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Diamond Shamrock
Coal Company

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JUL 10 1985

DIVISION OF OIL
GAS & MINING

July 8, 1985

Ms. Sandy Priut
355 West North Temple
3 Triad Center
Suite 350
Salt Lake City, Utah 84180

Dear Sandy;

Enclosed is a copy of a slope stability analysis report showing the safety factor of a recent slope change at the Trail Mountain Mine site.

Sincerely;

TRAIL MOUNTAIN COAL COMPANY

Allen P. Childs
Engineer

Trail Mountain Coal Company A Subsidiary of Diamond Shamrock
P.O. Box 370, Orangeville, Utah 84537-0370 Phone: 801 748-2140

137 West 2260 South, Salt Lake City, Utah 84115 Telephone (801) 487-7754

Delta
GEOTECHNICAL CONSULTANTS INC.

RECEIVED
JUL 10 1985
DIVISION OF OIL
GAS & MINING

July 5, 1985

Diamond Shamrock
Trail Mountain Coal Co.
P.O. Box 370
Orangeville, Utah 84537-0370

Attention: Mr. Allen Childs

Subject: Slope Stability Analysis
Fill Slope at Stations 9+00 to 11+00
Trail Mountain Coal Co.
Orangeville, Utah

Delta Job No. 1646

Gentlemen:

Presented in this report are the results of our stability analysis of the fill slope area between approximate stations 9+00 to 11+00 at the tipple area of the Trail Mountain Coal Mine.

SCOPE OF WORK

A slope stability analysis was conducted of a representative cross section of the fill area between approximate stations 9+00 to 11+00. The cross section was prepared by the client and was presented as being representative of the above fill slope area. Recent photos of the fill area were also provided by the client. Our selection of rock and soil parameters utilized in the analysis and site characteristics are based on published data and on previous field investigations of the site. A stability analysis of a fill slope at this site was conducted under a previous report (R & M No. 361080, drawing 3-A). However, the fill material type and slope geometry differ appreciably from the initial analysis and a reevaluation of the slope stability was required.

EXISTING SITE CONDITIONS

The site consists of a 35 to 40-foot high fill comprised of compacted gravel to block-sized rock derived from the Starpoint sandstone. The fill slope surface slopes at 35 degrees and is approximately equivalent to the steep natural slopes in the area. A 12 to 15-foot wide, 6 to 8-foot high berm is located along the toe of the slope. The berm is comprised of 6 to 8-foot diameter blocks of rock derived from the Starpoint sandstone. The Starpoint sandstone, a massive to thick-bedded sandstone, comprises the base and back slope of the fill area. The original and existing slope geometries are shown on the attached Figure A-1. The Starpoint sandstone dips three to four degrees into the hillside at the site area. The fill slope is well drained due to its granular nature.

ANALYSIS

The analysis was performed using the Swedish circle method of slices. This method ignores inter-slice strength contributions and is thus conservative. The two most likely failure surfaces, based on the site geometry and the soil-rock parameters, are shown on Figure A-1.

A factor of safety of 1.54 was determined for the drained, static condition for the failure surface undercutting the berm (failure surface "A").

A factor of safety of 1.31 was determined for the drained, static condition for the failure surface intersecting the slope just above the berm (failure surface "B").

Soil-rock strength parameters and calculations for the analysis are attached.

We have been pleased to provide this service to you. Please contact us if there are any questions on the above or if we may be of further service.

Very truly yours,

DELTA GEOTECHNICAL CONSULTANTS, INC.

LaMONTE G. SORENSON
Principal Engineering Geologist

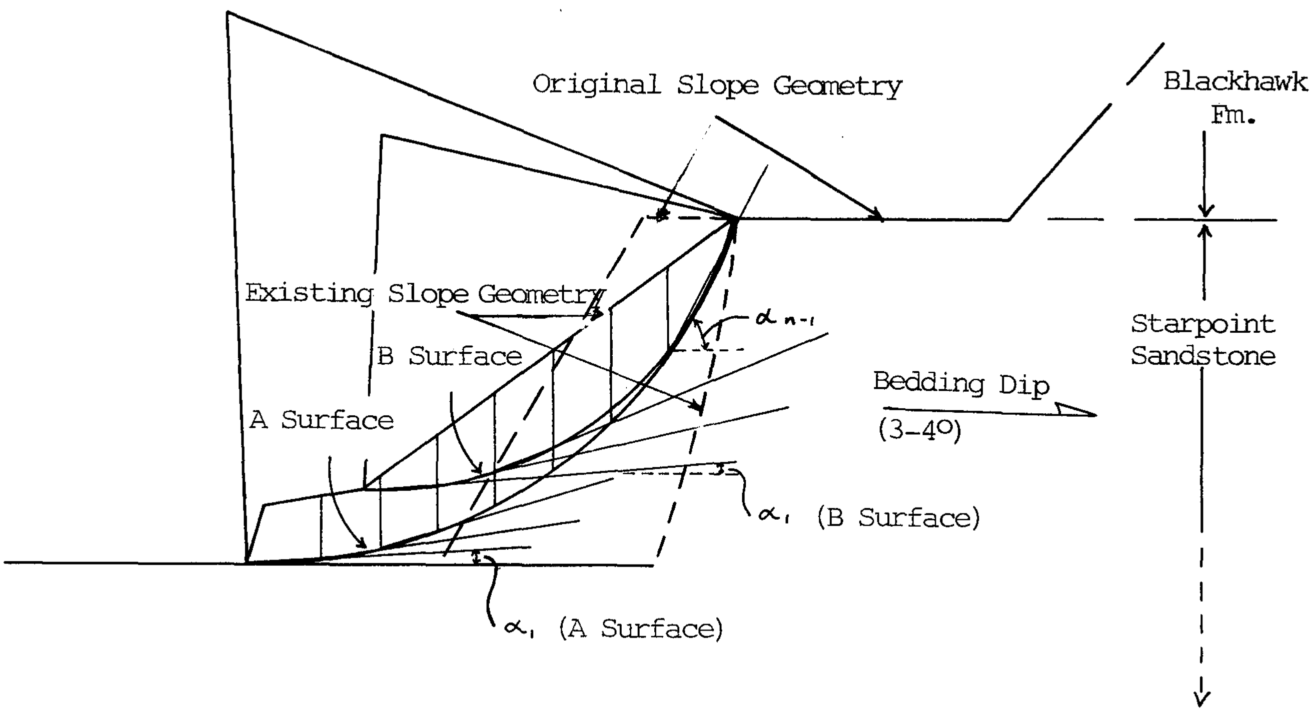
Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
No 7010
ANTHONY R. PAWLOSKI
State of Utah

ANTHONY R. PAWLOSKI, P.E.
Principal Engineer

LGS/amh

Delta



SCALE: 1"=20'

JOB NO. 1646

FIGURE A-1

SOIL-ROCK PARAMETERS UTILIZED

	γ	Ø	c
Starpoint Ss.	160	45	10,000
Fill (Derived from Starpoint Ss)	120	40	0

γ = Unit Weight of Material (pcf)

Ø = Angle of Internal Friction (degrees)

c = Cohesion (psf)

COMPUTATIONS

"A" Failure Surface

Slice No.	α	W	T	N	R
(1)	4	4320	301	4309	3616
(2)	10	4320	750	4254	3570
(3)	20	5400	938	5074	4258
(4)	27	6430	2942	6197	5200
(5)	31	7200	3708	6172	5179
(6)	39	7200	4531	5595	4695
(7)	48	6480	4815	4336	3638
(8)	62	2520	2225	1183	992
				20210	31148

$$FS = \frac{31148}{20210} = 1.54$$

"B" Failure Surface

Slice No.	α	W	T	N	R
(1)	-1	240	-4.2	240	2001
(2)	5	2880	251	2870	2408
(3)	13	5760	1296	5612	4709
(4)	20	6430	2216	2082	1747
(5)	32	7200	3815	6106	5123
(6)	46	6480	4661	4501	3777
(7)	62	2520	2225	1183	993
			14460		18958

$$FS = \frac{18950}{14460} = 1.31$$

α = Angle of Base of Slice from Horizontal (degrees)
W = Weight of Slice (pcf)
T = W (sin α) = Total Driving Force
N = W (cos α) = Component of W Normal to Slice
R = N tan Ø = Total Resisting Force
F = Factor of Safety Against Failure = R/T