noted repeatedly in the industry that the 10-year bond responsibility period is insufficient for the adequate development of more dense shrub populations. In this regard, flexibility must be built into the success evaluation process (and/or criteria). In this regard, if a positive recruitment rate to the shrub population can be shown to exist, there would be no need to achieve elevated densities within a modest time-frame such as a 10-year period.

Given this focus on erosion control, targeting of specific land uses, and the fact that the environs of the Red Cliff Project Area are conducive to the long-term development of desert shrub populations (across several decades), the following woody plant density success criteria will be applied to revegetation efforts: On grassland communities (targeted on approximately 65 percent of reclamation), zero woody plant density will be required as a success criterion although a goal of 50 plants per acre will be sought. If shrub communities evolve in these areas this acreage will count toward the wildlife habitat goal and be subject to appropriate standards. On shrubland communities (targeted on approximately 35 percent of reclamation designed for the post-mining land use goal of wildlife habitat), the following criteria will be applied depending on shrubland classification. On "core areas" (areas of shrub concentration), the standard shall be 300 plants per acre after 10 years, or 200 plants per acre with documentation of a positive shrub population recruitment rate. Similarly, in ecotonal areas, the standard shall be 150 plants per acre after 10 years, or 100 plants per acre with documentation of a positive recruitment rate.

5.6 Diversity

Since the 1980s DRMS regulations have allowed for the use of direct comparisons of species composition based on relative cover (composition) between reclaimed areas and undisturbed vegetation (e.g., baseline or reference areas) to document diversity. Baseline vegetation studies completed in 2006 revealed an average of 4.25 perennial species exhibiting between 3 and 50 percent relative cover across the late seral communities of the entire study area (see Table E5-6 – from the vegetation baseline).

When viewing baseline communities alone an average of 5.25 perennial species between 3 and 50 percent composition are indicated. However, the four reference areas (reasonable examples of each community) only exhibit an average of 3.25 perennial species. Furthermore, as indicated in Table E5-6, the diversity of perennial forbs is weakly represented in most native communities. Because these native areas are, by definition, late seral and revegetated areas are early to mid seral, allowances must be made regarding diversity.

In this regard and given a weighted comparison, diversity of revegetated areas will be considered adequate for final bond release if the number of perennial species exhibiting between 3 and 50 percent relative cover (composition) is equal to or greater than two. Furthermore, there should be no distinction among these species with regard to life form given the weak representation from forbs in the baseline data set.

If a direct comparison is made (i.e., community to community such as sagebrush reclamation to sagebrush reference area), then the number of species exhibiting between 3 and 50 percent relative cover (composition) must be 90 percent of the number of species documented from the appropriate reference area (rounded down to the nearest integer (whole number). For example, a juniper to juniper comparison would result in the need to exhibit 3 species between 3 and 50 percent composition (4 X 0.9 = 3.6 and 3.6 rounded down to the nearest integer would be 3).

Table E5-6
VEGETATION COVER – 2006

Diversity – Perennial Species with 3% – 50% Relative Cover (Including 2nd Hits)									
Community Type -->		**Salt Desert Shrub**		**Greasewood**		**Juniper Scrub**		**Sagebrush**	
Unit -->		**Baseline**	**Reference**	**Baseline**	**Reference**	**Baseline**	**Reference**	**Baseline**	**Reference**
N P Elymus salina	Salina Wildrye	19.61	45.35			11.36		8.77	
N P Hilaria jamesii	James' Galleta	3.18				5.17	7.13	6.07	10.17
N P Poa secunda	Sandberg Bluegrass			7.96	13.32			3.49	
Number of Perennial Grasses		**2**	**1**	**1**	**1**	**2**	**1**	**3**	**1**
N P Erigeron concinnus	Navajo Fleabane					7.44	24.37		6.96
N P Phlox hoodii	Carpet Phlox					3.10			
Number of Perennial Forbs		**0**	**0**	**0**	**0**	**2**	**1**	**0**	**1**
N P Artemisia tridentata var. wyo.	Wyo. Big Sagebrush			7.62	20.69	15.70	14.48	43.08	**59.97**
N P Atriplex confertifolia	Shadscale Saltbush	19.89	36.63			3.10			
N P Atriplex gardneri	Gardner's Saltbush	20.86	6.73						
N P Grayia spinosa	Spiny Hopsage								4.28
N P Gutierrezia sarothrae	Snakeweed	3.87				12.40	37.93	3.71	
N P Juniperus osteosperma	Utah Juniper					10.74			

Diversity – Perennial Species with 3% – 50% Relative Cover (Including 2nd Hits)									
Community Type -->		Salt Desert Shrub		Greasewood		Juniper Scrub		Sagebrush	
Unit -->		Baseline	Reference	Baseline	Reference	Baseline	Reference	Baseline	Reference
N P Sarcobatus vermiculatus	Greasewood			34.36	45.14				
Number of Shrubs		**2**	**2**	**2**	**2**	**4**	**2**	**2**	**1**
Total		**5**	**3**	**3**	**3**	**8**	**4**	**5**	**3**
Average		**4**		**3**		**6**		**4**	

5.7 Unique Circumstances

Finally, based on pre-mine mapping, approximately 5 percent of the vegetation study area (and probably more of the disturbance footprint) is effectively barren of vegetation (less than 3 percent ground cover). These areas are indicated as "BR" and "DSN". The BR areas are effectively 100 percent exposed Mancos shale. The DSN areas exhibit very thin cover values from a single shrub species (*Atriplex corrugata*) with occasional scattered patches of a grass, Salina wildrye (*Leymus salinus*). These would be very difficult to revegetate given the several decades of "weathering" of Mancos shale that would necessarily have to occur before these two species could be reintroduced to such circumstances. Therefore, as much as 5 percent of the reclaimed surface could exhibit barren or very thinly vegetated areas and still qualify for final bond release.

5.8 Revegetation Community Mapping / Stratification

During monitoring of revegetated units, developing shrub patches will be identified and as necessary delineated (circumnavigated with a sub-meter global positioning system [GPS] unit to document boundaries and acreage) to facilitate mapping that in turn will represent the juxtaposition (stratification) of developing communities.

As indicated previously, delineated shrub patches will be classified as either "core" areas or "ecotonal" areas depending on apparent density of developing shrub populations. Such stratification is necessary as success criteria associated with areas of wildlife habitat will be applicable to shrub-dominated communities as opposed to grassland success criteria applicable to remaining revegetation efforts targeting livestock grazing land uses.

5.9 Sample Layout

The sample layout protocol for revegetation monitoring and bond release evaluations shall be a systematic procedure designed to better account for the heterogeneous expression of seedings within reclaimed areas while precluding bias in the sample site selection process. By design, the procedure is initiated randomly, and thereafter, samples are located in a systematic manner, along grid coordinates spaced at fixed distances, e.g., 200 feet. In this manner, "representation"

from across the target reclamation unit is "forced" rather than risking the chance that significant pockets are entirely missed or overemphasized as often occurs with simple random sampling.

Unless too small, older reclaimed units (e.g., 7 or more years) shall receive a minimum of 20 ground cover transects and in monitoring areas – co-located shrub density belts. Production for monitoring purposes shall be collected from a representative subset (five) of these 20 sample points. For bond release efforts, production will be collected from a statistically adequate sample (where necessary) as defined below. Monitoring efforts for younger reclaimed units (e.g., 2 to 4 years) shall receive 15 transects and co-located woody density belts (as necessary) but no production sampling. First year units will receive one cluster of five emergent density quadrats spread in a representative manner for approximately every two to three acres of reclamation. With regard to any two-year-old or older reclamation unit that is smaller than about 5 acres, the number of samples (for monitoring) shall be limited to five.

The systematic procedure for sample location in revegetated units shall occur in the following stepwise manner. First, a fixed point of reference (e.g., fence corner) will be selected for the target unit to facilitate location of the systematic grid in the field. Second, a systematic grid of appropriate dimensions will be selected to provide a reasonable number of coordinate intersections (e.g., 5, 15, 20, etc.) that would then be used for the set of sample sites. Third, a scaled representation of the grid will be overlain on a computer-generated map of the target unit extending along north/south and east/west lines. Fourth, the initial placement of this grid will be implemented by selection of two random numbers (an X and Y distance) to be used for locating a systematic coordinate from the fixed point of reference, thereby making the effort unbiased. Fifth, where an excess number of potential sample points (grid intersections) is indicated by overlain maps, the excess may be randomly chosen for elimination. (If later determined that additional samples are needed, the eliminated potential sample sites would be added back in reverse order until enough samples can be collected.) Sixth, utilizing a handheld compass and pacing techniques, or a hand-held GPS, sample points will be located in the field.

Once a selected grid (sample) point is located in the field, sampling metrics will be utilized in a consistent and uniform manner. In this regard, ground cover sampling transects will always be oriented in the direction of the next site to be physically sampled to further limit any potential bias while facilitating sampling efficiency. Depending on logistics, timing, and access points to a target sampling area, the field crew may occasionally layout a set of points along coordinates in one direction and then sample them in reverse order. However, orientation protocol will always be maintained (i.e., in the direction of the next point to be physically sampled). If the boundary of an area is encountered before reaching the full length of a transect, the transect orientation will be turned 90 degrees in the appropriate direction so the transect will be completed within the target unit. In this manner, edge transects will be retained entirely within the target unit by "bouncing" off the boundaries. Production quadrats will always be oriented 90 degrees to the right (clockwise) of the ground cover transect and placed one meter (m) from the starting point so as to avoid any trampled vegetation. Woody plant density belts (typically for monitoring efforts) will be extended parallel to the ground cover transects for a distance of 50 m and width of 2 m. (If the grid distance is less than 50 m, density belts will be reconfigured to be 4 m X 25 m or similar configuration, but always totaling 100 square meters (m^2).

5.10 Determination of Ground Cover

Ground cover at each sampling site will be determined utilizing the pointintercept methodology. This methodology will be applied as follows: First, a transect 10 m in length will be extended from the starting point of each sample site toward the direction of the next site to be sampled. Then, at each one-meter interval along the transect, a "laser point bar", "optical point bar" or 10-point frame will be situated vertically above the ground surface, and a set of 10 readings recorded as to hits on vegetation (by species), litter, rock (greater than 2mm), or bare soil. Hits will be determined at each meter interval as follows:

1. When a laser point bar is used, a battery of 10 specialized lasers situated along the bar at 10-centimeter intervals will be activated and the variable intercepted by each of the narrow (0.02 inch) focused beams will be recorded;
2. If an optical point bar is used, intercepts will be recorded based on the item intercepted by fine crosshairs situated within each of 10 optical scopes located at 10-centimeter intervals.
3. If a 10-point frame is used, sharpened pins will be used to determine intercepts at 10-centimeter intervals. Care will be taken to NOT record "side touches" on the pins as this will result in a significant overestimation error.

The following sampling rules should apply during data collection. Intercepts will be recorded for the first (typically highest) current annual (alive during the current growing season) plant part intercepted without regard to underlying intercepts or attachment to a living base except when multiple strata are present. In this circumstance, multiple live hits may be recorded, but only one hit per stratum with the second live hit being recorded separately and not used to calculate total ground cover. Otherwise, the intercept will be litter, rock or bare soil. Rock intercepts are based on a particle size of 2 mm or larger (NRCS definition), otherwise it would be classified as bare soil. To distinguish between current year senescent plant material and litter (including standing dead), the following rule should apply: 1) if the material is gray or faded tan it should be considered litter; and 2) if the material is bright yellow or beige it should be considered current annual (alive) and recorded by species. On occasion, experience with non-conforming taxa may override this rule.

When using laser or optic instruments during windy field conditions, the observer should consistently utilize one of the following techniques for determining a hit: 1) record the first item focused upon that is intercepted by the narrow laser beam or cross-hair; 2) wait a few moments and record the item intercepted for the longest time, or 3) block the wind and record the intercept. When using a pin frame, the observer must wait for the wind to subside.

With regard to gaps in the overstory, the point-intercept procedure naturally corrects for overestimations created by 2-dimensional areal (quadrat) or 1- dimensional linear (line-intercept) techniques. In this regard, the 0-dimensional point is extended along a line-of-sight until it "intercepts" something that is then recorded. Frequently points simply pass through overstory gaps until a lower plant part, litter, rock or bare soil is encountered.

