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Shaw™
Shaw Environmental & Infrastructure, Inc.

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

CERTIFICATE OF ANALYSIS

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:	**Eberline - Hanford**
Shaw Project Number:	**100846.8000000**
Client SDG Number:	H3796
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 July 17, 2008. The sample was submitted for determination of moisture content, bulk density, and sieve analysis. The sample number received was B1VJ66.

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

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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.

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- 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

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Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.80000000
SDG No. H3796

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SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC1417	B1VJ66	Soil

Appendix B
Data Results

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MOISTURE CONTENT
ASTM D 2216

PROJECT NAME
Eberline Hanford

PROJECT NUMBER
100846.80000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE , % SW846	SOLIDS, % SW846
BC1417	B1VJ66	5.8	5.5	94.5

ASTM D 2216 results are based on dry sample weight.
SW846 results are based on wet sample weight.
Solids content is determined by subtracting the SW846 moisture (%) from 100.

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BULK DENSITY/DRY DENSITY
ASTM D 2937

PROJECT NAME: **Eberline Hanford**

PROJECT NUMBER: **100846.80000000**

LAB SAMPLE NUMBER	CLIENT SAMPLE NUMBER	AVERAGE LENGTH, inches	AVERAGE DIAMETER, inches*	WET WEIGHT, grams	MOISTURE CONTENT, %	BULK DENSITY, pcf	DRY DENSITY, pcf
BC1417	B1VJ66	3.2782	3.8618	2243.28	7.2	222.6	207.7

Moisture content calculated by ASTM D 2216 based on sample dry weight.
Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).
Dry density is the weight of the dry sample solids divided by the volume of the original sample.

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PARTICLE-SIZE DISTRIBUTION
ASTM D 422

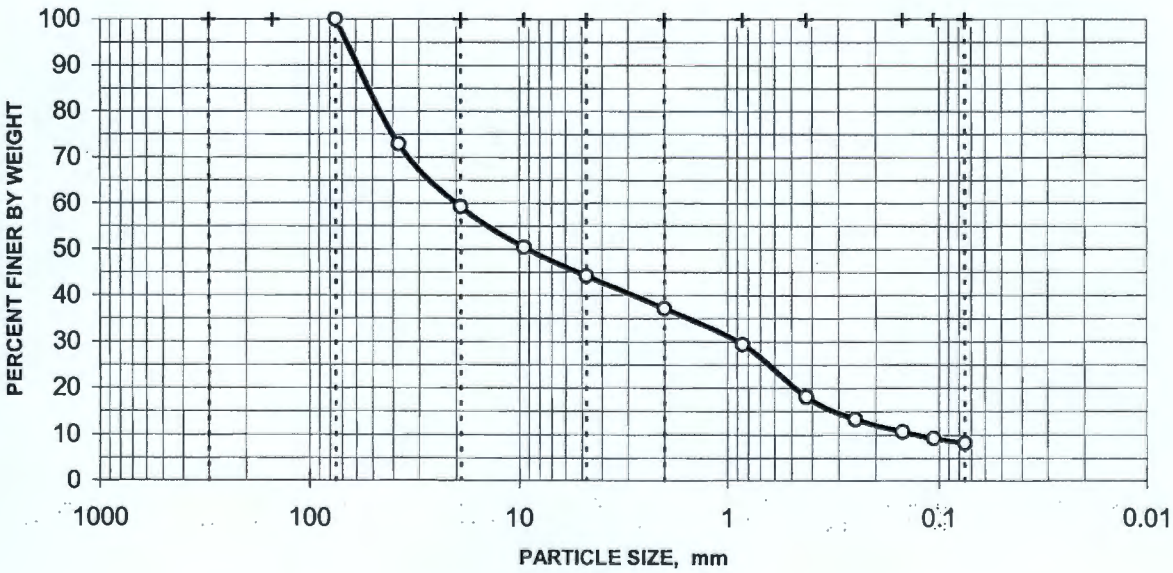
Project Name	Eberline Hanford	Field Sample No.	B1VJ66
Project No.	100846.80000000	Lab Sample No.	BC1417

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	3"	75.000	100.0%
	1.5"	37.500	72.8%
	0.75"	19.000	59.2%
	0.375"	9.500	50.4%
	#4	4.750	44.1%
	#10	2.000	37.2%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	29.4%
	#40	0.425	18.1%
	#60	0.250	13.3%
	#100	0.149	10.7%
	#140	0.106	9.2%
	#200	0.075	8.2%

DISTRIBUTION CURVE



55.9% Gravel 36.0% Sand 8.2% Silt/Clay

Appendix C
Chain of Custody Records

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F08-126-008	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Kauer, McIntyre, Rosane	TRENT, SJ	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**		
C6552, I-003	216-A-5 Crib Characterization Sampling and Analysis - Soil		F08-126		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**	
GRP 08-09	HNF-N-585-2	34.7 - 37.3	123124ES10	FEDERAL EXPRESS	
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**		
Shaw Group	SEE PTR H0054000		SEE PTR		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegitation
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)

SPECIAL HANDLING AND/OR STORAGE
Radioactive Tie To: B1VHY0

PRESERVATION	None	None	
TYPE OF CONTAINER	Split Spoon Liner	Moisture Resistant Cont	
NO. OF CONTAINER(S)	1	1	
VOLUME	1000g	200g	
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216;	

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B1VJ66	SOIL	7-2-08	0820		✓	

BC 1417

CHAIN OF POSSESSION / **SIGN/ PRINT NAMES**

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Larry Rosane, Jerry Rosane	7-2-08/1015	A-5, Site Ref	7-2-08/1015
A-5 Site Ref	7-15-8 0930	D Connolly	7-15-8 0930
D Connolly	7-15-8 1100	MO 745 Ref 1	7-15-8 1100
MO 745 Ref 1	7-16-8 0800	D Connolly	7-16-8 0800
D Connolly	7-16-8 1400	Fed Ex	

SPECIAL INSTRUCTIONS

** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

** Analytical batch QC must be run on a sample associated with this SAF.
(1)Bulk Density - D2937; Particle Size (Dry Sieve) - D422;

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
	Don Huskey SHAW ENVR.	LAB. TECH	7/17/08/0900
FINAL SAMPLE DISPOSITION	**DISPOSAL METHOD**	**DISPOSED BY**	**DATE/TIME**

A-6003-618(01/06)