GARY R. HERBERT
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GREG BELL
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Oil, Gas and Mining
JOHN R. BAZA
Division Director

Technical Analysis and Findings

Utah Coal Regulatory Program

May 9, 2017

PID: C0070039
TaskID: 5435
Mine Name: DUGOUT CANYON MINE
Title: WASTE ROCK SITE PHASE II EXPANSION

General Contents

Right of Entry

Analysis:

The amendment meets the State of Utah R645-301-114 requirements for providing a description of the document upon which the applicant bases their legal right to enter. Chapter 1, Section 114, page 1-4 of the Refuse Pile Amendment identifies Warranty Deed, Contract # SC-023, Exhibit C (No. 801673), Page 270, dated 9/1/91. This deed includes ownership of the refuse pile located within Section 18: E1/2NE1/4.

lreinhart

Right of Entry

Analysis:

The amendment meets the State of Utah R645 requirements for Right of Entry.

In attachment 1-1, the Permittee provides an Encroachment Permit from Carbon County. The permit allows the Permittee to conduct construction activity within the Carbon County road system. The access is required in order to construct the access road to Sediment Pond 2 and undisturbed culvert (UC-3). The previous technical analysis (Task ID #5368) identified a deficiency as the expiration date identified on the Encroachment Permit was shown as expiring on April 6th, 2016. The Permittee has provided an updated Encroachment Permit showing an expiration date of April 4th, 2018.

schriste

Legal Description

Analysis:

The amendment meets the State of Utah R645-301-121.120 and/or R645-301-141 requirements for providing a legal description that identifies the land (on a map) subject to coal mining (and reclamation).

Page 1-9 reflects an updated acreage of 104.68 acres. Acreage associated with G-29 has been removed since that well pad was never built and the Waste Rock Site has increased to 28.2 acres. The acreage table on page 1-10 changed accordingly. Plate 1-1 and RA Plate 1-1 show disturbed acreage and permit area.

lreinhart

Environmental Resource Information

Historic and Archeological Resource Information

Analysis:

The amendment meets the State of Utah R645-301-411.140 requirements for cultural and historic resources information.

The amendment does not include changes to Section 411.140 on page 4-2. Cultural and historic literature and site evaluations of the area were performed by Senco-Phenix in 1998. A copy of the report is located in Attachment 4-1. The report provides a narrative that describes the nature of cultural and historic resources within the permit area. Two IPs (primary and secondary flakes and chunks) were located within the Waste Rock Site and both were recommended as Not Eligible for the National Register of Historic Places. Coordination with the State Historic Preservation Officer (SHPO) is evidenced by letter dated August 2, 2005 (Task ID 2156). The Refuse Pile Expansion (Waste Rock Site) will have a â€œno effectâ€• to historic resources within or adjacent to the project area.

A map pursuant to R645-301-411.141 is provided in the confidential Attachment 4-1. There are no public parks or cemeteries within 100 feet of the permit area. Utah has approximately 169.3 miles of designated Wild and Scenic River, all of which are tributaries of the Virgin River in southwest Utah and outside the adjacent area. National System of Trails in Utah are inclusive of the Pony Express, California National Historic Trail, Mormon Pioneer Trail, and Old Spanish National Historic Trail. None of the trail systems are within the permit area.

lreinhart

Climatological Resource Information

Analysis:

The amendment meets the State of Utah R645 requirements for Climatological Resource Information Requirements.

The Permittee provides climatological information in two places within the approved Mining and Reclamation Plan (MRP). Climatological data is summarized in Appendix 4-1 of the main MRP as well as in RA Attachment 7-5, Climatological Information within the Refuse Pile Amendment MRP.

Twenty nine years of annual precipitation data (by month) for the refuse pile area are provided in Appendix 7-5. The data was obtained from the National Oceanographic Atmospheric Administration (NOAA) database.

Additionally, minimum and maximum temperature data is provided in Appendix 7-5 during a period of record from 1968 to 1995. Snow and sleet data is provided as well as degree days within Appendix 7-5 of the Refuse Pile Amendment.

schriste

Vegetation Resource Information

Analysis:

The amendment meets the State of Utah R645-301-321 requirements for vegetation resource information.

The amendment does not propose any changes to the Vegetation information located in Chapter 3 of the Refuse Pile Amendment, Section 321, pages 3-2 though 3-6. During May of 1998, the vegetation in the area designated for the refuse pile was surveyed by Patricia Johnston and George S. Cook and they determined it to be a Black sagebrush/galleta grass and Pinyon-Juniper, semi-desert shallow loam site. George S. Cook of the NRCS surveyed the conditions and production of the area; his finding is in Section 321.200. The report and survey for the area are included in RA Attachment 3-1. Vegetation communities adjacent to the refuse pile site are shown on RA Figure 3-1. Photographs of the Refuse Pile area prior to the 1998 gravel mining are included in RA Attachment 3-1.

lreinhart

Fish and Wildlife Resource Information

Analysis:

The amendment meets the State of Utah R645-301-322 requirements for fish and wildlife resource information.

The amendment does not include any changes to the Refuse Pile Amendment or Volume 1 of the MRP, Section 322, Fish

and Wildlife Information. Fish and Wildlife Information is located in Chapter 3, Section 322, pages 3-10 through 3-24.

The Waste Rock Site is not within a Greater Sage-grouse Management Area and therefore additional consultation on this species did not occur with Utah Division of Wildlife.

