SAF-RC-189
100N Field Remediation – Soil Full Protocol
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 6/3/14
INITIAL/DATE

COMMENTS:

SDG XP0095 SAF RC-189

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location: 100-N-84:6 Verification

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

May 30, 2014

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

Re: RC-189 Soil
Work Order: 349312
SDG: XP0095

Dear Joan Kessner:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 23, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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-189-309
Enclosures

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Case Narrative

Receipt Narrative
for
WC-HANFORD, INC.
SDG: XP0095
Work Order: 349312

May 30, 2014

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 May 23, 2014 for analysis.

Sample Identification: The laboratory received the following sample:

Laboratory ID	Client ID
349312001	J1TR45

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: GC Semivolatile PCB, General Chemistry and Metals.

Orlette Johnson
Project Manager

Chain of Custody and Supporting Documentation

Washington Closure Hanford

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-189-309

Collector: Q. Stowe	Company Contact: Joan Kessner	Telephone No.: 375-4688	Project Coordinator: KESSNER, JH
Price Code:	Data Turnaround: 7 days		
Project Designation: 100N Field Remediation	Sampling Location: 100-N-84:6, Verification		SAF No.: RC-189
Ice Chest No.: WCH-12-024	Field Logbook No.: EL-1652-12	COA: 01N8462000	Method of Shipment: Commerical Carrier
Shipped To: GEL Laboratories Charlston	Offsite Property No.: A131103		Bill of Lading/Air Bill No.: See OSPC

Other Labs Shipped To: 349312

POSSIBLE SAMPLE HAZARDS/REMARKS
potentially radioactive

Special Handling and/or Storage

Preservation	None	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
Type of Container	G/P	G/P	G/P	aG	G	aG					
No. of Container(s)	1	1	1	1	1	1					
Volume	250mL	125mL	250mL	250mL	125mL	250mL					
Sample Analysis	See item (1) in Special Instructions	Chromium Hex - 7196 {Hexavalent Chromium}	See item (2) in Special Instructions	PCBs - 8082	TPH-Diesel Range - WTPH-D +	PAHs - 8310					

Sample No.	Matrix	Sample Date	Sample Time										
J1TR45	SOIL	5-21-14	1329	x	x	x	x	DWS 5/21/14					

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Quincy Stowe	5-21-14 1442	DWSHEA DWSHEA	5/21/14 1442
DWSHEA DWSHEA	5/21/14 1644	Fridge 3C 1060 Battelle	5/21/14 1644
Fridge 3C 1060 Battelle	5/22/14 0840	DWSHEA DWSHEA	5/22/14 0840
DWSHEA DWSHEA	5/22/14 0851	Fed Ex	
Fedex		H. Taylor	052314 0900

Sign/Print Names

FINAL SAMPLE DISPOSITION: Disposal Method | Disposed By | Date/Time

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, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorous in phosphate, Sulfate}; ~~NO2/NO3 - 353.1 {Nitrogen in Nitrite and Nitrate}, pH (Soil) - 9045~~ DWS 5/20/14

REVIEWED BY SMS
DATE 5/22/14

XP0095

WCH-EE-011

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: WCHD	**SDG/AR/COC/Work Order:** 349312
Received By: HTaylor	**Date Received:** 052314

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?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample contatiners < action levels? 0cpm
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	**Yes**	**NA**	**No**	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 3 *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 130462961 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			
14	Carrier and tracking number.				Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7100 7084 0843 0957

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials HT Date 052314 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 30 May 2014

State	Certification
Alaska	UST−110
Arkansas	88−0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH−0169
Delaware	SC000122013−10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−12−00283, P330−12−00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013−10
Idaho Chemistry	SC00012
Idaho Radiochemistry	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
Michigan	9976
Mississippi	SC000122013−10
Nebraska	NE−OS−26−13
Nevada	SC000122014−1
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 GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235−14−9
Utah NELAP	SC000122013−11
Vermont	VT87156
Virginia NELAP	460202
Washington	C780−12
Wisconsin	999887790

PCB Analysis

Case Narrative

PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0095

Method/Analysis Information

Procedure:	**Analysis of Polychlorinated Biphenyls by ECD**
Analytical Method:	SW846 3541/8082A
Prep Method:	SW846 3541
Analytical Batch Number:	1390875
Prep Batch Number:	1390874

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

Sample ID	Client ID
349312001	J1TR45
1203095952	Method Blank (MB)
1203095953	Laboratory Control Sample (LCS)
1203095958	349312001(J1TR45) Matrix Spike (MS)
1203095959	349312001(J1TR45) Matrix Spike Duplicate (MSD)

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

Preparation/Analytical Method Verification

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-OA-E-040 REV# 20.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

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

Continuing Calibration Verification (CCV) Requirements
All associated calibration verification standards (ICV or CCV) met the acceptance criteria for the target analytes. All analytes were within the established retention time windows for this method.

Surrogate recovery did not meet the acceptance criteria in one of the CCV standards analyzed for this SDG; however, this had no adverse effects on the data as the sample in this SDG recovered well within the acceptance limits for the surrogate.

Quality Control (QC) Information

Method Blank (MB) Statement
The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries
QC sample 1203095958(J1TR45)(MS) did not meet surrogate recovery acceptance criteria on one analytical column due to sample matrix interference.

Laboratory Control Sample (LCS) Recovery
The LCS spike recoveries met the acceptance limits.

QC Sample Designation
Sample 349312001 (J1TR45) was selected for the matrix spike and matrix spike duplicate analysis for this SDG.

Matrix Spike (MS) Recovery Statement
The MS recoveries for this SDG were not within the established acceptance limits due to sample matrix interference.

Matrix Spike Duplicate (MSD) Recovery Statement
The MSD recoveries for this SDG were not within the established acceptance limits due to sample matrix interference.

MS/MSD Relative Percent Difference (RPD) Statement
The RPD between the MS and MSD did not meet the acceptance limits due to the matrix interference.

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. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns. All sample extracts were cleaned using alumina. Additionally, copper was added to all sample extracts to remove sulfur.

Sample Dilutions
Samples 1203095958 (J1TR45MS), 1203095959 (J1TR45MSD) and 349312001 (J1TR45)were diluted prior to analysis due to the oily matrix of the extracts.

Sample Re-extraction/Re-analysis
Re-extractions or re-analyses were not required in this SDG in this batch.

Miscellaneous Information

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually 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.

Data Exception (DER) Documentation
Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. DER #1298074 was generated for this SDG.

Manual Integrations
Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

Additional Comments
The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)
ECD8A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

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.

