0011

Internal
C/015/0015 ✓

From: Priscilla Burton
To: Karl Houskeeper; Steve Christensen; Wayne Western
Date: 2/14/2008 10:58 AM
Subject: Geotechnical Report NOV 10005
Attachments: E_Gefferth 02062008 Geotechnical Report.pdf

CC: Daron Haddock; Grubaugh-Littig, Pam; Mary Ann Wright

On Tuesday, Feb 5, we received a copy of the Geotechnical Report for the coal mine waste at the Emery Mine, the subject of the NOV 10005. The report is included with this email, because Karl was not copied on the original email. After reviewing this geotechnical document, the following is clear to me:

The pile is 25 ft. deep at the eastern end and 10 ft. deep at the western end. Two cores were drilled in the pile and below the pile, down 11 ft (eastern end) and 6 ft (western end) into native material. Samples from "distinct" material or at intervals of 5 ft. were taken. Samples from both cores were composited in one bucket. (Unknown whether native material was sampled and added to composite bucket. If it was, than approximately 30% of the sample would represent native soil.) One subsample of the composite was run by IterMountain Labs, Sheridan.

It is not good science to suggest that one composite sample represents 26,000 cu yds of material that has accumulated over the last 20 years, since the first sampling. For laboratory information to be meaningful, I recommend that the Division request a commitment in the NOV response plan. My suggestion follows:

"In accordance with R645-301-731.311, Consol will core sample the existing waste pile at least one year prior to final reclamation. The core sampling will be conducted on a grid over the surface of the pile with a minimum of 10 cores. A sample from each core will be taken at 5 ft intervals. Each 5 ft. interval will be analyzed for pH, EC, SAR, Acid Base Accounting, Se, B, and texture. The results of the analysis will be reported to the Division promptly and included in the annual report. The final reclamation handling plan may change, based upon the analyses."

What was your opinion?

EXISTING COAL MINE WASTE DISPOSAL SITE, SLOPE STABILITY AND CHEMICAL ANALYSES, EMERY MINE

Prepared for

CONSOLIDATION COAL COMPANY
Emery Mine
Emery, Utah

January 2008

Prepared by

EARTHFAX ENGINEERING, INC.
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WASTE DISPOSAL SITE
SLOPE STABILITY AND CHEMICAL ANALYSES,
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CHAPTER 1

INTRODUCTION

The CONSOL Emery Mine existing coal mine waste disposal site (ECMWDS) is located about 4 miles south of the town of Emery, Utah, and is approximately 0.15 miles northwest of the mine office building (see Figure 1, General Location Map). It has been constructed on a relatively flat area and has been used for several decades. This report presents slope stability and chemical analyses of samples collected from the ECMWDS in November 2007 that show that it conforms to the regulations detailed in Utah Administrative Code R645-301-500.

CHAPTER 2

METHODS

2.1 FIELD METHODS

Soil samples were collected from the ECMWDS on November 26, 2007 using a hollow stem auger drill rig. Two borings were advanced through the ECMWDS and into underlying native materials. Each boring was located near the center of the pile, with one being located in the area where the pile was tallest and another being located where the pile appears to be thinner. The locations of the drillholes are shown on Figure 2. Cuttings were monitored for changes in appearance and were collected from each distinct material encountered and/or for each 5-foot interval of drilling. A composite sample of cuttings from both drillholes was collected in a 5 gallon bucket for chemical analyses. Furthermore, four "undisturbed" samples of the ECMWDS were collected in 2½ inch diameter brass tubes using a modified California split spoon sampler.

2.2 LABORATORY METHODS

2.2.1 Geotechnical Analyses

Soil samples from the ECMWDS were analyzed by Geotechnical Engineering Group, Inc. (GEG) in Grand Junction, Colorado using the following test methods:

- Unified Soil Classification System (USCS) soil classification (ASTM D2487)
- Natural Moisture Content (ASTM D2216)
- Natural Density (ASTM D2937)
- Direct Shear Test Shear Strength (ASTM D3080)
- Standard Proctor Compaction Test (ASTM D698)

Natural density, moisture content, and direct shear strength tests were performed on the brass tube samples in order to determine the in-situ properties of the ECMWDS. Standard Proctor tests were performed on disturbed samples (cuttings) so that the optimum compaction density could be compared to the in-situ density as determined from the brass tube samples. Soil classification was also determined using disturbed samples.

2.2.2 Chemical Analyses

Chemical analyses were performed in order to determine the potential for adverse environmental impacts from the ECMWDS as well as to determine its coal ranking. A composite of the cuttings from both holes was taken to SGS North America, Inc. in Huntington, Utah for proximate and ultimate chemical analyses of the coal ranking of the material as well as to measure concentrations of the following analytes:

- Carbon
- Hydrogen
- Nitrogen
- Oxygen
- Sulfur
- Oxygen
- Ash

Additional tests were performed on the ash to determine the concentrations of the oxidized compounds produced by combustion.

A fraction of the bulk chemical analysis sample was sent to Inter-Mountain Labs in Sheridan, Wyoming to determine the following values:

- pH

- Saturation
- Electrical Conductivity
- Wilt Point
- Calcium
- Magnesium
- Sodium (Available and Exchangeable)
- Sodium Adsorption Ratio (SAR)
- Nitrate
- Boron
- Selenium
- Total Sulfur (Acid-Base and Acid-Base Potential)
- Neutralization Potential.

2.3 SLOPE STABILITY ANALYSIS METHOD

2.3.1 Slope Stability Model Overview

Slope stability was evaluated by applying Bishop's Method of Slices to three cross sections of the ECMWDS. As indicated in Figure 2, one cross section extended along the long axis of the ECMWDS (A-A') and the other two cross sections (B-B' and C-C') extended at two locations along the short axis of the ECMWDS. Slope stability analyses were performed on the steep slopes located at the ends of each cross section, where the ECMWDS contacts the existing ground. Since the southern slope of the ECMWDS along cross section B-B' has a grade of approximately 2%, the slope was considered stable and a stability analysis was not performed at this location. The geometry of the ECMWDS was based on a topographic survey performed in November 2007 by Ware Surveying. The underlying native ground surface was taken from aerial topography recorded in 1975 (VTN, 1976). Physical and mechanical properties of the slope materials were taken from the results of the geotechnical analyses.

2.3.2 Description of Bishop's Method of Slices

Bishop's Method of Slices is a commonly used method to determine slope stability that can be used to calculate a factor of safety (FS) against rotational shear failure based on the ratio of moments causing to those resisting failure. A FS of 1.0 would indicate that the driving and resisting forces are equal, and that failure, if it has not already occurred, is likely. A minimum FS of 1.5 is required for all waste rock pile slopes to meet the requirements of Utah Administrative Rule R645-301-536.110.

Bishop's Method of Slices tests various circular failure planes with radii that are centered at various distances above the slope. The FS is derived by calculating the moments of numerous vertical slices within the failing arc of soil about the center of the circular surface. The method applies strength (friction angle and cohesion) and density data for each soil type. The method also accounts for pore water pressures and the presence of a phreatic surface. A diagram of how Bishop's Method of Slices is applied and a derivation of the limit equilibrium equation used to determine the FS is presented in Attachment C. The computer program STABLE for Windows (M. Z. Associates, 2002) was used to perform the numerous calculations required to find the critical failure surfaces and their respective FS values.

2.3.3 Slope Failure Model Condition

The slopes of the ECMWDS were considered to be most susceptible to slope failure after a precipitation and/or snowmelt event that would increase pore pressures within the soil. Thus, the failure conditions for the slope stability models assume a perched phreatic surface along the top of the ECMWDS, resulting in a fully saturated pile. This condition is extremely conservative, since the ECMWDS consists primarily of granular materials and is adequately sloped to allow moisture to drain away. Given their low permeability, the native materials underlying the ECMWDS were assumed to remain unsaturated during slope failure.

2.3.4 Materials Properties

Material properties required for the slope stability model include the saturated density, the cohesion, and the friction angle of the coal refuse and underlying native materials. The coal refuse was divided into two layers with different mechanical properties, based on the geotechnical analysis results. Material properties for the native materials were conservatively assigned based on engineering judgment. The material properties used in the model are summarized in Section 3.2.

CHAPTER 3
RESULTS

3.1 SUBSURFACE DRILLING RESULTS

Samples and cuttings collected from the two drillholes indicate that the ECMWDS ranges in thickness from approximately 10 feet in the western portion (drillhole TH-2) to approximately 25 feet in the eastern portion (drillhole TH-1). Logs for each of the drillholes are included in Attachment A. Difficult drilling conditions were encountered shortly after the cuttings changed from coal-bearing materials to tan to brown silty sand. Thus, it was interpreted that the native materials located underneath the ECMWDS consist of weathered bedrock with a thin veneer of residual soils.

3.2 GEOTECHNICAL ANALYSES RESULTS

The materials within the ECMWDS have been classified as silty sand and silty clayey sand according to the USCS. In-situ density and Standard Proctor compaction results suggest that the lower portion of the ECMWDS contains denser coal or coal refuse than the upper portion of the ECMWDS. Direct shear test results also show slightly different soil strength parameters at the two depths within the ECMWDS. The laboratory results of the geotechnical analyses are presented in Attachment B and are summarized in Table 1.

An undisturbed sample collected from drillhole TH-1 at 10 feet deep had an in-situ density of 64.8 pounds per cubic foot (pcf) and an undisturbed sample collected from the same drillhole at 20 feet deep had an in-situ density of 80.0 pcf. The calculated saturated densities for the shallow and deep samples were 93.5 pcf and 99.6 pcf, respectively. The dry densities were 61.5 pcf and 80.0 pcf, respectively. The in-situ moisture contents were 5.3% and 8.7%, respectively.

Standard Proctor Tests (ASTM D698) were performed on samples collected from both drillholes at 0-10 feet below the surface of the ECMWDS and on one sample collected from drillhole TH-1 at 15-25 feet below the surface of the ECMWDS. The average maximum dry density of the shallow samples, as determined by the Standard Proctor Test, was 81.2 pcf with an average optimum moisture content of 12.3%. The maximum dry density of the deep sample, as determined by the Standard Proctor Test, was 117.5 pcf with an optimum moisture content of 12.5%.

Based on Standard Proctor Test results, the material located in the lower portion of the ECMWDS has been compacted to within 68% of the maximum dry density and is within 3.8% of the optimum moisture content. The material located in the upper portion of the ECMWDS and where the ECMWDS is less than 15 feet thick has been compacted to within 76% of the maximum dry density and is within 7% of the optimum moisture content.

Direct shear test results were performed on two undisturbed samples collected from drillhole TH-1 at 10 feet and 20 feet below the surface of the ECMWDS. The friction angles for the shallow and deep samples were found to be 28.9 and 30.3 degrees, respectively. The cohesions for the shallow and deep samples were found to be 213 and 193 pounds per square foot (psf), respectively.

3.3 CHEMICAL ANALYSES RESULTS

Chemical analyses results classified the coal refuse as lignitic coal with a calorific value of 7,149 British thermal units per pound (Btu/lb). The ash content was approximately 40%, and the sulfur content was approximately 1%. The pH of the coal refuse was 7.6. The complete results of the chemical analyses are presented in Attachment C.

Several analytes were compared against DOGM guidelines for evaluating overburden potential to support a vegetative root zone (Leatherwood and Duce, 1988). Table 2 summarizes the values of each parameter and its ranking according to Leatherwood and Duce (1988). While the material in the ECMWDS is not intended to support vegetation, the comparison suggests that the ECMWDS is neither toxic nor acid-forming. The sample was ranked as "good" for 8 out of 10 parameters used to classify a material's capacity to act as a vegetative root zone. These 8 parameters included pH, saturation, texture, selenium content, boron content, acid-base potential (ABP), available water capacity, and percentage of rock fragments. Two parameters (specific conductance and sodium adsorption ratio) were measured at levels considered to be "unacceptable" for supporting a vegetative root zone according to the DOGM report.

3.4 SLOPE STABILITY MODEL RESULTS

The slope stability analysis of the ECMWDS incorporated the density, friction angle, and cohesion values obtained from the geotechnical analyses described in Sections 2.2.1 and 3.2 of this report. The slope stability models considered the differences in material properties between material sampled from the upper and lower portions of the ECMWDS. In areas where the ECMWDS exceeded 15 feet thick, the portion of the ECMWDS that was greater than 15 feet deep was modeled with strength and density values corresponding to the sample collected from drillhole TH-1 at a depth of 20 feet. In all areas where the ECMWDS was less than 15 feet thick, and in the top 15 feet of areas where the ECMWDS was greater than 15 feet thick, the material was modeled with the strength and density values corresponding to the sample collected from drillhole TH-1 at a depth of 10 feet. Thus, the lower 15 feet of the ECMWDS (where it was at least 15 feet deep) was modeled with a saturated density of 99.6 pcf, a friction angle of 30.3 degrees, and a cohesion of 193 psf. The upper 15 feet of the ECMWDS (and where it was less than 15 feet thick) was modeled with a saturated density of 93.5 pcf, a friction angle of 28.9 degrees, and a cohesion of 213 psf. The native materials beneath the ECMWDS were given a density of 105 pcf, a friction angle of 28 degrees, and a cohesion of 500 psf, based on engineering judgment. These values were sufficient to restrict the critical failure plane to within the coal refuse, which is considered to occur during the most likely failure scenario. Figure 2 shows the geometry of each slope that was modeled.

The FS for the ECMWDS ranged from 1.74 on the north slope of Profile C-C' to 2.18 on the north slope of Profile B-B'. The FS for each slope is summarized in Table 3. Detailed slope stability analyses are presented in Attachment D.

3.5 DISCUSSION OF RESULTS

Based on the geotechnical analyses and slope stability modeling presented in this report, the ECMWDS conforms to the stability criteria mandated by Utah Administrative Rule R645-301-536.110. All slopes have a FS of at least 1.5, even in the extremely unlikely event that the pile becomes completely saturated.

Chemical analyses of the ECMWDS indicate that the coal refuse can be classified as lignitic coal, and may be used as a fuel resource. Furthermore, the analyses suggest that the material within the ECMWDS is neither toxic nor acid-forming, but is likely too saline to support vegetation. As a point of comparison only, the specific conductance and SAR are too high to rank as good for supporting vegetative root zones. However, the native soils in the vicinity of the ECMWDS may also rank as unacceptably saline according to the criteria outlined by Leatherwood and Duce (1988). The maximum SAR for the Persayo-Chipeta Association, 3-20% slopes, which has been mapped by the National Conservation Service (NRCS) to be the underlying soil at the ECMWDS site, is 13.0 (NRCS, 2008). This ranks as "unacceptable" for supporting vegetative root zones according to Leatherwood and Duce (1988). Hence, although the ECMWDS material has elevated salinity, this condition is widespread and occurs naturally in the region.

CHAPTER 4

REFERENCES

http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. U.S. Department of Agriculture National Resource Conservation Service Web Soil Survey, accessed January 22, 2008.

Leatherwood, James and Dan Duce, 1988. *Guidelines for Management of Topsoils and Overburden for Underground and Surface Coal Mining*. Unpublished report prepared by the State of Utah Department of Natural Resources Division of Oil, Gas, and Mining.

M.Z. Associates, 2002. *Stable for Windows*. Slope Stability Modeling Software.

VTN Engineers, Architects, Planners, and Photogrammetrists, 1976. Topographic Map of Emery Project, Emery and Sevier Counties, Utah. 1"=100' scale.

FIGURES

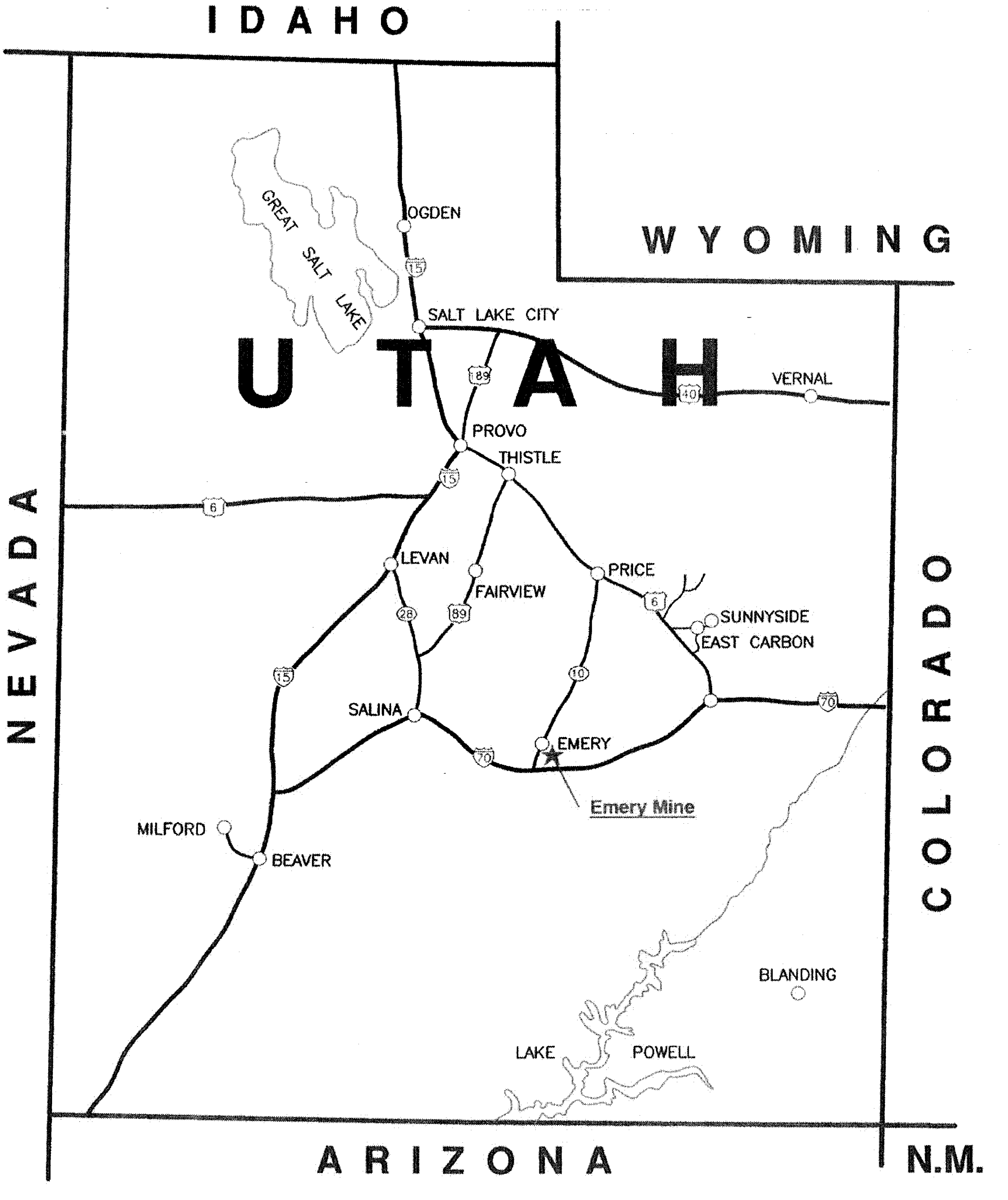


FIGURE 1. GENERAL LOCATION MAP

EarthFax

G:\UC982\15 - Structures and facilities\DWG\FIG-1GENLOC.dwg, Layout5-Layout1, 1/17/2008 4:31:03 PM

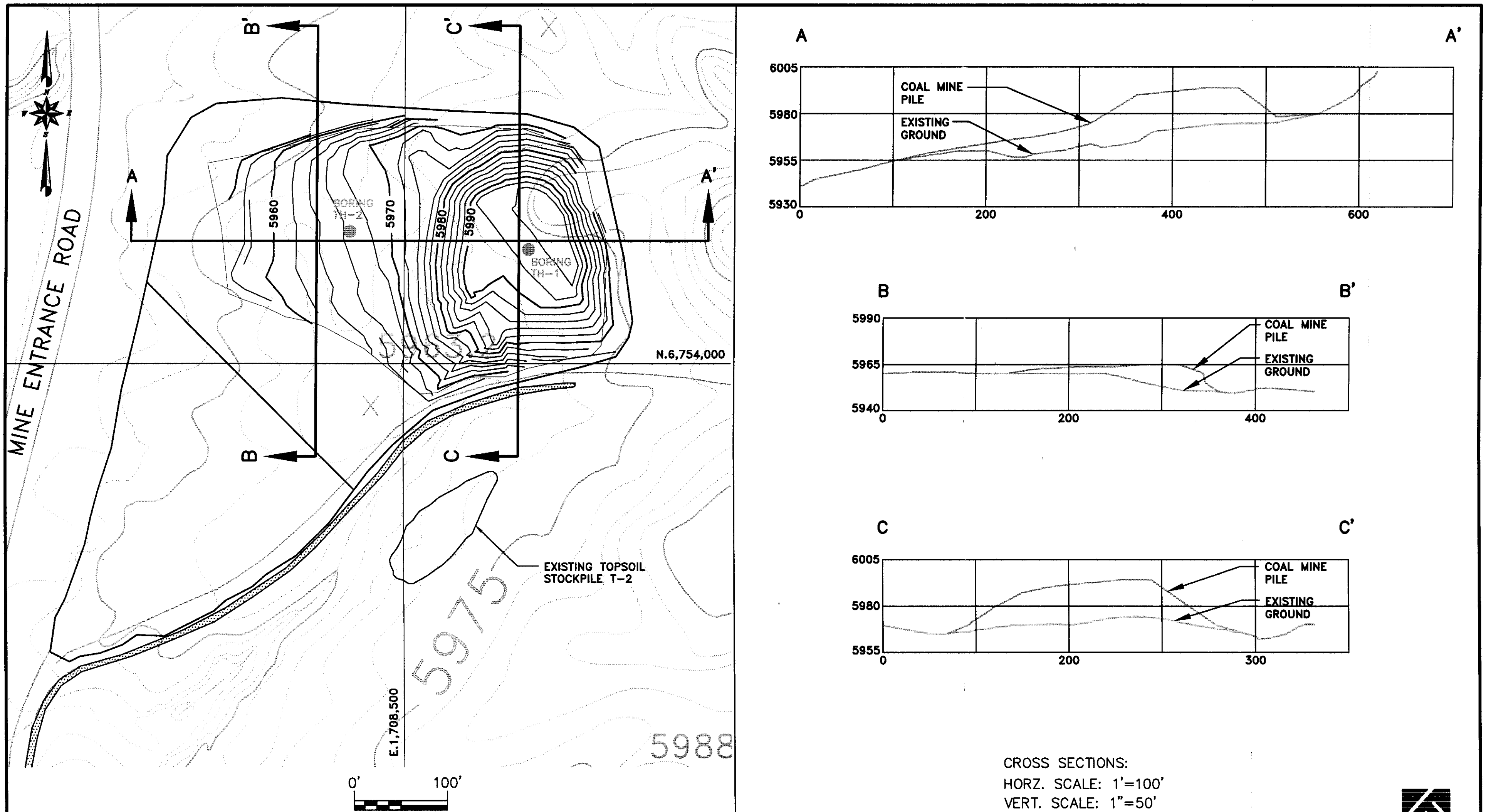


FIGURE 2. EXISTING COAL MINE WASTE DISPOSAL SITE PLAN AND CROSS-SECTIONS

TABLES

TABLE 1
Summary of Geotechnical Sample Analyses
Existing Coal Mine Waste Disposal Site
Consolidation Coal Emery Mine
Emery County, Utah[(a)]

Parameter	**Upper ECMWDS**	**Lower ECMWDS**
USCS Soil Classifications		
In-situ Density (pcf)	64.8[(b)]	80.0[(c)]
In-Situ Moisture Content (%)	5.3[(b)]	8.7[(c)]
Saturated Density (pcf)	93.5[(b)]	99.6[(c)]
Dry Density (pcf)	61.5[(b)]	80.0[(c)]
Standard Proctor Compaction Test (ASTM D698) Maximum Dry Density (pcf)	81.2[(d)]	117.5[(e)]
Standard Proctor Compaction Test (ASTM D698) Optimum Moisture Content (%)	12.3[(d)]	12.5[(e)]
Friction Angle (degrees)	28.9[(b)]	30.3[(c)]
Cohesion (psf)	213[(b)]	193[(c)]

[(a)] Refer to Attachment B for detailed geotechnical analysis results.
[(b)] Undisturbed sample from TH-1 @10'.
[(c)] Undisturbed sample from TH-1 @20'.
[(d)] Average of disturbed samples collected from 0-10' in both drillholes.
[(e)] Disturbed sample from TH-1, 15-25'.

TABLE 2
Evaluation of ECMWDS Material Properties as a Vegetative Root Zone
Existing Coal Mine Waste Disposal Site
Consolidation Coal Emery Mine
Emery County, Utah

Parameter	**Bulk Sample**	**Criteria for a Rank of "Good"** [(a)]
pH	7.6	6.1 – 8.2
Specific Conductance (mmhos/cm)	91.0[(b)]	0 – 2
Saturation (%)	31.0	25 – 80
Texture	sl	sl, l, sil, scl, vfscl, fsl
Sodium Adsorption Ratio (SAR)	89.0[(c)]	0 – 4
Selenium (ppm)	< 0.02	< 0.1
Boron (ppm)	1.46	< 5.0
Acid/Base Potential (ABP) (t $CaCO_3$ / 1,000 t mat'l)	73.2	> 5
Available Water Capacity (in/in)	9.84	> 0.10
Rock Fragments (% volume)		
3 in.	0	0 - 15
3-10 in.	0	0 – 15
10 in	0	0 – 3

[(a)] As determined by Leatherwood and Duce (1988)
[(b)] Typical value of specific conductance for the mapped NRCS soils unit (Persayo-Chipeta Association, 3-20% slopes) is 8 mmhos/cm (NRCS ,2008), which is considered fair – poor according to Leatherwood and Duce (1988).
[(c)] Typical value of SAR for the mapped NRCS soils unit (Persayo-Chipeta Association, 3-20% slopes) is 13.0 (NRCS ,2008), which is considered unacceptable according to Leatherwood and Duce (1988)

TABLE 3
Summary Slope Stability Model Results
Existing Coal Mine Waste Disposal Site
Consolidation Coal Emery Mine
Emery County, Utah

PROFILE	FS
A-A' West Slope	1.835
A-A' East Slope	1.858
B-B' North Slope	2.181
C-C' North Slope	1.736
C-C' South Slope	2.055

ATTACHMENT A

Drillhole Logs

Geotechnical Engineering Group, Inc.

LOG OF TEST PIT TH-1

PROJECT: Consol Emery Coal Mine **PROJECT NO.:** 2850
CLIENT:
LOCATION: See figure 2 **ELEVATION:** Unknown None
DRILLER: WJ **LOGGED BY:** SP
DEPTH TO WATER> INITIAL: None Found **AFTER 24 HOURS:** Backfilled
DATE: 11-26-2007 **DEPTH TO CAVING:** None

Depth (feet)	Description	Graphic	Sample Type	Blow Counts	Notes
0	Coal, dry, black, (COAL)				
5			Bulk		
			Bulk		
10			CT	21/12	
15					
20			CT	16/12	
25	Sand, slightly clayey, silty, gravelly, slightly moist, brown, (SP-SM)	25	Bul		
30					
35			Bulk		
36	Bottom of test pit when terminated: 36 ft.				

This information pertains only to this test pit and should not be interpreted as being indicitive of the site.

Geotechnical Engineering Group, Inc.

LOG OF TEST PIT TH-2

PROJECT: Consol Emery Coal Mine | PROJECT NO.: 2850

CLIENT:

LOCATION: See figure 2 | ELEVATION: Unknown None

DRILLER: WJ | LOGGED BY: SP

DEPTH TO WATER> INITIAL: None Found | AFTER 24 HOURS: Backfilled

DATE: 11-26-2007 | DEPTH TO CAVING: None

Depth (feet)	Description	Graphic	Sample Type	Blow Counts	Notes
0–10	Coal, dry, black, (COAL)		Bulk Bulk		
10–16	Sand, slightly clayey, silty, slightly gravelly, slightly moist, brown to tan, (SP-SM)		Bulk Bulk		
16	Bottom of test pit when terminated: 16 ft.				

This information pertains only to this test pit and should not be interpreted as being indicitive of the site.

Geotechnical Engineering Group, Inc.

KEY TO SYMBOLS

Symbol Description

Strata symbols

Coal

Poorly graded sand with silt

Notes:

1. Exploratory borings were drilled on 11-26-2007 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. These logs are subject to the interpretation by GEG of the soils encountered and limitations, conclusions, and recommendations in this report.

4. Results of tests conducted on samples recovered are reported on the logs.

Figure 3

ATTACHMENT B

Geotechnical Analyses

UNDISTURBED SOIL SAMPLE DENSITY CALCULATIONS
EXISTING COAL MINE WASTE DISPOSAL SITE
CONSOL EMERY MINE

Dry Density

TH-1 10'

Weight (lbs)		Volume (ft3)
0.0	Air	0.51
0.0	Water	0.00
61.5	Solids	0.49
61.5	TOTAL	1.0

TH-1 20'

Weight (lbs)		Volume (ft3)
0.0	Air	0.42
6.4	Water	0.00
73.6	Solids	0.58
80.0	TOTAL	1.0

Saturated Density

TH-1 10'

Weight (lbs)		Volume (ft3)
0.0	Air	0
32.0	Water	0.51
61.5	Solids	0.49
93.5	TOTAL	1.0

TH-1 20'

Weight (lbs)		Volume (ft3)
0.0	Air	0
26.0	Water	0.42
73.6	Solids	0.58
99.6	TOTAL	1.0

In-Situ Density

TH-1 10'

Weight (lbs)		Volume (ft3)
0.0	Air	0.46
3.3	Water	0.05
61.5	Solids	0.49
64.8	TOTAL	1.00

TH-1 20'

Weight (lbs)		Volume (ft3)
0.0	Air	0.31
6.4	Water	0.10
73.6	Solids	0.58
80.0	TOTAL	1.00

Notes:

Dry densities were taken from the geotechnical analyses of the undisturbed samples taken from TH-1 at 10' and 20' deep.

The average specific gravity of the solids fraction of the coal refuse was taken as 2.02. This is the average of 2.65 (a typical value for soil) and 1.4 (a typical value for bituminous coal). Chemical analyses (presented in Appendix C) indicate that the coal refuse is approximately 50% coal and 50% siliceous material. A specific gravity of 2.02 corresponds to a density of 126.11 pounds per cubic foot.

The weight of the air fraction of the coal refuse was assumed to be negligible in all cases.

In-situ densities were calculated using the water contents measured for each of the undisturbed samples (TH-1@10' = 5.3% and TH-1@20' = 8.7%)

Geotechnical Engineering Group, Inc.

January 21, 2008

Ari Menitove
7324 South Union Park Ave.
Midvale, Utah 84047

Attention: Mr. Menitove

Subject: Field Sampling and Laboratory Testing Services
Consol Emery Coal Mine
Job No. 2,850

Dear Mr. Menitove,

As requested, Geotechnical Engineering Group (GEG) performed field sampling and laboratory testing services on samples obtained by a GEG representative on November 26, 2007. Results of laboratory testing are included on Figs 6 though 17 and summarized on Table I.

We believe the laboratory study was performed and this letter was prepared in a manner consistent with that level of care and skill ordinarily used by geotechnical engineers practicing in this area at this time. No other warranty, either express or implied, is made. When we may be of further service or answer any questions from a geotechnical or construction materials point of view, please call.

Sincerely,
GEOTECHNICAL ENGINEERING GROUP, INC.

Reviewed By:

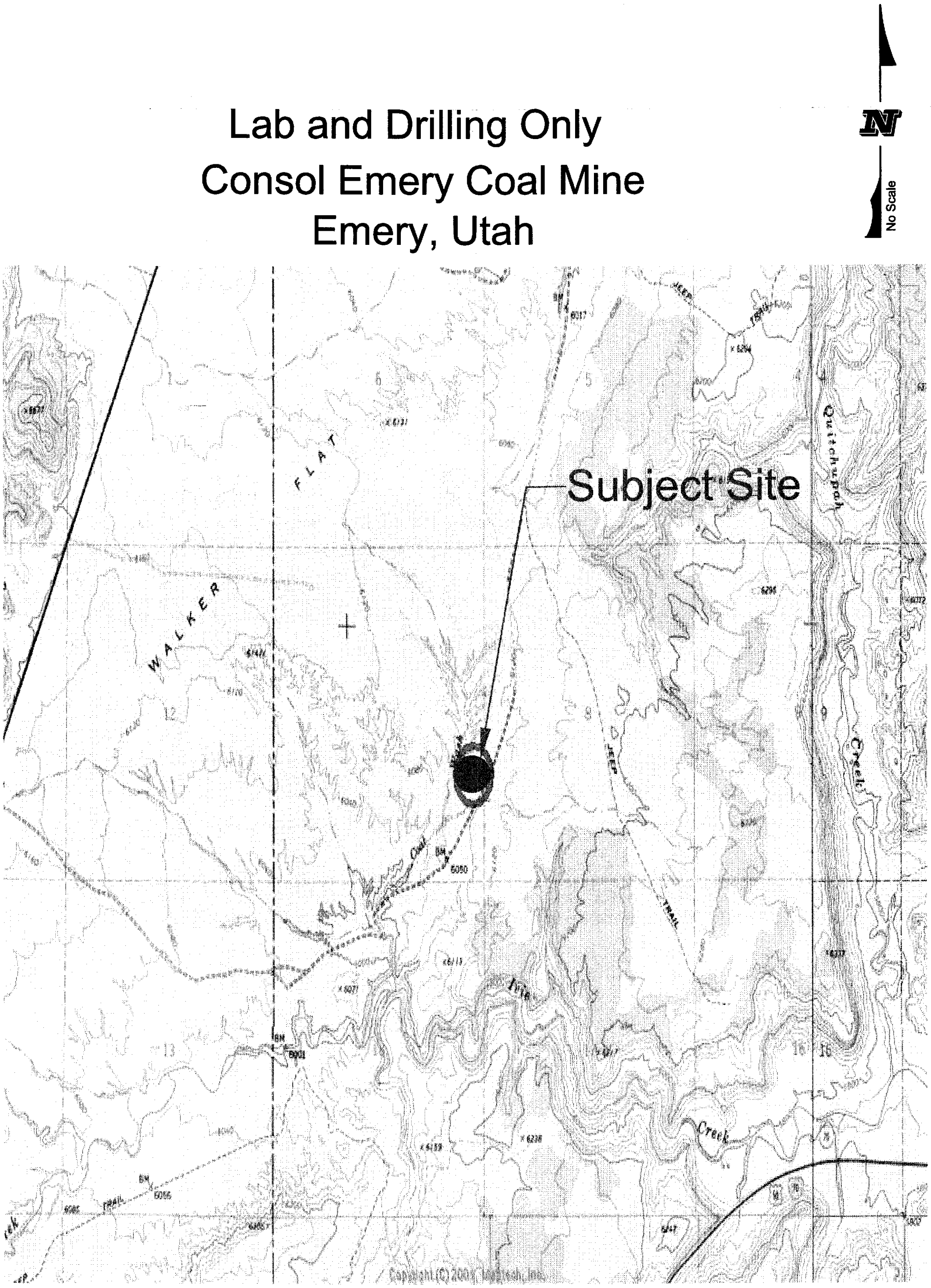
Terry Myers
Laboratory Supervisor

Robert W. Anderson
Staff Engineer

TM:RA:ra
(1 copy sent)

Geotechnical, Environmental and Materials Testing Consultants
Grand Junction - Montrose - Moab - Crested Butte
(970) 245-4078 • fax (970) 245-7115 • geotechnicalgroup.com
2308 Interstate Avenue, Grand Junction, Colorado 81505

Lab and Drilling Only
Consol Emery Coal Mine
Emery, Utah

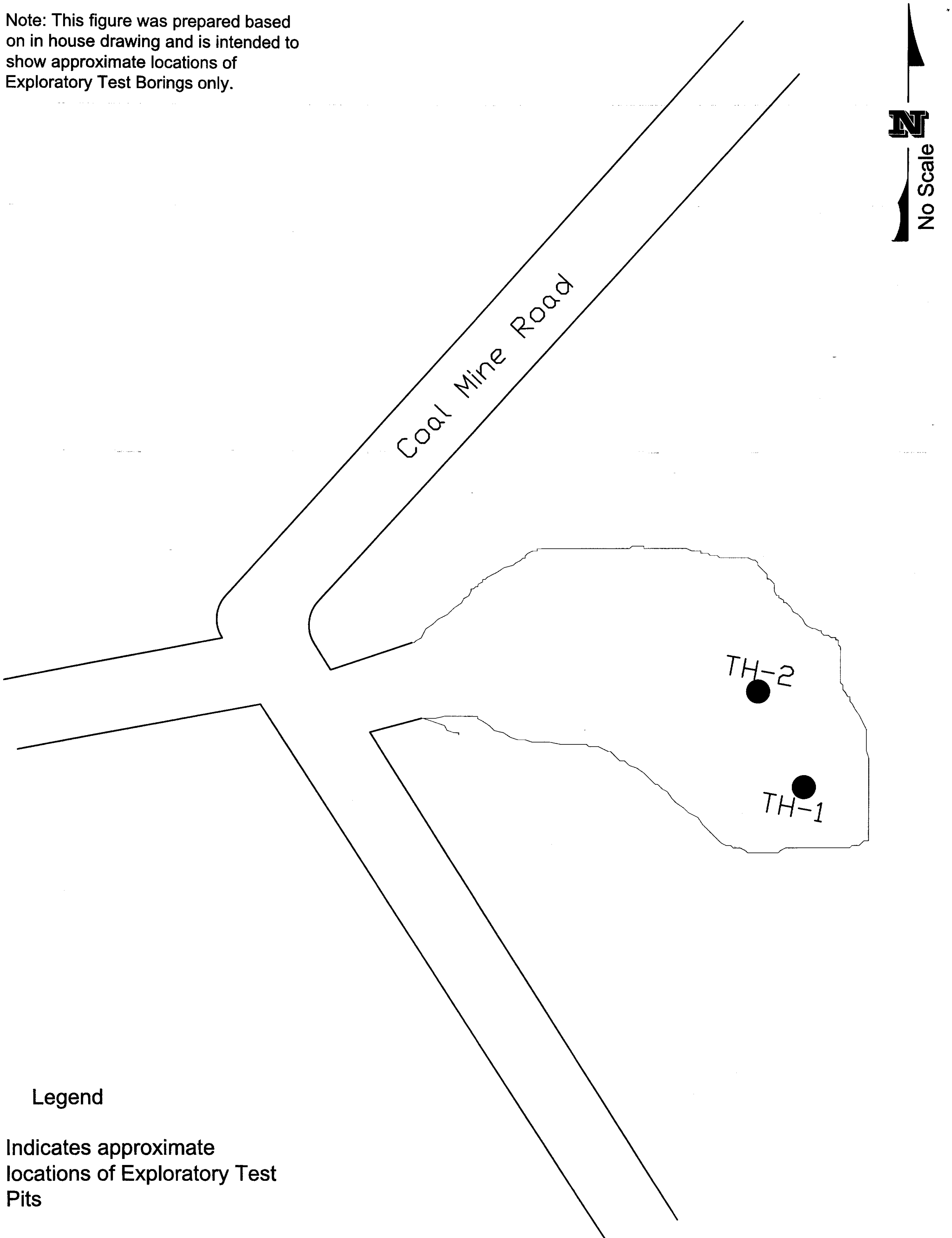


Job No. 2,850

Vicinity Map

Fig. 1

Note: This figure was prepared based on in house drawing and is intended to show approximate locations of Exploratory Test Borings only.



