



Shaw Environmental & 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

August 1, 2011

This is the Certificate of Analysis for the following samples:

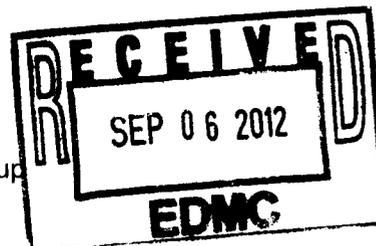
Shaw Project ID: Eberline Analytical
Shaw Project Number: 139736
Date Received by Lab: 07/14/11
Number of Samples: One (1)
Sample Type: Soil**I. Introduction/Case Narrative**

One (1) soil sample was received by the Shaw Geotechnical Laboratory on July 14, 2011. The sample was submitted for determination of bulk density, moisture content, particle size, and hydraulic conductivity/permeability and as listed on the Chain of Custody/Sample Analysis Request. The sample number for the received sample was B2C1T3.

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:

R. Gregory Bennett
Geotechnical Laboratory Manager, Technology Applications Group

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	ASTM D 2937
Moisture Content	ASTM D 2216
Particle Size (sieve only).....	ASTM D 422
Permeability.....	ASTM D 5084

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 heterogeneous 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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Mr. Michael Neely

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Shaw Project Name: Eberline Analytical

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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

Appendix A
Sample Cross-Reference List

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SAMPLE NUMBER CROSS-REFERENCE LIST

Lab Sample ID	Client Sample ID	MATRIX
SEK 5968	B2C1T3	SOIL

Appendix B
Data Results

PARTICLE-SIZE DISTRIBUTION
ASTM D 422

Project Name Eberine

Field Sample No. B2C1T3

Project No. 139736.15700000

Lab Sample No. SEK 5968

Moisture Content = 22.0%

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	100.0%
	0.375"	9.500	100.0%
	#4	4.750	100.0%
	#10	2.000	100.0%

F I N E	Sieve No.	Diameter mm	Percent Finer
	#20	0.850	97.5%
	#40	0.425	91.4%
	#60	0.250	86.4%
	#100	0.149	80.5%
	#140	0.106	74.7%
	#200	0.075	66.5%

0.0% Gravel

33.5% Sand

66.5% Silt/Clay

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Shaw

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**HYDRAULIC CONDUCTIVITY / PERMEABILITY
ASTM D 5084**

PROJECT NAME: Eberline

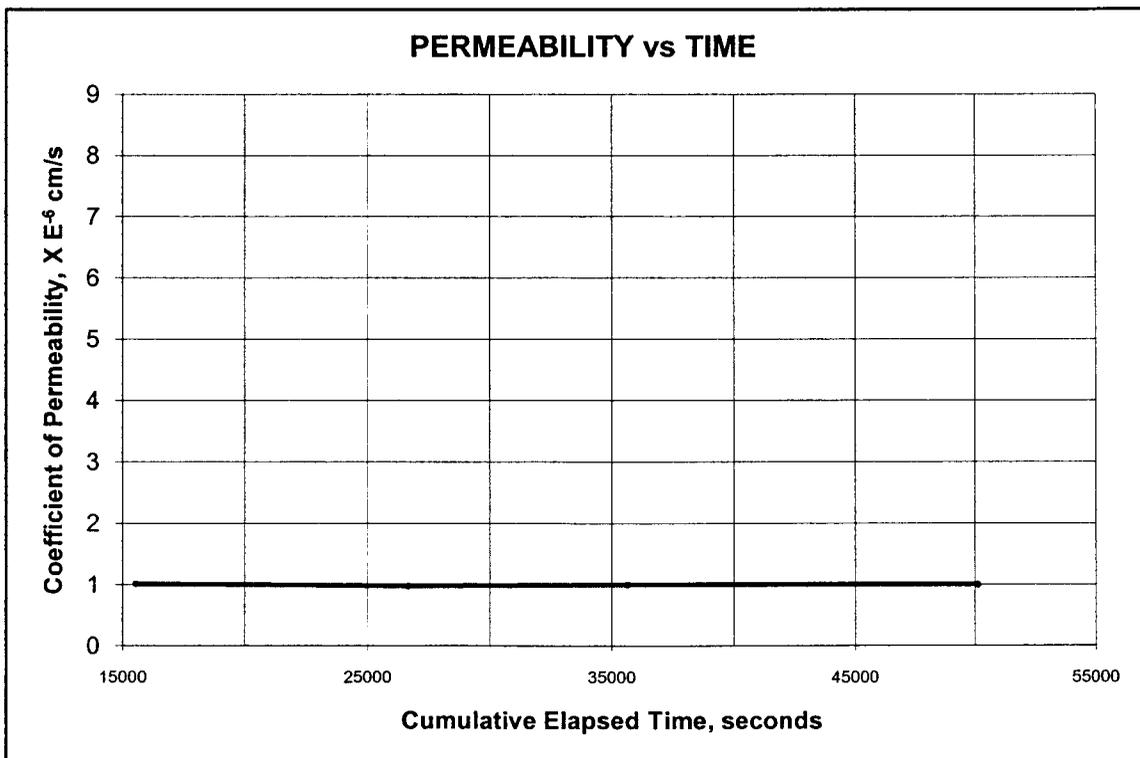
CLIENT SAMPLE NO. B2C1T3

PROJECT NO. 139736.15700000

LAB SAMPLE NO. SEK 5968

	INITIAL	FINAL		
Specimen diameter, cm	7.35			
Specimen length, cm	10.73		Hydraulic gradient	26.2
Wet weight of specimen, g.	918.38		Min. consolidation stress, psi	2.0
Specimen cross-sect. area, cm ²	42.38		Max. consolidation stress, psi	6.0
Water content, %	22.0		Total backpressure, psi	64.0
Wet unit weight, pcf	126.0			
Dry unit weight, pcf	103.3		Permeant Fluid	Deaired Tap Water
Est. degree of saturation, %	96.9	96.9		
Specific gravity of solids, assumed	2.65			

Coefficient of Permeability, cm/s 1.0E-06



Appendix C
Chain of Custody Records

CH2M Hill Plateau Remediation Company

COLLECTOR
Twain.com, Billingsley

SAMPLING LOCATION
C8184 (199-N-182); I-003

ICE CHEST NO.
GWS-241

SHIPPED TO
Shaw Group

COMPANY CONTACT
RADLOFF, AW

TELEPHONE NO.
376-4554

PROJECT DESIGNATION
100 Area Remedial Investigation/Feasibility Analysis - 100-NR-2 - Sediment

FIELD LOGBOOK NO.
HNF-N-585-15 p476

OFFSITE PROPERTY NO.
SEE PTR

PROJECT COORDINATOR
RADLOFF, AW

SAF NO.
F11-057

COA
300104ES10

BILL OF LADING/AIR BILL NO.
SEE PTR 794967012516

PRICE CODE
8H

AIR QUALITY

METHOD OF SHIPMENT
FEDERAL EXPRESS

PAGE 1 OF 1

TURNAROUND
30 Days/30 Days

ORIGINAL

PRESERVATION
None

HOLDING TIME
None

TYPE OF CONTAINER
Split Spoon Liner

NO. OF CONTAINER(S)
1

VOLUME
1000g

SAMPLE ANALYSIS
SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE DATE
7-12-11

SAMPLE TIME
1340

MATRIX*
SOIL

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

SEK 5968

Disposal weight 6 lbs.

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/PRINT NAMES	RECEIVED BY/STORED IN	DATE/TIME
A. Turner	7-12-11 1500		M. O'Connell	7-12-11 1500
SSU-RI	JUL 13 2011 0700		J.R. Aguilera	JUL 13 2011 0700
RELINQUISHED BY/REMOVED FROM	DATE/TIME		RECEIVED BY/STORED IN	DATE/TIME
J.R. Aguilera	JUL 13 2011 0700		FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME		RECEIVED BY/STORED IN	DATE/TIME
FEDEX	7-14-11/11:00		M. Boggin/Shaw Geo	7-14-11/11:00
RELINQUISHED BY/REMOVED FROM	DATE/TIME		RECEIVED BY/STORED IN	DATE/TIME
1				
RELINQUISHED BY/REMOVED FROM	DATE/TIME		RECEIVED BY/STORED IN	DATE/TIME
8				
RELINQUISHED BY/REMOVED FROM	DATE/TIME		RECEIVED BY/STORED IN	DATE/TIME
1				

LABORATORY SECTION

RECEIVED BY

DISPOSAL METHOD

FINAL SAMPLE DISPOSITION

DISPOSED BY

TITLE

DATE/TIME

SPECIAL INSTRUCTIONS

** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

** Physical Properties laboratory: Conduct the hydraulic conductivity test (ASTM D5084 or D2434) as appropriate to the sample matrix.

(1) Bulk Density - D2937; Particle Size (Dry Sieve) - D422; Permeability - D2434; Saturated Hydraulic Conductivity (Hydraulic Conductivity); D5094 *etc 4/12/11*

PRINTED ON 4/12/2011

A-5003-618 (REV 2)