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
29-MAY-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GC/ECD	SW846 3541/8082A	Solid	ANDW, CARE, WCHN
Batch ID:	**Sample Numbers:**		
1390875	See Below		

Potentially affected work order(s)(SDG): 349312(XP0095),349335,349395(EUI-9641)

Application Issues:

Failed Recovery for MS/PS

Failed RPD for MS/MSD, or PS/PSD

Failed Yield for Surrogates

Failed Recovery for MSD/PSD

Specification and Requirements Exception Description:	DER Disposition:
1. 1203095958MS and 1203095959MSD did not meet the spike recovery acceptance criteria. 2. The RPD between 1203095958MS and 1203095959MSD did not meet the acceptance criteria. 3. Sample 349395001 and 1203095958MS did not meet the surrogate recovery acceptance criteria.	1. & 2. The failures were due to sample matrix interference. The data were reported. 3. Sample 349395001 failed the surrogate recoveries due to the dilutions performed on the sample. The sample was diluted due to over range target hits. The parent sample of the 1203095958MS met the surrogate recovery acceptance criteria. The data were reported.

Originator's Name:

James Maestas 29-MAY-14

Data Validator/Group Leader:

Yiping Shi 29-MAY-14

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: XP0095 GEL Work Order: 349312 Project: RC-189 Soil

The Qualifiers in this report are defined as follows:

D Results are reported from a diluted aliquot of sample.

J 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).Value is estimated

T Spike and/or spike duplicate 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.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Jimin Cao **Name: Jimin Cao**

Date: 29 MAY 2014 **Title: Data Validator**

Sample Data Summary

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 29, 2014

Company :	WC-Hanford, Inc.
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354
Contact:	Joan Kessner
Project:	RC-189 Soil

Client SDG: XP0095

Client Sample ID:	J1TR45	Project:	WCHN00613
Sample ID:	349312001	Client ID:	WCHN001
Matrix:	SOIL		
Collect Date:	21-MAY-14 13:29		
Receive Date:	23-MAY-14		
Collector:	Client		
Moisture:	1.25%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DTU	2.24	2.24	6.73	ug/kg	2	JXM	05/28/14	1031	1390875	1
Aroclor-1221	DU	2.24	2.24	6.73	ug/kg	2					
Aroclor-1232	DU	2.24	2.24	6.73	ug/kg	2					
Aroclor-1242	DU	2.24	2.24	6.73	ug/kg	2					
Aroclor-1248	DU	2.24	2.24	6.73	ug/kg	2					
Aroclor-1254	D	13.1	2.24	6.73	ug/kg	2	JXM	05/28/14	1031	1390875	2
Aroclor-1260	DT	7.71	2.24	6.73	ug/kg	2					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	05/27/14	1045	1390874

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8082A	
2	SW846 3541/8082A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	4.33 ug/kg	6.73	64.4	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.67 ug/kg	6.73	99.2	(35%-119%)

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: May 29, 2014

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

Contact: **Joan Kessner**

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-PCB										
Batch 1390875										
QC1203095953 LCS										
Aroclor-1016	33.3			25.5	ug/kg		76.4	(39%-120%)	JXM	05/28/14 09:42
Aroclor-1260	33.3			30.6	ug/kg		91.9	(50%-116%)		
**4cmx	6.66			5.41	ug/kg		81.2	(44%-106%)		
**Decachlorobiphenyl	6.66			6.28	ug/kg		94.2	(35%-119%)		
QC1203095952 MB										
Aroclor-1016			U	1.11	ug/kg					05/28/14 09:30
Aroclor-1221			U	1.11	ug/kg					
Aroclor-1232			U	1.11	ug/kg					
Aroclor-1242			U	1.11	ug/kg					
Aroclor-1248			U	1.11	ug/kg					
Aroclor-1254			U	1.11	ug/kg					
Aroclor-1260			U	1.11	ug/kg					
**4cmx	6.67			5.36	ug/kg		80.4	(44%-106%)		
**Decachlorobiphenyl	6.67			6.24	ug/kg		93.6	(35%-119%)		
QC1203095958 349312001 MS										
Aroclor-1016	33.7 DTU	2.24 DTU		2.25	ug/kg		0*	(25%-125%)		05/28/14 10:46
Aroclor-1260	33.7 DT	7.71 DT		8.53	ug/kg		2.44*	(28%-127%)		
**4cmx	6.75	4.33		4.39	ug/kg		65.1	(44%-106%)		
**Decachlorobiphenyl	6.75	6.67		9.36	ug/kg		139*	(35%-119%)		
QC1203095959 349312001 MSD										
Aroclor-1016	33.7 DTU	2.24 DTU		2.25	ug/kg	N/A	0*	(0%-30%)		05/28/14 11:00

GEL LABORATORIES LLC

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

QC Summary

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB												
Batch 1390875												
Aroclor-1260	33.7	DT	7.71	DJT	5.95	ug/kg	35.6*	0*	(0%-30%)			
**4cmx	6.74		4.33		5.26	ug/kg		78	(44%-106%)	JXM	05/28/14	11:00
**Decachlorobiphenyl	6.74		6.67		6.05	ug/kg		89.7	(35%-119%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J 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).Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate 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.
- 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
- o Analyte failed to recover within LCS limits (0rganics only)

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

Prep Logbook

Automated Soxhlet Extraction

Batch ID: 1390874 **Verified by:** _____

Analyst: Sirena White

Method: SW846 3541

Lab SOP: GL-OA-E-066 REV# 5

Instrument: Semi-Volatiles Manual

Sample ID	Run Date	Aliquot (g)	Clean Up 1	Clean Up Amount 1 (mL)	Post Clean Up Amount 1 (mL)	Final Volume (mL)	Prepped Factor (mL/g)
1203095952 MB	27-MAY-2014 10:45:00	30	H2SO4/KMnO4	2	9	1	0.03333
1203095953 LCS	27-MAY-2014 10:45:00	30.01	H2SO4/KMnO4	2	9	1	0.03332
349309001	27-MAY-2014 10:45:00	30.21	H2SO4/KMnO4	2	9	1	0.0331
1203095956 MS (349309001)	27-MAY-2014 10:45:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
1203095957 MSD (349309001)	27-MAY-2014 10:45:00	30.03	H2SO4/KMnO4	2	9	1	0.0333
349312001	27-MAY-2014 10:45:00	30.1	H2SO4/KMnO4	2	9	1	0.03322
1203095958 MS (349312001)	27-MAY-2014 10:45:00	30.02	H2SO4/KMnO4	2	9	1	0.03331
1203095959 MSD (349312001)	27-MAY-2014 10:45:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
349335001	27-MAY-2014 10:45:00	30.09	H2SO4/KMnO4	2	9	1	0.03323
349335004	27-MAY-2014 10:45:00	30.08	H2SO4/KMnO4	2	9	1	0.03324
349335007	27-MAY-2014 10:45:00	30.11	H2SO4/KMnO4	2	9	1	0.03321
349335010	27-MAY-2014 10:45:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
349335013	27-MAY-2014 10:45:00	30.08	H2SO4/KMnO4	2	9	1	0.03324
349335016	27-MAY-2014 10:45:00	30.04	H2SO4/KMnO4	2	9	1	0.03329
349335019	27-MAY-2014 10:45:00	30.13	H2SO4/KMnO4	2	9	1	0.03319
349335022	27-MAY-2014 10:45:00	30.12	H2SO4/KMnO4	2	9	1	0.0332
349395001	27-MAY-2014 10:45:00	30.03	H2SO4/KMnO4	2	9	1	0.0333

