



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

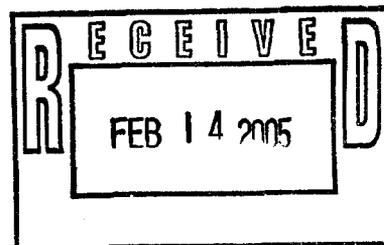
CERTIFICATE OF ANALYSIS

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

February 10, 2005

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	Eberline - Hanford
Shaw Project Number:	100846.51000000
Client Sample Data Group:	H2915
Date Received by Lab:	December 28, 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 28, 2004. The sample was submitted for determination of moisture content, bulk density, sieve analysis, hydraulic conductivity, specific gravity, and calcium carbonate content. The sample number received was B1B5H2.

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

00000001

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
Bulk Specific Gravity of Coarse Aggregate	ASTM C127
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

Page 4 of 12
February 10, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.51000000
SDG No. H2915

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

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
-----------------------	--------------------------	---------------

BC0519	B1B5H2	Soil
--------------	--------------	------

00000005

Appendix B
Sample Test Results

00000006

**PARTICLE-SIZE DISTRIBUTION
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B1B5H2

Project No. 100846.51000000

Lab Sample No. BC0519

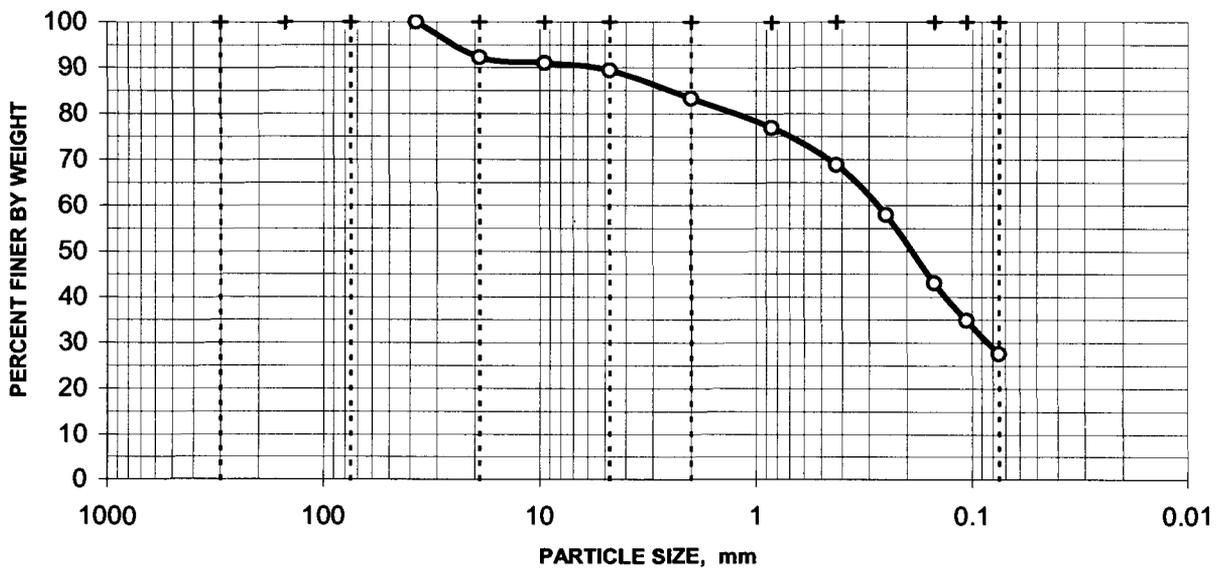
Moisture Content = 18.5%
 based on dry sample weight

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	92.2%
	0.375"	9.500	91.0%
	#4	4.750	89.4%
	#10	2.000	83.3%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	77.0%
	#40	0.425	68.8%
	#60	0.250	58.0%
	#100	0.149	43.0%
	#140	0.106	34.9%
	#200	0.075	27.6%

DISTRIBUTION CURVE



10.6% Gravel

61.8% Sand

27.6% Silt/Clay



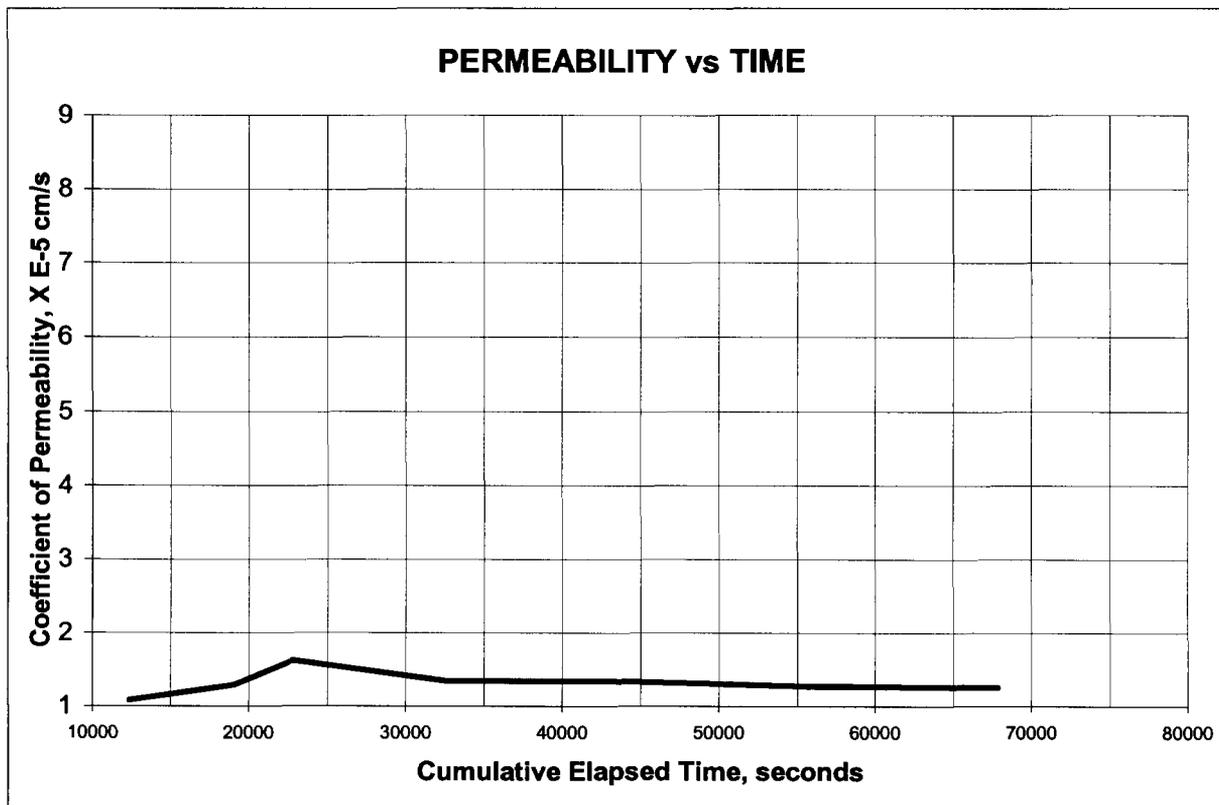
**HYDRAULIC CONDUCTIVITY / PERMEABILITY
 ASTM D 5084**

PROJECT NAME: Eberline Hanford
 PROJECT NO. 100846.51000000

CLIENT SAMPLE NO. B1B5H2
 LAB SAMPLE NO. BC0519

	INITIAL	FINAL		
Specimen diameter, cm	6.33		Hydraulic gradient	4.3
Specimen length, cm	8.15		Min. consolidation stress, psi	2.0
Wet weight of specimen, g.	450.61		Max. consolidation stress, psi	2.5
Specimen cross-sect. area, cm ²	31.50		Total backpressure, psi	8.5
Water content, %	19.8			
Wet unit weight, pcf	109.6		Permeant Fluid	Deaired DI Water
Dry unit weight, pcf	91.5			
Degree of saturation, %	61.9			
Specific gravity of solids	2.76			

Coefficient of Permeability, cm/s 1.3E-05



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

COLLECTOR
Pope/Pfister/Wiberg/Tyra

COMPANY CONTACT
LC Hulstrom

TELEPHONE NO.
373-3928

PROJECT COORDINATOR
TRENT, SJ

PRICE CODE 8N

DATA TURNAROUND
45 Days / 45 Days

SAMPLING LOCATION *QW 12/15/04*
200-PW2/216-S-7, 155-157.5 FT *153-155.5 FT*

PROJECT DESIGNATION
200-PW-2/200-PW-4 OU - Borehole Soil Sampling

SAF NO.
F03-006

AIR QUALITY

ICE CHEST NO. *GR-03-009*

FIELD LOGBOOK NO.
HNF-N-336-1

COA
119153E510

METHOD OF SHIPMENT
Federal Express

SHIPPED TO
Shaw Group

OFFSITE PROPERTY NO.
See PTK 14598

BILL OF LADING/AIRBILL NO.
See PTK 14598

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 <i>SDG# H2915</i>	PRESERVATION None None																			
		TYPE OF CONTAINER Moisture Resistant Cont Split Spoon Liner																			
		NO. OF CONTAINER(S) 1 1																			
		VOLUME 200g 1000g																			
SPECIAL HANDLING AND/OR STORAGE RADIOACTIVE TIE TO: <i>B1B591</i> <i>AK14</i>		SAMPLE ANALYSIS Moisture Content - D2216; Particle Size (Dry Sieve) - D422; <i>Bulk Density - D2937</i>																			

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME																
B1B5H2	SOIL	<i>12-15-04</i>	<i>0920</i>	✓	✓														
BC 0519																			

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
<i>[Signature]</i>	<i>12/20/04 10:30</i>	<i>[Signature]</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
<i>[Signature]</i>	<i>12/20/04 10:30</i>	<i>[Signature]</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
<i>[Signature]</i>	<i>12/20/04 10:30</i>	<i>[Signature]</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
<i>[Signature]</i>	<i>12/20/04 10:30</i>	<i>[Signature]</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
<i>[Signature]</i>	<i>12/20/04 10:30</i>	<i>[Signature]</i>
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN
<i>[Signature]</i>	<i>12/20/04 10:30</i>	<i>[Signature]</i>

LABORATORY SECTION RECEIVED BY *[Signature]* SHAW TITLE *12/28/04 @ 1030* DATE/TIME

FINAL SAMPLE DISPOSITION DISPOSAL METHOD _____ DISPOSED BY _____ DATE/TIME

SDG # H2915
Eberline Srvces

CHAIN OF CUSTODY

ORD # R4-12-221

RCVD: 12/20/04 DUE: 02/03/05

12/21/04 14:23:49

WORK ID: SAF# F03-006 SDG H2915

KEEP: 02/03/06 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS
01A-S	B1B5H2	LION	DISPOS E331S E333S E335S
=====			=====

BC 0519

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
<i>fred saw</i>	<i>12/21/04</i>	<i>shaw</i>	<i>12/22/04</i>	<i>[Signature]</i>	<i>12/28/04</i>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____