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Geotechnical & Construction Services Reno, Nevada 89502-7140 Facsimile: 775/359-7766

Mr. Rich Mattucci
Brown and Caldwell
3264 Goni Road, Suite 153
Carson City, Nevada 89706

December 17, 2009
Project No.: 0155-21-1

RE: Summary of Site Sampling and Materials Testing – Yerington Mine Site Yerington, Nevada

Dear Mr. Mattucci:

Black Eagle Consulting, Inc. is pleased to present the results of our site sampling and materials testing performed at the Yerington Mine site in Yerington, Nevada. All sampling and testing was performed in accordance with the scope of work outlined in the Brown and Caldwell Task Order #29 Authorization dated April 20, 2009.

Sulfide Tailings

Field Sampling and Testing

Sampling of the oxide tailings proposed for use as tailings capping material was performed in August 2009 by excavating 6 test pits, while sampling and field testing of the sulfide tailings was performed in May 2009 by excavating 3 test pits in the proposed South Landfill (sulfide tailings) area. The locations of the test pits are shown on the attached Plate 1 - Sampling Locations. Test pitting was accomplished using a John Deere® 160LC trackhoe to a maximum depth of approximately 20 feet below existing grade. Bulk samples for index testing were collected from excavation spoils obtained at specific depths in each material horizon. Due to the depth of the test pit and associated safety concerns, the depth to changes in stratigraphy and total depth of excavation in the oxide tailings material could only be approximated.

During test pit excavation within the oxide tailings material, representative material excavated from the test pit was spread out in a single approximate 18-inch-thick loose lift adjacent to the test pit and subjected to approximately 4 passes by the trackhoe. Nuclear density testing was then performed on the completed pads.

A nuclear density gauge was used to determine the in situ moisture content and dry density of the material present at the ground surface at each test pit location in the South Landfill area. Vane shear testing was also performed at the surface of each test pit in the South Landfill area prior to excavation in order to document the in situ shear strength of the material.

A geologist examined and identified all soils in the field in accordance with American Society for Testing and Materials (ASTM) D 2488. During test pitting, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada, laboratory for possible testing. Additional soil classification was subsequently performed in accordance with ASTM 2487 (Unified Soil Classification System [USCS]) upon completion of laboratory testing as described below. Logs of the test pits are presented as Plate 2 - Test Pit Logs, and a USCS chart has been included as Plate 3 - Graphic Soils Classification Chart. Sulfide tailings test pits are denoted are denoted as SST, NST, and Clay Tails.

A summary of the sampling locations and field testing is presented in Table 1 - Oxide Tailings and South Landfill Sampling Summary.

TABLE 1- OXIDE TAILINGS AND SOUTH LANDFILL SAMPLING SUMMARY

Test Location	Location Designation Test Pit (TP) Number	Test Depth (Inches)	Moisture Content (%)	Dry Density (pcf)	Vane Shear Value	Shear Strength (kPa)	Shear Strength (psi)	UTM Coordinates	
								Northings	Eastings
South Landfill Area	SST TP-01	6	5.7	91.3	96	145	21	4,319,809	309,684
	SST TP-02	6	6.4	93.5	80	121	18	4,319,877	309,785
	SST TP-03	6	11.4	84.3	93	141	20	4,319,984	309,670
Oxide Tailings	TP-06 OX	6*	5.7	115.1	NT	NT	NT	4,319,175	308,710
		12*	5.5	118.5	NT	NT	NT		
	TP-07 OX	6*	5.9	120.8	NT	NT	NT	4,319,204	308,674
		10*	6.0	121.3	NT	NT	NT		
	TP-08 OX	6*	6.2	114.0	NT	NT	NT	4,319,245	308,644
		12*	5.7	116.4	NT	NT	NT		
	TP-09 OX	6*	6.7	113.4	NT	NT	NT	4,319,307	308,601
		12*	6.4	119.1	NT	NT	NT		
	TP-10 OX	6*	5.0	121.6	NT	NT	NT	4,319,282	308,702
		12*	5.0	123.5	NT	NT	NT		
	TP-11 OX	6*	5.7	118.8	NT	NT	NT	4,319,328	308,716
		12*	5.7	122.8	NT	NT	NT		

NR = Not Recorded
NT = Not Tested
* Test performed on 18-inch section of oxide tailings material spread out and compacted by 4 passes of a John Deere® 160LC trackhoe.

Laboratory Testing

All soils testing performed in the Black Eagle Consulting, Inc. soils laboratory is conducted in accordance with the standards and methodologies described in Volume 4.08 of the ASTM standards. Oxide tailings samples are denoted as OX, while South Landfill samples are denoted as SST.

Representative samples of the oxide tailings and South Landfill materials were analyzed to determine their in situ moisture content (ASTM D 2216), grain size distribution (ASTM D 422), and plasticity index (ASTM D 4318). Test results were used to classify the soils according to ASTM D 2487 and to verify field logs, which were then updated as appropriate. Classification in this manner provides an indication of the soil's mechanical properties. Results of these tests are shown on Plate 4 - Index Test Results.

Moisture-density relationship tests (ASTM D 1557) were performed on representative samples of the oxide tailings and South Landfill materials. The maximum density shown by this test is compared with field densities to determine the percent relative compaction. The moisture density curves are included as Plate 5 Moisture-Density Relationship Test Results.

Specific gravity tests (ASTM D 5550) were performed on representative samples of oxide tailings and South Landfill materials to aid in hydrometer and direct shear testing of these materials. Test results are presented in Table 2 – Oxide Tailings and South Landfill Materials Laboratory Test Summary.

Direct shear tests (ASTM D 3080) were also performed on representative samples of South Landfill materials. Tests were run on remolded, inundated samples under various normal loads in order to develop a Mohr's strength envelope. For remolded samples, the sample was screened to remove particles larger than the number 4 sieve prior to testing. Results of these tests are shown on Plate 6 - Direct Shear Test Results.

Hydraulic conductivity tests (ASTM D 5084) were performed on representative samples of South Landfill materials. The tests were performed on samples remolded to approximately 90 percent of the materials maximum dry density (ASTM D 1557) at optimum moisture content. A confining pressure of 5 pounds per square inch (psi) was used during testing. Results of these tests are shown on Plate 7 - Hydraulic Conductivity Test Results.

A summary of all the laboratory testing performed on the oxide tailings and South Landfill materials is shown in Table 2.

TABLE 2 - OXIDE TAILINGS AND SOUTH LANDFILL MATERIALS LABORATORY TEST SUMMARY

Sample Identification and Location Test Pit (TP) No.	Sample Depth (ft)	Sample Number	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)	% < #200 Sieve	Maximum Size (mm)	Water Content (%)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Specific Gravity	Angle of Internal Friction (Degrees)	Cohesion (psf)	Hydraulic Conductivity (cm/sec)	USCS Classification
SST TP-01	0.0	Bulk	NV	NP	NP	18	4.75	9.4	104.3	14.1	2.587	47	523		SM
SST TP-01	1.5	A	NV	NP	NP	13	4.75	8.3							SM
SST TP-02	0.0	Bulk	NV	NP	NP	61	9.5	13.9	107.8	16.7	2.631	41	0	2.3×10^{-4}	ML
SST TP-02	1.5	A	NV	NP	NP	31	19	12.1							SM
SST TP-03	1.5	A	NV	NP	NP	67	9.5	14.0							ML
TP-06 OX	0.0	Bulk	28	20	8	14	19	4.2	120.6	12.7					SC
TP-07 OX	10.0	C	29	19	10	12	19	5.7							SC
TP-08 OX	5.0	B	31	19	12	12	19	5.8							SP-SC
TP-09 OX	0.0	Bulk	28	22	6	11	19	4.6	125.8	8.5					GP-GC
TP-10 OX	15.0	D	28	16	12	10	19	6.9							GP-GC
TP-11 OX	0.0	Bulk	31	19	12	12	19	6.0	125.9	10.1					SC

NV = No Value
NP = Non-Plastic

Seismic Design Criteria

The 2006 *International Building Code* (ICC, 2006), adopted by the City of Yerington, requires a detailed soils evaluation to a depth of 100 feet to develop appropriate soils criteria. However, the code states that a Site Class D may be used as a default value when the soil properties are not known in sufficient detail to determine the soil profile type. The Site Class D soil profile is for stiff soils with a shear velocity between 600 and 1,200 feet per second, or with an N (Standard Penetration Test [SPT]) value between 15 and 50 or an undrained shear strength between 1,000 and 2,000 pounds per square foot (psf). Based on our experience and the geology at the Yerington mine site, it is our opinion that the default Site Class D is appropriate. With that assumption, the recommended seismic design criteria follow:

TABLE 3 - SEISMIC DESIGN CRITERIA USING 2006 *INTERNATIONAL BUILDING CODE* (USGS, 2007)	
Approximate Latitude	39.00
Approximate Longitude	-119.20
Spectral Response at Short Periods, S_s, percent of gravity	1.246
Spectral Response at 1-Second Period, S_1, percent of gravity	0.478
Site Class	D
Site Coefficient F_a, decimal	1.00
Site Coefficient F_v, decimal	1.32
Site Adjusted Spectral Response at Short Periods, S_{MS}, percent of gravity	1.246
Site Adjusted Spectral Response at Long Periods, S_{M1}, percent of gravity	0.632

Closing

This report has been prepared with generally accepted geotechnical practices. The information submitted is based upon field exploration performed at the locations described in this letter-report. This report does not reflect soils or ground water variations that may be evident during the construction period. We recommend our firm be retained to perform construction observation in all phases of the project related to geotechnical factors. The owner shall be responsible for distribution of this geotechnical investigation to all designer and contractors whose work is related to geotechnical factors.