Type	Sample Id	Description	Serial Number	Spike Amt	Units
LCS	1203095953	PCB Laboratory Control	WE140505-06	1	mL
MS	1203095956	PCB Laboratory Control	WE140505-06	1	mL
MS	1203095958	PCB Laboratory Control	WE140505-06	1	mL
MSD	1203095957	PCB Laboratory Control	WE140505-06	1	mL
MSD	1203095959	PCB Laboratory Control	WE140505-06	1	mL
SURR	All	PEST LOW LEVEL SURROGATE 200 UG/L	WE140516-01	1	mL
REGNT	All	1:1 sulfuric acid	2091781	5	mL

Comments:

Final Solvent: Hexane
Verified by: SR
Prior to Clean-up: 2mL
Clean-up Initials: SJW
Clean-up SOP: GL-OA-E-037 Rev. 1
Clean-up Date: 05/27/14

Prep Logbook

Batch ID: **1390874** **Verified by:** _____

Analyst: **Sirena White**

Method: **SW846 3541**

Lab SOP: **GL-OA-E-066 REV# 5**

Instrument: **Semi-Volatiles Manual**

Sample ID	Run Date	Aliquot (g)	Clean Up 1	Clean Up Amount 1 (mL)	Post Clean Up Amount 1 (mL)	Final Volume (mL)	Prepped Factor (mL/g)
REGNT All	Hexane		2102333-B4	120	mL		
REGNT All	5% Potassium Permanganate		2106544	5	mL		
SOURC All	SODIUM SULFATE		2101676	30	g		

Metals Analysis

Case Narrative

Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0095

Sample Analysis

Sample ID	Client ID
349312001	J1TR45
1203095541	Method Blank (MB) **ICP**
1203095542	Laboratory Control Sample (LCS)
1203095551	349312001(J1TR45L) Serial Dilution (SD)
1203095549	349312001(J1TR45D) Sample Duplicate (DUP)
1203095550	349312001(J1TR45S) Matrix Spike (MS)
1203098288	349312001(J1TR45PS) Post Spike (PS)
1203095819	Method Blank (MB) **ICP-MS**
1203095820	Laboratory Control Sample (LCS)
1203095826	349312001(J1TR45L) Serial Dilution (SD)
1203095824	349312001(J1TR45D) Sample Duplicate (DUP)
1203095825	349312001(J1TR45S) Matrix Spike (MS)
1203096486	Method Blank (MB) **CVAA**
1203096487	Laboratory Control Sample (LCS)
1203096496	349312001(J1TR45L) Serial Dilution (SD)
1203096494	349312001(J1TR45D) Sample Duplicate (DUP)
1203096495	349312001(J1TR45S) Matrix Spike (MS)

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

Method/Analysis Information

Analytical Batch:	1390696, 1390819 and 1391070
Prep Batch :	1390695, 1390816 and 1391067
Standard Operating Procedures:	GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 23, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 27
Analytical Method:	SW846 3050B/6010C, SW846 3050B/6020A 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 - ICPMS was performed on a Perkin Elmer ELAN DRC-e inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector, and dynamic reaction cell. The DRC-e uses a dynamic reaction cell to eliminate polyatomic interferences. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

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/PQL Requirements
The PQL standard recoveries for SW846 6010C met the control limits except for potassium in files 052814-1 at 13:57 and 052914-4 at 13:53 and 17:20. Potassium recovered high in the both the initial and closing PQL standards; however the analyte concentration in the associated client sample was greater than two times the PQL.

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

Continuing Calibration Blanks (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: 349312001 (J1TR45)-ICP, ICP-MS 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 did not meet all the recommended quality control acceptance criteria for percent recoveries for the applicable analytes. Recoveries for potassium, silicon, vanadium, and zinc were not within the acceptance limits in sample 1203095550 (J1TR45)-ICP.

Duplicate Relative Percent Difference (RPD) Statement
The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. Not all applicable analytes met these requirements. The RPD values for chromium and copper were not within the acceptance limits in sample 1203095549 (J1TR45)-ICP.

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 in the post-digested sample.

Serial Dilution % Difference Statement
The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations 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 established acceptance percent difference criteria.

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 349312001 (J1TR45)-ICP/ICP-MS were diluted to minimize suppression for silver and lead due to matrix interferences. Sample 349312001 (J1TR45)-ICP was diluted because titanium exceeded the linear calibration range which affected antimony, cobalt, vanadium, and zinc. The ICPMS solid samples in this SDG were diluted the standard two times.

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. Data exception report (DER ID 1298932) was generated for this SDG.

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: Pat Steele **Date:** 05/30/2014

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
30-MAY-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ICP	SW846 3050B/6010C	Solid	WCHN
Batch ID:	**Sample Numbers:**		
1390696	See Below		

Potentially affected work order(s)(SDG): 349309(XP0094),349312(XP0095),349313(X0047)

Application Issues:

Failed Recovery for MS/PS

Failed RPD for DUP

Specification and Requirements Exception Description:	DER Disposition:
1. Failed Recovery for MS/PS: QC 1203095544MS,1203095547MS, 1203095550MS, 1203098287PS 2. Failed RPD for DUP: QC 1203095543DUP, 1203095549DUP	1. The matrix spike recovery failed outside of the control limits for silicon,potassium,vanadium,zinc and phosphorous. The post spike failed outside the required control limits for silicon but passed for all other analytes. This verifies the presence of a matrix interference for silicon and verifies the absence of a matrix interference for all the other analytes. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. 2. The sample and sample duplicate % RPD failed outside the control limits for calcium,chromium and copper 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.

