



Shaw Environmental & Infrastructure, Inc.

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REVISION 1

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:	100846.810000
Client SDG Number:	H3866
Date Received by Lab:	September 9, 2008
Number of Samples:	Two (2)
Sample Type:	Soil

I. Introduction/Case Narrative

Two soil samples were received by the Shaw Geotechnical Laboratory on September 9, 2008. The samples were submitted for determination of moisture content, bulk density, and sieve analysis. The sample numbers received were B1W0L3 and B1VJ76.

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 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

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC1429	B1W0L3	Soil
BC1434	B1VJ76	Soil

Appendix B
Data Results

**PARTICLE-SIZE DISTRIBUTION
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1W0L3

Project No. 100846.81000000

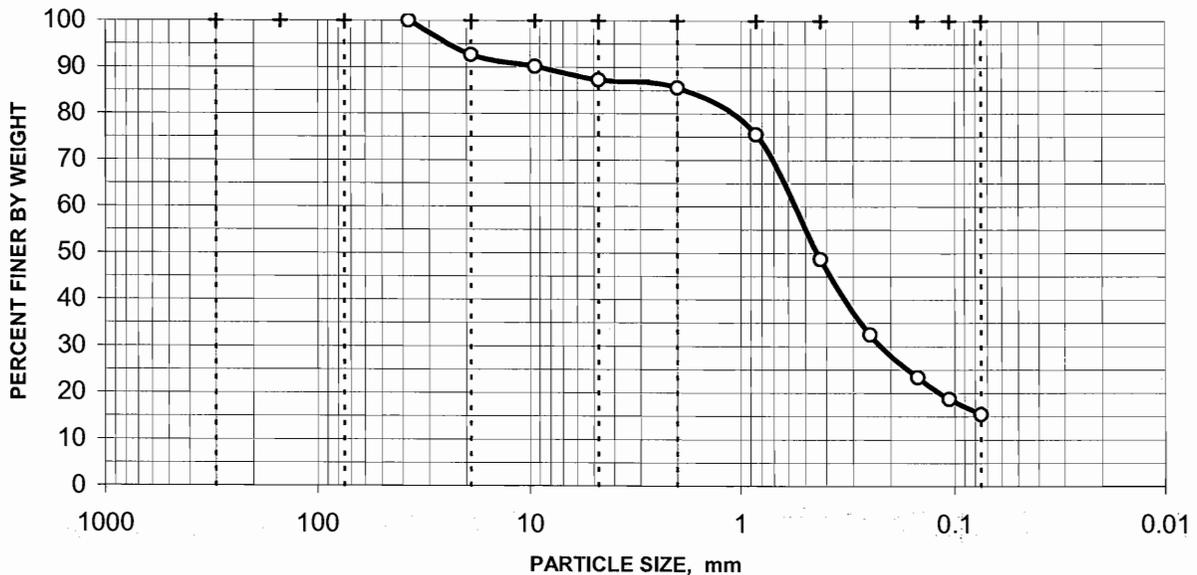
Lab Sample No. BC1429

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	92.6%
	0.375"	9.500	90.1%
	#4	4.750	87.2%
	#10	2.000	85.5%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	75.5%
	#40	0.425	48.6%
	#60	0.250	32.5%
	#100	0.149	23.3%
	#140	0.106	18.7%
	#200	0.075	15.4%

DISTRIBUTION CURVE



12.8% Gravel

71.8% Sand

15.4% Silt/Clay

**PARTICLE-SIZE DISTRIBUTION
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1VJ76

Project No. 100846.81000000

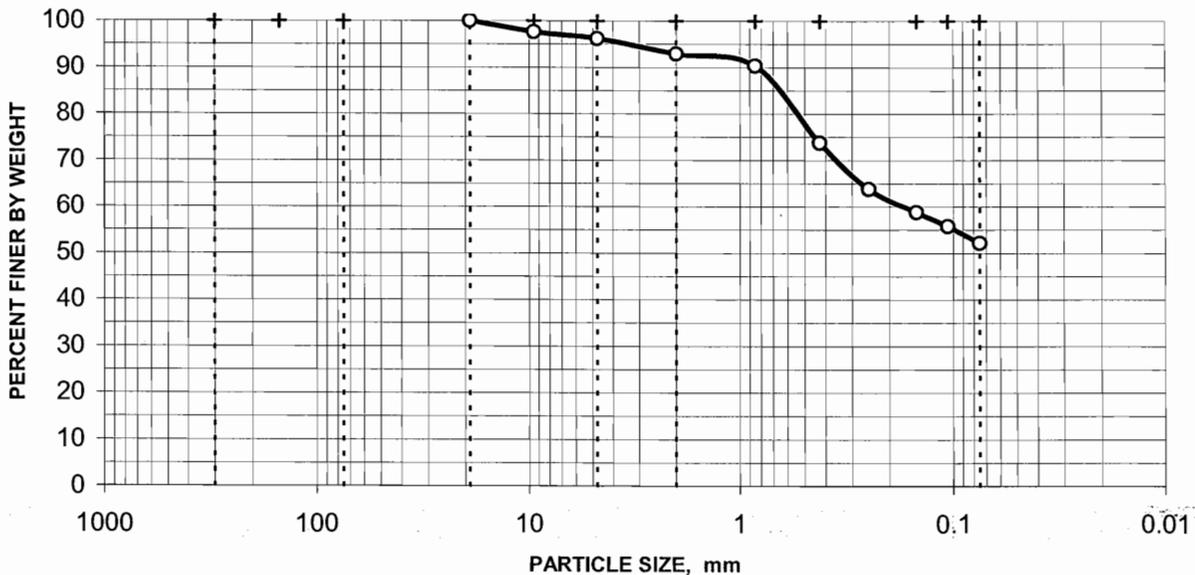
Lab Sample No. BC1434

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	97.6%
	#4	4.750	96.1%
	#10	2.000	92.9%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	90.3%
	#40	0.425	73.7%
	#60	0.250	63.8%
	#100	0.149	58.8%
	#140	0.106	55.8%
	#200	0.075	52.2%

DISTRIBUTION CURVE



3.9% Gravel

44.0% Sand

52.2% Silt/Clay

Appendix C
Chain of Custody Records

Fluor Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F08-126-051	PAGE 1 OF 1	
COLLECTOR <i>Mokler</i>		COMPANY CONTACT TRENT, SJ	TELEPHONE NO. 373-5869	PROJECT COORDINATOR WIDRIG, DL		PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days	
SAMPLING LOCATION C6552, I-064		PROJECT DESIGNATION 216-A-5 Crib Characterization Sampling and Analysis - Soil		SAF NO. F08-126		AIR QUALITY <input type="checkbox"/>		
ICE CHEST NO. <i>EWO-06-3</i>		FIELD LOGBOOK NO. <i>HNF-N-5852</i>	ACTUAL SAMPLE DEPTH <i>287.0' - 289.5'</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>Ship # H0070000</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				
		VOLUME	1000g	200g				
	SPECIAL HANDLING AND/OR STORAGE Radioactive Tie To: B1VJ51	SAMPLE ANALYSIS		SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216;			
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME					
B1W0L3	SOIL	<i>8-25-08</i>	<i>1300</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BC 1429		
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>J. Mokler</i>	<i>8-25-08 1515</i>	<i>A-5 Site Fridge</i>	<i>8/25/08 1515</i>	** Analytical batch QC must be run on a sample associated with this SAF.				
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	(1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422;				
<i>AS Site Fridge</i>	<i>AUG 28 2008 0730</i>	<i>Kevin Patterson</i>	<i>AUG 28 2008 0730</i>					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
<i>Kevin Patterson</i>	<i>AUG 28 2008 1500</i>	<i>Fluor Hanford</i>	<i>8/28/08 1500</i>					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
<i>M0413 RI</i>	<i>9-8-8 0730</i>	<i>D Connolly</i>	<i>9-8-8 0730</i>					
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
<i>D Connolly</i>	<i>9-8-8 1400</i>	<i>Fed Ex</i>						
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME					
LABORATORY SECTION	RECEIVED BY <i>Paul Aburn</i>	TITLE <i>R50</i>	DATE/TIME <i>9-9-08 @1000</i>					
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME					

COLLECTOR Mokler	COMPANY CONTACT TRENT, SJ	TELEPHONE NO. 373-5869	PROJECT COORDINATOR WIDRIG, DL	PRICE CODE 8N	DATA TURNAROUND 45 Days / 45 Days
SAMPLING LOCATION C6552, I-062	PROJECT DESIGNATION 216-A-5 Crib Characterization Sampling and Analysis - Soil		SAF NO. F08-126	AIR QUALITY <input type="checkbox"/>	
ICE CHEST NO. GWO-06-3	FIELD LOGBOOK NO. HNF-N-5852	ACTUAL SAMPLE DEPTH 284.4'-286.9'	COA 123124ES10	METHOD OF SHIPMENT FEDERAL EXPRESS	
SHIPPED TO Shaw Group	OFFSITE PROPERTY NO. SEE PTR	BILL OF LADING/AIR BILL NO. SEE PTR Ship # H0070000			

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								
		VOLUME	1000g	200g								
SPECIAL HANDLING AND/OR STORAGE Radioactive Tie To: B1VJ49		SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216;								

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B1VJ76	SOIL	8-25-08	0840	✓	✓	BC	1434				

CHAIN OF POSSESSION	SIGN/ PRINT NAMES
RELINQUISHED BY/REMOVED FROM J. Mokler	RECEIVED BY/STORED IN A-5 Site Fridge
DATE/TIME 8-25-08 - 1515	DATE/TIME 8/25/08 - 1515
RELINQUISHED BY/REMOVED FROM A-5 SITE Fridge	RECEIVED BY/STORED IN Kevin Patterson
DATE/TIME AUG 28 2008 / 1010	DATE/TIME AUG 28 2008 / 0710
RELINQUISHED BY/REMOVED FROM Kevin Patterson	RECEIVED BY/STORED IN Fluor Hanford
DATE/TIME AUG 28 2008 1500	DATE/TIME 8-28-08 1500
RELINQUISHED BY/REMOVED FROM MO 413 RMA	RECEIVED BY/STORED IN D Connolly
DATE/TIME 9-8-8 0730	DATE/TIME 9-8-8 0730
RELINQUISHED BY/REMOVED FROM D Connolly	RECEIVED BY/STORED IN Feil E
DATE/TIME 9-8-8 1400	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
DATE/TIME	DATE/TIME
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
DATE/TIME	DATE/TIME

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 <i>Paul Shum</i>	TITLE RSO	DATE/TIME 9-9-08 @1000
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME