

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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October 15, 2003

TO: Internal File

THRU: Pete Hess, Engineer / Inspector - Team Lead

FROM: Gregg Galecki, Environmental Scientist III - Hydrology

RE: Addition of Culverts and Sediment Control Structures, Canyon Fuel Company (CFC), Dugout Mine, C/007/039, Task ID #1749

### **SUMMARY:**

The current amendment addresses a modification to the drainage of Surface Facility area of the mine with the addition of three (3) culverts (DC-7a, DC-10 and DC-11, respectively), a sediment trap, and a sediment basin. The purpose of the modifications is to redirect surface flow on the facility (DC-7a), address a limited space and congestion problem (DC-10), and to reduce the sediment/coal fines reporting to the Sedimentation Pond (sediment trap, sediment basin). The modifications are submitted as text changes in Chapter 7 of the MRP and Addendum A to Appendix 7-9 (Culvert design drawings and calculations). The Sediment Trap and Sediment Basin are intended to function best during the warmer months when abundant coal fines are being washed into the ditches. During winter months, it is anticipated the trap and basin will fill with ice and become non-functional. For this reason, they have been designed as secondary systems and are still compliant if non-functional. It is the understanding of the Division that the information provided in Addendum A will be incorporated into Appendix 7-9 when As-built drawings are submitted following construction. The amendment was received at the Division on October 10, 2003. The current review addresses the proposed amendment solely from a hydrologic perspective, and only regulations germane to the control of surface drainage. The proposed amendment adequately addresses the minimum requirements of the regulations and is recommended for incorporation into the currently approved Mine Reclamation Plan (MRP).

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**TECHNICAL ANALYSIS:**

## **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:**

##### **Diversions: General**

During construction of the sediment trap, sediment basin, and culverts water will be routed through the surface facility and report to the Sediment Pond. Silt fences will be installed below the road at culvert DC-7a. The specifics of sediment control during construction are outlined in a Construction Design Specification manual that was given to the Division Inspector (Mr. Peter Hess).

##### **Diversions: Miscellaneous Flows**

Culvert DC-7a services undisturbed watershed WS-7 and approximately 400-feet of an access road within the disturbed area. No sediment control measures or siltation devices are necessary to treat the water prior to entering the creek as long as the road is maintained in accordance with R645-301 and R645-302 regulations. The road accessing the Mine water tank is designated as ASCA-6 (Alternate Sediment Control Area). Sediment generated from ASCA-6 will be controlled with silt fences or straw-bales in the ditch immediately upstream from the inlet to Culvert DC-7. Hydrograph calculations have been provided that demonstrate the proposed 22-inch HDPE pipe has been sized to adequately pass the peak runoff from a 10-year 6-hour designed storm event. The outflow from the culvert leading to Dugout Creek has not been ripped based on the rocky and vegetated nature of the slope leading to the creek and the anticipated peak flow discharge of 0.2 cfs (90 gpm).

Culvert DC-10 is approximately 325-feet in length and is located in a high-traffic area and adjacent to the equipment lay-down yard. The primary purpose of the culvert is eliminate congestion and create additional useable space within the lay-down yard. Culvert DC-10 is design as a 22-inch HDPE pipe with an outlet slope of 3.4 percent, it conveys disturbed area runoff to the Sediment Pond. The 10-year 24-hour designed storm event produces an anticipated peak flow of 4.0 cfs and an outlet velocity of 8.96 fps. This peak flow rate requires the outlet to

be riprapped with a  $D_{50}$  of 9-inches. Culvert DC-10 is preceded by a proposed sediment basin designed to collect coal fines to be placed back on the coal pile. This is designed to reduce sediment built-up in both Culvert DC-10 and the Sediment Pond. The addition of Culvert DC-10 is described in text under Diversion Culverts and Table 7-9 of the MRP. Based on design information provided in Addendum A to Appendix 7-9 the culvert design can handle a flow of 12 cfs with an anticipated flow of only 4 cfs.

Culvert DC-11, 24-inches in diameter, is included as part of a secondary system to convey disturbed area runoff to the Sediment Pond. Preceding Culvert DC-11 is a Sediment Trap whose design is discussed in the Sediment Control Measures Section. The purpose of installing the secondary system is to reduce the amount of sediment reporting to the Sediment Pond (addressed with Sediment Trap) and to raise the elevation of the Sediment Pond inflow (addressed with Culvert DC-11). As outlined in Table 7-9 of the MRP and Addendum A to Appendix 7-9 the designed flow based on the prescribed storm event is 5 cfs while the culvert has a capacity of 20 cfs. The outlet of the culvert will be riprapped with a 6-inch  $D_{50}$  based on a 7.25 fps peak flow velocity.

### **Sediment Control Measures**

A proposed concrete Sediment Basin is to be installed at the inlet to Culvert DC-10. This is outlined in text in Section 752 of the MRP with drawing designs and calculations located in Addendum A to Appendix 7-9. The function of the Sediment Basin is to reduce the sediment build-up in both culvert DC-10 and the Sediment Pond. The Sediment Basin has been designed to allow for 0.53-feet of freeboard above the anticipated storm event flow depth entering the basin and reporting to Culvert DC-10. As outlined in Section 752 of the MRP, the Sediment Basin has been designed to fully pass design flows, regardless of the quantity of sediment and/or ice collected in the trap; eliminating a concern of a compliance concern should the basin be full.

A proposed concrete Sediment Trap is to be installed at the inlet of Culvert DC-11. This is outlined in text in Section 752 of the MRP with drawings and design calculations located in Addendum A to Appendix 7-9. As outlined in Section 752 of the MRP, the Sediment trap has been designed to fully pass design flows, regardless of the quantity of sediment and/or ice collected in the trap; eliminating a concern of a compliance concern should the basin be full. If the trap is full, water will be directed to the Sediment Pond through existing ditch DD-1 and Culvert DC-1.

Flow from ditch DD-1a enters the trap and settles to a depth of 3.5-feet prior to flowing over a wall/broad-crested weir and into Culvert DC-11. The spillway is 1.5-feet below the top of the ramp leading to the trap resulting in a freeboard of 1.21-feet. Ditch DD-1 is 0.5-feet below the spillway, ensuring any flow will report to that ditch should Culvert DC-11 fill with ice or debris. Weep holes and a screen will be installed in the wall of the trap leading to the DC-11 and the overflow ditch to assist in drying the sediments prior to removal.

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**Findings:**

Information provided adequately addresses the minimum requirements of the Operation Plan – Hydrologic Information section 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:**

### **Mining Facilities Maps**

Included in Addendum A to Appendix 7-9 are figures 1 through 4 which outline the proposed sediment trap, sediment basin, and the respective culverts. The information supplied on these figures needs to be incorporated into plates 7-5, 7-7, and 7-8 of the currently approved MRP. It is the understanding of the Division that it will be incorporated into the respective plates as as-built information soon after the structures are built. At that point Addendum A will be removed from the MRP.

### **Certification Requirements**

All maps and figures submitted as part of Addendum A to Appendix 7-9 have been stamped, signed, and dated by a registered professional engineer (Layne D. Jensen, State of Utah, #189797).

**Findings:**

Information provided adequately addresses the minimum requirements of the Operation Plan – Maps, Plans, and Cross Sections of Mining Operations section 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:**

No modifications to the currently approved Reclamation Plan were necessary based on the currently proposed amendment. Reclamation of these areas are covered under the current plan.

**Findings:**

Information provided adequately addresses the minimum requirements of the Reclamation Plan – General Requirements section of the regulations.

**RECOMMENDATIONS:**

Incorporation of the proposed modifications into the currently approved MRP is recommended.