



Shaw Environmental & Infrastructure, Inc.

Geotechnical Laboratory  
1570 Bear Creek Road  
Kingston TN 37763  
(865) 482-6497

## ***CERTIFICATE OF ANALYSIS***

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

November 14, 2008

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	<b>Eberline - Hanford</b>
Shaw Project Number:	<b>100846.860000</b>
Client SDG Number:	H3853
Date Received by Lab:	September 4, 2008
Number of Samples:	One (1)
Sample Type:	Soil

### I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on September 4, 2008. The sample was submitted for determination of moisture content, bulk density, and sieve analysis. The sample number received was B1W0L5.

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:

A handwritten signature in black ink, appearing to read "Ralph Cole", written in a cursive style.

Ralph Cole  
Laboratory Manager, Geotechnical Services

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## 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)*, 2008. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock ..... **ASTM D 2216**  
Particle-Size Distribution of Soils ..... **ASTM D 422**  
Unit Weight ..... **USACE EM 1110-2-1906 app. II**

## 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

A separate sample container was submitted for moisture determination. The entire contents of the sample container was used to determine the moisture content of the sample. An aliquot of this sample was not used. The moisture content of the sieve analysis sample is given on the sieve results sheet.

**Appendix A**  
**Sample Cross-Reference List**

Page 4 of 8  
November 14, 2008  
Stephen Trent  
Fluor Hanford, Inc.  
Shaw Project Name: Eberline Hanford  
Shaw Project No. 100846.86000000  
SDG No. H3853

**Shaw Geotechnical  
Laboratory  
Kingston TN  
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SAMPLE NUMBER CROSS-REFERENCE LIST

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LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
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BC1428 .....	B1W0L5 .....	Soil
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**Appendix B**  
**Data Results**



**PARTICLE-SIZE DISTRIBUTION  
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1W0L5

Project No. 100846.86000000

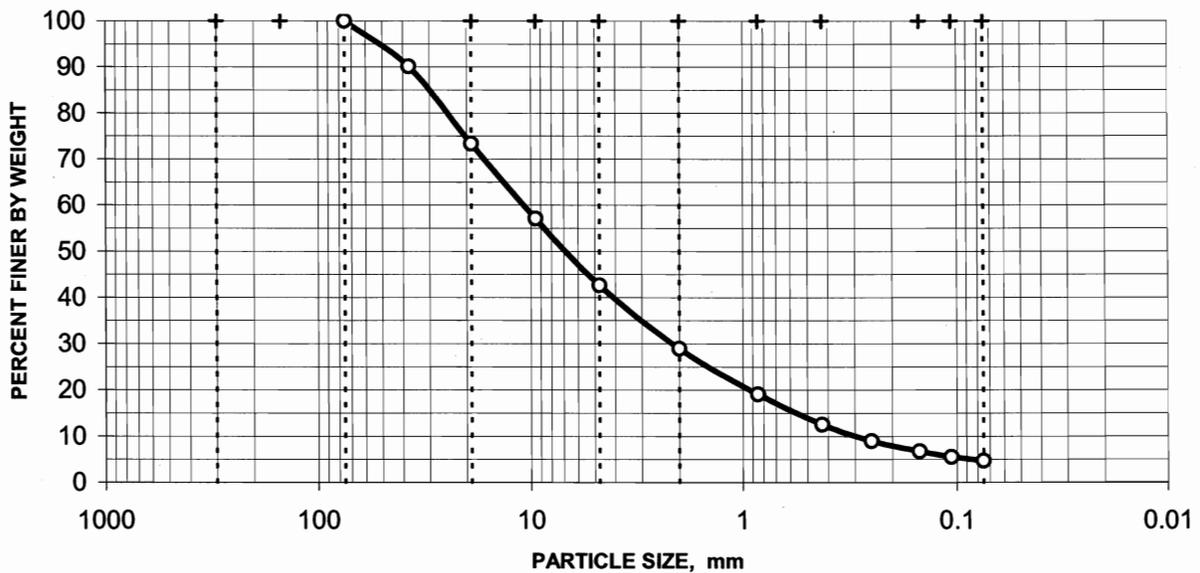
Lab Sample No. BC1428

**SIEVE ANALYSIS**

C O A R S E	Sieve No.	Diameter mm	Percent Finer
	3"	75.000	100.0%
	1.5"	37.500	90.1%
	0.75"	19.000	73.3%
	0.375"	9.500	57.0%
	#4	4.750	42.6%
	#10	2.000	28.9%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	19.1%
	#40	0.425	12.5%
	#60	0.250	9.0%
	#100	0.149	6.7%
	#140	0.106	5.5%
	#200	0.075	4.7%

**DISTRIBUTION CURVE**



57.4% Gravel

38.0% Sand

4.7% Silt/Clay



**Appendix C**  
**Chain of Custody Records**

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F08-126-056	PAGE 1 OF 1
COLLECTOR <i>Fu Han</i>	COMPANY CONTACT TRENT, SJ	TELEPHONE NO. 373-5869	PROJECT COORDINATOR WIDRIG, DL		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION 8-25-08 J.M. C6552, I-066 <i>I-073</i>	PROJECT DESIGNATION 216-A-5 Crib Characterization Sampling and Analysis - Soil		SAF NO. F08-126		AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO.	FIELD LOGBOOK NO. <i>HNF-A-585-2</i> <i>324.5 - 329.5</i>	ACTUAL SAMPLE DEPTH <i>324.5 - 329.5</i>		COA 123124ES10	METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO Shaw Group	OFFSITE PROPERTY NO. <i>911</i> <i>8-28-08</i> SEE PTR		BILL OF LADING/AIR BILL NO. SEE PTR			

MATRIX* A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)	PRESERVATION	None	None																
		TYPE OF CONTAINER	Split Spoon Liner	Moisture Resistant Cont																
		NO. OF CONTAINER(S)	1	1																
		VOLUME	1000g	200g																
<b>SPECIAL HANDLING AND/OR STORAGE</b> Radioactive Tie To: B1W0L4		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216;																

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME																
B1W0L5	SOIL	8/28/08	0825	X	X														

BC 1428

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM <i>Marick S. Hunt</i>	DATE/TIME 8-28-08 0900	RECEIVED BY/STORED IN <i>AS Fridge</i>	DATE/TIME 8-28-08 0900	** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.	
RELINQUISHED BY/REMOVED FROM <i>AS - Fridge</i>	DATE/TIME SEP 03 2008 1000	RECEIVED BY/STORED IN <i>Kevin P. ...</i>	DATE/TIME SEP 03 2008 1000	** Analytical batch QC must be run on a sample associated with this SAF. (1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422;	
RELINQUISHED BY/REMOVED FROM Fluor Hanford	DATE/TIME SEP 03 2008 1000	RECEIVED BY/STORED IN <i>FEDEX</i>	DATE/TIME		
RELINQUISHED BY/REMOVED FROM <i>Don Huskey SHAW</i>	DATE/TIME 9/4/08 1000	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		

LABORATORY SECTION	RECEIVED BY <i>DON HUSKEY SHAW E+I</i>	TITLE <i>LAB TECH</i>	DATE/TIME <i>9/4/08 / 1000</i>
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME