

RECEIVED FEBRUARY 25, 2011



Shaw Environmental &amp; Infrastructure, Inc.

Geotechnical Laboratory  
 304 Directors Drive  
 Knoxville, TN 37923  
 (865) 690-3211

*KB  
3-14-11*

*EBER0111052*

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**CERTIFICATE OF ANALYSIS**


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Mr. Michael Neely  
 CH2M Hill Plateau Remediation Company  
 P.O. Box 1600  
 Mail Stop – B6-06  
 Richland, WA 99352

February 24, 2011

This is the Certificate of Analysis for the following samples:

Shaw Project ID: Eberline Analytical  
 Shaw Project Number: 139736  
 Date Received by Lab: 01/27/11  
 Number of Samples: One (1)  
 Sample Type: Soil

I. Introduction/Case Narrative

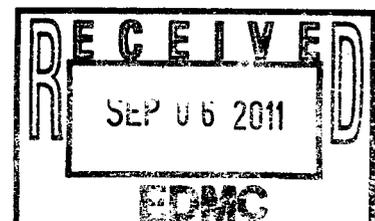
One (1) soil sample was received by the Shaw Geotechnical Laboratory on January 27, 2011. The sample was submitted for determination of bulk density, moisture content, particle size, and hydraulic conductivity/permeability as listed on the Chain of Custody/Sample Analysis Request. The sample number for the received sample was B29P76.

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 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:

R. Gregory Bennett  
 Geotechnical Laboratory Manager, Technology Applications Group



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## II. Analytical Results/Methodology

REFERENCES: United Nations, *Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*, third ed. New York, 1999. 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.

Bulk Density.....	<b>ASTM D 2937</b>
Moisture Content.....	<b>ASTM D 2216</b>
Particle Size (sieve only).....	<b>ASTM D 422</b>
Permeability.....	<b>ASTM D 5084</b>

## 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.

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Report No.: EBER0111052  
Mr. Michael Neely  
Client: CH2M Hill Plateau Remediation Company  
Shaw Project Name: Eberline Analytical  
Shaw Project No.: 139736

**Shaw**  
**Geotechnical Laboratory**  
**Knoxville, TN**  
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- 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

None

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

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Report No.: EBER0111052  
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Client: CH2M Hill Plateau Remediation Company  
Shaw Project Name: Eberline Analytical  
Shaw Project No.: 139736

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SAMPLE NUMBER CROSS-REFERENCE LIST

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Lab Sample ID	Client Sample ID	MATRIX
SEK 5378	B29P76	SOIL

**Appendix B**  
**Data Results**



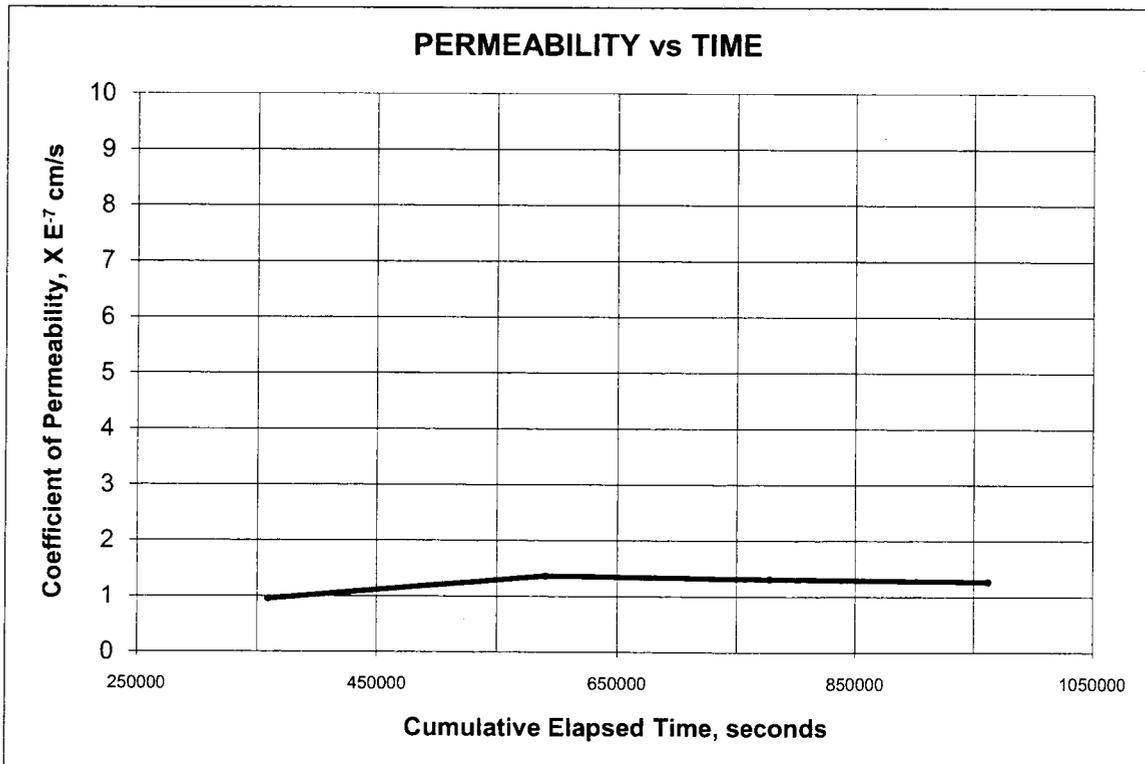




**HYDRAULIC CONDUCTIVITY / PERMEABILITY  
 ASTM D 5084**

PROJECT NAME:	Eberline	CLIENT SAMPLE NO.	B29P76
PROJECT NO.	139736.11700000	LAB SAMPLE NO.	SEK 5378
	<b>INITIAL</b>	<b>FINAL</b>	
Specimen diameter, cm	7.32		
Specimen length, cm	13.40	Hydraulic gradient	10.5
Wet weight of specimen, g.	1159.23	Min. consolidation stress, psi	2.0
Specimen cross-sect. area, cm <sup>2</sup>	42.09	Max. consolidation stress, psi	4.0
Water content, %	24.2	Total backpressure, psi	75.0
Wet unit weight, pcf	128.3	Permeant Fluid	Deaired Tap Water
Dry unit weight, pcf	103.3		
Est. degree of saturation, %	106.6	106.6	
Specific gravity of solids, assumed	2.65		

**Coefficient of Permeability, cm/s      1.2E-07**



**Appendix C**  
**Chain of Custody Records**

CH2M Hill Plateau Remediation Company

COLLECTOR

*J. Williams, Christian, Garcia*  
SAMPLING LOCATION

C7624 (199-D5-134); I-025

ICE CHEST NO.

*Gws-126*

SHIPPED TO

Shaw Group

MATRIX\*

- A=Air
- DL=Drum
- L=Liquid
- DS=Drum
- S=Drum
- 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 may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

SAMPLE NO.

829P76

MATRIX\*

SOIL

SAMPLE DATE

1-25-11

SAMPLE TIME

1245

✓

SEK 5378

PROJECT COORDINATOR

RADLOFF, AW

SAF NO.

F10-214

COA

300110ES10

BILL OF LADING/AIR BILL NO.

SEE PTR 794359065880

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COMPANY CONTACT

RADLOFF, AW

TELEPHONE NO.

376-4554

PROJECT DESIGNATION

100 Area Remedial Investigation/Feasibility Analysis - 100-HR-3 - Sediment

FIELD LOGBOOK NO.

HNF-N-491-13 P613

ACTUAL SAMPLE DEPTH

11'-13.5'

F10-214-116

PAGE 1 OF 1

PRICE CODE

8N

DATA

TURNAROUND

AIR QUALITY

PRICE CODE 7 H DATA

TURNAROUND 30 DAYS/30

METHOD OF SHIPMENT

FEDERAL EXPRESS

6.4 pounds

(B)

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM

DATE/TIME

1-25-11 1355

DATE/TIME

0800

DATE/TIME

1/26/11 1400

DATE/TIME

DATE/TIME

DATE/TIME

DATE/TIME

DATE/TIME

DATE/TIME

DATE/TIME

SIGN/ PRINT NAMES

RECEIVED BY/STORED IN

MD-413

RECEIVED BY/STORED IN

Thomas Wallace

RECEIVED BY/STORED IN

Feder

RECEIVED BY/STORED IN

SPECIAL INSTRUCTIONS

\*\* The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. \*\* The CACN for all analytical work at WSCF laboratory is 401642ES20.

(1) Bulk Density - D2937; Saturated Hydraulic Conductivity;

Permeability - D2434; Particle Size (Dry Sieve) - D422;

RECEIVED BY

*Johnathan*

TITLE

R50

DATE/TIME

1-27-11 @ 1030

DISPOSAL METHOD

DISPOSED BY

DATE/TIME