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August 24, 1988

TO: File

FROM: Rick P. Summers, Reclamation Hydrologist

RE: Revised Design of Reclamation Channel For Little Snyder Canyon, Blazon #1 Mine, Received August 23, 1988, North American Equities, ACT/007/021, Carbon County, Utah

Summary:

The above referenced revised submittal consists of a channel design, inlet structure for an existing culvert, an overflow swale, a culvert to pass the disturbed area drainage to the sediment pond, and a culvert outlet modification for the reclamation of Little Synder Canyon at the Blazon site. The submittal was made as a response to a stipulation on the permit issued in 1986.

Analysis:

The channel design was based upon a 100 yr. - 24 hr. design precipitation event. The original Technical Analysis for the permit stated that the 50 yr. - 24 hr. event would be acceptable for the design based upon the proposed post-mining land use for the site and the rules of UMC 817.133. However, upon more careful evaluation of the hydrograph for the area, it was found that the 100 yr. - 24 hr. peak flow event was less than the originally proposed 50 yr. - 24 hr. peak. This is largely due to utilization of a more specific precipitation depth from the NOAA atlas (Miller, et. al.) rather than using the data from the gage at the Clear Creek Summit. The applicant chose to use the 100 yr. - 24 hr. event for the design work to meet the more stringent requirements of our rules (UMC 817.44).

Review of the peak flow values presented indicate the applicant's values are correct. The technical analysis is as follows:

Parameter	Applicant's Value	DOGM Value
Area (acres)	121 ac.	130.1 ac.
Hydraulic Length	4730 ft.	5062.2 ft.
Watershed slope	34.8%	31.2%
Curve number	64	64
Ppt. 100/24	3.42 in.	3.42 in.
Time of Conc.	0.49 hrs.	0.54 hrs.
Storm Distr.	Type II	Type II

The results are:

Peak Flow	Applicant's Value	DOGM Value
100 yr. - 24 hr.	46.4 cfs	48.12 cfs
50 yr. - 24 hr.	30.61 cfs	29.3 cfs

The application presents the results of two sieve analyses of material existing in the recently excavated channel. The analysis indicated the need for the placement of a filter blanket for the channel design. The applicant correctly calculated and proposed a double sized filter blanket to insure channel, filter, and riprap stability.

The channel has been designed to pass the peak flow event at a depth of 0.98 feet with 0.52 ft. of freeboard. The application revised the slope value for the final configuration of the channel to 20.4 percent. The applicant proposes a trapezoidal channel with a 2 ft. bottom width and 2:1 sideslopes for the final configuration. The expected velocity from the 100 yr. - 24 hr. design event is 12.0 feet per second. The proposed riprap design was reviewed using the methods outlined in Hydraulic Engineering Circular No. 11 (HEC 11). The applicant has correctly calculated the D_{50} size to be 1.25 feet. A riprap gradation curve based upon that value has been incorporated into the proposal.

An existing culvert (24 " CMP), labeled culvert D, currently conveys the drainage across the pad and discharges into the Mud Creek Channel just downstream from Culvert B. The exact depth of this culvert is not known at this time. However, excavations conducted last fall indicate the pipe depth to be approximately 5.0 feet. The proposal demonstrates that this culvert is adequate to pass the 50 yr. - 24 hr. design event if the 5 foot headwall can be maintained. The reader is referred to the Technical Analysis and Decision Document of the original permit for justification for the use of a 50 yr. - 24 hr. event.

In addition, the applicant has proposed a 20 foot top width and a 1 foot deep overflow swale that can adequately pass the excess flow from the 100 yr. - 24 hr. precipitation event (17.1 cfs) at an acceptable velocity of 2.9 fps. As a conservative measure, 2 inch compacted road base will be installed to further insure the swale will not erode. The installation of the swale will result in interference with the drainage in the diversion labeled ditch B. A correctly sized culvert (18 inches) has been proposed to route the drainage through the channel reconstruction to the sediment pond.

The proposal states that the discharge from culvert (D) will be directed toward Mud Creek via a 90° elbow. The proposal presents information that demonstrates the exit velocity from the culvert will not be erosive due to the proposed installation of riprap in the Mud Creek channel with a D_{50} of 20 inches. A 90° elbow will be installed with bands using rods and lugs. The application presents information demonstrating that this will be adequate to dissapate the thrust forces on the elbow.

Recommendations

The proposal is approvable as submitted.

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