



Geotechnical Laboratory
PO Box 4339
1570 Bear Creek Road
Oak Ridge TN 37830
(865) 482-6497

CERTIFICATE OF ANALYSIS

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

August 21, 2008

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	Eberline - Hanford
Shaw Project Number:	100846.7600000
Client SDG Number:	H3771
Date Received by Lab:	June 13, 2008
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on June 13, 2008. The sample was submitted for determination of moisture content, bulk density, and sieve analysis. The sample number received was B1W0L9. A separate sample container was submitted for moisture content determination.

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

Moisture Content of Soil and Rock **ASTM D 2216**
Particle-Size Distribution of Soil **ASTM D 422**
Unit Weight, Bulk Density, Dry Density **USCOE 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

The entire contents of the sample container was used to determine the moisture content of the sample.

Appendix A
Sample Cross-Reference List

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
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BC1387	B1W0L9	Soil
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Appendix B

Data Results

**PARTICLE-SIZE DISTRIBUTION
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1W0L9

Project No. 100846.76000000

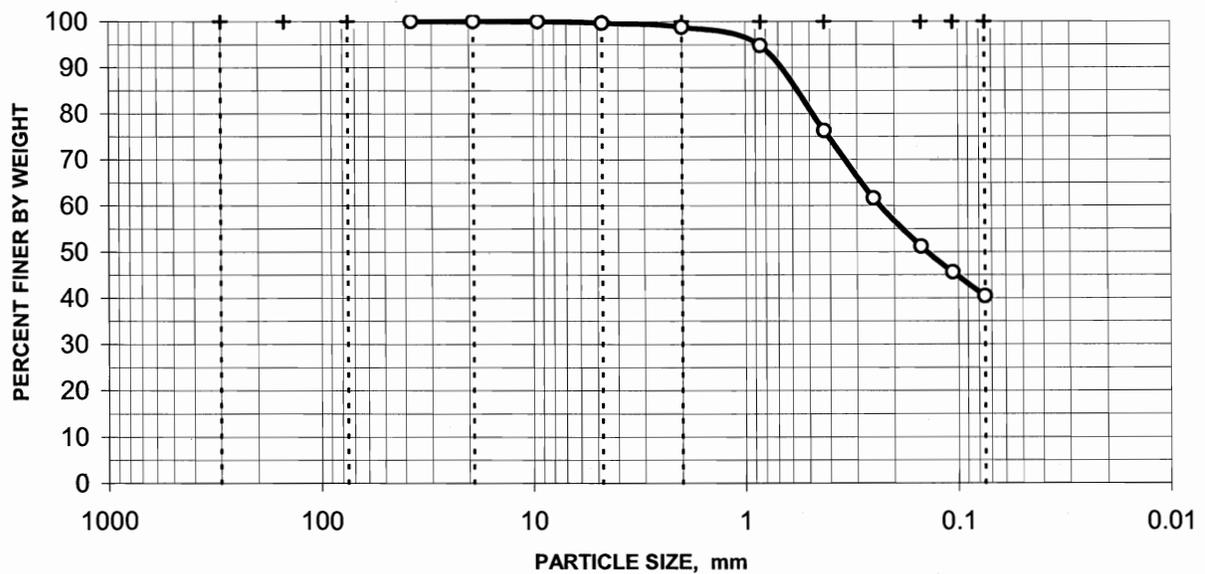
Lab Sample No. BC1387

SIEVE ANALYSIS

C O A R S E	Sieve No.	Diameter mm	Percent Finer
	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	100.0%
	0.375"	9.500	100.0%
	#4	4.750	99.7%
	#10	2.000	98.8%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	94.7%
	#40	0.425	76.3%
	#60	0.250	61.6%
	#100	0.149	51.1%
	#140	0.106	45.5%
	#200	0.075	40.4%

DISTRIBUTION CURVE



0.3% Gravel

59.3% Sand

40.4% Silt/Clay

Appendix C
Chain of Custody Records

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F08-126-063	PAGE 1 OF 1		
COLLECTOR NCO SAMPLER <i>PFISTER</i>		COMPANY CONTACT TRENT, SJ		TELEPHONE NO. 373-5869		PROJECT COORDINATOR WIDRIG, DL		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION C6551, I-000-PUSH		PROJECT DESIGNATION 216-A-5 Crib Characterization Sampling and Analysis - Soil				SAF NO. F08-126		AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. <i>GRP-08-04-14</i> <i>06-12-8</i>		FIELD LOGBOOK NO.		ACTUAL SAMPLE DEPTH <i>60.8 - 61.6'</i>		COA 123124ES10		METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO Shaw Group		OFFSITE PROPERTY NO. SEE PTR				BILL OF LADING/AIR BILL NO. SEE PTR <i>7920-7101-4319</i>			
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	POSSIBLE SAMPLE HAZARDS/ REMARKS 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			BC 1387
			VOLUME		1000g	200g			
SPECIAL HANDLING AND/OR STORAGE Radioactive Tie To: B1W0L8		SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216;				
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME						
B1W0L9	SOIL	<i>6-10-08</i>	<i>1300</i>	<i>✓</i>	<i>✓</i>				
CHAIN OF POSSESSION		SIGN/ PRINT NAMES				SPECIAL INSTRUCTIONS			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.	
<i>PFISTER/MS</i>		<i>6-10-08 1345</i>		<i>AZ-SITE FRIG A-5</i>		<i>6-10-08 1345</i>			
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		** Analytical batch QC must be run on a sample associated with this SAF.	
<i>AZ Site Fridge A-5</i>		<i>6-12-08 1000</i>		<i>D Connolly</i>		<i>06-28 1000</i>		(1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422;	
RELINQUISHED BY/REMOVED FROM		DATE/TIME		RECEIVED BY/STORED IN		DATE/TIME		<i>Contract # 630</i>	
<i>D Connolly</i>		<i>06-28 1330</i>		<i>Fred EF</i>					
RELINQUISHED BY/REMOVED FROM		DATE/TIME		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 Nudny / SHAW E+I</i>		TITLE <i>SR. LAB TECH</i>		DATE/TIME <i>6/13/08/0930</i>				
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD		DISPOSED BY		DATE/TIME				