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JIM
SEP 26 1984

EMERY MINING CORPORATION
A SAVAGE BROTHERS COMPANY

September 21, 1984

Mr. Jim Smith
Division of Oil, Gas & Mining
Natural Resources & Energy
State of Utah
4241 State Office Building
Salt Lake City, Utah 84114

Dear Mr. Smith:

REGARDING: NOV 84-7-10-1 Abatement Plans

Transmitted herewith are abatement measures as required to abate this violation. These plans also constitute a minor modification to the surface drainage system.

AREA #1

This area constitutes approximately 0.124 acres associated with the truck load out facility. To provide more positive control and treatment of the runoff from this area a concrete drop inlet and culvert will be installed down the haul road approximately 180'. This drainage structure will divert all drainage accumulation at this point into the north sediment pond for treatment. (See hydrologic section for analysis and design.)

AREA #2

This area constitutes the coal truck loop road west of the sediment ponds and that portion of the access road below area #1. This area consists mainly of asphalt paved roadways and associated bar ditches along the dirt berms surrounding the sediment ponds. The major source of sediments (that are of concern to the inspector) result from erosion of these berms and bar ditches. Therefore, to eliminate this source our proposal is to construct asphalt ditches

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and curbs on both sides of the ponds adjacent to the dirt berms. The area where they join, at the "Y", will also be paved. The existing drop inlet and culvert will be repaired and used as is presently done to transfer water from the "Y" area to the west bar ditch. (See hydrologic section for analysis and design).

Should you require further information contact myself or Tom Faucheux.

Sincerely,

Larry J. Guymon

Larry J. Guymon, P.E.
Construction Manager

cc: Bill Zeller
Jim Hamlin
Morgan Moon
Carl Pollastro
Tom Faucheux
Chris Shingleton

HYDROLOGIC ANALYSIS FOR TRUCK LOAD OUT AREA AT WILBERG MINE

This analysis covers two areas adjacent to the truck load out facility at the Wilberg Mine. Area one consists of the paved area immediately below the truck load out structure which drains down the access road. This area is considered affected and runoff from this area will be diverted into the sediment pond for treatment. Area two consists of the main access road below the diversion just described and the coal truck loop road west of the sediment ponds down to the convergence of these two roads. This area is not affected and this runoff will be routed to the drainage ditch along the main road below the mine.

The method used to calculate the runoff volumes will be the Rational method, which use is justified by the small size of each area and the fact that both are paved, making the selection of the runoff coefficient easy. The Rational formula is:

$$Q = C\ i\ A$$

Where Q = flow rate, acre inches per hour (or cubic feet per second)

C = Runoff coefficient, dimensionless

i = intensity of rainfall, inches per hour, for a rainfall event with duration equal to the time of concentration, t_c, of the watershed.

A = area of watershed, acres.

Because both areas are paved the runoff coefficient value is 1.0. The watershed areas are 0.124 and 0.667 acres for Areas one and two, respectively.

The rainfall intensity values must be interpolated from data gathered from outside sources. The time of concentration for each area is determined by calculating the time required for water to flow from the most distant point of the area to the outlet. The velocity of flow is taken from Figure 2.34 of Applied Hydrology and Sedimentology for Disturbed Areas, Oklahoma Technical Press, 1981. For sheet flow over paved areas the velocity for area one with an average slope of 5% is 4.5 feet per second, area two slope is 12.5% and the velocity is 7 feet per second. The time of concentration equals the travel distance divided by the velocity. The lengths are 180 feet and 660 feet, giving to values of 40 and 94 seconds for areas one and two respectively.

The recurrance interval for design is 10 years. The determination of the intensity for the 10 year rainfall event comes from the Precipitation - Frequency Atlas of the Western United States, Volume VI - Utah, National Oceanic and Atmospheric Administration, 1973, Pages 15 and 16.

The following table gives the rainfall values for the Wilberg Mine site:

FREQUENCY	DURATION	RAINFALL INCHES	METHOD OF DETERMINATION
2 Yr	6 Hr	1.0	Fig 19
2 Yr	24 Hr	1.4	Fig 25
100 Yr	6 Hr	2.2	Fig 24
100 Yr	24 Hr	3.4	Fig 30
2 Yr	1 Hr	.66	Table 11
100 Yr	1 Hr	1.57	Table 11
10 Yr	1 Hr	1.05	Figure 6
10 Yr	5 Min	.305	Table 12
10 Yr	10 Min	.473	Table 12
10 Yr	15 Min	.599	Table 12
10 Yr	30 Min	.830	Table 12

The intensity values for the short duration rainfall events needed for areas one and two are determined by curve fitting techniques and the relationship between duration and rainfall:

$$Y = AX^B$$

$$\text{or } \log Y = \log A + B \log X$$

where Y = rainfall, inches

X = duration, minutes

A, B = constants

Using the method of least squares for the 5, 10, 15 and 30 minute data points, the values for the constants are found to be 0.128 and 0.558 for A and B, respectively.

The intensities for the two areas in question are given by the following equation:

$$\text{Intensity} = 0.128\ (tc)^{0.558} \times \frac{60}{TC}$$

and tabulated as follows:

	tc minutes	Intensity Inches/Hour
Area 1	.667	9.18
Area 2	1.57	6.29

Using this data in the rational formula gives the following table:

Area	Intensity	Surface Area	Flow
1	9.18 in/hr	.124 acres	1.14 cfs
2	6.29 in/hr	.667 acres	4.19 cfs

The minimum slope of the culvert is 2% so the minimum diameter can be determined with the Manning Equation:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Solving for Diameter:

$$D = \left(\frac{n \quad Q}{.4644 \sqrt{S}} \right)^{.3750}$$

The = minimum diameters are 7 and 12 inches for areas one and two respectively.