

**FILE COPY**

July 6, 1987

TO: Technical File *KW*  
FROM: Kent Wheeler, Reclamation Hydrologist  
RE: Sediment Pond Decant Modification (Dated 3-31-87), Utah Fuel Company, Skyline Mine, ACT/007/005, Folder No. 2, Carbon County, Utah

SUMMARY:

The above applicant proposes raising the height of the decant structure (primary spillway) 1.6 ft. to increase the capacity of the sedimentation pond. This increase in storage is needed to adequately control increased discharges from the mine. This report found that after modification the structure will be able to pass the 100-yr, 24-hr storm event and still provide the necessary free board (1 ft). The modification should be approved with the conditions stated below.

BODY:

This proposal was reviewed on July 6, 1987. The review consisted of constructing a Stage - Discharge Curve for the sedimentation pond. The decant structure consists of a metal culvert (riser) 4 ft (48 in ) in diameter and 11.75 ft high. It is connected to a 24 in culvert, which discharges into a 72 in culvert diverting the undisturbed drainage under the mine site.

The procedure followed the steps outlined in Barfield, Warner and Haan (1985) for constructing a Stage - Discharge Curve. The size of the culvert made necessary only the calculation of weir flow and orifice flow (see attached documents).

The height of the primary spillway was assumed to be 8579.6 ft. msl; although, the submitted calculations incorrectly showed this elevation to be 89578.75 ft. msl. Using the corrected spillway elevation the decant structure passed the 100-yr, 24-hr storm event (77 cfs) as calculated by the Division (R.S. 11-15-85) with 1.5 ft of available free board (elevation of top pond is 8582.75 ft.).

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Memo to File  
ACT/007/005  
July 8, 1987

RECOMMENDATIONS:

This modification to the decant system should be approved after the following conditions are met.

- 1) A complete and adequate Stage Discharge Curve is resubmitted to the Division within 90 days. This report should include the calculations of weir flow and pipe flow. The graphical relationship between Stage and Discharge should be submitted showing both the 10yr - 24hr and the 100yr - 24hr storm events being conveyed by the decant devise. The data showing the elevations of the decant system should checked and corrected. Furthermore, the peak flows for the 100-yr, 24-hr storm event should be referenced
- 2) Map 3.21-2 needs a corrected water elevation for the 100-yr, 24-hr storm after recalculating the Stage - Discharge Curve. Map 3.21-2a needs the elevation of the junction between the riser and the 24 inch culvert. Finally, Map 3.21-2b needs the elevation of the principle spillway shown on it. These corrections should be completed and returned with the resubmitted Stage - Discharge Curves required in Condition Number 1.

cc: W. Hedberg  
S. Linner  
R. Summers  
1239R-20

Project: Skyline Sediment Pond - Stage Discharge  
 Date: 7-6-87  
 Reviewer: Kw

Weir Flow  
 $Q = Cb(H)^{1.5}$

where  $C = 3.27 + 0.4 H/W$   $W =$  height of structure  
 $H =$  head  
 $b =$  circumference  $= 2\pi r = 12.57 \text{ ft}$

Stage (ft)	Q (cfs)	C
0.00		C=0
0.25	5.1	C=3.28
0.50	14.62	C=3.29
0.75	26.9	C=3.30
1.00	41.5	C=3.30
1.25	58.14	C=3.31
1.50	76.7	C=3.32
1.75	96.9	C=3.33

Orifice Flow  
 $Q = C' a \sqrt{2gH}$

$C' = 0.6$   
 $a = \pi r^2 = 12.57 \text{ ft}^2$   
 $q = 32.2 \text{ ft/s}$

$= 60.52 \sqrt{H}$

stage (ft)	Q (cfs)
0.50	42.8
0.75	52.91
1.00	60.52
1.25	67.7
1.50	74.12
1.75	80.1
2.00	85.6
2.25	90.8
2.50	95.7
2.75	100.3

Maximum water elevation during 100 yr - 24 hr storm event 8581.2 ft

available freeboard 1.5 ft

∴ design modification should be approved after conditions are met.

Pipe Flow - unnecessary

$Q = \frac{a \sqrt{2gH'}}{\sqrt{1 + K_e + K_b + K_c L}}$   
 $= 69.300 \sqrt{H'}$

where

$a = 12.57$   
 $g = 32.2$   
 $K_e = 1$   
 $K_b = 0.5$   
 $K_c = 0.0182$   
 $L = 34$   
 $H' = H + (\text{inlet} - \text{outlet}) = 0.6D$   
 $H' = 11.2 + H$

stage (ft) | Q (cfs) greater than 100 yr - 24 hr storm event

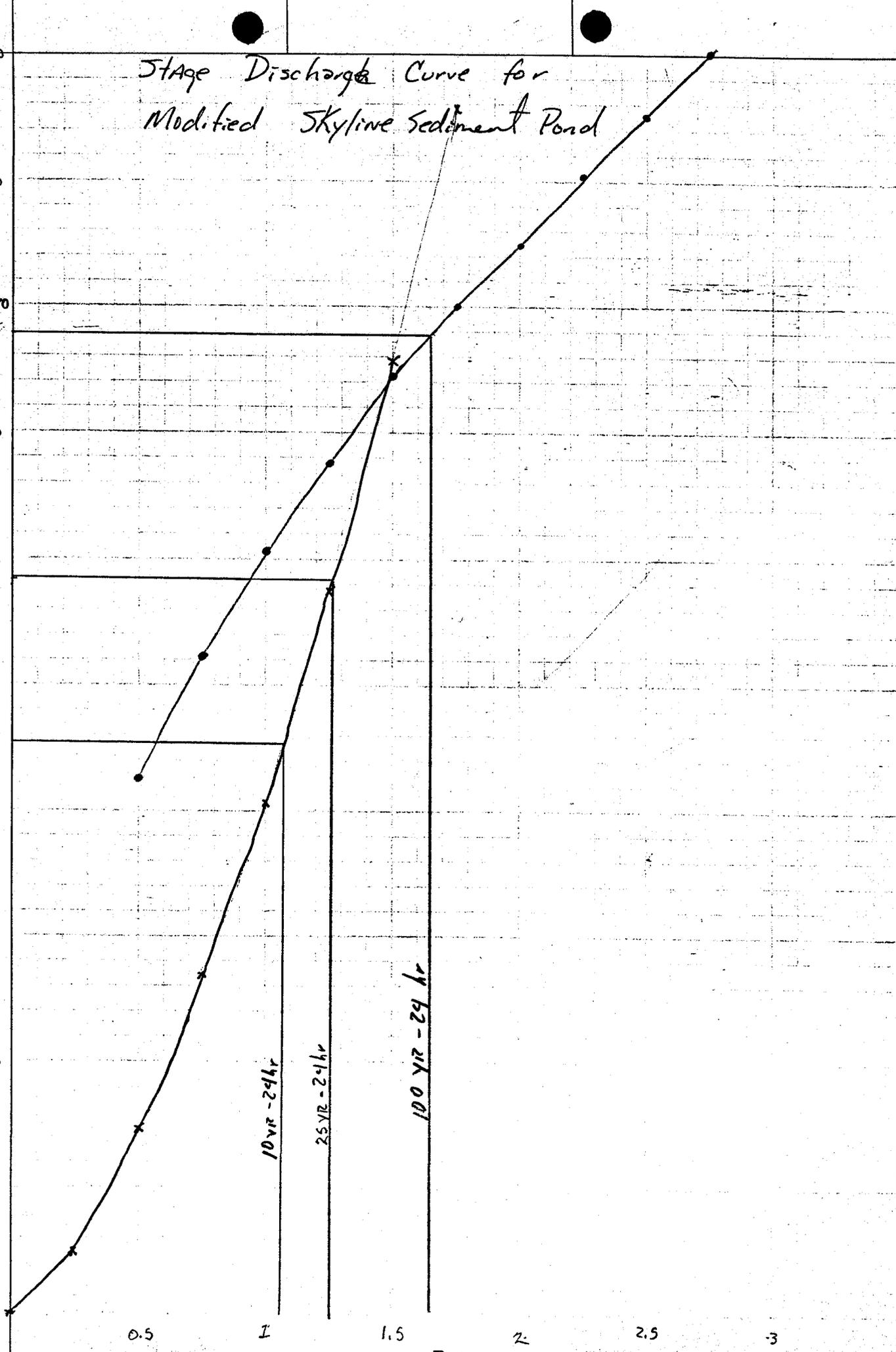


# Stage Discharge Curve for Modified Skyline Sediment Pond

42,381 50 SHEETS SQUARE  
42,382 100 SHEETS SQUARE  
42,389 200 SHEETS SQUARE  
MADE U.S.A.  
NATIONAL

Discharge  
cfs

10  
20  
30  
40  
50  
60  
70  
80  
90  
100



STAGE