We appreciate being of service to you on this project. If you have any questions, or require additional information or clarification, please do not hesitate to contact us.

Sincerely,

Black Eagle Consulting, Inc.

PROFESSIONAL ENGINEER STATE OF NEVADA
PATRICK A. PILLING
12-17-09
CIVIL
No. 9153

Patrick A. Pilling, Ph.D., P.E., D.GE.
President

Exp 12-31-11

PAP:mrc/lmk

Enclosures: Plate 1 – Sampling Locations
Plate 2 – Test Pit Logs
Plate 3 – Graphic Soils Classification Chart
Plate 4 – Index Test Results
Plate 5 – Moisture-Density Relationship Test Results
Plate 6 – Direct Shear Test Results
Plate 7 – Hydraulic Conductivity Test Results

Copies to: Addressee (3 copies)

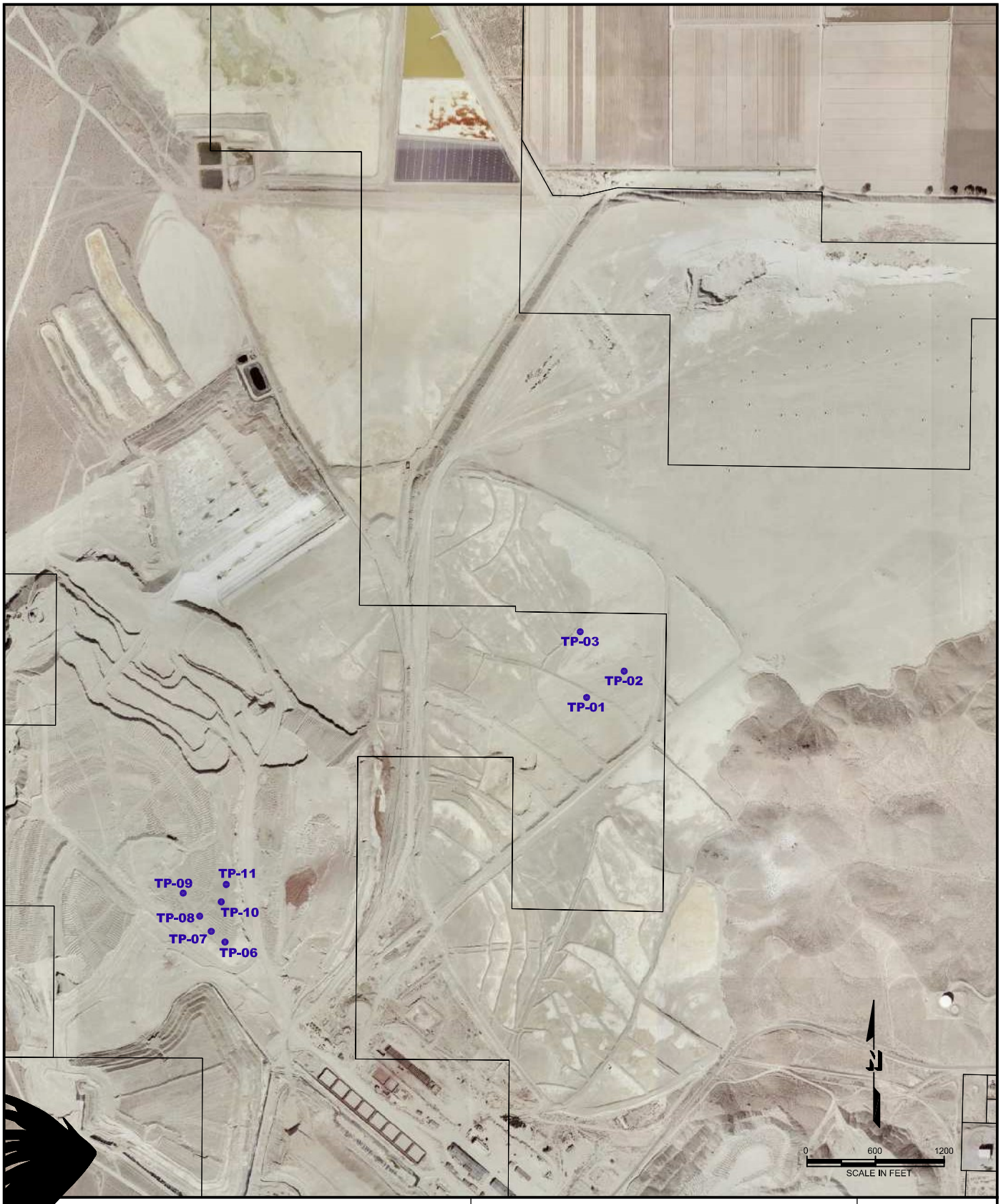
References:

American Society for Testing and Materials (ASTM), 2005, *Soil and Rock; Dimension Stone; Geosynthetics*, Volume 4.08.

International Code Council (ICC), 2006, *International Building Code*.

United States Geological Survey (USGS), 2007, *Earthquake Ground Motion Parameters*, Version 5.0.8.

ENCLOSURES



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Brown & Caldwell

Sample Locations

Yerington Mine

Yerington, Nevada

Project No.
0155-21-1

Plate 1

TEST PIT LOG

TEST PIT NO.: SST TP-01

DATE: 5/29/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
						GP-GC		0.0' - 1.2': **Poorly Graded Gravel with Clay and Sand** Tan, yellow, dry, dense to very dense, with an estimated 5-10% low to medium plasticity fines, 15-20% fine to coarse sand, and 70-75% fine to coarse angular to subangular gravel. Cap for tailings.
A	GRAB		8.3	NP	2			1.2' - 18.0': **Silty Sand** Tan, yellow, dry, loose to medium dense, with 13% non-plastic fines, and 87% fine to coarse sand.
					4			
B	GRAB				6			
					8			
					10	SM		Occasional thin gray clay layers up to 3 inches thick.
C	GRAB							
					12			
					14			
D	GRAB				16			
					18			18.0' - 20.0': **Sandy Silt** Gray, slightly moist, very stiff, with an estimated 65-70% non-plastic fines, and 30-35% fine to coarse sand.
E	GRAB					ML		

Excavated in the South Sulfide Tailings.

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SHEET 1 OF 1

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: SST TP-02

DATE: 5/29/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
						GP-GC		0.0' - 0.8': **Poorly Graded Gravel with Clay and Sand** Tan, yellow, dry, dense to very dense, with an estimated 5-10% low to medium plasticity fines, 15-20% fine to coarse sand, and 70-75% fine to coarse angular to subangular gravel. Cap for tailings.
						ML		0.8' - 1.4': **Sandy Silt** Gray, slightly moist, very stiff, with an estimated 65-70% non-plastic fines, and 30-35% fine to coarse sand.
A	GRAB		12.1	NP	2			
					4	SM		1.4' - 9.0': **Silty Sand** Yellow brown, slightly moist, loose to medium dense, with 13% non-plastic fines, and 87% fine to coarse sand.
B	GRAB				6			
					8			
					10	ML		9.0' - 13.0': **Sandy Silt** Gray, yellow brown, slightly moist, stiff to very stiff, with an estimated 70-75% non-plastic fines, and 25-30% fine to coarse sand.
C	GRAB							
					12			
					14	ML		13.0' - 17.5': **Sandy Silt** Blue-gray, yellow brown, slightly moist, very stiff, with an estimated 65-70% non-plastic fines, and 30-35% fine to coarse sand.
D	GRAB				16			
					18	ML		17.5' - 20.0': **Silt** Dark gray, slightly moist, stiff to very stiff, with an estimated 90-95% non-plastic fines, and 5-10% fine to coarse sand.
E	GRAB							

Excavated in the South Sulfide Tailings.

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BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: SST TP-03

DATE: 5/29/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
						GP-GC		0.0' - 1.0': **Poorly Graded Gravel with Clay and Sand** Tan, yellow, dry, dense to very dense, with an estimated 5-10% low to medium plasticity fines, 15-20% fine to coarse sand, and 70-75% fine to coarse angular to subangular gravel. Cap for tailings.
A	GRAB		14.0	NP	2	ML		1.0' - 4.0': **Sandy Silt** Reddish brown, gray, thinly bedded, slightly moist, stiff, with 67% non-plastic fines, and 33% fine to coarse sand.
					4			
B	GRAB				6	ML		4.0' - 9.0': **Sandy Silt** Yellow brown, gray, slightly moist, stiff to very stiff, with an estimated 70-75% non-plastic fines, and 25-30% fine to coarse sand.
					8			
C	GRAB				10	ML		9.0' - 13.0': **Sandy Silt** Gray, slightly moist, very stiff, with an estimated 65-70% non-plastic fines, and 30-35% fine to coarse sand.
					12			
D	GRAB				14	ML		13.0' - 17.0': **Sandy Silt** Blue-gray, slightly moist, stiff to very stiff, with an estimated 70-75% non-plastic fines, and 25-30% fine to coarse sand.
					16			
E	GRAB				18	ML		17.0' - 20.0': **Silt** Dark gray, slightly moist, stiff to very stiff, with an estimated 90-95% non-plastic fines, and 5-10% fine to coarse sand.

Excavated in the South Sulfide Tailings.

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SHEET 1 OF 1

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-06 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								0.0' - 20.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-15% medium plasticity fines, 40-50% fine to coarse sand, and 35-45% fine to coarse angular gravel.
A	GRAB				2			
					4			
B	GRAB				6			
					8			
					10	SP-SC		
C	GRAB				12			
					14			
D	GRAB				16			
					18			

Excavated in the Oxide Tailings. Bulk sample collected 0 - 20'.

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BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-06 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
E	GRAB							
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			

Excavated in the Oxide Tailings. Bulk sample collected 0 - 20'.

