CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
9/6/12	
3. Project No.	Page 1 of 1

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR12-023 "C Farm WMC 2011-C8100"	Vadose	HL Anastos	Vadose	200W/222-S/376-7603

17. Comment Submittal Approval

Date _____ Organization Manager (optional) (print and sign) _____

10. Agreement With Indicated Comment Disposition(s)

9-17-12 Date — Reviewer/Point of Contact (print and sign) HL Anastos — Author/Originator (print and sign) HL Anastos

11. CLOSED

9-17-12 Date — Reviewer/Point of Contact (print and sign) HL Anastos — Author/Originator (print and sign) HL Anastos

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1.	p.206 states that an LCS was not included with B2B1L6 for cyanide; however, a standard percent recovery of 92.0% is listed on the Data Summary Report (p. 213).	Data Summary Report	Clarify or correct.	Y	Not accepted: The 92% is the ICV which is a water sample; however the field samples were solids and an LCS to match sample matrix was not available.	closed

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
09/10/2012	
3. Project No.	Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR12-023		Scot Fitzgerald	Analytical Support Group	2753/373-7495

17. Comment Submittal Approval

09/10/2012 (Date) — Scot Fitzgerald (Organization Manager (optional) (print and sign))

10. Agreement With Indicated Comment Disposition(s)

Date — Reviewer/Point of Contact (print and sign)

Author/Originator (print and sign)

11. CLOSED

Scot Fitzgerald (Reviewer/Point of Contact (print and sign))

9-17-2012 (Date) — Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	Page 107 MS discussion does not include the sulfur and zirconium MS failures which can be seen in the supplementary data on page 161.		Add discussion of MS failures and flags to the qualification summary table and annotated data set.	Yes	Information was included in worksheet, memo and data form	closed
2	Page 206 and 211, narrative and qualification summary table indicate no LCS was run with cyanide. Lab narrative indicates only the low level standard was not run and data summary sheet indicates an LCS recovery of 92%.		Clarify statement	No	The 92% is the ICV which is a water sample; however the field samples were solids and an LCS to match sample matrix was not available.	closed
3	Pages 148 and 242 - Blank units are listed in ug/g - lab report lists blank units as ug/mL		Correct units.	Yes	Changed	closed
4	Page 280 - qualification summary lists UJ for Se-79 however in the appended data sets (pages 283,285)the Se-79 results are detects and are J flagged.		Correct data qualification summary table.	Yes	Corrected	closed

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
9/13/2012	RCR-VSR12-023
3. Project No.	Page 1 of 1
C Farm	

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR12-023, C Farm WMC 2011-C8100	SGRP	SL Huggins	SGRP QA	MO-2216E/A101 373-3630

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
9/13/12 (Date) SL Huggins (Organization Manager (optional) (print and sign))	(Date) (Reviewer/Point of Contact (print and sign)) (Author/Originator (print and sign))	9/13/12 (Date) SL Huggins (Reviewer/Point of Contact (print and sign)) (Author/Originator (print and sign))

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No comments, the comments identified by Scot and Heather duplicate my comments.					

ANALYTICAL QUALITY ASSOCIATES, INC.

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Data Validation Report for CH2M Hill
Plateau Remediation Company

VSR12-023
C Farm WMC 2011-C8100
Project C Farm C8100

Chemical & Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder Eyda Hergenreder ***Date: 09-03-12***

Validation reviewed by: ***Date: 09-05-12***

Marcia Hilchey

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Date: 03 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: C Farm C8100
Subject: Semivolatile Organics - Sample Data Group (SDG) 20110264

INTRODUCTION

This memorandum presents the results of data validation for SDG 20110264 prepared by 222-S Laboratory. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2B1L6	02/24/11	Solid	C	8270C
B2C1N1	04/04/11	Solid	C	8270C

Data validation was conducted in accordance with the CHPRC validation statement of work and the Field Sampling and Analysis Plan for Waste Management Area C, RPP-PLAN-40564, Rev. 3 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for semivolatile organics in soil are extraction within 14 days of sample collection and analysis within 40 days of sample extraction. Sample preservation requires chilling to 6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For batch 25983, associated with sample B2B1L6, only eight 8270C MS/MSD analytes were reported. Reported analytes not represented in the MS/MSD were bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, di-n-octylphthalate, 2-methylphenol, 3&4-methylphenol, hexachlorobutadiene, hexachloroethane, 1,2-dichlorobenzene, pyridine, tributyl phosphate, cyclohexanone, 2,6-bis(tert-butyl)-4-methylphenol (BHT), 2-ethoxyethanol, n-nitrosomorpholine and isobutanol. The B2B1L6 sample results for these non-represented analytes were non-detects and should be qualified as estimates and flagged "UJ."

For batch 26836, associated with sample B2C1N1, only eleven 8270C MS/MSD analytes were reported. Reported analytes not represented in the MS/MSDs were pyridine, tributyl phosphate, cyclohexanone, BHT, 2-ethoxyethanol, n-nitrosomorpholine and isobutanol. The B2C1N1 sample results for these non-represented analytes were non-detects and should be qualified as estimates and flagged “UJ.” Additionally the MS recovery for 1,4-dichlorobenzene was below the lower acceptance limit. The analytes represented by 1,4-dichlorobenzene were non-detects

and should be qualified as estimates and flagged "UJ." See the table in Appendix 2 for a listing of analytes.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

For batch 25983, associated with sample B2B1L6, only eight 8270C LCS analytes were reported. Reported analytes not represented in the MS/MSD were bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, di-n-octylphthalate, 2-methylphenol, 3&4-methylphenol, hexachlorobutadiene, hexachloroethane, 1,2-dichlorobenzene, pyridine, tributyl phosphate, cyclohexanone, BHT, 2-ethoxyethanol, n-nitrosomorpholine and isobutanol. The B2B1L6 sample results for these non-represented analytes were non-detects and should be qualified as estimates and flagged "UJ."

For batch 26836, associated with sample B2C1N1, only eleven 8270C LCS analytes were reported. Reported analytes not represented in the MS/MSDs were pyridine, tributyl phosphate, cyclohexanone, BHT, 2-ethoxyethanol, n-nitrosomorpholine and isobutanol. The B2C1N1 sample results for these non-represented analytes were non-detects and should be qualified as estimates and flagged “UJ.”

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs with associated non-detected sample results were below the CRDLs with the following exception. The cyclohexanone and di-n-butyl-phthalate MDLs for both samples were greater than the CRDL.

- **Completeness**

SDG 20110264 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to MS/MSD and LCS non-represented QC data and low MS recovery. See the table in Appendix 2 for a listing of all affected sample results.

It should be noted that a Chain-of-Custody was not included for sample B2C1N1, since the sample was a composite from three other samples. The COC that included the three composite samples was included.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

RPP-PLAN-40564, Rev. 3, *Field Sampling and Analysis Plan for Waste Management Area C*, September 2011.

HNF-20433, Rev.0, *Data Validation Procedure for Chemical Analyses,* June 2004

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U —** The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ —** The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J —** Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+ —** Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J- —** Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N —** The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ —** The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+ —** The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ- —** The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR —** Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R —** Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDG: 20110264	Reviewer: AQA	Project: C Farm C8100	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
1,2-dichlorobenzene, 2-methylphenol, 3&4-methylphenol, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, di-n-octylphthalate, hexachlorobutadiene, hexachloroethane, pyridine, tributyl phosphate, BHT, 2-ethoxyethanol, cyclohexanone, n-nitrosomorpholine, isobutanol	UJ	B2B1L6	Non-represented MS/MSD and LCS data
pyridine, tributyl phosphate, BHT, 2-ethoxyethanol, cyclohexanone, n-nitrosomorpholine, isobutanol	UJ	B2C1N1	Non-represented MS/MSD and LCS data
1,2-dichlorobenzene, 1,4-dichlorobenzene, hexachlorobutadiene, hexachloroethane	UJ	B2C1N1	Low MS recovery

