0097446

SAF-RC-194
Soil/Sediment Sampling – Integrated Remedial Investigation/Feasibility Study, 100-F Area Boreholes
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

No Distribution Required

RECEIVED
JUL 11 2011
EDMC

COMMENTS:

SDG K3163 SAF-RC-194

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: C7971 (118-F-1); I-011

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

RECEIVED
MAR 2011

7 March 2011

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H9-03
Richland, WA 99354

Subject: Analytical Data Package

Dear Ms. Kessner:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	1102127
SDG #	K3163
SAF #	RC-194
Date Received	02/15/11
# Samples	1
Matrix	SOIL
Volatiles	
Semivolatiles	
Pest/PCB	
Glycols	
DRO/KRO/GRO	
PAHs	
Herbicides	
Metals	
Inorganics	X

The electronic data deliverable (EDD) has been emailed. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory
A Division of Eberline Analytical Corporation

Orlette S. Johnson
Project Manager

LIONVILLE LABORATORY
A division of Iberline Analytical Corporation

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

RECEIVED
MAR 2011

WC-Hanford, Inc.	Project: RC-194	
2620 Fermi Avenue	Project Number: K3163	Reported:
Richland WA, 99354	Project Manager: Joan Kessner	03/05/2011 18:25

Analytical Report for Wet Chemistry

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B28VT9	1102127-01	Soil	02/11/2011 13:00	02/15/2011 14:34

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

Case Narrative

Client: WC-HANFORD RC-194 K3163
LVL#: 1102127 **Date Received:** 02-15-11

INORGANIC NARRATIVE

1. This narrative covers the analyses of 1 soil sample.

2. The sample was prepared and analyzed in accordance with the methods indicated on the data summary report. Results for soil or solid pH are measured in water at 25°C unless otherwise specified.

   Lionville Lab (LvL) is NELAP accredited by the State of Pennsylvania. For a complete list of accrediting authorities and the corresponding analytes/methods, please contact your Project Manager. LvL certifies that all test results meet the requirements of NELAC with any exception noted in the following statements.

3. Sample holding times as required by the method and/or contract were met.

4. The results presented in this report are derived from samples that met LvL's sample acceptance policy.

5. The Laboratory Control Sample (LCS) for pH was within the method criteria.

6. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

7. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

for

Iain Daniels
Laboratory Manager
Lionville Laboratory

3/7/11
Date

njp\i102-127

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-194	
2620 Fermi Avenue	Project Number: K3163	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	03/05/2011 18:25

Notes and Definitions

*	Value outside QC acceptance criteria
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
Dry	Sample results reported on a dry weight basis
Wet	Sample results reported on a wet weight basis
RPD	Relative Percent Difference

264 Welsh Pool Road
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Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-194	
2620 Fermi Avenue	Project Number: K3163	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	03/05/2011 18:25

Wet Chemistry
Lionville Laboratory

Analyte	Result and Qualifier	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
B28VT9 (1102127-01) Soil								
pH	8.71	0.10	pH Units	1	L102359	02/23/2011	02/23/2011	SW846 9045D
%Moisture	16.2	0.10	% by Weight	1	L102266	02/17/2011	02/17/2011	D2216

264 Welsh Pool Road
Exton, PA 19341
Phone: 610-280-3000
Fax: 610-280-3041

WC-Hanford, Inc.	Project: RC-194	
2620 Fermi Avenue	Project Number: K3163	**Reported:**
Richland WA, 99354	Project Manager: Joan Kessner	03/05/2011 18:25

Wet Chemistry - Quality Control

Lionville Laboratory

Analyte	Result and Qualifiers	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch L102266 - Default Prep GenChem									
Duplicate (L102266-DUP5)		**Source: 1102127-01**	Prepared & Analyzed: 02/17/2011						
%Moisture	16.3	0.10	% by Weight		16.2			0.615	20
Batch L102359 - Default Prep GenChem									
Duplicate (L102359-DUP9)		**Source: 1102127-01**	Prepared & Analyzed: 02/23/2011						
pH	8.66	0.10	pH Units		8.71			0.576	20
Reference (L102359-SRM1)			Prepared & Analyzed: 02/23/2011						
pH	9.96	0.10	pH Units	10.000		99.6	99-101		

Lionville Laboratory Use Only

1/02/27

Custody Transfer Record/Lab Work Request

Page 1 of 1

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Lionville Laboratory
A Division of Eberline Analytical Corporation

Client WC. Hanford SAF# RC-194

Est. Final Proj. Sampling Date

Project#

Project Contact/Phone#

Lionville Laboratory Project Manager Arlette Johnson

QC SW Del STD TAT 30 days

21 wed 2-16-11

Date Rec'd 2.15.11 Date Due 3-8-11

		A	B
Refrigerator #		1	Sub
#/Type Container	Liquid		
	Solid	1car	1pl
Volume	Liquid		Lin
	Solid	200gr	1L
Preservatives		—	—
ANALYSES REQUESTED →		% Moist.	Particle Size

MATRIX CODES:
W Water
WW Waste Water
GW Groundwater
WST Waste
WI Wipe
SO Solid
S Soil
SL Sludge
SE Sediment
PC Paint Chips
O Oil
NAL Non-Aqueous Liquid
L Leachate
A Air
T Tissue
F Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	ORGANIC VOA	BNA	Pest/PCB	Herb	INORG Metal	CN	% Moist.	Particle Size
							Lionville Laboratory Use Only						pH Gammist	SUB
01	B28VT9	✓	✓	S	2.11.11	1300							X	X

Special Instructions:

Special Instructions:

2/16/11 1. pH logged per client

2.

3.

4.

5.

6.

See SRC

Relinquished by	Received by	Date	Time
[signature]	[signature]	2.15.11	14:34

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time
ORIGINAL REWRITTEN			

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-194-124 | PAGE 1 OF 1

COLLECTOR: Christian, Garcia, Kauer	COMPANY CONTACT: ANNA RADLOFF	TELEPHONE NO.: 376-4554	PROJECT COORDINATOR: KESSNER, JH
PRICE CODE: 8N	DATA TURNAROUND: 45 Days / 45 Days	AIR QUALITY: ☐	
SAMPLING LOCATION: C7971 (118-F-1); I-011	PROJECT DESIGNATION: Soil/Sediment Sampling - Integrated Remedial Investigation/Feasibility Stud	SAF NO.: RC-194	
ICE CHEST NO.: GWS-500	FIELD LOGBOOK NO.: HNF-N-585-12 pg 66	ACTUAL SAMPLE DEPTH: 29.0 - 31.5 ft	COA: 302513ES10
METHOD OF SHIPMENT: FEDERAL EXPRESS	SHIPPED TO: Lionville Laboratory Incorporated	OFFSITE PROPERTY NO.: SEE PTR	BILL OF LADING/AIR BILL NO.: SEE PTR 7944227 38880

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
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
~~RADIOACTIVE TIE TO: B28VT8.~~ E 2/11/11

PRESERVATION	None	None	None
HOLDING TIME	ASAP	None	None
TYPE OF CONTAINER	G/P	Split Spoon Liner	Moisture Resistant Cont
NO. OF CONTAINER(S)	1 N/A	1	1
VOLUME	250ml	1000g	200g
SAMPLE ANALYSIS	pH (Soil) - 9045 (100 Area RIFS); E 2/11/11	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216 (100 Area RIFS);

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B28VT9	SOIL	2/11/11	1300	N/C	/	/

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM: E. Christian E. Christian	DATE/TIME: 2/11/11 1400	RECEIVED BY/STORED IN: SSU-R2	DATE/TIME: 2/11/11 1400
RELINQUISHED BY/REMOVED FROM: SSU-R2	DATE/TIME: 2-14-11 0900	RECEIVED BY/STORED IN: CM Aguilar CM Aguilar	DATE/TIME: 2-14-11 0900
RELINQUISHED BY/REMOVED FROM: CM Aguilar CM Aguilar	DATE/TIME: 2-14-11 1400	RECEIVED BY/STORED IN: FEDEX	DATE/TIME:
RELINQUISHED BY/REMOVED FROM: Fed Ex	DATE/TIME: 2.15.11 1434	RECEIVED BY/STORED IN: [illegible]	DATE/TIME: 2.15.11 1434
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
The laboratory is to analyze pH within 24 hours of receipt.☐☐** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.
(1) Bulk Density - D2937 (100 Area RIFS); Particle Size (Dry Sieve) - D422 (100 Area RIFS); Saturated Hydraulic Conductivity - D2434 (100 Area RIFS) {Hydraulic Conductivity}; Saturated Hydraulic Conductivity - D5084 (100 Area RIFS) {Hydraulic Conductivity};

ORIGINAL

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

A-6003-618 (REV 1)

Lionville Laboratory

SAMPLE RECEIPT CHECKLIST (SRC)

CLIENT: WC Hanford
Project/SAF/SOW/Release #: RC-194

Date: 2-15-11

LvL Batch #: 1102127

Sample Custodian: [illegible]

NOTE: EXPLAIN ALL DISCREPANCIES

1. Samples Hand Delivered or Shipped?	Carrier FedEx		Airbill # 7944 2273 8880
2. Custody Seals on coolers or shipping containers intact, signed & dated?	☑ Yes	☐ No	☐ No Seals
3. Outside of coolers or shipping containers are free from damage?	☑ Yes	☐ No	*Comments:*
4. All expected paperwork received (coc & other client specific information) sealed in plactic bag and easily accessible?	☑ Yes	☐ No	
5. Samples received cooled or ambient?	Temp 1.9	°C	Cooler # GWS-500
How was the temperature taken?	☑ IR	☐ Temp. Blank	☐ Other (Specify)
Is the Temp. Criteria met for these samples? (Hg in soils @ 4°C)	☑ Yes	☐ No	
6. Custody seals on sample containers intact, signed and dated?	☑ Yes	☐ No	☐ No Seals
7. COC (Client & LvL) signed & dated?	☑ Yes	☐ No	
8. Sample containers are intact?	☑ Yes	☐ No	
9. All samples on COC received?	☑ Yes	☐ No	
All samples received on COC?	☑ Yes	☐ No	
10. All sample label information matches COC?	☑ Yes	☐ No	
11. Samples properly preserved? (If #5 is no, then this is no.)	☑ Yes	☐ No	
12. Samples received within hold times?	☑ Yes	☐ No	
Short holds taken to wet lab?	☐ Yes	☐ No	☑ N/A
13. VOA, TOC, TOX free of headspace?	☐ Yes	☐ No	☑ N/A
14. QC stickers placed on bottles designated by client?	☑ Yes	☐ No	☐ N/A
15. Shipment meets LvL Sample Acceptance Policy? (Identify all bottles that do not meet the policy, which is on the reverse of this page.)	☑ Yes	☐ No	
16. Project Manager contacted concerning any discrepancies?	☐ Yes	☐ No	☑ N/A

Person Contacted _____ Date _____

LIONVILLE LABORATORY
A division of Eberline Analytical Corporation

264 Welsh Pool Road
Exton, Pennsylvania 19341
Phone (610) 280-3000
Fax (610) 280-3041

RECEIVED
JUN 2011

28 June 2011

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H9-03
Richland, WA 99354

Subject: Geotechnical Analysis Data Package - LVL# 1102127, SDG K3163

Dear Ms. Kessner:

Enclosed is the hard copy analytical report for geotechnical analyses for the referenced SDG. The analyses were subcontracted to Shaw Environmental & Infrastructure (Shaw) with prior approval from WC-Hanford, Inc. Shaw is a DOECAP audited and approved vendor.

If you have any questions or require additional information, please don't hesitate to contact me at (610) 280-3012.

Sincerely,

Lionville Laboratory
A Division of Eberline Analytical Corporation

Orlette S. Johnson
Project Manager

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Christian, Garcia, Kauer	ANNA RADLOFF	376-4554	KESSNER, JH	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**		
C7971 (118-F-1); I-011	Soil/Sediment Sampling - Integrated Remedial Investigation/Feasibility Stud		RC-194		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**	
GWS-500	HNF-N-585-12 pg 66	29.0' - 31.5' ft	302513ES10	FEDERAL EXPRESS	
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**		
Lionville Laboratory Incorporated	SEE PTR		SEE PTR 7944227 38880		

000000007

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
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
~~RADIOACTIVE TIE TO: B28VT8.~~ E. 2/11/11

PRESERVATION	None	None	None
HOLDING TIME	ASAP	None	None
TYPE OF CONTAINER	G/P	Split Spoon Liner	Moisture Resistant Can
NO. OF CONTAINER(S)	1	1	1
VOLUME	250ml	1000g	200g
SAMPLE ANALYSIS	pH (Soil) - 9045 (100 Area RIFS);	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Moisture Content - D2216 (100 Area RIFS);