Originator's Name:

Helen Camello 30-MAY-14

Data Validator/Group Leader:

Theresa McKelvey 30-MAY-14

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: XP0095 GEL Work Order: 349312 Project: RC-189 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 Pat Steele 05/30/2014

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 30, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-189 Soil

Client SDG: XP0095

Client Sample ID: J1TR45
Sample ID: 349312001
Matrix: SOIL
Collect Date: 21-MAY-14 13:29
Receive Date: 23-MAY-14
Collector: Client
Moisture: 1.25%

Project: WCHN00613
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	U	0.00391	0.00391	0.0117	mg/kg	1	NOR1	05/28/14	1146	1391070	1
Metals Analysis-ICP											
ICP METALS 6010TR Client List "Dry Weight Corrected"											
Aluminum		6160	6.79	20.0	mg/kg	1	HSC	05/28/14	1808	1390696	2
Arsenic	C	3.98	0.499	3.00	mg/kg	1					
Barium		65.2	0.0999	0.499	mg/kg	1					
Beryllium		0.565	0.0999	0.499	mg/kg	1					
Boron	B	1.21	0.999	4.99	mg/kg	1					
Cadmium	B	0.425	0.0999	0.499	mg/kg	1					
Calcium		9700	7.99	25.0	mg/kg	1					
Chromium	*	35.4	0.150	0.499	mg/kg	1					
Copper	*	30.7	0.300	0.999	mg/kg	1					
Iron		19100	7.99	25.0	mg/kg	1					
Magnesium		4860	8.49	30.0	mg/kg	1					
Manganese		288	0.200	0.999	mg/kg	1					
Molybdenum	B	0.337	0.200	0.999	mg/kg	1					
Nickel		11.2	0.150	0.499	mg/kg	1					
Potassium	N	1170	6.39	25.0	mg/kg	1					
Silicon	N	739	1.50	9.99	mg/kg	1					
Silver	U	0.0999	0.0999	0.499	mg/kg	1					
Sodium		366	6.99	25.0	mg/kg	1	HSC	05/29/14	0808	1390696	3
Antimony	DU	1.65	1.65	4.99	mg/kg	5	HSC	05/29/14	1649	1390696	4
Cobalt	D	7.45	0.749	2.50	mg/kg	5					
Lead	DU	1.65	1.65	4.99	mg/kg	5					
Vanadium	DN	41.9	0.499	2.50	mg/kg	5					
Zinc	DN	120	2.00	4.99	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.323	0.323	1.00	mg/kg	2	SKJ	05/28/14	1628	1390819	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	JXM5	05/27/14	0730	1390816
SW846 3050B	SW846 3050B Prep for 6010C	JXM5	05/27/14	0730	1390695
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	05/27/14	1702	1391067

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

Certificate of Analysis

Report Date: May 30, 2014

Company :	WC-Hanford, Inc.		
Address :	2620 Fermi Avenue MSIN H4-21 Richland, Washington 99354		
Contact:	Joan Kessner	Client SDG:	XP0095
Project:	RC-189 Soil		

Client Sample ID:	J1TR45	Project:	WCHN00613
Sample ID:	349312001	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	
5	SW846 3050B/6020A	

Notes:

Quality Control Summary

GEL LABORATORIES LLC

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

QC Summary

Report Date: May 30, 2014

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

Contact: **Joan Kessner**

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis - ICPMS											
Batch 1390819											
QC1203095824 349312001 DUP											
Selenium		DU	0.323	DU	0.334	mg/kg	N/A			SKJ	05/28/14 16:31
QC1203095820 LCS											
Selenium	4.82			D	4.80	mg/kg		99.7	(80%-120%)		05/28/14 15:50
QC1203095819 MB											
Selenium				DU	0.306	mg/kg					05/28/14 15:46
QC1203095825 349312001 MS											
Selenium	5.04	DU	0.323	D	4.94	mg/kg		96	(75%-125%)		05/28/14 16:35
QC1203095826 349312001 SDILT											
Selenium		DU	0.512	DU	1.62	ug/L	N/A		(0%-10%)		05/28/14 16:39
Metals Analysis-ICP											
Batch 1390696											
QC1203095549 349312001 DUP											
Aluminum			6160		6280	mg/kg	2.06		(0%-20%)	HSC	05/28/14 18:11
Antimony		DU	1.65	DU	1.62	mg/kg	N/A				05/29/14 16:52
Arsenic		C	3.98		3.72	mg/kg	6.93 ^		(+/-2.94)		05/28/14 18:11
Barium			65.2		62.5	mg/kg	4.20		(0%-20%)		
Beryllium			0.565		0.528	mg/kg	6.66 ^		(+/-0.490)		
Boron		B	1.21	B	1.12	mg/kg	7.76 ^		(+/-4.90)		
Cadmium		B	0.425	B	0.389	mg/kg	8.80 ^		(+/-0.490)		
Calcium			9700		9810	mg/kg	1.04		(0%-20%)		
Chromium		*	35.4	*	25.5	mg/kg	32.7*		(0%-20%)		
Cobalt		D	7.45	D	6.56	mg/kg	12.7 ^		(+/-2.45)		05/29/14 16:52
Copper		*	30.7	*	24.8	mg/kg	21.4*		(0%-20%)		05/28/14 18:11
Iron			19100		18400	mg/kg	4.05		(0%-20%)		

GEL LABORATORIES LLC

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QC Summary

Workorder: 349312 **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1390696										
Lead	DU	1.65	DU	1.62	mg/kg	N/A			HSC	05/29/14 16:52
Magnesium		4860		4780	mg/kg	1.70		(0%-20%)		05/28/14 18:11
Manganese		288		296	mg/kg	2.73		(0%-20%)		
Molybdenum	B	0.337	B	0.264	mg/kg	24.3 ^		(+/-0.979)		
Nickel		11.2		12.0	mg/kg	6.91		(0%-20%)		
Potassium	N	1170		1190	mg/kg	2.16		(0%-20%)		
Silicon	N	739		762	mg/kg	3.10		(0%-20%)		
Silver	U	0.0999	U	0.0979	mg/kg	N/A				
Sodium		366		322	mg/kg	12.8		(0%-20%)		05/29/14 08:11
Vanadium	DN	41.9	D	40.9	mg/kg	2.44		(0%-20%)		05/29/14 16:52
Zinc	DN	120	D	127	mg/kg	5.97		(0%-20%)		
QC1203095542 LCS										
Aluminum	473			497	mg/kg		105	(80%-120%)		05/28/14 17:46
Antimony	47.3			47.8	mg/kg		101	(80%-120%)		05/29/14 16:21
Arsenic	47.3			49.6	mg/kg		105	(80%-120%)		05/28/14 17:46
Barium	47.3			49.0	mg/kg		104	(80%-120%)		
Beryllium	47.3			50.5	mg/kg		107	(80%-120%)		
Boron	47.3			48.6	mg/kg		103	(80%-120%)		
Cadmium	47.3			49.8	mg/kg		105	(80%-120%)		
Calcium	473			492	mg/kg		104	(80%-120%)		
Chromium	47.3			49.0	mg/kg		104	(80%-120%)		
Cobalt	47.3			46.8	mg/kg		99	(80%-120%)		05/29/14 16:21