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SHEET 2 OF 2

TEST PIT LOG

TEST PIT NO.: TP-07 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
						SP-SC		0.0' - 11.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-15% medium plasticity fines, 40-50% fine to coarse sand, and 35-45% fine to coarse angular gravel.
A	GRAB				2			
					4			
B	GRAB				6			
					8			
					10			
C	GRAB							
					12	SP-SC		11.0' - 20.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-10% medium plasticity fines, 45-50% fine to coarse sand, and 40-45% fine to coarse angular gravel.
					14			
D	GRAB				16			
					18			

Excavated in the Oxide Tailings.

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TEST PIT LOG

TEST PIT NO.: TP-07 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
E	GRAB							
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			

Excavated in the Oxide Tailings.

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BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-08 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								0.0' - 12.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-15% medium plasticity fines, 40-50% fine to coarse sand, and 35-45% fine to coarse angular gravel.
A	GRAB				2			
					4			
B	GRAB				6	SP-SC		
					8			
					10			
C	GRAB							
					12			12.0' - 20.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-10% medium plasticity fines, 45-50% fine to coarse sand, and 40-45% fine to coarse angular gravel.
					14			
D	GRAB				16	SP-SC		
					18			

Excavated in the Oxide Tailings.

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BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-08 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
E	GRAB							
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			

Excavated in the Oxide Tailings.

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PLATE: 2

SHEET 2 OF 2

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-09 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								0.0' - 20.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-15% medium plasticity fines, 40-50% fine to coarse sand, and 35-45% fine to coarse angular gravel.
A	GRAB				2			
					4			
B	GRAB				6			
					8			
					10	SP-SC		
C	GRAB				12			
					14			
D	GRAB				16			
					18			

Excavated in the Oxide Tailings. Bulk sample collected 0 - 20'.

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BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-09 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
E	GRAB							
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			

Excavated in the Oxide Tailings. Bulk sample collected 0 - 20'.

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PLATE: 2

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-10 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								0.0' - 20.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-15% medium plasticity fines, 40-50% fine to coarse sand, and 35-45% fine to coarse angular gravel.
A	GRAB				2			
					4			
B	GRAB				6			
					8			
					10	SP-SC		
C	GRAB				12			
					14			
D	GRAB				16			
					18			

Excavated in the Oxide Tailings.

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(775) 359-6600

Brown & Caldwell
Yerington Mine
Yerington, NV

PROJECT NO.: **0155-21-1**

PLATE: 2

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-10 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
E	GRAB							
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			

Excavated in the Oxide Tailings.

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Brown & Caldwell
Yerington Mine
Yerington, NV

PROJECT NO.: **0155-21-1**

PLATE: 2

SHEET 2 OF 2

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-11 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								0.0' - 20.0': **Poorly Graded Sand with Clay and Gravel** Brown, dark brown, slightly moist, very dense, with an estimated 5-15% medium plasticity fines, 40-50% fine to coarse sand, and 35-45% fine to coarse angular gravel.
A	GRAB				2			
					4			
B	GRAB				6			
					8			
					10	SP-SC		
C	GRAB				12			
					14			
D	GRAB				16			
					18			

Excavated in the Oxide Tailings. Bulk sample collected 0 - 20'.

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Brown & Caldwell
Yerington Mine
Yerington, NV

PROJECT NO.: **0155-21-1**

PLATE: 2

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

TEST PIT LOG

TEST PIT NO.: TP-11 OX

DATE: 8/12/2009

TYPE OF HOE: Cat 160C LC

DEPTH TO GROUND WATER (ft): NE

LOGGED BY: SMM

GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
E	GRAB							
					22			
					24			
					26			
					28			
					30			
					32			
					34			
					36			
					38			

Excavated in the Oxide Tailings. Bulk sample collected 0 - 20'.

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Brown & Caldwell
Yerington Mine
Yerington, NV

PROJECT NO.: **0155-21-1**

PLATE: 2

SHEET 2 OF 2

BORING_LOG 0155211.GPJ BLKEAGLE.GDT 12/15/2009

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL MATERIAL				--	FILL MATERIAL, NON-NATIVE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

EXPLORATION SAMPLE TERMINOLOGY

Sample Type	Sample Symbol	Sample Code
Auger Cuttings		Auger
Bulk (Grab) Sample		Grab
Modified California Sampler		MC
Shelby Tube		SH or ST
Standard Penetration Test		SPT
Split Spoon		SS
No Sample		

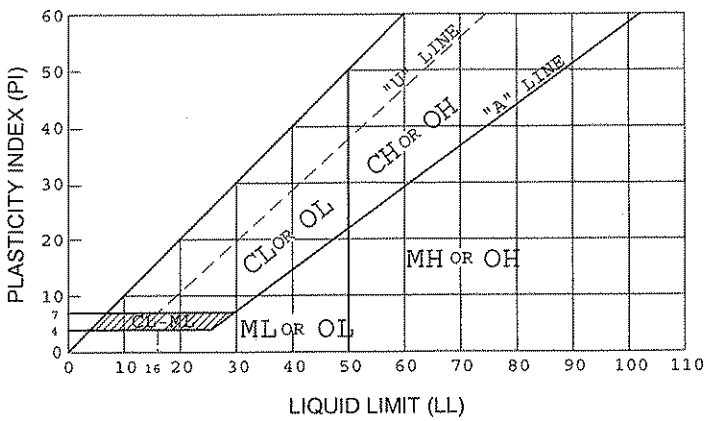
GRAIN SIZE TERMINOLOGY

Component of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 2mm)
Sand	# 4 to #200 sieve (2mm to 0.074mm)
Silt or Clay	Passing #200 sieve (0.074mm)

RELATIVE DENSITY OF GRANULAR SOILS

N - Blows/ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
greater than 50	Very Dense

PLASTICITY CHART



FOR CLASSIFICATION OF FINE-GRAINED SOILS AND FINE-GRAINED FRACTION OF COARSE-GRAINED SOILS

CONSISTENCY OF COHESIVE SOILS

Unconfined Compressive Strength, psf	N - Blows/ft	Consistency
less than 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	5 - 8	Firm
2,000 - 4,000	9 - 15	Stiff
4,000 - 8,000	16 - 30	Very Stiff
8,000 - 16,000	31 - 60	Hard
greater than 16,000	greater than 60	Very Hard

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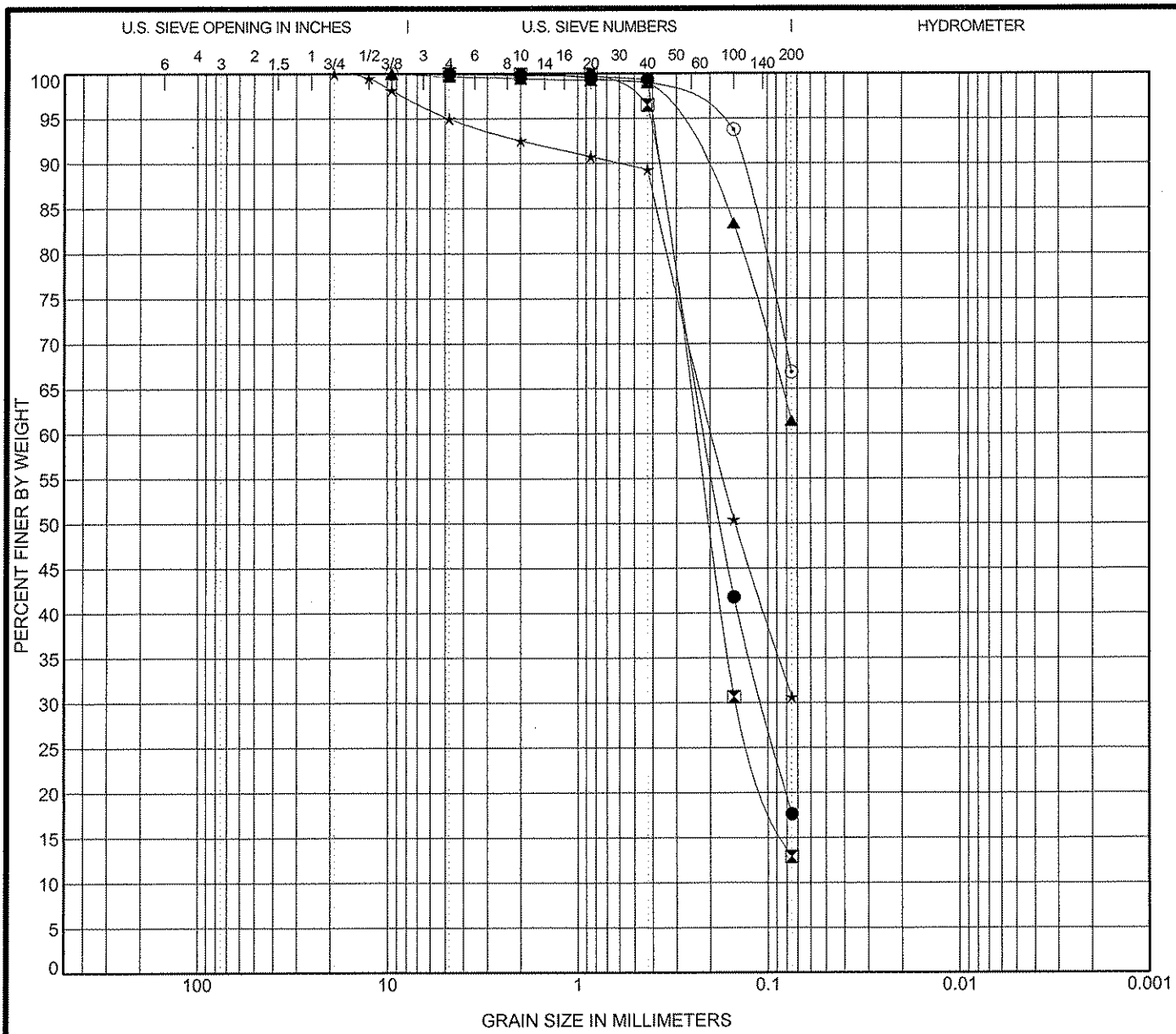
USCS Soil Classification Chart

Project: **Yerington Mine**

Location: **Yerington, NV**

Project Number: **0155-21-1** Plate: 3

USCS CHART 0155211.GPJ US LAB.GDT 12/15/2009



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
●	**SST TP-01**	**0.0'**	**SILTY SAND (SM)**	**NP**	**NP**	**NP**		
⊠	**SST TP-01**	**1.5'**	**SILTY SAND (SM)**	**NP**	**NP**	**NP**		
▲	**SST TP-02**	**0.0'**	**SANDY SILT (ML)**	**NP**	**NP**	**NP**		
★	**SST TP-02**	**1.5'**	**SILTY SAND (SM)**	**NP**	**NP**	**NP**		
⊙	**SST TP-03**	**1.5'**	**SANDY SILT (ML)**	**NP**	**NP**	**NP**		

	Specimen Identification		D100	D60	D30	D10	MC %	%Gravel	%Sand	%Silt	%Clay
●	**SST TP-01**	**0.0'**	**4.75**	**0.209**	**0.107**		**9.4**	**0.0**	**82.4**	**17.6**	
⊠	**SST TP-01**	**1.5'**	**4.75**	**0.239**	**0.146**		**8.3**	**0.0**	**87.1**	**12.9**	
▲	**SST TP-02**	**0.0'**	**9.5**				**13.9**	**0.3**	**38.2**	**61.4**	
★	**SST TP-02**	**1.5'**	**19**	**0.194**			**12.1**	**5.0**	**64.4**	**30.6**	
⊙	**SST TP-03**	**1.5'**	**9.5**				**14.0**	**0.0**	**33.1**	**66.8**	

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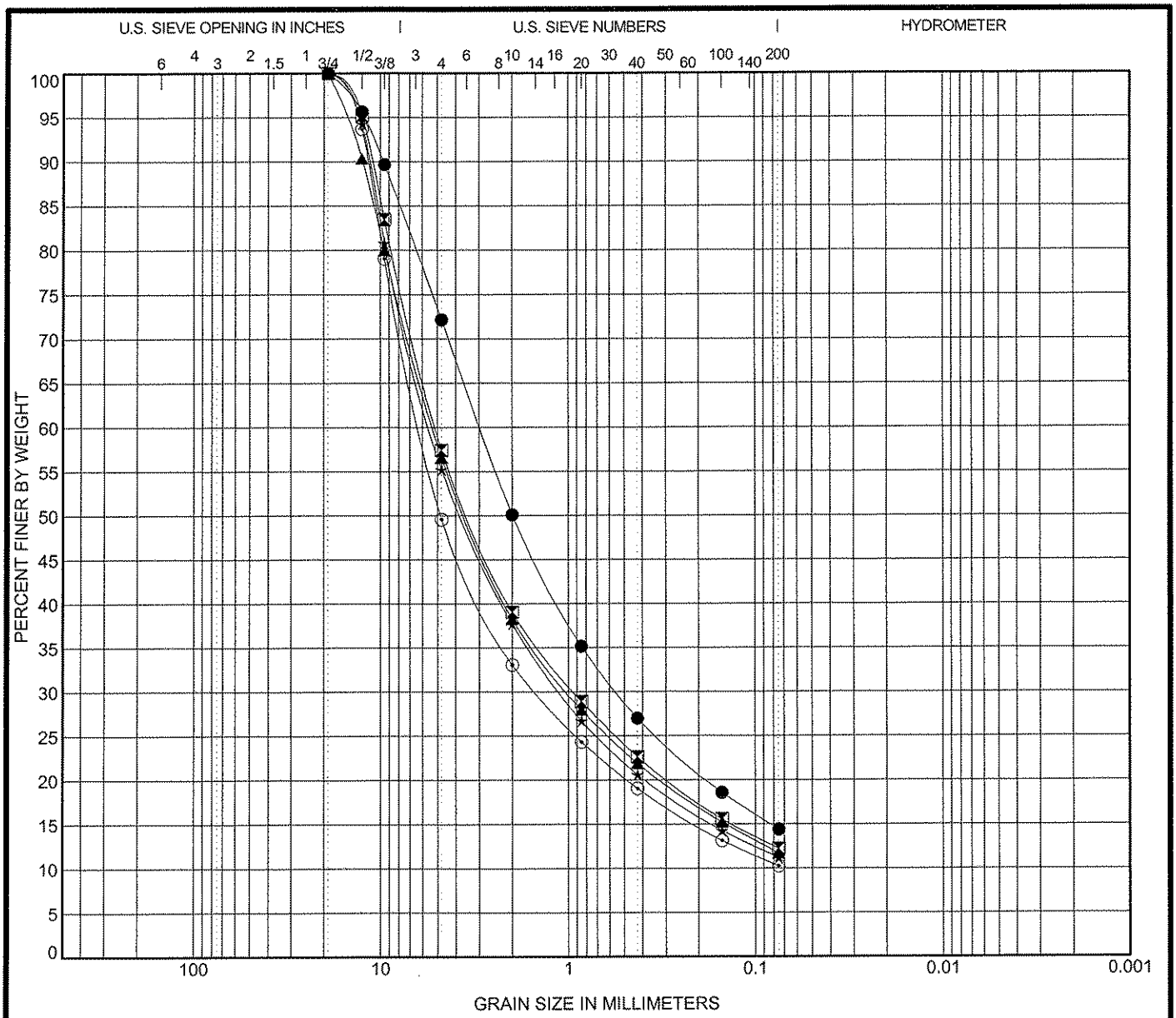
GRAIN SIZE DISTRIBUTION

Project: **Yerington Mine**

Location: **Yerington, NV**

Project Number: **0155-21-1** Plate: 4a

US GRAIN SIZE2 0155211.GPJ US LAB.GDT 12/15/2009



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
●	TP-06 OX	0.0'	CLAYEY SAND with GRAVEL (SC)	28	20	8		
⊠	TP-07 OX	10.0'	CLAYEY SAND with GRAVEL (SC)	29	19	10	3.62	107.54
▲	TP-08 OX	5.0'	POORLY GRADED SAND with CLAY and GRAVEL (SP-SC)	31	19	12	3.62	98.46
★	TP-09 OX	0.0'	POORLY GRADED GRAVEL with SILTY CLAY and SAND (GP-GC)	28	22	6	3.88	94.00
⊙	TP-10 OX	15.0'	POORLY GRADED GRAVEL with CLAY and SAND (GP-GC)	28	16	12	5.13	85.89

	Specimen Identification		D100	D60	D30	D10	MC %	%Gravel	%Sand	%Silt	%Clay
●	TP-06 OX	0.0'	19	2.95	0.549		4.2	27.8	57.8	14.4	
⊠	TP-07 OX	10.0'	19	5.09	0.934		5.7	42.6	45.2	12.2	
▲	TP-08 OX	5.0'	19	5.263	1.009		5.8	43.5	44.8	11.7	
★	TP-09 OX	0.0'	19	5.408	1.099		4.6	44.8	44.0	11.2	
⊙	TP-10 OX	15.0'	19	6.072	1.484		6.9	50.4	39.3	10.2	

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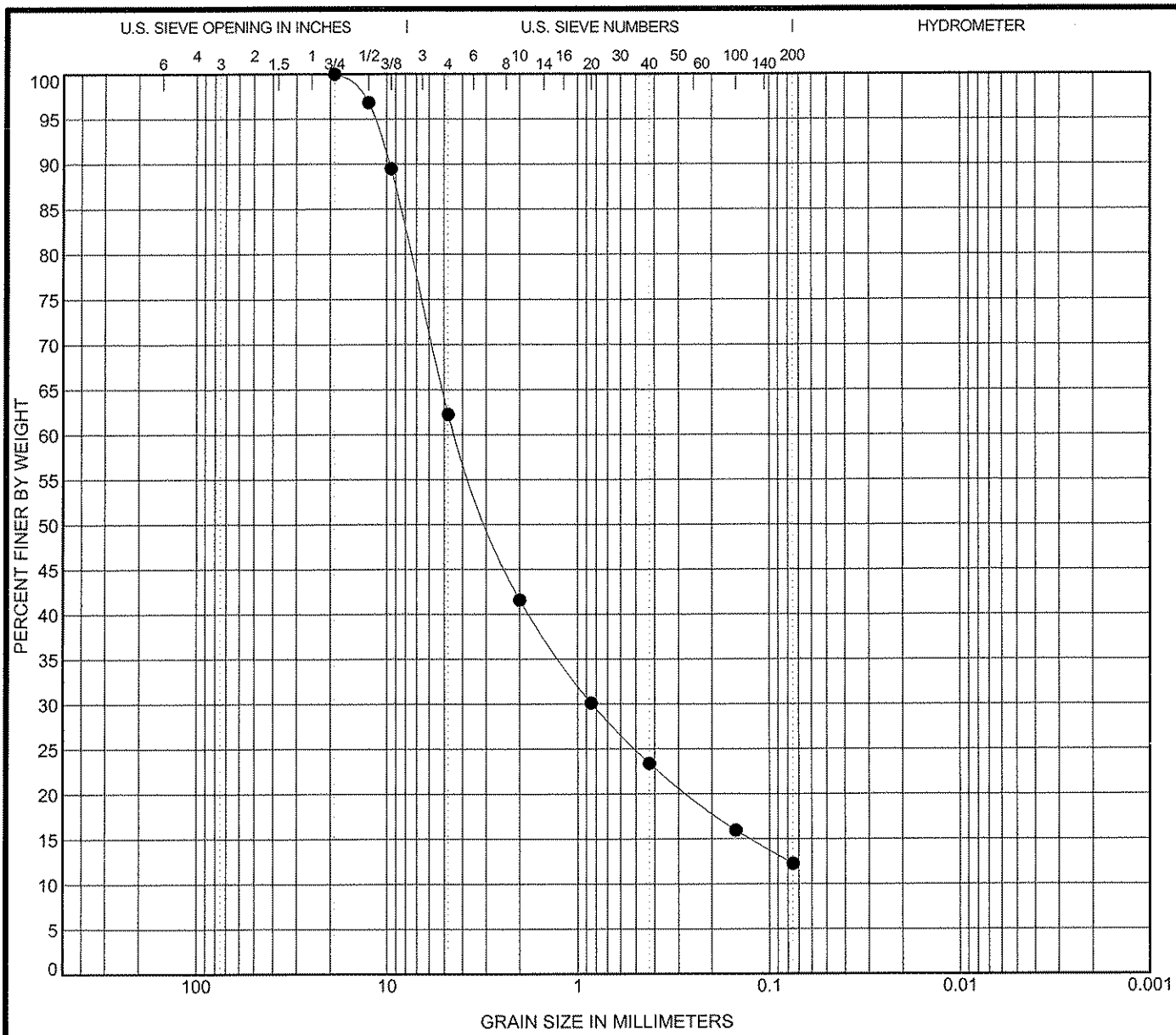
GRAIN SIZE DISTRIBUTION

