T E C H N I C A L M E M O R A N D U M

Utah Coal Regulatory Program

August 5, 2005

TO: Internal File

THRU: Priscilla w. Burton, Environmental Scientist III/Soils, Team Lead

FROM: David W. Darby, Environmental Scientist III/Geohydrologist

RE: Refuse Pile Expansion, Canyon Fuel Company, LLC., Dugout Mine, C/007/0039, Task ID #2156

SUMMARY:

The Division received an initial submittal for the Dugout Mine Pile Expansion on February 18, 2005. This memo analyzes the review of the hydrology section. The proposed mining activity will increase the size of the refuse pile, change the locations of some diversion ditches, revise hydrologic calculations and change the reclamation at the Dugout Mine.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GENERAL

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

Analysis:

Chapters 5 and 7 of the amendment contain information and engineered designs increase the size of the refuse pile for the Dugout Mine. Chapter 7 provides information to control runoff from the undisturbed area and contain disturbed area drainage. Maps depicting the drainage controls have been supplied and certified by a registered professional engineer.

Findings:

Information provided by the Permittee meets the minimum requirements of the General resource information section.

PERMIT AREA

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

Analysis:

The amended area is shown on Plate RA 7-1. The refuse site is located at the foot of the Book Cliffs escarpment in the Mancos Shale. A layer of sandstone and shale will form the base of the refuse pile. The refuse pile will fill an ephemeral drainage. The upper portion of the drainage will be diverted around the refuse pile and eventually drain into Dugout Creek. Any drainage from the disturbed site will be diverted to a sedimentation pond and treated before it is released. Another ephemeral drainage lies to the west. It drains into Dugout Creek and will be monitored. No contamination by the refuse pile is expected. Hydrologic structures will be sized to transport undisturbed drainage around the refuse pile.

The refuse site will be used to deposit underground waste rock from mining activities. The proposed refuse disposal area is located in T14S R12E Section 18, on property owned by Canyon Fuel Company, LLC. The site is located approximately 6.5 miles southwest of the Dugout Canyon Mine and immediately adjacent to the Carbon County road accessing the mine. The site is located at an elevation of 5,900 feet on a pediment composed of gravelly alluvial deposits overlying the Mancos Shale.

Findings:

The information in the MRP meets the minimum requirements of the regulations for the Permit Area section.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The Permittee has collected baseline information from the stream ephemeral channel and wells on the refuse site. The stream channel west and south of the refuse pile is monitored by the Permittee. Stream Monitoring sites SS-2 and SS-1 are located above and below the discharge site of the refuse pile. The sites have been monitored since May 1995. The stream and well data has been submitted to the DOGM Water Quality Database.

Ground-water information

The permittee has been monitoring three monitoring wells on the Refuse Site since December 1998. The wells are identified as DH-1, DH-2, and DH-3 as shown on Plate RA 7-1. The affects to groundwater are expected to be minimal, since the base layer is the Mancos Shale. It is expected that most of the precipitation will runoff the pile and be captured inside the berm that will surround the refuse pile. During the operational phase, the runoff captured in the berm will flow to the sedimentation pond. During the reclamation phase the roughened surface will hopefully capture runoff to enhance the growth of vegetation. After final reclamation any runoff following the reclaimed surface will flow into channel. It will be treated by vegetation and slope stabilization. A very small percentage of the precipitation will enter the groundwater.

Well level information has been reported quarterly to the DOGM Coal database since December 1989. The water level of DH-1 has varied in the past from a depth of 32 feet to 50 feet. The level in well DH-2 has fluctuated from a depth of 36.3 feet to 41.24 feet. The level of DH-3 has fluctuated from 97.42 feet to 91.8 feet.

Any water seeping into the ground will percolate down to the Mancos Shale, and then migrate along the shale to a point of discharge. Seepage from the pile, if at all, is expected to be very small. The original topography will be effective in directing any ground water flow. Groundwater percolating through the refuse pile should not impact any streams below, because the quantities should be very low, and they will be filtered by alluvium prior to reaching any other stream.

Surface water information

Surface sites SS-1 and SS-2 are established to monitor the stream channel that begins on the west side of the refuse site, then runs through the site between the refuse pile and the sedimentation pond. Data garnered from the database from May 1995 to present show no flow in the channel.

