

SAF-RC-232
100-IU-2 & 100-IU-6 Remaining
Waste Sites – Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt

H4-21

KW 7/24/13
INITIAL/DATE

COMMENTS:

SDG X0004

SAF-RC-232

Rad only

Chem only

Rad & Chem

Complete

Partial

Sample Location: 100-H-56



July 23, 2013

Joan Kessner
WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354

Re: RC-232 Soil
Work Order: 329027
SDG: X0004

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 05, 2013. This revised data report has been prepared and reviewed in accordance with GEL's standard operating procedures. After receipt of the original data package, the client requested the lab to report Chloroform. This report has been revised to include that request.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1616.

Sincerely,

Orlette Johnson
Project Manager

Purchase Order: 1510
Chain of Custody: RC-232-033
Enclosures



Table of Contents

Case Narrative.....	1
Chain of Custody and Supporting Documentation.....	3
Laboratory Certifications.....	7
Metals Analysis.....	9
Case Narrative.....	10
Sample Data Summary.....	17
Quality Control Summary.....	25
General Chem Analysis.....	33
Case Narrative.....	34
Sample Data Summary.....	51
Quality Control Summary.....	56
Miscellaneous.....	61

Case Narrative

**Receipt Narrative
for
WC-HANFORD, INC.
SDG: X0004
Work Order: 329027**

July 22, 2013

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on July 05, 2013 for analysis.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
329027001	J1RR68
329027002	J1RR69
329027003	J1RR70

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: General Chemistry and Metals.



Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

Washington Closure Hanford
 Collector: **B JACKSON**
 Project Designation: **100-IU-2 & 100-IU-6 Remaining Waste Sites**
 Ice Chest No.: **WCH-11-055**
 Shipped To: **Eberline - GEL**

Company Contact: **Joan Kessner**
 Telephone No.: **375-4688**
 Project Coordinator: **KESSNER, JH**
 Price Code: **8C**
 Data Turnaround: **15 Days**

Sampling Location: **100-H-56 - Test Pit underlying soil**
 Field Logbook No.: **EL-1667**
 Method of Shipment: **fed EX**

Offsite Property No.: **A120886**
 Bill of Lading/Air Bill No.: **See OSPC**

Sample No.	Matrix	Sample Date	Sample Time	Preservation			Freeze
				Cool 4C	None	Cool 4C	
J1RR68	SOIL	7-1-13	1020	X			
J1RR69	SOIL	7-1-13	1020	X			
J1RR70	SOIL	7-1-13	1020	X			
J1RR71	SOIL	7-1-13	1020	X			
J1RR72	SOIL	7-1-13	1020	X			

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)

(2) IC Anions - 9056 (Bromide, Chloride, Fluoride, Nitrate, Nitrite, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphate, Sulfate); NO2/NO3 - 353.1 (Nitrogen in Nitrite and Nitrate); pH (Soil) - 9045 (pH Measurement)

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
MA Bamberger	7-1-13 1430	MA Bamberger	7-1-13 1430
MA Bamberger	7-1-13 1200	MA Bamberger	7-1-13 1200
MA Bamberger	7-1-13 1200	MA Bamberger	7-1-13 1200

FINAL SAMPLE DISPOSITION

Disposal Method: _____ Date/Time: _____





SAMPLE RECEIPT & REVIEW FORM

Client: <u>HAND</u>		SDG/AR/COC/Work Order: <u>320027</u>	
Received By: <u>MK</u>		Date Received: <u>7-5-13</u>	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>CPED</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		<input checked="" type="checkbox"/>		Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) <u>all temperatures are recorded in Celsius</u>
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>41502182</u> Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?		<input checked="" type="checkbox"/>		(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?		<input checked="" type="checkbox"/>		Sample ID's affected: <u>3 per ID → Received R68, R69, + R70</u>
12	Are sample containers identifiable as GEL provided?		<input checked="" type="checkbox"/>		
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14	Carrier and tracking number.		<input checked="" type="checkbox"/>		Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>7961 4873 6600 21^c</u> <u>7961 4876 3511 21^c</u>

Comments (Use Continuation Form if needed):

Laboratory Certifications

List of current GEL Certifications as of 22 July 2013

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP A2LA ISO 17025	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Nevada	SC000122011-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-8
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Metals Analysis

Case Narrative

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG X0004**

Sample Analysis

Sample ID	Client ID
329027001	J1RR68
329027002	J1RR69
329027003	J1RR70
1202905478	Method Blank (MB) ICP
1202905479	Laboratory Control Sample (LCS)
1202905482	329027001(J1RR68L) Serial Dilution (SD)
1202905480	329027001(J1RR68D) Sample Duplicate (DUP)
1202905481	329027001(J1RR68S) Matrix Spike (MS)
1202912174	329027001(J1RR68PS) Post Spike (PS)
1202905710	Method Blank (MB) CVAA
1202905711	Laboratory Control Sample (LCS)
1202905720	329027001(J1RR68L) Serial Dilution (SD)
1202905718	329027001(J1RR68D) Sample Duplicate (DUP)
1202905719	329027001(J1RR68S) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Method/Analysis Information

Analytical Batch:	1313382 and 1313479
Prep Batch :	1313381 and 1313478
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22 and GL-MA-E-010 REV# 26
Analytical Method:	SW846 3050B/6010C and SW846 7471B
Prep Method :	SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL Requirements

All CRDL standards met the advisory control limits with the exceptions of antimony, potassium, and zinc. The PQL recovered high for antimony, potassium, and zinc but the samples were less than the MDL for antimony and 2x greater than the PQL for potassium and zinc, thus the data was not affected.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blank (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 329027001 (J1RR68)-ICP and CVAA.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes, with the exception of silicon and sodium.

