



State of Utah

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January 27, 1998

TO: File

THRU: Joe Helfrich, Daron Haddock, Permit Supervisor's

FROM: Sharon Falvey, Senior Reclamation Specialist

RE: Notice of Violation N97-45-1-1 response, Horizon Coal Company, Horizon Mine, ACT/007/020-97F 1/15/98, Folder #2, Carbon County, Utah

SYNOPSIS

This violation has resulted in a need to re-establish the final reclamation of the site. This review is related to review of the final surface configuration. Applicable portions of the Technical Analyses (TA) should be incorporated into the next TA update.

ANALYSIS

Reclamation 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:

Grading to Drain and Approximate Original Contour

The permittee has committed to keep surface drainage from entering sealed entries in section 3.5.3.1. The permittee has committed to re-contour the area to drain to the final reclamation channel in section 3-25. However, contour information on the reclamation topography plate 3-7 shows an area near the confluence of Jewkes Creek and the Portal canyon drainage which does not drain to the channel. This area retains the existing road configuration. The retention of the road bed here has the potential to concentrate water and increase erosion potential. This area should be reconfigured to grade with the surrounding hillside and the road bed configuration should be removed.

Diversions.

The permittee has proposed a drainage plan which re-configures Jewkes Creek's drainage channel and Portal Canyon drainage channel. The new configuration of Portal Canyon eliminates the basin behind the existing embankment.

Portal Canyon was designed to carry a peak flow of 9.95 cfs. The permittee's analysis assumed a one foot flow line because no high water mark was found. Since this is an ephemeral system it is often difficult to determine the height of the channel forming flows. Typically the channel forming flows are high intensity short durations events in ephemeral systems. Based on the presented design information the design capacity of this channel exceeds the minimum required design flow for an ephemeral system. Based on the topography provided on plate 3-7 the portal canyon channel will have a maximum slope of 0.16 ft /ft and a minimum slope of 0.02 ft/ft. The Portal Canyon channel design should use the maximum channel slope as presented in the proposed configuration for channel designs.

The Upper Jewkes Creek channel is designed to carry 143.5 cfs in the combined channel and flood plain configuration while, the Lower Jewkes Creek channel is designed to handle a combined channel and flood plain flow of 150.6 cfs. The estimated capacity of the upper end of the disturbance was 27.65 cfs based on a high water mark. The estimated capacity of the downstream channel below the disturbance was determined to be 38.67 cfs. The reclamation channel capacity downstream is designed to exceed the capacity of the Jewkes Creek channel upstream and down stream of the site based on presented design information. The design will allow flows from the design 100- year, 6-hour event to pass through the channel and flood plain configuration.

The centrally-located channel section is placed away from the toe of steep backfilled slopes. A small riprapped channel section is designed to carry a low flow from the 10-year, 6-hour event. A sand filter blanket is provided to promote recharge into the surrounding soils. **See the Jan. 16, 1988 memo regarding riprap sizing.**

The Jewkes Creek channel design is intended to provide a means to re-establish the riparian vegetation, existing at the site prior to disturbance, and is intended to simulate the pre-mining channel configuration while considering other site conditions. Some issues that are related to the success of the permittee's proposal are based on the hydraulic characteristics of the soil adjacent to the channel, the gradient downstream of the site and, the amount of sediment and intensity of flows being transported through the system. Intuitively it seems the areas of steeper gradient would not contain the check dams and the accumulation of flow and flatter gradient would be used to establish the riparian area. The proposed design concept is to decrease the gradient through deposition within the higher gradient areas. The ability of this design to be stable may be measured through the ability of the design to withstand flows received at the site.

According to Rosgren's Classification system Jewkes Creek would approximate an "E stream type" configuration. The channel type is based on characteristics of the existing stream gradient assuming a moderate sediment supply and healthy vegetation. The classic channel under these conditions would have a width to depth ratio less than 12, an entrenchment ratio greater than 2.2, a sinuosity greater than 1.5 and, a surface water slope less than 0.02. Because there is a high sediment load in the existing system (upstream logging presently occurring) and because the potential for additional flows from the reclaimed channel section and an increased slope, a channel more closely resembling a "C stream type" might be more appropriate.

The upper channel RD-2 is designed to include channel slope ranging from 0.03 to 0.07 ft/ft. The minimum slope based on the topographic contour information is 0.015 ft/ft and the maximum slope is 0.049 ft/ft. Loose rock check dams, 1.5 ft high with a designed spillway, and apron will be installed at upstream and downstream locations. The most efficient spacing is to place the check dams at the upstream toe of the deposition behind the previous check dam (Heede, 1976). To determine this distance, for an initial gradient less than 20%, the deposition behind the slope is approximately 0.7 of the initial gradient. This would result in slopes of 0.034 and 0.011 ft/ft behind the dams following accumulation of sediment. A spacing of approximately 136 linear feet between dams would result for the 0.015 slope and approximately 44 linear feet between dams would result for the 0.049 slope. The proposed locations are in the steeper section of the channel and are designed between 75 and 50 feet apart. These distances appear appropriate for the proposed gradient where the check dams are located according to plate 3-7.

The lower channel RD-3 is designed to include a channel slope ranging from 0.02 to 0.07 ft/ft. The lower portion will have check dams while the upper section will not incorporate check dams. The minimum and maximum slopes, based on Plate 3-7, are 0.08 and 0.027 ft/ft. The design provides a small channel within a larger channel to construct a flood plain while providing stability. The typical bottom width of the flood plain is 30 feet while the base channel will be 8 feet wide and contain the low check dam with a four foot wide notched spillway. The design proposed eliminates check dam keys. These were determined unnecessary by the designer because they are surrounded with the channel filter blanket. Check dam keys are designed to anchor the structure and to retain flow within the channel preventing water from cutting around the structure. Cutting usually occurs once sediment is deposited behind the structure and water spills over the length of the dam. Should significant cutting of this nature occur design reconstruction may be necessary. The designs provided considers the site conditions and the goals of reclamation and meets the regulatory requirements for design flow.

During reclamation the 4 inch pipeline from Sweets Pond to the mine site will be disconnected, the end of the pipes will be plugged and, the pipeline abandoned in place. The reclamation for this site should be performed in a timely manner since it is no longer proposed to be used.

Findings:

The permittee must provide the following, in accordance with the requirements of:

R645-301-731. 1) The maximum slope in the proposed reclamation site configuration, as shown on Plate 3-7, should be used where the maximum slope is used to design the channel especially for Porter Fork where the difference is significant. 2) Regrade the area which retains the road at the junction of Portal Canyon and Jewkes Creek to blend with the surrounding hillside. The road bed configuration should be removed as this area has the potential to concentrate water and increase erosion.

RECOMMENDATION:

The identified deficiencies should be addressed and incorporated into the plan prior to approval of this document.