Legend

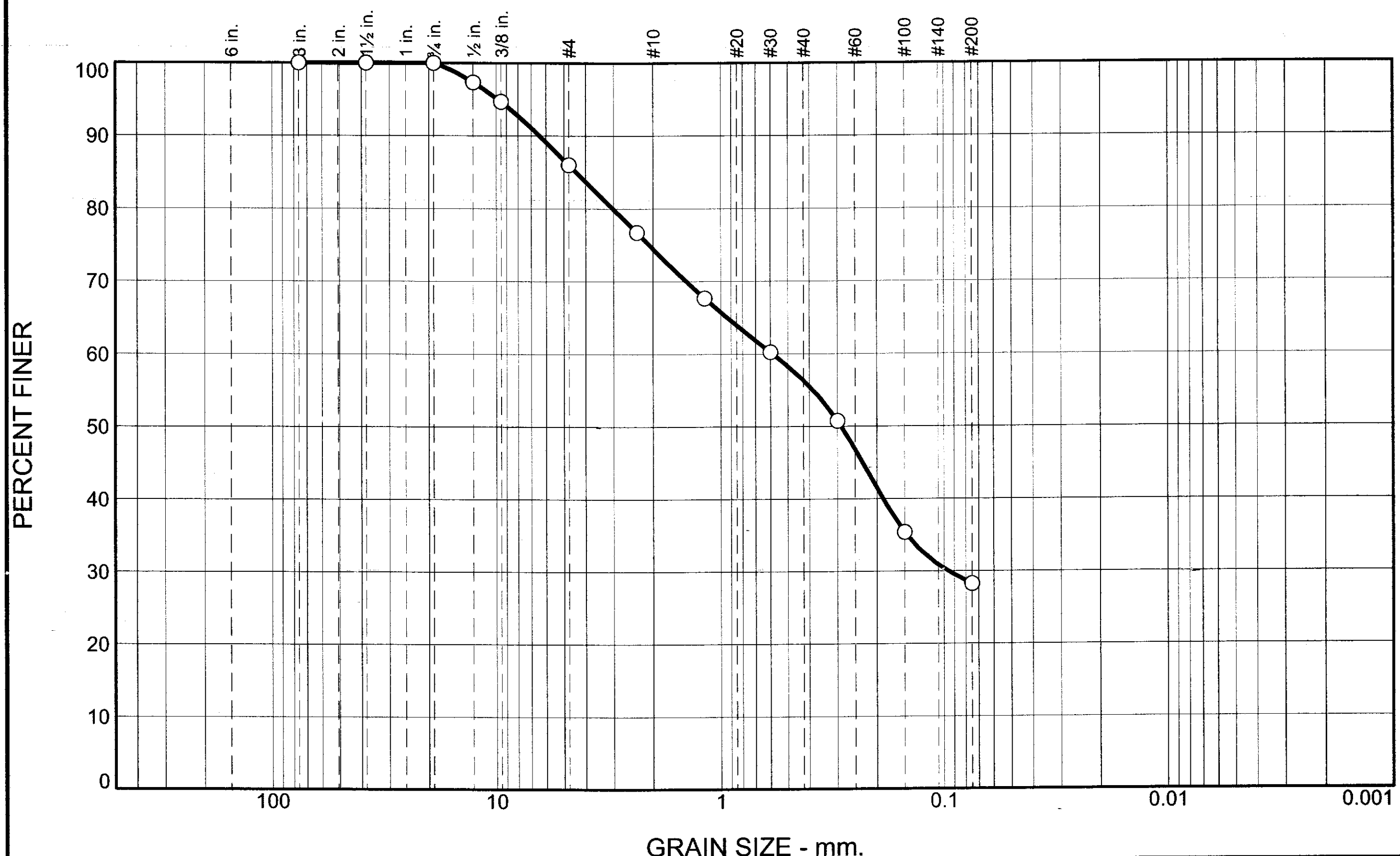
● Indicates approximate locations of Exploratory Test Pits

Job No. 2,850

Location of Exploratory Borings

Fig. 2

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	14	12	18	28	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100		
1.5	100		
.75	100		
.5	97		
.375	95		
#4	86		
#8	77		
#16	68		
#30	60		
#50	51		
#100	35		
#200	28		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 4.4013 D_{60}= 0.5861 D_{50}= 0.2893
D_{30}= 0.0961 D_{15}= D_{10}=
C_u= C_c=

Date Tested: 12-10-2007 **Tested By:** JG

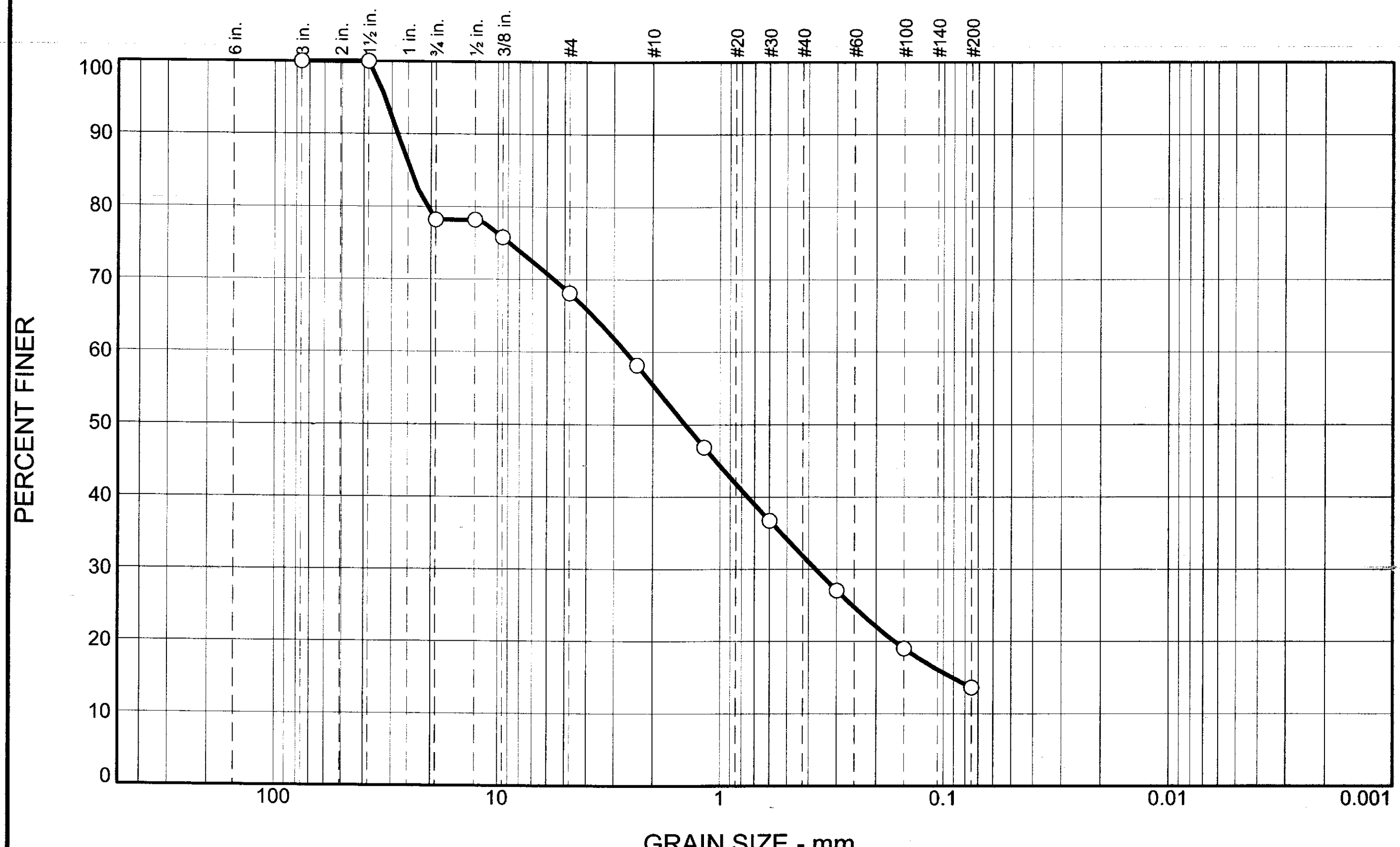
Remarks

Sample No.: **Source of Sample:** TH-1 **Date Sampled:**
Location: **Elev./Depth:** 0-10
Checked By: MT **Title:**

Geotechnical Engineering Group, Inc.

Client:
Project: Consol Emery Coal Mine
Project No: 2850 **Figure** 6

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	22	10	12	24	18	14	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100		
1.5	100		
.75	78		
.5	78		
.375	76		
#4	68		
#8	58		
#16	47		
#30	37		
#50	27		
#100	19		
#200	14		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 24.7358 D_{60}= 2.6485 D_{50}= 1.4338
D_{30}= 0.3727 D_{15}= 0.0914 D_{10}=
C_u= C_c=

Date Tested: 12-14-2007 **Tested By:** TAM

Remarks

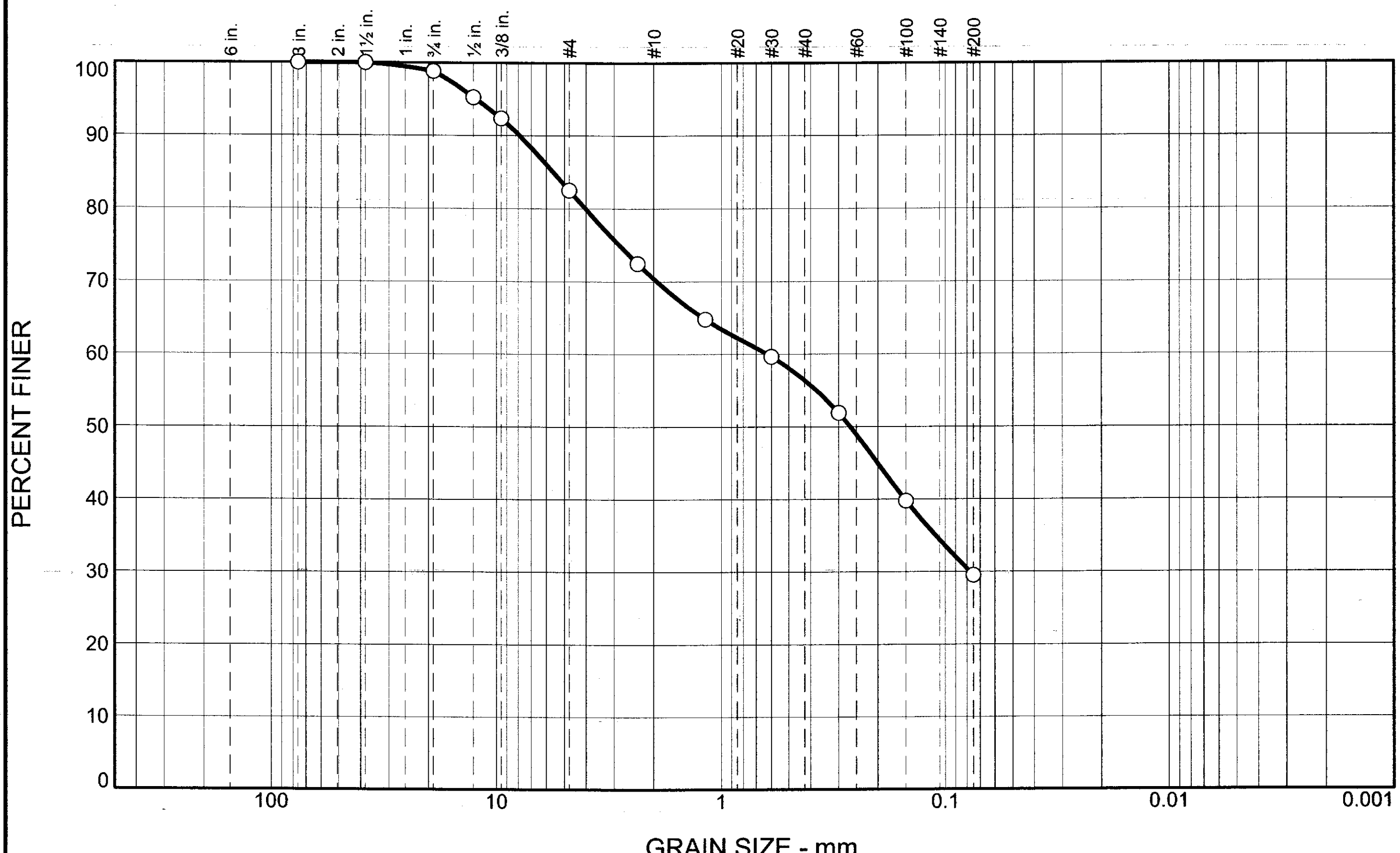
Sample No.: **Source of Sample:** TH-1 **Date Sampled:**
Location: **Elev./Depth:** 10
Checked By: MT **Title:**

Geotechnical Engineering Group, Inc.

Client:
Project: Consol Emery Coal Mine

Project No: 2850 **Figure** 7

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	1	16	13	14	27	29	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100		
1.5	100		
.75	99		
.5	95		
.375	92		
#4	83		
#8	72		
#16	65		
#30	60		
#50	52		
#100	40		
#200	29		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 5.5841 D_{60}= 0.6285 D_{50}= 0.2666
D_{30}= 0.0778 D_{15}= D_{10}=
C_u= C_c=

Date Tested: 12-10-2007 **Tested By:** TAM

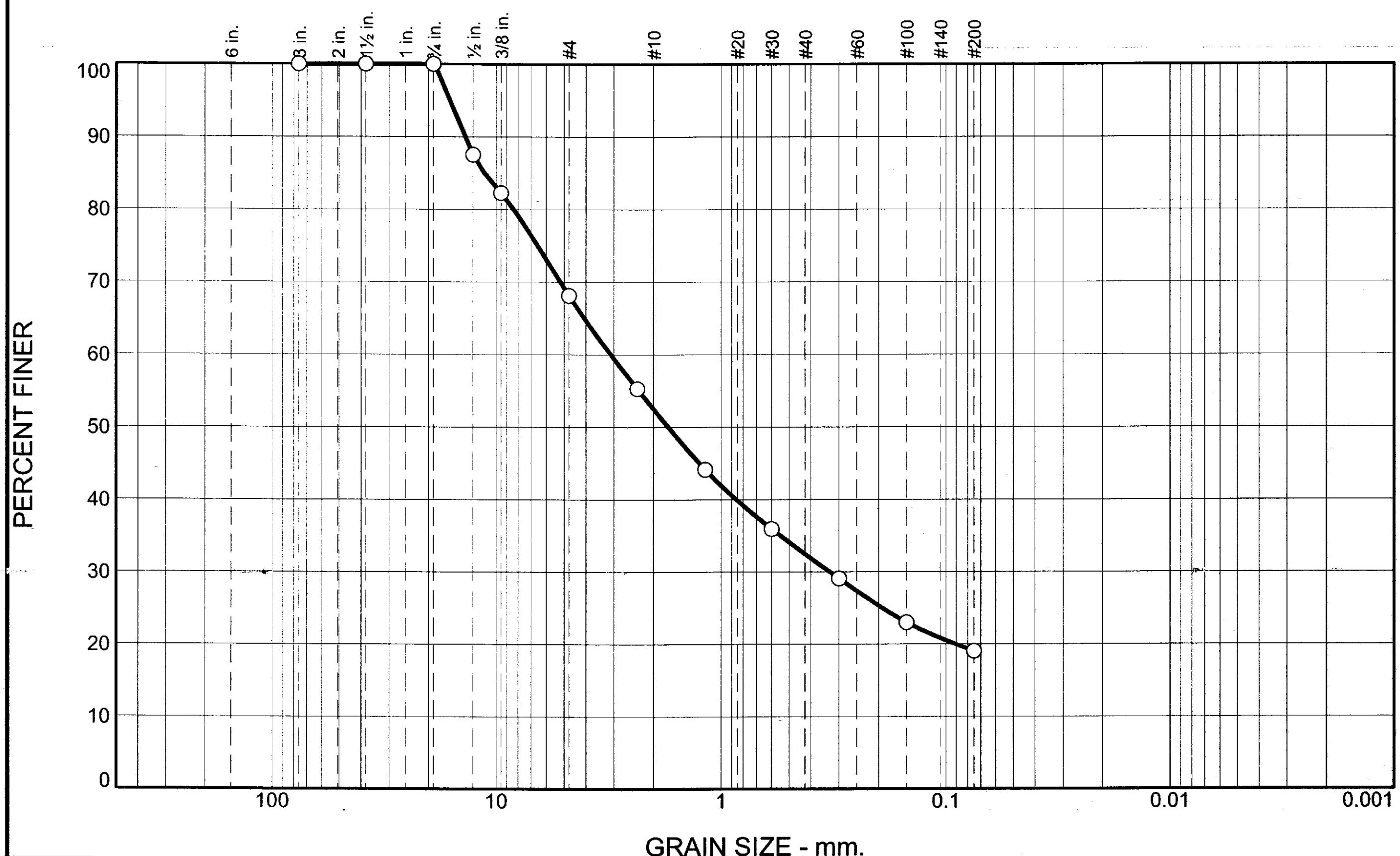
Remarks

Sample No.: **Source of Sample:** TH-1 **Date Sampled:**
Location: **Elev./Depth:** 15-25
Checked By: MT **Title:**

Geotechnical Engineering Group, Inc.

Client:
Project: Consol Emery Coal Mine
Project No: 2850 **Figure** 8

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	32	16	20	13	19	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100		
1.5	100		
.75	100		
.5	88		
.375	82		
#4	68		
#8	55		
#16	44		
#30	36		
#50	29		
#100	23		
#200	19		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 11.2834 D_{60}= 3.0951 D_{50}= 1.7237
D_{30}= 0.3304 D_{15}= D_{10}=
C_u= C_c=

Date Tested: 12-11-2007 **Tested By:** TAM

Remarks

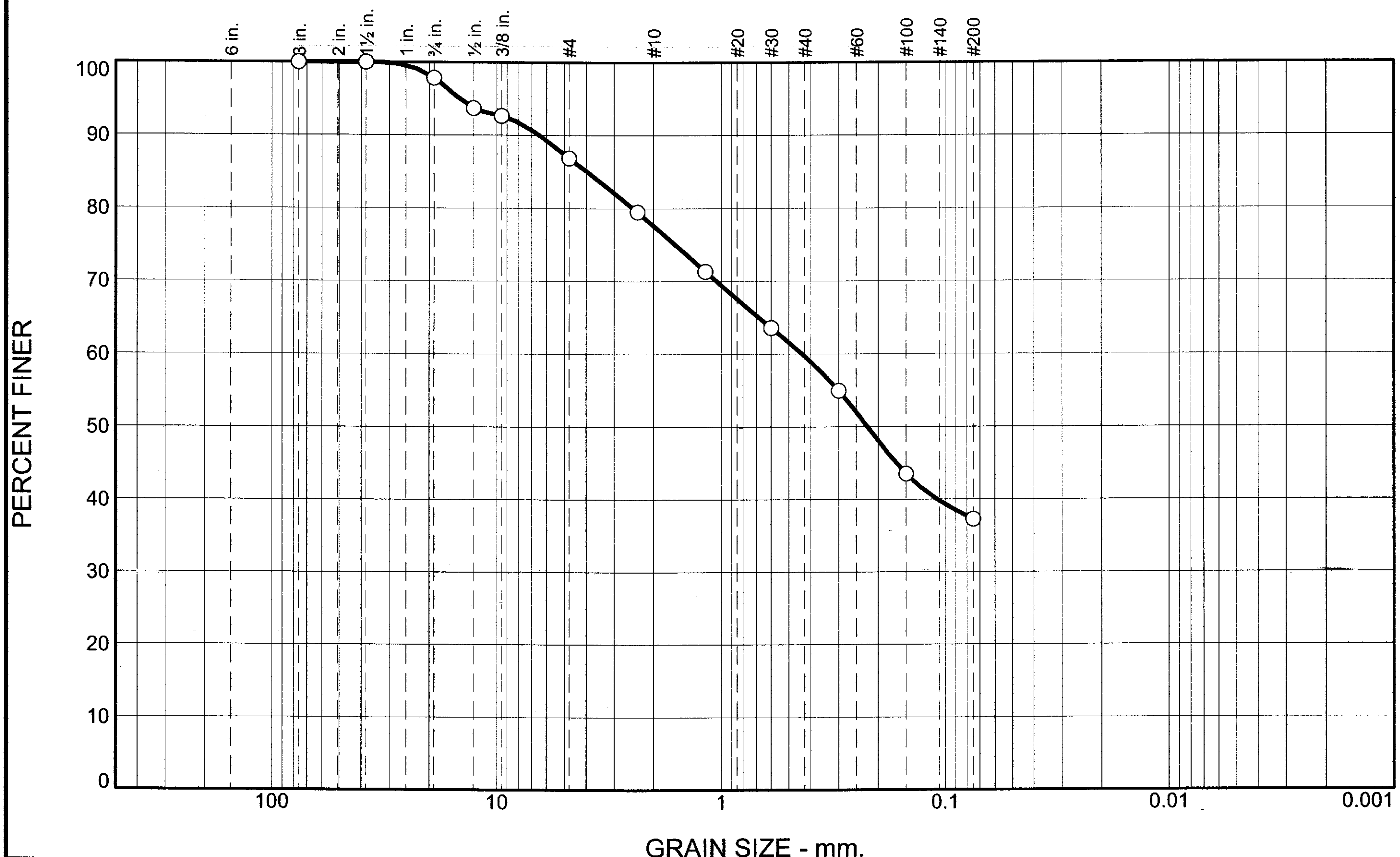
Sample No.: **Source of Sample:** TH-1 **Date Sampled:**
Location: **Elev./Depth:** 20
Checked By: MT **Title:**

Geotechnical Engineering Group, Inc.

Client:
Project: Consol Emery Coal Mine

Project No: 2850 **Figure** 9

Gradation Test Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	2	11	9	18	23	37	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100		
1.5	100		
.75	98		
.5	94		
.375	93		
#4	87		
#8	79		
#16	71		
#30	64		
#50	55		
#100	43		
#200	37		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS= AASHTO=

Coefficients

D_{85}= 3.9644 D_{60}= 0.4367 D_{50}= 0.2239
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 12-10-2007 **Tested By:** AI

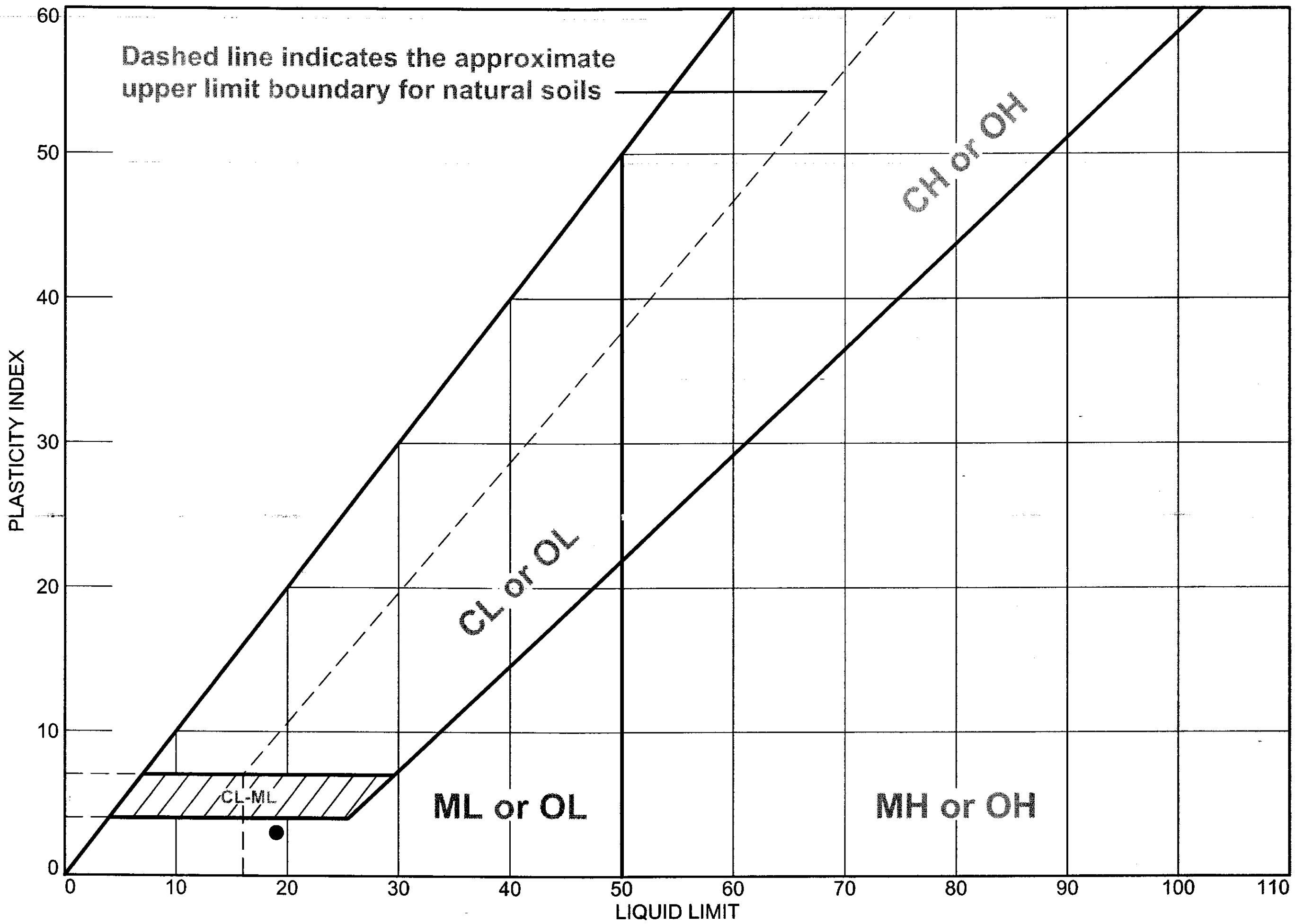
Remarks

Sample No.: **Source of Sample:** TH-2 **Date Sampled:**
Location: **Elev./Depth:** 0-10
Checked By: MT **Title:**

Geotechnical Engineering Group, Inc.

Client:
Project: Consol Emery Coal Mine
Project No: 2850 **Figure** 10

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		19	16	3	56	28	SM
■		18	18	NP	56	29	SM

Project No. 2850 **Client:**

Project: Consol Emery Coal Mine

● **Source of Sample:** TH-1 **Depth:** 0-10

■ **Source of Sample:** TH-1 **Depth:** 15-25

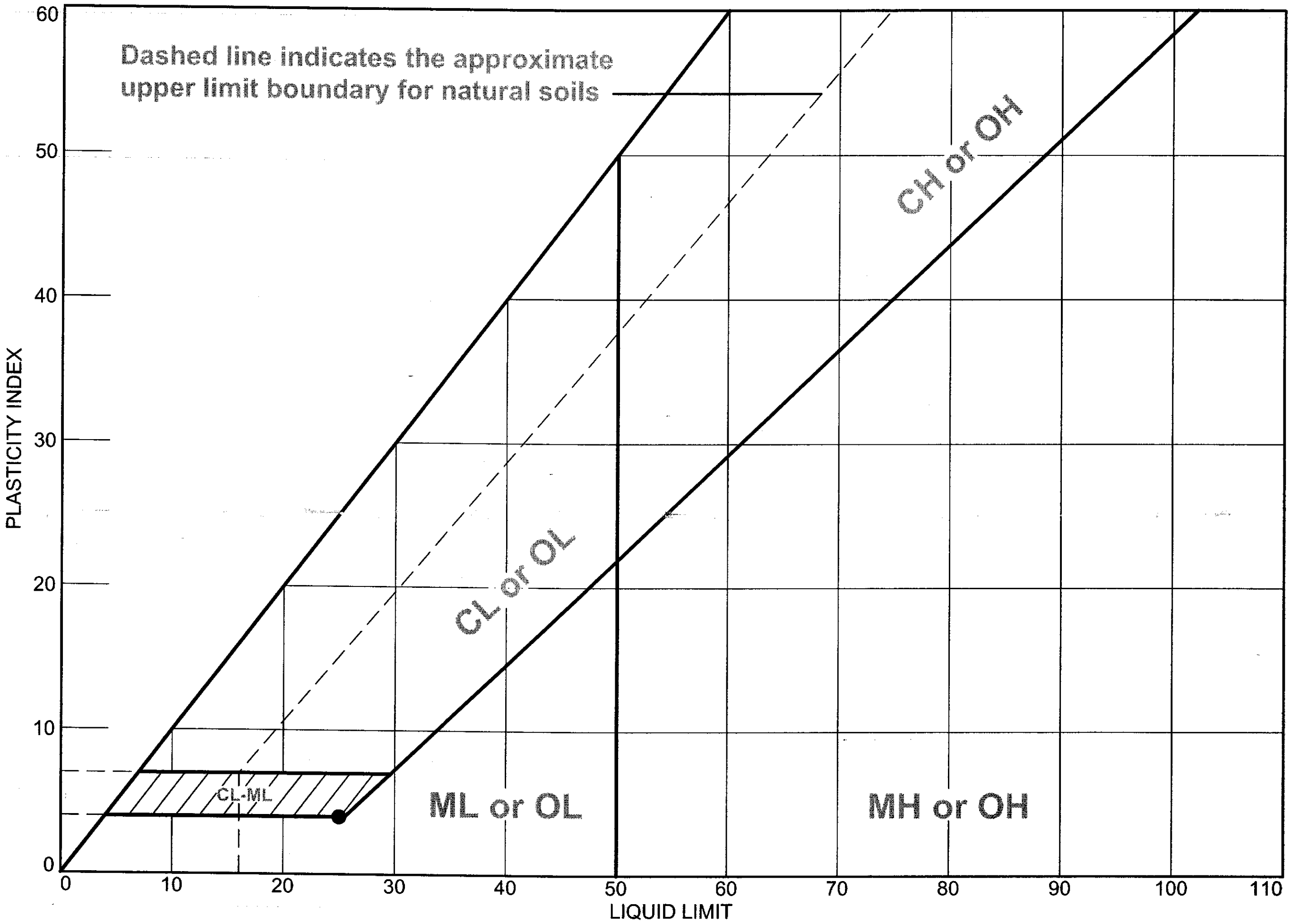
Remarks:

Geotechnical Engineering Group, Inc.

Figure 11

Tested By: JD **Checked By:** MT

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		25	21	4	60	37	SC-SM

Project No. 2850 **Client:**

Project: Consol Emery Coal Mine

● **Source of Sample:** TH-2 **Depth:** 0-10

Geotechnical Engineering Group, Inc.

Remarks:

Figure 12

Tested By: JD **Checked By:** MT

Moisture-Density Relationship Curve (Proctor)

Geotechnical Engineering Group, Inc.

Project No.: 2850 **Date:**

Project: Consol Emery Coal Mine

Source: TH-1 **Elev./Depth:** 0-10 **Sample No.**

Remarks:

MATERIAL DESCRIPTION

Description:

Classifications - **USCS:** SM **AASHTO:** A-2-4(0)

Nat. Moist. = **Sp.G. =**

Liquid Limit = 19 **Plasticity Index =** 3

% > No.4 = 14.0 % **% < No.200 =** 28 %

TEST RESULTS
Maximum dry density = 83.5 pcf
Optimum moisture = 14.0 %

Test specification:
ASTM D 698-91 Procedure A Standard

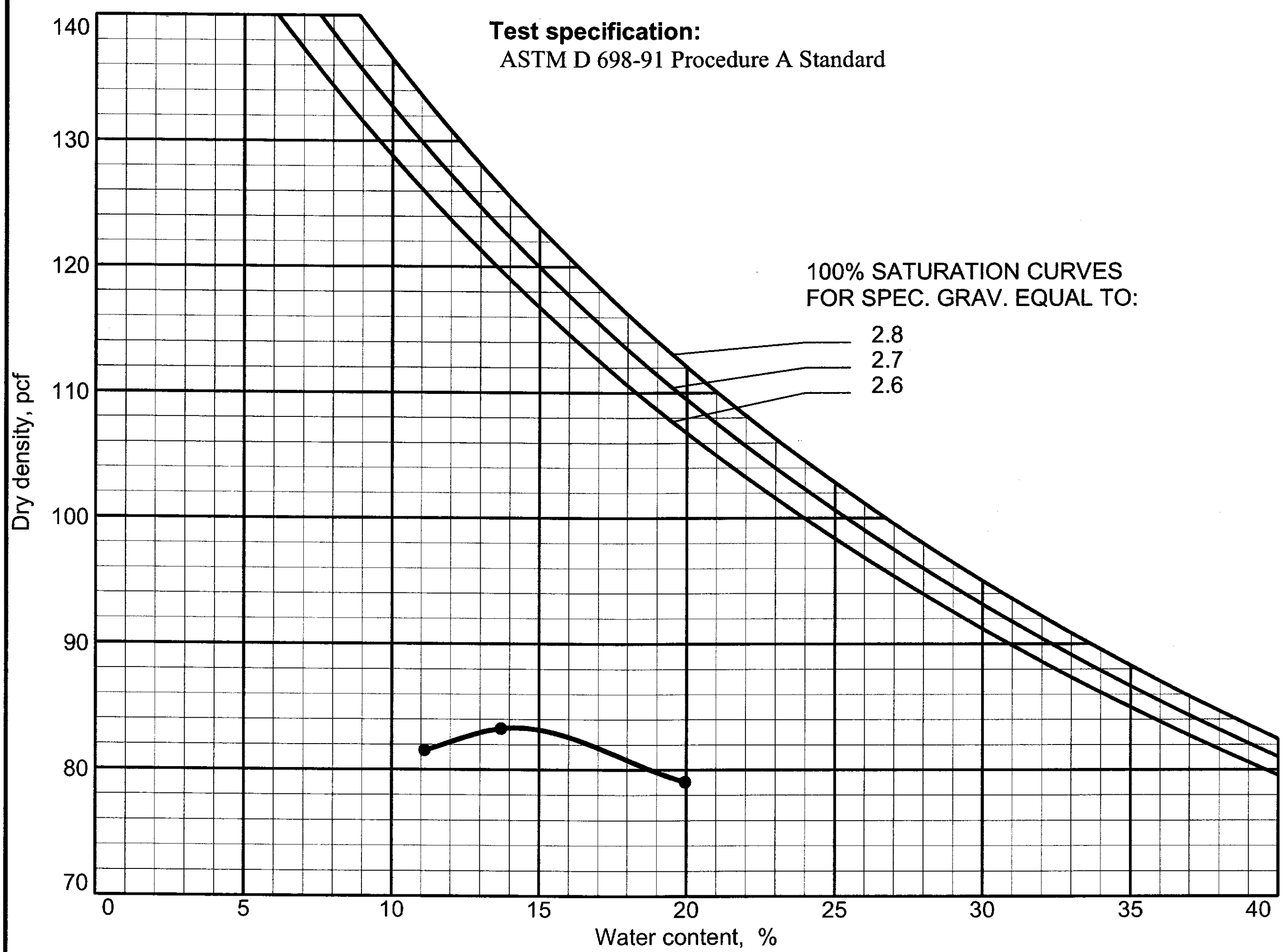


Figure 13

Moisture-Density Relationship Curve (Proctor)

Geotechnical Engineering Group, Inc.

Project No.: 2850
Project: Consol Emery Coal Mine

Date:

Source: TH-1
Elev./Depth: 15-25
Sample No.
Remarks:

MATERIAL DESCRIPTION

Description:

Classifications - **USCS:** SM **AASHTO:** A-2-4(0)
Nat. Moist. = **Sp.G. =**
Liquid Limit = 18 **Plasticity Index =** NP
% > No.4 = 17.0 % **% < No.200 =** 29 %

TEST RESULTS
Maximum dry density = 117.5 pcf
Optimum moisture = 12.5 %

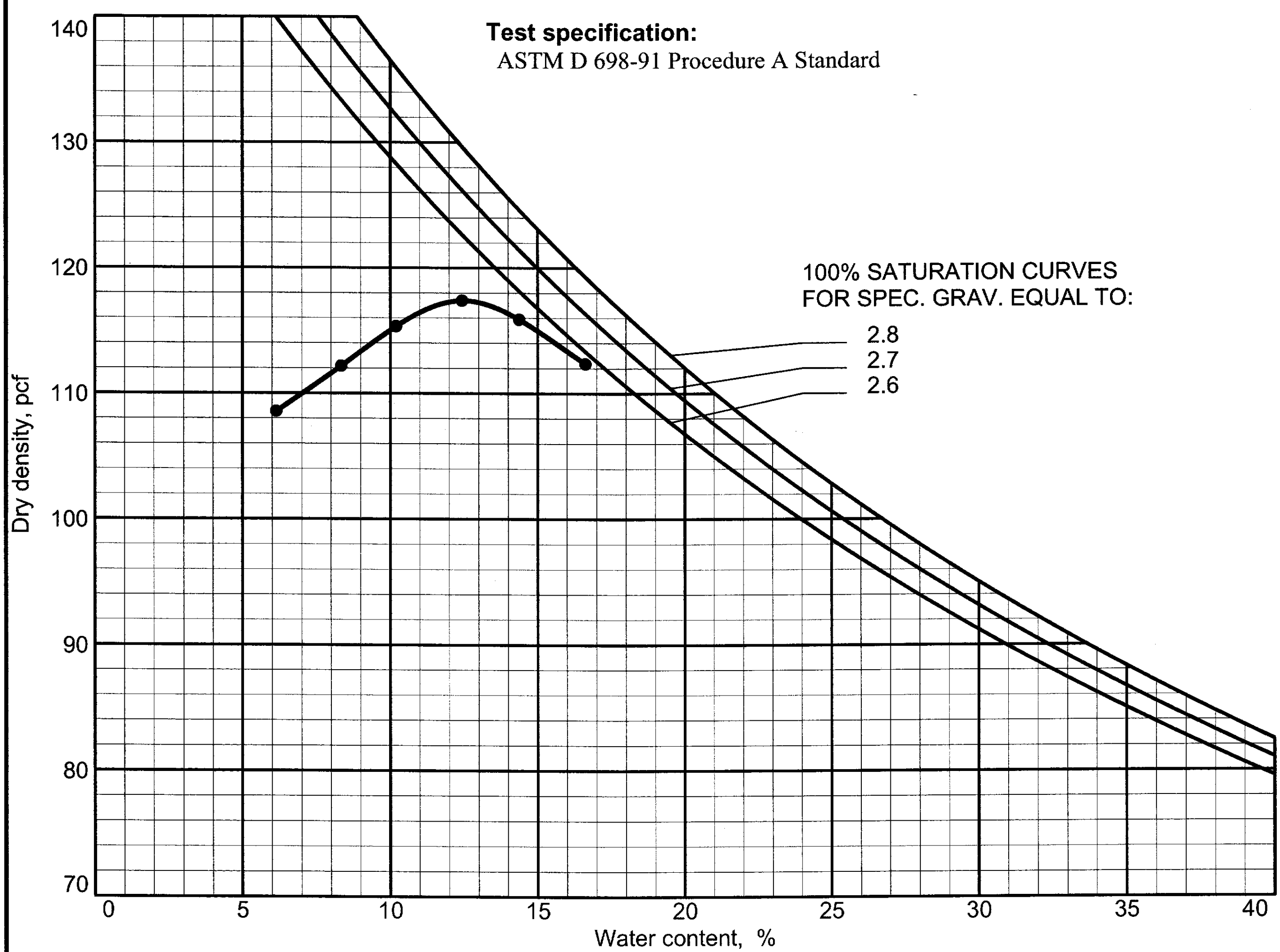


Figure 14

Moisture-Density Relationship Curve (Proctor)

Geotechnical Engineering Group, Inc.

Project No.: 2850 **Date:**
Project: Consol Emery Coal Mine

Source: TH-2 **Elev./Depth:** 0-10 **Sample No.**
Remarks:

MATERIAL DESCRIPTION

Description:

Classifications - **USCS:** SC-SM **AASHTO:** A-4(0)
Nat. Moist. = **Sp.G. =**
Liquid Limit = 25 **Plasticity Index =** 4
% > No.4 = 13.0 % **% < No.200 =** 37 %

TEST RESULTS
Maximum dry density = 79.5 pcf
Optimum moisture = 16.0 %

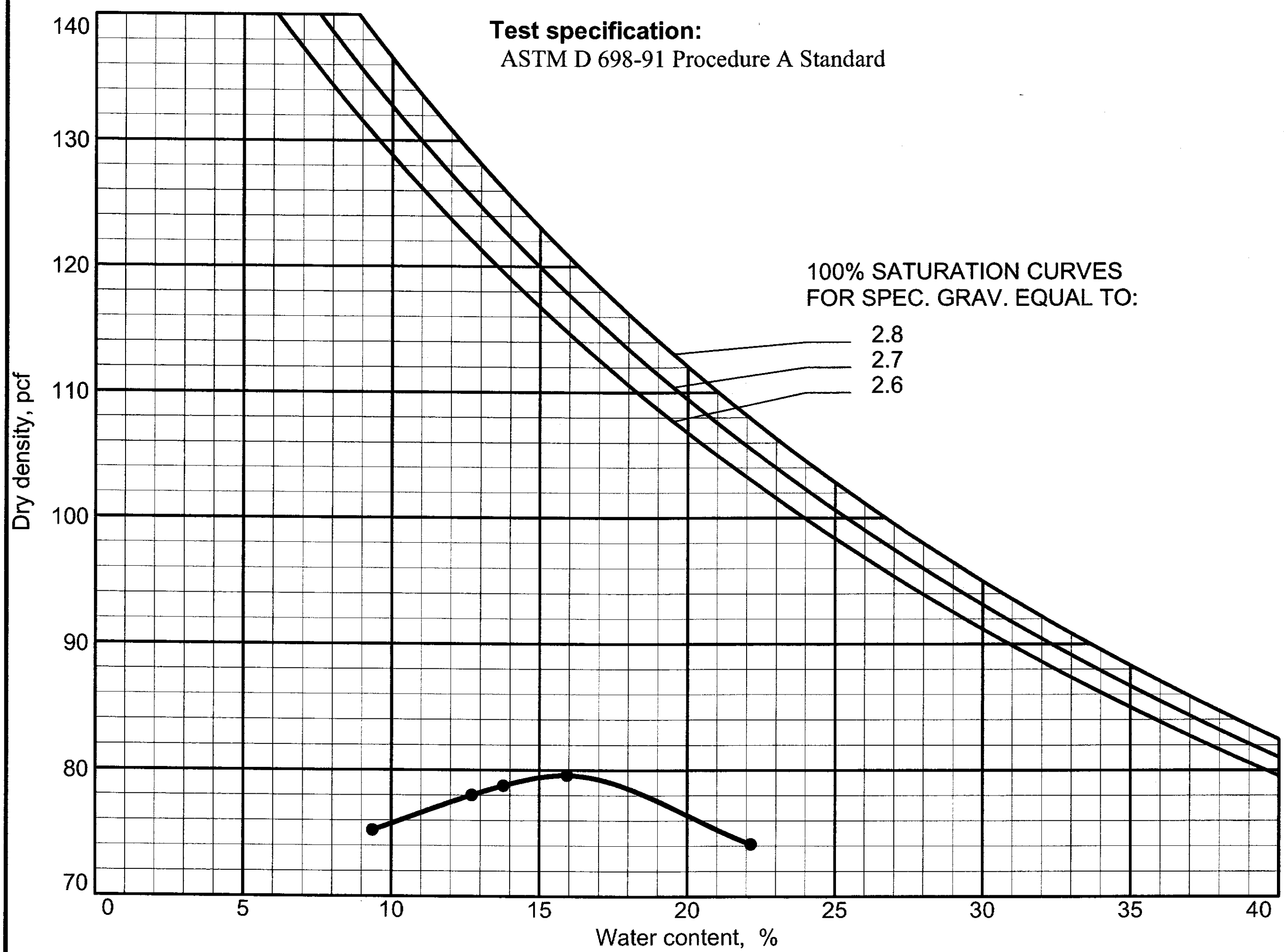
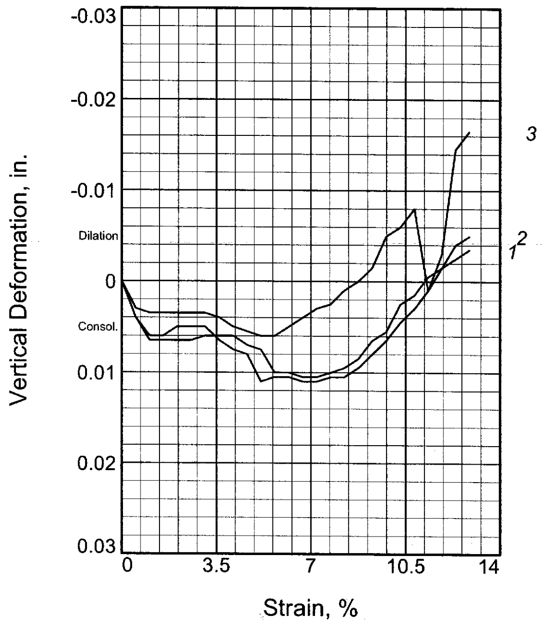
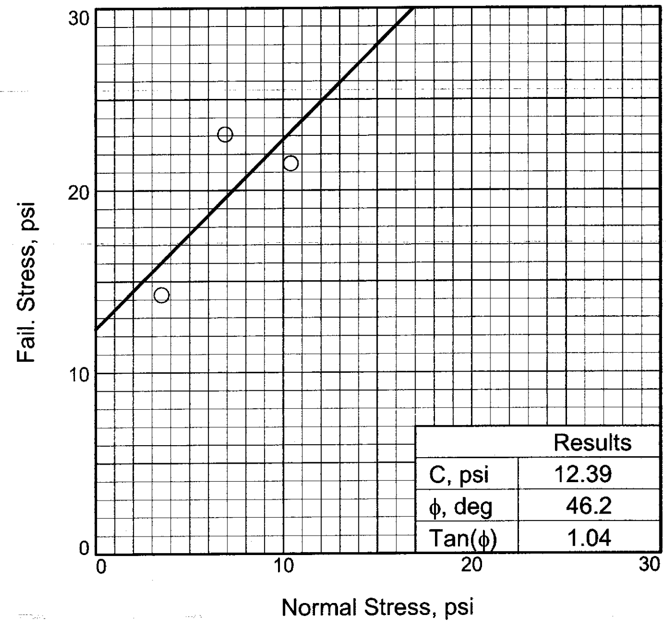
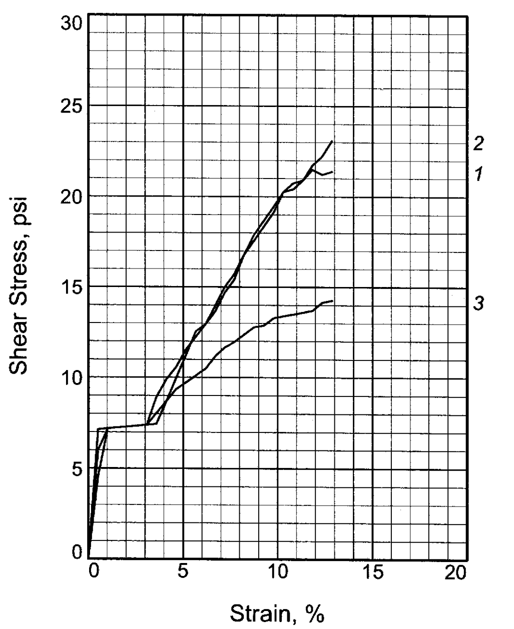


Figure 15





	Results
C, psi	12.39
ϕ, deg	46.2
Tan(ϕ)	1.04



	Sample No.	1	2	3
Initial	Water Content, %	5.3	5.3	5.3
	Dry Density, pcf	61.5	61.5	61.5
	Saturation, %	8.4	8.4	8.4
	Void Ratio	1.6880	1.6880	1.6880
	Diameter, in.	1.94	1.94	1.94
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	32.7	32.7	32.7
	Dry Density, pcf	61.5	61.5	61.5
	Saturation, %	51.4	51.4	51.4
	Void Ratio	1.6880	1.6880	1.6880
	Diameter, in.	1.94	1.94	1.94
	Height, in.	1.00	1.00	1.00
	Normal Stress, psi	10.40	6.90	3.50
	Fail. Stress, psi	21.49	23.08	14.26
	Strain, %	11.8	12.9	12.9
	Ult. Stress, psi			
	Strain, %			
	Strain rate, in./min.	0.63	0.63	0.63

Sample Type: CT
Description:

Assumed Specific Gravity= 2.65
Remarks:

Figure 16

Client:

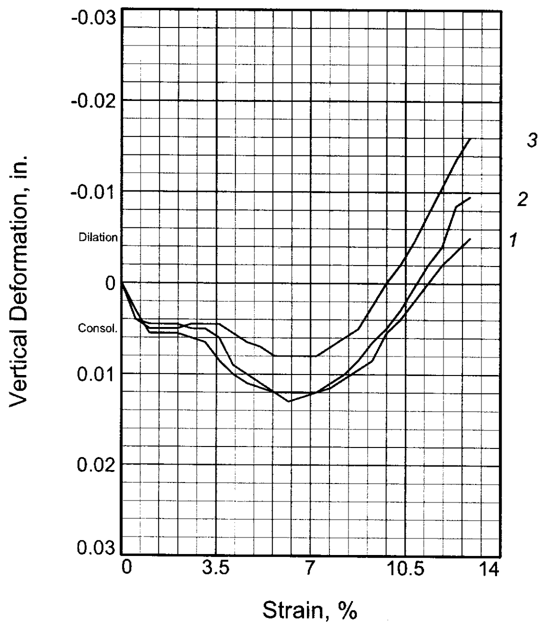
Project: Consol Emery Coal Mine

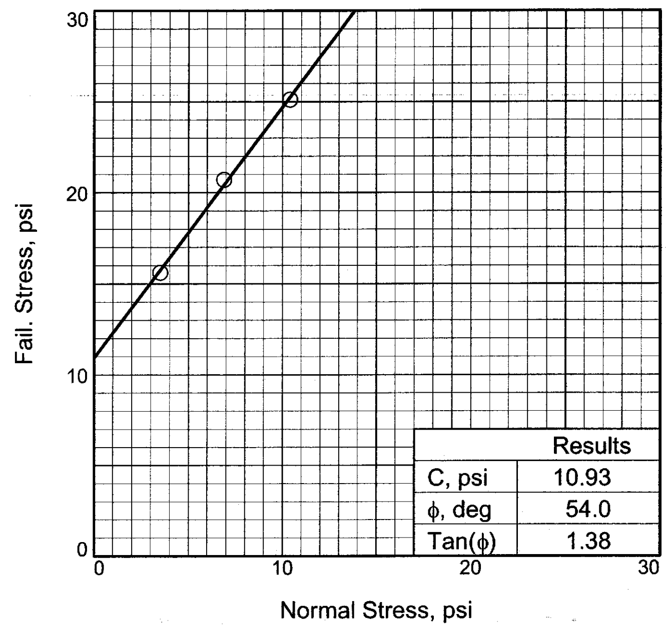
Source of Sample: TH-1 **Depth:** 10

Proj. No.: 2850 **Date Sampled:**

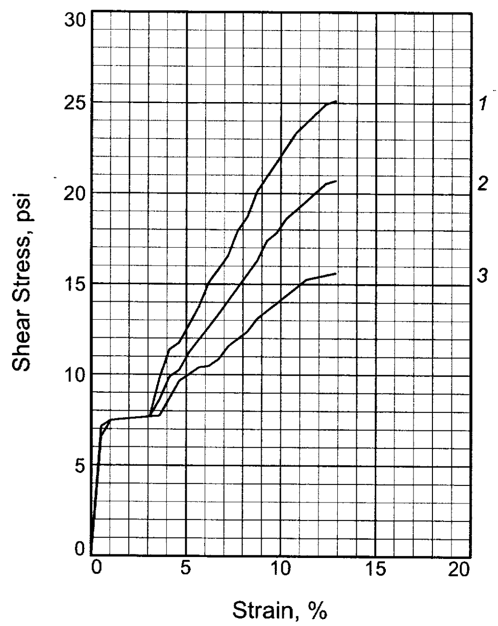
Geotechnical Engineering Group, Inc.

Tested By: AI **Checked By:** MT





	Results
C, psi	10.93
ϕ, deg	54.0
Tan(ϕ)	1.38



	Sample No.	1	2	3
Initial	Water Content, %	8.7	8.7	8.7
	Dry Density, pcf	73.6	73.6	73.6
	Saturation, %	18.5	18.5	18.5
	Void Ratio	1.2478	1.2478	1.2478
	Diameter, in.	1.94	1.94	1.94
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	23.4	23.4	23.4
	Dry Density, pcf	73.6	73.6	73.6
	Saturation, %	49.6	49.6	49.6
	Void Ratio	1.2478	1.2478	1.2478
	Diameter, in.	1.94	1.94	1.94
	Height, in.	1.00	1.00	1.00
	Normal Stress, psi	10.40	6.90	3.50
	Fail. Stress, psi	25.12	20.71	15.61
	Strain, %	12.9	12.9	12.9
	Ult. Stress, psi			
	Strain, %			
	Strain rate, in./min.	0.63	0.63	0.63

Sample Type:
Description:

Assumed Specific Gravity= 2.65
Remarks:

Client:

Project: Consol Emery Coal Mine

Source of Sample: TH-1 **Depth:** 20

Proj. No.: 2850 **Date Sampled:**

Geotechnical Engineering Group, Inc.

Figure 17

Tested By: AI **Checked By:** MT

ATTACHMENT C

Chemical Analyses

SGS

December 7, 2007

EarthFax Engineering Inc.
7324 South Union Park Avenue
Suite 100
Midvale Utah 84047
Ari Menitove
801-561-1861

Sample identification by

Kind of sample reported to us

WASTE STOCKPILE
1 BUCKET
SAMPLE WT. 35.24 LBS.

Sample taken at

Sample taken by

Date sampled November 26, 2007

Date received November 27, 2007

Analysis Report No. 59-284449

ANALYSIS OF ASH	**WEIGHT %, IGNITED BASIS**
Silicon dioxide	52.64
Aluminum oxide	10.81
Titanium dioxide	0.51
Iron oxide	3.88
Calcium oxide	16.83
Magnesium oxide	3.68
Potassium oxide	0.82
Sodium oxide	3.63
Sulfur trioxide	6.91
Phosphorus pentoxide	0.08
Strontium oxide	0.08
Barium oxide	0.07
Manganese oxide	0.06
Undetermined	0.00
	100.00

Silica Value = 68.34
Base:Acid Ratio = 0.45
T_{250} Temperature = 2355 |F

Type of Ash = LIGNITIC
Fouling Index = 3.63
Slagging Index = XXXXX

Respectfully submitted,
SGS NORTH AMERICA INC.

Huntington Laboratory

SGS

December 7, 2007

EarthFax Engineering Inc.
7324 South Union Park Avenue
Suite 100
Midvale Utah 84047
Ari Menitove
801-561-1861

Sample identification by

Kind of sample reported to us WASTE STOCKPILE
1 BUCKET
SAMPLE WT. 35.24 LBS.

Sample taken at

Sample taken by

Date sampled November 26, 2007

Date received November 27, 2007

Analysis Report No. 59-284449

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	6.15	xxxxx
% Ash	39.78	42.39
% Volatile	28.09	29.93
% Fixed Carbon	25.98	27.68
	100.00	100.00
Btu/lb	7149	7617
% Sulfur	0.99	1.05
MAF Btu		13222
SO_2 lb/mill. Btu @ 100%	2.77	
Alk. as Sodium Oxide	1.66	1.77

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	6.15	xxxxx
% Carbon	41.89	44.63
% Hydrogen	3.04	3.24
% Nitrogen	0.67	0.71
% Sulfur	0.99	1.05
% Ash	39.78	42.39
% Oxygen(diff)	7.48	7.98
	100.00	100.00

Respectfully submitted,
SGS NORTH AMERICA INC.

[signature]

Huntington Laboratory

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Soil Analysis Report

SGS Minerals Services
P.O. Box 1020
Huntington, UT 84528

Report ID: S0712019001

Project: Utah Table 6
Date Received: 12/3/2007

Date Reported: 1/10/2008
Work Order: S0712019

Lab ID	Sample ID	pH	Saturation	Electrical Conductivity	Field Capacity	Wilt Point	Calcium	Magnesium	Sodium	SAR
		s.u.	%	dS/m	%	%	meq/L	meq/L	meq/L	
S0712019-001	Earth Fax Coal Sample	7.6	31.0	91.0	25	10	47.2	81.8	715	89.0

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Soil Analysis Report

SGS Minerals Services
P.O. Box 1020
Huntington, UT 84528

Report ID: S0712019001

Project: Utah Table 6
Date Received: 12/3/2007

Date Reported: 1/10/2008
Work Order: S0712019

Lab ID	Sample ID	Sand	Silt	Clay	Texture	Coarse Fragment	Available Sodium	Exchangeable Sodium
		%	%	%		%	meq/100g	meq/100g
S0712019-001	Earth Fax Coal Sample	75.0	16.0	9.0	Sandy Loam	0.09	39.0	16.9

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

Soil Analysis Report
SGS Minerals Services
P.O. Box 1020
Huntington, UT 84528

Report ID: S0712019001

Project: Utah Table 6
Date Received: 12/3/2007

Date Reported: 1/10/2008
Work Order: S0712019

			Nitrogen			Total	T.S.	Neut.	T.S.	Total	
		TKN	Nitrate	Boron	Selenium	Sulfur	AB	Pot.	ABP	Carbon	TOC
Lab ID	**Sample ID**	%	ppm	ppm	ppm	%	t/1000t	t/1000t	t/1000t	%	%
S0712019-001	Earth Fax Coal Sample	0.15	<0.02	1.46	<0.02	1.31	40.9	114	73.2	40.3	39.0

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

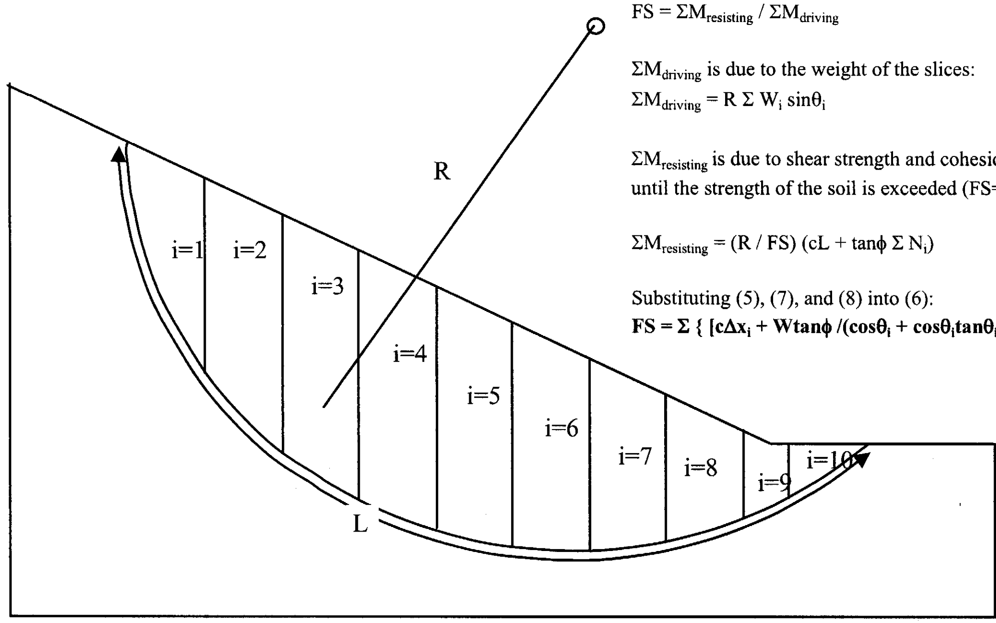
Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

ATTACHMENT D

Slope Stability Analyses

Variables:

- N = Normal force exerted on slice
- θ = Inclination of base of slice
- W = Weight of slice
- τ = Shear stress at base of slice
- Δx = Width of slice
- FS = Factor of Safety
- c = Soil cohesion
- σ = Frictional shear stress on slice
- ϕ = Soil friction angle
- M = Moment
- R = Length of moment arm
- L = Total length of failure plane (all slices)



Assume resultant of forces in y-direction is zero:

$\Sigma F_y = 0$

$= N_i \cos\theta_i - W_i + \tau_i \sin\theta$ (1)

Solve for N_i:

$N_i \cos\theta_i = W - \tau_i \sin\theta$ (2)

Shear on soil = sum of cohesion (c) and shear strength ($\sigma \tan \phi$)

$\tau i = c\, \Delta x_i / (FS\cos\theta_i) + \sigma_i \tan\phi_i\, \Delta x_i / (FS \cos\theta_i)$ (3)

Normal stress (σ_i) is a function of the normal force on the slice (N_i)

$\sigma_i = (N_i / \Delta x_i) \cos\theta_i$ (4)

Substituting (3) and (4) into (2)

$N_i = [W_i - (c\, \Delta x_i \tan\theta) / FS] / [\cos\theta_i (1 + \tan\theta_i \tan\phi / FS)]$ (5)

Moment Equations:

$FS = \Sigma M_{resisting} / \Sigma M_{driving}$ (6)

$\Sigma M_{driving}$ is due to the weight of the slices:

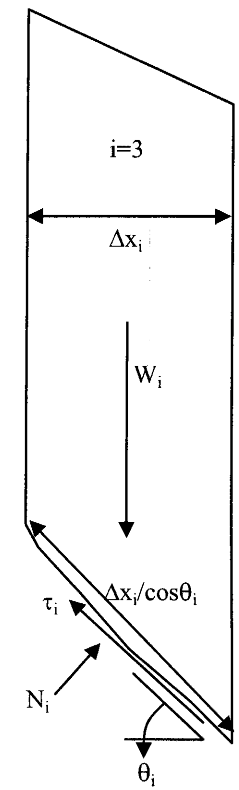
$\Sigma M_{driving} = R\, \Sigma\, W_i \sin\theta_i$ (7)

$\Sigma M_{resisting}$ is due to shear strength and cohesion of the slices. It can increase until the strength of the soil is exceeded (FS=1)

$\Sigma M_{resisting} = (R / FS)\, (cL + \tan\phi\, \Sigma\, N_i)$ (8)

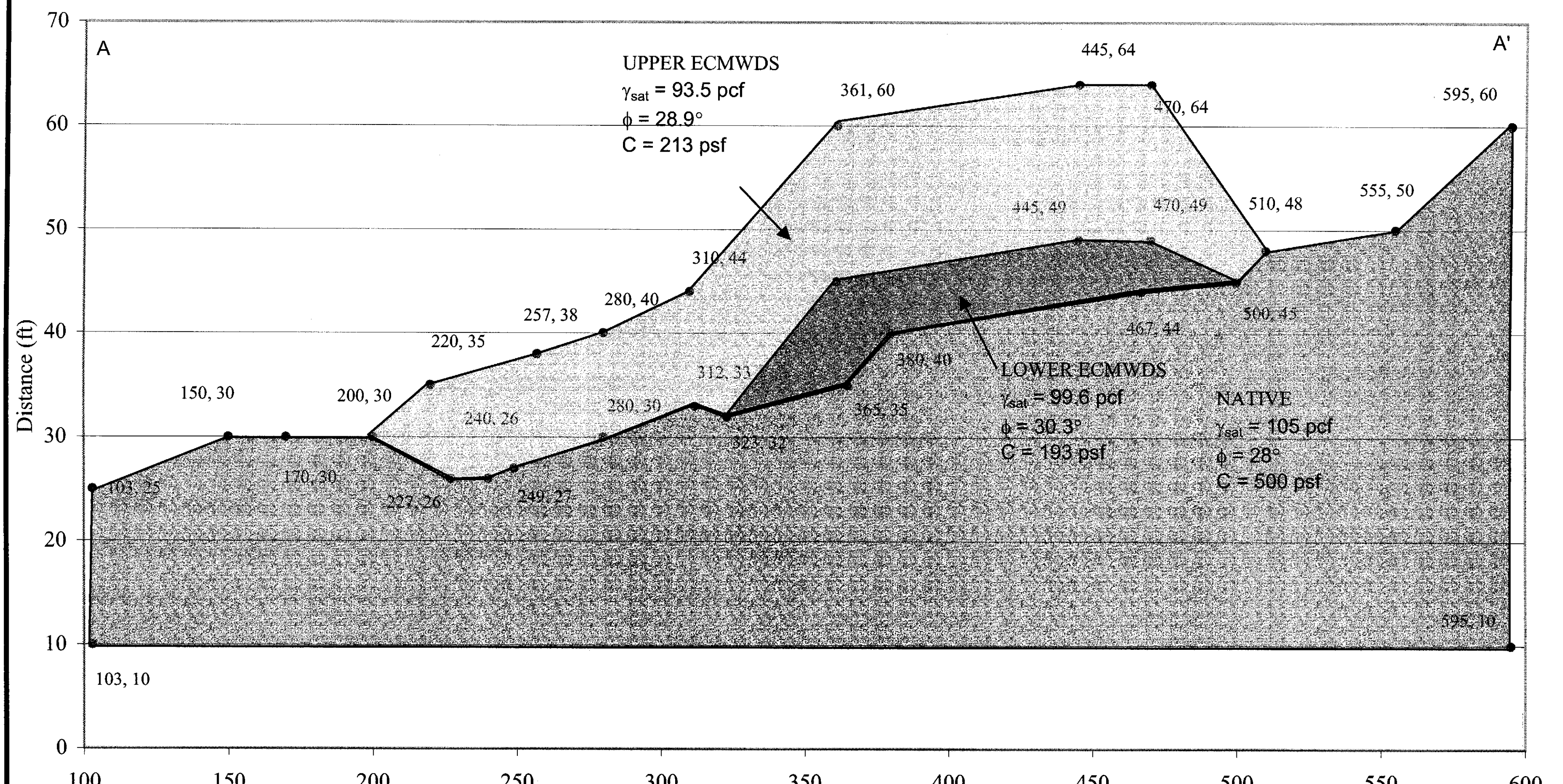
Substituting (5), (7), and (8) into (6):

$\mathbf{FS = \Sigma \{ [c\Delta x_i + W\tan\phi / (\cos\theta_i + \cos\theta_i \tan\theta_i \tan\phi / FS)] \} / (\Sigma\, W_i \sin\theta_i)}$

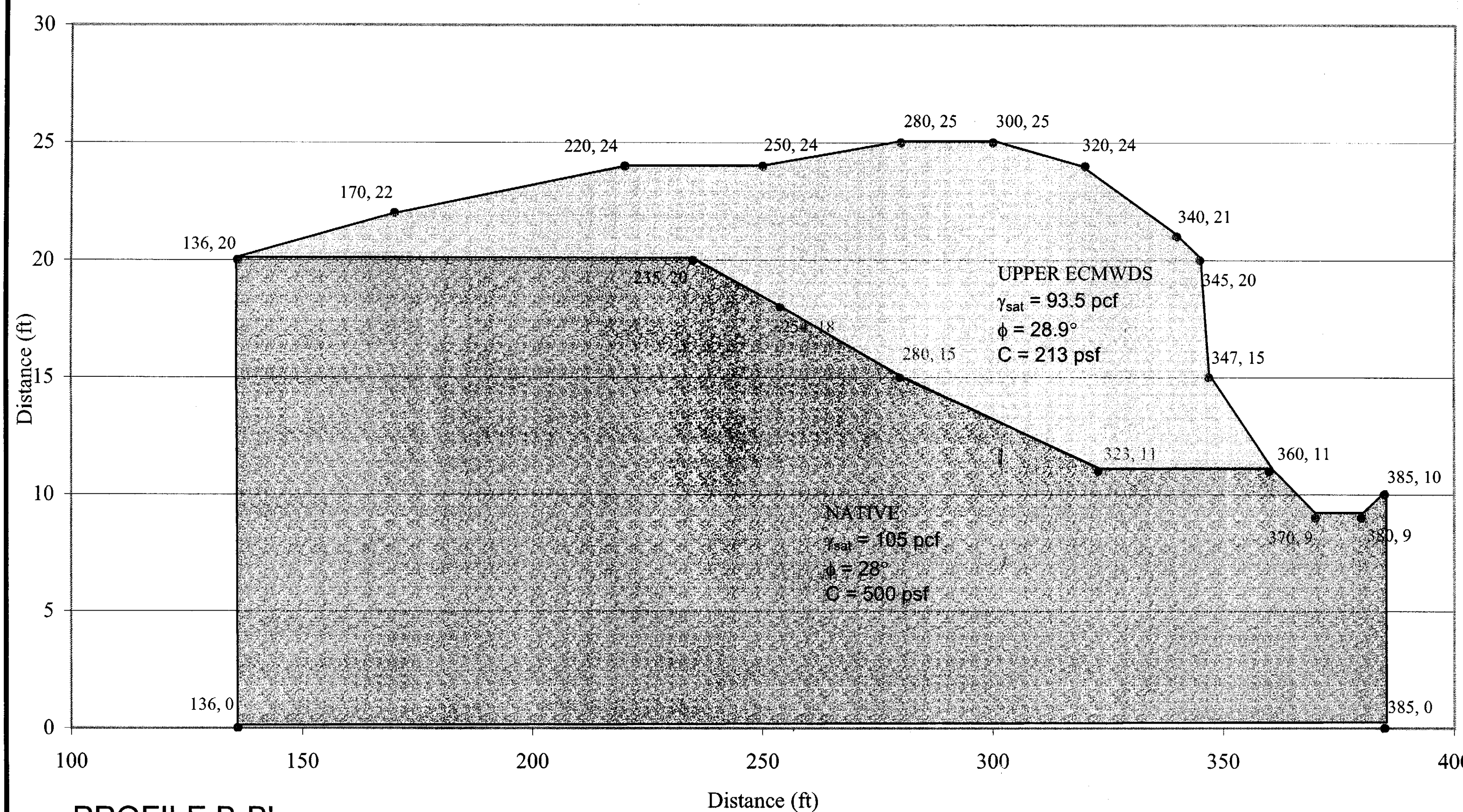


Note: Since FS is on both sides of the equation, the solution is iterative

ILLUSTRATION OF BISHOP'S METHOD OF SLICES TO DETERMINE THE FACTOR OF SAFETY (FS) AGAINST ROTATIONAL SHEAR FAILURE

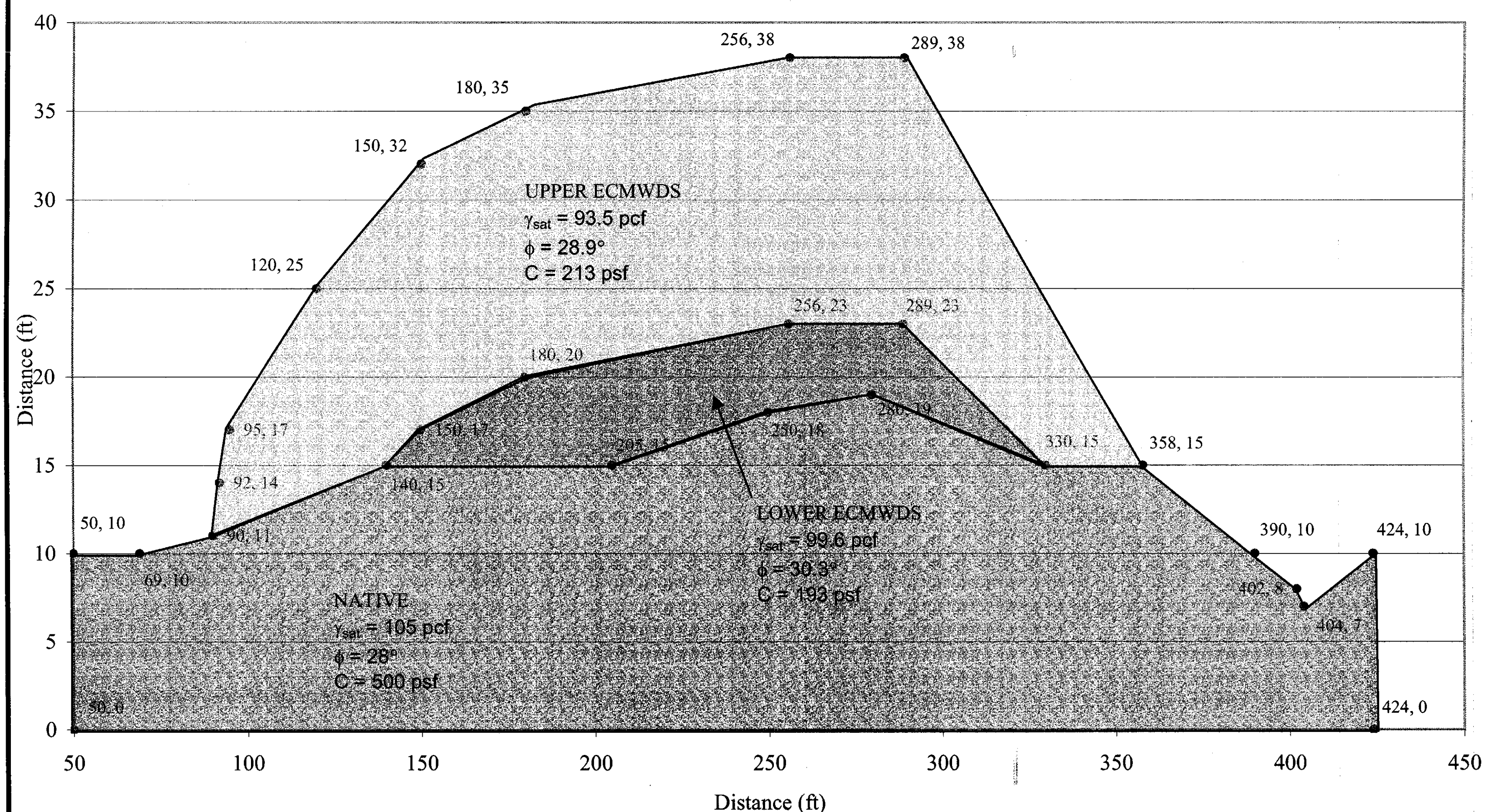

A
A'
UPPER ECMWDS
γsat = 93.5 pcf
ϕ = 28.9°
C = 213 psf
LOWER ECMWDS
γsat = 99.6 pcf
ϕ = 30.3°
C = 193 psf
NATIVE
γsat = 105 pcf
ϕ = 28°
C = 500 psf
103, 25
103, 10
150, 30
170, 30
200, 30
220, 35
227, 26
240, 26
249, 27
257, 38
280, 40
280, 30
310, 44
312, 33
323, 32
361, 60
365, 35
380, 40
445, 64
445, 49
470, 64
470, 49
467, 44
500, 45
510, 48
555, 50
595, 60
595, 10
Distance (ft)
Distance (ft)
0
10
20
30
40
50
60
70
100
150
200
250
300
350
400
450
500
550
600

PROFILE A-A'



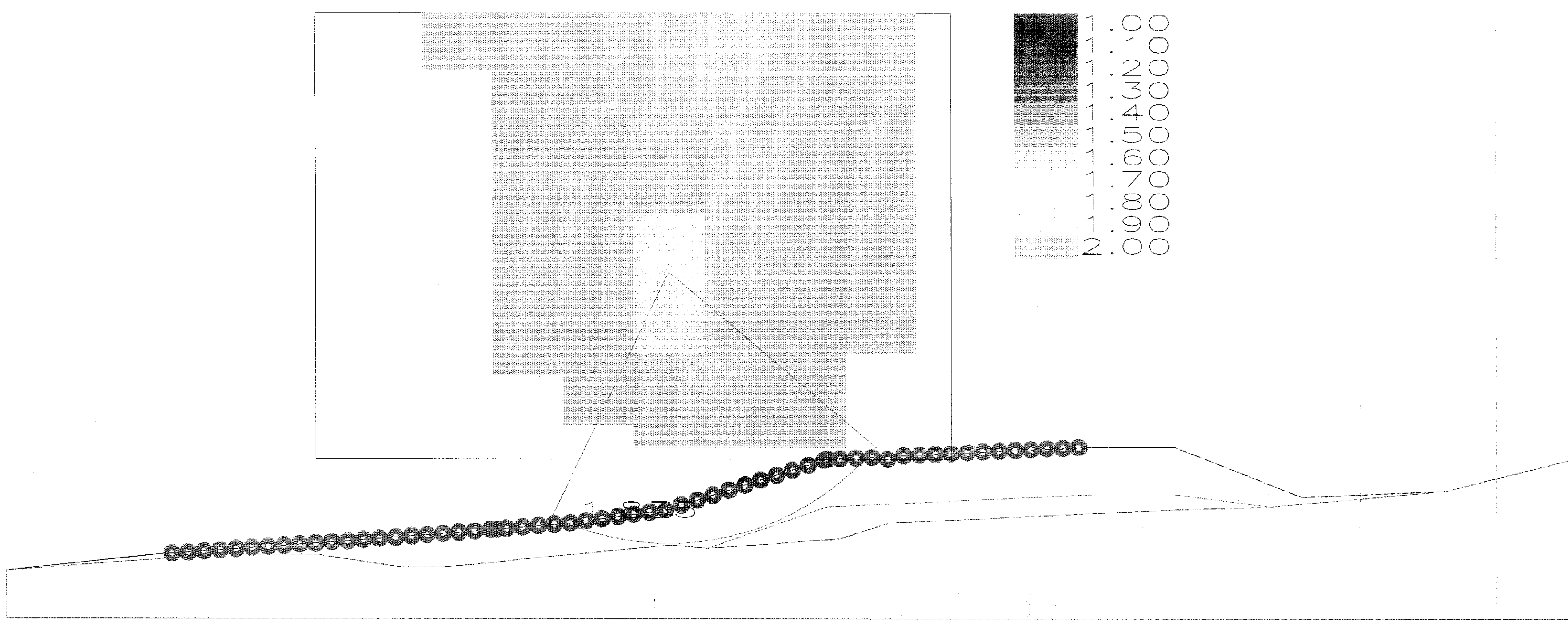
30
25
20
15
10
5
0
Distance (ft)
100
150
200
250
300
350
400
Distance (ft)
136, 20
170, 22
220, 24
250, 24
280, 25
300, 25
320, 24
340, 21
345, 20
347, 15
360, 11
370, 9
380, 9
385, 10
385, 0
136, 0
235, 20
254, 18
280, 15
323, 11
UPPER ECMWDS
γ_{sat} = 93.5 pcf
ϕ = 28.9°
C = 213 psf
NATIVE
γ_{sat} = 105 pcf
ϕ = 28°
C = 500 psf

PROFILE B-B'

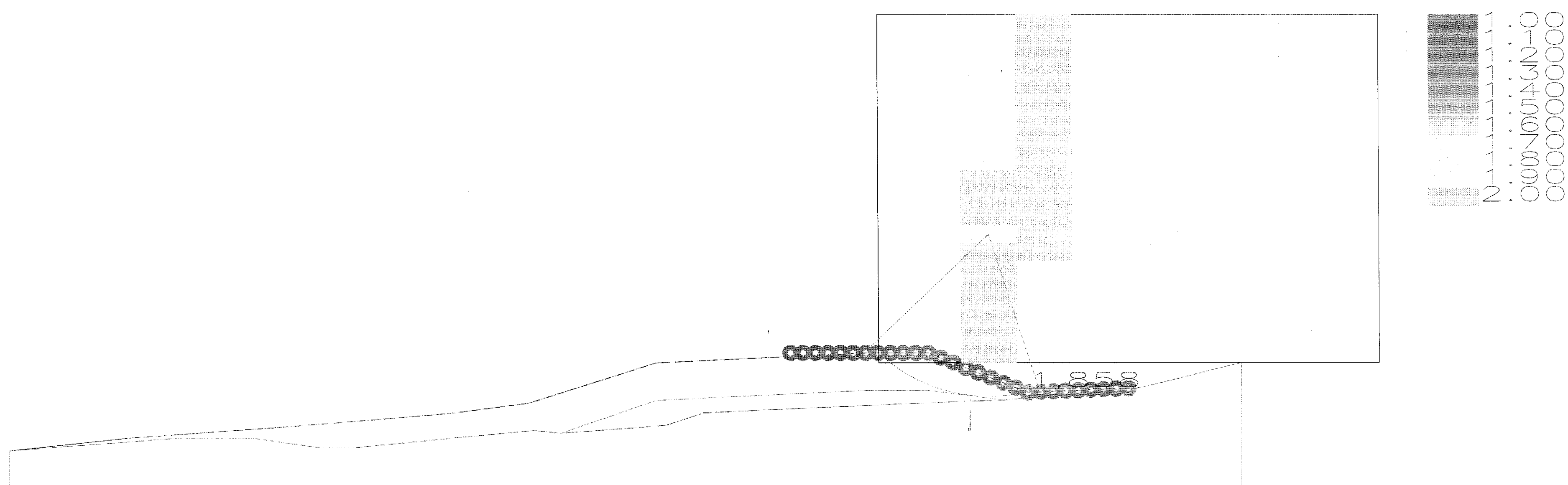


UPPER ECMWDS
γ_{sat} = 93.5 pcf
ϕ = 28.9°
C = 213 psf
LOWER ECMWDS
γ_{sat} = 99.6 pcf
ϕ = 30.3°
C = 193 psf
NATIVE
γ_{sat} = 105 pcf
ϕ = 28°
C = 500 psf
50, 10
69, 10
90, 11
92, 14
95, 17
120, 25
150, 32
180, 35
256, 38
289, 38
140, 15
150, 17
180, 20
205, 15
250, 18
256, 23
280, 19
289, 23
330, 15
358, 15
390, 10
402, 8
404, 7
424, 10
424, 0
50, 0
Distance (ft)
Distance (ft)

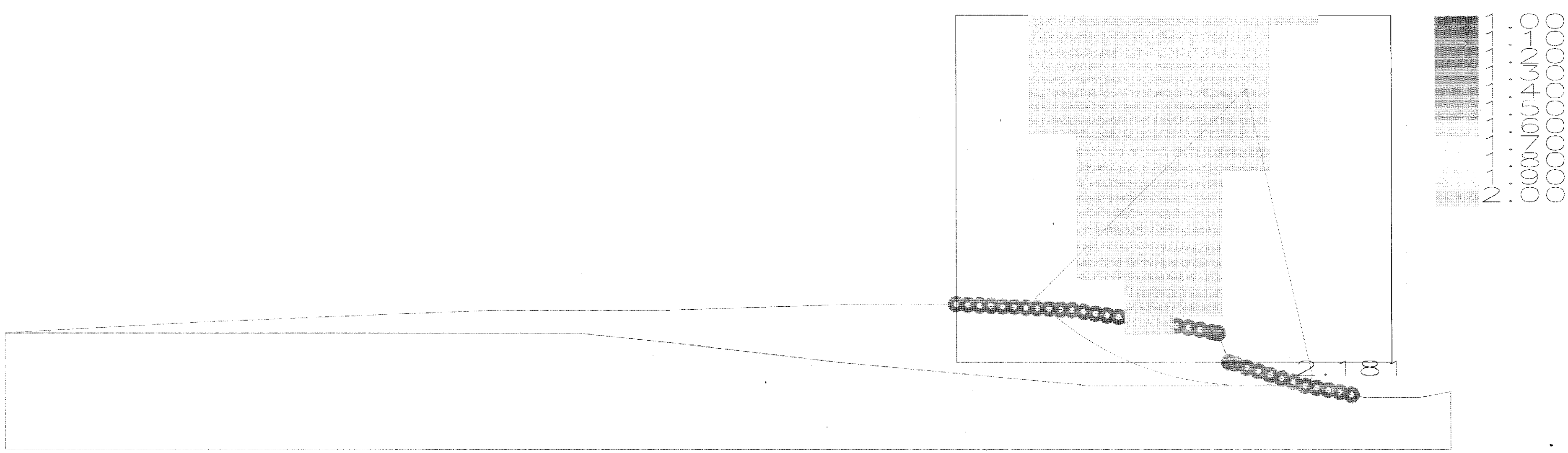
PROFILE C-C'



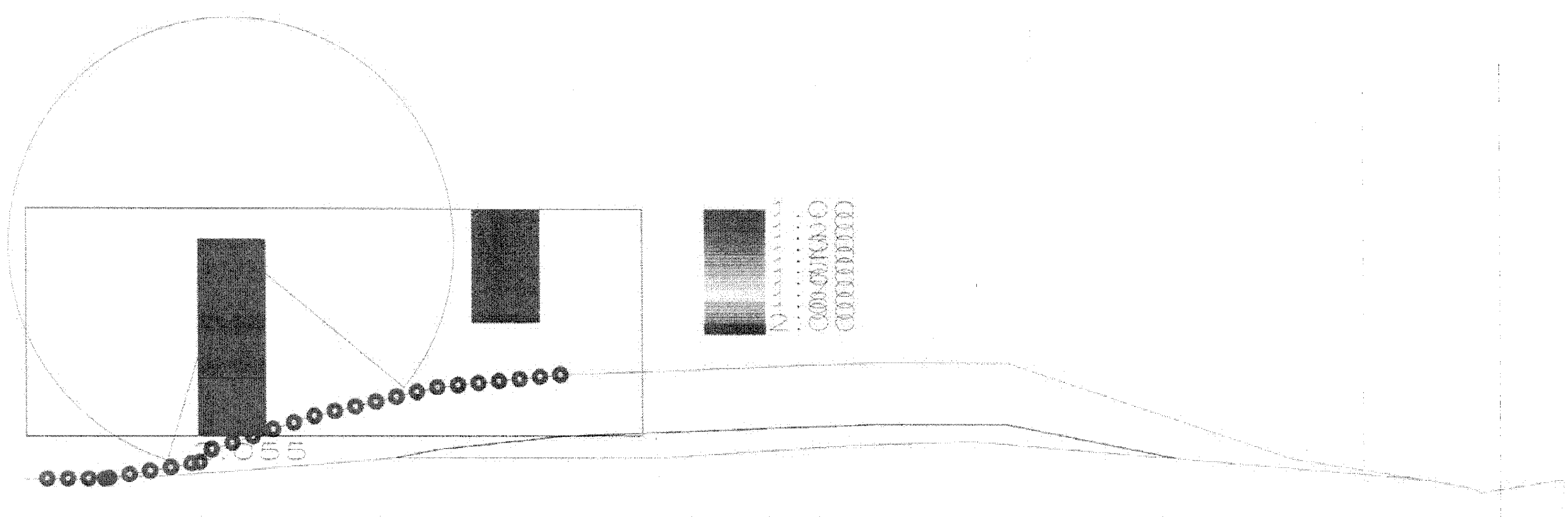
Project : CONSOL
Datafile : A—A' West Slope
Analysis : Bishop
STABLE.2002 MZ Associates Ltd



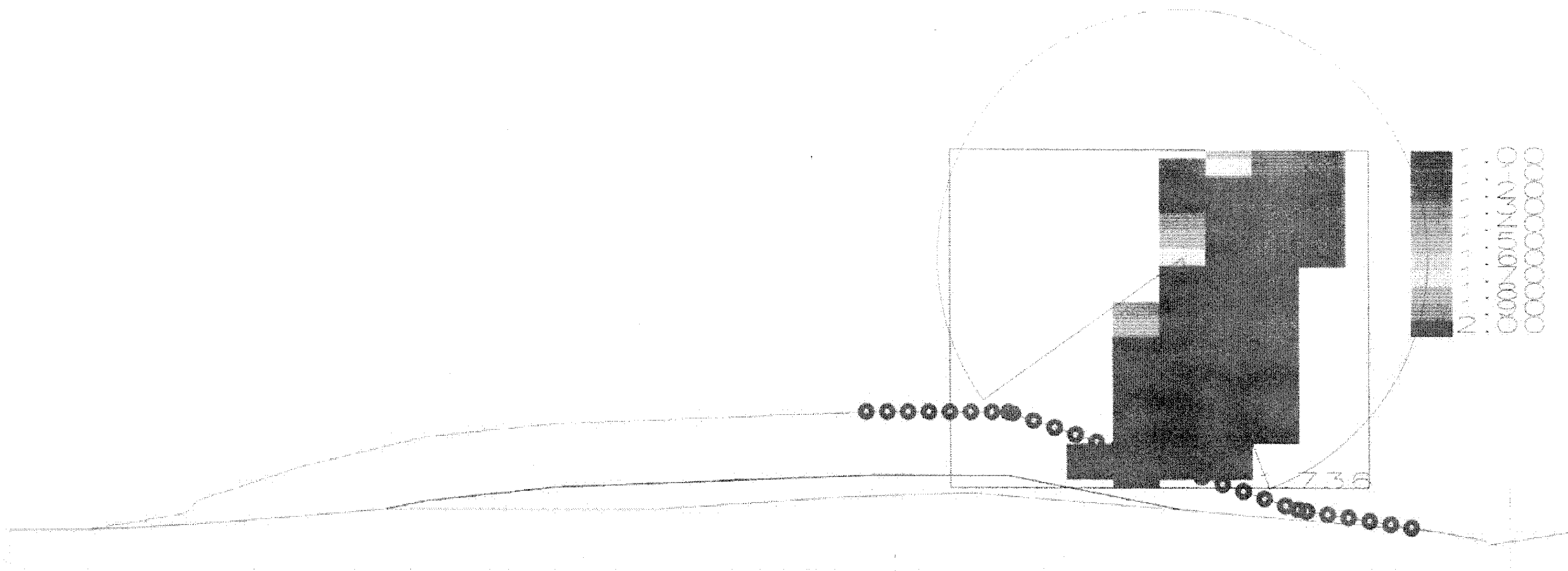
Project : CONSOL
Datafile : A—A' East Slope
Analysis : Bishop
STABLE.2002 MZ Associates Ltd



Project : CONSOL
Datafile : B—B' North Slope Surface Points
Analysis : Bishop
STABLE2002 MZ Associates Ltd



Project : CONSOL
Datafile : C-C' South Slope
Analysis : Bishop
STABLE2002 MZ Associates Ltd



Project : CONSOL
Datafile : C-C' North Slope
Analysis : Bishop
STABLE 2002 MZ Associates Ltd

STABLE Version 9.03.00u

Bishop
****

TITLE
A-A' West Slope
****
UNITS (Metric/Imperial) = I

****
GEOMETRY DEFINITION

POINTS

NO.	X	Y
1	103.000	25.000
2	150.000	30.000
3	220.000	35.000
4	257.000	38.000
5	280.000	40.000
6	310.000	44.000
7	361.000	60.000
8	445.000	64.000
9	470.000	64.000
10	510.000	48.000
11	555.000	50.000
12	595.000	60.000
13	170.000	30.000
14	200.000	30.000
15	227.000	26.000
16	240.000	26.000
17	249.000	27.000
18	280.000	30.000
19	312.000	33.000
20	323.000	32.000
21	365.000	35.000
22	380.000	40.000
23	467.000	44.000
24	500.000	45.000
25	595.000	10.000
26	103.000	10.000
45	155.000	30.360
46	160.000	30.710
47	165.000	31.070
48	170.000	31.430
49	175.000	31.790
50	180.000	32.140
51	185.000	32.500
52	190.000	32.860
53	195.000	33.210
54	200.000	33.570
55	205.000	33.930
56	210.000	34.290
57	215.000	34.640
58	225.000	35.410
59	230.000	35.810
60	235.000	36.220
61	240.000	36.620
62	245.000	37.030
63	250.000	37.430
64	255.000	37.840
65	260.000	38.260

66	265.000	38.700
67	270.000	39.130
68	275.000	39.570
69	285.000	40.670
70	290.000	41.330
71	295.000	42.000
72	300.000	42.670
73	305.000	43.330
74	315.000	45.570
75	320.000	47.140
76	325.000	48.710
77	330.000	50.270
78	335.000	51.840
79	340.000	53.410
80	345.000	54.980
81	350.000	56.550
82	355.000	58.120
83	360.000	59.690
84	365.000	60.190
85	370.000	60.430
86	375.000	60.670
87	380.000	60.010
88	385.000	61.140
89	390.000	61.380
90	395.000	61.620
91	400.000	61.860
92	405.000	62.100
93	410.000	62.330
94	415.000	62.570
95	420.000	62.810
96	425.000	63.050
97	430.000	63.290
98	435.000	63.520
99	440.000	63.760
100	361.000	45.000
101	445.000	49.000
102	470.000	49.000

LINES

Lo X	Hi X	SOIL
1	2	1
2	3	1
3	4	1
4	5	1
5	6	1
6	7	1
7	8	1
8	9	1
9	10	1
10	11	1
1	13	2
13	14	2
14	15	2
15	16	2
16	17	2
17	18	2
18	19	2
19	20	2
20	21	2
21	22	2
22	23	2
23	24	2

24	11	2
11	12	2
12	25	2
26	25	2
26	1	2
20	100	3
100	101	3
101	102	3
102	24	3

****
SOILS

SOIL	NAME	LINETYPE-PEN	COHESION	FRICTION	UNIT WT.
1	UpperRefuse	CONTINUOUS-BLACK	213.00	28.9	93.500
2	Native	CONTINUOUS-BLUE	500.00	28.0	105.000
3	LowerRefuse	CONTINUOUS-BROWN	193.00	30.3	99.600

****
PORE PRESSURE SPECIFICATION

SOIL	PIEZO Y/N/P	RU Value	EXCESS Value
1	Y	0.000	0.000
2	N	0.000	0.000
3	N	0.000	0.000

PIEZOMETRIC SURFACE

POINT

2
3
4
5
6
7
8
9
10
11

POINT PORE PRESSURES

POINT PRESSURE

****

SLIP DIRECTION (+/- X) = -

****
SLIP-CIRCLES

MANUAL

Circle Centre Grid Extremities

```
              200.000
          ***************
          *             *
 200.000  *             *    400.000
```

```
*               *
****************
     60.000

X spacing -- no. of cols (max 10)=   10
Y spacing -- no. of rows (max 20)=   20


Grid(s)  1 - 50
    Circles tangent to line   2   3
    Circles tangent to line  13  14
    Number of tangents (Top, Bottom + Intermediate)=   50

Grid   51    Circles through point    45
Grid   52    Circles through point    46
Grid   53    Circles through point    47
Grid   54    Circles through point    48
Grid   55    Circles through point    49
Grid   56    Circles through point    50
Grid   57    Circles through point    51
Grid   58    Circles through point    52
Grid   59    Circles through point    53
Grid   60    Circles through point    54
Grid   61    Circles through point    55
Grid   62    Circles through point    56
Grid   63    Circles through point    57
Grid   64    Circles through point    58
Grid   65    Circles through point    59
Grid   66    Circles through point    60
Grid   67    Circles through point    61
Grid   68    Circles through point    62
Grid   69    Circles through point    63
Grid   70    Circles through point    64
Grid   71    Circles through point    65
Grid   72    Circles through point    66
Grid   73    Circles through point    67
Grid   74    Circles through point    68
Grid   75    Circles through point    69
Grid   76    Circles through point    70
Grid   77    Circles through point    71
Grid   78    Circles through point    72
Grid   79    Circles through point    73
Grid   80    Circles through point    74
Grid   81    Circles through point    75
Grid   82    Circles through point    76
Grid   83    Circles through point    77
Grid   84    Circles through point    78
Grid   85    Circles through point    79
Grid   86    Circles through point    80
Grid   87    Circles through point    81
Grid   88    Circles through point    82
Grid   89    Circles through point    83
Grid   90    Circles through point    84
Grid   91    Circles through point    85
Grid   92    Circles through point    86
Grid   93    Circles through point    87
Grid   94    Circles through point    88
Grid   95    Circles through point    89
Grid   96    Circles through point    90
Grid   97    Circles through point    91
Grid   98    Circles through point    92
Grid   99    Circles through point    93
Grid  100    Circles through point    94
```

```
Grid  101    Circles through point   95
Grid  102    Circles through point   96
Grid  103    Circles through point   97
Grid  104    Circles through point   98
Grid  105    Circles through point   99
Grid  106    Circles through point    3
Grid  107    Circles through point    4
Grid  108    Circles through point    5
Grid  109    Circles through point    6
Grid  110    Circles through point    7
```

****
OPTIONS

```
TENSION CRACK (None/Dry/Wet)      = N
CRACK BASE Y COORD                =        0.000

EARTHQUAKE ACCELERATION           =        0.000

MINIMUM SLIDE MASS                =        0.000
```

****

POINT LOADS

POINT   ANGLE   FORCE

****
SOIL REINFORCEMENT

POINT_A   POINT_B   FORCE   PEN

****
SLICE DATA= N
****

STABLE Version 9.03.00u

Bishop
****

TITLE
A-A' East Slope
****
UNITS (Metric/Imperial) = I

****
GEOMETRY DEFINITION

POINTS

NO.	X	Y
1	103.000	25.000
2	150.000	30.000
3	220.000	35.000
4	257.000	38.000
5	280.000	40.000
6	310.000	44.000
7	361.000	60.000
8	445.000	64.000
9	470.000	64.000
10	510.000	48.000
11	555.000	50.000
12	595.000	60.000
13	170.000	30.000
14	200.000	30.000
15	227.000	26.000
16	240.000	26.000
17	249.000	27.000
18	280.000	30.000
19	312.000	33.000
20	323.000	32.000
21	365.000	35.000
22	380.000	40.000
23	467.000	44.000
24	500.000	45.000
25	595.000	10.000
26	103.000	10.000
36	415.000	64.000
37	420.000	64.000
38	425.000	64.000
39	430.000	64.000
40	435.000	64.000
41	440.000	64.000
43	450.000	64.000
44	455.000	64.000
45	460.000	64.000
46	465.000	64.000
47	475.000	62.000
48	480.000	60.000
49	485.000	58.000
50	490.000	56.000
51	495.000	54.000
52	500.000	52.000
53	505.000	50.000
54	515.000	48.220
55	520.000	48.440
56	525.000	48.670
57	530.000	48.890

58	535.000	49.110
59	540.000	49.330
60	545.000	49.560
61	550.000	49.780
62	361.000	45.000
63	445.000	49.000
64	470.000	49.000

LINES

Lo X	Hi X	SOIL
1	2	1
2	3	1
3	4	1
4	5	1
5	6	1
6	7	1
7	8	1
8	9	1
9	10	1
10	11	1
1	13	2
13	14	2
14	15	2
15	16	2
16	17	2
17	18	2
18	19	2
19	20	2
20	21	2
21	22	2
22	23	2
23	24	2
24	11	2
11	12	2
12	25	2
26	25	2
26	1	2
20	62	3
62	63	3
63	64	3
64	24	3

****
SOILS

SOIL	NAME	LINETYPE-PEN	COHESION	FRICTION	UNIT WT.
1	UpperRefuse	CONTINUOUS-BLACK	213.00	28.9	93.500
2	Native	CONTINUOUS-BLUE	500.00	28.0	105.000
3	LowerRefuse	CONTINUOUS-BROWN	193.00	30.3	99.630

****
PORE PRESSURE SPECIFICATION

SOIL	PIEZO Y/N/P	RU Value	EXCESS Value
1	Y	0.000	0.000
2	N	0.000	0.000
3	N	0.000	0.000

PIEZOMETRIC SURFACE

POINT

2
3
4
5
6
7
8
9
10
11
12

POINT PORE PRESSURES

POINT PRESSURE

****

SLIP DIRECTION (+/- X) = +

****

SLIP-CIRCLES

MANUAL

Circle Centre Grid Extremities

```
              200.000
           ***************
           *             *
  450.000  *             *   650.000
           *             *
           ***************
               60.000
```

X spacing -- no. of cols (max 10)= 10
Y spacing -- no. of rows (max 20)= 20

Grid	1	Circles through point	36
Grid	2	Circles through point	37
Grid	3	Circles through point	38
Grid	4	Circles through point	39
Grid	5	Circles through point	40
Grid	6	Circles through point	41
Grid	7	Circles through point	8
Grid	8	Circles through point	43
Grid	9	Circles through point	44
Grid	10	Circles through point	45
Grid	11	Circles through point	46
Grid	12	Circles through point	47
Grid	13	Circles through point	48
Grid	14	Circles through point	49
Grid	15	Circles through point	50
Grid	16	Circles through point	51
Grid	17	Circles through point	52
Grid	18	Circles through point	53
Grid	19	Circles through point	54
Grid	20	Circles through point	55
Grid	21	Circles through point	56

Grid	22	Circles through point	57
Grid	23	Circles through point	58
Grid	24	Circles through point	59
Grid	25	Circles through point	60
Grid	26	Circles through point	61
Grid	27	Circles through point	61
Grid	28	Circles through point	61
Grid	29	Circles through point	10
Grid	30	Circles through point	9

****
OPTIONS

TENSION CRACK (None/Dry/Wet) = N
CRACK BASE Y COORD = 0.000

EARTHQUAKE ACCELERATION = 0.000

MINIMUM SLIDE MASS = 0.000

****

POINT LOADS

POINT ANGLE FORCE

****
SOIL REINFORCEMENT

POINT_A POINT_B FORCE PEN

****
SLICE DATA= N
****

STABLE Version 9.03.00u

Bishop
****

TITLE
B-B' North Slope Surface Points
****
UNITS (Metric/Imperial) = I

****
GEOMETRY DEFINITION

POINTS

NO.	X	Y
1	136.000	20.000
2	170.000	22.000
3	220.000	24.000
4	250.000	24.000
5	280.000	25.000
6	300.000	25.000
7	320.000	24.000
8	340.000	21.000
9	345.000	20.000
10	347.000	15.000
11	360.000	11.000
12	235.000	20.000
13	254.000	18.000
14	280.000	15.000
15	323.000	11.000
16	370.000	9.000
17	380.000	9.000
18	385.000	10.000
19	385.000	0.000
20	136.000	0.000
26	302.000	24.900
27	304.000	24.800
28	306.000	24.700
29	308.000	24.600
30	310.000	24.500
31	312.000	24.400
32	314.000	24.300
33	316.000	24.200
34	318.000	24.100
35	322.000	23.700
36	324.000	23.400
37	326.000	23.100
38	328.000	22.800
39	330.000	22.500
40	332.000	22.200
41	334.000	21.900
42	336.000	21.600
43	338.000	21.300
44	342.000	20.600
45	344.000	20.200
46	348.000	14.690
47	350.000	14.080
48	352.000	13.460
49	354.000	12.850
50	356.000	12.230
51	358.000	11.620
52	362.000	10.600

53	364.000	10.200
54	366.000	9.800
55	368.000	9.400

LINES

Lo X	Hi X	SOIL
1	2	1
2	3	1
3	4	1
5	6	1
6	7	1
7	8	1
8	9	1
9	10	1
10	11	1
4	5	1
11	16	2
20	1	2
1	12	2
12	13	2
13	14	2
14	15	2
15	11	2
16	17	2
17	18	2
18	19	2
20	19	2

****
SOILS

SOIL	NAME	LINETYPE-PEN	COHESION	FRICTION	UNIT WT.
1	UpperRefuse	CONTINUOUS-RED	213.00	28.9	93.500
2	Native	CONTINUOUS-BLUE	500.00	28.0	105.000

****
PORE PRESSURE SPECIFICATION

SOIL	PIEZO Y/N/P	RU Value	EXCESS Value
1	Y	0.000	0.000
2	N	0.000	0.000

PIEZOMETRIC SURFACE

POINT
1
2
3
4
5
6
7
8
9
10
11

POINT PORE PRESSURES

POINT   PRESSURE

```
**********************************************************

SLIP DIRECTION   (+/- X) = +

**********************************************************
SLIP-CIRCLES

MANUAL

Circle Centre Grid Extremities

                75.000
           ***************
           *             *
   300.000 *             *   375.000
           *             *
           ***************
                15.000

X spacing -- no. of cols (max 10)=   10
Y spacing -- no. of rows (max 20)=   20


Grid    1    Circles through point   26
Grid    2    Circles through point   27
Grid    3    Circles through point   28
Grid    4    Circles through point   29
Grid    5    Circles through point   30
Grid    6    Circles through point   31
Grid    7    Circles through point   32
Grid    8    Circles through point   33
Grid    9    Circles through point   34
Grid   10    Circles through point   35
Grid   11    Circles through point   36
Grid   12    Circles through point   37
Grid   13    Circles through point   38
Grid   14    Circles through point   39
Grid   15    Circles through point   40
Grid   16    Circles through point   41
Grid   17    Circles through point   42
Grid   18    Circles through point   43
Grid   19    Circles through point   44
Grid   20    Circles through point   45
Grid   21    Circles through point   46
Grid   22    Circles through point   47
Grid   23    Circles through point   48
Grid   24    Circles through point   49
Grid   25    Circles through point   50
Grid   26    Circles through point   51
Grid   27    Circles through point   52
Grid   28    Circles through point   53
Grid   29    Circles through point   54
Grid   30    Circles through point   55
Grid   31    Circles through point   55
Grid   32    Circles through point    6
Grid   33    Circles through point    7
Grid   34    Circles through point    8
Grid   35    Circles through point    9
Grid   36    Circles through point   10
Grid   37    Circles through point   11
```

```
**************************************************************
OPTIONS

TENSION CRACK (None/Dry/Wet)        = N
CRACK BASE Y COORD                  =       0.000

EARTHQUAKE ACCELERATION             =       0.000

MINIMUM SLIDE MASS                  =       0.000

**************************************************************

POINT LOADS

POINT    ANGLE        FORCE

**************************************************************
SOIL REINFORCEMENT

   POINT_A  POINT_B      FORCE    PEN

**************************************************************
SLICE DATA= N
**************************************************************
```

STABLE Version 9.03.00u

Bishop
****

TITLE
C-C' North Slope
****
UNITS (Metric/Imperial) = I

****
GEOMETRY DEFINITION

POINTS

NO.	X	Y
1	50.000	10.000
2	69.000	10.000
3	92.000	14.000
4	95.000	17.000
5	120.000	25.000
6	150.000	32.000
7	180.000	35.000
8	256.000	38.000
9	289.000	38.000
10	358.000	15.000
11	390.000	10.000
12	402.000	8.000
13	404.000	7.000
14	424.000	10.000
15	90.000	11.000
16	140.000	15.000
17	205.000	15.000
18	250.000	18.000
19	280.000	19.000
20	330.000	15.000
21	424.000	0.000
22	50.000	0.000
23	255.000	38.000
24	260.000	38.000
25	265.000	38.000
26	270.000	38.000
27	275.000	38.000
28	280.000	38.000
29	285.000	38.000
30	290.000	37.670
31	295.000	36.000
32	300.000	34.330
33	305.000	32.670
34	310.000	31.000
35	315.000	29.330
36	320.000	27.670
37	325.000	26.000
38	330.000	24.330
39	335.000	22.670
40	340.000	21.000
41	345.000	19.330
42	350.000	17.670
43	355.000	16.000
44	360.000	14.690
45	365.000	13.910
46	370.000	13.130
47	375.000	12.340

48	380.000	11.560
49	385.000	10.780
50	150.000	17.000
51	180.000	20.000
52	256.000	23.000
53	289.000	23.000

LINES

Lo X	Hi X	SOIL
2	3	1
3	4	1
4	5	1
5	6	1
6	7	1
7	8	1
8	9	1
9	10	1
10	11	1
22	1	2
1	2	2
2	15	2
15	16	2
16	17	2
17	18	2
18	19	2
19	20	2
20	11	2
11	12	2
12	13	2
13	14	2
14	21	2
22	21	2
16	50	3
50	51	3
51	52	3
52	53	3
53	20	3

****
SOILS

SOIL	NAME	LINETYPE-PEN	COHESION	FRICTION	UNIT WT.
1	UpperRefuse	CONTINUOUS-RED	213.00	28.9	93.500
2	Native	CONTINUOUS-BLUE	500.00	28.0	105.000
3	LowerRefuse	CONTINUOUS-BLACK	193.00	30.3	99.600

****
PORE PRESSURE SPECIFICATION

SOIL	PIEZO Y/N/P	RU Value	EXCESS Value
1	Y	0.000	0.000
2	N	0.000	0.000
3	N	0.000	0.000

PIEZOMETRIC SURFACE

POINT

2
3

```
      4
      5
      6
      7
      8
      9
     10
     11

POINT PORE PRESSURES

POINT   PRESSURE

***********************************************************

SLIP DIRECTION  (+/- X) = +

***********************************************************
SLIP-CIRCLES

MANUAL

Circle Centre Grid Extremities

                100.000
            ***************
            *             *
   275.000  *             *   375.000
            *             *
            ***************
                 20.000

X spacing -- no. of cols (max 10)=   10
Y spacing -- no. of rows (max 20)=   20


Grid    1    Circles through point    23
Grid    2    Circles through point    24
Grid    3    Circles through point    25
Grid    4    Circles through point    26
Grid    5    Circles through point    27
Grid    6    Circles through point    28
Grid    7    Circles through point    29
Grid    8    Circles through point    30
Grid    9    Circles through point    31
Grid   10    Circles through point    32
Grid   11    Circles through point    33
Grid   12    Circles through point    34
Grid   13    Circles through point    35
Grid   14    Circles through point    36
Grid   15    Circles through point    37
Grid   16    Circles through point    38
Grid   17    Circles through point    39
Grid   18    Circles through point    40
Grid   19    Circles through point    41
Grid   20    Circles through point    42
Grid   21    Circles through point    43
Grid   22    Circles through point    44
Grid   23    Circles through point    45
Grid   24    Circles through point    46
Grid   25    Circles through point    47
Grid   26    Circles through point    48
```

```
Grid   27    Circles through point    49
Grid   28    Circles through point     9
Grid   29    Circles through point    10
```

****

OPTIONS

```
TENSION CRACK (None/Dry/Wet)      = N
CRACK BASE Y COORD                =        0.000

EARTHQUAKE ACCELERATION           =        0.000

MINIMUM SLIDE MASS                =        0.000
```

****

POINT LOADS

POINT   ANGLE   FORCE

****

SOIL REINFORCEMENT

   POINT_A   POINT_B   FORCE   PEN

****

SLICE DATA= N

****

STABLE Version 9.03.00u

Bishop
****

TITLE
C-C' South Slope
****
UNITS (Metric/Imperial) = I

****
GEOMETRY DEFINITION

POINTS

NO.	X	Y
1	50.000	10.000
2	69.000	10.000
3	92.000	14.000
4	95.000	17.000
5	120.000	25.000
6	150.000	32.000
7	180.000	35.000
8	256.000	38.000
9	289.000	38.000
10	358.000	15.000
11	390.000	10.000
12	402.000	8.000
13	404.000	7.000
14	424.000	10.000
15	90.000	11.000
16	140.000	15.000
17	205.000	15.000
18	250.000	18.000
19	280.000	19.000
20	330.000	15.000
21	424.000	0.000
22	50.000	0.000
23	55.000	10.000
24	60.000	10.000
25	65.000	10.000
26	70.000	10.170
27	75.000	11.040
28	80.000	11.910
29	85.000	12.780
30	90.000	13.650
31	100.000	18.600
32	105.000	20.200
33	110.000	21.800
34	115.000	23.400
35	125.000	26.170
36	130.000	27.330
37	135.000	28.500
38	140.000	29.670
39	145.000	30.830
40	155.000	32.500
41	160.000	33.000
42	165.000	33.500
43	170.000	34.000
44	175.000	34.500
45	150.000	17.000
46	180.000	20.000
47	256.000	23.000

48 289.000 23.000

LINES

Lo X	Hi X	SOIL
2	3	1
3	4	1
4	5	1
5	6	1
6	7	1
7	8	1
8	9	1
9	10	1
10	11	1
22	1	2
1	2	2
2	15	2
15	16	2
16	17	2
17	18	2
18	19	2
19	20	2
20	11	2
11	12	2
12	13	2
13	14	2
14	21	2
22	21	2
16	45	3
45	46	3
46	47	3
47	48	3
48	20	3

****
SOILS

SOIL	NAME	LINETYPE-PEN	COHESION	FRICTION	UNIT WT.
1	UpperRefuse	CONTINUOUS-RED	213.00	28.9	93.500
2	Native	CONTINUOUS-BLUE	500.00	28.0	105.000
3	LowerRefuse	CONTINUOUS-BLACK	193.00	30.3	99.600

****
PORE PRESSURE SPECIFICATION

SOIL	PIEZO Y/N/P	RU Value	EXCESS Value
1	Y	0.000	0.000
2	N	0.000	0.000
3	N	0.000	0.000

PIEZOMETRIC SURFACE

POINT

2
3
4
5
6
7
8

```
     9
    10
    11

POINT PORE PRESSURES

POINT  PRESSURE

***********************************************************

SLIP DIRECTION  (+/- X) = -

***********************************************************
SLIP-CIRCLES

MANUAL

Circle Centre Grid Extremities

                 75.000
             ***************
             *             *
    50.000   *             *   200.000
             *             *
             ***************
                 20.000

X spacing -- no. of cols (max 10)=   10
Y spacing -- no. of rows (max 20)=   20


Grid    1    Circles through point    23
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Grid   16    Circles through point    38
Grid   17    Circles through point    39
Grid   18    Circles through point     2
Grid   19    Circles through point     3
Grid   20    Circles through point     4
Grid   21    Circles through point     5
Grid   22    Circles through point     6
Grid   23    Circles through point    40
Grid   24    Circles through point    41
Grid   25    Circles through point    42
Grid   26    Circles through point    43
Grid   27    Circles through point    44
Grid   28    Circles through point     7

***********************************************************
OPTIONS
```

```
TENSION CRACK (None/Dry/Wet)      = N
CRACK BASE Y COORD                =       0.000

EARTHQUAKE ACCELERATION           =       0.000

MINIMUM SLIDE MASS                =       0.000

**********************************************************

POINT LOADS

POINT   ANGLE      FORCE

**********************************************************
SOIL REINFORCEMENT

   POINT_A  POINT_B     FORCE   PEN

**********************************************************
SLICE DATA= N
**********************************************************
```

From: Wayne Western
To: Burton, Priscilla; Christensen, Steve; Houskeeper, Karl
Date: 2/14/2008 11:08 AM
Subject: Re: Geotechnical Report NOV 10005

CC: Grubaugh-Littig, Pam; Haddock, Daron; Wright, Mary Ann

Comrades,

I agree that a more robust sampling plan is needed. I have no specification for the sampling plan. What have we asked other mines to do?

Red

>>> Priscilla Burton 2/14/2008 10:58 AM >>>
On Tuesday, Feb 5, we received a copy of the Geotechnical Report for the coal mine waste at the Emery Mine, the subject of the NOV 10005. The report is included with this email, because Karl was not copied on the original email. After reviewing this geotechnical document, the following is clear to me:

The pile is 25 ft. deep at the eastern end and 10 ft. deep at the western end. Two cores were drilled in the pile and below the pile, down 11 ft (eastern end) and 6 ft (western end) into native material. Samples from "distinct" material or at intervals of 5 ft. were taken. Samples from both cores were composited in one bucket. (Unknown whether native material was sampled and added to composite bucket. If it was, than approximately 30% of the sample would represent native soil.) One subsample of the composite was run by IterMountain Labs, Sheridan.

It is not good science to suggest that one composite sample represents 26,000 cu yds of material that has accumulated over the last 20 years, since the first sampling. For laboratory information to be meaningful, I recommend that the Division request a commitment in the NOV response plan. My suggestion follows:

"In accordance with R645-301-731.311, Consol will core sample the existing waste pile at least one year prior to final reclamation. The core sampling will be conducted on a grid over the surface of the pile with a minimum of 10 cores. A sample from each core will be taken at 5 ft intervals. Each 5 ft. interval will be analyzed for pH, EC, SAR, Acid Base Accounting, Se, B, and texture. The results of the analysis will be reported to the Division promptly and included in the annual report. The final reclamation handling plan may change, based upon the analyses."

What was your opinion?