Comments: None

Appendix 3

Annotated Laboratory Reports

02 - Aug - 2011 16:30:19
DSRHardcopyWOLimits 2.7.26a
DSR.Jar v. 2.7.27

Data Summary Report

Sample Group: 20110264
Core Number: C8100
Customer Sample ID: B2B1L6
Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004103	A	7440-36-0	Antimony	ug/g	102	<2.00E-04	0.219	0.183	0.201	17.8	99.5	9.76E-03	n/a	
S11V004103	A	SN-117	Tin-117	ug/g	105	<1.00E-03	<0.0488	<0.0494	n/a	n/a	107	0.0488	n/a	U
S11V004103	A	15832-50-5	Tin-126	ug/g	n/a	<2.00E-05	<9.76E-04	<9.89E-04	n/a	n/a	n/a	9.76E-04	n/a	U
S11V004104	O	120-82-1	1,2,4-Trichlorobenzene	ug/kg	86.3	<77.4	<75.9	n/a	n/a	n/a	96.6	75.9	n/a	UT
S11V004104	O	95-50-1	1,2-Dichlorobenzene UJ	ug/kg	n/a	<101	<98.8	n/a	n/a	n/a	n/a	98.8	n/a	U
S11V004104	O	121-14-2	2,4-Dinitrotoluene	ug/kg	93.1	<38.1	<37.4	n/a	n/a	n/a	90.0	37.4	n/a	U
S11V004104	O	95-95-4	2,4,5-Trichlorophenol	ug/kg	n/a	<44.0	<43.2	n/a	n/a	n/a	n/a	43.2	n/a	U
S11V004104	O	88-06-2	2,4,6-Trichlorophenol	ug/kg	n/a	<49.5	<48.6	n/a	n/a	n/a	n/a	48.6	n/a	U
S11V004104	O	95-48-7	2-Methylphenol UJ	ug/kg	n/a	<57.5	<56.4	n/a	n/a	n/a	n/a	56.4	n/a	U
S11V004104	O	88-75-5	2-Nitrophenol	ug/kg	n/a	<53.7	<52.7	n/a	n/a	n/a	n/a	52.7	n/a	U
S11V004104	O	65794-96-9	3 &4 Methylphenol UJ	ug/kg	n/a	<51.4	<50.4	n/a	n/a	n/a	n/a	50.4	n/a	U
S11V004104	O	83-32-9	Acenaphthene	ug/kg	87.3	<17.6	<17.3	n/a	n/a	n/a	102	17.3	n/a	U
S11V004104	O	56-55-3	Benzo(a)anthracene	ug/kg	n/a	<37.8	<37.1	n/a	n/a	n/a	n/a	37.1	n/a	U
S11V004104	O	205-99-2	Benzo(b)fluoranthene	ug/kg	n/a	<48.9	<48.0	n/a	n/a	n/a	n/a	48.0	n/a	U
S11V004104	O	50-32-8	Benzo(a)pyrene	ug/kg	n/a	<41.2	<40.4	n/a	n/a	n/a	n/a	40.4	n/a	U
S11V004104	O	117-81-7	Bis(2-ethylhexyl) phthalate UJ	ug/kg	n/a	<590	<579	n/a	n/a	n/a	n/a	579	n/a	U
S11V004104	O	207-08-9	Benzo(k)fluoranthene	ug/kg	n/a	<39.1	<38.4	n/a	n/a	n/a	n/a	38.4	n/a	U
S11V004104	O	85-68-7	Butylbenzylphthalate UJ	ug/kg	n/a	<50.0	<49.0	n/a	n/a	n/a	n/a	49.0	n/a	U
S11V004104	O	59-50-7	4-Chloro-3-methylphenol	ug/kg	87.3	<43.2	<42.4	n/a	n/a	n/a	97.4	42.4	n/a	UT
S11V004104	O	95-57-8	2-Chlorophenol	ug/kg	86.0	<66.5	<65.2	n/a	n/a	n/a	91.3	65.2	n/a	U
S11V004104	O	218-01-9	Chrysene	ug/kg	n/a	<81.4	<79.8	n/a	n/a	n/a	n/a	79.8	n/a	U
S11V004104	O	53-70-3	Dibenz[a,h]anthracene	ug/kg	n/a	<51.1	<50.1	n/a	n/a	n/a	n/a	50.1	n/a	U
S11V004104	O	84-74-2	Di-n-butylphthalate UJ	ug/kg	n/a	<562	<552	n/a	n/a	n/a	n/a	552	n/a	U
S11V004104	O	117-84-0	Di-n-octylphthalate UJ	ug/kg	n/a	<47.7	<46.8	n/a	n/a	n/a	n/a	46.8	n/a	U
S11V004104	O	621-64-7	N-Nitroso-di-n-dipropylamine	ug/kg	87.3	<58.1	<57.0	n/a	n/a	n/a	102	57.0	n/a	UT
S11V004104	O	206-44-0	Fluoranthene	ug/kg	n/a	<35.4	<34.7	n/a	n/a	n/a	n/a	34.7	n/a	U
S11V004104	O	87-68-3	Hexachlorobutadiene UJ	ug/kg	n/a	<69.7	<68.4	n/a	n/a	n/a	n/a	68.4	n/a	U
S11V004104	O	67-72-1	Hexachloroethane UJ	ug/kg	n/a	<112	<110	n/a	n/a	n/a	n/a	110	n/a	U
S11V004104	O	193-39-5	Indeno(1,2,3-cd)pyrene	ug/kg	n/a	<51.0	<50.0	n/a	n/a	n/a	n/a	50.0	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
U - Less Than Detection Limit
B - Estimated
B - Blank Contamination
C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264
Core Number: C8100
Customer Sample ID: B2B1L6
Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004104	O	91-20-3	Naphthalene	ug/kg	n/a	<62.6	<61.4	n/a	n/a	n/a	n/a	61.4	n/a	U
S11V004104	O	98-95-3	Nitrobenzene	ug/kg	n/a	<64.6	<63.4	n/a	n/a	n/a	n/a	63.4	n/a	U
S11V004104	O	87-86-5	Pentachlorophenol	ug/kg	106	<37.5	<36.8	n/a	n/a	n/a	96.1	36.8	n/a	U
S11V004104	O	129-00-0	Pyrene	ug/kg	104	<62.9	<61.7	n/a	n/a	n/a	114	61.7	n/a	UT
S11V004104	O	110-86-1	Pyridine UJ	ug/kg	n/a	<65.0	<63.8	n/a	n/a	n/a	n/a	63.8	n/a	U
S11V004104	O	126-73-8	Tributyl phosphate UJ	ug/kg	n/a	<108	<106	n/a	n/a	n/a	n/a	106	n/a	U
S11V004104	O	128-37-0	BHT UJ	ug/kg	n/a	<236	<231	n/a	n/a	n/a	n/a	231	n/a	U
S11V004104	O	110-80-5	2-Ethoxyethanol UJ	ug/kg	n/a	<182	<179	n/a	n/a	n/a	n/a	179	n/a	U
S11V004104	O	1319-77-3	Total Methylphenols	ug/kg	n/a	<107	<105	n/a	n/a	n/a	n/a	105	n/a	U
S11V004104	O	108-94-1	Cyclohexanone UJ	ug/kg	n/a	<558	<547	n/a	n/a	n/a	n/a	547	n/a	U
S11V004104	O	59-89-2	N-Nitrosomorpholine UJ	ug/kg	n/a	<191	<188	n/a	n/a	n/a	n/a	188	n/a	U
S11V004104	O	78-83-1	Isobutanol UJ	ug/kg	n/a	<460	<452	n/a	n/a	n/a	n/a	452	n/a	U
S11V004105	W	16984-48-8	Fluoride	ug/g	103	<1.61E-03	0.502	0.438	0.470	13.8	108	0.0142	n/a	
S11V004105	W	GLYCOLAT	Glycolate	ug/g	101	<9.37E-03	<0.0826	<0.0821	n/a	n/a	103	0.0826	n/a	U
S11V004105	W	71-50-1	Acetate	ug/g	103	<6.04E-03	3.22	<0.0529	n/a	n/a	105	0.0532	n/a	
S11V004105	W	FORMATE	Formate	ug/g	103	0.0206	0.236	0.189	0.213	22.3	105	0.0412	n/a	B
S11V004105	W	16887-00-6	Chloride	ug/g	102	0.0207	0.354	0.312	0.333	12.9	107	0.0880	n/a	C
S11V004105	W	14797-65-0	Nitrite	ug/g	102	0.0637	0.613	0.854	0.734	32.8	102	0.169	n/a	CB
S11V004105	W	14808-79-8	Sulfate	ug/g	105	0.0350	2.94	2.57	2.75	13.7	107	0.165	n/a	
S11V004105	W	338-70-5	Oxalate	ug/g	101	<0.0231	<0.204	<0.202	n/a	n/a	104	0.204	n/a	U
S11V004105	W	24959-67-9	Bromide	ug/g	103	<0.0580	<0.511	<0.508	n/a	n/a	106	0.511	n/a	U
S11V004105	W	14797-55-8	Nitrate	ug/g	102	<0.0208	3.24	3.01	3.13	7.40	105	0.183	n/a	
S11V004105	W	14265-44-2	Phosphate	ug/g	102	<0.0167	1.77	1.53	1.65	14.1	105	0.147	n/a	B
S11V004106	A	7429-90-5	Aluminum	ug/g	91.6	<0.0300	7.74E+03	8.43E+03	8.09E+03	8.54	2.81E+03	2.74	n/a	
S11V004106	A	7440-42-8	Boron	ug/g	89.1	<0.0300	43.9	47.5	45.7	7.89	134	2.74	n/a	N
S11V004106	A	7440-39-3	Barium	ug/g	96.7	<3.00E-03	244	272	258	10.6	179	0.274	n/a	
S11V004106	A	7440-41-7	Beryllium	ug/g	101	<1.00E-03	0.328	0.368	0.348	11.4	97.7	0.0915	n/a	B
S11V004106	A	7440-70-2	Calcium	ug/g	90.8	0.139	1.53E+04	1.94E+04	1.74E+04	23.5	6.45E+03	4.57	n/a	
S11V004106	A	7440-45-1	Cerium	ug/g	98.7	<0.0300	20.3	22.4	21.4	10.0	103	2.74	n/a	B

