



Geotechnical Laboratory
 PO Box 4339
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 (865) 482-6497

CERTIFICATE OF ANALYSIS

Stephen Trent
 Fluor Hanford, Inc.
 825 Jadwin Avenue
 Richland, Washington 99352

August 1, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	Eberline - Hanford
Shaw Project Number:	100846.60000000
Client Sample Data Group:	H3214
Date Received by Lab:	June 20, 2005
Number of Samples:	One (1)
Sample Type:	Soil

RECEIVED
 NOV 16 2005
EDMC

I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on June 20, 2005. The sample was submitted for determination of bulk density, sieve analysis, hydraulic conductivity, specific gravity, and calcium carbonate content. The sample number received was B1D7M3.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole
 Laboratory Manager, Geotechnical Services



II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2005. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock.....	ASTM D 2216
Bulk Density of Soils	EM 1110-2-1906
Particle-size Analysis of Soils	ASTM D 422
Hydraulic Conductivity of Porous Materials Using a Flexible Wall Permeameter	ASTM D 5084
Specific Gravity of Soil.....	ASTM D 854
Calcium Carbonate Content.....	ASTM D 4373

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.
- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.
- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.
- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.
- Certified and trained personnel - all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.
- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).

IV. Data Qualification

None.

Appendix A
Sample Cross-Reference List

00000004

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August 1, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.60000000
SDG No. H3214

**Shaw Geotechnical
Laboratory
Oak Ridge TN
(865) 482-6497**

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC0590	B1D7M3	Soil

Appendix B
Sample Test Results

00000006

**PARTICLE-SIZE DISTRIBUTION
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1D7M3

Project No. 100846.60000000

Lab Sample No. BC0590

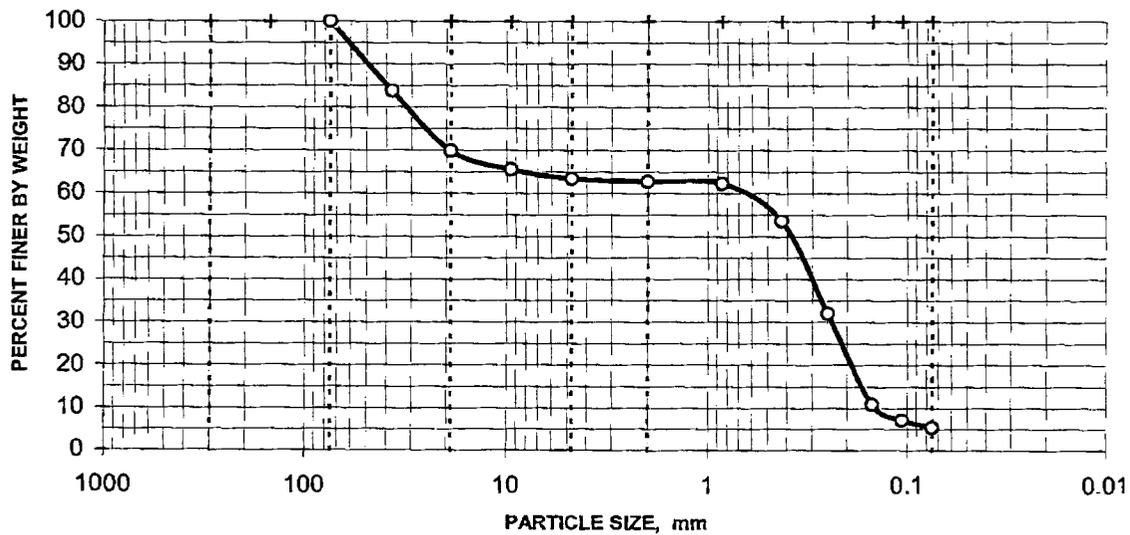
Moisture Content = 18.5%
 based on dry sample weight

SIEVE ANALYSIS

C O A R S E	Sieve No.	Diameter mm	Percent Finer
	3"	75.000	100.0%
	1.5"	37.500	83.8%
	0.75"	19.000	69.9%
	0.375"	9.500	65.5%
	#4	4.750	63.4%
	#10	2.000	62.7%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	62.3%
	#40	0.425	53.6%
	#60	0.250	32.0%
	#100	0.149	10.8%
	#140	0.106	7.1%
	#200	0.075	5.4%