Duplicate Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of RL is used to evaluate the DUP results. All applicable analytes met these requirements, with the exception of vanadium.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes and verifies the absence of matrix interferences.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instrument. Samples 329027001 (J1RR68), 329027002 (J1RR69) and 329027003 (J1RR70) required dilutions in order to bring titanium raw values within the linear range of the instrument, and for antimony, cobalt, lead, vanadium, and zinc that titanium interferes with, in order to ensure that the inter-element correction factors were valid. Sample 329027003 (J1RR70) required a 10x dilution in order to bring over range mercury concentrations within the linear calibration range of the instrument.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was

generated for this SDG:1203925. A copy is included in the Miscellaneous Data section of this package.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____  **Date:** 7/9/13 _____

DATA EXCEPTION REPORT

Mo.Day Yr. 19-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1313382	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 329027(X0004)			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1202905481MS</p> <p>2. Failed RPD for DUP: QC 1202905480DUP</p>		<p>1. The matrix spike recovery failed outside of the control limits for silicon and sodium. The post spike passed the required control limits for all analytes. This verifies the absence of a matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p> <p>2. The sample and sample duplicate % RPD failed outside the control limits for vanadium due to possible sample non-homogeneity and/or matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.</p>	

Originator's Name:

Helen Camello 19-JUL-13

Data Validator/Group Leader:

Theresa McKelvey 19-JUL-13

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

WCHN001 WC-HANFORD, INC.

Client SDG: X0004 GEL Work Order: 329027 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by



7/19/13

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 19, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: X0004

Client Sample ID: J1RR68
Sample ID: 329027001

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 19, 2013

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: X0004

Client Sample ID: J1RR69 Project: WCHN00213
 Sample ID: 329027002 Client ID: WCHN001
 Matrix: SOIL
 Collect Date: 02-JUL-13 08:20
 Receive Date: 05-JUL-13
 Collector: Client
 Moisture: 4%

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	B	5.82	3.98	11.9	ug/kg	1	NOR1	07/11/13	1322	1313479	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		6610000	6820	20100	ug/kg	1	HSC	07/15/13	1658	1313382	2
Beryllium		624	100	502	ug/kg	1					
Boron	B	2820	1000	5020	ug/kg	1					
Cadmium	B	496	100	502	ug/kg	1					
Chromium		12400	151	502	ug/kg	1					
Copper		23000	301	1000	ug/kg	1					
Iron		21900000	8030	25100	ug/kg	1					
Manganese		314000	201	1000	ug/kg	1					
Molybdenum	U	201	201	1000	ug/kg	1					
Nickel		12900	151	502	ug/kg	1					
Potassium		1110000	6420	25100	ug/kg	1					
Selenium	U	502	502	3010	ug/kg	1					
Silver	BC	480	100	502	ug/kg	1					
Arsenic		10100	502	3010	ug/kg	1	HSC	07/19/13	1017	1313382	3
Barium		78100	100	502	ug/kg	1					
Calcium		7820000	8030	25100	ug/kg	1					
Magnesium		4800000	8530	30100	ug/kg	1					
Silicon	N	1960000	1510	10000	ug/kg	1					
Sodium	N	248000	7020	25100	ug/kg	1					
Antimony	DU	1660	1660	5020	ug/kg	5	HSC	07/19/13	1136	1313382	4
Cobalt	D	7090	753	2510	ug/kg	5					
Lead	D	26200	1660	5020	ug/kg	5					
Vanadium	*D	55100	502	2510	ug/kg	5					
Zinc	D	45300	2010	5020	ug/kg	5					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	SW846 3050B Prep for 6010C	AXG2	07/12/13	0800	1313381
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	07/10/13	1437	1313478

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 19, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: X0004

Client Sample ID: J1RR69
Sample ID: 329027002

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 19, 2013

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: X0004

Client Sample ID: J1RR70
Sample ID: 329027003

Project: WCHN00213
Client ID: WCHN001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7471B	
2	SW846 3050B/6010C	
3	SW846 3050B/6010C	
4	SW846 3050B/6010C	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 19, 2013

Page 1 of 7

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington

Contact: Joan Kessner

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313382										
QC1202905480	329027001 DUP										
Aluminum		7100000		6860000	ug/kg	3.42		(0%-20%)	HSC	07/15/13	17:06
Antimony	DU	1730	DU	1700	ug/kg	N/A	^			07/19/13	11:45
Arsenic		3610		3770	ug/kg	4.42	^	(+/-3080)		07/19/13	10:24
Barium		59500		63000	ug/kg	5.65		(0%-20%)			
Beryllium		628	B	473	ug/kg	28.2	^	(+/-514)		07/15/13	17:06
Boron	B	1700	B	1460	ug/kg	15.4	^	(+/-5140)			
Cadmium	B	522	B	303	ug/kg	53.1	^	(+/-514)			
Calcium		4730000		4870000	ug/kg	2.94		(0%-20%)		07/19/13	10:24
Chromium		15900		13100	ug/kg	19.4		(0%-20%)		07/15/13	17:06
Cobalt	D	6720	D	6370	ug/kg	5.33	^	(+/-2570)		07/19/13	11:45
Copper		18000		16600	ug/kg	8.40		(0%-20%)		07/15/13	17:06
Iron		21000000		18700000	ug/kg	11.7		(0%-20%)			
Lead	BD	5060	D	5540	ug/kg	9.04	^	(+/-5140)		07/19/13	11:45
Magnesium		4510000		4160000	ug/kg	7.98		(0%-20%)		07/19/13	10:24
Manganese		323000		288000	ug/kg	11.4		(0%-20%)		07/15/13	17:06
Molybdenum	U	210	U	206	ug/kg	N/A	^				
Nickel		13500		11800	ug/kg	13.0		(0%-20%)			
Potassium		1400000		1380000	ug/kg	2.00		(0%-20%)			
Selenium	U	524	U	514	ug/kg	N/A	^				
Silicon	N	2010000		1740000	ug/kg	14.2		(0%-20%)		07/19/13	10:24

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 2 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313382										
Silver	C	599	C	553	ug/kg	7.94	^	(+/-514)	HSC	07/15/13	17:06
Sodium	N	198000		164000	ug/kg	19.0		(0%-20%)		07/19/13	10:24
Vanadium	*D	55100	*D	44900	ug/kg	20.3*		(0%-20%)		07/19/13	11:45
Zinc	D	39400	D	37200	ug/kg	5.79		(0%-20%)			
QC1202905479	LCS										
Aluminum		500000		527000	ug/kg			105 (80%-120%)		07/15/13	16:55
Antimony		50000		50800	ug/kg			102 (80%-120%)		07/19/13	11:33
Arsenic		50000		52000	ug/kg			104 (80%-120%)		07/19/13	10:14
Barium		50000		52600	ug/kg			105 (80%-120%)			
Beryllium		50000		56300	ug/kg			113 (80%-120%)		07/15/13	16:55
Boron		50000		54200	ug/kg			108 (80%-120%)			
Cadmium		50000		58200	ug/kg			116 (80%-120%)			
Calcium		500000		544000	ug/kg			109 (80%-120%)		07/19/13	10:14
Chromium		50000		53400	ug/kg			107 (80%-120%)		07/15/13	16:55
Cobalt		50000		50900	ug/kg			102 (80%-120%)		07/19/13	11:33
Copper		50000		54200	ug/kg			108 (80%-120%)		07/15/13	16:55
Iron		500000		560000	ug/kg			112 (80%-120%)			
Lead		50000		51600	ug/kg			103 (80%-120%)		07/19/13	11:33
Magnesium		500000		547000	ug/kg			109 (80%-120%)		07/19/13	10:14
Manganese		50000		53000	ug/kg			106 (80%-120%)		07/15/13	16:55
Molybdenum		50000		52700	ug/kg			105 (80%-120%)			
Nickel		50000		53600	ug/kg			107 (80%-120%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 3 of 7

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313382										
Potassium	500000			542000	ug/kg		108	(80%-120%)	HSC	07/15/13	16:55
Selenium	50000			58700	ug/kg		117	(80%-120%)			
Silicon	500000			474000	ug/kg		94.8	(80%-120%)		07/19/13	10:14
Silver	50000			54200	ug/kg		108	(80%-120%)		07/15/13	16:55
Sodium	500000			556000	ug/kg		111	(80%-120%)		07/19/13	10:14
Vanadium	50000			51300	ug/kg		103	(80%-120%)		07/19/13	11:33
Zinc	50000			51500	ug/kg		103	(80%-120%)			
QC1202905478	MB										
Aluminum			U	6430	ug/kg					07/15/13	16:51
Antimony			B	482	ug/kg					07/19/13	11:30
Arsenic			B	604	ug/kg					07/19/13	10:11
Barium			U	94.5	ug/kg						
Beryllium			U	94.5	ug/kg					07/15/13	16:51
Boron			U	945	ug/kg						
Cadmium			U	94.5	ug/kg						
Calcium			U	7560	ug/kg					07/19/13	10:11
Chromium			U	142	ug/kg					07/15/13	16:51
Cobalt			U	142	ug/kg					07/19/13	11:30
Copper			B	331	ug/kg					07/15/13	16:51
Iron			U	7560	ug/kg						
Lead			U	312	ug/kg					07/19/13	11:30
Magnesium			U	8030	ug/kg					07/19/13	10:11

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 4 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313382										
Manganese			U	189	ug/kg				HSC	07/15/13	16:51
Molybdenum			B	-367	ug/kg						
Nickel			U	142	ug/kg						
Potassium			B	7100	ug/kg						
Selenium			U	473	ug/kg						
Silicon			U	1420	ug/kg					07/19/13	10:11
Silver			B	150	ug/kg					07/15/13	16:51
Sodium			U	6620	ug/kg					07/19/13	10:11
Vanadium			U	94.5	ug/kg					07/19/13	11:30
Zinc			U	378	ug/kg						
QC1202905481 329027001 MS											
Aluminum	529000	7100000		8980000	ug/kg		N/A	(75%-125%)		07/15/13	17:08
Antimony	52900	DU 1730	D	48000	ug/kg		90.7	(75%-125%)		07/19/13	11:48
Arsenic	52900	3610		57800	ug/kg		102	(75%-125%)		07/19/13	10:26
Barium	52900	59500		116000	ug/kg		106	(75%-125%)			
Beryllium	52900	628		58200	ug/kg		109	(75%-125%)		07/15/13	17:08
Boron	52900	B 1700		57800	ug/kg		106	(75%-125%)			
Cadmium	52900	B 522		58800	ug/kg		110	(75%-125%)			
Calcium	529000	4730000		5670000	ug/kg		N/A	(75%-125%)		07/19/13	10:26
Chromium	52900	15900		67300	ug/kg		97.1	(75%-125%)		07/15/13	17:08
Cobalt	52900	D 6720	D	61400	ug/kg		103	(75%-125%)		07/19/13	11:48
Copper	52900	18000		77900	ug/kg		113	(75%-125%)		07/15/13	17:08

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 5 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313382										
Iron	529000	21000000		20300000	ug/kg		N/A	(75%-125%)	HSC	07/15/13	17:08
Lead	52900	BD	5060	D	61500	ug/kg	107	(75%-125%)		07/19/13	11:48
Magnesium	529000	4510000		4930000	ug/kg		N/A	(75%-125%)		07/19/13	10:26
Manganese	52900	323000		357000	ug/kg		N/A	(75%-125%)		07/15/13	17:08
Molybdenum	52900	U	210		54200	ug/kg	102	(75%-125%)			
Nickel	52900		13500		67200	ug/kg	102	(75%-125%)			
Potassium	529000	1400000		2030000	ug/kg		118	(75%-125%)			
Selenium	52900	U	524		59300	ug/kg	112	(75%-125%)			
Silicon	529000	N	2010000	N	2020000	ug/kg	2.11 *	(75%-125%)		07/19/13	10:26
Silver	52900	C	599		57600	ug/kg	108	(75%-125%)		07/15/13	17:08
Sodium	529000	N	198000	N	900000	ug/kg	133 *	(75%-125%)		07/19/13	10:26
Vanadium	52900	*D	55100	D	104000	ug/kg	92	(75%-125%)		07/19/13	11:48
Zinc	52900	D	39400	D	95400	ug/kg	106	(75%-125%)			
QC1202912174 329027001 PS											
Silicon	5000	N	19200		23500	ug/L	86.2	(80%-120%)		07/19/13	13:25
Sodium	5000	N	1890		6500	ug/L	92.2	(80%-120%)			
QC1202905482 329027001 SDILT											
Aluminum			67700	D	14400	ug/L	6.32	(0%-10%)		07/15/13	17:11
Antimony		DU	-3.58	DU	8650	ug/L	N/A	(0%-10%)		07/19/13	11:52
Arsenic			34.4	CD	9.44	ug/L	37.2	(0%-10%)		07/19/13	10:28
Barium			568	D	118	ug/L	4.06	(0%-10%)			
Beryllium			5.99	DU	524	ug/L	N/A	(0%-10%)		07/15/13	17:11
Boron		B	16.2	DU	5240	ug/L	N/A	(0%-10%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 6 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1313382										
Cadmium	B	4.98	DU	524	ug/L	N/A		(0%-10%)	HSC	07/15/13	17:11
Calcium		45100	D	9540	ug/L	5.78		(0%-10%)		07/19/13	10:28
Chromium		152	D	31.0	ug/L	2.3		(0%-10%)		07/15/13	17:11
Cobalt	D	12.8	D	2.52	ug/L	1.58		(0%-10%)		07/19/13	11:52
Copper		172	CD	36.1	ug/L	5.18		(0%-10%)		07/15/13	17:11
Iron		201000	D	42500	ug/L	6		(0%-10%)			
Lead	BD	9.65	DU	8650	ug/L	N/A		(0%-10%)		07/19/13	11:52
Magnesium		43000	D	9180	ug/L	6.68		(0%-10%)		07/19/13	10:28
Manganese		3080	D	642	ug/L	4.14		(0%-10%)		07/15/13	17:11
Molybdenum	U	-2.41	DU	1050	ug/L	N/A		(0%-10%)			
Nickel		129	D	25.7	ug/L	.276		(0%-10%)			
Potassium		13400	CD	2790	ug/L	4.18		(0%-10%)			
Selenium	U	1.62	DU	2620	ug/L	N/A		(0%-10%)			
Silicon	N	19200	D	3940	ug/L	2.78		(0%-10%)		07/19/13	10:28
Silver	C	5.71	CD	1.14	ug/L	.0998		(0%-10%)		07/15/13	17:11
Sodium	N	1890	D	418	ug/L	10.6		(0%-10%)		07/19/13	10:28
Vanadium	*D	105	D	20.8	ug/L	1.03		(0%-10%)		07/19/13	11:52
Zinc	D	75.1	D	15.4	ug/L	2.62		(0%-10%)			

Metals Analysis-Mercury

Batch 1313479

QC1202905718 329027001 DUP

Mercury	B	5.22	B	6.29	ug/kg	18.6 ^		(+/-12.5)	NOR1	07/11/13	13:14
---------	---	------	---	------	-------	--------	--	-----------	------	----------	-------

QC1202905711 LCS

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 7 of 7

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1313479										
Mercury	115			120	ug/kg		105	(80%-120%)		07/11/13	13:00
QC1202905710	MB										
Mercury			U	3.87	ug/kg				NOR1	07/11/13	12:55
QC1202905719	329027001 MS										
Mercury	125	B	5.22	B	137		105	(80%-120%)		07/11/13	13:15
QC1202905720	329027001 SDILT										
Mercury		B	0.083	DU	21.1	ug/L	N/A	(0%-10%)		07/11/13	13:20

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

General Chem Analysis

Case Narrative

**General Chemistry Narrative
WC-HANFORD, INC. (WCHN)
SDG X0004**

Method/Analysis Information

Product: pH
Analytical Batch: 1313837 **Method:** SW9045D pH

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9045D:

Sample ID	Client ID
329027001	J1RR68
329027002	J1RR69
329027003	J1RR70
1202906472	Laboratory Control Sample (LCS)
1202906473	329027001(J1RR68) Sample Duplicate (DUP)
1202906475	329170001(J1RR71) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 21.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Electrode analysis was performed on a PerpHect pH Meter Orion 370.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Quality Control (QC) Information

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329027001 (J1RR68) and 329170001 (J1RR71).

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

The following samples from this sample group were received by the lab outside of the method specified holding time: 329027001 (J1RR68), 329027002 (J1RR69) and 329027003 (J1RR70).

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1201510 329027001 (J1RR68), 329027002 (J1RR69) and 329027003 (J1RR70).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Ion Chromatography
Analytical Batch: 1313450 **Method:** SW846 9056A Anions
Prep Batch : 1313449 **Method:** SW846 9056A

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 9056A:

Sample ID	Client ID
329027001	J1RR68
329027002	J1RR69
329027003	J1RR70
1202905601	Method Blank (MB)
1202905602	329027001(J1RR68) Sample Duplicate (DUP)
1202905603	329027001(J1RR68) Matrix Spike (MS)
1202905604	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 21.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

The ICV standard was above the required limits. The results for the following samples bracketed by the failing ICV are less than the MDL or are QC samples associated with these samples. Therefore, the data is deemed acceptable for Bromide and Orthophosphate. 1202905601 (MB), 1202905602 (J1RR68), 1202905603 (J1RR68), 1202905604 (LCS), 329027001 (J1RR68), 329027002 (J1RR69) and 329027003 (J1RR70).

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following sample was selected for QC analysis: 329027001 (J1RR68).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The spike recovery falls outside of the established acceptance limits due to matrix interference: 1202905603 (J1RR68).

Duplicate Relative Percent Difference (RPD) Statement

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable for Chloride. 1202905602 (J1RR68) and 329027001 (J1RR68).

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1203204 1202905603 (J1RR68).

Manual Integrations

Manual integrations were not required for the samples in this SDG.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Nitrate + Nitrite
Analytical Batch: 1313804 **Method:** EPA 353.2 Nitrogen and Nitrate/Nitrite
Prep Batch : 1313803 **Method:** EEPA 353.2 Modified

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 353.2 Modified:

Sample ID	Client ID
329027001	J1RR68
329027002	J1RR69
329027003	J1RR70
1202906412	Method Blank (MB)
1202906413	Laboratory Control Sample (LCS)
1202906414	329027001(J1RR68) Sample Duplicate (DUP)
1202906415	329027001(J1RR68) Matrix Spike (MS)
1202906419	329170001(J1RR71) Sample Duplicate (DUP)
1202906420	329170001(J1RR71) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 8.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

Calibration Verification Information

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329027001 (J1RR68) and 329170001 (J1RR71).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample: 1202906414 (J1RR68).

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information**Data Exception (DER) Documentation**

The following DER was generated for this SDG: 1202576 1202906414 (J1RR68).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Hexavalent Chromium
Analytical Batch: 1315407 **Method:** SW846_7196A Hexavalent Chromium
Prep Batch : 1315406 **Method:** SW846 3060A

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 7196A:

Sample ID	Client ID
329027001	J1RR68
329027002	J1RR69
329027003	J1RR70
1202910159	Method Blank (MB)
1202910160	Laboratory Control Sample (LCS)
1202910161	329027001(J1RR68) Sample Duplicate (DUP)
1202910162	329027001(J1RR68) Matrix Spike (MS)
1202910163	329027001(J1RR68) Matrix Spike Duplicate (MSD)
1202910164	329170001(J1RR71) Sample Duplicate (DUP)
1202910165	329170001(J1RR71) Matrix Spike (MS)
1202910166	329170001(J1RR71) Matrix Spike Duplicate (MSD)
1202910167	329170001(J1RR71) Matrix Spike (MS)
1202910168	329027001(J1RR68) Matrix Spike (MS)
1202910169	329027001(J1RR68) Matrix Spike Duplicate (MSD)
1202910170	329170001(J1RR71) Matrix Spike Duplicate (MSD)
1202910533	Insoluble Lab Control Sample (ILCS)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-044 REV# 18.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Spectrometric analysis was performed on a Spectronic 20D+ Digital Spectrophotometer.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

The following samples were selected for QC analysis: 329027001 (J1RR68) and 329170001 (J1RR71).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The spike duplicate recovery falls outside of the established acceptance limits. Since both the spike recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported. 1202910162 (J1RR68) and 1202910163 (J1RR68).

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the spike and spike duplicate met the acceptance limits.

Duplicate Relative Percent Difference (RPD) Statement

The values for the sample and duplicate are less than the Practical Quantitation Limit (PQL); therefore, the RPD is not applicable. 1202910161 (J1RR68), 1202910164 (J1RR71) and 329027001 (J1RR68).

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1203307 1202910163 (J1RR68), 1202910168 (J1RR68) and 1202910170 (J1RR71).

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer:  Date: 19 July 13

DATA EXCEPTION REPORT

Mo.Day Yr. 11-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ELECTRODE	Test / Method: SW846 9045C/9045D, SW846 9045D	Matrix Type: Solid	Client Code: PAES, WCHN
Batch ID: 1313837	Sample Numbers: See below.		
Potentially affected work order(s)(SDG): 328601,328605,329027(X0004),329170(X0005)			
Application Issues: Container scanning event for custody missed Sample received out of holding			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Sample received out of holding:</p> <p>328601 001</p> <p>328605 001</p> <p>329027 001,002,003</p> <p>329170 001,002</p> <p>2. Container scanning event for custody missed:</p> <p>328601 001</p> <p>328605 001</p>		<p>1. Samples were received out of holding.</p> <p>2. Samples were not scanned to the analytical batch prior to analysis; however, they were in the analyst's custody at the time of analysis.</p>	

Originator's Name:

Lindsey Jensen 11-JUL-13

Data Validator/Group Leader:

Julia Hamilton 12-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 16-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: LACHAT Flow Injection Analyzer	Test / Method: EPA 353.2 Modified	Matrix Type: Solid	Client Code: GSWS, JEMZ, WCHN, WSRB
Batch ID: 1313804	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 328737,328742,329027(X0004),329122,329170(X0005),329241			
Application Issues: Failed Recovery for MS/PS Failed RPD for DUP			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS/PS: QC 1202908602MS</p> <p>2. Failed RPD for DUP: QC 1202906414DUP</p>		<p>1. The spike recovery falls outside of the established acceptance limits due to matrix interference.</p> <p>2. The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample.</p>	

Originator's Name:

Kristen Parson 16-JUL-13

Data Validator/Group Leader:

Thomas Lewis 16-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 17-JUL-13	Division: Other	Quality Criteria: SOP	Type: Process
Instrument Type: IC	Test / Method: ICX9056A_S	Matrix Type: Solid	Client Code: WCHN001
Batch ID: 1313450	Sample Numbers: All		
<p>Potentially affected work order(s)(SDG): 329027(X0004),329170(X0005)</p> <p>Application Issues: Failed Recovery for MS/PS</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MS: 1202905603</p>		<p>1. The MS/PS failed required acceptance limits for Sulfate due to matrix interference. Of the remaining anions in the MS/PS, all meet required acceptance limits. The deviation is noted in the Case Narrative and DER, and the data has been reported.</p>	

Originator's Name:
Virginia Winger 17-JUL-13

Data Validator/Group Leader:
Mary Sherwood 17-JUL-13

DATA EXCEPTION REPORT

Mo.Day Yr. 17-JUL-13	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: VIS SPECTROMETER	Test / Method: SW846 7196A	Matrix Type: Solid	Client Code: ENRG, WCHN
Batch ID: 1315407	Sample Numbers: See Below		
<p>Potentially affected work order(s)(SDG): 329027(X0004),329170(X0005),329476</p> <p>Application Issues: Failed Recovery for MS/PS Failed Recovery for MSD/PSD</p>			
Specification and Requirements Exception Description:		DER Disposition:	
<p>1. Failed Recovery for MSD/PSD: QC 1202910163MSD,</p>		<p>1. The spike duplicate recovery falls outside of the established acceptance limits. Since both the spike recovery and the RPD between the spike and spike duplicate fall within acceptance limits, the data is reported.</p>	

Originator's Name:

Travis Tola 17-JUL-13

Data Validator/Group Leader:

Thomas Lewis 19-JUL-13

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Certificate of Analysis Report
for**

WCHN001 WC-HANFORD, INC.