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004334		%WATERA	%WATER-APD	%	n/a	n/a	3.870	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004334		57-12-5	Cyanide	ug/g	97.9	<0.0370	<0.479	<0.480	n/a	n/a	98.0	0.479	n/a	U
S11V004334		WT%SOLID	Weight percent solids	%	n/a	n/a	96.1	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004334		7439-97-6	Mercury	ug/g	95.0	<1.00E-04	<9.97E-03	n/a	n/a	n/a	n/a	9.97E-03	n/a	U
S11V004334		PH	pH	unitless	n/a	n/a	8.75	8.72	8.74	0.343	n/a	0.0100	n/a	
S11V004335		13966-00-2	Potassium-40	uCi/g	n/a	n/a	1.34E-05	n/a	n/a	n/a	n/a	2.16E-06	4.68	
S11V004335		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.58E-08	n/a	n/a	n/a	n/a	8.58E-08	n/a	U
S11V004335		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.02E-07	n/a	n/a	n/a	n/a	2.02E-07	n/a	U
S11V004335		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	<6.60E-08	n/a	n/a	n/a	n/a	6.60E-08	n/a	U
S11V004335		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<1.87E-07	n/a	n/a	n/a	n/a	1.87E-07	n/a	U
S11V004335		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.31E-07	n/a	n/a	n/a	n/a	1.31E-07	n/a	U
S11V004335		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.49E-07	n/a	n/a	n/a	n/a	2.49E-07	n/a	U
S11V004335		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.07E-07	n/a	n/a	n/a	n/a	8.95E-08	15.47	
S11V004335		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.67E-07	n/a	n/a	n/a	n/a	1.19E-07	6.51	
S11V004335		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	4.13E-07	n/a	n/a	n/a	n/a	1.90E-07	17.34	
S11V004335		15067-28-4	Lead-214	uCi/g	n/a	n/a	4.09E-07	n/a	n/a	n/a	n/a	1.63E-07	11.50	
S11V004335		13982-63-3	Radium-226	uCi/g	n/a	n/a	<1.39E-06	n/a	n/a	n/a	n/a	1.39E-06	40.38	U
S11V004335		14331-83-0	Actinium-228	uCi/g	n/a	n/a	5.26E-07	n/a	n/a	n/a	n/a	3.37E-07	14.29	
S11V004335		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<3.92E-05	n/a	n/a	n/a	n/a	3.92E-05	n/a	U
S11V004335		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<4.16E-06	n/a	n/a	n/a	n/a	4.16E-06	n/a	U
S11V004335		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<1.84E-06	n/a	n/a	n/a	n/a	1.84E-06	n/a	U
S11V004336		CONDUCT	Conductivity	uMHO/cm	98.5	<1.00	370	n/a	n/a	n/a	n/a	1.00	n/a	
S11V004336	WV	14133-76-7	Technetium-99	ug/g	99.8	<6.00E-06	<5.76E-06	n/a	n/a	n/a	n/a	5.76E-06	n/a	U
S11V004338	A	7440-36-0	Antimony	ug/g	110	<2.00E-04	0.121	n/a	n/a	n/a	n/a	1.99E-03	n/a	
S11V004338	A	SN-117	Tin-117	ug/g	105	<1.00E-03	0.0324	n/a	n/a	n/a	n/a	9.96E-03	n/a	
S11V004338	A	15832-50-5	Tin-126	ug/g	n/a	<2.00E-05	3.92E-04	n/a	n/a	n/a	n/a	1.99E-04	n/a	E
S11V004339	O	120-82-1	1,2,4-Trichlorobenzene	ug/kg	75.0	<77.4	<72.2	n/a	n/a	n/a	75.6	72.2	n/a	U
S11V004339	O	95-50-1	1,2-Dichlorobenzene UJ	ug/kg	n/a	<101	<93.9	n/a	n/a	n/a	n/a	93.9	n/a	U
S11V004339	O	106-46-7	1,4-Dichlorobenzene UJ	ug/kg	71.9	<113	<106	n/a	n/a	n/a	69.4	106	n/a	U

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004339	O	121-14-2	2,4-Dinitrotoluene	ug/kg	95.7	<38.1	<35.5	n/a	n/a	n/a	96.0	35.5	n/a	U
S11V004339	O	95-95-4	2,4,5-Trichlorophenol	ug/kg	n/a	<44.0	<41.0	n/a	n/a	n/a	n/a	41.0	n/a	U
S11V004339	O	88-06-2	2,4,6-Trichlorophenol	ug/kg	n/a	<49.5	<46.2	n/a	n/a	n/a	n/a	46.2	n/a	U
S11V004339	O	95-48-7	2-Methylphenol	ug/kg	n/a	<57.5	<53.6	n/a	n/a	n/a	n/a	53.6	n/a	U
S11V004339	O	88-75-5	2-Nitrophenol	ug/kg	n/a	<53.7	<50.1	n/a	n/a	n/a	n/a	50.1	n/a	U
S11V004339	O	65794-96-9	3 &4 Methylphenol	ug/kg	n/a	<51.4	<47.9	n/a	n/a	n/a	n/a	47.9	n/a	U
S11V004339	O	83-32-9	Acenaphthene	ug/kg	84.9	<17.6	<16.4	n/a	n/a	n/a	87.3	16.4	n/a	U
S11V004339	O	56-55-3	Benzo(a)anthracene	ug/kg	n/a	<37.8	<35.3	n/a	n/a	n/a	n/a	35.3	n/a	U
S11V004339	O	205-99-2	Benzo(b)fluoranthene	ug/kg	n/a	<48.9	<45.6	n/a	n/a	n/a	n/a	45.6	n/a	U
S11V004339	O	50-32-8	Benzo(a)pyrene	ug/kg	n/a	<41.2	<38.4	n/a	n/a	n/a	n/a	38.4	n/a	U
S11V004339	O	117-81-7	Bis(2-ethylhexyl) phthalate	ug/kg	n/a	<590	<551	n/a	n/a	n/a	n/a	551	n/a	U
S11V004339	O	207-08-9	Benzo(k)fluoranthene	ug/kg	n/a	<39.1	<36.5	n/a	n/a	n/a	n/a	36.5	n/a	U
S11V004339	O	85-68-7	Butylbenzylphthalate	ug/kg	n/a	<50.0	<46.6	n/a	n/a	n/a	n/a	46.6	n/a	U
S11V004339	O	59-50-7	4-Chloro-3-methylphenol	ug/kg	79.5	<43.2	<40.3	n/a	n/a	n/a	84.3	40.3	n/a	U
S11V004339	O	95-57-8	2-Chlorophenol	ug/kg	77.0	<66.5	<62.0	n/a	n/a	n/a	78.2	62.0	n/a	U
S11V004339	O	218-01-9	Chrysene	ug/kg	n/a	<81.4	<75.9	n/a	n/a	n/a	n/a	75.9	n/a	U
S11V004339	O	53-70-3	Dibenz[a,h]anthracene	ug/kg	n/a	<51.1	<47.7	n/a	n/a	n/a	n/a	47.7	n/a	U
S11V004339	O	84-74-2	Di-n-butylphthalate	ug/kg	n/a	<562	<524	n/a	n/a	n/a	n/a	524	n/a	U
S11V004339	O	117-84-0	Di-n-octylphthalate	ug/kg	n/a	<47.7	<44.5	n/a	n/a	n/a	n/a	44.5	n/a	U
S11V004339	O	621-64-7	N-Nitroso-di-n-dipropylamine	ug/kg	76.7	<58.1	<54.2	n/a	n/a	n/a	74.8	54.2	n/a	U
S11V004339	O	206-44-0	Fluoranthene	ug/kg	n/a	<35.4	<33.0	n/a	n/a	n/a	n/a	33.0	n/a	U
S11V004339	O	87-68-3	Hexachlorobutadiene UJ	ug/kg	n/a	<69.7	<65.0	n/a	n/a	n/a	n/a	65.0	n/a	U
S11V004339	O	67-72-1	Hexachloroethane UJ	ug/kg	n/a	<112	<104	n/a	n/a	n/a	n/a	104	n/a	U
S11V004339	O	193-39-5	Indeno(1,2,3-cd)pyrene	ug/kg	n/a	<51.0	<47.6	n/a	n/a	n/a	n/a	47.6	n/a	U
S11V004339	O	108-95-2	Phenol	ug/kg	79.6	<59.4	<55.4	n/a	n/a	n/a	80.9	55.4	n/a	U
S11V004339	O	91-20-3	Naphthalene	ug/kg	n/a	<62.6	<58.4	n/a	n/a	n/a	n/a	58.4	n/a	U
S11V004339	O	98-95-3	Nitrobenzene	ug/kg	n/a	<64.6	<60.3	n/a	n/a	n/a	n/a	60.3	n/a	U
S11V004339	O	100-02-7	4-Nitrophenol	ug/kg	90.4	<52.6	<49.1	n/a	n/a	n/a	94.5	49.1	n/a	U
S11V004339	O	87-86-5	Pentachlorophenol	ug/kg	89.1	<37.5	<35.0	n/a	n/a	n/a	91.1	35.0	n/a	U