QC Summary

Workorder: 349312 **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1390696										
Copper	47.3			50.2	mg/kg		106	(80%-120%)	HSC	05/28/14 17:46
Iron	473			501	mg/kg		106	(80%-120%)		
Lead	47.3			47.8	mg/kg		101	(80%-120%)		05/29/14 16:21
Magnesium	473			510	mg/kg		108	(80%-120%)		05/28/14 17:46
Manganese	47.3			50.4	mg/kg		107	(80%-120%)		
Molybdenum	47.3			48.4	mg/kg		102	(80%-120%)		
Nickel	47.3			49.0	mg/kg		104	(80%-120%)		
Potassium	473			486	mg/kg		103	(80%-120%)		
Silicon	473			434	mg/kg		91.8	(80%-120%)		
Silver	47.3			48.7	mg/kg		103	(80%-120%)		
Sodium	473			495	mg/kg		105	(80%-120%)		05/29/14 07:47
Vanadium	47.3			49.9	mg/kg		106	(80%-120%)		05/29/14 16:21
Zinc	47.3			49.9	mg/kg		106	(80%-120%)		
QC1203095541 MB										
Aluminum			U	6.55	mg/kg					05/28/14 17:43
Antimony			U	0.318	mg/kg					05/29/14 16:18
Arsenic			B	0.900	mg/kg					05/28/14 17:43
Barium			U	0.0963	mg/kg					
Beryllium			U	0.0963	mg/kg					
Boron			U	0.963	mg/kg					
Cadmium			U	0.0963	mg/kg					
Calcium			U	7.71	mg/kg					

QC Summary

Workorder: 349312 **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1390696											
Chromium				U	0.145	mg/kg				HSC	05/28/14 17:43
Cobalt				U	0.145	mg/kg					05/29/14 16:18
Copper				U	0.289	mg/kg					05/28/14 17:43
Iron				U	7.71	mg/kg					
Lead				U	0.318	mg/kg					05/29/14 16:18
Magnesium				U	8.19	mg/kg					05/28/14 17:43
Manganese				U	0.193	mg/kg					
Molybdenum				U	0.193	mg/kg					
Nickel				U	0.145	mg/kg					
Potassium				U	6.17	mg/kg					
Silicon				U	1.45	mg/kg					
Silver				U	0.0963	mg/kg					
Sodium				U	6.74	mg/kg					05/29/14 07:44
Vanadium				U	0.0963	mg/kg					05/29/14 16:18
Zinc				U	0.385	mg/kg					
QC1203095550 349312001 MS											
Aluminum	488		6160		8010	mg/kg		N/A	(75%-125%)		05/28/14 18:14
Antimony	48.8	DU	1.65	D	47.3	mg/kg		96.9	(75%-125%)		05/29/14 16:55
Arsenic	48.8	C	3.98		53.1	mg/kg		101	(75%-125%)		05/28/14 18:14
Barium	48.8		65.2		118	mg/kg		108	(75%-125%)		
Beryllium	48.8		0.565		50.7	mg/kg		103	(75%-125%)		
Boron	48.8	B	1.21		49.9	mg/kg		99.8	(75%-125%)		

QC Summary

Workorder: 349312 **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1390696											
Cadmium	48.8	B	0.425		48.6	mg/kg		98.7	(75%-125%)	HSC	05/28/14 18:14
Calcium	488		9700		11100	mg/kg		N/A	(75%-125%)		
Chromium	48.8	*	35.4		76.1	mg/kg		83.4	(75%-125%)		
Cobalt	48.8	D	7.45	D	56.4	mg/kg		100	(75%-125%)		05/29/14 16:55
Copper	48.8	*	30.7		84.3	mg/kg		110	(75%-125%)		05/28/14 18:14
Iron	488		19100		21900	mg/kg		N/A	(75%-125%)		
Lead	48.8	DU	1.65	D	54.9	mg/kg		109	(75%-125%)		05/29/14 16:55
Magnesium	488		4860		6010	mg/kg		N/A	(75%-125%)		05/28/14 18:14
Manganese	48.8		288		354	mg/kg		N/A	(75%-125%)		
Molybdenum	48.8	B	0.337		48.5	mg/kg		98.6	(75%-125%)		
Nickel	48.8		11.2		59.5	mg/kg		99	(75%-125%)		
Potassium	488	N	1170	N	1790	mg/kg		128*	(75%-125%)		
Silicon	488	N	739	N	942	mg/kg		41.6*	(75%-125%)		
Silver	48.8	U	0.0999		49.1	mg/kg		101	(75%-125%)		
Sodium	488		366		937	mg/kg		117	(75%-125%)		05/29/14 08:14
Vanadium	48.8	DN	41.9	DN	103	mg/kg		126*	(75%-125%)		05/29/14 16:55
Zinc	48.8	DN	120	DN	187	mg/kg		138*	(75%-125%)		
QC1203098288 349312001 PS											
Potassium	5000	N	11700		16000	ug/L		86.7	(80%-120%)		05/29/14 16:46
Silicon	5000	N	7400		13000	ug/L		112	(80%-120%)		
Vanadium	500	DN	83.9	D	605	ug/L		104	(80%-120%)		05/30/14 12:18
Zinc	500	DN	240	D	738	ug/L		99.6	(80%-120%)		

QC Summary

Workorder: 349312 **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Metals Analysis-ICP

Batch 1390696

QC1203095551 349312001 SDILT

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Aluminum		61600	D	13200	ug/L	6.69		(0%-10%)	HSC	05/28/14 18:16
Antimony	DU	-3.18	DU	8.24	ug/L	N/A		(0%-10%)		05/29/14 16:58
Arsenic	C	39.9	D	10.9	ug/L	36.5		(0%-10%)		05/28/14 18:16
Barium		653	D	137	ug/L	5.1		(0%-10%)		
Beryllium		5.65	D	1.17	ug/L	3.14		(0%-10%)		
Boron	B	12.1	DU	4.99	ug/L	N/A		(0%-10%)		
Cadmium	B	4.26	DU	0.499	ug/L	N/A		(0%-10%)		
Calcium		97200	D	20400	ug/L	5.2		(0%-10%)		
Chromium	*	355	D	74.7	ug/L	5.35		(0%-10%)		
Cobalt	D	14.9	D	3.00	ug/L	.673		(0%-10%)		05/29/14 16:58
Copper	*	308	D	62.1	ug/L	.887		(0%-10%)		05/28/14 18:16
Iron		192000	D	40900	ug/L	6.82		(0%-10%)		
Lead	DU	3.24	DU	8.24	ug/L	N/A		(0%-10%)		05/29/14 16:58
Magnesium		48600	D	10200	ug/L	4.46		(0%-10%)		05/28/14 18:16
Manganese		2890	D	614	ug/L	6.39		(0%-10%)		
Molybdenum	B	3.37	DU	0.999	ug/L	N/A		(0%-10%)		
Nickel		112	D	23.5	ug/L	5.03		(0%-10%)		
Potassium	N	11700	D	2440	ug/L	4.31		(0%-10%)		
Silicon	N	7400	D	1590	ug/L	7.21		(0%-10%)		
Silver	U	-4.71	DU	0.499	ug/L	N/A		(0%-10%)		
Sodium		3660	D	709	ug/L	3.22		(0%-10%)		05/29/14 08:16