Drainage from the refuse pile will report to a sedimentation pond during the operational phase. The pile will be monitored for toxic or hazardous materials. At reclamation if any acid or toxic material are identified, the pile will be covered with a minimum of 4 feet of topsoil, as required by R645-301-553.252, then revegetated.

Baseline Cumulative Impact Area Information

A Cumulative Impact Area (CIA) was established for the Soldier Canyon Mine prior to any mining in Dugout Canyon. The Dugout Mine and Refuse Pile lie within the established Soldier Canyon Mines CIA. The Soldier Canyon and Dugout Mines upstream from the Refuse Pile will not be affected from its operations. The cumulative impacts of the mines would be identified in the water quality discharges of all three sites.

Modeling

No numerical groundwater or surface water modeling was conducted for this site.

Probable Hydrologic Consequences Determination

A PHC determination prepared by Mayo and Associates in 1996 is in Appendix 7-2. The PHC determination for the MRP begins on page 741.

Adverse impacts to the hydrologic balance

The Permittee has committed to install various sediment control measures to prevent contributions of sediment to the stream. Mitigation measures will be implemented if monitoring data show impacts have occurred.

Acid forming or toxic forming materials

The probable impacts from acidity, total suspended solids, and total dissolved solids were assessed by the Permittee. Information in Chapter 6 and 7 indicates there are no acid- and toxic-forming materials from the refuse material to cause adverse impacts. There is no significant potential for contamination of surface and ground waters in the permit and adjacent areas (p. 7-41).

Important water quality parameters

Dugout is classified as class 2B (secondary contact recreation use), 3C (non-game fish and other aquatic life use), and 4 (agricultural use). If discharges occur from the Refuse site to Dugout Creek, TDS concentration of these discharges should not exceed applicable water-quality standards.

Ground water and surface-water availability

The stream channels adjacent to the site are considered ephemeral. There are no springs ponds, lakes, wells or seeps on or adjacent to the refuse site.

Flooding or streamflow alteration

There is a potential that sedimentation pond water will be discharged to the unnamed creek and then to Dugout Creek. The amount of discharge is unknown at this time. Discharges will be monitored. Discharges if any will be infrequent if at all.

Sediment yield from the disturbed area

Silt fences and straw-bale dikes will be installed to control erosion as vegetation becomes established during reclamation. These measures will reduce the amount of erosion and control adverse impacts to the environment.

Potential Hydrocarbon Contamination

There should be no potential influence from hydrocarbon contamination.

Road Salting

No salting of roads will occur within the permit area. This potential impact is not a concern (p. 7-50).

Surface-Water Monitoring Plan

The Permittee will continue monitoring surface waters throughout operational and reclamation phases. Surface water quality and quantity information is considered sufficient to characterize baseline conditions for the Refuse Pile area.

Findings:

The information provided by the Permittee meets the minimum requirements of the Hydrologic Resource Information Sections of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps

The Permittee has met the requirements of R645-301-521.141. Plate RA 7-1 clearly shows the boundaries of the proposed fan portal area, which is the area to be affected.

Mine Workings Maps

Plate 7-1 shows the location of surface facilities, their elevations, and dimensions.

Monitoring and Sampling Location Maps

Elevations and locations of monitoring stations used to gather data on water quality and quantity are depicted on Plate RA 7-1.

Surface Water Resource Maps

The surface water resources adjacent to the Refuse Pile are identified on Map 7-1.

Well Maps

There are no gas, oil, or water wells within the proposed Refuse area.

Contour Maps

Plate 7-1 shows the existing topography and the proposed topography during mining. Plate 7-3 shows the topography after reclamation.

Findings:

The information provided by the Permittee meets the minimum regulatory requirements.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Ground-water monitoring

The Permittee has committed to submit well monitoring data for the mine site by the end of the quarter following sampling. If analysis of any ground water sample indicates noncompliance with the permit condition, the Permittee will notify the Division and take immediate appropriate action.

Surface Water Monitoring

Operational surface-water monitoring protocols are given on pages 7-58 of the MRP. Sites PC-1and PC-3, located above and below the disturbed areas and UPDES discharge points, are to be monitored quarterly for flow and operational field and laboratory parameters. Operational surface-water quality parameters that are to be monitored at the Dugout Canyon Mine are listed in Table 7-5 of the MRP. The Permittee elected to establish a monitoring plan consistent with operational parameters in Table 3 of Technical Directive 004 with the deletions of total alkalinity and hardness. These were not included.

For surface water, Technical Directive-004 recommends one water-quality sample at low flow every fifth year, either during the year preceding the reissue of a permit, or during the midterm review. The sample is to be analyzed for baseline parameters. In addition to the

regular monitoring, the MRP contains a commitment to collect one water sample at each sampling point during the low flow period every fifth year, during the year preceding permit renewal, which is to be analyzed for baseline parameters (p. 7-59).

Acid- and Toxic-Forming Materials and Underground Development Waste

Analyses presented in Chapters 6 and 7 of the MRP indicate that acid- and toxic-forming materials are not present within the permit area. Parameters defining acid- and toxic-forming materials will periodically be monitored as described in Chapter 6. In the event that acid- or toxic-forming materials are identified, they will be disposed of in appropriate waste-rock disposal facilities as described in Chapter 5 of the MRP.

Discharges Into An Underground Mine

In Section 513.600 of the MRP, the Permittee states that no discharges will occur from the surface into the underground mine workings.

Gravity Discharges From Underground Mines

No gravity discharges will be made from an underground mine in the permit and adjacent areas (p. 7-60).

Water-Quality Standards And Effluent Limitations

Discharges of water from disturbed areas will be in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining contained in 40 CFR Part 434 (p. 7-90).

Diversions: General

The Permittee has developed designs to implement several diversion structures (culverts and a berm) on the surface facilities to direct and control runoff. Plate 7-1 identifies the drainage ditches, culverts, and berms to be used to direct runoff away from and through the Refuse Pile site. The designs and calculations for the diversion structures are in Attachment 7-2.

Stream Buffer Zones

Section 731.600 of the application indicates that mining activities will not take place within the 100-foot buffer zone of a perennial stream.

Sediment Control Measures

Measures to control sediment include the main sedimentation pond, containment berms, silt fences, straw bales, and gravel/riprap protection. The runoff and sediment control plan has been designed to ensure that the operations within the disturbed area should not cause or contribute to degradation of water-quality outside the disturbed area. Riprap calculations have been submitted along with a cross-section for operational ditches UD–1b, UD-1c, DD-1, DD-2b, DD-3a, DD-3b and reclamation ditches RD-2 showing a filter and graded. Cross-sections of the ditches showing the design of riprap placement are shown in Attachment 7-4.

Siltation Structures: Exemptions

The subsoil and topsoil stock pile areas are ASCAs. ASCAs describe disturbed areas that cannot use retention time settling as a means of sediment concentration reduction, (i.e., use of a pond or sediment trap is not possible). Other methods such as vegetation, silt fences or straw bales, berms, roughening, gravel or other accepted measures are used to control sediment pickup and transportation from small areas. ASCA's include outslopes of ditches and ponds, outcast slopes of roads and other small disturbed areas.

Discharge Structures

There will be one sedimentation pond used at the Refuse Site. Sedimentation design plans and calculations are in Attachment RA 7-2. The pond will be retained until removed. The operator used SEDCAD+ 3.1 Civil Software Design program to calculate inflows to the pond, the stage-volume capacity of the pond and spillway design. Contributing drainage area of 15.6 acres yields. The pond is designed to have total containment of the 100-year, 24-hour storm event. No decant is designed for the pond. The runoff volume the 100-year, 24-hour event was calculated to be 2.22 acre-feet. The volume of the runoff from the storm event and the maximum sediment storage is 2.89 acre-feet.

The emergency spillway has been designed with a median riprap diameter of 6 inches within the crest section and 12 to 9 inches in the outslope sections of the channel. Calculations regarding the emergency spillway are presented in Attachment 7-2.

Plate RA 7-2 identifies the details for sediment and water storage.

Hydrologic Balance Protection

Information provided by the Permittee indicates no water will be consumed for this operation. Mine water discharge has been addressed in the MRP for the Dugout Mine.

Findings:

Information provided by the Permittee meets the minimum requirements of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected Area Maps

The Permittee has supplied several maps that show the disturbed area.

Mining Facilities Maps

Plate RA 7-1, shows the location of the Refuse Site structures.

Monitoring and Sampling Location Maps

Elevations and locations of monitoring stations used to gather operational water quality and quantity data are on Plate RA 7-1.