Regardless of instrument, a total of 100 intercepts per transect will be recorded resulting in 1 percent cover per intercept. This methodology and instrumentation (excepting the 10-point frame) facilitates the collection of the most unbiased, repeatable, precise, and cost-effective ground cover data possible. Identification and nomenclature of plant species should follow Weber and Wittman (1996) Colorado Flora: Western Slope or newer accepted publication.

5.11 Determination of Production

Where production samples are to be collected (7 or more year-old units or Bond Release units) current annual herbaceous production will typically be collected from a 0.5 square meter (m^2) quadrat frame (0.5m x 1.0m) placed one meter and 90 degrees to the right (clockwise) of the ground cover transect to facilitate avoidance of vegetation trampled by investigators during sample site location. Where elevated variability is apparent within a reclamation unit or reference area, the sampling unit (quadrat frame) for that unit / reference area can be increased in size to $1m^2$ or $2m^2$ for the entire unit to help absorb additional variation. The best frame shape to maintain is rectangular and therefore, should be 0.5m x 2m for a $1m^2$ sample or 0.5m x 4m for a $2m^2$ sample. However, it is important that all samples from within a given unit or reference area remain consistent in size and shape (i.e., quadrat size and shape can only be changed between areas). Once collected, care must be taken to report data on a consistent basis (typically 0.5 m^2 basis) and then converted to pounds per acre.

If more production samples are necessary than cover samples (typical case for bond release efforts), orientation protocol will be maintained except that no ground cover data will be collected from the extra sample points. For example: if it is expected that 45 production samples are necessary for an adequate production estimate, then cover would only be recorded from those samples not evenly divisible by 3. This would result in 30 cover samples and 45 production samples. From within each quadrat, all above ground current annual herbaceous vegetation within the vertical boundaries of the frame will be clipped and bagged separately by life form as follows:

- Perennial Grass Perennial Forb
- Annual Grass Annual Forb
- Subshrub Noxious Weeds (if found)

All production samples will be returned to the lab for drying and weighing.

Drying will occur at 105 degrees C until a stable weight is achieved (24 hours).

Samples will then be re-weighed to the nearest 0.1 gram.

5.12 Determination of Woody Plant Density

Two sampling methods may be employed for monitoring woody plant density within Red Cliff's revegetated units. The first method, belt transects, may be employed when the size of the monitoring unit exceeds about five acres. At each sample site in such areas, a 2-meter wide by 50-meter long belt transect (or alternately 4 x 25 meter transect) should be established parallel to the ground cover transect and in the direction of the next sampling point. All woody plants (shrubs and trees but not subshrubs), within each belt will be enumerated by species. Determination of whether or not a plant may be counted is dependent upon the location of its main stem or root collar where it exits the ground surface with regard to belt limits. A total of 5, 15 or 20 belt transects may be sampled for each monitoring unit.

For bond release sampling, sufficient samples must be collected to insure adequacy of the effort (to facilitate valid testing) in accordance with one of the three methods under either Rule 4.15.11 (2), or Rule 4.15.11 (3). Depending on the selected protocol, care must be taken to collect at

least the minimum number of samples indicated (15, 30, 40, or 75, depending on the procedure utilized).

The second method, total enumeration, may be employed for monitoring units of any size, but feasibly only when the size of a unit is less than approximately five acres. For bond release purposes, total enumeration shall be the typical method utilized unless shrub patches are too large (e.g., greater than 10 to 15 acres) to practically utilize this technique (in which case belts will be utilized).

Total enumeration involves total counts of woody plant populations as opposed to estimates of mean densities through statistical sampling. Implementation of the total count technique would involve circumscribing the boundaries of a target polygon with hip chain thread, tree marking paint, surveyor's flagging, or similar visible designation. Once a unit is circumscribed in this manner, a team of two or more biologists (shoulder-to-shoulder) traverse the patch enumerating each plant by species (tally meters aid this process immensely).

The person farthest inside the line of observers trails hip chain thread, or by other means marks their path to prevent missing or double counting specimens on subsequent passes. The distance between observers should be 15 to 20 feet or less depending on the height of grasses and the presence of low growing taxa such as rose or snowberry. Each internal observer should also "zigzag" as the team progresses, occasionally turning to view the area just passed to ensure visual coverage of the entire survey path. Constant communication among team members precludes double counting or missing of plants located along the margins of observed paths. Results from total enumeration efforts can be compared directly with success criteria without statistical testing.

5.13 Determination of Seedling Emergence

At each emergent density sample point (revegetation monitoring only), five one-square foot (ft^2) quadrats should be blindly tossed to the ground and the number of emergents rooted within the perimeter of each shall be recorded accordingly into one of five classes: perennial grass, perennial forb, shrub, annual grass, or annual forb. Where possible recognizable taxa may be recorded by species. Efforts with 0-1 perennial emergents may be problematic and require remediation. At a minimum, future monitoring should be mandated. Efforts with 1-2 perennial emergents per ft^2 are considered to be fair, while 2-3 perennial emergents per ft^2 are considered good. A range of 3-4 perennial emergents per ft^2 would be considered very good. Five or more perennial emergents per ft^2 can be considered excellent.

5.14 Sample Adequacy Determination / Success Evaluation

Sampling within each monitored unit shall be conducted to a minimum of 5, 15 or 20 samples as appropriate for most procedures, however, reverse null testing requires a minimum of 30 samples (but sample adequacy does not have to be demonstrated). At Red Cliff, sampling within each unit under consideration for bond release shall start with a minimum of 15 (reference area) or 20 (revegetated area) samples and continue until a statistically adequate sample (if necessary) has been obtained in accordance with Rule 4.15.11 (2) (a)[direct comparison], (b)[standard-null testing], or (c)[reverse-null testing]. From initial sampling efforts, sample means and standard deviations for total non-overlapping vegetation ground cover, production, and woody plant density will be calculated. For bond release applications, the typical procedure is that sampling

continues until an adequate sample, nmin, has been collected in accordance with the Cochran formula (below) for determining sample adequacy, whereby the population is estimated to within 10 percent of the true mean (μ) with 90 percent confidence. For woody plant density, the estimate is to within 15 percent of the true mean.

When the inequality (nmin ≤ n) is true, sampling is deemed adequate; and nmin is determined as follows:

$$nmin = (t^2 s^2) / (d\bar{x})^2$$

where:

n = the number of actual samples collected (initial size = 15 or 20)

t = the value from the one-tailed *t* distribution for 90 percent confidence with n-1 degrees of freedom (a value of approximately 1.3);

s^2 = the variance of the estimate as calculated from the initial samples;

d = precision (0.10 for cover and production or 0.15 for woody plant density;

$\bar{x}$ = the mean of the estimate as calculated from the initial samples.

If the initial samples do not provide a suitable estimate of the mean (i.e., the inequality is false), additional samples should be collected until the inequality (nmin ≤ n) becomes true. However, where sampling is for managerial (monitoring) information, adequacy is not necessary and is calculated for informational purposes only.

If reverse-null testing will be utilized to document success, then in accordance with Rule 4.15.11 (2) (c) a minimum of 30 samples must be collected and demonstration of sample adequacy is not necessary. In this regard, the smaller the variance (given by extra sampling) the better the chances of passing closely matched parameters.

For certain statistical demonstrations of woody plant density, a determination of sampling adequacy is often problematic, hence Rule 4.15.11 (3) may be used in lieu of Rule 4.15.11 (2). Rule 4.15.11 (3) (a) is a reverse-null approach based on the median and requires a minimum of 30 samples. Rule 4.15.11 (3) (b) allows direct comparison with standards if a statistically adequate sample cannot be demonstrated in accordance with Rule 4.15.11 (2) (a), however, a minimum of 75 samples with a minimum quadrat size of 100 m^2 is required (equivalent to total enumeration of 1.85 acres). Rule 4.15.11 (3) (c) is a standard-null approach based on determination of a "running mean" and a minimum of 40 samples is required.

To summarize, success evaluations involve either a direct or a statistical *t*-test comparison of appropriate parameters for each variable of interest (cover, production, diversity, or woody plant density). For monitoring efforts, comparisons shall be made directly with either the reference area parameters or the permitted standards to facilitate a determination of the progress of revegetation. In the case of ground cover and to a more limited degree, production, comparisons shall be made against reference area data of the same year. Diversity and woody plant density variables shall be compared against the standards defined above.

For bond release efforts, direct comparisons are made when the revegetated area mean value for a given variable is greater than either 90 percent of the standard or the reference area mean assuming that a statistically adequate sample has been collected. If a statistically adequate sample cannot be obtained, a "reverse-null" hypothesis test may be employed as detailed in Rule

4.15.11 (2)(c). If an adequate sample is obtained for a particular variable, but the mean is less than 90 percent of the reference area mean or standard, a "standard-null" hypothesis *t*-test may be employed as detailed in Rule 4.15.11 (2) (b).

For the typically problematic variable of woody plant density, Colorado has implemented three alternate adequacy / success evaluation methods under Rule 4.15.11 (3) that may be utilized in lieu of those detailed under 4.15.11 (2).

Until experience dictates which procedure is best (because these are relatively new metrics to the science), it would be prudent to collect a minimum of 75 belt transects (at least 100 m^2 in size) as indicated in 4.15.11 (3)(b)(i) unless total population enumeration occurs. These data can then be used for the various analyses / comparisons.

Revegetation will be monitored once during the third to fifth years of the liability period based on the results of a visual assessment of the vegetation and in consultation with the Division. Should the reclamation appear successful and the vegetation warrant such, monitoring data will be collected in preparation for a Phase II bond release application. Absolute cover data will be collected to adequacy in both reclaimed and reference areas. Multiple hit data will not be collected. An estimate of the species diversity success will be based on first hit data which, in the case of a herb dominated community, is highly correlated with multiple hit data. Should the reclaimed areas not be candidates for a Phase II bond release application, cover data will not necessarily be collected to adequacy.

Should the reclamation and revegetation successfully meet the requirements, quantitative sampling will be carried out in years nine and ten of the bond liability period. Methods will be consistent with the methods and analytical techniques used during the baseline study except that woody stem density sampling would not be carried out because no standard applies.

5.15 Rill and Gully Inspections

Reclaimed areas will be checked annually after snowmelt for the formation of rills and gullies. To document each inspection, a report will be prepared and be made available for inspections as required under Rule 5.02.4. Rills and gullies deeper than nine inches will be noted in the report. By the end of August of the same year, laborers or small equipment will be used to fill, grade or otherwise stabilize rills and gullies deeper than nine inches. The repaired area will be seeded and mulched by the end of the same year. Mulch will be anchored to the ground with netting if appropriate.

5.16 Soil Testing Plan

Upon reclamation, an analysis of the soils will be made to determine the fertilization requirements of the areas involved. If the analysis shows that the soil is deficient in phosphorus, it will be added to the soil prior to seeding.

Other elements may be added the year after seeding. Unneeded fertilization and irrigation will be avoided. Native plants have low potential response to fertilizer and undesirable weed competition is likely.

5.17 Disposal of Debris, Acid-Forming and Toxic Forming Materials

There is no indication that any acid-forming or toxic forming materials will be encountered on-site. If sustained combustion of debris or non-coal waste becomes a problem the operator will be prepared to react appropriately. Chemical fire extinguishers will be available in the shop warehouse area and on mobile equipment. A water truck will be available to respond to any problem area. Earth moving equipment may be available to smother a fire if necessary.

5.18 Sealing or Managing Mine Openings, Exploration Holes, Other Boreholes or Wells

The mine portals will be sealed in accordance with 30 CFR 75.1711. The exploration and monitoring holes will be sealed in accordance with the requirements of Rule 4.07.

Drill holes, not completed to aquifers will be sealed by replacing cuttings or other suitable media in the hole and placing a suitable plug 10 feet below the ground to support a cement plug or other media approved by the Division to within 3 feet of the ground surface.

Drill holes completed in non artisan aquifers will be sealed using cement or other suitable sealant by placing the sealant to extend 20 feet above and below the water bearing zone. A surface plug will then be placed in accordance with the above paragraph. The hole will be marked.

The following monitoring plan is designed to provide data which will verify the Red Cliff Mine will not have significant adverse impacts on the surface or subsurface water which is within or adjacent to the permit area.

Stock Ponds will be monitored quarterly. Depending on weather conditions, the first quarter monitoring event may be delayed until April or May. Freeboard or water depth will be collected for each pond.

The following four monitoring wells will be monitored: F-50, 7-34-7, 8-2-8, 8-3-10. Depending on weather conditions, the first quarter monitoring event may be delayed until April or May. Field parameters will be measured each quarter. A full suite sample will be obtained semi-annually during the second and fourth quarters.

Alluvial wells VB-06-03 and VB-06-10 will be monitored quarterly for field parameters. A full suite sample will be obtained semi-annually during the second and fourth quarters.

Surface water monitoring stations SW-1, SW-2 and SW-3 will be monitored quarterly for field parameters. A full suite sample will be obtained semi-annually during the second and fourth quarters.

Big Salt Wash will be monitored at BSW-1 and BSW-2 to develop baseline information in anticipation of the mine expanding to the west. BSW-1and BSW-2 will be monitored quarterly for field parameters. A full suite sample will be obtained semi-annually during the second and fourth quarters.

East Salt Creek will be monitored at two locations ESC-1 and ESC-2.

ESC-1 is located where East Salt Creek flows under SH-139 at approximate mile marker 15.5. ESC-2 is located where East Salt Creek flows under CR T.

The sediment ponds will be monitored in accordance with discharge permit requirements.

Mine inflows will be measured semi-annually for field parameters. An annual full suite analysis will be obtained for any point source of inflow greater than 5 gallons per minute. Results of the mine inflow monitoring including a seep location map and seep rate of flow will be submitted with the annual hydrologic report.

Water samples are typically analyzed by ACZ Laboratories, Inc. of Steamboat Springs, or Enviro-Chem of Grand Junction for the following parameters.

Ground Water	
Parameter	**Units**
Water Level (Field)	feet
pH (F & L)	standard
Conductivity (F & L)	uhmos/cm
Temperature (Field)	Celsius
Total Dissolved Solids	mg/l
Bicarbonate (HCO_3^-)	mg/l
Calcium (Ca^{+2})(Dis)	mg/l
Carbonate (CO_3^-)	mg/l
Hardness	mg/l
Chloride (Cl^-)	mg/l
Magnesium (Mg^{+2}) (Dis)	mg/l
Ammonia, (NH_3)	mg/l
Nitrate-Nitrite	mg/l
Phosphate (PO_4^{-3} as P)	mg/l
Sodium (Na^+) (Dis)	mg/l
Sulfate (SO_4^{--})	mg/l
Arsenic (As) (Dis)	mg/l
Cadmium (Cd) (Dis)	mg/l
Iron (Fe) (Dis)	mg/l
Iron (Fe) (Trec)	mg/l
Manganese (Mn) (Dis)	mg/l
Manganese (Mn) (Trec)	mg/l
Mercury (Hg) (Dis)	mg/l
Selenium (Se) (Dis)	mg/l
Zinc (Zn) (Dis)	mg/l

Trec = Total Recoverable
Dis = Dissolved
F & L = Field & Laboratory

Surface Water List	
Parameter	**Units**
Flow (Field)	GPM – CFS
pH (F & L)	su
Conductivity (F & L)	uhmos/cm
Temperature (Field)	Celsius
Total Suspended Solids	mg/l
Total Dissolved Solids	mg/l
Total Alkalinity	mg/l
Bicarbonate (HCO_3^-)	mg/l
Carbonate	mg/l
Hydroxide	mg/l
Sulfate (SO_4--)	mg/l

Surface Water List	
Parameter	**Units**
Calcium (Ca^{+2})(Trec)	mg/l
Magnesium (Mg^{+2}) (Trec)	mg/l
Sodium Adsorption Ratio	- -
Hardness	mg/l
Chloride (Cl^{-})	mg/l
Sodium (Na^{+}) (Trec)	mg/l
Potassium	mg/l
Aluminum (Al) (Trec)	mg/l
Arsenic (As) (Trec)	mg/l
Boron (B) (Trec)	mg/l
Copper (Cu) (Trec)	mg/l
Iron (Fe) (Trec)	mg/l
Lead (Pb) (Trec)	mg/l
Manganese (Mn) (Trec)	mg/l
Selenium (Se) (Trec)	mg/l

Trec = Total Recoverable; F & L = Field & Laboratory;
su = Standard Units

Records of the above monitoring will be maintained on-site and submitted to the Division annually in the form of an annual hydrology report. The annual hydrology report (AHR) will be submitted each year on or before April 30th. Pictures of stock ponds will be taken annually and included in the AHRs.

The data obtained from the monitoring program outlined above will be utilized to determine if the mine is having an impact on the hydrologic balance. Impact on the hydrologic balance will be evaluated by analyzing rapid and/or unanticipated changes at a monitoring site. A rapid drop in the water level in one of the monitoring wells might indicate the mine is impacting the perched water bearing zone. A change in water quality might indicate the mining operation is causing water bearing zones to mix or is disturbing water bearing zones.

6.0 Subsidence Monitoring Program

Surveyed subsidence monuments will not achieve the monitoring required to determine if a light use road has been damaged. Therefore, the Operator will visually monitor the light use roads above the area to be mined to determine if there has been material damage. The monitoring will be performed four times per year. Since access to the area is restricted during winter and spring months, the four monitoring events will likely occur on or about May, June, August and October of each year.

Results of the monitoring program shall be submitted to the DRMS semiannually.

The monitoring program will extend for a time, beyond cessation of mining in any area, consistent with the need for verification of the subsidence prediction.

7.0 Railroad Fire Mitigation[1]

In order to mitigate fires caused by the train, it is necessary to treat potentially hazardous vegetation within the railroad ROW. There are three basic methods of reducing ROW fire hazards: mechanical clearing (physical removal of vegetation), burning, and chemical treatment. These fire hazard reduction methods often need to be used in combination for optimum hazard reduction.

Mechanical clearing is most useful for initial clearing of heavy fuels, such as old logs, and for construction and maintenance of firebreaks. Chemical treatment is most useful for maintenance of clearings already established. However, it can create flash-fuel problems if used as the first treatment. Burning can be used for either initial or maintenance treatment but is normally unsafe without a mechanically cleared firebreak.

Certain fire hazards cannot be treated by removal, burning or herbicides. These might include vegetation such as moss and grass growing on rock cliffs or cut-banks, rare or endangered plant species, and short stretches of ROW where these fire hazard reduction methods are precluded for any reason. In these situations, fire retardant chemicals should be employed, either alone or in combination with the other methods.

7.1 Mechanical Clearing

The most common method of railroad ROW hazard reduction is mechanical clearing, i.e., physical removal of the flammable vegetation and debris. This is sometimes done over an entire area from the edge of the railroad bed to the edge of the ROW or other desired width, and is a sufficient positive fire prevention measure since all vegetation is removed to bare soil. It is also considerably expensive, and can lead to adverse environmental impacts including soil erosion.

A more common use of mechanical clearing is to construct a firebreak at the outer edge of the area to be treated. This is not considered an effective measure unless the area between the firebreak and the railroad bed is also treated.

7.2 Burning

In many situations burning is one way of getting rid of ROW fire hazards. Achieving the desired results safely is not easy nor is it simple.

According to the National Interagency Fire Center (NIFC) (NIFC no date), a prescribed fire may be defined as any fire ignited by management actions under certain pre-determined conditions to meet specific objectives related to hazardous fuels reduction or habitat improvement. NEPA requirements must be met prior to ignition, along with approval of a prescribed fire plan which provides the information needed to implement an individual prescribed fire project. Prescribed fires are ignited and managed within a "window" of very specific conditions including winds, temperatures, humidity, and other factors specified in the prescribed fire plan. The “window” guides the selection of appropriate management responses. The prescribed fire plan also may include other required actions including safety, economic factors, air quality, public health, and other environmental, geographic, administrative, social, or legal considerations (NIFC no date).

[1] Adapted from Union Pacific Railroad et al. 1999

Environmental concerns are more of a factor in burning operations than they are in mechanical clearing operations. The items of primary importance are air and water pollution. Soil erosion, which is the primary concern in mechanical clearing, is of minor or secondary concern in burning since the roots are usually left to hold the soil. Also, if the burning is done properly, the larger plants will remain. Open burning is regulated by fire laws and air pollution control laws.

7.3 Chemical Treatment

Chemical treatment of fire hazards involves the application of herbicides and/or fire retardant. Both federal and state law closely regulates this type of activity. These laws require most effective chemicals to be applied by a licensed or certified applicator. The most common type of chemical treatment of railroad rights-of-way is with a non-selective soil-applied herbicide applied to the railroad bed and to enough additional width to comply with Federal Railroad Administration (FRA) regulations. In most cases, unless hindered by adverse weather or other outside factors, this provides excellent fire prevention protection within the width treated.

7.4 Fire Resistant Plants

Another approach to ROW fire hazard reduction is the replacement of native vegetation with fire resistant vegetation. Most of the research in this field has been directed toward landscaping for structures located in hazardous fire areas rather than large scale ROW plantings. However, some limited success has been achieved which might be applied to ROW fire hazard reduction.

7.5 Fire Fighting Methods

When fires do occur on railroad property or ROW, the company has a legal responsibility to report them to the protection agency and to do all in its power to suppress the fire.

Some railroad companies use hyrailer (a vehicle that can travel on rails and roads) patrols and water tank cars in fire-prone areas to fight wildfires started by trains.

Hyrailer patrols may be timed to follow 10-15 minutes behind trains. They may only be activated during fire season and usually only during daylight hours. They may have a one or two-person crew which is provided with a radio and limited firefighting tools. Unless they discover a fire while it is still very small they will usually need help in suppressing it. Such patrols are quite costly, and they are, therefore, seldom put behind every train during an entire fire season. Some companies activate them based on “very high” and “extreme” ratings or specified burning indexes of the National Fire Danger Rating system obtained from the protection agencies. Other companies activate the patrols only on Red Flag Alert or Warning also obtained from the protection agencies. A few automatically patrol behind every train during fire season.

Several railroad companies provide water tank cars exclusively for fire protection purposes during fire season. These large water sources (8,000-12,000 gallons each) can be of great help to fire suppression forces. To be fully effective, they must be capable of being moved to the scene of a fire quickly and left there, or nearby, as long as needed. Use of water tank cars often presents some problems as it may not be economically practical to have a locomotive and crew on standby where the cars are parked. Also ROW fires seldom occur at sidings, thus a tank car at the fire will usually tie up a mainline track. In spite of these problems, such tank cars have proven of great value to firefighters.

One type of water tank car is attached to the rear of each train and is equipped with spray nozzles that can sprinkle the entire ROW for approximately 20 feet each side of centerline. The nozzles can be activated either by the brake pipe reduction, which applies the train air brakes, or manually by the conductor.

8.0 BLM's Standards and Guidelines (BLM 1997)

8.1 Standards for Public Land Health

Standards describe conditions needed to sustain public land health, and relate to all uses of the public lands. Standards are applied on a landscape scale and relate to the potential of the landscape.

Standard 1: Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.

Indicators:

- Expression of rills, soil pedestals is minimal.
- Evidence of actively-eroding gullies (incised channels) is minimal.
- Canopy and ground cover are appropriate.
- There is litter accumulating in place and is not sorted by normal overland water flow.
- There is appropriate organic matter in soil.
- There is diversity of plant species with a variety of root depths.
- Upland swales have vegetation cover or density greater than that of adjacent uplands.
- There are vigorous, desirable plants.

Standard 2: Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100-year floods. Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.

Indicators:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Streambank vegetation is present and is comprised of species and communities that have root systems capable of withstanding high streamflow events.
- Plant species present indicate maintenance of riparian moisture characteristics.
- Stream is in balance with the water and sediment being supplied by the watershed (e.g., no headcutting, no excessive erosion or deposition).
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point bars with a range of age classes and successional stages.

- An active floodplain is present.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.
- Stream channels with size and meander pattern appropriate for the stream's position in the landscape, and parent materials.
- Woody debris contributes to the character of the stream channel morphology.

Standard 3: Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.

Indicators:

- Noxious weeds and undesirable species are minimal in the overall plant community.
- Native plant and animal communities are spatially distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.
- Plants and animals are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations.
- Landscapes exhibit connectivity of habitat or presence of corridors to prevent habitat fragmentation.
- Photosynthetic activity is evident throughout the growing season.
- Diversity and density of plant and animal species are in balance with habitat/landscape potential and exhibit resilience to human activities.
- Appropriate plant litter accumulates and is evenly distributed across the landscape.
- Landscapes composed of several plant communities that may be in a variety of successional stages and patterns.

Standard 4: Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Indicators:

- All the indicators associated with the plant and animal communities standard apply.
- There are stable and increasing populations of endemic and protected species in suitable habitat.
- Suitable habitat is available for recovery of endemic and protected species.

Standard 5: The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters

include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.

Indicators:

- Appropriate populations of macroinvertabrates, vertebrates, and algae are present.
- Surface and ground waters only contain substances (e.g., sediment, scum, floating debris, odor, heavy metal precipitates on channel substrate) attributable to humans within the amounts, concentrations, or combinations as directed by the Water Quality Standards established by the State of Colorado (5 CCR 1002-8).

8.2 Guidelines for Livestock Grazing Management

Guidelines are the management tools, methods, strategies, and techniques (e.g., best management practices) designed to maintain or achieve healthy public lands as defined by the standards. Currently, the only guidelines for BLM Colorado that have been developed in concert with the Resource Advisory Councils are livestock grazing management guidelines.

1. Grazing management practices promote plant health by providing for one or more of the following:
   - periodic rest or deferment from grazing during critical growth periods;
   - adequate recovery and regrowth periods;
   - opportunity for seed dissemination and seedling establishment.
2. Grazing management practices address the kind, numbers, and class of livestock, season, duration, distribution, frequency and intensity of grazing use and livestock health.
3. Grazing management practices maintain sufficient residual vegetation on both upland and riparian sites to protect the soil from wind and water erosion, to assist in maintaining appropriate soil infiltration and permeability, and to buffer temperature extremes. In riparian areas, vegetation dissipates energy, captures sediment, recharges ground water, and contributes to stream stability.
4. Native plant species and natural revegetation are emphasized in the support of sustaining ecological functions and site integrity. Where reseeding is required, on land treatment efforts, emphasis will be placed on using native plant species. Seeding of non-native plant species will be considered based on local goals, native seed availability and cost, persistence of non-native plants and annuals and noxious weeds on the site, and composition of non-natives in the seed mix.
5. Range improvement projects are designed consistent with overall ecological functions and processes with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.
6. Grazing management will occur in a manner that does not encourage the establishment or spread of noxious weeds. In addition to mechanical, chemical, and biological methods of weed control, livestock may be used where feasible as a tool to inhibit or stop the spread of noxious weeds.

7. Natural occurrences such as fire, drought, flooding, and prescribed land treatments should be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape, including the maintenance, restoration, or enhancement of habitat to promote and assist the recovery and conservation of threatened, endangered, or other special status species, by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors, and thus minimizing habitat fragmentation.
8. Colorado Best Management Practices and other scientifically developed practices that enhance land and water quality should be used in the development of activity plans prepared for land use.

9.0 Special Stipulations

9.1 General

1. The holder shall notify the BLM Authorized Officer (AO) at least 24 hours prior to the commencement of any surface-disturbing activities under this grant. The BLM contact person is Christina Stark, Grand Junction Field Office, 2815 H Road, Grand Junction, Colorado 81506, phone (970) 244-3022.
    a. This authorization is contingent upon receipt of and compliance with all appropriate federal, state, county, and local, permits. The applicant shall be responsible for obtaining all necessary environmental clearances and permits from all agencies (U.S. Army Corps of Engineers, Colorado Division of Wildlife, U.S. Fish and Wildlife, U.S. Forest Service, Colorado Department of Transportation, Colorado Department of Health and Environment, County Health Department, etc.) before commencing any work. Without all clearances and permits, this authorization shall be not in effect. Applicant shall assume all responsibility and liability related to potential environmental hazards encountered in connection with work under this authorization.
2. The holder shall construct, operate, maintain and reclaim the ROW and all work areas in strict conformity with the submitted application and BLM stipulations.
3. Copies of the ROW grant with the stipulations shall be kept on-site during construction and maintenance activities. All construction personnel shall review the grant and stipulations before working on the ROW.
4. The holder shall notify all existing ROW holders in the project area prior to beginning any surface disturbance or construction activities. The holder shall obtain an agreement with any existing ROW holders or other parties with authorized facilities that cross or are adjacent to those of the holder to assure that no damage to an existing ROW or authorized facility will occur. The agreement(s) shall be obtained prior to any use of the ROW or existing facility.
5. The exterior boundaries of the construction area shall be clearly flagged prior to any surface disturbing activities.
6. The holder shall promptly remove and dispose of all waste caused by its activities. The term "waste" as used herein means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, petroleum products, ashes, and equipment. No burning of trash, trees, brush, or any other material shall be allowed.
7. Proper precautions shall be taken at all times to prevent or suppress fires. Range or forest fires will be reported to the BLM Grand Junction Field Office. The operator shall be responsible for the prevention and suppression of fires on public lands caused by its employees, contractors, or subcontractors. During conditions of extreme fire danger, surface use operations may be either limited or suspended in specific areas, or additional measures may be required by the BLM.
8. Sixty days prior to termination of the ROW, the holder shall contact the AO to arrange a joint inspection of the ROW. This inspection will be held to agree to an acceptable

termination and rehabilitation plan. This plan shall include removal of facilities, recontouring, and seeding at the discretion of the AO. The AO must approve the plan in writing prior to the holder's commencement of any termination activities.

9. Applicant shall comply with all State and County regulations and permit requirements.
10. Stormwater BMPs identified in the Storm Water Management Plan shall be in place prior to any earth-disturbing activity. Additional BMPs will be installed as determined necessary by the AO.

9.2 Roads

1. Roads will be constructed and maintained to BLM road standards (BLM Manual Section 9113). All vehicle travel will be within the approved driving surface. A copy of the manual can be obtained from the BLM Grand Junction Field Office.
2. No signs or advertising devices shall be placed on the premises or on adjacent public lands, except those posted by or at the direction of the AO.
3. If requested by the AO the holder shall furnish and install culverts of the gauge, materials, diameter(s), and length(s) as indicated and approved. Culverts shall be free of corrosion, dents, or other deleterious conditions. Culverts shall be placed on channel bottoms on firm, uniform beds which have been shaped to accept them and aligned to minimize erosion. Backfill shall be thoroughly compacted. No equipment shall be routed over a culvert until backfill depth is adequate to protect the culverts.
4. All maintenance and road improvement activities shall be confined to the existing road surface and ditches, unless prior approval is obtained from the AO.
5. All existing authorized roads used for construction shall be maintained in as good as, or in better than existing condition. This may include, but is not limited to, roadway surface repairs (blading the roadway), cleaning ditches and drainage facilities, and dust abatement. After construction, existing roads shall be restored to meet or exceed conditions existing prior to construction. All road maintenance activities must be approved by the AO.
    a. As part of the required reclamation, all disturbed areas shall be seeded with a seed mixture suitable to specific site conditions. This mixture shall be approved prior to reclamation by the AO. All seed mixtures must be certified to be weed-free. Application rates are for pure, live seed. Certification and seed tags must be submitted to the Field Manager within 30 days of seeding.
    b. Prepare seedbed by contour cultivating four to six inches deep. Drill seed after September and before soil is frozen, covering seed 0.5 to 1 inch deep. Where seed cannot be drilled, broadcast application shall be used at twice the recommended application rate, and cover 0.5 to 1 inch deep with a harrow or drag bar. Disturbed portions of the ROW surface shall be left rough and not smoothed to help facilitated seed germination and seedling survival.
    c. Seeding must be completed after September 15 and prior to December 15.

9.3 Transmission Lines

1. Unless otherwise agreed to by the AO in writing, transmission lines shall be constructed in accordance to standards outlined in "Suggested Practices for Raptor Protection on Power Lines," (Raptor Research Foundation, Inc. 1981). The holder shall assume the burden and expense of proving that pole designs not shown in the above publication are "eagle safe." Such proof shall be provided by a raptor expert approved by the AO. The BLM reserves the right to require modifications or additions to all transmission line structures placed on this ROW, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions shall be made by the holder without liability or expense to the United States.
2. Holder shall evenly spread the excess soil material excavated from the pole holes within the ROW and in the immediate vicinity of the pole structure.

9.4 Railroad Spur and Water Pipeline

1. Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation. Topsoil shall only be used for reclamation and shall not be used to bed or pad the pipe during backfilling.
2. Vegetation removed from the ROW will not be placed in piles or windrows. All cut vegetation shall either be removed completely from the site or chipped and scattered on-site.
3. If traffic is disrupted during construction then suitable traffic control measures will be implemented. Traffic control measures will include warning signs, barriers or flagmen unless otherwise approved by the AO.
4. Open trenches shall be maintained in a safe condition. Trenches adjacent to access roads shall be covered and/or warning barriers erected upon completion of daily construction or at anytime personnel are not present on the construction site.

9.5 Cultural Resources

1. The applicant is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts or fossils. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the AO. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the AO. An evaluation of the discovery will be made by the AO to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the AO after consulting with the holder.
2. Pursuant to 43 CFR 10.4(g), the holder of this authorization must notify the AO, by telephone, with 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), you must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the AO.

9.6 Soils and Vegetation

1. When saturated soil conditions exist on or along the ROW, construction shall be halted until soil material dries out sufficiently for construction to proceed without undue damage and erosion to the ROW.
2. The holder shall disturb and remove only the minimum amount of soils and vegetation within the authorized ROW necessary for the construction of structures and facilities.
3. All disturbed areas shall be recontoured to blend with the natural topography to the satisfaction of the AO within 30 days of project completion or cessation of construction activity.
4. The grant holder shall provide satisfactory reclamation of all sites disturbed by their activity. This may include installation of erosion control devices and seeding at the discretion of the AO.

9.7 Noxious Weeds

1. All construction equipment and vehicles shall be clean and free of weeds and weed seeds prior to moving equipment onto public lands and start of construction. Cleaning shall be accomplished by pressure-washing with water unless otherwise approved by the AO.
2. On the ROW, the holder shall monitor and control those noxious weeds that may occur or be found, as listed in the booklet, Noxious Weeds of Mesa County. If chemical control is necessary, use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the holder shall obtain from the AO written approval of a plan showing the type and quantity of material to be used, the pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the AO. Emergency use of pesticides shall be approved in writing by the AO prior to such use.

9.8 Threatened and Endangered Species

1. The BLM AO shall be notified at least 30 days prior to any non-emergency related surface disturbance or maintenance activities. The AO may require the completion of a special status plant species survey by a third-party contractor at the expense of the holder, or the BLM may choose to complete the survey. The BLM may take actions or make recommendations to protect any special status plant populations identified near or on the ROW.

9.9 Hazardous Materials

1. The holder shall comply with all applicable federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic

Substances Control Act of 1976, as amended (15 U.S.C. 2601 et seq.) with regard to any toxic substances that are used, generated by or stored on the ROW or on facilities authorized under this ROW grant (see 40 CFR, Part 702 799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1 761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any federal agency or state government as a result of a reportable release or spill of any toxic substances shall be furnished to the AO concurrent with the filing of the reports to the involved Federal agency or State government.

9.10 Visual Resources

1. To limit changes in the observable character of the landscape, as many trees as possible shall be retained.
2. To mitigate straight line visual effects of cut slopes or cleared vegetation, adaptive management techniques may be required by BLM staff to create an irregular shape or mosaic pattern.
3. Surface facilities shall be painted a non-reflective Shale Green color that blends with the natural environment, or another color as determined by the AO.

9.11 Health and Safety

The holder shall comply with applicable state standards for public health and safety, environmental protection and siting, construction, operation and maintenance, if these state standards are more stringent than Federal standards for similar projects.

10.0 References

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National Interagency Fire Center (NIFC). No date. Prescribed Fire Treatments. Available online at http://www.nifc.gov/fuels/overview/prescribedTreatment.html Accessed July 14, 2008.

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