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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

January 19, 2005

F04-013

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	Eberline - Hanford
Shaw Project Number:	100846.40000000
Client Sample Data Group:	H2862
Date Received by Lab:	December 6, 2004
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction/Case Narrative

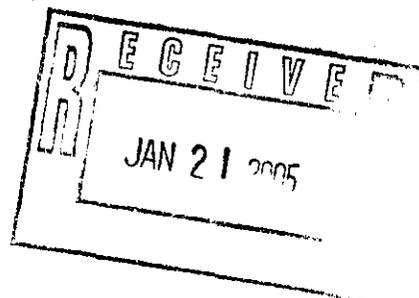
One soil sample was received by the Shaw Geotechnical Laboratory on December 6, 2004. The sample was submitted for determination of bulk density, sieve analysis, permeability, specific gravity and calcium carbonate content. The sample number received was B19378.

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)*, 2004. 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 certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and 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

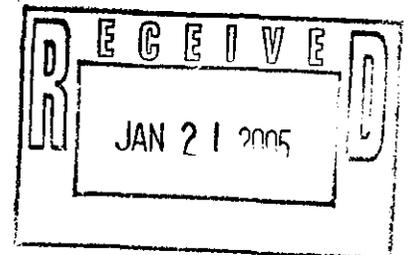
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January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.40000000
SDG No. H2862

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

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
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BC0491	B19378	Soil
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00000005

Appendix B
Sample Test Results

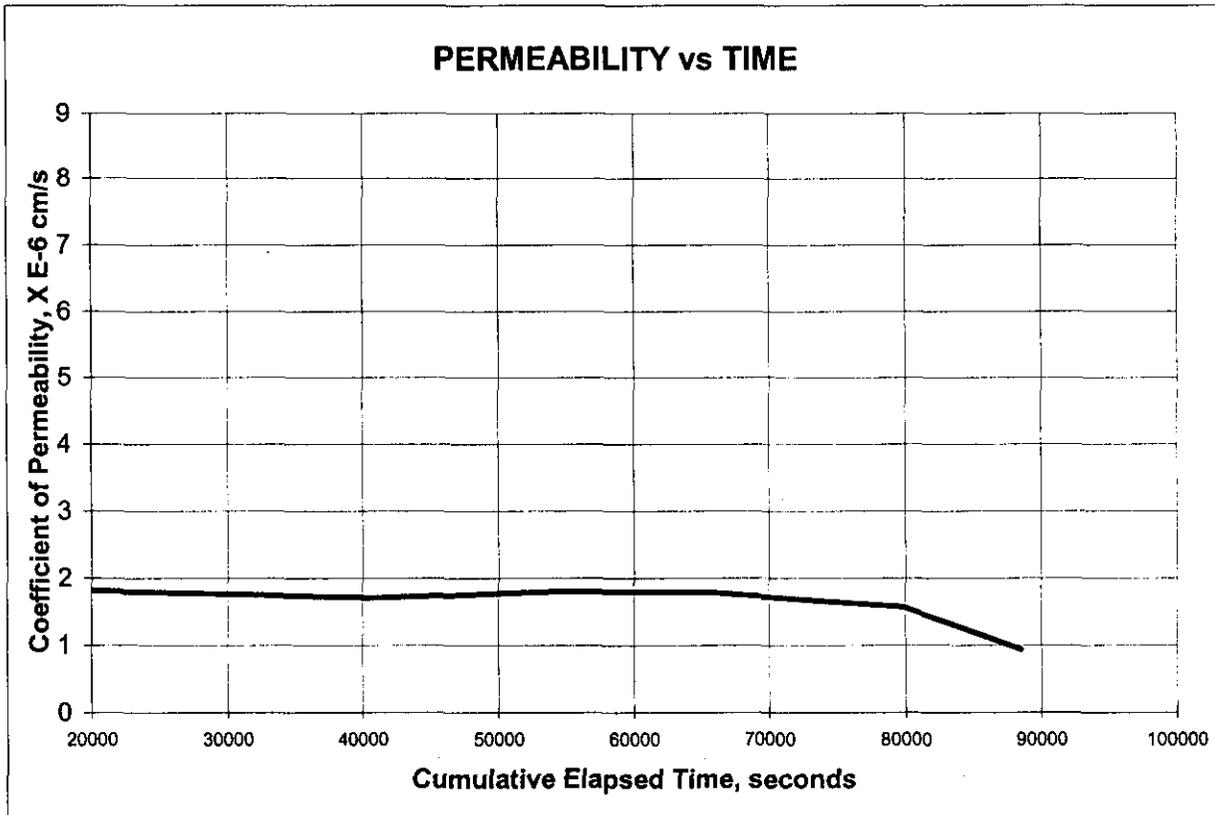
**HYDRAULIC CONDUCTIVITY / PERMEABILITY
 ASTM D 5084**

PROJECT NAME: Eberline Hanford
 PROJECT NO. 100846.40000000

CLIENT SAMPLE NO. B19378
 LAB SAMPLE NO. BC0491

	INITIAL	FINAL		
Specimen diameter, cm	6.33		Hydraulic gradient	20.4
Specimen length, cm	6.90		Min. consolidation stress, psi	2.0
Wet weight of specimen, g.	500.5		Max. consolidation stress, psi	2.5
Specimen cross-sect. area, cm ²	31.47		Total backpressure, psi	7.5
Water content, %	17.3		Permeant Fluid	Deaired DI Water
Wet unit weight, pcf	143.9			
Dry unit weight, pcf	122.7			
Degree of saturation, %	123.6			
Specific gravity of solids	2.71			

Coefficient of Permeability, cm/s 1.5E-06



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

SDA # H2862
Rberline Srvcas

CHAIN OF CUSTODY

ORD # R4-12-016

12/02/04 14:46:42

WORK ID: SAF# F04-013 SDG H2862

KEEP: 01/16/06 DISP: S

RCVD: 12/02/04 DUE: 01/16/05

<u>DASH</u>	<u>SAMPLE IDENTIFICATION</u>	<u>STORED</u>	<u>TESTS</u>					
01A-S	B19378	SHAW	DISPOS	E329S	E331S	E333S	E335S	E342S

BC 0491

<u>RELEASED BY</u>	<u>DATE</u>	<u>TRANSFERRED TO</u>	<u>DATE</u>	<u>RECEIVED BY</u>	<u>DATE</u>
<i>[Signature]</i>	12/2/04	SHAW LAB	12/2/04	<i>[Signature]</i>	12/6/04
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		F04-013-073	Page 1 of 1
Collector Johansen/Alexander/Genl/Thomas		Company Contact Mark Bynes		Telephone No. 373-3996	Project Coordinator TRENT, SJ
Project Designation 200-UP-1 Remedial Investigation Sampling and Analysis - S		Sampling Location 285-290' 200-UP-1, C4300; 260-265' Rem 11/24/04		SAF No. F04-013	Price Code 8N Data Turnaround 45 Days
Ice Chest No. GKP-03-017		Field Logbook No. HNF-N-3841		COA 119324ES10	Method of Shipment Federal Express
Shipped To Shaw Group		Offsite Property No. See PTK 14504		Bill of Lading/Air Bill No. See PTK 14504	

POSSIBLE SAMPLE HAZARDS/REMARKS N/A MAB 12/1/04 Rad to B19302 Special Handling and/or Storage N/A SDG # H2862	Preservation	None	None																	
	Type of Container	Moisture Resistant	Split Spoon Liner																	
	No. of Container(s)		2																	
	Volume		1000g																	
SAMPLE ANALYSIS		Moisture Content - 2216	See item (1) in Special Instructions.																	

Sample No.	Matrix *	Sample Date	Sample Time																		
B19378	SOIL	11/24/04	13:45																		
	BC 0491																				

CHAIN OF POSSESSION Rem 11/24/04				SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time	(1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422; Calcium Carbonate Content, Saturated Hydraulic Conductivity; Particle Density - D854				S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other	
MAB 12/1/04 R.O. Mahood	11/24/04 18:30	R.O. Mahood MO-026	11/24/04 18:30						
MAB 12/1/04 R.O. Mahood	11/24/04 18:30	MAB 12/1/04 R.O. Mahood	11/24/04 18:30						
MAB 12/1/04 R.O. Mahood	11/24/04 18:30	MAB 12/1/04 R.O. Mahood	11/24/04 18:30						
MAB 12/1/04 R.O. Mahood	11/24/04 18:30	MAB 12/1/04 R.O. Mahood	11/24/04 18:30						
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						
Fed Ex 12/2/04 9:40		Fed Ex 12/2/04 10:30							
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						
Fed Ex 12/2/04 4:00		Fed Ex							
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time						

LABORATORY SECTION	Received By	Title		Date/Time
	Jalal Shah	SHAW		12/6/04 @ 1000
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By		Date/Time

00000014