RA Attachment 3-3 is a list of federally listed, threatened, and endangered and candidate species (TES). This list was compiled in June 2002. Pursuant to Section 7 of the Endangered Species Act, the Division conducted an analysis of current TES (Consultation Code: 06E23000-2017-SLI-0197) and compared the 2017 list to the 2002 list and verified all current species have been previously evaluated. These species include Mexican Spotted owl, Yellow-Billed Cuckoo, Bonytail chub, Colorado pikeminnow, Humpback chub, and Razorback sucker. Sensitive species include White-tailed Prairie-dog, Ferruginous Hawk, Kit Fox, Burrowing Owl, and Northern Goshawk. All state sensitive species listed, with the exception of the Kit Fox were previously evaluated. The Waste Rock Site is not located within Critical, Substantial, or High-Value habitat for Kit Fox. (http://dwrcdc.nr.utah.gov/rsgis2/Search/Map.asp?Id=583)

A letter from the UDWR referencing the lack of federally listed threatened or endangered fish or wildlife species is located in Attachment 3-2. Due to the disturbed condition of the land associated with the extraction of gravel, T&E plant species are not likely to exist within the permit area. The refuse pile site does not support habitat for bats or fish.

The Division determined that approval of this amendment would not affect a listed species or designated critical habitat and therefore did not initiate formal consultation with U.S. Fish and Wildlife Service.

Sections 333.300 and 358.500 of the MRP contain additional discussion pertaining to protective measures. CFC plans to enhance the site by restoring a disturbed gravel pit to natural rangeland.

lreinhart

Land Use Resource Information

Analysis:

The amendment meets the State of Utah R645-301-411 requirements for land use information.

The amendment modifies Figure 4-1 to update the expanded permit boundary.

The Refuse Pile Amendment Ch. 4, Section 410 on pages 4-1 and 4-2 pre-mining land-use is described as a gravel pit from 1998-1999. In preceding years the areas was utilized as open range for livestock and wildlife habitat. Section 321.200 provides forage production per acre.

lreinhart

Alluvial Valley Floors

Analysis:

The amendment meets the State of Utah R645 requirements for Alluvial Valley Floor Determination.

The proposed increase to the Dugout Canyon Mineâ€™s refuse pile facility disturbed area is small (1.4 acres). Such a small increase in disturbed area acreage does not require that the Permittee revisit the Alluvial Valley Floor Determination information provided in Chapter 9 of the Refuse Pile Amendment.

Within Chapter 9 of the Refuse Pile amendment, the Permittee provides a discussion as to the previously approved investigation as to the presence or absence of an alluvial valley floor within or adjacent to the refuse pile site.

Figure 6-1, Area Geology depicts the surficial geology within and adjacent to the refuse pile site. Quaternary alluvium is present directly east of the permit boundary. However; the surface geology of the refuse site itself is dominated by Mancos Shale and pediment gravels. As such, the refuse pileâ€™s construction did not require the removal or disturbance of alluvial fill material.

Based on information provided in Section 411.130 of the main MRP, the nearest area of irrigated crop-land that could be considered for Alluvial Valley Floor determination is approximately 4 miles southwest of the Dugout Mine facility.

Additionally, based on soil test pits that were constructed in advance of the permitting and construction of the site, no water was encountered nor was evidence of mottling or other indications of high water tables that could be utilized by agricultural

crops.

schriste

Hydro Baseline Information

Analysis:

The amendment meets the State of Utah R645 requirements for Baseline Information.

Beginning on page 7-3 of the Refuse Pile Amendment MRP (RA MRP), the Permittee provides ground and surface water information. The refuse pile area is located within the Dugout Creek watershed. Dugout Creek has been observed and characterized as intermittent in the area of the refuse pile site. Several small tributaries to Dugout Creek are located adjacent to the refuse pile site and are ephemeral in nature. Two baseline surface water monitoring points are located in the ephemeral drainage: one point located upstream of the refuse pile with the second point located downstream of the site at the county road crossing (SS-1 and SS-2). SS-1 and SS-2 have each produced measurable flows only four times in the period of record since monitoring at these sites began in 1998. The drainage is clearly an ephemeral in nature and responds to snowmelt and precipitation events when flow is observed.

Baseline ground water data was obtained from four monitoring wells located approximately 2 miles south of the Soldier Canyon Mine. Additionally, ground water data (quality and quantity) has been obtained quarterly since 2003. The ground water within the permit and adjacent area is a sodium-sulfate-chloride type with a depth to water ranging from 25 to 90 feet below the surface.

schriste

Hydro Baseline Cumulative Impact Area

Analysis:

The amendment meets the State of Utah R645 requirements for Baseline Cumulative Impact Area Information.

The refuse pile is located within the existing and approved cumulative impact area (See Plate 1 Cumulative Impact Area (CIA) Book Cliffs Area II CHIA). The Book Cliffs Area II Cumulative Hydrologic Impact Assessment (CHIA) presents and evaluates the potential cumulative impacts to hydrologic resources of the refuse pile and area coal mining operations. As such the site is located within the existing CIA boundary and discussed in the Book Cliffs Area II CHIA. A revision to the CHIA is not required with the proposed waste rock site expansion.

schriste

Probable Hydrologic Consequences Determination

Analysis:

The amendment meets the State of Utah R645 requirements for Probable Hydrologic Consequences (PHC) determination.

Beginning on page 7-5 of the RA MRP, the probable hydrologic consequences of the refuse pile site are discussed. The RA MRP identifies contamination from acid- or toxic-forming materials, increased sediment yield from disturbed areas, increased total dissolved solids concentrations (TDS), impacts to ground and surface water availability, hydrocarbon contamination and contamination of ground and surface water from road salting activities.

Acid- or Toxic-forming Materials are discussed on page 7-6 of the RA MRP. Based on baseline data presented in Chapter 6 of the MRP, no acid- or toxic-forming materials have been identified in the soils or strata at the site. Additionally, the Permittee commits to sampling refuse materials generated by the mine in an effort to identify any potentially acid- or toxic-forming materials. In the event that such materials are identified, the Permittee commits to burying the material under a minimum of 4 feet of non-acid, non-toxic, non-combustible materials during final reclamation.

The potential for increased sediment yield from the disturbed area and impacts associated with acidity, total suspended solids and total dissolved solids going off-site are considered minimal. The storm water runoff system at the site employs a combination of diversions, sediment ponds, berms and straw bales to minimize the potential of increased off-site sediment yield. These sediment control measures have been designed per State of Utah R645 performance standards and are routinely inspected and maintained.

Potential impacts to ground and surface water availability are considered minimal. The primary reason being the relatively scant amount of hydrologic resources located within and adjacent to the refuse pile site (i.e. ground and surface water). An ephemeral drainage is located directly adjacent to the site; however, since monitoring of this drainage began in 1998, only 4 flow events have been sampled at the site. Additionally, the surficial Mancos Shale layer that dominates the surface at the site is relatively impermeable.

schriste

Maps Existing Structures and Facilities

Analysis:

The amendment meets the State of Utah R645 requirements for Existing Structures and Facilities Maps.

Plate 5-1, Dugout Refuse Pile Design Operational Plan Phase II provides a plan view of the refuse pile site including all elements of the storm water conveyance system, top soil and sub-soil pile locations etc.

schriste

Maps Monitoring and Sampling Locations

Analysis:

The amendment meets the State of Utah R645 requirements for Monitoring and Sampling Location Maps.

Plate 7-1A, Drainages, Sediment Control Structures and Sampling Locations Phase II depicts the locations of the three ground water monitoring sites (DH-1, DH-2 and DH-3) as well as the two surface water monitoring sites (SS-1 and SS-2).

schriste

Maps Permit Area Boundary

Analysis:

The amendment meets the State of Utah R645-301-323 requirements for maps and aerial photographs.

Map and photographs of the permit area and adjacent area are provided on Plate 1-1 and RA Figure 3-1 shows the location of the reference area.

lreinhart

Operation Plan

Air Pollution Control Plan

Analysis:

The amendment meets the State of Utah R645-301-422 requirements for air pollution control plan.

A description of the coordination and compliance efforts with the Utah Division of Air Quality is discussed in Section 422 page 4-12 and 4-13. A copy of the Approval Order (DAQE-AN0116340008-07, Project Code: N011634-0009) and supporting information can be found in Appendix 4-1.

lreinhart

Subsidence Control Plan Renewable Resource

Analysis:

The amendment meets the State of Utah R645-301-332 requirements since there is no subsidence at the Waste Rock Site.

Fish and Wildlife Protection and Enhancement Plan

Analysis:

The amendment meets the State of Utah R645-301-333 requirements to describe how using best technology currently available to minimize adverse impacts to fish and wildlife, including compliance with the Endangered Species Act.

A discussion of the location and operation of haul and access roads and support facilities to avoid or minimize impacts on fish and wildlife species is located in Section 333 on page 3-29 of Chapter 3 of the MRP. Protection measures that will be used during active mining include minimizing the total area of disturbance, design, construction, and operation of facilities to minimize biological impacts including barriers to wildlife movements, design and installation of electrical equipment to minimize electrocution hazards, establishment of stream buffer zones, control and monitoring of surface discharges and water quality, exclusion of wildlife from potentially hazardous areas, and reclamation of disturbed areas when they are no longer needed.

In addition, raptor surveys are conducted within a ½ mile buffer of active mining facilities. The amendment includes a raptor survey from 2015 in which the results of the Waste Rock Site are located on pages 7 & 8. No new nests were discovered.

lreinhart

Topsoil and Subsoil

Analysis:

Analysis:

The application meets the requirements of R645-301-230, Soil Operation Plan.

The application will expand the permit boundary by 1.4 acres. The refuse pile footprint will eventually expand by 4.3 acres (from 548,552 sq. ft. to 736,810 sq. ft as shown on RA Plate 5-1 Redline). The expansion fills the triangular permit boundary by lengthening the pile along the West fence line by 600 linear feet and extending the pile to the SE approximately 500 feet. To accommodate this expansion, 3.23 undisturbed acres will be stripped of topsoil and subsoil, mostly from Map Unit J (pinyon covered and cobbly soils) (RA Volume, p. 2-14). Sediment pond 2 will be mostly constructed in soil Map Unit H (RA Plate 2-1).

The Phase II expansion is described in RA Volume, Chapter 2, Section 242.100. Storage locations and volumes and contemporaneous placement are described on p. 2-15. Both A & B horizons will be salvaged and added to the volume of topsoil stockpiled in topsoil stockpile #2 (2,937 CY), to be redistributed during contemporaneous reclamation of the waste rock site. The C horizon will be salvaged and added to the volume of subsoil stockpiled in subsoil stockpile #2 (2,753 CY) to be redistributed in contemporaneous reclamation of the waste rock site (RA Volume, pp. 2-14, 2-15). Topsoil and subsoil salvage will be accomplished with front end loaders and other wheel mounted equipment. (Section 242.100, p. 2-17). During contemporaneous reclamation, 6,023 CY of topsoil and 23,933 CY of subsoil will be placed over the contemporaneous and test plot areas on the NE side of the waste rock site outlined on Plate RA 2-2.

At the completion of the contemporaneous reclamation, two TOPSOIL piles (#1 and #3) will hold a total of 14,126 CY and one SUBSOIL pile will hold 12,131 CY. The contractor's soil salvage plan is provided in RA Attachment 2-1. The Attachment 2-1 salvage plan describes the contemporaneous reclamation of the waste rock site by removal and use of 2,753 CY subsoil currently stockpiled in Subsoil pile #3* and removal and use of the existing pond topsoil stockpile**, as well as the boulder pile. Attachment 2-1 describes the removal and live haul of topsoil from Map Units J (3-8 inches) and H (3 – 12 inches) under the supervision of a soil scientist.

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*In RA Attachment 2-1, the contractor mistakenly refers to subsoil pile 3 rather than subsoil pile 2 for contemporaneous reclamation.

** The pond topsoil stockpile is topsoil stockpile #2.

pburton

Vegetation

Analysis:

The amendment meets the State of Utah R645-301-331 requirements for protection of vegetation.

The amendment does not include any changes to the MRP Refuse Pile Amendment or Chapter 3. The Refuse Pile Amendment notes the refuse pile site was previously disturbed for the excavation of gravel. The gravel was mined by Nelson Construction and used in the construction of the Carbon County Dugout Canyon Road. Following the excavation work, the site was left in a disturbed condition. Section 341.200 describes the seed mixes to be used in final reclamation and interim reclamation. The interim seed mix will be planted to stabilize all areas not actively being utilized on the refuse pile site. The practice will continue until final reclamation grading begins.

lreinhart

Road System Other Transportation Facilities

Analysis:

The amendment meets the State of Utah R645 requirements for Plans and Drawings relative to road systems.

In section 732.400 and 742.400 of the RA MRP, the Permittee discusses the road design and sediment control measures to be implemented at the refuse site. No permanent roads are contemplated with the refuse site. All of the roads are considered temporary and will be reclaimed. None of the roads are located within the channel of an intermittent or perennial stream or an ephemeral stream that drains a watershed larger than one square mile.

schriste

Spoil Waste Refuse Piles

Analysis:

The amendment meets the Refuse Pile Requirements of the State of Utah R65 rules.

Chapter 5 of the RA MRP describes the construction of the refuse pile site. The refuse site is primarily designed as the storage area for the refuse generated from Canyon Fuel Company properties (i.e. Skyline, Dugout and Sufco).

The refuse pile site can be generally characterized as having minimal hydrologic resources (i.e. ground and surface water). An ephemeral drainage is located directly adjacent to the site; however, it has produced a measurable flow four times since 1998 (See DOGM Water Quality Database sites SS-1 and SS-2). Additionally, the potential for impacts to ground water resources is considered minimal due to the surficial geology of the site being dominated by Mancos Shale. The Mancos Shale has very low permeability and thus the potential for vertical migration of any leachate to the underlying ground water (approximately 35’- 90’ below grade) is considered minimal.

schriste

Spoil Waste Impounding Structures

Analysis:

The amendment meets the State of Utah R645 requirements for Impounding Structures.

The embankments of the two impoundments at the refuse pile site are not constructed from coal waste material and will not be used to impound coal mine waste. The impoundment structures on the refuse site are designed for storm water runoff management and sediment control.

schriste

Hydrologic Ground Water Monitoring

Analysis:

The amendment meets the State of Utah R645 requirements for Ground Water Monitoring.

On page 7-9 of the RA Amendment, the Permittee provides the ground water monitoring plan for the site. There are three monitoring wells utilized for water monitoring purposes (DH-1, DH-2 and DH-3). Quarterly water levels are obtained from of

them. Once a year (during the 4th quarter), water quality samples are obtained from DH-1. Annual water quality samples will be obtained from DH-1 until final bond release. The samples obtained from DH-1 are analyzed for the parameters listed in Table 7-24, Groundwater Monitoring Program. The parameters listed meet the requirements per R645-301-731.211.

schriste

Hydro Surface Water Monitoring

Analysis:

The amendment meets the State of Utah R645 requirements for Surface Water Monitoring.

Two surface water monitoring sites (SS-1 and SS-2) are located adjacent to the refuse pile site. The monitoring points are located within an ephemeral drainage to the west and south-west of the refuse pile site (one upstream of the pile with the second point located downstream). The sites are monitored per protocol 1 outlined in Table 7-5 of the Surface Water Monitoring Program within the main MRP. The parameters outlined in protocol 1 meet the requirements of R645-301-731.220.

schriste

Hydrologic Acid and Toxic forming Materials

Analysis:

The amendment meets the State of Utah R645 requirements for Acid- and Toxic-Forming Materials.

On page 7-10 of the RA MRP, the Permittee discusses acid- or toxic forming materials. The Permittee provides a commitment to monitor/sample the materials placed on the refuse pile and analyze them for acid- or toxic-forming materials. In the event that such materials are identified, the Permittee commits to placing it under a minimum of 4 feet of non-acidic, non-toxic, non-combustible materials. Results from samples collected are provided in Attachment 5-4 of the RA MRP and within Appendix 5-7 of the approved MRP.

schriste

Hydrologic Water Quality Standards

Analysis:

The amendment meets the State of Utah R645 requirements for Water Quality Standards and Effluent Limitations.

Appendix 7-6 of the RA MRP provides a copy of the most current Utah Pollutant Discharge Elimination System (UPDES) permit. UPDES Permit No. UT0025593 was issued by the Utah Division of Water Quality on August 26th, 2015 and became effective on September 1st, 2015. The UPDES permit will expire on August 31st, 2020.

The Permittee has added an outfall to the UPDES Permit (Outfall 007). Outfall 007 is identified in the recently revised UPDES permit as the outfall for the proposed sediment pond to be constructed with the waste rock expansion (sediment pond 2).

schriste

Hydrologic Diversion General

Analysis:

The amendment meets the State of Utah R645 requirements for Diversions: General.

RA Attachment 7-7, Dugout Canyon Mine Refuse Pile Phase II Hydrology Design Report provides the detailed design information for the runoff and sediment control measures to be constructed and implemented at the refuse pile site. In designing the various conveyance structures, the Permittee utilized HydroCAD 10.0. The HydroCAD modeling report is provided in Attachment 7-7. Chapter 3 of RA Attachment 7-7 discusses how the curve number (CN) values were obtained from Natural Resources Conservation Service (NRCS) data. The NRCS identifies the majority of the native soil types on

site as being within Hydrologic Soil Group B. The Permittee made the assumption in their calculations that the site will not have vegetation in developed areas. Non-pond disturbed areas were assumed to have a CN value of 86 and the pond areas a CN value of 98. These CN values are very conservative. A conservative CN value of 71 was assumed for undeveloped and reclaimed areas where Pinyon and Juniper will be located. The subsoil and topsoil stockpiles are to be revegetated with native grass and were assumed to be of poor vegetative cover. The Permittee utilized a CN value of 67 for these areas; again, a conservative value.

Plate 7-2A, Operational and Reclamation Storm Water Conveyance Details Phase II provides cross-sectional views of the various diversions (i.e. ditches and berms). Table 6 of Attachment 7-7 provides detailed design information for the various diversions to be implemented and constructed at the refuse site (i.e. design storm event, maximum depth, freeboard, maximum velocity and rock size). Table 7 of Attachment 7-7 provides the same design information in Table 6 relative to the reclamation phase for the site.

RA Table 7-3, Diversion Design Summary provides the detailed design information for the diversions to be constructed at the refuse pile site. The previous technical analysis (Task ID #5368) had identified a deficiency relative to the design storm utilized in sizing the diversions. Upon review of the Table 7-3 as well as the design calculations and modeling provided, the Permittee had utilized the incorrect design storm event for the operational diversions. A 10-year, 6-hour event was utilized for the temporary diversions (i.e. the diversions that will be reclaimed post-mining activity). Per the requirements outlined in R645-301-746.212, a deficiency was identified during the previous technical analysis that a 100-year, 6-hour precipitation event is to be utilized in designing diversion channels that receive runoff from areas above a refuse pile and runoff from the surface of the refuse pile itself. The Permittee revised the design calculations and subsequent sizing of diversions by utilizing a 100-year, 6-hour event for all diversions (e.g. both temporary and permanent diversions).

Diversion culverts are discussed on page 7-14 of the RA MRP. The proposed expansion calls for the construction of undisturbed culvert UC-3. UC-3 will convey runoff from the undisturbed area east of the refuse pile and from UC-1 under the access road to Sediment Pond 2. Additionally, the Permitee provides the design information for undisturbed culvert UC-3 in Attachment 7-7. The previous technical analysis (Task ID #5368) had identified a deficiency in that the Permittee had not provided a detailed design drawing for culvert UC-3 (i.e. a cross-sectional view and inlet/outlet detail). Per R645-301-731, -740 and -742.300, the Permittee is required provide the detailed design drawings for how culvert UC-3 will be constructed and installed (i.e. cross-sectional view and inlet/outlet details). Plate 7-2A, Operational and Reclamation Storm Water Conveyance Details Phase II was revised to show a cross-sectional view of undisturbed culvert UC-3.

Additionally, the previous technical analysis requested the Permittee to provide an as-built drawing for undisturbed culvert UC-1. The Permittee provided an as-built drawing for undisturbed culvert UC-1 in RA Attachment 7-4.

On page 7-13 of Attachment 7-7, the Permittee provides a narrative of the storm water routing to be utilized at the site. At the bottom of page 7-13, the Permittee discusses diversion swales DS-1 and DS-2. The previous technical analysis (Task ID #5368) identified a deficiency. A statement was made about DS-1 that upon review of Plate 7-1A, required clarification. The Permittee was directed to clarify the first sentence on page 7-13 of Chapter 7 under Diversion Swales section. The statement indicated that disturbed swale DS-1 would convey runoff from DD-1 to DD-6 over the Upper Haul Road. However, upon review of Plate 7-1A, it was unclear as to how this would occur. DS-1 appears to convey runoff from DD-6 to DD-8. The Permittee has clarified the routing associated with DS-1 on page 7-13.

schriste

Hydrologic Diversion Perennial and Intermitten

Analysis:

The amendment meets the State of Utah R645 requirements for Diversions: Perennial and Intermittent Streams.

The refuse pile site is not located within or adjacent to a perennial or intermittent stream drainage. As a result, this portion of the rules does not apply. The performance standards established for diversions associated with refuse piles apply in in this case.

schriste

Hydrologic Diversion Misc. Flows

Analysis:

The amendment meets the State of Utah R645 requirements for Diversions: Miscellaneous flows.

Although the flow diversions within the refuse pile site could be characterized as miscellaneous flows, as the site is a refuse pile, the required design standards for such diversions are outlined in R645-301-746.212.

schriste

Hydrologic Stream Buffer Zones

Analysis:

The amendment meets the State of Utah R645 requirements for Stream Buffer Zones.

The proposed expansion and the site itself are not located within 100' of a perennial or intermittent stream.

schriste

Hydrologic Sediment Control Measures

Analysis:

The amendment meets the State of Utah R645 requirements for sediment control measures.

The Permittee proposes the utilization of a variety of sediment control measures to prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area.

A series of diversions (berms, ditches and swales) have been designed to route storm water flow to two primary sediment ponds (Sediment Pond 1 and Sediment Pond 2- See Plate 7-1A). With proper construction, maintenance and inspection, the sediment control measures will effectively route any suspended solids to one of the two primary sediment ponds. Rip rap details have been provided for the spillway designs of both primary sediment ponds and for diversion ditches to be constructed in more erodible material. Additionally, a terrace will be constructed in the final configuration of the refuse pile on the southern and south-eastern portion of the pile to help reduce overland flow velocities.

The Division finds that the proposed sediment control measures represent the best technology currently available.

schriste

Hydrologic Siltation Sedimentation

Analysis:

The amendment meets the State of Utah R645 requirements for Siltation Structures: Sedimentation Ponds.

The Permittee proposes the construction of a second sediment pond (Sediment Pond 2) with the refuse site expansion. The detailed design information for Sediment Pond 2 is provided in Attachment 7-7 of Chapter 7. Tables 1-4 in Attachment 7-7 provide the stage capacities of the two sediment ponds (i.e. Sediment Pond 1 and Sediment Pond 2). Table 5 provides the overflow structure details for the Sediment Pond 1 and Sediment Pond 2 spillways.

A narrative describing the design considerations for Sediment Pond 2 is provided in Section 742. Sediment removal from both sedimentation ponds (1 and 2) will occur when the sediment level reaches the 60% clean-out elevation. As with Sediment Pond 1, Sediment Pond 2 has been designed as a total containment structure. Sediment Pond 2 has been designed to fully contain the resulting runoff from a 100-year, 24-hour precipitation event as opposed to a 10-year, 24-hour event. As a result, additional storage volume is achieved. As Sediment Pond 2 is a total containment pond, no decant structures have been incorporated in its design. If water is to be removed, it would be pumped in compliance with the aforementioned UPDES permit.

Plate 7-3A, Operational Sedimentation Pond Details Phase II provides the design drawings (i.e. plan view, cross-sectional view of Sediment Pond 2. In addition, Plate 7-3A provides a cross-sectional view of the single-channel spillway to be constructed with a call-out for the 4" riprap detail.

As the pond is designed for total containment, short circuiting is of minimal concern. The MSHA requirements defined in 30 CFR 77.216 do not apply to either of the sediment ponds at the refuse pile site as they will not impound water or sediment to an elevation of 20 feet or more above the upstream toe of the structures. The runoff volume reporting to Sediment Pond 2 generated from a 100-year, 24-hour storm event was calculated as 56,900 cubic feet (1.3 acre feet). The annual sediment yield contribution to Sediment Pond 2 was calculated to be 26,900 cubic feet (0.679 acre feet). The crest elevation of the

spillway for Sediment Pond 2 corresponds to a holding capacity of 2.27 acre feet.

schriste

Hydrologic Siltation Treatment

Analysis:

The amendment does not meet the State of Utah R645 requirements for Siltation Structures: Other Treatment Facilities.

On page 5, 6, 7 Attachment 7-7 describes two sediment basins (SB-1 and SB-2 respectively). The sediment basins are located directly adjacent to the topsoil and sub-soil stockpiles. The sediment basins have been designed to treat the 10-year, 24-hour event per the requirements of R645-301-742.231.

The previous technical analysis (Task ID #5368) identified a deficiency relative to the two sediment basins. The sediment basins were not depicted on any of the surface facility maps (namely Plate 5-1 and Plate 7-1A). The Permittee was directed to revise Plates 5-1 and 7-1A to depict the locations of sediment basins SB-1 and SB-2. The Permittee has made the revisions to the aforementioned plates.

schriste

Hydrologic Discharge Structures

Analysis:

The amendment meets the State of Utah R645 requirements for discharge structures.

On page 7-20 of Chapter 7 of the RA MRP as well as in Attachment 7-7, the Permittee provides the design considerations and supporting calculations for the discharge structure of Sediment Pond 2. Per R645-301-743.131, the Division may approve a single-open channel spillway that is of non-erodible construction and designed to carry sustained flows. The Permittee has designed a single open channel spillway that has been designed with a median riprap diameter of 4 inches. The riprap will be underlain with a geo-fabric liner. Plate 7-3A, Operational Sedimentation Pond Details Phase II provides the design drawings (i.e. plan view, cross-sectional view of Sediment Pond 2. In addition, Plate 7-3A provides a cross-sectional view of the single-channel spillway to be constructed with a call-out for the 4” riprap detail.

A 25-year, 6-hour precipitation event was utilized in the design of the single open channel spillway as required per R645-301-743.300.

schriste

Maps Affected Area

Analysis:

The application meets the State of Utah R645 requirements for Affected Area maps.

Plate 7-1A, Drainages, Sediment Control Structures and Sampling Locations Phase II depicts the various drainage control measures and sediment control structures that will be used operationally.

Plate 7-2A, Operational and Reclamation Storm Water Conveyance Details Phase II provides cross-sectional views of the diversion ditches and berms to be utilized for storm water routing at the refuse pile site.

Plate 7-3A, Operational Sedimentation Pond Details Phase II provides plan and cross-sectional views of the two sediment ponds to be utilized at the refuse pile site (Sediment Pond 1 and Sediment Pond 2). Additionally, Plate 7-3A provides the spillway/outlet details for both sediment ponds.

Plate 7-4A, Operational Watersheds Phase II depicts the delineated watersheds during the operational phase of the refuse pile.

Plate 7-5A, Reclamation Watersheds Phase II depicts the final topography of reclaimed watersheds at the refuse pile site.

schriste

Maps Facilities

Analysis:

The amendment meets the State of Utah R645 requirements for Mining Facilities Maps.

Plate 5-1, Dugout Refuse Pile Design Operational Plan, Phase II depicts the operational configuration of the refuse pile site in addition to providing topographic contours. During the previous technical analysis Plate 5-1 (Task ID #5368), it appeared that some drainage conveyance structures were not depicted or not depicted in their entirety.

The Permittee was directed to revise Plate 5-1 to depict the full extent of undisturbed ditch UD-1. The Permittee has revised the plate to accurately depict the extent, alignment and orientation of undisturbed ditch UD-1.

Plate 7-1A, Drainages, Sediment Control Structures and Sampling Locations, Phase II provides a detailed plan view drawing of the hydrologic features (monitoring locations, diversions, sediment control measures etc.) for the refuse pile site. During the previous technical analysis of Plate 7-1A, needed clarifications were identified. The Permittee was directed to provide the following revisions and/or clarification to Plate 7-1A:

1) Revise the depiction of undisturbed ditch and disturbed ditch so that they are different from one another. The map and legend calls out both the undisturbed and disturbed ditches as a light blue, hatched line. For clarification, they must be depicted differently.
2) The depiction of ditches must be consistent. The legend shows ditches as light blue, hatched line. However; in some instances (e.g. DD-11 and UD-1) ditches are depicted as a solid blue line which is not identified in the legend of Plate 7-1A.
3) It appears that disturbed drainage ditch DD-6 is not depicted on Plate 7-1A. Please revise accordingly.

Upon review of the recently submitted Plate 7-1A, the Permittee has made the aforementioned revisions to the surface drainage network at the proposed waste rock expansion.

schriste

Maps Monitoring and Sampling Locations

Analysis:

The amendment meets the State of Utah R645 requirements for Monitoring and Sampling Location Maps.

Plate 7-1A, Drainages, Sediment Control Structures and Sampling Locations Phase II depicts the locations of the 5 hydrologic monitoring locations within and adjacent to the refuse pile site (surface water monitoring sites SS-1 and SS-2 and ground water monitoring sites DH-1, DH-2 and DH-3).

schriste

Reclamation Plan

PostMining Land Use

Analysis:

The amendment meets the State of Utah R645-301-412 requirements for postmining land use.

The amendment does not make any changes to the Refuse Pile Amendment Ch. 4.

The description of the PMLU is located in Sections 412 and 412 on pages 4-3 and 4-5. The proposed use is wildlife habitat and livestock grazing. The plan explains how the proposed postmining land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use; The PMLU is consistent with surface owner plans and applicable Utah and local land-use plans and programs. The post-mining roads are discussed in Section 542.600.

lreinhart

WildLife Protection

Analysis:

The amendment meets the State of Utah R645-301-342 requirements for a fish and wildlife plan for the reclamation and postmining phase of operation.

Enhancement measures are identified in Section 342 on pages 3-46 and 3-47 and include revegetation to sustain and improve wildlife habitat following the termination of mining operations. Habitats will be restored and enhanced beyond their pre-mining conditions since the pre-mining condition was a gravel pit.

The plant species provided in the final reclamation seed mix identified on page 3-9 of the Refuse Amendment includes plant species that provide nutritional value and cover for wildlife.

The proposed operation will not affect the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitats, as determined under the Endangered Species Act.

lreinhart

Topsoil and Subsoil

Analysis:

Analysis:
The application meets the requirements of R645-301-240, Reclamation Plan.

The final height of the refuse pile will be 5,996 ft. The slopes will be graded to a maximum of 2h:1v. A ten foot wide terrace will be graded into the pile slope at 5,925 ft. to divide the outslope into two runs of 65-70 ft. (Chap 2., p. 2-17 and RA Plate 5-1).

RA Attachment 2-2 provides the total refuse pile surface area adjusted for slope to be 792,473 sq ft (18.19 acres). The soil cover plan remains unchanged. It is to mix 1 foot of subsoil with the surface foot of waste to avoid an abrupt change in texture; to lay 2.6 additional feet of subsoil over the mixed subsoil/refuse; and to cover the subsoil with 0.4 feet of topsoil. The volume required to achieve four feet of cover is 117,403 CY (Chapter 2, Sec. 242.100, p. 2-14). The volume of imported subsoil required under the described reclamation scenario is 46,515 CY. A borrow area was designated to the South of the Waste Rock site to recover this extra material (RA Attachment 2-2).

Contemporaneous reclamation of 4.5 acres on the refuse pile will be accomplished with use of subsoil pile #2 and live haul of subsoil and topsoil from the expansion, shown on RA Plate 2-2. Within the 4.5 acres, a 0.15 acre test plot, on the NE facing outslope, will demonstrate the success of using only two feet of cover over the waste, in accordance with R645-301-553.252. The waste has been routinely sampled (1 sample/5,000 CY) for acid/toxic parameters (Chap 5, p. 5-18, refer to annual reports for laboratory analysis).

The contemporaneous topsoil and subsoil volumes are 3,086 CY and 23,933 CY, respectively (p. 2-15). Topsoil pile #2 (2,937 CY) and Subsoil pile #2 (2,753 CY) will be consumed in the contemporaneous reclamation.
Refuse will be ripped prior to subsoil application (Section 341.200, p. 3-10). To avoid compaction, soil will be spread using track mounted equipment (Section 241.100). Soil samples will be collected for analysis of soil nutrients. Plans for sampling stockpiled soil materials for soil nutrients at the time of use have not changed (RA Chap 2, Section 243)

One ton/acre weed free hay will be incorporated into the surface soils (on the contour) along with soil nutrients (if required, based on testing). Seed will be either broadcast or hydroseeded. Warm season grasses will be hydroseeded. Cold season grasses will be broadcast in the late Fall (Section 341.200). Hydroseeding of warm season grasses will be followed by hydromulch application at 2,000 lbs/ac and tackifier. The final reclamation seed mix is provided in Section 341.200, p. 3-9.

pburton

Hydrological Information Reclamation Plan

Analysis:

The amendment meets the State of Utah R645 requirements for Hydrologic Reclamation Plan.

The Permittee discusses the hydrologic reclamation plan in section 540 of Chapter 5 of the RA MRP as well as on page 9 of Attachment 7-7. Plate 5-2, Dugout Refuse Pile Design Reclamation Plan Phase II depicts the final surface topography and permanent drainage components that will be retained post final reclamation. Plate 7-5A, RA Table 7-3, Diversion Design

Summary provides a list of the permanent diversions to be retained following final reclamation. Plate 7-5A, Reclamation Watersheds, Phase II depicts the reclaimed watersheds and drainage patterns that will be established following final reclamation. A timetable for completion of each step of the reclamation plan is presented in RA Figure 5-1.

Per the requirements of R645-301-742.323, the Permittee has utilized a 100-year, 6-hour precipitation event for the design of all permanent diversions. The permanent diversions to be retained are berms RB-1, RB-2, RB-3, RB-4, RB-5, RB-6, diversion ditches RD-1, RD-2, RD-3, RD-4, RD-5, RD-6, RD-7, RD-8 and swale RS-1. A 10' wide terrace will be constructed on the southern slope of the refuse pile at approximately 5,925 feet in elevation. The terrace will work to slow overland flow velocities and in turn serve to provide slope stabilization while vegetation is established on the site. The terrace will be tied into the permanent diversions to allow for controlled flow off the pile during the bond liability period.

The two sediment ponds (Sediment Pond 1 and Sediment Pond 2) will be reclaimed following the termination of activity at the refuse pile site. On page 7-12 of Chapter 7 of the RA MRP, the Permittee states that the sedimentation ponds will be maintained until removal in accordance with the reclamation plan. The emergency spillway for Sedimentation Pond 1 will be extended up-gradient to create permanent diversion RD-4. The emergency spillway for Sedimentation Pond 2 will be removed.

Natural drainage patterns for the area will be restored by removing the sediment ponds and temporary diversions. As the refuse site is located between two ephemeral drainages, the impact to natural drainage patterns is not considered significant. The reclamation of the site will establish natural, pre-mining activity drainage patterns.

Section 765 of Chapter 7 of the RA MRP indicates that when no longer required for monitoring of water levels and potential adverse impacts, the monitoring wells located on site will be capped, sealed and backfilled.

schriste

Contemporaneous Reclamation General

Analysis:

The amendment meets the State of Utah R645-301-352 requirements for contemporaneous reclamation.

Contemporaneous reclamation will commence on the northeastern portion of the refuse pile and proceed to the south until final reclamation is achieved. See section 242.100 for more details.

lreinhart

Revegetation General Requirements

Analysis:

The amendment meets the State of Utah R645-301-341 requirements for a revegetation plan.

The amendment does not make any changes to the existing approved reclamation plan. The reclamation plan for final revegetation is located in the Refuse Pile Amendment, Section 340 on pages 3-8 through 3-11 and Section 340 of Ch.3 pages 3-33 through 3-46. The plan describes how all lands disturbed by mining and operations (except water areas and surface of roads approved as part of the postmining land use) comply with the biological protection performance standards. The plan includes a detailed schedule and timetable for each major step (Section 242.100 of MRP and pages 3-10 and 3-11), seed mix (page 3-9), planting methods and mulching (page 3-11).

The amendment meets the State of Utah R645-301-353 requirements for vegetative cover.

The revegetation plan is described in Section 353 on page 3-13. All areas disturbed will be regraded and seeded with the seedmix on page 3-9. This seedmix should result in a vegetative cover that is diverse, effective, and permanent comprised of native species and compatible with wildlife and livestock.

lreinhart

Revegetation Standards for Success

Analysis:

The amendment meets the State of Utah R645-301-356 requirements for revegetation standards for success.

Measures proposed to determine success of revegetation are identified on pages 3-15 and 3-16 of the Refuse Amendment. The success of the reclaimed area will be compared with the approved reference area (RA Figure 3-1). As shown on the top of page 3-16, both the Waste Rock Site and Reference area are sagebrush/grass vegetation communities. Plate 3-1E shows the location of the reference site.

The designated post-mining land use is wildlife habitat and livestock grazing and therefore, production, cover, and shrub density shall be used to determine revegetation success. Refer to Section 411 of the approved MRP for additional information. Page 3-54 of the MRP states, “The success of revegetation for fish and wildlife habitat will be determined on the basis of tree and shrub stocking and vegetative ground cover. Minimum stocking and planting arrangements will be those approved by the Division on the basis of local and regional conditions. Cover success will not be less than that required to achieve the approved postmining land use. The Permittee commits to determine minimum stocking and planting arrangements in accordance with regulation prior to reclamation and revegetation of the Waste Rock Site.

lreinhart

Stabilization of Surface Areas

Analysis:

Analysis:
The application meets the requirements for soil stabilization, R645-301-244.

Section 331 states that the interim seed mix will be planted to stabilize all areas not actively being utilized on the refuse pile site.

During final reclamation, the refuse pile will be graded to final contours and then ripped to a depth of two feet. Cover soils will be applied and the surface foot will be ripped into the waste rock (RA Attach. 2-2). The cover soil will be left rough (pocked and gouged on the flatter slopes). One ton/acre noxious weed free hay will be incorporated into the surface soils, followed by seeding and hydromulch at 2,000 lbs/ac (Chap 3, Section 341.200). Excelsior blanket will be used on the 2h:1v outslopes of the reclaimed pile (Section 242.100, Erosion).

pburton

Bonding Determination of Amount

Analysis:

The Dugout Canyon C/007/039 Waste Rock Site Phase II Expansion, Task 5435 Meets the Bond Determination of Amount requirements for the State of Utah R645-301-830. The The amount of the bond is sufficient to assure the completion of the reclamation plan if the work has to be performed by the Division in the event of forfeiture.

The following are calculations for the bond amount.
Subtotal Demo and Removal: $732,013.00
Subtotal Back-filling and Grading: $1,083,312
Subtotal Re-veg: $449,698
Direct Costs: $2,265,023
Indirect Cost: $607,027
Escalation Cost for 2015 to 2020: $176,509
Escalated Reclamation Cost Rounded to nearest $1,000 in 2020 dollars is $3,049,000.00

Surety Bond Amount Posted in 2009: $3,550,000.00

bwiser

CHIA

CHIA

Analysis:

The amendment meets the State of Utah R645 requirements for Cumulative Hydrologic Impact Assessment (CHIA)

The refuse pile is located within the existing and approved cumulative impact area (See Plate 1 Cumulative Impact Area (CIA) Book Cliffs Area II CHIA). The Book Cliffs Area II Cumulative Hydrologic Impact Assessment (CHIA) presents and evaluates the potential cumulative impacts to hydrologic resources of the refuse pile and area coal mining operations. As such the site is located within the existing CIA boundary and discussed in the Book Cliffs Area II CHIA, a revision to the CHIA is not required with the proposed waste rock site expansion.

schriste