QC Summary

Workorder: 349312 **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1390696										
Vanadium	DN	83.9	D	16.5	ug/L	1.51		(0%-10%)	HSC	05/29/14 16:58
Zinc	DN	240	D	48.7	ug/L	1.32		(0%-10%)		
Metals Analysis-Mercury										
Batch 1391070										
QC1203096494 349312001 DUP										
Mercury	U	0.00391	U	0.00394	mg/kg	N/A			NOR1	05/28/14 11:48
QC1203096487 LCS										
Mercury	0.117			0.120	mg/kg		102	(80%-120%)		05/28/14 10:51
QC1203096486 MB										
Mercury			U	0.00402	mg/kg					05/28/14 10:50
QC1203096495 349312001 MS										
Mercury	0.118 U	0.00391		0.123	mg/kg		103	(80%-120%)		05/28/14 11:50
QC1203096496 349312001 SDILT										
Mercury	U	0.033	DU	0.0196	ug/L	N/A		(0%-10%)		05/28/14 11:51

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

QC Summary

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

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

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

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: **1390695**
Analyst: Jack Mabry
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 23
Instrument: BAL-893

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203095542	Metals Spike Mix I	UI2087791-01	.25	mL
LCS	1203095542	Metals Spike Mix II	UI2087793-06	.25	mL
MS	1203095544	Metals Spike Mix I	UI2087791-01	.25	mL
MS	1203095544	Metals Spike Mix II	UI2087793-06	.25	mL
MS	1203095547	Metals Spike Mix I	UI2087791-01	.25	mL
MS	1203095547	Metals Spike Mix II	UI2087793-06	.25	mL
MS	1203095550	Metals Spike Mix I	UI2087791-01	.25	mL
MS	1203095550	Metals Spike Mix II	UI2087793-06	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203095541 MB	27-MAY-2014 07:30:06	Oil	0.519	50	96.33911
1203095542 LCS	27-MAY-2014 07:30:06	Oil	0.529	50	94.51796
349309001	27-MAY-2014 07:30:06	Soil	0.569	50	87.87346
1203095546 DUP (349309001)	27-MAY-2014 07:30:06	Soil	0.559	50	89.44544
1203095547 MS (349309001)	27-MAY-2014 07:30:06	Soil	0.583	50	85.76329
1203095548 SDILT (349309001)	27-MAY-2014 07:30:06	Soil	0.569	50	87.87346
349312001	27-MAY-2014 07:30:06	Soil	0.507	50	98.61933
1203095549 DUP (349312001)	27-MAY-2014 07:30:06	Soil	0.517	50	96.7118
1203095550 MS (349312001)	27-MAY-2014 07:30:06	Soil	0.519	50	96.33911
1203095551 SDILT (349312001)	27-MAY-2014 07:30:06	Soil	0.507	50	98.61933
349313001	27-MAY-2014 07:30:06	Oil	0.521	50	95.96929
1203095543 DUP (349313001)	27-MAY-2014 07:30:06	Oil	0.508	50	98.4252
1203095544 MS (349313001)	27-MAY-2014 07:30:06	Oil	0.517	50	96.7118
1203095545 SDILT (349313001)	27-MAY-2014 07:30:06	Oil	0.521	50	95.96929

Reagent/Solvent Lot ID	Description	Amount
2108818	HYDROCHLORIC ACID	10 mL
2108826	Concentrated Nitric Acid	1.25 mL

Comments:

Block Temperature: 94 C

Thermometer ID: 118840

Hot Block ID: 9

Fine gray soil with gray rocks.

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: **1390816**
Analyst: Jack Mabry
Method: SW846 3050B
Lab SOP: GL-MA-E-009 REV# 23
Instrument: BAL-893

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203095820	ICP-MS spiking soluiton A	UI2087809-A	.25	mL
LCS	1203095820	ICP-MS spiking solution B	UI2091844-B	.25	mL
MS	1203095822	ICP-MS spiking soluiton A	UI2087809-A	.25	mL
MS	1203095822	ICP-MS spiking solution B	UI2091844-B	.25	mL
MS	1203095825	ICP-MS spiking soluiton A	UI2087809-A	.25	mL
MS	1203095825	ICP-MS spiking solution B	UI2091844-B	.25	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203095819 MB	27-MAY-2014 07:30:53	Soil	0.54	50	92.59259
1203095820 LCS	27-MAY-2014 07:30:53	Soil	0.519	50	96.33911
349309001	27-MAY-2014 07:30:53	Soil	0.505	50	99.0099
1203095821 DUP (349309001)	27-MAY-2014 07:30:53	Soil	0.522	50	95.78544
1203095822 MS (349309001)	27-MAY-2014 07:30:53	Soil	0.511	50	97.84736
1203095823 SDILT (349309001)	27-MAY-2014 07:30:53	Soil	0.505	50	99.0099
349312001	27-MAY-2014 07:30:53	Soil	0.517	50	96.7118
1203095824 DUP (349312001)	27-MAY-2014 07:30:53	Soil	0.5	50	100
1203095825 MS (349312001)	27-MAY-2014 07:30:53	Soil	0.502	50	99.60159
1203095826 SDILT (349312001)	27-MAY-2014 07:30:53	Soil	0.517	50	96.7118

Reagent/Solvent Lot ID	Description	Amount
1976094-02	Hydrogen Peroxide 30%	1.5 mL
2108826	Concentrated Nitric Acid	5 mL

Comments:

Block Temperature: 93 C

Thermometer ID: 61066-a1

Hot Block ID: 8

Fine gray soil with gray rocks.

Prep Logbook

Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer

Batch ID: **1391067**
Analyst: Alan Stanley
Method: SW846 7471B Prep
Lab SOP: GL-MA-E-010 REV# 27
Instrument: Metals Manual Instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203096487	MHGSOILMSSPIKE	WHG140527-14	.3	mL
MS	1203096489	MHGSOILMSSPIKE	WHG140527-14	.3	mL
MS	1203096492	MHGSOILMSSPIKE	WHG140527-14	.3	mL
MS	1203096495	MHGSOILMSSPIKE	WHG140527-14	.3	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203096486 MB	27-MAY-2014 17:02:02	Soil	0.5	30	60
1203096487 LCS	27-MAY-2014 17:02:02	Soil	0.512	30	58.59375
348185001	27-MAY-2014 17:02:02	Soil	0.521	30	57.58157
1203096488 DUP (348185001)	27-MAY-2014 17:02:02	Soil	0.508	30	59.05512
1203096489 MS (348185001)	27-MAY-2014 17:02:02	Soil	0.503	30	59.64215
1203096490 SDILT (348185001)	27-MAY-2014 17:02:02	Soil	0.521	30	57.58157
348185002	27-MAY-2014 17:02:02	Soil	0.543	30	55.24862
348185003	27-MAY-2014 17:02:02	Soil	0.516	30	58.13953
348185004	27-MAY-2014 17:02:02	Soil	0.537	30	55.86592
348185005	27-MAY-2014 17:02:02	Soil	0.538	30	55.76208
348185006	27-MAY-2014 17:02:02	Soil	0.549	30	54.64481
348185007	27-MAY-2014 17:02:02	Soil	0.582	30	51.54639
348185008	27-MAY-2014 17:02:02	Soil	0.506	30	59.28854
348185009	27-MAY-2014 17:02:02	Soil	0.502	30	59.76096
348185010	27-MAY-2014 17:02:02	Soil	0.518	30	57.91506
348185011	27-MAY-2014 17:02:02	Soil	0.554	30	54.15162
348185012	27-MAY-2014 17:02:02	Soil	0.522	30	57.47126
349309001	27-MAY-2014 17:02:02	Soil	0.512	30	58.59375
1203096491 DUP (349309001)	27-MAY-2014 17:02:02	Soil	0.513	30	58.47953
1203096492 MS (349309001)	27-MAY-2014 17:02:02	Soil	0.502	30	59.76096
1203096493 SDILT (349309001)	27-MAY-2014 17:02:02	Soil	0.512	30	58.59375
349312001	27-MAY-2014 17:02:02	Soil	0.52	30	57.69231
1203096494 DUP (349312001)	27-MAY-2014 17:02:02	Soil	0.517	30	58.02708
1203096495 MS (349312001)	27-MAY-2014 17:02:02	Soil	0.516	30	58.13953
1203096496 SDILT (349312001)	27-MAY-2014 17:02:02	Soil	0.52	30	57.69231

Reagent/Solvent Lot ID	Description	Amount

Comments:

Prep Logbook

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)

Reagent/Solvent Lot ID	Description	Amount
140401-C	5% KMnO4 solution	7.5 mL
140522-1	NITRIC ACID	.375 mL
2072331-C	Hg reducing agent	2 mL
2108387-A	Hydrochloric Acid Conc.	1.125 mL
WHG140527-07	Mercury Working Standard 1st Source CAL S 0.2/CRA	30 uL
WHG140527-08	Mercury Working Standard 1st Source CAL S 0.5	75 uL
WHG140527-09	Mercury Working 1st Source CAL S 2.0	300 uL
WHG140527-10	Mercury Working 1st Source CAL S 5.0/CCV	750 uL
WHG140527-11	Mercury Working 1st Source CAL S 10.0	1500 uL
WHG140527-12	Mercury Working 2nd Source S 5.0/ICV	750 uL

Comments:

Digestion Start Date: 27-MAY-2014 17:02

Digestion End Date: 27-MAY-2014 17:32

Block Temperature: 95 C

Thermometer ID: 119131

Hot Block ID: 6

The first QC was a brown soil like material. The second QC was a small pebble like material. The third QC was a light brown soil like material.

General Chem Analysis

Case Narrative

General Chemistry Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0095

Method/Analysis Information

Product:	**Ion Chromatography**		
Analytical Batch:	1391170	**Method:**	SW846 9056A Anions
Prep Batch :	1391169	**Method:**	SW846 9056A

Sample Analysis

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

Sample ID	Client ID
349312001	J1TR45
1203096781	Method Blank (MB)
1203096782	349312001(J1TR45) Sample Duplicate (DUP)
1203096783	349312001(J1TR45) Matrix Spike (MS)
1203096784	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# 22.

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)
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 sample was selected for QC analysis: 349312001 (J1TR45).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recovery for this sample set was within the required acceptance limits.

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
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
Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integrations
The following samples from this sample group had to be manually integrated due to errors in the instrument software peak integration: 1203096782 (J1TR45) and 349312001 (J1TR45).

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:	1391953	**Method:**	SW846_7196A Hexavalent Chromium
Prep Batch :	1391951	**Method:**	SW846 3060A

Sample Analysis

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

Sample ID	Client ID
349312001	J1TR45
1203098651	Method Blank (MB)
1203098652	349312001(J1TR45) Sample Duplicate (DUP)
1203098653	349312001(J1TR45) Matrix Spike (MS)
1203098655	349312001(J1TR45) Matrix Spike Duplicate (MSD)
1203098657	Laboratory Control Sample (LCS)
1203098658	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# 19.

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 sample was selected for QC analysis: 349312001 (J1TR45).

Matrix Spike (MS)/Post Spike (PS) Recovery Statement
The MS/PS recovery for this sample set was within the required acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement
The MSD recovery for this sample set was within the required acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement
The RPD between the spike and spike duplicate met the acceptance limits.

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
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
Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for 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.

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:**_____30May14_____

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: XP0095 GEL Work Order: 349312 Project: RC-189 Soil

The Qualifiers in this report are defined as follows:

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 _____

GEL LABORATORIES LLC

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

Certificate of Analysis

Report Date: May 30, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-189 Soil

Client SDG: XP0095

Client Sample ID: J1TR45
Sample ID: 349312001
Matrix: SOIL
Collect Date: 21-MAY-14 13:29
Receive Date: 23-MAY-14
Collector: Client
Moisture: 1.25%

Project: WCHN00613
Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography											
SW846 9056A Anions "Dry Weight Corrected"											
Bromide	U	0.664	0.664	1.98	mg/kg	1	DM	05/27/14	1848	1391170	1
Chloride		3.30	0.664	1.98	mg/kg	1					
Fluoride	U	0.327	0.327	0.990	mg/kg	1					
Nitrate-N		3.92	0.327	0.990	mg/kg	1					
Nitrite-N	U	0.327	0.327	0.990	mg/kg	1					
O-Phosphate as P	U	0.664	0.664	1.98	mg/kg	1					
Sulfate		22.1	1.32	3.96	mg/kg	1					
Spectrometric Analysis											
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"											
Hexavalent Chromium	U	0.121	0.121	0.403	mg/kg	1	EXM3	05/30/14	0810	1391953	2

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	EXM3	05/29/14	1710	1391951
SW846 9056A	SW846 9056A Total Anions in Soil	DM	05/27/14	1400	1391169

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 9056A	
2	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: May 30, 2014

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

Contact: **Joan Kessner**

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography										
Batch 1391170										
QC1203096782 349312001 DUP										
Bromide	U	0.664	U	0.670	mg/kg	N/A			DM	05/27/14 19:18
Chloride		3.30		3.33	mg/kg	0.953 ^		(+/-2.00)		
Fluoride	U	0.327	U	0.330	mg/kg	N/A				
Nitrate-N		3.92		3.78	mg/kg	3.65 ^		(+/-1.00)		
Nitrite-N	U	0.327	U	0.330	mg/kg	N/A				
O-Phosphate as P	U	0.664	U	0.670	mg/kg	N/A				
Sulfate		22.1		21.5	mg/kg	2.96		(0%-20%)		
QC1203096784 LCS										
Bromide	12.5			13.1	mg/kg		105	(90%-110%)		05/27/14 18:18
Chloride	50.0			48.9	mg/kg		97.7	(90%-110%)		
Fluoride	25.0			25.6	mg/kg		102	(90%-110%)		
Nitrate-N	25.0			24.9	mg/kg		99.6	(90%-110%)		
Nitrite-N	25.0			25.0	mg/kg		100	(90%-110%)		
O-Phosphate as P	12.5			13.6	mg/kg		108	(90%-110%)		
Sulfate	100			99.8	mg/kg		99.8	(90%-110%)		
QC1203096781 MB										
Bromide			U	0.670	mg/kg					05/27/14 17:48
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					

GEL LABORATORIES LLC

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QC Summary

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Ion Chromatography											
Batch 1391170											
O-Phosphate as P				U	0.670	mg/kg				DM	05/27/14 17:48
Sulfate				U	1.33	mg/kg					
QC1203096783 349312001 MS											
Bromide	12.4	U	0.664		11.7	mg/kg		94.3	(70%-134%)		05/27/14 19:48
Chloride	49.5		3.30		49.1	mg/kg		92.5	(46%-150%)		
Fluoride	24.8	U	0.327		22.7	mg/kg		91.6	(34%-134%)		
Nitrate-N	24.8		3.92		30.7	mg/kg		108	(68%-129%)		
Nitrite-N	24.8	U	0.327		22.6	mg/kg		90.7	(68%-130%)		
O-Phosphate as P	12.4	U	0.664		12.1	mg/kg		95.6	(26%-124%)		
Sulfate	99.0		22.1		117	mg/kg		96	(50%-151%)		
Spectrometric Analysis											
Batch 1391953											
QC1203098652 349312001 DUP											
Hexavalent Chromium				U	0.118	mg/kg	N/A		(+/-0.393)	EXM3	05/30/14 08:12
QC1203098658 ILCS											
Hexavalent Chromium	7.58				6.21	mg/kg		81.9	(80%-120%)		05/30/14 07:55
QC1203098657 LCS											
Hexavalent Chromium	3.99				3.67	mg/kg		91.8	(80%-120%)		05/30/14 07:46
QC1203098651 MB											
Hexavalent Chromium				U	0.118	mg/kg					05/30/14 07:45
QC1203098653 349312001 MS											
Hexavalent Chromium	4.03				3.40	mg/kg		82.5	(75%-125%)		05/30/14 08:14
QC1203098655 349312001 MSD											
Hexavalent Chromium	3.97				3.17	mg/kg	7.16	77.9	(0%-30%)		05/30/14 08:17

Notes:

The Qualifiers in this report are defined as follows:

> Result greater than quantifiable range or greater than upper limit of the analysis range

QC Summary

Workorder: **349312** **Client SDG:** XP0095 **Project Description:** RC-189 Soil

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

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 or %RPD not applicable.
^ 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: 1390580
Analyst: KYW2
Date/Time: 23-MAY-2014
Procedure Code DRY WEIGHT
Procedure Description Dry Weight-Percent Moisture
Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1203095310	**4.273**

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 (%)
349309001	SAMPLE		BALHD2000D	15:48	7.074	43.988	43.407	36.914	36.333	1.57
349312001	SAMPLE		BALHD2000D	15:48	7.056	35.119	34.768	28.063	27.712	1.25
349317001	SAMPLE		BALHD2000D	15:48	7.086	44.756	36.854	37.67	29.768	21
1203095310	DUP	349317001	BALHD2000D	15:48	6.957	44.136	36.659	37.179	29.702	20.1

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

Prep Logbook

Colorimetric Determination of Hexavalent Chromium

Batch ID: **1391951**
Analyst: Erin McCance
Method: SW846 3060A
Lab SOP: GL-GC-E-044 REV# 19
Instrument: Sartorius Balance B-001

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
ILCS	1203098658	100mg/kg for cr6	IMM140123-HVC	.08	g
LCS	1203098657	Cr6 LCS 10mg/L	WD140529-1	.4	mL
MS	1203098653	Cr6 Intermediate Spike 10mg/L	140529-Cr6	.4	mL
MS	1203098654	Cr6 Intermediate Spike 10mg/L	140529-Cr6	.4	mL
MSD	1203098655	Cr6 Intermediate Spike 10mg/L	140529-Cr6	.4	mL
MSD	1203098656	Cr6 Intermediate Spike 10mg/L	140529-Cr6	.4	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)	pH Check
1203098651 MB	29-MAY-2014 17:10:00	Soil	1.0157	40	39.38171	7.5
1203098657 LCS	29-MAY-2014 17:10:00	Soil	1.0015	40	39.94009	7.5
1203098658 ILCS	29-MAY-2014 17:10:00	Soil	1.0549	40	37.91829	7.5
349312001	29-MAY-2014 17:10:00	Soil	1.0039	40	39.84461	7.5
1203098652 DUP (349312001)	29-MAY-2014 17:10:00	Soil	1.0295	40	38.85381	7.5
1203098653 MS (349312001)	29-MAY-2014 17:10:00	Soil	1.0045	40	39.82081	7.5
1203098655 MSD (349312001)	29-MAY-2014 17:10:00	Soil	1.0215	40	39.1581	7.5
1203098654 MS (349312001)	29-MAY-2014 17:10:00	Soil	1.0211	40	39.17344	7.5
1203098656 MSD (349312001)	29-MAY-2014 17:10:00	Soil	1.0565	40	37.86086	7.5

Reagent/Solvent Lot ID	Description	Amount
140109-C	MAGNESIUM CHLORIDE SOLUTION FOR CR+6	1 mL
IMM140325-HVC	5M Nitric Acid Solution for Cr+6	2 mL
IMM140515b-HVCS	DIGESTION SOLUTION FOR CR+6	20 mL
IMM140521-HVCS	PHOSPHATE BUFFER SOLUTION FOR CR+6	.5 mL

Comments:

Prep Logbook

Ion Chromatography (IC)

Batch ID: **1391169**
Analyst: Dustin Miller
Method: SW846 9056A
Lab SOP: GL-GC-E-086 REV# 22
Instrument: No analytical instrument

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1203096784	Spiking Solution	UIC140524SPK	.4	mL
MS	1203096783	Spiking Solution	UIC140524SPK	.4	mL

Sample ID	Run Date	Matrix	Initial Weight (g)	Final Volume (mL)	Prep Factor (mL/g)
1203096781 MB	27-MAY-2014 14:00:21	Soil	4	40	10
1203096784 LCS	27-MAY-2014 14:00:21	Soil	4	40	10
349312001	27-MAY-2014 14:00:21	Soil	4.09	40	9.77995
1203096782 DUP (349312001)	27-MAY-2014 14:00:21	Soil	4.05	40	9.87654
1203096783 MS (349312001)	27-MAY-2014 14:00:21	Soil	4.09	40	9.77995

Reagent/Solvent Lot ID	Description	Amount

Comments: