



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

July 25, 2011

This is the Certificate of Analysis for the following samples:

Shaw Project ID: Eberline Analytical
Shaw Project Number: 139736
Date Received by Lab: 07/12/11
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 12, 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 B2C1T1.

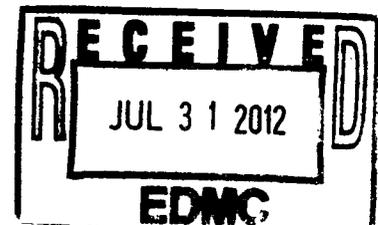
Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records; Appendix D, Sample Issue Resolution Forms.

"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:

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

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 DensityASTM D 2937
Moisture ContentASTM 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.

- 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

Page 4 of 9
Report No.: EBER0711094
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

Lab Sample ID	Client Sample ID	MATRIX
SEK 5967	B2C1T1	SOIL

Appendix B
Data Results

PARTICLE-SIZE DISTRIBUTION
ASTM D 422

Project Name Eberine

Field Sample No. B2C1T1

Project No. 139736.15600000

Lab Sample No. SEK 5967

Moisture Content = 19.4%

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	100.0%
	#40	0.425	96.5%
	#60	0.250	47.3%
	#100	0.149	21.4%
	#140	0.106	17.5%
	#200	0.075	15.8%

0.0% Gravel

84.2% Sand

15.8% Silt/Clay

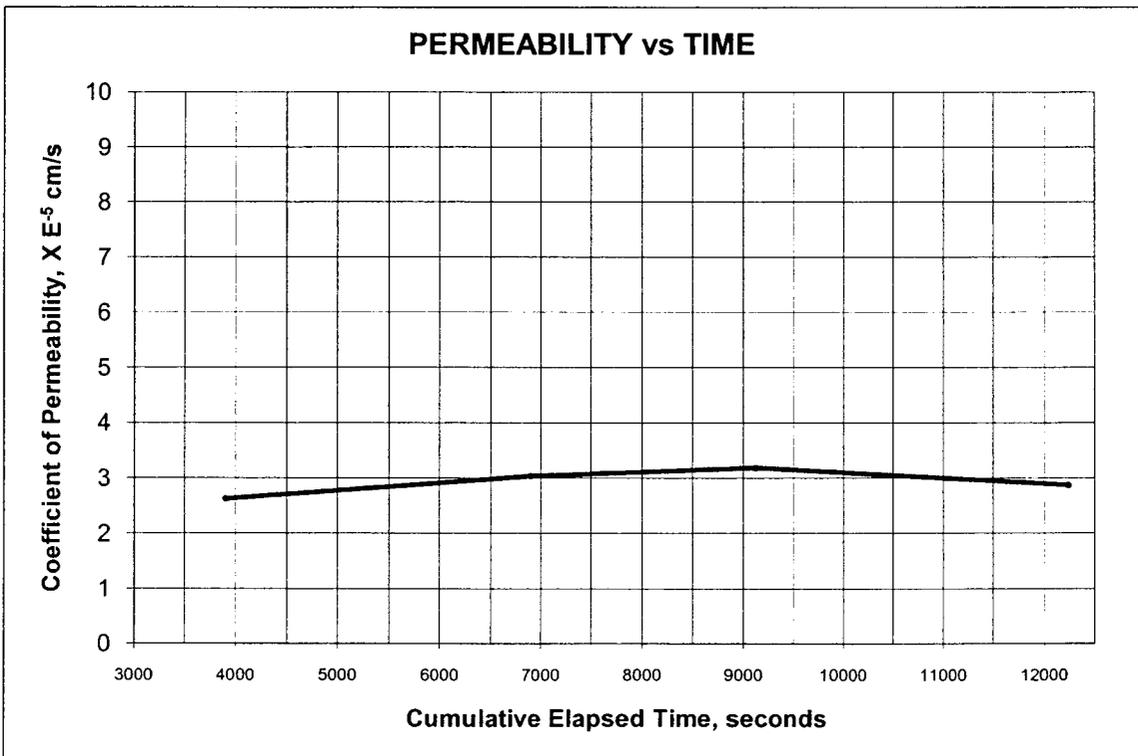
HYDRAULIC CONDUCTIVITY / PERMEABILITY
ASTM D 5084

PROJECT NAME: Eberline
 PROJECT NO. 139736.15600000

CLIENT SAMPLE NO. B2C1T1
 LAB SAMPLE NO. SEK 5967

	INITIAL	FINAL		
Specimen diameter, cm	5.04			
Specimen length, cm	6.62		Hydraulic gradient	10.6
Wet weight of specimen, g.	292.15		Min. consolidation stress, psi	2.0
Specimen cross-sect. area, cm ²	19.99		Max. consolidation stress, psi	3.0
Water content, %	19.4		Total backpressure, psi	67.0
Wet unit weight, pcf	137.8			
Dry unit weight, pcf	115.3		Permeant Fluid	Deaired Tap Water
Est. degree of saturation, %	118.6	118.6		
Specific gravity of solids, assumed	2.65			

Coefficient of Permeability, cm/s **2.9E-05**



Appendix C
Chain of Custody Records

DATA TURNAROUND 30 Days/30 Days

AIR QUALITY

SAF NO. F11-057

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

SAMPLING LOCATION C8184 (199-N-182); 1-002

METHOD OF SHIPMENT FEDERAL EXPRESS

COA 300104ES10

FIELD LOGBOOK NO. 14 NF-11-585-15 4675

ACTUAL SAMPLE DEPTH 126.8-129.3 ft

ICE CHEST NO. 6203-223

ORIGINAL

BILL OF LADING/AIR BILL NO. 7972889 25883

SEE PTR

OFFSITE PROPERTY NO. SEE PTR

SHIPPED TO Shaw Group

9

Disp. weight 6 lbs.

SEK 5967

NO. OF CONTAINER(S) 1

SPECIAL HANDLING AND/OR STORAGE SOIL

PRESERVATION None

HOLDING TIME None

TYPE OF CONTAINER Split Spoon Liner

VOLUME 1000g

SAMPLE ANALYSIS

NO. OF CONTAINER(S) 1

SAMPLE DATE 7-7-11

SAMPLE TIME 1015

MATRIX* SOIL

DATE/TIME 7-7-11 1200

MOISTURE RESISTANT CONT. 1

SEE ITEM (1) IN SPECIAL INSTRUCTIONS D2216;

DATE/TIME 7-7-11 0910

DATE/TIME 7-7-11 0910

DATE/TIME 7-12-11/11:00

RECEIVED BY/STORED IN M. Buehler/Geo

RECEIVED BY/STORED IN M. Buehler/Geo