



Geotechnical Laboratory  
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## 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:          | <b>Eberline - Hanford</b> |
| Shaw Project Number:      | <b>100846.52000000</b>    |
| Client Sample Data Group: | H2923                     |
| Date Received by Lab:     | December 30, 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 30, 2004. The sample was submitted for determination of moisture content, bulk density, and sieve analysis. The sample number received was B19972.

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**  
Particle-size Analysis of Soils ..... **ASTM D 422**  
Bulk Density of Soils ..... **EM 1110-2-1906**

## 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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February 10, 2005  
Stephen Trent  
Fluor Hanford, Inc.  
Shaw Project Name: Eberline Hanford  
Shaw Project No. 100846.52000000  
SDG No. H2923

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

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**SAMPLE NUMBER CROSS-REFERENCE LIST**

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| LAB SAMPLE NO. | CLIENT SAMPLE NO. | MATRIX |
|----------------|-------------------|--------|
| BC0520 .....   | B19972 .....      | Soil   |

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

00000006





**PARTICLE-SIZE DISTRIBUTION  
 ASTM D 422**

Project Name Eberline Hanford

Field Sample No. B19972

Project No. 100846.52000000

Lab Sample No. BC0520

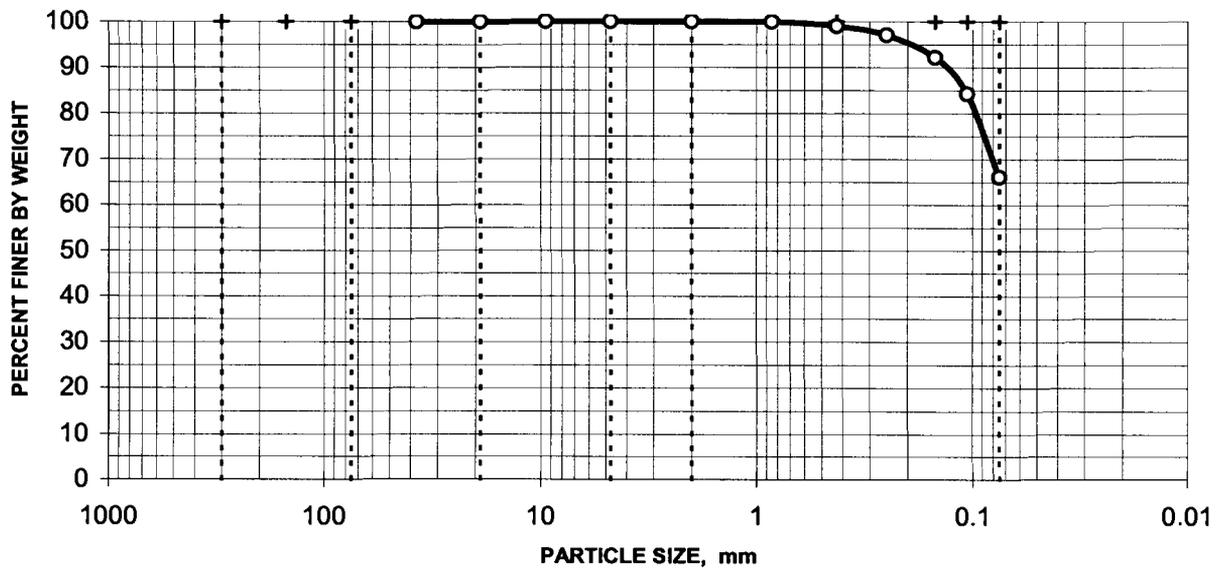
Moisture Content = 10.6%  
 based on dry sample weight

**SIEVE ANALYSIS**

| C<br>O<br>A<br>R<br>S<br>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       | 100.0%        |
|                            | #4        | 4.750       | 100.0%        |
|                            | #10       | 2.000       | 100.0%        |

| F<br>I<br>N<br>E | Sieve No. | Diameter mm | Percent Finer |
|------------------|-----------|-------------|---------------|
|                  | #20       | 0.850       | 99.9%         |
|                  | #40       | 0.425       | 99.0%         |
|                  | #60       | 0.250       | 97.0%         |
|                  | #100      | 0.149       | 92.1%         |
|                  | #140      | 0.106       | 84.3%         |
|                  | #200      | 0.075       | 66.0%         |

**DISTRIBUTION CURVE**



0.0% Gravel

34.0% Sand

66.0% Silt/Clay

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

|  |   |   |             |                                      |                                      |   |             |
|--|---|---|-------------|--------------------------------------|--------------------------------------|---|-------------|
| FLUOR Hanford Inc.   |   | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST                                      |             |                                      |                                      | F04-015-076   | PAGE 1 OF 1 |
| COLLECTOR<br>Pope/Pfister/Tyra/Wiberg/ <i>WEIL</i>   |   | COMPANY CONTACT<br>CS Cearlock  |             | TELEPHONE NO.<br>372-9638            |                                      | PROJECT COORDINATOR<br>TRENT, SJ                    |             |
| SAMPLING LOCATION<br>216-U-3; 127FT-129.5FT  |   | PROJECT DESIGNATION<br>200-MW-1 Characterization Sampling and Analysis - Soil |             |                                      |                                      | SAF NO.<br>F04-015                                  |             |
| PRICE CODE 8N  |   | DATA TURNAROUND<br>45 Days / 45 Days  |             | AIR QUALITY <input type="checkbox"/> |                                      |   |             |
| ICE CHEST NO.<br><i>GRR-03-003</i>   |   | FIELD LOGBOOK NO.<br>HNF-N-386 1  |             | COA<br>119144ES10                    |                                      | METHOD OF SHIPMENT<br>Federal Express               |             |
| SHIPPED TO<br>Shaw Group   |   | OFFSITE PROPERTY NO.<br><i>See PTR 14601</i>                                  |             |                                      |                                      | BILL OF LADING/AIR BILL NO.<br><i>See PTR 14601</i> |             |
| MATRIX*<br>A=Air<br>DL=Drum<br>Liquids<br>DS=Drum<br>Solids<br>L=Liquid<br>O=Oil<br>S=Soil<br>SE=Sediment<br>T=Tissue<br>V=Vegetation<br>W=Water<br>WI=Wipe<br>X=Other | POSSIBLE SAMPLE HAZARDS/ REMARKS<br>N/A | PRESERVATION  |             | None                                 | None                                 |   |             |
|  |   | TYPE OF CONTAINER   |             | Moisture Resistant Cont              | Liner                                |   |             |
|  |   | NO. OF CONTAINER(S)   |             | 1                                    | 1                                    |   |             |
|  |   | VOLUME  |             | 200g                                 | 1000g<br><i>2811g</i>                |   |             |
| SPECIAL HANDLING AND/OR STORAGE<br>Radioactive Tie To: <i>B19956 map 12/21/04</i><br><i>B19955</i>   |   | SAMPLE ANALYSIS   |             | Moisture Content - D2216;            | SEE ITEM (1) IN SPECIAL INSTRUCTIONS |   |             |
| SAMPLE NO.   | MATRIX*                                 | SAMPLE DATE   | SAMPLE TIME |                                      |                                      |   |             |
| B19972   | SOIL                                    | 12/20/04  | 0740        | X                                    | X                                    |   |             |
| BC 0520  |   |   |             |                                      |                                      |   |             |
| CHAIN OF POSSESSION  |   |   |             | SIGN/ PRINT NAMES                    |                                      | SPECIAL INSTRUCTIONS                                |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
| <i>David Tyra</i>  |   | 12/20/04 09:10  |             | <i>MD-0210 FRIGERIA</i>              |                                      | 12/20/04 09:10                                      |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
| <i>MD-0210</i>   |   | 12/21/04 08:00  |             | <i>M.H. Baulch</i>                   |                                      | 12/21/04 08:00                                      |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
| <i>M.H. Baulch</i>   |   | 12/21/04 08:00  |             | <i>LED</i>                           |                                      |   |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
| <i>Joe So</i>  |   | 12/23/04 12:00  |             | <i>Joe So</i>                        |                                      | 12/23/04 12:00                                      |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
| <i>Joe So</i>  |   | 12/28/04 3:00   |             | <i>Fed Exp</i>                       |                                      | 12/28/04  |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
|  |   |   |             |                                      |                                      |   |             |
| RELINQUISHED BY/REMOVED FROM   |   | DATE/TIME   |             | RECEIVED BY/STORED IN                |                                      | DATE/TIME   |             |
|  |   |   |             |                                      |                                      |   |             |
| LABORATORY SECTION   | RECEIVED BY                             | TITLE   |             | DATE/TIME                            |                                      |   |             |
|  | <i>[Signature]</i>                      | <i>SHAW</i>   |             | <i>12/30/04 @ 0945</i>               |                                      |   |             |
| FINAL SAMPLE DISPOSITION   | DISPOSAL METHOD                         | DISPOSED BY   |             | DATE/TIME                            |                                      |   |             |
|  |   |   |             |                                      |                                      |   |             |

SDG# H2923

PAGE 1

Eberline Srvces

CHAIN OF CUSTODY

ORD # R4-12-281

12/27/04 14:26:57

WORK ID: SAF# F04-015 SDG H2927

RCVD: 12/23/04 DUE: 02/06/05

KEEP: 02/06/06 DISP: S

| <u>DASH</u> | <u>SAMPLE IDENTIFICATION</u> | <u>STORED</u> | <u>TESTS</u> |       |             |
|-------------|------------------------------|---------------|--------------|-------|-------------|
| 01A-S       | B19972                       | LION          | DISPOS       | E331S | E333S E335S |

BC 0520

| <u>RELEASED BY</u> | <u>DATE</u>     | <u>TRANSFERRED TO</u> | <u>DATE</u>     | <u>RECEIVED BY</u> | <u>DATE</u>     |
|--------------------|-----------------|-----------------------|-----------------|--------------------|-----------------|
| <i>fred Davis</i>  | <i>12/28/04</i> | <i>Shaw</i>           | <i>12/28/04</i> | <i>[Signature]</i> | <i>12/30/04</i> |
| _____              | _____           | _____                 | _____           | _____              | _____           |
| _____              | _____           | _____                 | _____           | _____              | _____           |
| _____              | _____           | _____                 | _____           | _____              | _____           |

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