Certification Requirements

Cross sections, maps, and plans have been prepared by, or under the direction of, a certified registered professional engineer.

Findings:

The information submitted by the Permittee meets the minimum requirements of the regulations.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The Permittee has provided plans for reclamation of the Refuse Pile upon completion of mining. Plate RA 7-3 shows the final configuration of the Refuse Site after all the temporary drainages have been removed. Table 7-3 identifies the reclamation design characteristics.

Findings:

The Permittee's submitted information meets the minimum regulatory requirements.

APPROXIMATE ORIGINAL CONTOUR RESTORATION

Regulatory Reference: 30 CFR Sec. 784.15, 785.16, 817.102, 817.107, 817.133; R645-301-234, -301-412, -301-413, -301-512, -301-531, -301-533, -301-553, -301-536, -301-542, -301-731, -301-732, -301-733, -301-764.

Analysis:

The Permittee plans to build up the refuse pile to a height of 60 feet above the surrounding landscape. The final shape of the refuse pile will stand out compared to the surrounding area and susceptible to erosion, both wind and precipitation, because of exposure and the softer unprotected soils.

Findings:

The Permittee has supplied reclamation information to meet the minimum regulatory requirements of the regulations.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Ground-water monitoring

Ground water wells will be monitored until final reclamation.

Surface-water monitoring

Data will be collected from the sedimentation pond discharge point in accordance with the UPDES permit. Data will be collected under the surface water-monitoring program every year until bond release. Locations of surface-water monitoring sites are on Plate 7-1.

Acid and toxic-forming materials

There are several places within the MRP text that indicate that there are no acid- or toxic-forming materials within the Dugout Canyon Mine permit area. The text locations include Chapter 6, Geology, Chapter 5, Engineering, and Chapter 7, Hydrology. It appears this is not a problem at this site.

Transfer of wells

No wells will be transferred.

Discharges into an underground mine

No discharges of surface water will be made to an underground mine in the permit and adjacent areas (p. 7-60).

Gravity discharges

No gravity discharges will be made from an underground mine in the permit and adjacent areas (p. 7-60).

Water quality standards and effluent limitations

Discharges of water from disturbed areas will be in compliance with all Utah and federal water quality laws and regulations and with effluent limitations for coal mining contained in 40 CFR Part 434.

Diversions

All corrugated metal culverts will be removed during reclamation except those controlled by the county under the Dugout road. The disturbed areas will be re-contoured except for the refuse pile. All regraded areas will be roughened and reseeded. Many of the operational diversions will be removed at reclamation, while some will remain as identified in Table 7-3

Sediment control measures

The sediment control measures that will be utilized during reclamation will include silt fences and straw bales. These are considered adequate when properly installed and maintained.

Siltation structures

At reclamation the Permittee will remove the sediment pond and re-contour the site. The Permittee plans to use straw bales, silt fences, mulching and surface roughening to treat / capture any sediment generated during the revegetation process.

Other treatment facilities

The Permittee will use gouging, mulch, and reseeding to establish vegetation. These will control erosion and minimize the contribution of sediment to the stream channel during and after reclamation.

Discharge structures

No discharge structures or impoundments will exist at the fan portal site after it has been reclaimed.

Casing and sealing of wells

The Permittee has committed, in Section 731.400, to seal the monitoring wells when no longer needed.

Findings:

Information provided by the Permittee meets the minimum requirements of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Affected Area Boundary Maps

The Permittee has supplied 7-3, identifying the sediment control areas that will be utilized during reclamation. Plate RA 5-2 depicts the reclamation topography and cross-section locations.

Reclamation Backfilling And Grading Maps

Plates RA 5-5 and RA 7-3 show the backfilling and grading plans.

Reclamation Facilities Maps

No facilities will be left at reclamation.

Final Surface Configuration Maps

Plate RA 7-3 shows the final surface configuration.

Certification Requirements

Cross sections, maps, and plans have been prepared by, or under the direction of, a registered professional engineer.

Findings:

Information provided by the Permittee meets the minimum requirements of the regulations.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The addition of the Refuse Pile site will not prompt changes in the current CHIA.

Findings:

The Division will not have to update the CHIA to include expansion of the Refuse Pile since no additional hydrologic impacts could occur.

RECOMMENDATIONS:

The hydrologic portion of the Refuse Pile Amendment is recommended for approval.

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