Client SDG: X0004 GEL Work Order: 329027 Project: RC-232 Soil

The Qualifiers in this report are defined as follows:

B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

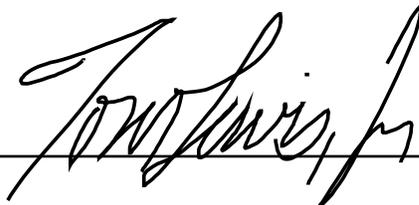
X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Orlette Johnson.

Reviewed by



GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: July 19, 2013

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: X0004

Client Sample ID: J1RR69	Project: WCHN00213
Sample ID: 329027002	Client ID: WCHN001
Matrix: SOIL	
Collect Date: 02-JUL-13 08:20	
Receive Date: 05-JUL-13	
Collector: Client	
Moisture: 4%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Electrode Analysis											
SW9045D pH "As Received"											
pH at Temp 21.6C	X	8.93	0.010	0.100	pH Units	1	LXA1	07/11/13	1427	1313837	1
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.698	0.698	2.08	mg/kg	1	VH1	07/17/13	0218	1313450	2
Chloride	B	1.48	0.698	2.08	mg/kg	1					
Fluoride	B	0.808	0.344	1.04	mg/kg	1					
Nitrate-N		2.89	0.344	1.04	mg/kg	1					
Nitrite-N	U	0.344	0.344	1.04	mg/kg	1					
O-Phosphate as P	U	0.698	0.698	2.08	mg/kg	1					
Sulfate		13.3	1.39	4.17	mg/kg	1					
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "Dry Weight Corrected"											
Nitrogen, Nitrate/Nitrite		2.05	0.174	0.511	mg/kg	1	KLP1	07/15/13	1604	1313804	3
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	U	0.156	0.156	0.390	mg/kg	1	TXT1	07/17/13	1514	1315407	4

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 353.2 Modified	EPA 353.2 Modified Nitrate/Nitrite	KLP1	07/15/13	1440	1313803
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	LXA1	07/17/13	1024	1315406
SW846 9056A	SW846 9056A Total Anions in Soil	VH1	07/16/13	1635	1313449

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9045D	
2	SW846 9056A	
3	EPA 353.2 Modified	
4	SW846 7196A	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 19, 2013

Page 1 of 4

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Contact: Joan Kessner

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Electrode Analysis											
Batch	1313837										
QC1202906473	329027001	DUP									
pH	X	8.35	X	8.32	pH Units	0.360		(0%-10%)	LXA1	07/11/13	14:25
QC1202906475	329170001	DUP									
pH	X	8.63	X	8.67	pH Units	0.462		(0%-10%)		07/11/13	14:32
QC1202906472	LCS										
pH	7.00			6.98	pH Units		99.7	(99%-101%)		07/11/13	14:02
Ion Chromatography											
Batch	1313450										
QC1202905602	329027001	DUP									
Bromide	U	0.715	U	0.715	mg/kg	N/A	^		VH1	07/17/13	01:19
Chloride	B	0.890	U	0.715	mg/kg	N/A	^	(+/-2.13)			
Fluoride	U	0.352	U	0.352	mg/kg	N/A	^				
Nitrate-N		2.48		2.51	mg/kg	1.28	^	(+/-1.07)			
Nitrite-N	U	0.352	U	0.352	mg/kg	N/A	^				
O-Phosphate as P	U	0.715	U	0.715	mg/kg	N/A	^				
Sulfate		32.5		32.2	mg/kg	0.756		(0%-20%)			
QC1202905604	LCS										
Bromide	12.5			13.1	mg/kg		105	(90%-110%)		07/17/13	00:19
Chloride	50.0			49.1	mg/kg		98.1	(90%-110%)			
Fluoride	25.0			26.2	mg/kg		105	(90%-110%)			
Nitrate-N	25.0			25.4	mg/kg		101	(90%-110%)			
Nitrite-N	25.0			26.5	mg/kg		106	(90%-110%)			
O-Phosphate as P	12.5			11.4	mg/kg		91	(90%-110%)			
Sulfate	100			103	mg/kg		103	(90%-110%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Ion Chromatography											
Batch	1313450										
QC1202905601	MB										
Bromide			U	0.670	mg/kg				VH1	07/16/13	23:49
Chloride			U	0.670	mg/kg						
Fluoride			U	0.330	mg/kg						
Nitrate-N			U	0.330	mg/kg						
Nitrite-N			U	0.330	mg/kg						
O-Phosphate as P			U	0.670	mg/kg						
Sulfate			U	1.33	mg/kg						
QC1202905603	329027001	MS									
Bromide	13.3	U	0.715	12.8	mg/kg		96	(61%-133%)		07/17/13	01:49
Chloride	53.4	B	0.890	49.7	mg/kg		91.5	(60%-131%)			
Fluoride	26.7	U	0.352	20.1	mg/kg		75.2	(31%-122%)			
Nitrate-N	26.7		2.48	31.0	mg/kg		107	(63%-129%)			
Nitrite-N	26.7	U	0.352	26.1	mg/kg		97.9	(64%-132%)			
O-Phosphate as P	13.3	U	0.715	10.4	mg/kg		78	(23%-118%)			
Sulfate	107		32.5	203	mg/kg		160*	(55%-137%)			
Nutrient Analysis											
Batch	1313804										
QC1202906414	329027001	DUP									
Nitrogen, Nitrate/Nitrite			3.98	3.19	mg/kg	200*			KLP1	07/15/13	15:57
QC1202906419	329170001	DUP									
Nitrogen, Nitrate/Nitrite			1.29	1.17	mg/kg	9.75 ^		(+/-0.551)		07/15/13	16:10
QC1202906413	LCS										
Nitrogen, Nitrate/Nitrite	10.0			9.95	mg/kg		99.5	(90%-110%)		07/15/13	15:50
QC1202906412	MB										
Nitrogen, Nitrate/Nitrite			U	0.170	mg/kg					07/15/13	15:49

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Nutrient Analysis											
Batch	1313804										
QC1202906415	329027001	MS									
Nitrogen, Nitrate/Nitrite	10.6	3.98		13.7	mg/kg		91.4	(75%-125%)	KLP1	07/15/13	15:58
QC1202906420	329170001	MS									
Nitrogen, Nitrate/Nitrite	11.1	1.29		11.6	mg/kg		93.4	(75%-125%)		07/15/13	16:11
Spectrometric Analysis											
Batch	1315407										
QC1202910161	329027001	DUP									
Hexavalent Chromium		U	0.168	U	0.170	mg/kg	N/A ^		TXT1	07/17/13	14:47
QC1202910164	329170001	DUP									
Hexavalent Chromium		U	0.176	U	0.178	mg/kg	N/A ^			07/17/13	15:19
QC1202910533	ILCS										
Hexavalent Chromium	8.00			8.02	mg/kg		100	(80%-120%)		07/17/13	14:42
QC1202910160	LCS										
Hexavalent Chromium	3.99			4.56	mg/kg		114	(80%-120%)		07/17/13	14:39
QC1202910159	MB										
Hexavalent Chromium			U	0.159	mg/kg					07/17/13	14:37
QC1202910162	329027001	MS									
Hexavalent Chromium	4.25	U	0.168		3.35	mg/kg		78.9	(75%-125%)	07/17/13	15:07
QC1202910165	329170001	MS									
Hexavalent Chromium	4.49	U	0.176		4.37	mg/kg		97.3	(75%-125%)	07/17/13	15:21
QC1202910167	329170001	MS									
Hexavalent Chromium	4.45	U	0.176		4.46	mg/kg		100	(75%-125%)	07/17/13	15:24
QC1202910168	329027001	MS									
Hexavalent Chromium	4.09	U	0.168		2.99	mg/kg		73.2*	(75%-125%)	07/17/13	15:10
QC1202910163	329027001	MSD									
Hexavalent Chromium	4.10	U	0.168		3.06	mg/kg	9.01	74.7*	(0%-30%)	07/17/13	15:09
QC1202910166	329170001	MSD									
Hexavalent Chromium	4.46	U	0.176		4.22	mg/kg	3.58	94.5	(0%-30%)	07/17/13	15:22
QC1202910169	329027001	MSD									
Hexavalent Chromium	4.15	U	0.168		3.98	mg/kg	11.3	95.9	(0%-30%)	07/17/13	15:25
QC1202910170	329170001	MSD									
Hexavalent Chromium	4.45	U	0.176		3.13	mg/kg	4.43	70.4*	(0%-30%)	07/17/13	15:12

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 329027

Client SDG: X0004

Project Description: RC-232 Soil

Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
----------	-----	--------	------	----	-------	------	------	-------	-------	------	------

Notes:

The Qualifiers in this report are defined as follows:

- > Result greater than quantifiable range or greater than upper limit of the analysis range
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was ≤ 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Miscellaneous

Moisture LogBook

Batch: 1312924

Analyst: CXC1

Date/Time: 08-JUL-2013

Procedure Code DRY WEIGHT

Procedure Description Dry Weight-Percent Moisture

Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1202904474	8.528

Sample Id	Sample Type	Original Hsn	Instrument	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
329027001	SAMPLE		BALHD2000D	12:12	7.253	26.648	25.428	19.395	18.175	6.29
329027002	SAMPLE		BALHD2000D	12:12	7.027	37.121	35.917	30.094	28.89	4
329027003	SAMPLE		BALHD2000D	12:12	7.199	39.807	37.068	32.608	29.869	8.4
329031001	SAMPLE		BALHD2000D	12:12	7.215	27.028	24.713	19.813	17.498	11.7
329033001	SAMPLE		BALHD2000D	12:12	7.218	32.268	29.466	25.05	22.248	11.2
329034001	SAMPLE		BALHD2000D	12:12	7.288	24.896	20.625	17.608	13.337	24.3
329035001	SAMPLE		BALHD2000D	12:12	7.252	39.956	31.65	32.704	24.398	25.4
329036001	SAMPLE		BALHD2000D	12:12	7.309	27.127	21.808	19.818	14.499	26.8
1202904474	DUP	329027001	BALHD2000D	12:12	7.137	37.466	35.369	30.329	28.232	6.91

Comments:

A) Result = (Net Initial - Net Final) / Net Initial * 100

Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS