0100815

SAF-RC-154
618-10 & 618-11 Field Remediation – Soil In-Process
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Kathy Wendt H4-21 KW 11/22/11
INITIAL/DATE

COMMENTS:

SDG D1132503 SAF-RC-154

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

Sample Location/Waste Site: 618-10 Telehandler Eng. Compartment

RECEIVED
JAN 13 2012
EDMC

Cover

RECEIVED
NOV 2011

Report Identification Number: D1132503
Subcontract Number: S003827A00
Name of Industrial Hygienist:
Laboratory Identification Number: DCHM
SAF#: RC-154 / 618-10 & 618-11 Field Remediation
Sample Receipt Date: 11/18/2011

Sample Information

Sample Date	Customer Sample Number	Laboratory Sample Number	Method	Analytical Batch Identification	Sample Matrix
11/15/2011	J1MM93	1132503001	NIOSH 7300 Mod.	77191	Bulk

I certify that this electronic image and all hardcopies produced from this image accurately represent the data and are in compliance with the contract specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager or the Manager's designee.

Name: Penny A. Foote
Title: Chemist
Date: November 22, 2011

Case Narrative

Report Identification Number: D1132503
Subcontract Number: S003827A00
Name of Industrial Hygienist:
Laboratory Identification Number: DCHM
SAF#: RC-154 / 618-10 & 618-11 Field Remediation
Sample Receipt Date: 11/18/2011

General Workorder Information: There is one sample in workorder 1132503 which was analyzed for panel B and antimony in bulk. No problems were encountered with the receipt of these samples and no contact with the CTR was required.

Method Summary: Transferred 0.25 g portions of each bulk sample or MCE filter submitted as a sample to 50 mL centrifuge tube that were digested in the presence of 10 mL of concentrated nitric acid. In cases where the total sample available was less than 0.25 g, the total sample was transferred and digested. Samples were digested in a hot block set at 116 °C for at least 60 minutes. After digestion was complete, the samples were quantitatively transferred to 50mL centrifuge tubes and then diluted to a 50 mL volume with ASTM Type II Water. Samples were shaken and delivered for ICP analysis.

Sample Preparation: All samples were prepared in accordance with DCL SOP "IH-AN-021" and NIOSH method NMAM 7300 modified for hot block digestion.

Holding Times: The holding times were met for both sample preparation and analysis.

Instrument Calibration: Instrument calibration was performed in accordance with NIOSH method NMAM 7300.

Initial and Continuing Calibration Verification Analysis: All spiked analyte recoveries in all Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV) samples are within the quality control limits of +/- 10%.

Initial and Continuing Calibration Blank Analysis: None of the requested analytes were found in the Initial Calibration Blank (ICB) or Continuing Calibration Blanks (CCB) at levels above the respective Limit of Quantitation (LOQ). See the report for reported Limit of Quantitation (LOQ) of each analyte.

Method Blank Analysis: None of the requested analytes were found in the reagent blank sample above the Contract Required Detection Limit (CRDL). None of the requested analytes were found in the media blank sample above the Contract Required Detection Limit (CRDL).

Dilution(s): None were required.

Laboratory Control Sample and Duplicate Analysis: One Laboratory Control Samples (LCS) and one Laboratory Control Sample Duplicates (LCSD) were prepared and analyzed with these samples.

The LCS results were within the control limit of +/- 20%. The Relative Percent Differences (RPD) between the LCS results and the LCSD results were within the control limit of 20%.

Replicate Analysis: This sample was replicated in the analytical run. The RPDs between the sample and replicate were within the control limit of 20%. If the result of the sample or replicate is below the CRDL, replicate analysis is negligible.

Flagging Codes: None.

Nonconformance/Corrective Action Report (NC/CAR): None.

Sample Calculation: The final results are calculated by the following equation:

Final result for aqueous samples (μg/g) = (A) x (B) x (C)

Where:

A = Analyte concentration from instrument determination (μg/L)

B = Concentration factor from sample preparation

$$= \frac{\text{Final Volume of Digestate (L)}}{\text{Sample(g)}}$$

C = Dilution performed at time of analysis

Example Calculation: (1 μg/L) x (0.050L/0.25g) x (1) = 0.2 μg/g

Miscellaneous Comments: See below for weight and source of weight for the sample in this workorder.

Sample	Weight (grams)	Weight Source
1132503001 (J1MM93)	0.2508	Bulk

Results

Report Identification Number: D1132503
Subcontract Number: S003827A00
Name of Industrial Hygienist:
Laboratory Identification Number: DCHM
SAF#: RC-154 / 618-10 & 618-11 Field Remediation
Sample Receipt Date: 11/18/2011

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Aluminum ug/g	Antimony ug/g	Arsenic ug/g
J1MM93	1132503001	11/21/2011	6400	(6.5) J	<10 U
Limit of Detection (LOD)			20	4	10
Required Detection Limit (RDL)			70	10	50

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Beryllium ug/g	Cadmium ug/g	Calcium ug/g
J1MM93	1132503001	11/21/2011	0.29	1.1	29000
Limit of Detection (LOD)			0.06	0.3	40
Required Detection Limit (RDL)			0.2	0.9	100

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Chromium ug/g	Cobalt ug/g	Copper ug/g
J1MM93	1132503001	11/21/2011	12	9.7	210
Limit of Detection (LOD)			4	0.3	0.6
Required Detection Limit (RDL)			10	0.9	2

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Iron ug/g	Lead ug/g	Lithium ug/g
J1MM93	1132503001	11/21/2011	15000	22	<3 U
Limit of Detection (LOD)			30	4	3
Required Detection Limit (RDL)			90	10	10

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Magnesium ug/g	Manganese ug/g	Molybdenum ug/g
J1MM93	1132503001	11/21/2011	9700	330	3.6
Limit of Detection (LOD)			2	0.9	0.6
Required Detection Limit (RDL)			6	3	2

Results

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Nickel ug/g		Phosphorus ug/g		Platinum ug/g	
J1MM93	1132503001	11/21/2011	13		890		<3	U
Limit of Detection (LOD)			0.4		7		3	
Required Detection Limit (RDL)			1		20		10	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Selenium ug/g		Silver ug/g		Sodium ug/g	
J1MM93	1132503001	11/21/2011	<4	U	(1.6)	J	480	
Limit of Detection (LOD)			4		0.6		9	
Required Detection Limit (RDL)			10		2		30	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Tellurium ug/g		Thallium ug/g		Titanium ug/g	
J1MM93	1132503001	11/21/2011	<2	U	<3	U	770	
Limit of Detection (LOD)			2		3		0.2	
Required Detection Limit (RDL)			8		9		0.8	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Vanadium ug/g		Yttrium ug/g		Zinc ug/g	
J1MM93	1132503001	11/21/2011	27		8.0		520	
Limit of Detection (LOD)			0.2		0.1		1	
Required Detection Limit (RDL)			0.5		0.5		5	

Customer Sample Number	Laboratory Sample Number	Date Analyzed	Zirconium ug/g		Air Volume grams	
J1MM93	1132503001	11/21/2011	18		**	
Limit of Detection (LOD)			2		NA	
Required Detection Limit (RDL)			5		NA	

U - Parameter not detected above LOD
J - Parameter between LOD and RDL
** - Not provided or unable to calculate
NA - Not Applicable

QC Summary

Report Identification Number: D1132503
Subcontract Number: S003827A00
Name of Industrial Hygienist:
Laboratory Identification Number: DCHM
SAF#: RC-154 / 618-10 & 618-11 Field Remediation
Sample Receipt Date: 11/18/2011

Batch ID: 77191

QC Sample ID	QC Type	Analyte	Units	Result	Parent Result	Target	Percent Rec.	Relative Percent Diff.
248417	LCS	Arsenic	ug/g	815.	NA	800.	102.	NA
248417	LCS	Beryllium	ug/g	82.9	NA	80.0	104.	NA
248417	LCS	Cadmium	ug/g	83.2	NA	80.0	104.	NA
248417	LCS	Cobalt	ug/g	85.1	NA	80.0	106.	NA
248417	LCS	Chromium	ug/g	834.	NA	800.	104.	NA
248417	LCS	Copper	ug/g	87.8	NA	80.0	110.	NA
248417	LCS	Iron	ug/g	854.	NA	800.	107.	NA
248417	LCS	Magnesium	ug/g	811.	NA	800.	101.	NA
248417	LCS	Manganese	ug/g	831.	NA	800.	104.	NA
248417	LCS	Nickel	ug/g	85.2	NA	80.0	107.	NA
248417	LCS	Lead	ug/g	841.	NA	800.	105.	NA
248417	LCS	Selenium	ug/g	853.	NA	800.	107.	NA
248417	LCS	Molybdenum	ug/g	86.4	NA	80.0	108.	NA
248417	LCS	Silver	ug/g	859.	NA	800.	107.	NA
248417	LCS	Phosphorus	ug/g	825.	NA	800.	103.	NA
248417	LCS	Titanium	ug/g	82.9	NA	80.0	104.	NA
248417	LCS	Zinc	ug/g	798.	NA	800.	99.7	NA
248417	LCS	Antimony	ug/g	813.	NA	800.	102.	NA
248418	LCSD	Arsenic	ug/g	827.	815.	800.	103.	1.48
248418	LCSD	Beryllium	ug/g	85.0	82.9	80.0	106.	2.46
248418	LCSD	Cadmium	ug/g	85.6	83.2	80.0	107.	2.83
248418	LCSD	Cobalt	ug/g	86.8	85.1	80.0	109.	2.07
248418	LCSD	Chromium	ug/g	855.	834.	800.	107.	2.52
248418	LCSD	Copper	ug/g	90.1	87.8	80.0	113.	2.53
248418	LCSD	Iron	ug/g	875.	854.	800.	109.	2.42
248418	LCSD	Magnesium	ug/g	830.	811.	800.	104.	2.30
248418	LCSD	Manganese	ug/g	852.	831.	800.	106.	2.46
248418	LCSD	Nickel	ug/g	86.6	85.2	80.0	108.	1.55
248418	LCSD	Lead	ug/g	855.	841.	800.	107.	1.72
248418	LCSD	Selenium	ug/g	860.	853.	800.	107.	0.792
248418	LCSD	Molybdenum	ug/g	86.5	86.4	80.0	108.	0.202
248418	LCSD	Silver	ug/g	883.	859.	800.	110.	2.75

QC Summary

248418	LCSD	Phosphorus	ug/g	833.	825.	800.	104.	1.04
248418	LCSD	Titanium	ug/g	83.9	82.9	80.0	105.	1.18
248418	LCSD	Zinc	ug/g	816.	798.	800.	102.	2.22
248418	LCSD	Antimony	ug/g	818.	813.	800.	102.	0.559

MB - Method Blank
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MSD - Matrix Spike Duplicate
LD - Laboratory Duplicate

NA - Not Applicable
ND - Parameter not detected above LOD

LCS, LCSD Percent Rec. = (Result / Target) * 100.0
MS, MSD Percent Rec. = ((Result – Parent) / Target) * 100.0

LCS, LCSD Relative Percent Diff. = ((|LCS – LCSD|) / ((LCS + LCSD)/2.0)) * 100.
MS, MSD Relative Percent Diff. = ((|MS – MSD|) / ((MS+ MSD)/2.0)) * 100.
LD Relative Percent Diff. = ((|Parent – LD|) / ((Parent + LD)/2.0)) * 100

3298 / #3

1132503

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-154-089 | Page 1 of 1

Collector: Matt Blakningship	Company Contact: Joan Kessner	Telephone No.: 509-375-4688	Project Coordinator: KESSNER, JH
Project Designation: 618-10 & 618-11 Field Remediation - Soil In-Process	Sampling Location: 618-10 Telehandler Eng. Compartment		SAF No.: RC-154
Ice Chest No.: ~~N/A~~ WCH-11-087	Field Logbook No.: EL-1648-01	COA: I618DT8100	Method of Shipment: Fed Ex
Shipped To: ALS Laboratories - Salt Lake City ~~RCF~~ AJ 11-16-11	Offsite Property No.: A100602		Bill of Lading/Air Bill No.: See OSPC

Price Code: ~~8L~~ 11-15-11 CMB 8A

Data Turnaround: SV 11/15/11 ~~7 Days~~ ASAP

1132503

POSSIBLE SAMPLE HAZARDS/REMARKS

~~Potential~~ Radioactive, Be < DOT Limits

AJ 11-16-11 AJ 11-15-11

Special Handling and/or Storage

NONE SV 11/15/11

Preservation	None	None ~~Cool 4°C~~ AJ 11-16-11											
Type of Container	aG	aG											
No. of Container(s)	1	1											
Volume	60mL	60mL											
SAMPLE ANALYSIS	RCF/SEA Shipping Screen AJ 11-16-11	NIOSH 7300											
Sample No.	Matrix *	Sample Date	Sample Time			RCF							
J1MM93	SOIL	11-15-11	1030	X	X	30860	71g						

CHAIN OF POSSESSION

Relinquished By/Removed From	Date/Time	Sign/Print Names	Received By/Stored In	Date/Time
MBLANKINGSHIP	11/15/11 1045	S. van Den Hende	11/15/11 1045	
S. van Den Hende	11/15/11 1255	Binghum	11/15/11 1255	
WCH	11/15/11 1400	Rechmann	11-15-11 1400 RCF	
Rechmann	11-16-11 0955	A. Freier A. Freier	11-16-11 0955	
A. Freier A. Freier	11-16-11 1020	Fed Ex		
		[signature]	11-18-11	

SPECIAL INSTRUCTIONS

Contact Joan Kessner for clarification on analysis. Metals analysis shall be run as NIOSH 7300 Method (28 metals list).

This sample will trans-ship from RCF to ALS-SL. Please contact J. Kessner with questions. SV 11/15/11

Matrix *: S=Soil, SE=Sediment, SO=Solid, Sl=Sludge, W=Water, O=Oil, A=Air, DS=Drum Solids, DL=Drum Liquids, T=Tissue, WI=Wipe, L=Liquid, V=Vegetation, X=Other

LABORATORY SECTION	Received By	Title 10:30	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

REVIEWED BY CMB DATE 11/16/11

WCH-EE-011

COC

COC

Project Shipment Specific Client/Shipper's Notification of Sample Radioactivity

Please complete this form and include it with each shipment.

Sample Number/RCF Number: JIMM93 / RCF308160

Shipment Date: 11-16-11

All samples shipped in this cooler have been screened for radioactivity. All samples have activity less than:

Total Activity	Gross Alpha Activity	Gross Beta/Gamma Activity
<1500 pCi/g	<500 pCi/sample	<1000 pCi/Sample

I certify that the samples shipped to DataChem are below the criteria above.

WCH Signature : Jon H Kessner Date: 11/15/11

Any samples in the shipment which have activity above the levels specified above require DataChem approval prior to shipment in accordance with the DataChem SOP WA-DC-002.

DataChem Nuclear Material License UT 1800237

This release has been authorized by Robert P. Di Rienzo, DataChem Radiation Safety Officer on December 6, 2007.

Apex™

11/15/2011 3:18:23PM Page 1 of 4

Analysis Report for RCF30860
J1MM93 SAF:RC-154 618-10 Telehandler Eng. Compartment 60ml aG

GAMMA SPECTRUM ANALYSIS

Sample Identification	: RCF30860
Sample Description	: J1MM93 SAF:RC-154 618-10 Telehandler Eng. Compartment 60ml aG
Sample Type	: Non Standard Geometry
Sample Size	: 7.100E+01 grams
Facility	: Default
Sample Taken On	: 11/15/2011 10:30:00AM
Acquisition Started	: 11/15/2011 2:18:04PM
Procedure	: Non Standard Geometry
Operator	: RCT
Detector Name	: PGTLYNX
Geometry	: Non Standard Geometry
Live Time	: 3600.0 seconds
Real Time	: 3602.5 seconds
Dead Time	: 0.07 %
Peak Locate Threshold	: 3.00
Peak Locate Range (in channels)	: 40 - 4096
Peak Area Range (in channels)	: 40 - 4096
Identification Energy Tolerance	: 1.000 keV
Energy Calibration Used Done On	: 3/3/2011
Efficiency Calibration Used Done On	: 3/11/2011
Efficiency Calibration Description	: PGTL NSTD 030711EC SN28751A-238
Sample Number	: 21077

"Qualitative Only"

INTERFERENCE CORRECTED REPORT

	Nuclide Name		Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
	K-40		1.000	9.33E+00	1.93E+00	
	PB-212		0.711	3.13E-01	1.00E-01	
	RA-226d	@	0.675	3.91E-01	1.02E-01	
	TH-232d		0.849	3.51E-01	9.90E-02	
X	U-235		0.548			

Analysis Report for RCF30860

J1MM93 SAF:RC-154 618-10 Telehandler Eng. Compartment 60ml aG

Nuclide Name	Nuclide Id Confidence	Wt mean Activity (pCi/grams)	Wt mean Activity Uncertainty	Comments
U-238d	0.333	7.03E-01	7.76E-01	

? = nuclide is part of an undetermined solution
X = nuclide rejected by the interference analysis
@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000 sigma

UNIDENTIFIED PEAKS

Peak Locate Performed on : 11/15/2011 3:18:09PM
Peak Locate From Channel : 40
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide

All peaks were identified.

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet
Errors quoted at 2.000 sigma

NUCLIDE MDA REPORT

Nuclide Library Used : \\WC98582\ApexRoot\Default\Library\RCF Unknown.NLB

	Nuclide Name	Energy (keV)		Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
+	K-40	1460.83	*	10.67	9.33E+00	1.68E+00	1.68E+00
	CO-60	1173.24		99.90	6.22E-03	1.62E-01	1.62E-01
		1332.50		99.98	7.51E-02		1.79E-01
	NB-94	702.63		99.81	-3.78E-02	1.27E-01	1.30E-01
		871.10		99.89	2.62E-02		1.27E-01
	AG-108m	433.94		90.50	-1.48E-03	1.05E-01	1.05E-01
		614.28		89.80	-4.85E-02		1.71E-01
		722.94		90.80	2.27E-02		1.48E-01
	CS-137	661.66		85.21	1.41E-02	1.42E-01	1.42E-01
	EU-152	40.12		38.40	4.63E-02	1.89E-01	2.66E-01
		45.38		11.10	3.09E-01		8.35E-01
		121.78		28.40	8.94E-03		1.89E-01
		244.69		7.51	-1.00E+00		1.01E+00
		344.29		26.60	-1.42E-01		2.92E-01
		411.12		2.23	5.14E-01		4.13E+00

Analysis Report for RCF30860

J1MM93 SAF:RC-154 618-10 Telehandler Eng. Compartment 60ml aG

	Nuclide Name	Energy (keV)		Yield(%)	Activity (pCi/grams)	Nuclide MDA (pCi/grams)	Line MDA (pCi/grams)
	EU-152	443.89		2.80	-7.77E-01	1.89E-01	3.37E+00
		778.92		12.98	6.82E-02		1.13E+00
		867.38		4.21	-7.06E-01		3.01E+00
		964.11		14.50	-5.44E-01		1.11E+00
		1085.89		9.94	-1.51E+00		1.51E+00
		1089.71		1.71	-6.18E+00		9.14E+00
		1112.07		13.60	-1.02E+00		1.25E+00
		1212.93		1.40	-5.29E+00		1.36E+01
		1299.16		1.63	-3.06E+00		1.03E+01
		1408.00		20.80	-5.62E-01		7.69E-01
	EU-154	123.10		40.50	-4.22E-02	1.30E-01	1.30E-01
		723.36		19.70	1.05E-01		6.84E-01
		873.23		11.45	2.84E-02		1.11E+00
		1004.78		17.90	7.47E-02		9.22E-01
		1274.54		35.50	1.16E-01		4.84E-01
	EU-155	86.54		34.00	1.12E-01	1.58E-01	1.58E-01
		105.31		20.60	-9.44E-02		2.39E-01
+	PB-212	74.81	*	10.50	3.56E-01	2.76E-01	4.48E-01
		77.11	*	17.70	2.97E-01		2.76E-01
		87.19		6.27	3.91E-01		8.49E-01
+	RA-226d	186.11	*	3.28	1.27E+00	1.87E-01	2.06E+00
		241.92		7.46	-8.97E-01		1.43E+00
		295.09	*	19.20	3.42E-01		3.74E-01
		351.87	*	37.10	4.51E-01		1.87E-01
		609.31	*	46.10	3.27E-01		2.64E-01
		1120.27		15.00	5.92E-01		1.54E+00
		1764.49		15.90	8.74E-01		1.39E+00
+	TH-232d	238.58	*	43.60	3.32E-01	1.84E-01	1.84E-01
		338.42	*	12.40	3.53E-01		7.02E-01
		583.02	*	30.87	4.22E-01		3.29E-01
		911.16	*	29.00	3.33E-01		3.96E-01
		968.97		17.40	4.33E-01		1.14E+00
	U-235	143.79		10.50	2.29E-02	1.27E-01	5.98E-01
		163.38		4.70	6.57E-01		1.33E+00
		185.74	*	53.00	7.88E-02		1.27E-01
		205.33		4.70	-5.49E-01		1.50E+00
+	U-238d	63.29		3.80	1.20E+00	1.27E+00	1.61E+00
		92.56	*	5.41	7.03E-01		1.27E+00
	AM-241	59.54		35.70	-1.49E-02	1.72E-01	1.72E-01
	CM-243	99.52		14.40	1.46E-01	2.19E-01	3.69E-01
		103.73		23.00	-7.91E-02		2.19E-01
		116.93		8.32	1.26E-01		6.99E-01
		228.19		10.56	-2.27E-01		6.50E-01
		277.60		14.00	-8.77E-02		5.95E-01
	CM-245	99.52		21.10	9.97E-02	1.50E-01	2.52E-01
		103.73		33.60	-5.42E-02		1.50E-01
		116.93		12.20	8.57E-02		4.77E-01
		174.94		9.50	-4.75E-02		5.78E-01

2011-11-21-1132503-06

Analysis Report for RCF30860

J1MM93 SAF:RC-154 618-10 Telehandler Eng. Compartment 60ml aG

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = MDA value not calculated
@ = Half-life too short to be able to perform the decay correction

DATA REVIEW COMMENTS REPORT

Creation Date	Comment	User

No Data Review Comments Entered.

JAMES T. ROLPH

NOV 15 2011

ANALYTICAL REPORT

Report Date: November 22, 2011

Joan Kessner
Washington Closure Hanford, LLC
2620 Fermi Ave.
Richland, WA 99354

Phone: (509) 375-4688

E-mail: Joan.kessner@wch-rcc.com

Workorder: **34-1132503**
Client Project ID: 618-10 & 618-11 Field Remediat
Purchase Order: 618-10 & 618-11 Fiel
Project Manager: Kevin Griffiths

Analytical Results

Sample ID: **J1MM93** Media: Bulk Collected: 11/15/2011
Lab ID: 1132503001 Sampling Location: 618-10 Telehandler E Received: 11/18/2011

Method: NIOSH 7300 Mod. **Sampling Parameter: Weight 0.2508 grams** **Prepared:** 11/21/2011 **Analyzed:** 11/21/2011

Analyte	ug/g	LOD (ug/g)	RL (ug/g)
Aluminum	**6400**	20	70
Antimony	**(6.5)**	4.0	10
Arsenic	<10	10	50
Beryllium	**0.29**	0.060	0.20
Cadmium	**1.1**	0.30	0.90
Calcium	**29000**	40	100
Chromium	**12**	4.0	10
Cobalt	**9.7**	0.30	0.90
Copper	**210**	0.60	2.0
Iron	**15000**	30	90
Lead	**22**	4.0	10
Lithium	<3.0	3.0	10
Magnesium	**9700**	2.0	6.0
Manganese	**330**	0.90	3.0
Molybdenum	**3.6**	0.60	2.0
Nickel	**13**	0.40	1.0
Phosphorus	**890**	7.0	20
Platinum	<3	3.0	10
Selenium	<4	4.0	10
Silver	**(1.6)**	0.60	2.0
Sodium	**480**	9.0	30
Tellurium	<2.0	2.0	8.0
Thallium	<3.0	3.0	9.0
Titanium	**770**	0.20	0.80

Results Continued on Next Page

ANALYTICAL REPORT

Workorder: **34-1132503**
Client Project ID: 618-10 & 618-11 Field Remediat
Purchase Order: 618-10 & 618-11 Fiel
Project Manager: Kevin Griffiths

Analytical Results

Sample ID: **J1MM93** Media: Bulk Collected: 11/15/2011
Lab ID: 1132503001 Sampling Location: 618-10 Telehandler E Received: 11/18/2011

Method: NIOSH 7300 Mod. **Sampling Parameter: Weight 0.2508 grams** **Prepared:** 11/21/2011 **Analyzed:** 11/21/2011

Analyte	ug/g	LOD (ug/g)	RL (ug/g)
Vanadium	**27**	0.20	0.50
Yttrium	**8.0**	0.10	0.50
Zinc	**520**	1.0	5.0
Zirconium	**18**	2.0	5.0

Report Authorization

Method: NIOSH 7300 Mod.

Penny A. Foote — Analyst

Peter P. Steen — Peer Review

Laboratory Contact Information

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ANALYTICAL REPORT

Workorder: **34-1132503**
Client Project ID: 618-10 & 618-11 Field Remediat
Purchase Order: 618-10 & 618-11 Fiel
Project Manager: Kevin Griffiths

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ACLASS (DoD ELAP)	AT-1421	http://www.aclasscorp.com
	Utah (NELAC)	DATA1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdw/labservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	Iowa	IA# 376	http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx
	Florida (TNI)	E871067	http://www.dep.state.fl.us/labs/bars/sas/qa/
	Texas (TNI)	T104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Lead Testing: CPSC Soil, Dust, Paint ,Air	ACLASS (ISO 17025, CPSC)	AT-1421	http://www.aclasscorp.com
	AIHA (ISO 17025, AIHA ELLAP and NLLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	ACLASS (ISO 17025)	AT-1421	http://www.aclasscorp.com

Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.
LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.
ND = Not Detected, Testing result not detected above the LOD or LOQ.
** No result could be reported, see sample comments for details.
< This testing result is less than the numerical value.
( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

Quality Control Sample
Batch Report

Analysis Information

Workorder: 1132503

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: IH Metals QC, Bulk Prep
Batch: IIPX/9529 (HBN: 77186)
Prepared By: Mary N. Karanu

Analysis: NIOSH 7300 Mod.
Batch: IICP/6344 (HBN: 77191)
Analyzed By: Penny A. Foote

Blank

Blank: 248416
Analyzed: 11/21/2011 11:35

Units: ug/g

Analyte	Result	RL
Aluminum	ND	65.8
Antimony	ND	12.9
Arsenic	ND	48
Beryllium	ND	0.184
Cadmium	ND	0.88
Calcium	ND	146
Chromium	ND	12.3
Cobalt	ND	0.906
Copper	ND	2.04
Iron	ND	86
Lead	ND	14.1
Lithium	ND	10
Magnesium	ND	5.68
Manganese	ND	3.06
Molybdenum	ND	2
Nickel	ND	1.39
Phosphorus	ND	23
Platinum	ND	6.74
Selenium	ND	12.9
Silver	ND	1.93
Sodium	ND	30
Tellurium	ND	7.8
Thallium	ND	9.4
Titanium	ND	0.8
Vanadium	ND	0.54
Yttrium	ND	0.5
Zinc	ND	4.52
Zirconium	ND	5.24

Symbols and Definitions
* - See Comments section for more information
▲ - Sample result is greater than 4 times the spike added.

RPD - Relative % Difference (Spike / Spike Duplicate)
ND - Not Detected
QC results are not adjusted for moisture correction, where applicable.

Quality Control Sample
Batch Report

Analysis Information

Workorder: 1132503

Limits: Historical/Performance
Basis: ALS Laboratory Group

Preparation: IH Metals QC, Bulk Prep
Batch: IIPX/9529 (HBN: 77186)
Prepared By: Mary N. Karanu

Analysis: NIOSH 7300 Mod.
Batch: IICP/6344 (HBN: 77191)
Analyzed By: Penny A. Foote

Laboratory Control Sample - Laboratory Control Sample Duplicate

LCS: 248417
Analyzed: 11/21/2011 11:38

LCSD: 248418
Analyzed: 11/21/2011 11:41

Units: ug/g

Analyte	Result	Target	% Recovery	QC Limits		Result	RPD	QC Limits		
Arsenic	815	800	102	86.2	113.4	827	1.48	0	20	
Beryllium	82.9	80	104	83.8	114.6	85	2.46	0	20	
Cadmium	83.2	80	104	83	118.5	85.6	2.83	0	20	
Cobalt	85.1	80	106	87.9	116.5	86.8	2.07	0	20	
Chromium	834	800	104	78.7	119.3	855	2.52	0	20	
Copper	87.8	80	110	76.4	130.4	90.1	2.53	0	20	
Iron	854	800	107	71.1	125.4	875	2.42	0	20	
Magnesium	811	800	101	80	126.7	830	2.3	0	20	
Manganese	831	800	104	86.3	112.9	852	2.46	0	20	
Nickel	85.2	80	107	86	118.2	86.6	1.55	0	20	
Lead	841	800	105	73.8	127.2	855	1.72	0	20	
Selenium	853	800	107	58.2	144.7	860	0.792	0	20	
Molybdenum	86.4	80	108	80	120	86.5	0.202	0	20	
Silver	859	800	107	69.4	128.7	883	2.75	0	40	
Phosphorus	825	800	103	62.8	130.8	833	1.04	0	20	
Titanium	82.9	80	104	80	120	83.9	1.18	0	20	
Zinc	798	800	99.7	64.2	133.1	816	2.22	0	20	
Antimony	813	800	102	0	197	818	0.559	0	60	

Symbols and Definitions

* - See Comments section for more information
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RPD - Relative % Difference (Spike / Spike Duplicate)
ND - Not Detected
QC results are not adjusted for moisture correction, where applicable.

Quality Control Sample
Batch Report

Analysis Information

Workorder: 1132503

Limits: Historical/Performance	**Preparation:** IH Metals QC, Bulk Prep	**Analysis:** NIOSH 7300 Mod.
Basis: ALS Laboratory Group	**Batch:** IIPX/9529 (HBN: 77186)	**Batch:** IICP/6344 (HBN: 77191)
	Prepared By: Mary N. Karanu	**Analyzed By:** Penny A. Foote

Comments

None

QC Data Approved and Reviewed by

Penny A. Foote	Peter P. Steen	11/22/2011
Analyst	Peer Review	Date

Symbols and Definitions

* - See Comments section for more information

▲ - Sample result is greater than 4 times the spike added.

RPD - Relative % Difference (Spike / Spike Duplicate)

ND - Not Detected

QC results are not adjusted for moisture correction, where applicable.