

RECEIVED DECEMBER 08, 2010



Shaw Environmental &amp; Infrastructure, Inc.

Geotechnical Laboratory  
304 Directors Drive  
Knoxville, TN 37923  
(865) 690-3211**CERTIFICATE OF ANALYSIS**

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

December 6, 2010

This is the Certificate of Analysis for the following samples:

Shaw Project ID: Eberline Analytical  
Shaw Project Number: 139736  
Date Received by Lab: 11/05/10  
Number of Samples: One  
Sample Type: Soil

**I. Introduction/Case Narrative**

One soil sample was received by the Shaw Geotechnical Laboratory on November 5, 2010. The sample was submitted for determination of particle size, moisture, bulk density and permeability. The sample number received was B28JK3.

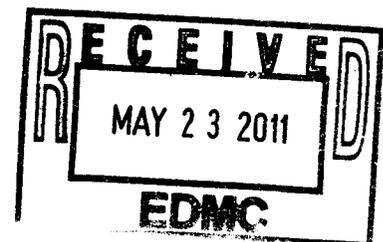
Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; Appendix C, Chain-of-Custody/Sample Receipt Records.

"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:

A handwritten signature in black ink, appearing to read "R. Gregory Bennett".

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.

Particle Size by Dry Sieve.....	<b>ASTM D 422</b>
Soil Moisture .....	<b>ASTM D 2216</b>
Bulk Density .....	<b>ASTM D 2937</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.

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Report No.: EBER1110033  
Mr. Michael Neely  
Client: CH2M Hill Plateau Remediation Company  
Shaw Project Name: Eberline Analytical  
Shaw Project No.: 139736

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**Geotechnical Laboratory**  
**Knoxville, TN**  
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- 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 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.: EBER1110033  
Mr. Michael Neely  
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 5117	B28JK3	SOIL

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







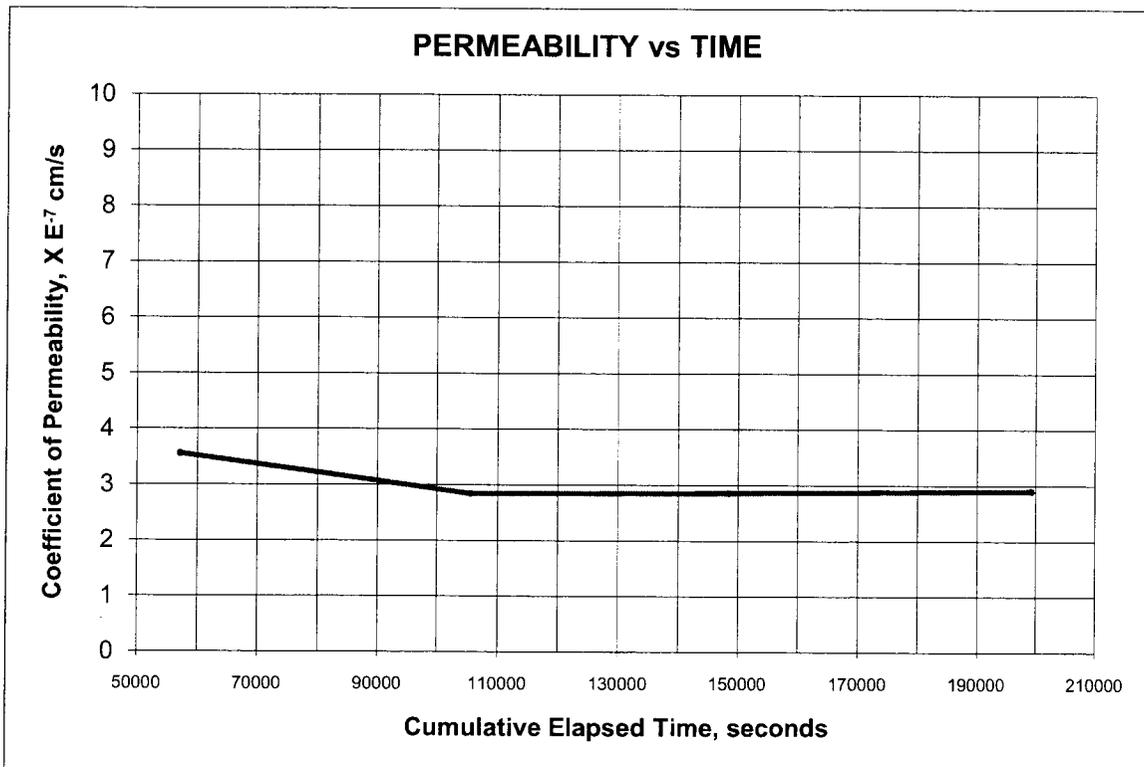
**HYDRAULIC CONDUCTIVITY / PERMEABILITY  
 ASTM D 5084**

PROJECT NAME: Eberline  
 PROJECT NO. 139736.1020000

CLIENT SAMPLE NO. B28JK3  
 LAB SAMPLE NO. SEK 5117

	INITIAL	FINAL		
Specimen diameter, cm	7.11			
Specimen length, cm	14.05		Hydraulic gradient	25.0
Wet weight of specimen, g.	1192.89		Min. consolidation stress, psi	2.0
Specimen cross-sect. area, cm <sup>2</sup>	39.71		Max. consolidation stress, psi	7.0
Water content, %	24.0		Total backpressure, psi	43.0
Wet unit weight, pcf	133.5			
Dry unit weight, pcf	107.6		Permeant Fluid	Deaired DI Water
Est. degree of saturation, %	118.5	118.5		
Specific gravity of solids, assumed	2.65			

**Coefficient of Permeability, cm/s 3.0E-07**



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

CH2M Hill Plateau Remediation Company

COLLECTOR

*Kevin Kaye, B. Mingley*

SAMPLING LOCATION  
C7626 (199-D6-3); I-018

ICE CHEST NO.  
*6ws-617*

SHIPPED TO  
Shaw Group

MATRIX\*  
A=Air  
DL=Drum  
Liquids  
DS=Drum  
Solids  
L=Liquid  
O=Oil  
S=Soil  
SE=Sediment  
T=Tissue  
V=Vegetation  
W=Water  
WJ=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.  
B28JK3

MATRIX\*  
SOIL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

COMPANY CONTACT  
DYKMAN, DL

TELEPHONE NO.  
373-2530

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

FIELD LOGBOOK NO.  
HNF-N-576-3 *P9124*

ACTUAL SAMPLE DEPTH  
*54.9 - 56.9 FT*

OFFSITE PROPERTY NO.  
SEE PTR

BILL OF LADING/AIR BILL NO.  
*7964*

SEE PTR

PRESERVATION  
None

HOLDING TIME  
None

TYPE OF CONTAINER  
Liner

NO. OF CONTAINER(S)  
1

VOLUME  
1000ml

SAMPLE ANALYSIS  
SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE DATE  
11-3-10

SAMPLE TIME  
1020

SEK5117

*Disposal weight, lbs: 6 lbs*

*7964 158.6 3624*

*CPD*

*02258*

F10-214-033

PAGE 1 OF 1

PRICE CODE  
8N

DATA TURNAROUND  
45 Days / 45 Days

AIR QUALITY

METHOD OF SHIPMENT  
FEDERAL EXPRESS

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM  
*Robbano Bobelone 11-3-10* DATE/TIME  
1330

RELINQUISHED BY/REMOVED FROM  
*SSU-R2* DATE/TIME  
11/4/10 09:30

RELINQUISHED BY/REMOVED FROM  
*Br. T. Nelson* DATE/TIME  
11/4/10 11:30

RELINQUISHED BY/REMOVED FROM

RECEIVED BY  
DATE/TIME

RECEIVED BY/STORED IN  
*SSU-R2* DATE/TIME  
NOV 03 2010 1330

RECEIVED BY/STORED IN  
*Br. T. Nelson* DATE/TIME  
11/4/10 09:30

RECEIVED BY/STORED IN  
*FED EX* DATE/TIME  
11/5/10 10:50

RECEIVED BY/STORED IN

RECEIVED BY/STORED IN

LABORATORY SECTION

TITLE

FINAL SAMPLE DISPOSITION

DISPOSED BY

DATE/TIME

DATE/TIME

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;

*ORIGINAL*