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**BEAVER CREEK Coal Company**

Post Office Box 1378  
Price, Utah 84501  
Telephone 801 637-5050



November 29, 1988

Mr. Lowell Braxton  
Administrator  
Utah Division of Oil, Gas & Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

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DIVISION OF  
OIL, GAS & MINING

RE: Compliance with Stipulation No.1  
Mid-Term Permit Review  
Gordon Creek No.2 and 7 Mines  
ACT/007/016, Folder #3  
Carbon County, Utah

Dear Mr. Braxton:

Enclosed are 3 copies of the slope stability calculations and soil analysis for the Sweet's Canyon Pond embankment. This information is submitted to satisfy the Mid-Term Permit Review Stipulation-No.1 of October 6, 1988.

The information is submitted as Appendix 10, and should be inserted into the Appendices section of the P.A.P.

If you have any questions, or need any further information, please let me know.

Respectfully,

Dan W. Guy  
Manager Permitting/Compliance

cc: Johnny Coffey  
File

DWG/cr  
IBM MIKE

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Mining and Reclamation Plan  
Gordon Creek No. 2 and No. 7 Mines

APPENDIX 10

SWEET'S CANYON POND

SLOPE STABILITY ANALYSIS

11/30/88

SWEETS CANYON POND

SLOPE STABILITY ANALYSIS

As indicated in Section 7.2.8.1.2, the Sweet's Canyon Pond is a permanent structure. The maximum slope on the pond is a 1.5H:IV; therefore, a stability analysis has been performed on the steepest slope to ensure the long-term integrity of the pond.

The stability analysis is based on pond embankment soil tests, which include sieve analysis, moisture-density relationship (Proctor), direct shear, and in-place densities. The soil analysis also provide values for cohesion and the friction angle for this particular embankment. All soil testing data are provided in this appendix.

The stability analysis was calculated using the Hoek Method. The following parameters were used for the analysis :

Embankment Height- 25'

Slope Angle (1.5H:IV) - 33.69°

Soil Cohesion - 3.96 psi

Friction Angle - 37.8°

Bulk Density - 108.6 pcf

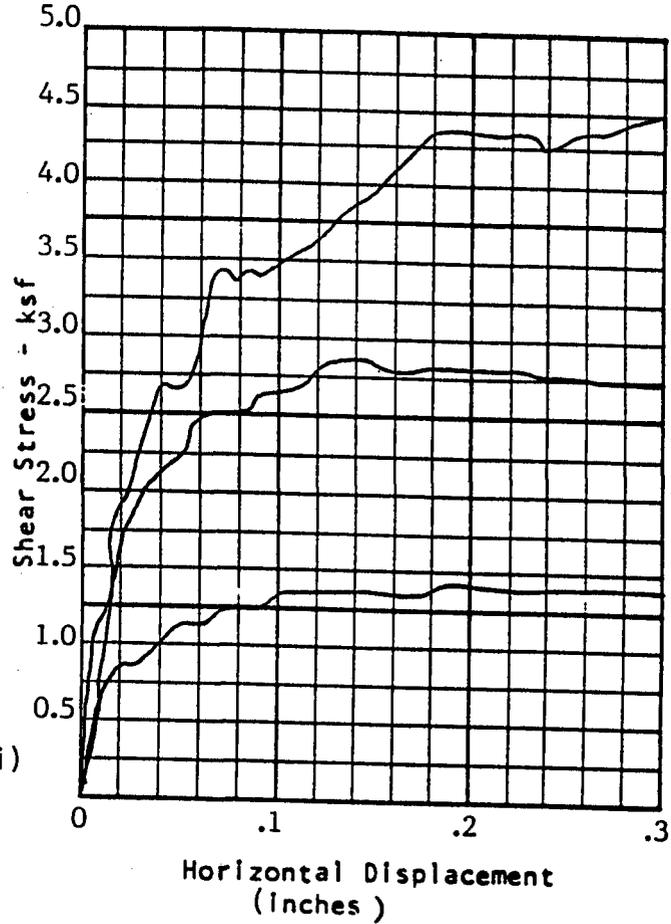
When these parameters are applied to the equations and circular failure charts in Figures 3-1a and 3-1b (pages 3-12 and 3-13, respectively) of Chapter 3 of this M.R.P., a safety factor of 3.12 is found for dry conditions, and 2.35 for saturated conditions.

Based on the above cauculations, and actual soil analysis, the pond embankment is considered stable, even under saturated conditions.

# CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers

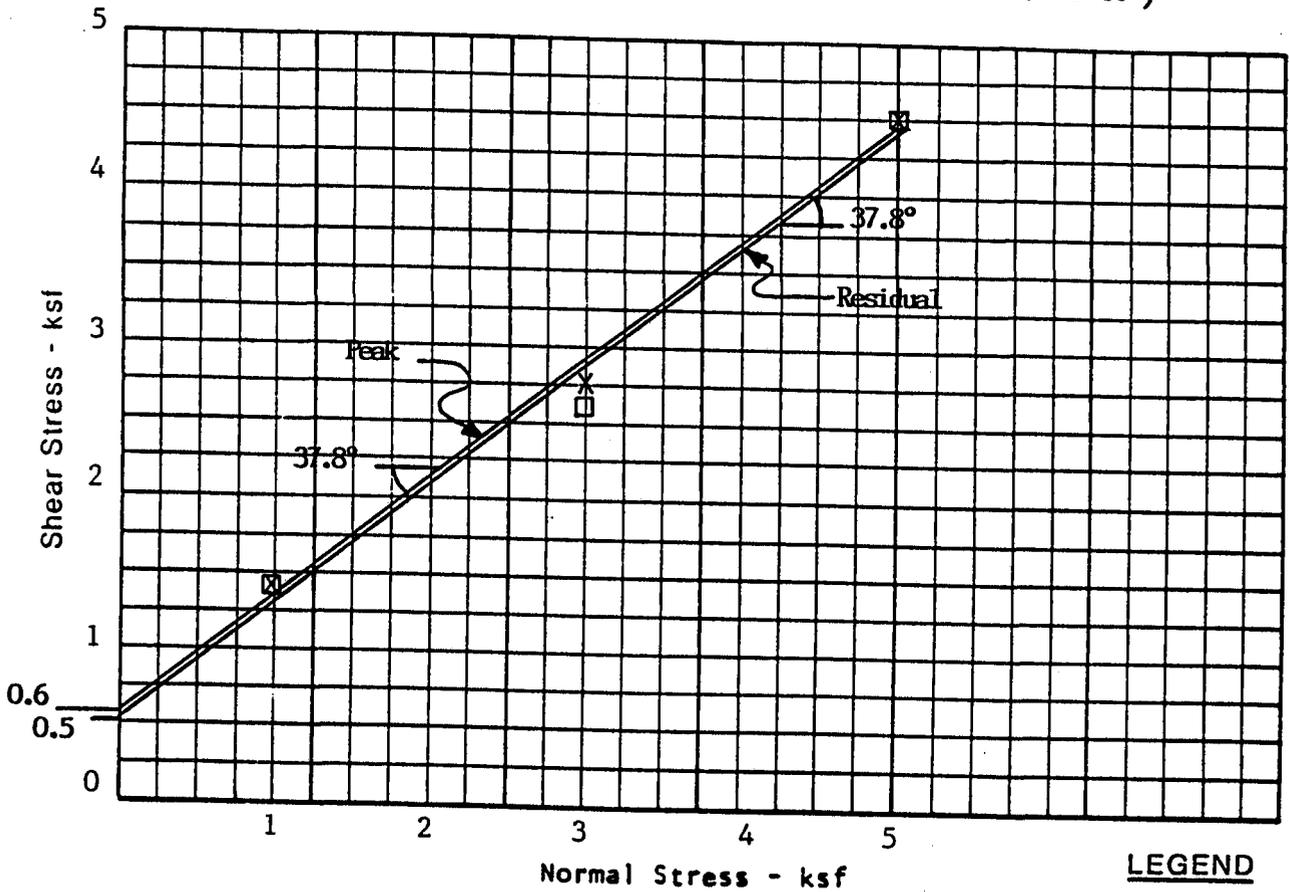
TEST NUMBER	1	2	3	4
LOCATION	1- 6/15/88	1- 6/15/88	1- 6/15/88	
HEIGHT-INCH	0.50	0.50	0.75	
DIAMETER-INCH	1.93	1.93	1.93	
WATER CONTENT - %	15.0	15.0	15.0	
DRY DENSITY - pcf	108.6	108.6	108.6	
CONSOL. LOAD - ksf	1.0	3.0	5.0	
NORMAL LOAD - ksf	1.0	3.0	5.0	
SHEAR STRESS - ksf	1.4	2.8	4.5	Peak Residual



TYPE OF SPECIMEN Remolded at 95% Proctor

SOIL DESCRIPTION Slightly Sandy Clay  
Cohesion = 0.57 KSF (3.96 psi)

TYPE OF TEST Consolidated Undrained

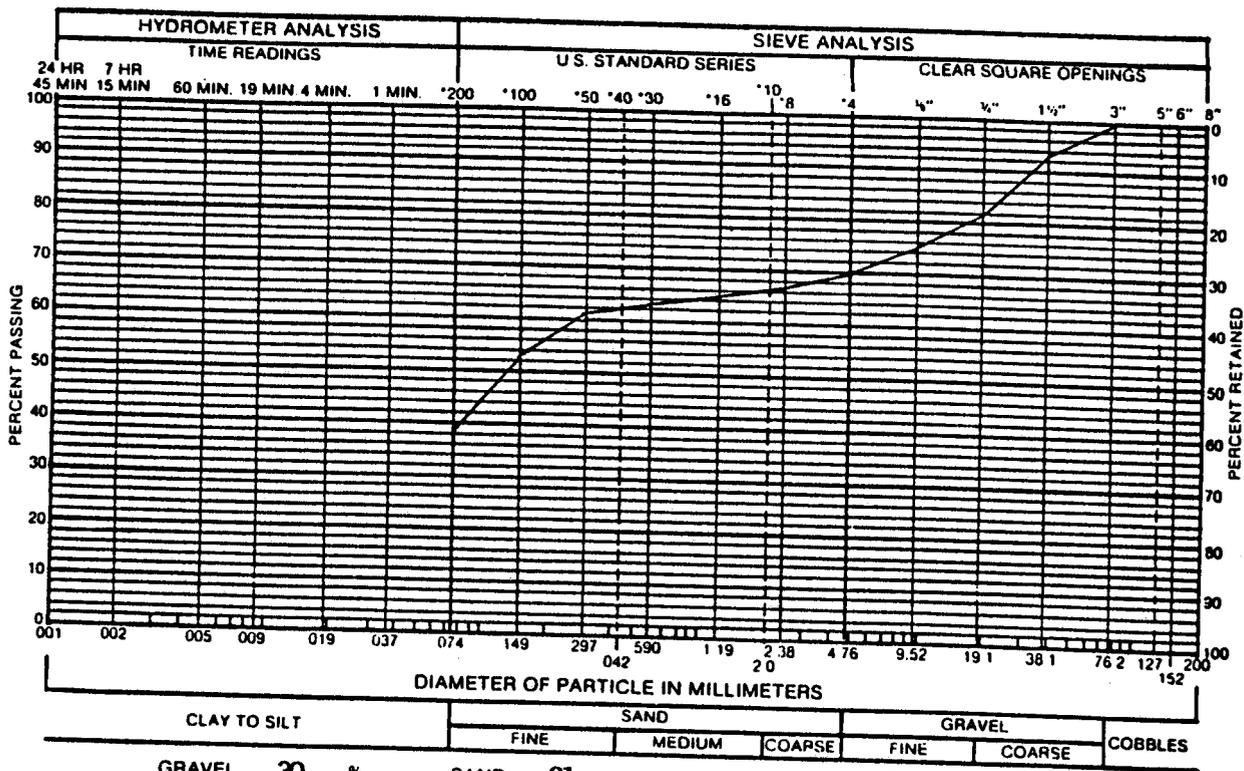


DIRECT SHEAR TEST RESULTS

**LEGEND**

X Peak  
□ Residual

# chen and associates, inc.

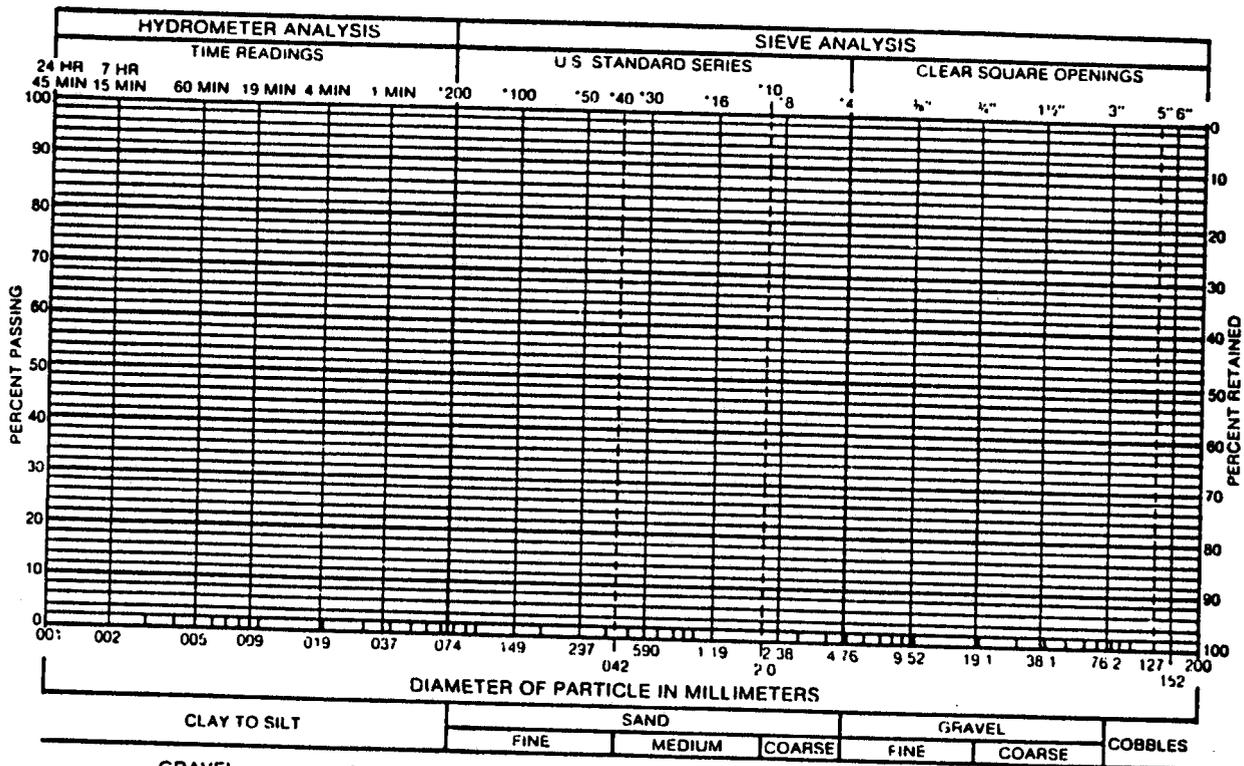


CLAY TO SILT      SAND      GRAVEL      COBBLES

GRAVEL 30 %      SAND 31 %      SILT AND CLAY 39 %

LIQUID LIMIT — %      PLASTICITY INDEX — %

SAMPLE OF **Sandy Clay with Gravel** FROM **Beaver Creek**  
#1-6/15/88



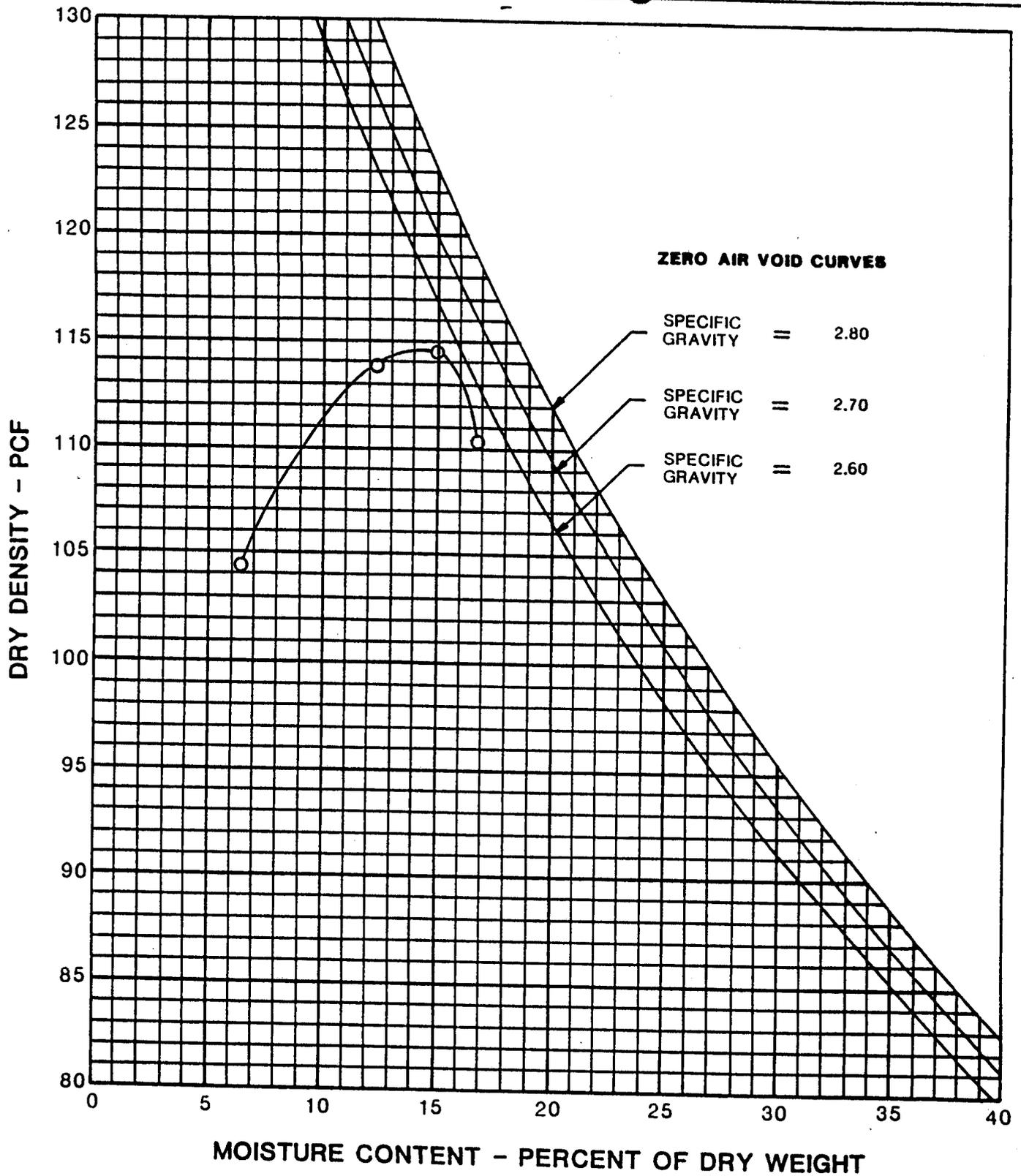
CLAY TO SILT      SAND      GRAVEL      COBBLES

GRAVEL %      SAND %      SILT AND CLAY %

LIQUID LIMIT %      PLASTICITY INDEX %

SAMPLE OF FROM

Job No. 519488



SAMPLE NO : #1-6/15/88		BORING:	DEPTH :	<b>Chen &amp; Associates</b> <b>MOISTURE-DENSITY</b> <b>RELATIONSHIP</b>		
LOCATION : Beaver Creek						
SOIL DESCRIPTION : Sandy Clay with Gravel						
MAX. DRY DENSITY : 114.6 PCF				OPT. MOIST. CONTENT : 14.5 %		PROCEDURE : ASTM D-698 Method D
LIQUID LIMIT :		PLASTICITY INDEX:		JOB NO.: 519488		Figure
GRAVEL : 30 %		SAND : 31 %		SILT AND CLAY (~200): 39 %		



# NUCLEAR RELATIVE COMPACTION TEST DATA

PROJECT *Beaver Creek Coal*  
 JOB NUMBER *Herricks / C-110*  
 DATE *7-7-88*  
 TAKEN BY *Evan G. Nixon EGN*

TEST NUMBER	1	2	3	4	5	6	7	8	9	10
STATION										
OFFSET										
ELEVATION										
MOD & DEPTH	8"	8"	8"							
DENSITY COUNT	2670	2190	2474							
DENSITY COUNT RATIO										
WET DENSITY PCF	102.7	109.9	105.6							
AIR-GAP COUNT										
AIR-GAP RATIO										
AIR-GAP DENSITY										
MOISTURE COUNT	133	179	129							
MOISTURE COUNT RATIO										
MOISTURE PCF										
DRY DENSITY	92.2	95.2	95.5							
% MOISTURE	11.4%	15.4%	10.6%							
MAX. OBTAINABLE DENSITY										
OPTIMUM MOISTURE										
% RELATIVE COMPACTION										

STANDARD COUNT	
DENSITY	MOISTURE
2284	614

REMARKS: