



STATE OF UTAH  
NATURAL RESOURCES  
Oil, Gas & Mining

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July 30, 1984

*ACI/007/006  
#2*

TO: D. Wayne Hedberg, Reclamation Hydrologist/Permit Supervisor  
FROM: Jack Wittman, Reclamation Hydrologist *JW*  
RE: Comments on Unit Train Loadout Plans.

UMC 784.16 Reclamation Plans: Ponds, Impoundments, Banks, Dams and Embankments

The sediment storage staff gauge should be marked in red at the 60% sediment storage elevation.

UMC 817.46(u) Sediment Ponds

According to this section the monitoring point for sediment ponds shifts at the time reclamation commences from the effluent or discharge point to the influent of the pond. This monitoring shift will then substantiate the hydrologic progress of the reclamation effort.

UMC 784.24 Transportation Facilities.

The PMC response to DOGM's comments indicate that dispersion structures and inlet protection will not be installed with the influent culvert on sediment pond 8. This is not acceptable. In accordance with Rule 517.47, "discharge from diversions shall be controlled to reduce erosion."

UMC 817.42 Hydrologic Balance: WQ Standards & Eff limitations

As proposed, a collection ditch would be an acceptable alternative measure if coupled with a silt fence or strawbales. PMC should submit plans addressing this.

UMC 817.46 Sediment Ponds

The following statements and questions relate to the applicants response to review comments made in the PMC July 5th Review response. Numbers correspond to original comments.

1. The applicant has not applied the unit hydrograph methodology correctly. In the review response the applicant has shown that:

$$Q_p = 484AQ/tp \quad (\text{eq. \#1})$$

As the reviewer understands it this peak flow,  $Q_p$ , was then used as the height of a triangular hydrograph with a known volume,  $Q$ . These parameters were then used to solve for the time to base,  $tp$ , and using the relationship  $tp = 2.67 t_p$ , the time to peak was determined, thus defining the triangular flood hydrograph as shown on Map 7., Volume III.

Equation 1 describes the trigonometric relationship between a triangular Unit hydrograph, (that simplified hydrograph resulting from a unit rainfall excess volume), and the height of that triangle. It should not be used to describe a sythetic flood hydrograph, (see NEH-4 p 16.8), which is built from incremental rainfall excess volumes predicted from the design storm distribution.

Because UMC 817.46 requires either a detension time in excess of 24 hours or total containment, and because the applicant is attempting to show adequate detension time, a complete synthetic flood is needed to determine the position of the centroid of the inflow hydrograph, (see Burfield, Warner & Haan, P. 257-267). The SCS Unit Hydrograph method, (one acceptable method for generating a flood hydrograph), is covered completely in NEH-4 p 16-17 (example 2).

The applicant states that equation 1 was used in the peak flow determination, yet on Table 2 of Volume 1, (sediment Pond 8 Runoff & Peak Flow Calculations), the peak flows apparently were determined with SCS Nomogram ES-1027 from A Method for Determining Volume and Rate of Runoff in Small Water Sheds, (SCS-TP-149, 1973). This method not only has questionable validity to an area with 50% slope but also does not aid in the generation of a flood hydrograph. While peak flow estimates are important for culvert sizing they do not define the criterim for sediment pond design, i.e., detention time, and total containment.

2. Plans for size and spacing of anti-seep collars should result in a 10% increase in flow length (Barfield, et.al, 1981; p. 473). These calculations should be shown. The proposed design (two 4' X 4' collars) would only be sufficient if the culvert was less than 40' long.

$$2 \text{ collars X } 2 \frac{(4' \text{ collar} - 2' \text{ Culvert})}{2} = 4' \text{ increase in flow length}$$

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5. The applicant states that map 6 was used to develop the stage discharge curve shown on Table 4 of exhibit 2, yet this map has 4 foot intervals between contours and the table shows a two foot resolution. Again, either the two foot contour map should be submitted or the table should be revised.

JW/jvb  
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