Project: **Yerington Mine**

Location: **Yerington, NV**

Project Number: **0155-21-1** Plate: 4b

US_GRAIN_SIZE2_0155211.GPJ US_LAB.GDT 12/15/2009



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	USCS Classification	LL	PL	PI	Cc	Cu
● **TP-11 OX 0.0'**	**CLAYEY SAND with GRAVEL (SC)**	**31**	**19**	**12**	**3.32**	**87.72**

Specimen Identification	D100	D60	D30	D10	MC %	%Gravel	%Sand	%Silt	%Clay
● **TP-11 OX 0.0'**	**19**	**4.324**	**0.842**		**6.0**	**37.8**	**50.0**	**12.2**	

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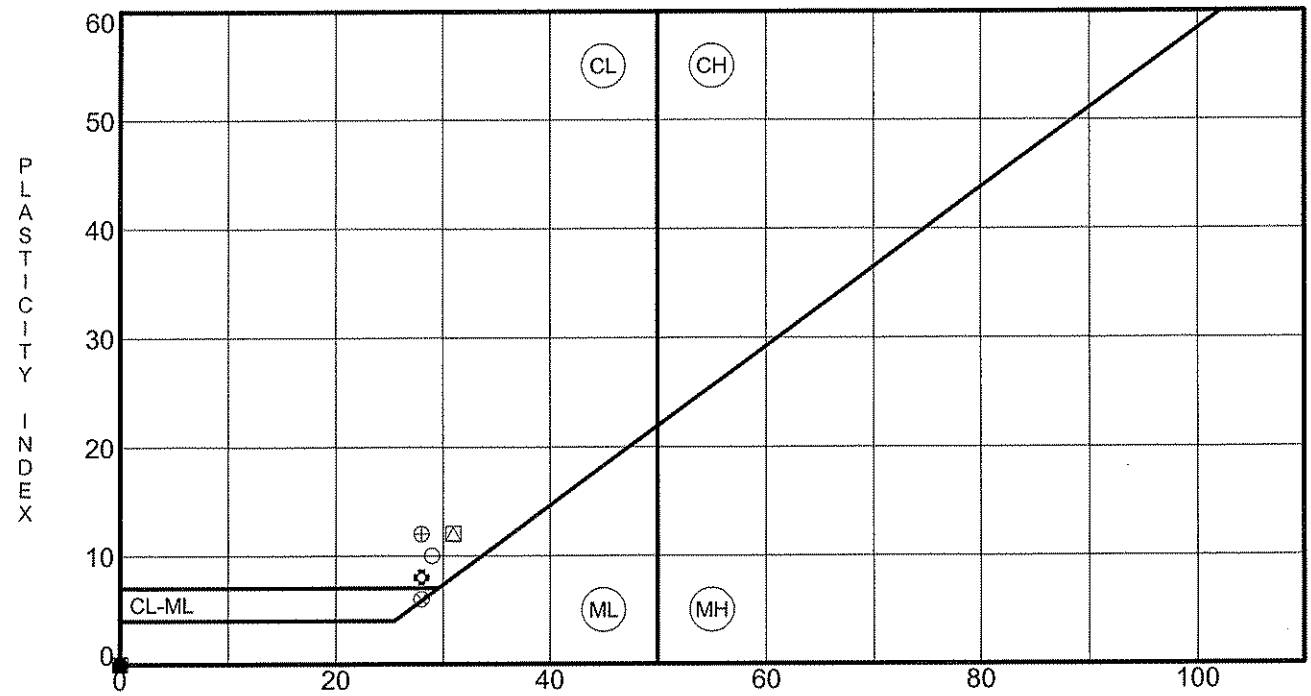
GRAIN SIZE DISTRIBUTION

Project: **Yerington Mine**

Location: **Yerington, NV**

Project Number: **0155-21-1** Plate: 4c



Specimen Depth in Feet.

	Specimen Identification		LL	PL	PI	Fines	USCS Classification
●	SST TP-01	0.0'	NP	NP	NP	18	SILTY SAND (SM)
⊠	SST TP-01	1.5'	NP	NP	NP	13	SILTY SAND (SM)
▲	SST TP-02	0.0'	NP	NP	NP	61	SANDY SILT (ML)
★	SST TP-02	1.5'	NP	NP	NP	31	SILTY SAND (SM)
⊙	SST TP-03	1.5'	NP	NP	NP	67	SANDY SILT (ML)
✿	TP-06 OX	0.0'	28	20	8	14	CLAYEY SAND with GRAVEL (SC)
○	TP-07 OX	10.0'	29	19	10	12	CLAYEY SAND with GRAVEL (SC)
△	TP-08 OX	5.0'	31	19	12	12	POORLY GRADED SAND with CLAY and GRAVEL (SP-SC)
⊗	TP-09 OX	0.0'	28	22	6	11	POORLY GRADED GRAVEL with SILTY CLAY and SAND (GP-GC
⊕	TP-10 OX	15.0'	28	16	12	10	POORLY GRADED GRAVEL with CLAY and SAND (GP-GC)
□	TP-11 OX	0.0'	31	19	12	12	CLAYEY SAND with GRAVEL (SC)

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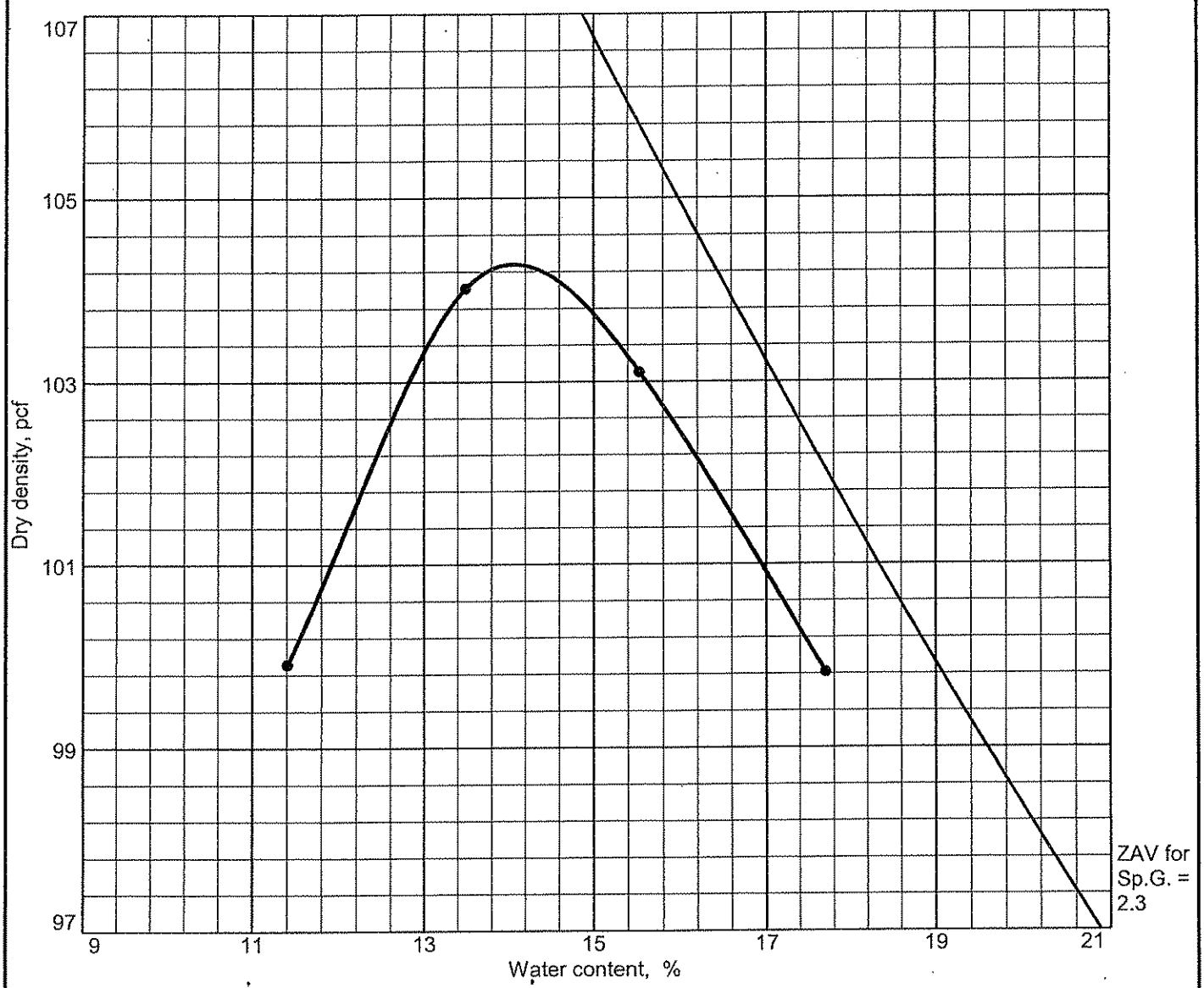
ATTERBERG LIMITS RESULTS

Project: **Yerington Mine**
Location: **Yerington, NV**
Project Number: **0155-21-1** Plate: 4d

US ATTERBERG LIMITS 0155211.GPJ US LAB.GDT 12/15/2009

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.0' - 20.0'	SM				No Value	Non Plastic	0.0	17.6

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 104.3 pcf Optimum moisture = 14.1 %	Silty Sand

Project No. 0155-21-1 **Client:** Brown and Caldwell
Project: Yerington Mine

● **Source:** SST TP-01 **Sample No.:** Bulk **Elev./Depth:** 0.0' - 20.0'

Remarks:
Laboratory Number 1273

BLACK EAGLE CONSULTING, INC.
Reno, Nevada

Plate 5a

COMPACTION TEST REPORT

Test specification: ASTM D 1557-00 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.0' - 20.0'	ML				No Value	Non Plastic		

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 107.8 pcf Optimum moisture = 16.7 %	Sandy Silt

Project No. 0155-21-1 **Client:** Brown & Caldwell
Project: Yerington Mine

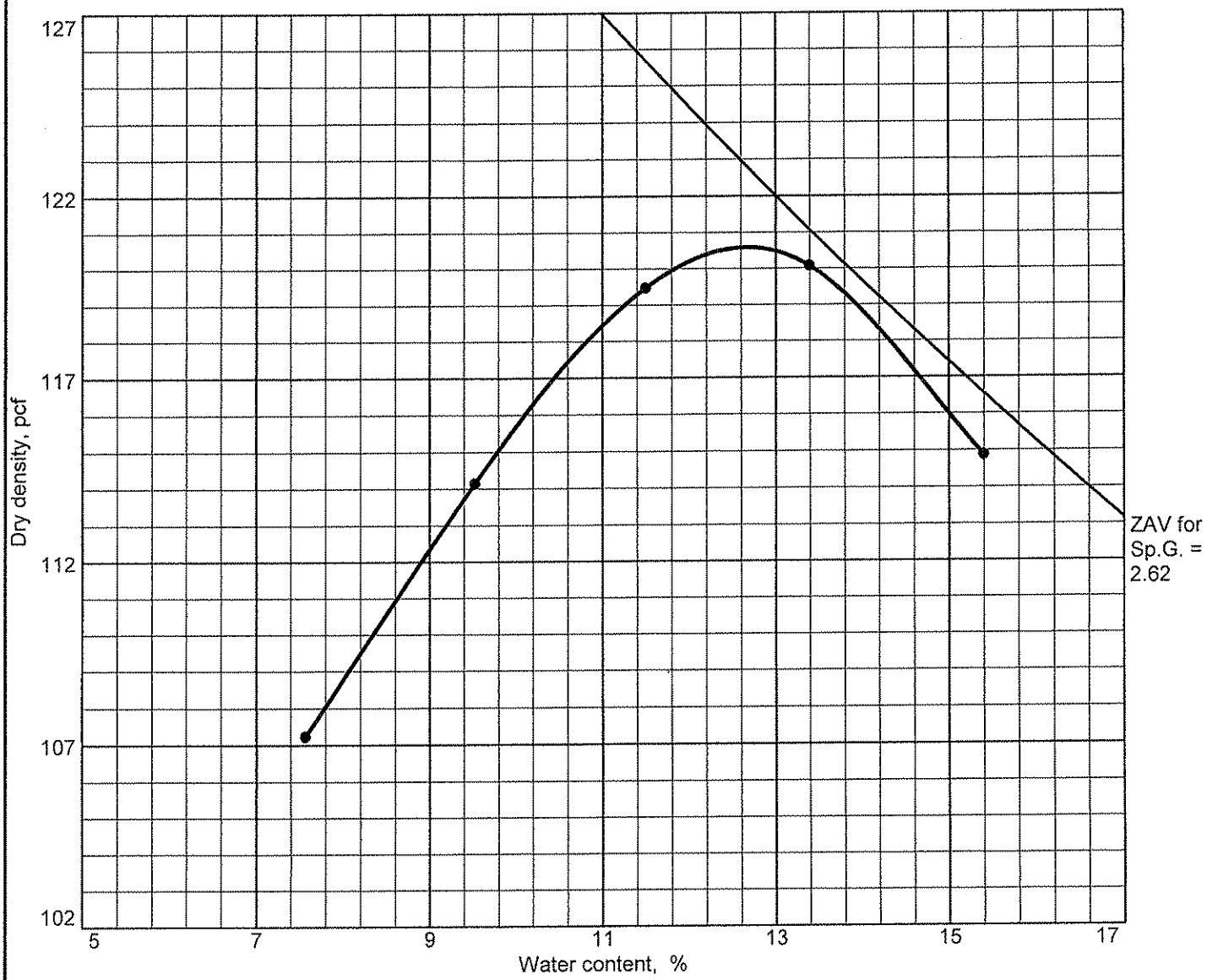
● **Source:** SST TP-02 **Sample No.:** Bulk **Elev./Depth:** 0.0' - 20.0'

Remarks:
Laboratory Number 1273

BLACK EAGLE CONSULTING, INC.
Reno, Nevada

Plate 5b

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
	SC		4.2		28	20	0.0	14.4

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 120.6 pcf Optimum moisture = 12.7 %	Clayey Sand with Gravel

Project No. 0155-21-1 **Client:** Brown and Caldwell
Project: Yerington Mine

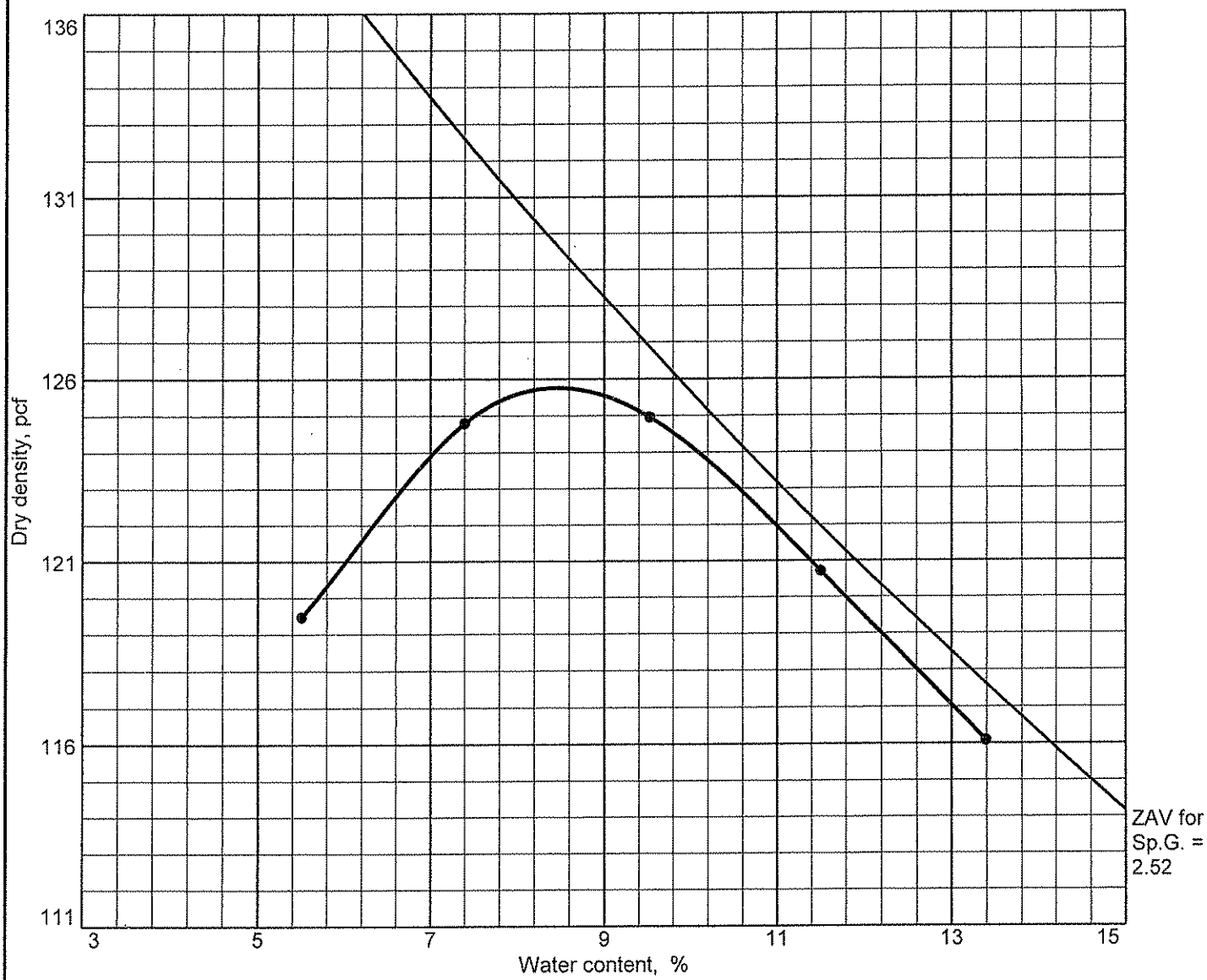
● **Source:** TP-06 OX

Remarks:
Laboratory Number 1449

BLACK EAGLE CONSULTING, INC.
Reno, Nevada

Plate 5c

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0' - 20.0'	GP - GC		4.6		28	6	0.0	11.1

TEST RESULTS

Maximum dry density = 125.8 pcf

Optimum moisture = 8.5 %

MATERIAL DESCRIPTION

Poorly Graded Gravel with Silty Clay and Sand

Project No. 0155-21-1 **Client:** Brown and Caldwell

Project: Yerington Mine

● **Source:** TP-09 OX **Sample No.:** Bulk **Elev./Depth:** 0.0' - 20.0'

Remarks:

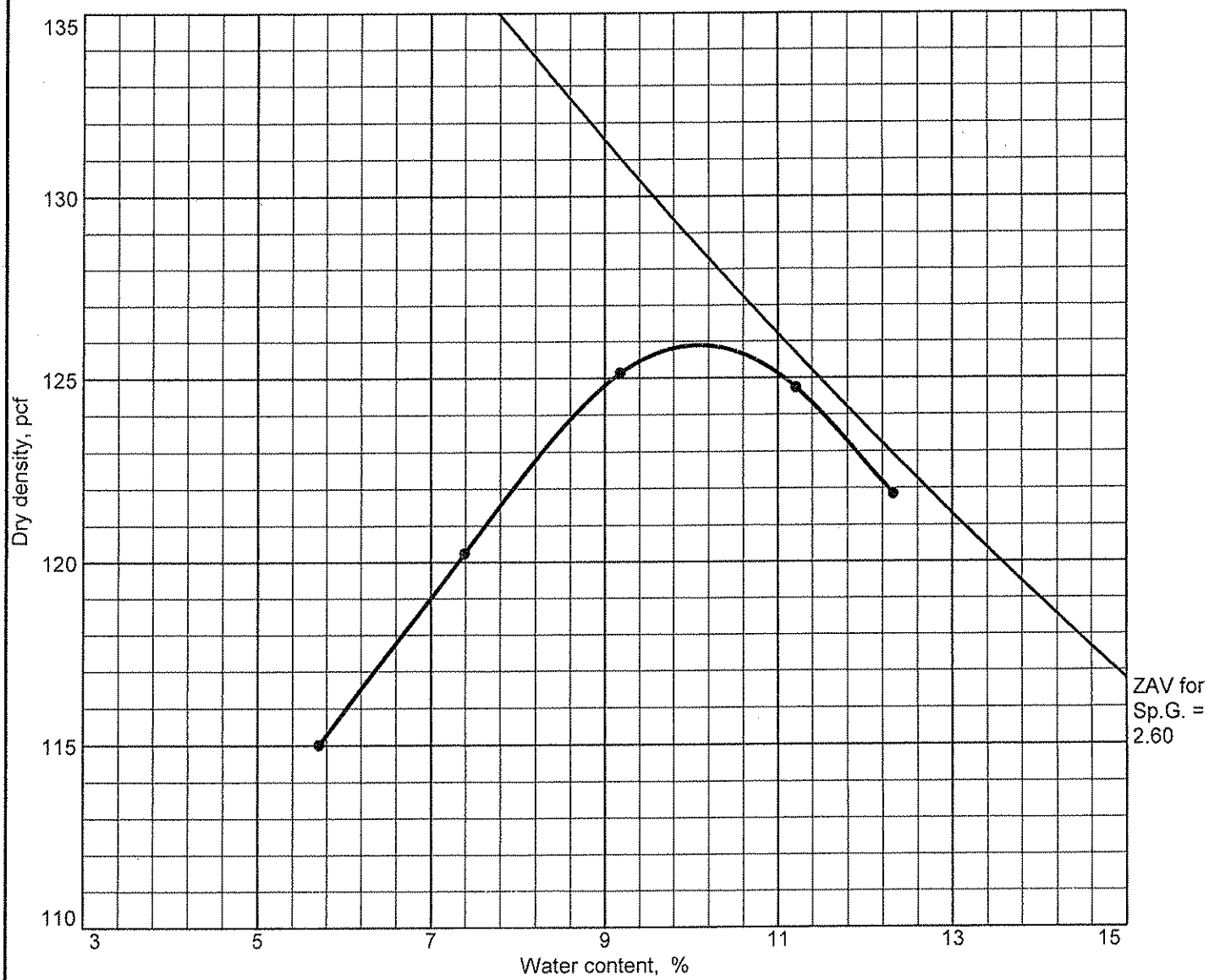
Laboratory Number 1449

BLACK EAGLE CONSULTING, INC.

Reno, Nevada

Plate 5d

COMPACTION TEST REPORT



Test specification: ASTM D 698-00a Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
0.0' - 20.0'	SC		6.0		31	12	0.0	12.2

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 125.9 pcf Optimum moisture = 10.1 %	Clayey Sand with Gravel

Project No. 0155-21-1 **Client:** Brown and Caldwell
Project: Yerington Mine

● **Source:** TP-11 OX **Sample No.:** Bulk **Elev./Depth:** 0.0' - 20.0'

Remarks:
Laboratory Number 1449

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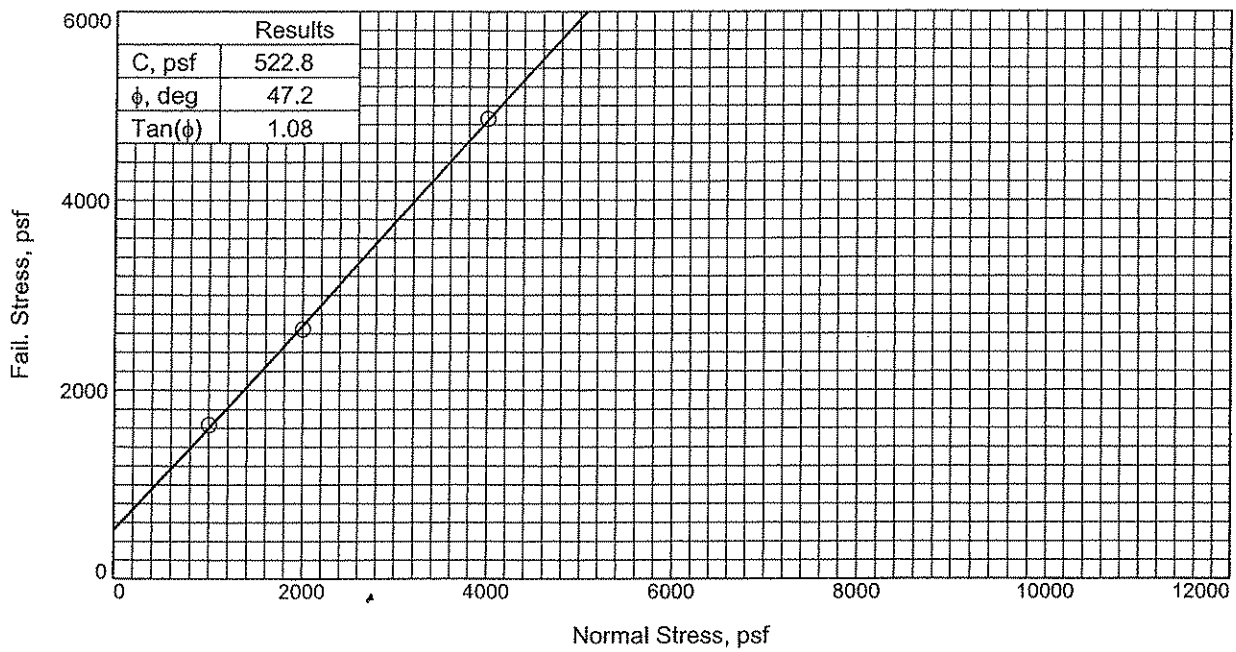
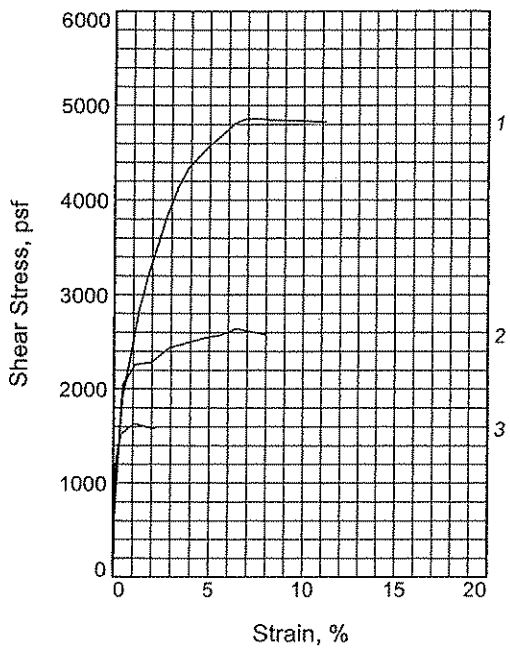
Plate 5e





Sample No.		1	2	3
Initial	Water Content, %	11.3	11.3	11.3
	Dry Density, pcf	88.7	88.1	89.3
	Saturation, %	35.7	35.3	36.3
	Void Ratio	0.8215	0.8322	0.8078
	Diameter, in.	2.420	2.420	2.420
	Height, in.	1.000	1.000	1.000
At Test	Water Content, %	26.5	28.0	26.8
	Dry Density, pcf	95.7	91.5	92.1
	Saturation, %	99.7	94.7	92.1
	Void Ratio	0.6869	0.7655	0.7529
	Diameter, in.	2.420	2.420	2.420
	Height, in.	0.926	0.964	0.970
Normal Stress, psf		4000.0	2000.0	1000.0
Fail. Stress, psf		4858.9	2642.3	1631.1
Strain, %		7.2	6.4	1.1
Ult. Stress, psf				
Strain, %				
Strain rate, in./min.		0.002	0.002	0.002

Sample Type: Remolded
Description: Silty Sand

LL= No Value **PI=** Non Plastic
Specific Gravity= 2.587
Remarks: Laboratory Number 1273

Client: Brown & Caldwell

Project: Yerington Mine

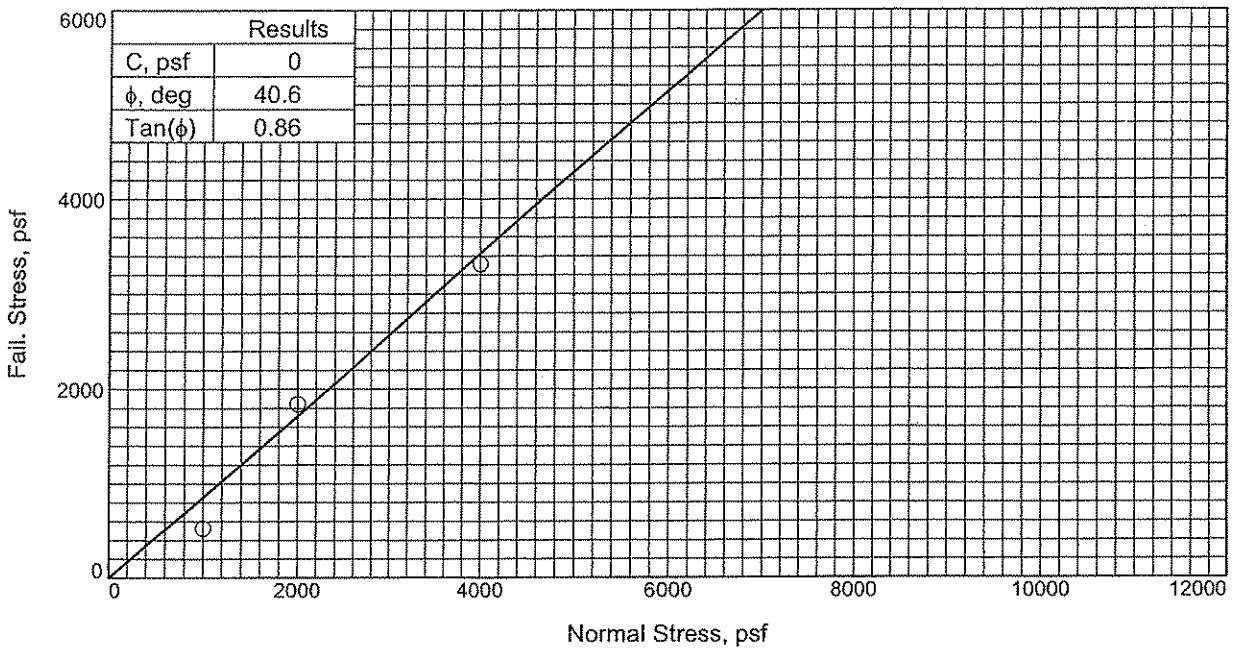
Source of Sample: SST TP-01 **Depth:** 0.0' - 20.0'
Sample Number: Bulk
Proj. No.: 0155-21-1 **Date Sampled:**

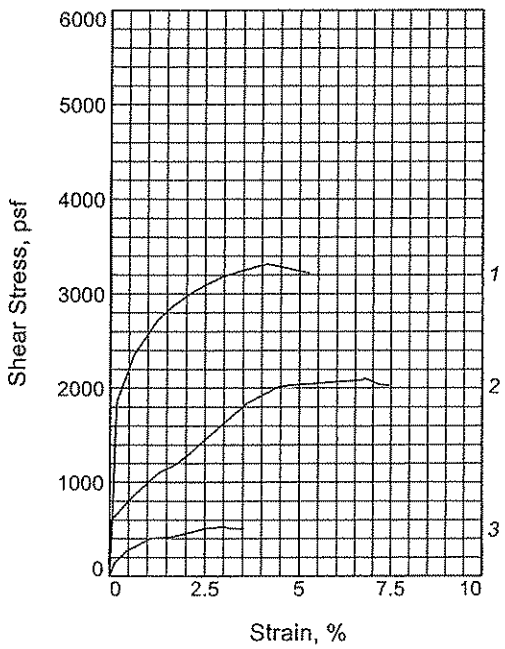
DIRECT SHEAR TEST REPORT

BLACK EAGLE CONSULTING, INC.

Plate 6a

Tested By: G. Bomberger





Sample No.		1	2	3
Initial	Water Content, %	11.3	11.3	11.3
	Dry Density, pcf	101.2	102.3	102.1
	Saturation, %	47.9	49.2	49.0
	Void Ratio	0.6222	0.6057	0.6081
	Diameter, in.	2.420	2.420	2.420
	Height, in.	1.000	1.000	1.000
At Test	Water Content, %	18.4	18.8	21.8
	Dry Density, pcf	109.3	108.3	103.6
	Saturation, %	96.2	95.9	97.8
	Void Ratio	0.5020	0.5166	0.5857
	Diameter, in.	2.420	2.420	2.420
	Height, in.	0.926	0.945	0.986
Normal Stress, psf		4000.0	2000.0	1000.0
Fail. Stress, psf		3315.4	1844.0	526.0
Strain, %		4.1	3.6	3.0
Ult. Stress, psf				
Strain, %				
Strain rate, in./min.		0.002	0.002	0.002

Sample Type: Remolded
Description: Sandy Silt

LL= No Value **PI=** Non Plastic
Specific Gravity= 2.631
Remarks: Laboratory Number 1273

Client: Brown & Caldwell

Project: Yerington Mine

Source of Sample: SST TP-02 **Depth:** 0.0' - 20.0'
Sample Number: Bulk
Proj. No.: 0155-21-1 **Date Sampled:**

DIRECT SHEAR TEST REPORT

BLACK EAGLE CONSULTING, INC.

Plate 6b

Tested By: G. Bomberger

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

Job No:	698-001	**Boring:**	SSTP-02	**Date:**	06/11/09
Client:	Black Eagle Consulting	**Sample:**	Bulk	**By:**	MD/PJ
Project:	0155-21-1	**Depth, ft.:**	0-20	**Remolded:**	Target= 90% of 107.8 pcf @ 16% (OPT).

Visual Classification: Silty Sand

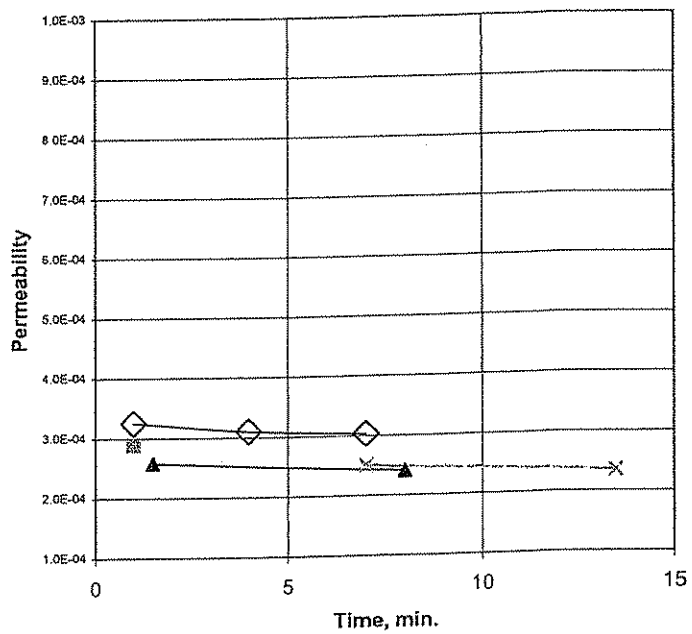
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
74	69	69	5

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 5

Date	Minutes	Head, (in)	K,cm/sec
6/8/2009	0.00	15.00	Start of Test
6/8/2009	1.00	12.00	3.2E-04
6/8/2009	4.00	6.40	3.1E-04
6/8/2009	7.00	3.50	3.0E-04
6/8/2009	1.00	12.30	2.9E-04
6/8/2009	1.50	11.50	2.6E-04
6/8/2009	8.00	4.00	2.4E-04
6/8/2009	7.00	4.50	2.5E-04
6/8/2009	13.50	1.70	2.3E-04



Average Permeability: 3.E-04 cm/sec

Sample Data:	Initial	Final
Height, in	3.00	2.94
Diameter, in	2.38	2.38
Area, in2	4.43	4.43
Volume in3	13.29	13.02
Total Volume, cc	217.8	213.4
Volume Solids, cc	127.4	127.4
Volume Voids, cc	90.4	86.0
Void Ratio	0.7	0.7
Total Porosity, %	41.5	40.3
Air-Filled Porosity, %	15.2	-0.3
Water-Filled Porosity,%	26.3	40.6
Saturation, %	63.5	100.7
Specific Gravity	2.631	2.631
Wet Weight, gm	392.6	421.9
Dry Weight, gm	335.3	335.3
Tare, gm	0.00	0.00
Moisture, %	17.1	25.8
Dry Density, pcf	96.1	98.0

Remarks: Due to slumping of the sample after the confining pressure was released, the final sample dimensions and associated values are approximate.