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**SHARONSTEEL • Mining Division**

SHARON STEEL CORPORATION

File ACT/007/011  
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October 28, 1981

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DIVISION OF  
OIL, GAS & MINING

State of Utah  
 Department of Natural Resources  
 Division of Oil, Gas & Mining  
 1788 West North Temple Street  
 Salt Lake City, Utah 84116

Attention: Mr. Wayne Hedberg, Hydrologist

Re: King VI Mine ACT/007/011  
 Stipulation 7-81-14  
 Ref. Vaughan Hansen & Associates 8/78  
 Rollins, Brown & Gunnell 5/79

Gentlemen:

Since my visit with you and Lee Spencer on October 15th, I have examined the reports sent to your office from both Vaughn Hansen Associates and Rollins, Brown and Gunnell, Inc.

By computation, the Vaughan Hansen Associates Report (VHA) arrives at a storage volume of 6.98 acre feet in the sedimentation pond, whereas, the Rollins, Brown and Gunnell, Inc. Report (RB&G) arrives at a sedimentation pond size of 3.75 acre feet. Our discussion on October 15 centered around the possibility that the VHA report took into consideration the whole watershed west and north of the South Fork yard while the RB&G report must have taken into consideration some diversion ditching which United States Fuel Company has not provided. In reviewing the maps provided with the VHA report, it seemed that a diversion ditch west of the bath house, discharging into the South Fork stream south of the South Fork yard would be appropriate. Secondly a diversion ditch north of the shops building discharging onto the hillside east of the shops building yard might also bear consideration since the disparity of (6.95-3.75) 3.23 acre feet in the sedimentation pond didn't seem to lend itself to any other solution. You will recall, that none of us liked what seemed to be the result of our discussion, since (1) the 3.75 acre feet pond had been approved by DOGM and is in fact in place in South Fork Canyon and (2) United States Fuel Company wouldn't be too happy having to put in any diversion ditches due to an "after the fact" sort of discussion.

The bases for my comparing the two reports were (1) to see if the watershed considered was the same, (2) to see if the event used for computation was the same and (3) to see the effect of the revised regulation requiring 0.1 acre feet per acre of disturbed area for sedimentation storage. What I found was a variance in the curve numbers CN used for the computation. Premises (1) and (2) above did, in fact, remain the same but the curve number used for computation in the VHA report was 80 and that of the RB&G report was 72. The CN affects the watershed storage factor in the computation  $S = (1000 \div CN) - 10$  which result is used in the calculation of the run-off volume:

$$Q = (P - 0.2S)^2 \div (P + 0.8S)$$

The change in the CN used from 80 to 72 resulted in a run-off volume reduction of almost 50% - 0.72" to 0.394".

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Both reports used as reference a CN of 90 for disturbed area and 70 for the natural watershed. The difference comes from the fact that the VHA report was based on curve numbers derived from "personal hydrologic judgement following field observations." The RB&G report used "weighted" curve numbers computed as shown in Table 1. Because of the overwhelming amount of natural watershed acres (83.4) to disturbed acres (7.6) the resultant CN was much lower than that made by judgement.

In summary then, the 3.75 acre feet sedimentation pond is calculated to hold all of the run-off from the whole watershed (91 acres) resulting from a 10-year 24-hour storm. This report has been approved by the DOGM and the pond as well as the drainage system have been built on that basis. With that in mind and with overflow barricades constructed in the South Fork yard area to prevent contamination of the South Fork Canyon stream, it would appear that diversion ditches are not required to be installed by United States Fuel Company.

I am adding a calculation to point out the difference in sedimentation pond storage volume as a summary of this letter.

VHA Report Calculation

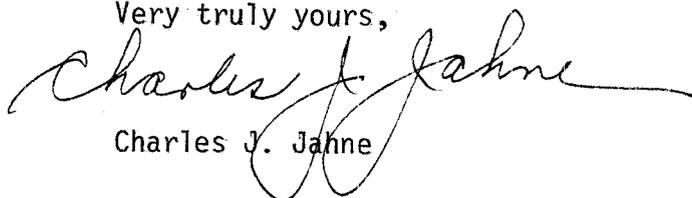
CN for Area = 80  
 S = 2.5 Area = 91 Acres  
 P = 2.25 (10 Yr. 24 Hr. Event)  
 $Q = (2.25 - 0.2 \times 2.5)^2 \div (2.25 + 0.8 \times 2.5) = 0.720"$   
 $V_{Storage} = 91 \times (0.720 \div 12) = \dots \dots \dots 5.46 \text{ A.F.}$   
 $V_{Sed.} = 0.2 \times 7.6 \dots \dots \dots 1.52 \text{ A.F.}$   
 Total Volume = 6.98 A.F.

RB&G Report Calculation

CN for Dist. Area = 90  
 CN for Natural Watershed = 70  
 $CN \text{ for Area} = [(90 \times 7.6) + (70 \times 83.4)] \div 91 = 72$   
 S = 3.95 Total Area = 91 Acres  
 $Q = (2.25 - 0.2 \times 3.95)^2 \div (2.25 + 0.8 \times 3.95) = 0.394"$   
 $V_{Storage} = 91 \times (0.394 \div 12) = \dots \dots \dots 2.99 \text{ A.F.}$   
 $V_{Sed.} = \dots \dots \dots 0.76 \text{ A.F.}$   
 Total Volume = 3.75 A.F.

If you have any questions on this, please call me.

Very truly yours,

  
 Charles J. Jahne

CJJ:jrs