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B28VT9	SOIL	2/11/11	1300	N/C	✓	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
E. Christian E. Christian	2/11/11 1400	SSU-R2	2/11/11 1400
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
SSU-R2 2-14-11	0900	CM Aguilar CM Aguilar	2-14-11 0900
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
CM Aguilar CM Aguilar	2-14-11 1400	FEDEX	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
FEDEX	2.15.11 1434	[illegible]	2.15.11 1434
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
The laboratory is to analyze pH within 24 hours of receipt.☐☐** The RCCC acknowledges that the analytical holding time for Nitrate, Nitrite, and Phosphate by EPA methods 300.0 or 9056 will not be met.
(1) Bulk Density - D2937 (100 Area RIFS); Particle Size (Dry Sieve) - D422 (100 Area RIFS); Saturated Hydraulic Conductivity - D2434 (100 Area RIFS) {Hydraulic Conductivity}; Saturated Hydraulic Conductivity - D5084 (100 Area RIFS) {Hydraulic Conductivity};

ORIGINAL

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

A-6003-618 (REV 1)

Shaw
Shaw Environmental & Infrastructure, Inc.

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

CERTIFICATE OF ANALYSIS

Orlette Johnson
Lionville Laboratory
264 Welsh Pond Road
Exton PA 19341

June 27, 2011

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	**Lionville**
Shaw Project Number:	**135594.00220000**
Date Received by Lab:	05/23/2011
Number of Samples:	One (1)
Sample Type:	Soil

I. Introduction/Case Narrative

One (1) soil sample was received by the Shaw Geotechnical Laboratory on May 23, 2011. The sample was submitted for determination of bulk density, particle-size distribution, and hydraulic conductivity/permeability.

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

Reviewed and Approved:

R. Gregory Bennett
Geotechnical Laboratory Manager, Technology Applications Group

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

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**
Particle-Size Distribution of Soils ..... **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.

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

- 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

Report No.: LION0511092Q
Orlette Johnson
Client: Lionville
Shaw Project Name: Lionville
Shaw Project No. 135594.00220000

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

SAMPLE NUMBER CROSS-REFERENCE LIST

Client Transfer Record #: 1102127

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
SEK 5832	B28VT9	SOIL

Appendix B
Data Results

Report No.: LION0511092Q
Orlette Johnson
Client: Lionville
Shaw Project Name: Lionville
Shaw Project No. 135594.00220000

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

BULK DENSITY/DRY DENSITY
ASTM D 2937

PROJECT NAME: **Lionville**

PROJECT NUMBER: **135594.00220000**

LAB SAMPLE NUMBER	CLIENT SAMPLE NUMBER	AVERAGE LENGTH, inches	AVERAGE DIAMETER, inches*	WET WEIGHT, grams	MOISTURE CONTENT, %	BULK DENSITY, pcf	DRY DENSITY, pcf
SEK 5832	B28VT9	5.9930	3.7412	2227.07	20.1	128.8	107.3

Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

Report No.: LION0511092Q
Orlette Johnson
Client: Lionville
Shaw Project Name: Lionville
Shaw Project No. 135594.00220000

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

PARTICLE-SIZE ANALYSIS
ASTM D 422

Project Name
Lionville
Project No.
135594

Client Sample No.
B28VT9
Lab Sample No.
SEK 5832

Specific Gravity = 2.65
assumed

Moisture Content = 20.1%
based on dry sample weight

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	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	99.1%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	96.7%
	#40	0.425	95.9%
	#60	0.250	95.4%
	#100	0.149	95.0%
	#140	0.106	94.7%
	#200	0.075	94.3%

HYDROMETER ANALYSIS

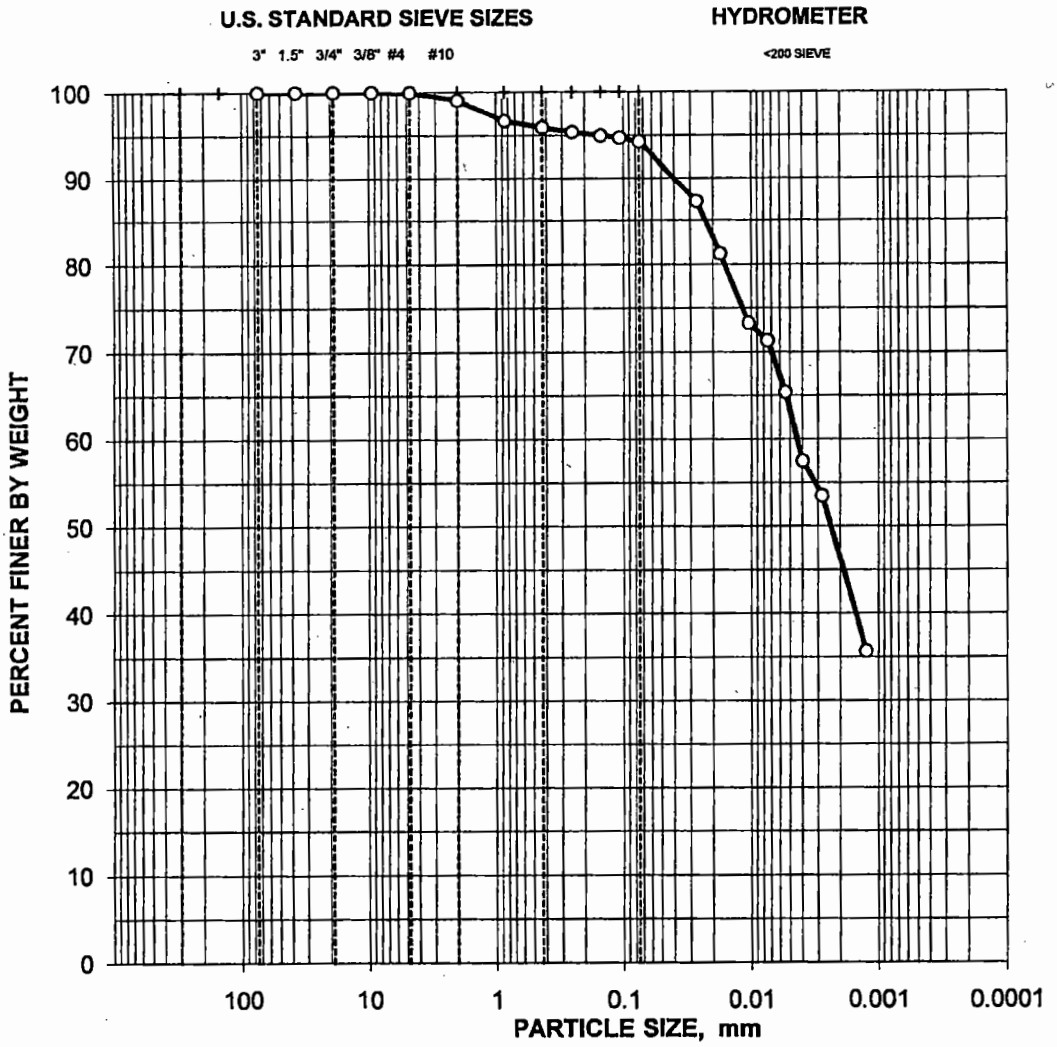
	Diameter mm	Percent Finer
HYDROMETER	0.02681	87.2%
	0.01747	81.2%
	0.01043	73.3%
	0.00746	71.3%
	0.00541	65.4%
	0.00396	57.5%
	0.00278	53.5%
	0.00124	35.7%

0.0% Gravel 5.7% Sand 94.3% Silt/Clay

Report No.: LION0511092Q
Orlette Johnson
Client: Lionville
Shaw Project Name: Lionville
Shaw Project No. 135594.00220000

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

Lionville



CLIENT SAMPLE NO.: B28VT9 **LAB SAMPLE NO.:** SEK 5832

BOULDERS	COBBLES	GRAVEL		SAND			Silt/Clay
		COARSE	FINE	COARSE	MEDIUM	FINE	

Report No.: LION0511092Q
Orlette Johnson
Client: Lionville
Shaw Project Name: Lionville
Shaw Project No. 135594.00220000

Shaw
Geotechnical Laboratory
Knoxville, TN
(865) 690-3211

HYDRAULIC CONDUCTIVITY / PERMEABILITY
ASTM D 5084

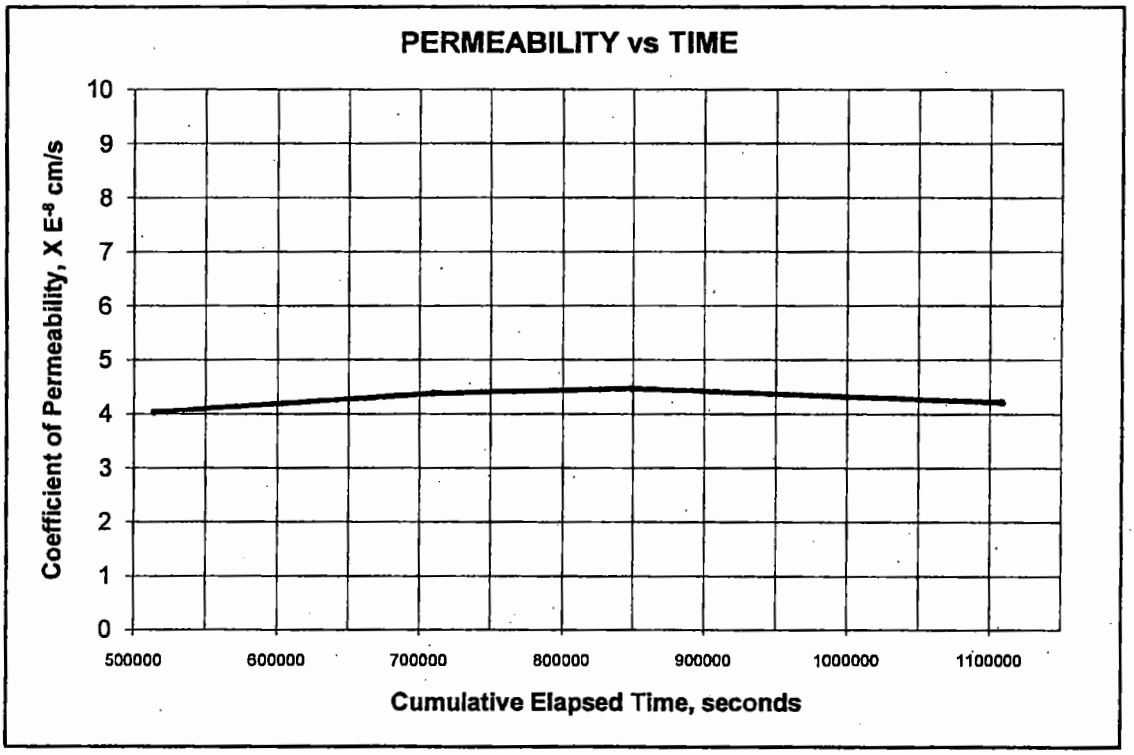
PROJECT NAME: Lionville
PROJECT NO. 135594.0022

CLIENT SAMPLE NO. B28VT9
LAB SAMPLE NO. SEK 5832

	INITIAL	FINAL
Specimen diameter, cm	7.33	
Specimen length, cm	9.32	
Wet weight of specimen, g.	769.94	
Specimen cross-sect. area, cm^2	42.15	
Water content, %	20.1	
Wet unit weight, pcf	122.4	
Dry unit weight, pcf	102.0	
Est. degree of saturation, %	85.4	85.4
Specific gravity of solids, assumed	2.65	

Hydraulic gradient	22.7
Min. consolidation stress, psi	2.0
Max. consolidation stress, psi	5.0
Total backpressure, psi	20.0
Permeant Fluid	Deaired Tap Water

Coefficient of Permeability, cm/s 4.3E-08



Appendix C
Chain of Custody Records

Shaw® Shaw Environmental, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE DOCUMENT NO.: 1102127

PAGE 1 OF 1

Bill To: ojohnson@lionvillelab.com via email acceptable
Lionville Laboratory
Attn: Orlette Johnson
264 Welsh Pool Road
Exton, PA 19341

Report To: ojohnson@lionvillelab.com via email acceptable
Orlette Johnson, Lionville Laboratory
264 Welsh Pool Road, Exton, PA 19341

Project Name/No: WC-Hanford RC-194 K3163
Sample Team Member:
Profit Center:
Project Manager:
Purchase Order No.: 7118
Required Report Date:

Sample Shipment Date:
Laboratory Destination: 304 Directors Drive, Knoxville, TN 37923
Laboratory Contact: Greg Bennett/865-694-7311
Project Contact/Phone: Orlette Johnson/610-280-3012
Carrier Waybill No.:

Sample Number	Sample Type/ Description	Date/Time Collected	Container Type	Sample Volume	Preservative	Requested Testing Program	Condition on Receipt	Disposal Record
B28VT9	SOIL	02/11/2011 13:00	Liner	1000g	None	D2937, D422, D5084/D2434	SEK 5832	

Special Instructions:

Possible Hazard Identification: None/Unknown

RAD Flammable: Poison B: Unknown:

Sample Disposal:
Return to Client: X Disposal by Lab: Archive:

Turnaround Time:

Level of QC Required:
I. II. III. Project Specific:

1. Relinquished by: Victor Hernandez	Date: 5-19-11	1. Received by: ILPG	Date: 5-19-11
	Time:		Time:
2. Relinquished by:	Date:	2. Received by: Don Hanley / SHAW E&I	Date: 5/23/11
	Time:		Time: 1400
3. Relinquished by:	Date:	2. Received by:	Date:
	Time:		Time:

Comments: