



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 29, 2004

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	Eberline - Hanford
Shaw Project Number:	100846.06000000
Client Sampling Authorization Form No.	F03-020
Client Sample Data Group:	H249T
Date Received by Lab:	January 16, 2004
Number of Samples:	One (1)
Sample Type:	Soil



### I. Introduction/Case Narrative

One soil sample was received by the Shaw Geotechnical Laboratory on January 16, 2004. The sample was submitted for determination of particle-size distribution and moisture content. The sample number received was B183P5.

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

**RECEIVED**  
 JUN 21 2004  
**EDMC**

## 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)*, 2003. Shaw Environmental and infrastructure, Standard Operating Procedures.

Particle-Size Distribution of Soils ..... **ASTM D 422**  
Moisture Content of Soil and Rock..... **ASTM D 2216**

## 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

Two moisture content results are reported. One data page reports the moisture content of a sample aliquot submitted for "moisture content" determination. The second moisture result is reported on the grainsize report sheet, and was determined using excess material from the grainsize test specimen.

**Appendix A**  
**Sample Cross-Reference List**

Page 4 of 13  
January 29, 2004  
Stephen Trent  
Fluor Hanford, Inc.  
Shaw Project Name: Eberline Hanford  
Shaw Project No. 100846.06000000  
SAF No. F03-020  
SDG No. H2491

**Shaw Geotechnical  
Laboratory  
Oak Ridge TN  
865/482-6497**

---

**SAMPLE NUMBER CROSS-REFERENCE LIST**

---

<b>LAB SAMPLE NO.</b>	<b>CLIENT SAMPLE NO.</b>	<b>MATRIX</b>
-----------------------	--------------------------	---------------

---

BC0258 .....	B183P5.....	Soil
--------------	-------------	------

**Appendix B**  
**Sample Test Results**



**PARTICLE-SIZE ANALYSIS  
 ASTM D 422**

Project Name Eberline - Hanford

Client Sample No. B183P5

Project No. 100846.04000000

Lab Sample No. BC0258

Specific Gravity = 2.65  
 assumed for calculations

Moisture Content = 6.6%  
 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	91.4%
	0.75"	19.000	73.4%
	0.375"	9.500	59.6%
	#4	4.750	47.4%
	#10	2.000	38.0%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	33.1%
	#40	0.425	28.7%
	#60	0.250	24.0%
	#100	0.149	18.0%
	#140	0.106	15.4%
	#200	0.075	13.4%

**HYDROMETER ANALYSIS**

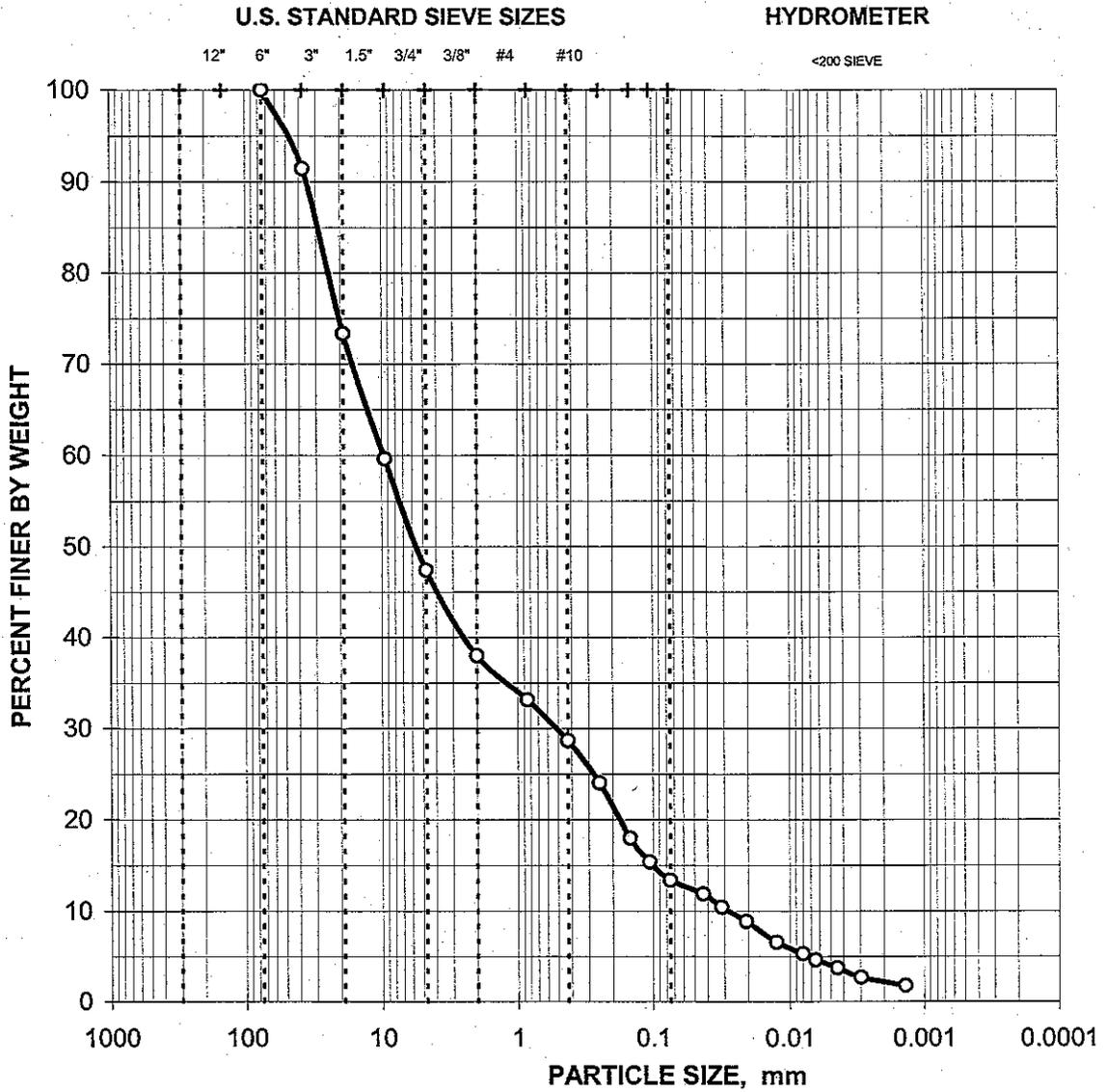
H Y D R O M E T E R	Diameter mm	Percent Finer
	0.04304	11.9%
	0.03151	10.5%
	0.02064	8.9%
	0.01246	6.6%
	0.00802	5.3%
	0.00646	4.6%
	0.00445	3.7%
	0.00296	2.7%
0.00138	1.8%	

52.6% Gravel

34.0% Sand

13.4% Silt/Clay

**Eberline - Hanford**



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

6 RE 1-23-04  
10084607000000

FLUOR Hanford Inc.		CENTRAL PLATEAU CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			F03-020-033	Page 1 of 1
Collector Pope/Hughes/Pfister	Company Contact Steve Trent	Telephone No. 373-5869	Project Coordinator TRENT, SJ		Price Code 8N 510	Data Turnaround 45 Days
Project Designation 216-B-26 Characterization Sampling - Soil Sampling		Sampling Location C3245 (329-331-5-1) 338'-340.5' RP 1-13-4		SAF No. F03-020	Air Quality <input type="checkbox"/> 8C	
Ice Chest No. GAP-03-021	Field Logbook No. HNF-N-350-1	COA 119142ES10	Method of Shipment Federal Express		1530 DAYS	
Shipped To Shaw Group		Offsite Property No. See PTR		Bill of Lading/Air Bill No. See PTR		

POSSIBLE SAMPLE HAZARDS/REMARKS Had to go to B18534  Special Handling and/or Storage  SDG# H2491	Preservation	None	None																	
	Type of Container	Moisture Resistant	Liner																	
	No. of Container(s)	1	1																	
	Volume	200g	1000g																	

SAMPLE ANALYSIS				Moisture Content - D2216	Particle Size (Dry Sieve) - D422															
-----------------	--	--	--	--------------------------	----------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Sample No.	Matrix *	Sample Date	Sample Time																		
B183P5	SOIL	1-13-4	1510	X	X																

BC 0258

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time				
JSPope	1/13/04 1630	MO-026	1/13/04 1630				
MO-026	1/14/04 0725	MO-026	1/14/04 0725				
MO-026	1/14/04 0725	Field Ex					
Field Ex	1/15/04 9:30	Field Ex	1/15/04 9:30				
Field Ex	1/15/04 2:00pm	Field Ex	1-16-04/1000				

- S=Soil
- SF=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

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

SDG # H2491

Eberline Svcs

CHAIN OF CUSTODY

ORD # R4-01-084

01/15/04 10:13:25

WORK ID: SAF# F03-020 SDG H2491

RCVD: 01/15/04 DUE: 01/30/04

KEEP: 01/29/05 DISP: S

DASH SAMPLE IDENTIFICATION

STORED

TESTS

01A-S B183P5

SHAW-LAB

DISPOS E331S E333S

RELEASED BY

DATE

TRANSFERRED TO

DATE

RECEIVED BY

DATE

J. Shaw  
\_\_\_\_\_  
\_\_\_\_\_

1-15-04  
\_\_\_\_\_  
\_\_\_\_\_

Shaw Geotech.  
\_\_\_\_\_  
\_\_\_\_\_

1-15-04  
\_\_\_\_\_  
\_\_\_\_\_

D. Husley / SHAW E+I  
\_\_\_\_\_  
\_\_\_\_\_

1-16-04  
\_\_\_\_\_  
\_\_\_\_\_

SDG # H2491

PAGE 1 Eberline Srvces  
CONTRACT: PO# RSH-SOW-93-0003

PURCHASE ORDER # R4-01-084-SU-SW  
01/15/04 10:13:05

ORDER Eberline Services/Richmond  
FROM Analytical Services  
2030 Wright Avenue  
Richmond, CA 94804-0040  
ATTEN Purchasing  
PHONE 510-235-2633

INVOICE Eberline Services/Richmond  
TO Analytical Services  
2030 Wright Avenue  
Richmond, CA 94804-0040  
ATTEN Purchasing  
PHONE 510-235-2633

*Gyanant*  
AUTHORIZED BY

ORDER Shaw Geotechnical Laboratory  
TO 1570 Bear Creek Road  
Oak Ridge, TN 37830

Please telephone our Sample Control Department immediately if any problems are encountered in the receipt or the analysis of the samples listed below.

ATTEN Ralph R. Cole

This Purchase Order authorizes Shaw to perform all work listed on the enclosed CDC. Alterations to work requested can only be made by Eberline Services or the appropriate Hanford client.

PRICE CODE *SC*

<u>FRACTION TEST</u>	<u>DESCRIPTION</u>	<u>UNITS</u>	<u>DUE DATE</u>	<u>COST</u>
01A E331S	D422 Particle Size-Dry Sve	Please Advise	01/30/04	0.00
E333S	D2216 Moisture Content	Please Advise	01/30/04	0.00
<b>TOTAL CHARGE NOT TO EXCEED</b>				<b>\$0.00</b>

SDG # H2491

PAGE 1

Eberline Srvces

WORK SHEET

ORD # R4-01-084

CLIENT: WES\_HANFORD

CON: KCJ

CAT: ENVMSW

RCVD: 01/15/04 DUE: 01/30/04

PROJ: WRC\_FLR

01/15/04 10:13:13

STAT: TRANSMITTED 01/15/04

DASH	SAMPLE IDENTIFICATION	STORED	DEPT	START	DUE BY	TESTS,	FRACTIONS /
01A-S	B183P5	SHAW-LAB	EN	01/15	01/15	DISPOS	
			SU SW	12/21	01/30	E331S	E333S

# WSCF ANALYTICAL RESULTS REPORT

Attention: Steve Trent  
Project: F03-020: F03-020

Group #: WSCF20031726

Sample #	Client ID	CAS #	Test Performed	Matrix	WSCF Method	RQ	Result	Unit	DF	MDL	Analyze	Sample	Receive	
<b>Radiochemistry</b>														
W030001234	B18534	GPP	TRENT	12587-46-1	Gross alpha	SOIL	LA-508-421 U	0.200	pCi/g	1.00	1.3	01/05/04	12/31/03	12/31/03
W030001234	B18534	GPP	TRENT	E.T.C	Alpha error by LC	SOIL	LA-508-421 +-	2.0	pCi/g	1.00	0.0	01/05/04	12/31/03	12/31/03
W030001234	B18534	GPP	TRENT	12587-47-2	Gross beta	SOIL	LA-508-421	4.80	pCi/g	1.00	1.6	01/05/04	12/31/03	12/31/03
W030001234	B18534	GPP	TRENT	E.T.C	Beta error by LC	SOIL	LA-508-421 +-	4.1	pCi/g	1.00	0.0	01/05/04	12/31/03	12/31/03

Tu to B183P1 & B183P3/B183P5

MDL=Minimum Detection Limit  
RQ=Result Qualifier

U - Analyzed for but not detected above limiting criteria.

DF=Dilution Factor

\* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

Report WGPP/ver. 1

Ground Water Protection Program