State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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September 29, 1989

TO: Richard V. Smith, Permit Supervisor

FROM: Tom Munson, Reclamation Hydrologist

RE: **Review of Ditch Calculations Comparison, Cyprus-Plateau Mining Company Starpoint Mine, ACT/007/006, Folder #2, Carbon County, Utah**

Synopsis

Cyprus-Plateau Mining Company submitted a table comparing peak flows used by the Division versus peak flows generated by Hansen, Allen and Luce for the Coal Refuse Pile Ditches. This memo discusses this table and the validity of the numbers.

Analysis

The operator used all the wrong numbers for peak flows as shown in their peak flow comparison table (see attached Table 2) versus the Division's Table One (copy attached). It should be noted that at the time of the analysis, a rainfall value of 2.2 inches for the 100 year, 6 hour storm was used, versus a 2.0 inches for Hansen's calculations.

If one references the attached computer sheets, one can see how the difference in rainfall can generate the difference in peak flows. All rainfall data is taken from the NOAA rainfall atlas and is interpreted from nomographs.

Recommendation

In the future, Cyprus-Plateau Mining Company should use correct numbers when making comparisons and qualify the input parameters to prevent incorrect assertions about the quality of Division analysis.

djh
Enclosures
cc: L. P. Braxton, DOGM
AT46/27

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TABLE I

Plateau Mining Ditch Field Data

DITCH NUMBER	SLOPE FT./FT.	DITCH DEPTH FT.	BOTTOM WIDTH FT.	SIDESLOPE RIGHT BANK FT./FT.	SIDESLOPE LEFT BANK FT./FT.	AVERAGE SIDESLOPE FT./FT.	MANNING'S n	CURVE NUMBER	PEAK FLOW cfs (CORRECT #'S)	CALCULATED DEPTH FT.	CALCULATED VELOCITY FT./S (INCORRECT #'S)
6B											
MIN SLOPE	0.02	0.66	0.1	1.6:1	16.5:1	9.1:1	0.032	70	23.08	0.83	3.7
MAX SLOPE	0.07	0.66	0.1	1.8:1	6.3:1	4:1	0.032	70	23.08	0.89	7.1
7E											
MIN SLOPE	0.04		1.9	1:1	3:1	1.5:1	0.032	70	16.43	0.67	5.5
MAX SLOPE	0.06	5.0	2.3	1:2	0.5:1	0.75:1	0.032	70	16.43	0.68	6.1
16A											
MIN SLOPE											
MAX SLOPE							0.032	70			
16B											
MIN SLOPE											
MAX SLOPE	0.12	2.0	0.1	1.8:1	6.25:1	4:1	0.032	70	2.2	0.33	4.8
16D											
MIN SLOPE											
MAX SLOPE							0.032	70			
16E											
MIN SLOPE											
MAX SLOPE	0.12						0.032	70			
16F											
MIN SLOPE											
MAX SLOPE							0.032	70			
8											
MIN SLOPE	0.08										
MAX SLOPE	0.12	2.6	0.1	9:1	1.5:1	5.25:1	0.032	70	1.97	0.29	4.4
76											
MIN SLOPE								75	3.90	0.34	5.0
MAX SLOPE	0.12	2.6	0.1	11.7:1	0.75:1	6.2:1	0.032	70	2.29	0.28	4.4
33											
MIN SLOPE								75	0.27	0.11	1.9
MAX SLOPE	0.06	0.6	0.6	12.1:1	1.2:1	6.7:1	0.032	70	0.17	0.09	1.7
32											
MIN SLOPE								75	0.31	0.12	2.9
MAX SLOPE	0.1	0.6	0.6	4.4:1	0.67:1	2.5:1	0.032	70	0.19	0.09	2.5

TABLE 2

DITCH	PEAK FLOW cfs MUNSON'S		PEAK FLOW cfs HANSEN'S	DIFFERENCE	% DIFFERENCE
	SEE COMPUTER SHEETS				
6B Now 6C	23.08		16.8	6.28	37.4
	WE USED 2.2" OF RAINFALL		THEY USED 2.0" OF RAINFALL		
7E Now 7G	WRONG COLUMN ON DIVISION TABLE	CORRECT PEAK FLOW #'S			
MIN SLOPE	5.5	16.43	1.83	3.67	200.6
MAX SLOPE	6.1		1.83	4.27	233.3
16A	–				
16B	4.8	* 2.2	*1 1.38	3.42	~~247.8~~ 55%
16D	–				
16E	–				
16F	–				
8	4.4	1.97	1.23	3.17	~~257.7~~ 60%
32 MIN	2.9	.31	0.12	2.78	~~2316.7~~ 158%
MAX	2.5	.19	0.12	2.38	~~1983.3~~ 35%
33 MIN	1.9	.27	0.20	1.70	~~850.0~~ 35%
MAX	1.7	.17	0.20	1.50	~~750.0~~ 15%
76 MIN	5.0	3.8	0.35	4.65	~~1328.6~~ 986%
MAX	4.4	2.3	0.35	4.05	~~1157.1~~ 557%

*1 INCLUDES ALL FLOW FROM 16A – 16F

* " "

9/12/89

INPUT SUMMARY
FOR W.S.: 63

STORM:	WATERSHED:	
DISTRIBUTION = SCS TYPE 'B'	LAND SLOPE =	0.0000 %
	CURVE NUMBER =	75.00
RAINFALL DEPTH = 2.20 IN	CHANNEL LENGTH =	0.00 FT
	TIME OF CONC. =	.3901 HR
STORM DURATION = 6.00 HR	WATERSHED AREA =	85.30 AC
NUMBER OF LINES = 131	TIME INCREMENT =	.0520 HR

OUTPUT SUMMARY

RUNOFF DEPTH =	.4831 IN		
INITIAL ABSTRACTION =	.6666 IN		
PEAK FLOW =	23.08	CFS	(.2684 IPH)
AT TIME =	2.75	HRS	

MUNSON

Data Documents SS-338-1478-11

INPUT SUMMARY
FOR W.S.: 63

STORM:		WATERSHED:		
DISTRIBUTION = SCS TYPE 'B'		LAND SLOPE	=	0.0000 %
RAINFALL DEPTH =	2.00 IN	CURVE NUMBER	=	75.00
		CHANNEL LENGTH	=	0.00 FT
		TIME OF CONC.	=	.3901 HR
STORM DURATION =	6.00 HR	WATERSHED AREA	=	85.30 AC
NUMBER OF LINES =	131	TIME INCREMENT	=	.0520 HR

OUTPUT SUMMARY

RUNOFF DEPTH =	.3809 IN		
INITIAL ABSTRACTION =	.5666 IN		
PEAK FLOW =	16.80	CFS	(.1954 IPH)
AT TIME =	2.75	HRS	

HANSEN

Data Documents SS-338-1478-11