DISTRIBUTION CURVE



36.6% Gravel

58.1% Sand

5.4% Silt/Clay

00000007

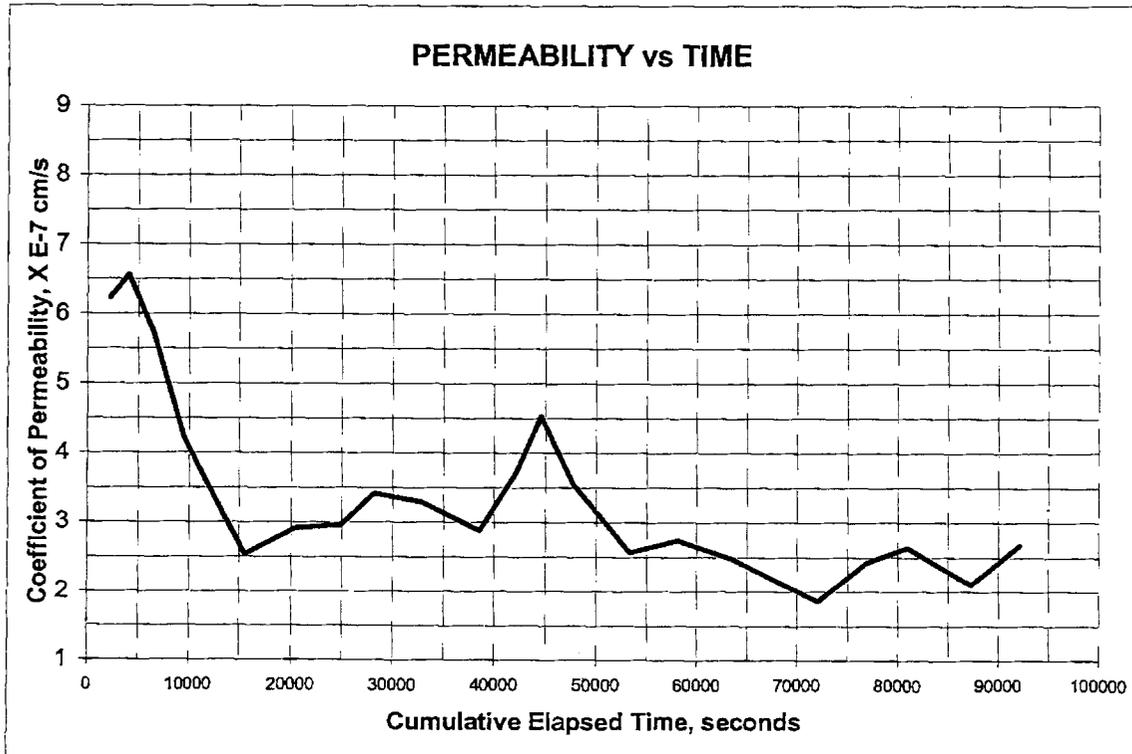
**HYDRAULIC CONDUCTIVITY / PERMEABILITY
 ASTM D 5084**

PROJECT NAME: Eberline Hanford
 PROJECT NO. 100846.60000000

CLIENT SAMPLE NO. B1D7M3
 LAB SAMPLE NO. BC0590

	INITIAL	FINAL		
Specimen diameter, cm	6.31		Hydraulic gradient	4.3
Specimen length, cm	8.24		Min. consolidation stress, psi	2.0
Wet weight of specimen, g.	529.98		Max. consolidation stress, psi	2.5
Specimen cross-sect. area, cm ²	31.28		Total backpressure, psi	7.5
Water content, %	18.5	27.2	Permeant Fluid	Deaired DI Water
Wet unit weight, pcf	128.4			
Dry unit weight, pcf	108.3			
Degree of saturation, %	93.0			
Specific gravity of solids	2.6525			

Coefficient of Permeability, cm/s 2.5E-05



00000008

Appendix C
Chain-of-Custody and Request-for-Analysis Records

00000012

COLLECTOR: Alexander/Gent/Mahood
 PRICE CODE: 8N
 DATA TURNAROUND: 45 Days / 45 Days

COMPANY CONTACT: TRENT, SJ
 PROJECT COORDINATOR: TRENT, SJ
 SAF NO.: F04-033
 AIR QUALITY:

PROJECT DESIGNATION: 200-ZP-1 Characterization Sampling and Analysis - Soil
 FIELD LOGBOOK NO.: 119325ES10
 METHOD OF SHIPMENT: FEDERAL EXPRESS

OFFSITE PROPERTY NO.: *See PTK 15729*
 BILL OF LADING/AIR BTL NO.: *SU PKR 15729*

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS
A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water W=Water X=Other	<i>Bad to go BID7M5</i>	None	Split Spoon Liner	2	1000g	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
BID7M3	SOIL	6-9-05	0810

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	RECEIVED BY/STORIED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM		<i>M.P. 026</i>	6-9-05 17:15
RELINQUISHED BY/REMOVED FROM		<i>M.H. 026</i>	6-9-05 17:15
RELINQUISHED BY/REMOVED FROM		<i>FED EX</i>	06/15/05
RELINQUISHED BY/REMOVED FROM		<i>Alex Kelybely</i>	6/17/05 16:00

SPECIAL INSTRUCTIONS:
 (1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422; Calcium Carbonate Content; Saturated Hydraulic Conductivity; Particle Density - D854;
 Note: Gross weight 2.8 and 3.0 Kg

LABORATORY SECTION: *Don Huskey SHAW E+I/ETDC*
 RECEIVED BY: *Don Huskey*
 TITLE: *S.R. ENG. TECH.*
 DATE/TIME: *6/20/05 / 0930*
 DISPOSAL METHOD: *DISPOSED BY*

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Eberline Svcs

CHAIN OF CUSTODY

ORD # R5-06-131

06/17/05 10:21:31

WORK ID: SAF# F04-033 SDG H3214

RCVD: 06/15/05 DUE: 07/30/05

KEEP: 07/30/06 DISP: S

<u>DASH</u>	<u>SAMPLE IDENTIFICATION</u>	<u>STORED</u>	<u>TESTS</u>				
01A-S	B1D7M3	SHAW	E329S	E331S	E335S	E342S	E345S

<u>RELEASED BY</u>	<u>DATE</u>	<u>TRANSFERRED TO</u>	<u>DATE</u>	<u>RECEIVED BY</u>	<u>DATE</u>
<i>Alex Kelusky</i>	<i>6/17/05</i>	<i>SHAW</i>	<i>6/17/05</i>	<i>Don Huskey</i>	<i>6/20/05</i>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

BC 0590

00000014