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004339	O	129-00-0	Pyrene	ug/kg	103	<62.9	<58.7	n/a	n/a	n/a	95.5	58.7	n/a	U
S11V004339	O	110-86-1	Pyridine UJ	ug/kg	n/a	<65.0	<60.6	n/a	n/a	n/a	n/a	60.6	n/a	U
S11V004339	O	126-73-8	Tributyl phosphate UJ	ug/kg	n/a	<108	<101	n/a	n/a	n/a	n/a	101	n/a	U
S11V004339	O	128-37-0	BHT UJ	ug/kg	n/a	<236	<220	n/a	n/a	n/a	n/a	220	n/a	U
S11V004339	O	110-80-5	2-Ethoxyethanol UJ	ug/kg	n/a	<182	<170	n/a	n/a	n/a	n/a	170	n/a	U
S11V004339	O	1319-77-3	Total Methylphenols	ug/kg	n/a	<107	<99.4	n/a	n/a	n/a	n/a	99.4	n/a	U
S11V004339	O	108-94-1	Cyclohexanone UJ	ug/kg	n/a	<559	<522	n/a	n/a	n/a	n/a	522	n/a	U
S11V004339	O	59-89-2	N-Nitrosomorpholine UJ	ug/kg	n/a	<191	<178	n/a	n/a	n/a	n/a	178	n/a	U
S11V004339	O	78-83-1	Isobutanol UJ	ug/kg	n/a	n/a	<429	n/a	n/a	n/a	n/a	429	n/a	U
S11V004340	W	16984-48-8	Fluoride	ug/g	104	<1.61E-03	1.14	n/a	n/a	n/a	n/a	0.0157	n/a	M
S11V004340	W	GLYCOLAT	Glycolate	ug/g	101	<9.37E-03	<0.0913	n/a	n/a	n/a	n/a	0.0913	n/a	U
S11V004340	W	71-50-1	Acetate	ug/g	105	<6.04E-03	0.494	n/a	n/a	n/a	n/a	0.0589	n/a	B
S11V004340	W	FORMATE	Formate	ug/g	103	<4.67E-03	0.270	n/a	n/a	n/a	n/a	0.0455	n/a	B
S11V004340	W	16887-00-6	Chloride	ug/g	104	<9.98E-03	14.0	n/a	n/a	n/a	n/a	0.0973	n/a	
S11V004340	W	14797-65-0	Nitrite	ug/g	103	0.0518	0.435	n/a	n/a	n/a	n/a	0.187	n/a	CB
S11V004340	W	14808-79-8	Sulfate	ug/g	105	<0.0187	95.8	n/a	n/a	n/a	n/a	0.182	n/a	
S11V004340	W	338-70-5	Oxalate	ug/g	101	<0.0231	<0.225	n/a	n/a	n/a	n/a	0.225	n/a	U
S11V004340	W	24959-67-9	Bromide	ug/g	104	<0.0580	<0.565	n/a	n/a	n/a	n/a	0.565	n/a	U
S11V004340	W	14797-55-8	Nitrate	ug/g	103	<0.0208	7.59	n/a	n/a	n/a	n/a	0.203	n/a	
S11V004340	W	14265-44-2	Phosphate	ug/g	103	<0.0167	<0.163	n/a	n/a	n/a	n/a	0.163	n/a	UN
S11V004341	A	7429-90-5	Aluminum	ug/g	88.6	<0.0300	6.38E+03	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341	A	7440-42-8	Boron	ug/g	87.4	<0.0300	3.46	n/a	n/a	n/a	n/a	1.50	n/a	B
S11V004341	A	7440-39-3	Barium	ug/g	93.9	<3.00E-03	60.0	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341	A	7440-41-7	Beryllium	ug/g	96.2	<1.00E-03	0.119	n/a	n/a	n/a	n/a	0.0499	n/a	B
S11V004341	A	7440-69-9	Bismuth	ug/g	87.5	<0.100	7.23	n/a	n/a	n/a	n/a	4.99	n/a	B
S11V004341	A	7440-70-2	Calcium	ug/g	84.4	0.0523	5.71E+03	n/a	n/a	n/a	n/a	2.49	n/a	
S11V004341	A	7440-45-1	Cerium	ug/g	96.7	<0.0300	16.8	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341	A	7440-48-4	Cobalt	ug/g	88.8	<0.0100	5.80	n/a	n/a	n/a	n/a	0.499	n/a	
S11V004341	A	7440-47-3	Chromium	ug/g	89.2	<5.00E-03	27.4	n/a	n/a	n/a	n/a	0.249	n/a	

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EH
09/03/12

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C Farm WMC 2011-C8100
Data Summary and Opportunistic Analyte Results

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
S11V004104	O		Heptane	142-82-5	3.63	ug/kg	420	BJN
S11V004104	O		Benzene, 1,2-dichloro-	102-36-3	10.57	ug/kg	260	JN
S11V004104	O		Naphthalene, 2,3,6-tri	829-26-5	12.95	ug/kg	290	JN
S11V004104	O		Naphthalene, 1,6-dimet	483-78-3	13.80	ug/kg	780	JN
S11V004104	O		Bromacil	314-40-9	15.72	ug/kg	940	JN
S11V004104	O		1-Docosene	1599-67-3	18.91	ug/kg	720	JN
S11V004104	O		Octadecanoic acid	57-11-4	19.30	ug/kg	310	JN
S11V004104	O		Eicosane	112-95-8	20.14	ug/kg	340	JN
S11V004104	O		Unknown-1		21.49	ug/kg	230	J
S11V004104	O		Unknown-2		22.06	ug/kg	200	J
S11V004104	O		Unknown-3		22.79	ug/kg	1.5E+03	J
S11V004104	O		Unknown-4		22.94	ug/kg	250	J
S11V004104	O		Unknown-5		23.14	ug/kg	290	J
S11V004104	O		Unknown-6		23.29	ug/kg	1.1E+03	J
S11V004104	O		Stigmastane	601-58-1	23.35	ug/kg	740	JN
S11V004104	O		Unknown-7		23.55	ug/kg	310	J
S11V004104	O		Unknown-8		24.43	ug/kg	250	J
S11V004104	O		Unknown-9		24.73	ug/kg	250	J
S11V004104	O		Unknown-10		24.90	ug/kg	290	J
S11V004104	O		Ethyl trans-13,14-dihy	89887-37-6	25.18	ug/kg	370	JN
S11V004104	O		Unknown-11		25.32	ug/kg	580	J
S11V004104	O		Unknown-12		25.40	ug/kg	300	J
S11V004104	O		Unknown-13		26.87	ug/kg	340	J
S11V004104	O		Unknown-14		27.59	ug/kg	410	J
S11V004104	O		Unknown-15		27.74	ug/kg	360	J
S11V004104	O		Unknown-16		28.20	ug/kg	1.1E+03	J
S11V004104	O		Stigmast-4-en-3-one	1058-61-3	28.89	ug/kg	1000	JN

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C Farm WMC 2011-C8100
Data Summary and Opportunistic Analyte Results

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample#	R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
S11V004104		O	BLNK	Heptane	142-82-5	3.64	ug/kg	450	

NA = Not Analyzed, ND = Not Detectec

T - MS/MSD Outside Range
B - Blank Contamination
U - Less Than Detection Limit
J - Estimated
N - Named TIC

C Farm WMC 2011-C8100
Data Summary and Opportunistic Analyte Results

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	QC Type	Analyte	CAS No.	Retention Time (Minutes)	Unit	Result	Qual Flags
S11V004339	O	BLNK	Oxirane, trimethyl-	5076-19-7	3.20	ug/kg	210	

NA = Not Analyzed, ND = Not Detectec

T - MS/MSD Outside Range
B - Blank Contamination
U - Less Than Detection Limit
J - Estimated
N - Named TIC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

222-S LABORATORY

FINAL ANALYTICAL REPORT FOR SOIL SAMPLES FROM WASTE MANAGEMENT AREA C, CORE HOLE C8100, IN SUPPORT OF RCRA CLOSURE

1.0 INTRODUCTION

This final report presents the results for the samples taken from C Farm between February 24, 2011 and April 4, 2011. The samples were analyzed in accordance with RPP-PLAN-40564, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* (FSAP), RPP-PLAN-38777, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C* (SAP); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory* (QAPP); SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*; and the additional guidance given by the client's point of contact (POC).

Because the 222-S Laboratory facility was designed to analyze hazardous and complex tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative. The following attachments are included in this report.

Attachment 1 Data Summary Report
Attachment 2 Sample Breakdown Diagrams
Attachment 3 Holding Time Report
Attachment 4 Additional QC Results
Attachment 5 Tentatively Identified Compound (TIC) Report
Attachment 6 Analytical Batch and Laboratory Sample Identification Number Index
Attachment 7 Geological Report with Bulk Density Results
Attachment 8 Characterization Change Notices (CCN), and Correspondence
Attachment 9 Receipt Paperwork

2.0 SAMPLE RECEIPT AND BREAKDOWN

2.1 SAMPLE RECEIPT

A total of two grab samples, ten core intervals, and one equipment blank were received by the 222-S Laboratory between February 24, 2011 and April 4, 2011. The samples were delivered in a cooler with ice. The temperatures of the temperature blanks were measured and recorded on the sample receipt check list and the chain of custody form. All temperature blanks were in compliance with the SW-846-specified preservation temperature of 6 ^{o}C.

2.2 SAMPLE BREAKDOWN

The laboratory received each core interval as three liner samples and one shoe sample when complete core recovery was obtained. The liner samples from each core interval were extruded, described, and composited with the shoe sample by the Washington River Protection Solutions (WRPS) geologist. The WRPS geologist measured the bulk density for core liners that had sufficient recovery (see Attachments 1 and 2) and the percent moisture for all composite samples. The geologist's report is included in Attachment 7. The composite for each core interval was analyzed as described in the SAP. All core intervals had complete recovery except for intervals I002, I003, I004, and I005. These core intervals were composited to form two sample extended intervals: I002+I003 and I004+I005 (see Attachment 2).

3.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the SAP. Secondary analytes are reported only if detected. In addition to the required isotopes, all isotopes with positive gamma energy analysis (GEA) results were reported.

The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radionuclide analyses, or the minimum detectable activity (MDA) for radionuclides.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. For solid samples, the aliquot classes are defined as follows:

"A" indicates samples that were prepared by SW-846 3050B.

"E" indicates samples that were prepared by a strong acid digest.

"S" indicates samples that were prepared by a distillation.

"W" indicates samples that were prepared by a standard water digest.

"O" indicates sample s that were prepared by methylene chloride extraction

Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation or with sample preparation performed as a part of the procedure steps.

Additionally the results for ^{99}Tc with units of pCi/g do not have letter identifier in "A#" column. These analysis were performed on the vadose water digest as required in the FSAP

The "Qual Flags" column in Attachment 1 contains data qualifier flags from FEAD CP-15383, *Common Requirements of the Format for Electronic Analytical Data,* that are defined as follows:

"B" for organic or radiochemistry results is used to indicate that the analyte was detected in the method or preparation blank and in the sample.

"B" for inorganic results is used to indicate that the reported result should be considered an estimate because it is below the quantitation limit. The "B" flag is applied to sample concentrations that are greater than the MDL but less than the quantitation limit.

"C" for inorganic results is used to indicate that the analyte was detected in the method or preparation blank and in the sample, and the result for the blank was greater than or equal to 20% of the reported sample result.

"E" for radiochemistry results is used to indicate an estimated result due to interference.

"N" for all but gas chromatography/mass spectrometry (GC/MS) is used to indicate that the matrix spike (MS) recovery or matrix spike duplicate (MSD) recovery was outside of the specified range in the QAPP or SAP.

"M" for inorganic results is used to indicate that the relative percent difference (RPD) between the sample and the duplicate is greater than 30%.

"U" for all results is used to indicate that the reported result is less than the calculated detection limit.

"T" for CG/MS is used to indicate that the MS or MSD recovery was outside of the specified range in the QAPP or SAP.

Manual calculations using rounded results from the Data Summary Report (Attachment 1) or result calculation forms may differ slightly from the actual results derived from the raw data.

3.1 SAMPLE DIGESTIONS

3.1.1 Radiochemistry Strong Acid Digestion

Strong acid digestions with a hot plate for the heat source were performed using a mixture of concentrated nitric and hydrochloric acids. For each digest, approximately 1 to 10 g of sample was digested depending on the analysis being performed. The digestate was then filtered and diluted to a final volume. This digestion was used for all radiochemical analyses except GEA, ^{3}H, ^{14}C, and ^{129}I. This digestion is a leach of the acid soluble species only.

3.1.2 SW-846 3050B – Acid Digestion-Heating Block

This acid digestion follows SW-846 3050B using a heating block and nitric and hydrochloric acids. An aliquot of approximately 1 to 5 g of each sample was digested. All heating-block digestions were filtered and diluted to a final volume of 50 mL. In soil, this digestion is a leach of the acid soluble species only. This digestion was used for all inductively coupled plasma/mass spectrometry (ICP/MS) and inductively coupled plasma/atomic emission spectroscopy (ICP/AES) analyses except for ^{99}Tc, isotopic tin (^{117}Sn and ^{126}Sn), and antimony analysis. The digestion is modified for the ^{99}Tc analysis by using only nitric acid. This is done to eliminate the possibility of the formation of a zinc-chlorine ion pair of mass 99. The laboratory believes this

ion, when present, is responsible for low level false positives. A separate digestion for antimony and isotopic tin was prepared using additional hydrochloric acid to improve MS recoveries.

3.1.3 Water Digestion

A water digestion or leach was prepared for the anions by ion chromatography (IC), ^{14}C, and ^{3}H analyses using approximately 4 to 10 g of sample. Sonification was used, and the leachate was then filtered. In soil, this digestion is a leach of the water soluble species only.

3.1.4 Vadose Water Digestion

An approximately 65-gram sample of soil was leached using a ratio of one part water to one part soil. To maintain a one-to-one ratio, the amount of water added to the sample was adjusted based on the percent moisture of the soil. The slurries were placed on a shaker table for about 1 hour, were transferred to a centrifuge tube and centrifuged at 4,000 rpm for 30 minutes, and then filtered using a disposable vacuum filtration system. The filtrates were transferred to a clean bottle and then analyzed for ^{99}Tc by ICP/MS. A separate unfiltered aliquot was analyzed for conductivity.

3.2 INORGANIC ANALYSES

3.2.1 Cyanide

The cyanide analysis by distillation and spectrophotometry was performed on the grab samples, liner composite samples, and equipment blank. All analyses met the SW-846 holding time of 14 days except for two samples (S11V004098 and S11V004115), which exceeded the holding time by one day. The samples were originally analyzed within the holding time, but due to low MS and continuing calibration verification standard recoveries, reanalysis was necessary. There was no change in the results from the initial analysis. The laboratory believes there was little or no affect on the data usability from the holding time excursion. There was no required reporting limit in the SAP for cyanide. The target detection limit was met. For all batches except for Batch 26248, there were no notable issues and all QC requirements in the SAP and the QAPP were met.

Batch 26248: The analyst failed to include a low level standard (LLS) with this batch. Since the sample result was below the MDL, all other quality control (QC) parameters were within their prescribed limits, all LLSs in the other 10 batches were in control, and a passing LLS was analyzed with the calibration standards the previous day, it is the laboratory's opinion that the data usability was not affected.

3.2.2 Conductivity

The conductivity analysis was performed on the grab samples and liner composite samples. These analyses met all QC requirements in the SAP and QAPP. The SAP lists an administrative holding time requirement of 28 days. SW-846 9050A lists a holding time of 28 days for aqueous samples only. There is not a promulgated holding time for the conductivity measure of a soil

sample. All conductivity measurements were taken on the Vadose water digest portion within 28 days of sampling. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.2.3 pH Analysis

The pH analysis was performed on the grab samples, liner composite samples, and equipment blank. These analyses met all QC requirements in the SAP and QAPP. The SAP lists a pH holding time requirement of "24 hours or as soon as possible." All solid pH measurements were taken as soon as possible after liner extrusion and compositing of the sample. The sampling-to-analysis time varied from 5.5 hours to 145 hours (see Attachment 3). There is no correlation between pH results and time to analysis, and the results fall within an expected range for alkaline soils. This indicates that the variation in time has no apparent effect on the soil results.

3.2.4 Mercury

Analysis for mercury by cold-vapor/atomic absorption was performed on the grab samples, liner composite samples, and equipment blank. For all samples analyzed, results met the QC requirements in the SAP and QAPP and all analyses met the holding time of 28 days. This analysis met the required and target detection limits.

3.2.5 Ion Chromatography – Ammonium

Analysis for ammonium was performed using a distillation preparation of the grab samples, liner composite samples, and equipment blank. The SAP lists an administrative holding time of 7 days for ammonium in soil. The laboratory believes that after distillation and preservation, the holding time is 28 days based on U.S. Environmental Protection Agency drinking water and waste water holding times for preserved aqueous samples. There is no regulatory holding time limit promulgated for ammonium in soil. All samples met the administrative holding times. These analyses met the target detection limit listed in the SAP. There was no required detection limit in the SAP for ammonium.

Batches 25867, 25918, 26004, 26213, and 26815: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26068: Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the sample at less than five times the blank level. This result has been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26517: The RPD exceeded the required 30%. Since the result for this analyte was below the quantitation limit, the criterion does not apply and reanalysis is not required. Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the samples at less than five times the blank level. The results have been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

3.2.6 Ion Chromatography – Anions and Small Organic Acids

Ion chromatography analysis was performed on a standard water digest of subsamples from the grab samples, liner composite samples, and equipment blank.

The laboratory met all of the required and target detection limits. For the standard water digest, all analyses were within the applicable holding times. The sample spikes used for the standard water digestions are predigestion spikes.

Batch 26180: There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

Batch 26531: The results for chloride, formate, and sulfate in the preparation blank were above the MDL but below the quantitation limit. All sample results that were less than five times the blank result have been flagged with a "C". Since all blank results were below the quantitation limit, the usability of the data was not affected. The RPD for nitrite exceeded the 30% requirement in the SAP. Since the result for this analyte was below the quantitation limit reanalysis was not required.

Batch 26818: The RPD for fluoride exceeded the 30% requirement in the SAP at 33%; since the RPDs for chloride and sulfate met this requirement, the laboratory believes this is due to matrix inhomogeneity. All fluoride results in this batch have been flagged with an "M". The RPDs for nitrite and formate exceeded the 30% requirement in the SAP. Since the results for these analytes were below the quantitation limit reanalysis was not required.

The MS recovery for phosphate exceeded the ±25% requirement in the SAP at 74%. The laboratory believes this was due to matrix interference since all other MS recoveries were between 93% and 105% and phosphate MS recoveries are frequently low in Vadose samples. These exceedances were discussed with the client POC (see Attachment 8).

3.2.7 Inductively Coupled Plasma/Atomic Emission Spectroscopy

The ICP/AES analysis was performed on an acid-digest (SW-846 3050B) of the grab samples, liner composite samples, and equipment blank. The ICP/AES analysis was unable to obtain the required detection limit for antimony, arsenic, cadmium, lead, selenium, silver, and thallium. These elements have been reported from separate ICP/MS analyses. Total uranium has not been reported by the ICP/AES analysis since it cannot meet the required detection limits in the SAP. The isotopic uranium analysis by ICP/MS met the required detection limit for ^{238}U, which is essentially total uranium. The overall data usability was not affected. For all other metals reported by ICP/AES, all target and required detection limits were met. SW-846 lists the holding time for ICP/AES metals as 6 months. All analyses met the holding time.

Due to inter-element interferences, the elements europium, niobium, neodymium, and ruthenium have not been reported even though detected in the samples. The laboratory believes that these results are likely due to unmitigated inter-element interferences. These are all secondary analytes.

Batch 26884: The initial and closing LLS recoveries for potassium and iron were above the 130% requirement. This could indicate a high bias. However, since the sample results for these elements were below the quantitation limit the data usability was not affected.

Batch 26878: Results above MDL but below the quantitation limit for manganese in the opening and closing interference check standard "A" (ICSA) and for chromium in the closing ICSA indicate a possible high bias for these elements. However, the recovery of manganese and chromium in the interference check standard "AB" (ICSAB) was within the ±20% requirement; this indicates no significant bias was present. Low levels of iron and calcium were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result. Sulfur was detected in the preparation blank at slightly above the MDL. Three samples have sulfur results at less than five times the blank result and have been flagged with a "C". Sulfur is a secondary analyte.

The MS recoveries for aluminum, barium, calcium, iron, magnesium, sodium, and phosphorous exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for boron, silicon, sulfur, and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes. The MS recovery for strontium exceeded the ±25% requirement at 128%. For all other required elements whose results were less than four times the spike, the MS recoveries were within the requirement. Therefore, the laboratory believes that the high recovery for strontium is due to inhomogeneity.

The RPD for cobalt exceeded the 30% requirement in the FSAP and SAP at 34%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

The laboratory control sample (LCS) recovery for silicon exceeded the ±25% requirement at 16%. Because of this and since silicon is a secondary element, it has not been reported. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

Due to the failure of all instrument quality control samples, thorium has not been reported. Reliable thorium results are reported by ICP/MS.

Batch 26957: The initial and closing LLS recoveries for chromium and iron were below the 70% requirement. This could indicate a low bias. However, since the sample results for chromium were at least 10 times the level of the LLS and the results for iron were at least 5,000 times the LLS level, it is the laboratory's opinion that the data usability was not affected. The LLS for beryllium exceeded the ±30% requirement at 149%. This could indicate a low basis for beryllium. However, since all results were below the quantitation limit, the data usability was not affected.

Results above the MDL but below the quantitation limit for manganese and titanium in the opening and closing ICSA and for barium, phosphorous, strontium, and vanadium in the closing ICSA indicate a possible high bias for these elements. However, the recoveries for these elements in the ICSAB were within the ±20% requirement; this indicates no significant bias was

present. Low levels of calcium and sulfur were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result.

The MS recoveries for aluminum, calcium, iron, phosphorous, and titanium exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for sulfur and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes.

The serial dilution for lanthanum exceeded the ±10% requirement at 14%. This could indicate that the lanthanum results are biased low. Lanthanum is a secondary element.

The LCS recovery for silicon exceeded the ±25% requirement at 78%. Silicon is a secondary element. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

3.2.8 Inductively Coupled Plasma/Mass Spectroscopy

The ICP/MS actinide and trace metal analyses were performed on the standard SW-846 3050B acid digestion of the grab samples, liner composite samples, and equipment blank. ICP/MS analysis for ^{126}Sn and antimony was perform on the same digest with additional hydrochloric acid, which is required to keep tin and antimony in solution. For all samples, the ICP/MS ^{99}Tc analysis was performed on the sample digest without the addition of hydrochloric acid. Hydrochloric acid is not used for ^{99}Tc analysis because of the potential formation of a ZnCl with mass 99. Technetium-99 was also analyzed using the Vadose water digest.

Direct is the most accurate type of calibration; however, standard material is not commercially available for all of the isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's mass-response curve, which is generated by using the intensity/concentration relationship for the available isotope standards. Results estimated in this manner are designated "semi-quantitative."

Table 1. Inductively Coupled Plasma-Mass Spectroscopy Standards and Spikes

Standard Type	Analytes Analyzed
Initial calibration verification (nondigested)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Acid digest standard (laboratory control standard)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Predigest spike (MS)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Post-digest spike	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
No standard or spike of either type	^{126}Sn, ^{230}Th, ^{233}U, ^{234}U, ^{236}U

Technetium-99

For the acid digestion, the required detection limit listed in the SAP for ^{99}Tc was met. The target detection limit for ^{99}Tc was not met. For the water digested samples, both the target and required detection limits were met. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time.

The acid-digested ^{99}Tc analysis is subject to isobaric interference from natural ruthenium and cobalt argide, and zinc chloride ions. However, these samples were analyzed using an ICP/MS with a collision cell, which eliminates the polyatomic interferences. Interference from natural ^{99}Ru seems unlikely since none of the more abundant nature isotopes (100, 101, and 102) were detected.

For the water digest, one sample, B2C1N0, had a positive result above the MDL and slightly below the quantitation level of 10 times the MDL. This result was twice the LLS concentration. The client requested ^{99}Tc analysis by radiochemistry (resin separation followed by liquid scintillation counting), which confirmed the ICP/MS result for this sample. The water digested ^{99}Tc results were originally reported, along with the nitrate results, in ATL Document No. 20110264-D14 as required in the FSAP.

Batches 26871, 26872, and 27327: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met. Batch 27327 contained the equipment blank and also reports the result for ^{126}Sn.

Tin-126 and Antimony

For the solid samples, antimony and ^{126}Sn were analyzed from the same digest because of the need for additional hydrochloric acid, which results in better MS recoveries. However, this appears to cause an isobaric interference with ^{126}Sn. The laboratory has concluded that the most likely interferences are from the polyatomic ions, zirconium chloride, strontium argide, and yttrium chloride—all with mass of 126. A preliminary investigation indicated that using an ICP/MS with a collision cell will eliminate this interference. However, the instrument needed for this analysis is not currently able to operate in a "semi-quantitative" mode. The laboratory is currently working on resolving this issue. Based on the client's earlier instructions (see Attachment 8), samples with a positive result for ^{126}Sn have been flagged with an "E".

Batch 26962: The RPD for ^{126}Sn exceeded the 30% requirement in the FSAP and SAP at 38%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

Actinides

The required and target detection limits were met for all isotopes in all samples. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time (see Attachment 3).

Batches 26835 and 26968: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26833: Laboratory personnel improperly prepared the low level MS. The higher level MS was recovered within the required ±25% for all analytes. Since a low level MS was recovered within the required limits for all analytes in Batch 26968, the SAP requirement for at least on MS per core hole was met and reanalysis of Batch 26833 was unnecessary.

Trace Metals

Arsenic, cadmium, lead, selenium, silver, and thallium were analyzed by ICP/MS to obtain the required detection limits in the SAP. Except for the required detection limit for selenium, all required detection limits were met or the sample results were above the quantitation limit and the sample detection limit criteria do not apply. All target detection limits were met. The required detection limit for selenium was more than an order of magnitude below the detection limit obtained by ICP/MS. The laboratory does not anticipate reaching this detection limit for future projects. The adjusted MDL for selenium soil results was approximately 1.3 μg/g. SW-846 lists the holding time for metals as 6 months. All samples were analyzed within the holding time (see Attachment 3). There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

3.3 RADIOCHEMICAL ANALYSIS

The holding time listed in the SAP for radioactive isotopes is 6 months. All samples were analyzed within the required holding time. The holding time tables for these analytes are included in Attachment 3. With the exception of the ^{14}C and ^{3}H analyses, tracers and spikes are added prior to digestion.

3.3.1 Gamma Energy Analysis

Gamma energy analysis was performed directly on approximately 60 mL of soil from liner grab samples, liner composite samples, and the equipment blank. The SAP requires the reporting of all isotopes with positive results above the MDA; therefore, isotopes additional to those required in the SAP were reported when detected. The GEA analysis met all of the required detection limits in the SAP except for one sample for ^{228}Th, which was only slightly higher. The laboratory was able to meet the target detection limits for all ^{137}Cs and all ^{125}Sb analyses. Seven of the ten ^{154}Eu result met the target detection limit. The laboratory was unable to meet the remaining target detection limits. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.2 Strontium-89/90

Strontium-89/90 analysis was performed on the grab samples, liner composite samples, and equipment blank. All of the sample analyses met the required and target detection limits. The SAP requested ^{90}Sr, not $^{89/90}Sr$, be reported. The 222-S Laboratory only performs the latter analysis. Since the half-life for ^{89}Sr is approximately 51 days and ^{89}Sr has not been produced at Hanford for years, $^{89/90}Sr$ is essentially ^{90}Sr. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.3 Tritium

The ^{3}H analysis by liquid scintillation counting (LSC) was performed directly on the field and equipment blanks and a water leach of the liner composite samples. This method only measured the ^{3}H in the samples that could be dissolved in water. This analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.4 Selenium-79

The ^{79}Se analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the target detection limit in the SAP. No required detection limit was listed. No standard is currently available for ^{79}Se, and a cold carrier is used to monitor recovery and is measured gravimetrically. The ^{14}C LSC curve is used to determine the ^{79}Se results since their energies are similar. All samples have very low positive results, which were caused by an elevated quench from samples, resulting in insufficient background subtraction. These results should be considered very low level false positives and have been flagged with a "E". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26240: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the sample. The sample has been flagged with a "B".

Batch 27781: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the samples. The samples have been flagged with a "B". The RPD for the duplicate exceeded the 30% requirement in the SAP and FSAP. Since the sample result was below the quantitation limit, this criterion does not apply.

3.3.5 Carbon-14

The ^{14}C analysis by LSC was performed on a water leach of the grab samples, liner composite samples, and equipment blank. The analysis achieved the required detection limit in the SAP but exceeded the target detection limit. This analysis will only detect water soluble forms of ^{14}C. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.6 Nickel-63

The ^{63}Ni analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.7 Iodine-129

Analysis for ^{129}I by low energy GEA was performed on the grab samples, liner composite samples, and equipment blank. The required and target detection limits in the SAP were met. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.8 Americium-241, Curium-243/244, and Curium-242

Analysis for ^{241}Am, $^{243/244}$Cm, and ^{242}Cm by alpha energy analysis (AEA) was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met. The SAP requested ^{243}Cm and ^{244}Cm be reported separately. Since it is not possible to resolve these individual isotopes when using AEA, these isotopes have been reported as $^{243/244}$Cm.

3.3.9 Plutonium-238 and Plutonium-239/240

Plutonium isotopic (^{238}Pu and $^{239/240}$Pu) analysis by AEA was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met.

3.4 ORGANIC ANALYSES

3.4.1 Semivolatile Organic Analysis

The semivolatile organic analysis (SVOA) by GC/MS was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. All holding times were met.

The SVOA analysis met the required and target detection limits with two exceptions:

- The adjusted MDLs for cyclohexanone were above the 0.5-mg/kg target detection limit for most samples. This compound obtained detection limits between 0.5 mg/kg and 0.6 mg/kg.

- The adjusted MDLs for di-n-butyl-phthalate were above the target detection limit of 0.33 mg/kg. The analysis achieved a detection limit of between 0.5 mg/kg and 0.6 mg/kg for this compound.

LCS, MS, and MSD recoveries were compared against the laboratory's statistical process control (SPC) limits, as required by SW-846. The use of SPC limits is permitted in the FSAP, SAP, and QAPP. The results of surrogate, LSC, and MS/MSD are contained in Attachment 4. 1,4-dichlorobenzene, phenol, and pentachlorophenol are secondary compounds but have been reported in order to provide QC results for the LCS and MS/MSD.

The SAP and FSAP requested 3-methylphenol and 4-methylpnenol be reported separately. Since it is not possible to resolve these individual compounds when performing SVOA by SW-846 8270C, these compounds have been reported as 3&4 methylphenol.

Batch 26489: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 25983: The MS experienced high recovery for 1,2,4-trichlorobenzene, 4-chloror-3-methylphenol, N-nitroso-di-n-propylamine, and Pyrene; since the result for all of these compounds were below the MDL, the data quality was not affected and reanalysis was not required. The results for these compounds have been flagged with a "T" for both samples in this batch. One sample experienced high recoveries for the surrogate terphenyl-d14; since the results for all primary compounds were below MDL, the data usability was not affected and reanalysis was unnecessary. The LCS and MS/MSD did not contain phenol, 4-nitrophenol, or 1,4-dichlorobenzene. The decision by the client to add these secondary compounds to the spikes was made after this batch was analyzed; these compounds are contained in all subsequent batches.

Batch 26487: The LCS recovery for 2-4-dinitrotoluene exceeded the laboratory statistical control limit of 60%-99% at 101%. Since the recovery is within the ±30% in the SAP and FSAP and the sample result was below the MDL, a qualifier flag was not applied.

Batches 26760 and 26836: There were no notable issues with these batches, and all QC requirements in the FSAP, SAP, and QAPP were met

3.4.2 .Polychlorinated Biphenyls Analysis

Polychlorinated biphenyls (PCB) analysis was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. The accelerated solvent extraction method was used for the solid sample analysis, and solid sample results were corrected to the dry weight of the sample. The LCS, MS, and MSD consisted of only Aroclor-1254 because it is the most common Aroclor detected in Hanford Site samples.

Batch 26470: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 26128: The recoveries for the surrogate tetrachloro-m-xlyene exceeded the laboratory's statistically derived control limit of 53%-115% at 117% and 123%. Since the all sample results were below the MDL, the data usability was not affected.

3.4.3 Tentatively Identified Compounds

Unassigned peaks or TICs were treated as follows. Standards were obtained and analyzed for each secondary analyte identified in the SAP. This data was accumulated in the Hanford library. Following analysis, the largest TICs with instrument responses greater than 10% of the response of the nearest internal standard were evaluated and compared to the Hanford library. The estimated concentration of these TICs was calculated using measured response factors from the Hanford library compound list.

After comparison to the Hanford library, remaining unknowns were compared to the National Institute of Standards and Technology's NIST 02, *HP Mass Spectral Libraries*. The estimated concentration of compounds identified in the NIST library was calculated based on an arbitrary response factor of 1.0. If the compounds were not identified as a result of this comparison, they were reported as "unknown." Summaries of the SVOA TICs from the field samples and method blanks are provided in Attachment 5. TICs that were found in the field samples and were present in the associated batch method blank have been flagged with "B".

4.0 PROCEDURES

Table 2 Lists the procedures used in analyzing the samples contained in this report

Table 2. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
Cyanide	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9010C)	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9014)
Conductivity	LA-504-102, Rev. A-0 Vadose Water Digest	LA-512-107, Rev. G-0
pH (solid)	LA-212-105, Rev. H-0 (SW-846 9045D)	LA-212-105, Rev. H-0 (SW-846 9045D)
Mercury – Cold Vapor Atomic Absorption	LA-325-110, Rev. A-0 (SW-846 7470A, 7471B)	LA-325-106, Rev. G-0 (SW-846 7470A, 7471A)
Ammonia – IC	LA-544-112, Rev. E-0	LA-533-101, Rev. Q-0
Anions & Organic Acids – IC	LA-504-101, Rev. M-0 LA-504-102, Rev. A-0 (Vadose Water Digest)	LA-533-115, Rev. J-0, K-0
Metals – ICP /AES	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-505-161, Rev. J-0-A, K-0 (SW-846 6010C)
^{99}Tc, ^{126}Sn – ICP/MS	Direct	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0
^{99}Tc – ICP/MS	LA-504-102, Rev. A-0 (Vadose Water Digest) LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-103, Rev. B-0
Metals, ^{126}Sn – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0 (SW-846 6020A)
Actinides – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1
Radiochemical Analyses		
GEA	Direct	LA-548-121, Rev. I-0 LA-508-167, Rev. A-0

Analysis	Preparation Method	Analysis Procedure
$^{89/90}$Sr – Separation/GPC	Digestion LA-544-101, Rev. G-0 Separation LA-220-103, Rev. K-0 (solid) LA-220-104, Rev. J-0-A (liquid)	LA-508-124, Rev. B-0
^{3}H – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-218-116, Rev. A-0	LA-508-121, Rev. G-0
^{14}C – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-348-104, Rev. I-0	LA-508-121, Rev. G-0
^{79}Se – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-365-132, Rev. J-0	LA-508-121, Rev. G-0
^{63}Ni – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-285-102, Rev. E-0	LA-508-121, Rev. G-0
^{129}I – Separation/GEA	LA-378-105, Rev. D-0, E-0	LA-508-165, Rev. D-0
^{241}Am, $^{243/244, 242}$Cm – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
$^{239/240, 238}$Pu – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
Analysis	**Preparation Method**	**Analysis Procedure**
Organic Analyses		
SVOC – GC/MS	LA-523-115, Rev. H-0 LA-523-138, Rev. G-0	LA-523-135, Rev. D-0-A SW-846 8270D
PCB – GC/Electron Capture Detector	LA-523-115, Rev. H -0 LA 523-144, Rev. D-0	LA-523-140, Rev. G-0 SW-846 8082A

5.0 REFERENCES

ATL-MP-1011, 2010, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Rev. 10, 10-A, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

FEAD CP-15383, 2007, *Common Requirements of the Format for Electronic Analytical Data,* Version 8, CH2M Hill Plateau Remediation Co., Richland, WA.

RPP-PLAN-3877, 2009, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C*, Rev. 1, Washington River Protection Solutions, Inc., Richland, Washington.

RPP-PLAN-40564, 2009, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* Rev. 2, Washington River Protection Solutions, Inc., Richland, Washington.

NIST 02, 2002, *HP Mass Spectral Libraries*, July 2002 Release, Hewlett-Packard Company, Palo Alto, California.

SW-846, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,* Third Edition, as amended, U.S. Environmental Protection Agency, Washington, D.C.

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 1 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Gs
NO. OF CONTAINER(S)	2
VOLUME	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE / SAMPLE TIME	
B2B1L6	SOIL	2-24-11 B 2-24-11 1108 26	✓

S11V004098

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
Cphill C-bell	2-24-11 0920	RLSteele RLSteele	2.24.11 0920	Grp 20110264
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	-1°C Temp
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RLSteele S11V004098
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

PRINTED ON 2/15/2011

A-6003-618 (REV 2)

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 2 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03 **AIR QUALITY** ☐	**DATA TURNAROUND** 60 Days / 120 Days
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001		
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** n/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** n/A		**BILL OF LADING/AIR BILL NO.** n/A		

SPECIAL INSTRUCTIONS

**Only samples from intervals within the top 15 ft. will be analyzed for pesticides,and PCBs.
(1) pH (Soil) - 9045; Semi-VOA - 8270 Complete (TF) {1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4-Dinitrotoluene, 2,6-bis(1,1-dimethylethyl)-4-methyl phenol, 2-Chlorophenol, 2-Methylphenol (cresol, o-), 2-Nitrophenol, 3+4 Methylphenol (cresol, m+p), 4-Chloro-3-methylphenol, Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Bis(2-ethylhexyl) phthalate, Butylbenzylphthalate, Cellosolve Solvent, Chrysene, Cyclohexanone, Di-n-butylphthalate, Di-n-octylphthalate, Dibenz[a,h]anthracene, Fluoranthene, Hexachlorobutadiene, Hexachloroethane, Indeno(1,2,3-cd)pyrene, Isobutyl alcohol, n-Nitrosodi-n-dipropylamine, n-Nitrosomorpholine, Naphthalene, Nitrobenzene, Pyrene, Pyridine, Total cresols, Tributyl phosphate}; 6010_Metals_ICP; 6020_METALS_ICPMS (TF) {Antimony, Arsenic, Cadmium, Selenium, Silver, Thallium}; Mercury - 7471 - (CV) (TF); IC Anions - 9056; 300.7_AMMONIUM (TF); ~~Sulfide - 9215 (TF)~~ CAT 2/16/11; ~~Total Cyanide - 9014 (TF)~~ CAT 2/16/11; GAMMA ENERGY ANALYSIS (TF) {Antimony-125, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Thorium-228, Thorium-234}; GAMMA ENERGY ANALYSIS (TF); Americium-241 (TF); I129_SEP_GEA (TF); C-14; CURIUM {Curium-242, Curium-243/244}; H3 - TRITIUM; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Nickel-63 (TF); Selenium-79 (TF); Strontium-89,90 -- Total Sr; Actinides ICPMS (TF) {Neptunium-237, Thorium-230, Thorium-232, Uranium-233, Uranium-234, Uranium-235, Uranium-236, Uranium-238}; RADISO_ICPMS (TF) {Technetium-99, Tin-126}; Conductivity - 9050_WE; Percent Solids (TF); Percent Water (TF); PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		V11-001-024	PAGE 1 OF 1
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03 **DATA TURNAROUND**
SAMPLING LOCATION C8100 I010	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐ **60 Days / 120 Days**
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-00004	**ACTUAL SAMPLE DEPTH** 222.8 - ~~224.8~~ 224.8	**COA** BC 4-4-11 N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE **ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A	

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Liner
NO. OF CONTAINER(S)	1
VOLUME	160g
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B2C1L9	SOIL	4-4-11	1020	✓
B2C1M0	SOIL	4-4-11	1020	✓
B2C1M1	SOIL	4-4-11	1020	✓

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	SIGN/ PRINT NAMES: RECEIVED BY/STORED IN	DATE/TIME
Campbell	4-4-11 1100	RHStaggs	4-4-11 1100

SPECIAL INSTRUCTIONS
Scott Snook 4-4-11
**LABORATORY
Only samples from intervals within the top 15 ft. will be analyzed for pesticides, and PCBs.
After bulk density on liners is performed, the liners shall be composited.
(1) Bulk Density - D2937 (TF) {Bulk density - wet};

Temp blank 0°C Related ATL

GRP # 20110264
SAM # S11V004330 Liner A
4331 Liner B
4332 Liner C

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

Appendix 5

Data Validation Supporting Documentation

Appendix A - Chemical Data Validation Checklist

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: C Farm C8100			DATA PACKAGE: VSR12-023		
VALIDATOR: Eyda Hergenreder		LAB: 222-S Laboratory		DATE: 09-03-2012	
			SDG: 20110264		
ANALYSES PERFORMED					
SW-846 8260		SW-846 8260 (TCLP)	SW-846 8270 X		SW-846 8270 (TCLP)
SAMPLES/MATRIX Soil samples SDG 20110264: B2B1L6, B2C1N1					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: None

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

GC/MS tuning/performance check acceptable?	Yes	No	N/A
Initial calibrations acceptable?	Yes	No	N/A
Continuing calibrations acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Calculation check acceptable?	Yes	No	N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes	No	N/A
Calibration blank results acceptable? (Levels D, E)	Yes	No	N/A
Laboratory blanks analyzed?	Yes	No	N/A
Laboratory blank results acceptable?	Yes	No	N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes	No	N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	(Yes)	No	N/A
Surrogate/system monitoring compound recoveries acceptable?	(Yes)	No	N/A
Surrogates traceable? (Levels D, E)	Yes	No	(N/A)
Surrogates expired? (Levels D, E)	Yes	No	(N/A)
MS/MSD samples analyzed?	(Yes)	No	N/A
MS/MSD results acceptable?	Yes	(No)	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	No	(N/A)
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments:

Batch 25983: MS and LCS spiking solution included 8 analytes
Batch 26836; MS and LCS spiking solution included 11 analytes
MS%R 1,4-dichlorobenzene 69%

5. PRECISION (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A

MS/MSD RPD values acceptable? ..... (Yes) No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

Field duplicate RPD values acceptable? ..... Yes No (N/A)

Field split RPD values acceptable? ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

6. SYSTEM PERFORMANCE (Levels D and E)

Internal standards analyzed? ..... Yes No (N/A)

Internal standard areas acceptable? ..... Yes No (N/A)

Internal standard retention times acceptable? ..... Yes No (N/A)

Standards traceable? ..... Yes No (N/A)

Standards expired? ..... Yes No (N/A)

Transcription/calculation errors? ..... Yes No (N/A)

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A

Sample holding times acceptable? ..... (Yes) No N/A

Comments: None

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No (N/A)

Compound quantitation acceptable? (Levels D, E) ..... Yes No (N/A)

Results reported for all requested analyses?..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E)..... Yes No (N/A)

Laboratory properly identified and coded all TIC? (Levels D, E) ..... Yes No (N/A)

Detection limits meet RDL?..... Yes (No) N/A

Transcription/calculation errors? (Levels D, E)..... Yes No (N/A)

Comments:

RDL > CRDL for cyclohexanone and di-n-butyl-phthalate

9. SAMPLE CLEANUP (Levels D and E)

GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:

Comments (attach additional sheets as necessary): None

Appendix 6

Additional Documentation Requested By Client

LABCORE Completed Batch Report for Batch# 00025983

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1102280003	BLNK				
2	S1102280004	LCS				
3	S11V004104	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1102280006	MS	S11V004104			
5	S1102280007	MSD	S11V004104			
6	S11V004121	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00025983

Analyst: Ojanen, Carol **Book#:**

Instrument: GCMSD5 (TUVOK) for SVOA

Method: SVOA 222S #2, LA-523-135 Rev/Mod D-0-A

Specification: C Farm WMC 2011-C8100

Prep Batch: 00025900

Batch Comment:

C-Farm WMC 2011-C8100, SVOA, SOL, prep # 25900

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	BLNK	S1102280003		0 0	O		1,2,4-Trichlorobenzene	SOLID		<7.7400E+01			77.4	ug/Kg			U
1	BLNK	S1102280003		0 0	O		1,2-Dichlorobenzene	SOLID		<1.0070E+02			100.7	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2,4-Dinitrotoluene	SOLID		<3.8100E+01			38.1	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2,4,5-Trichlorophenol	SOLID		<4.4000E+01			44	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2,4,6-Trichlorophenol	SOLID		<4.9500E+01			49.5	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2-Methylphenol	SOLID		<5.7500E+01			57.5	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2-Nitrophenol	SOLID		<5.3700E+01			53.7	ug/Kg			U
1	BLNK	S1102280003		0 0	O		3 & 4 Methylphenol Total	SOLID		<5.1400E+01			51.4	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Acenaphthene	SOLID		<1.7600E+01			17.6	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Benzo(a)anthracene	SOLID		<3.7800E+01			37.8	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Benzo(b)fluoranthene	SOLID		<4.8900E+01			48.9	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Benzo(a)pyrene	SOLID		<4.1200E+01			41.2	ug/Kg			U
1	BLNK	S1102280003		0 0	O		bis(2-Ethylhexyl)phthalate	SOLID		<5.9020E+02			590.2	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Benzo(k)fluoranthene	SOLID		<3.9100E+01			39.1	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Butylbenzylphthalate	SOLID		<5.0000E+01			50	ug/Kg			U
1	BLNK	S1102280003		0 0	O		4-Chloro-3-methylphenol	SOLID		<4.3200E+01			43.2	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2-Chlorophenol	SOLID		<6.6500E+01			66.5	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Chrysene	SOLID		<8.1400E+01			81.4	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Dibenz(a,h)anthracene	SOLID		<5.1100E+01			51.1	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Di-n-butylphthalate	SOLID		<5.6230E+02			562.3	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Di-n-octylphthalate	SOLID		<4.7700E+01			47.7	ug/Kg			U
1	BLNK	S1102280003		0 0	O		N-Nitrosodipropylamine	SOLID		<5.8100E+01			58.1	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Fluoranthene	SOLID		<3.5400E+01			35.4	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Hexachlorobutadiene	SOLID		<6.9700E+01			69.7	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Hexachloroethane	SOLID		<1.1180E+02			111.8	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Indeno(1,2,3-cd)pyrene	SOLID		<5.1000E+01			51	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Naphthalene	SOLID		<6.2600E+01			62.6	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Nitrobenzene	SOLID		<6.4600E+01			64.6	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Pentachlorophenol	SOLID		<3.7500E+01			37.5	ug/Kg			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00025983

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
1	BLNK	S1102280003		0 0	O		Pyrene	SOLID		<6.2900E+01			62.9	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Pyridine	SOLID		<6.5000E+01			65	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Tri-n-butylphosphate	SOLID		<1.0780E+02			107.8	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2,6 bis-4Methylphenol	SOLID		<2.3560E+02			235.6	ug/Kg			U
1	BLNK	S1102280003		0 0	O		2-Ethoxyethanol	SOLID		<1.8240E+02			182.4	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Methylphenols, Total	SOLID		<1.0660E+02			106.6	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Cyclohexanone	SOLID		<5.5810E+02			558.1	ug/Kg			U
1	BLNK	S1102280003		0 0	O		N-Nitrosomorpholine	SOLID		<1.9130E+02			191.3	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Isobutanol	SOLID		<4.6030E+02			460.3	ug/Kg			U
1	BLNK	S1102280003		0 0	O		Heptane	SOLID		454.61234				ug/Kg			JNT
Sample Sequence 2																	
2	LCS	S1102280004		0 0	O		1,2,4-Trichlorobenzene	SOLID	2000	1.7264E+03			77.4	ug/Kg	86.32	% Recovery	
2	LCS	S1102280004		0 0	O		2,4-Dinitrotoluene	SOLID	2000	1.8619E+03			38.1	ug/Kg	93.095	% Recovery	
2	LCS	S1102280004		0 0	O		Acenaphthene	SOLID	2000	1.7463E+03			17.6	ug/Kg	87.315	% Recovery	
2	LCS	S1102280004		0 0	O		4-Chloro-3-methylphenol	SOLID	4000	3.4931E+03			43.2	ug/Kg	87.328	% Recovery	
2	LCS	S1102280004		0 0	O		2-Chlorophenol	SOLID	4000	3.4403E+03			66.5	ug/Kg	86.008	% Recovery	
2	LCS	S1102280004		0 0	O		N-Nitrosodipropylamine	SOLID	2000	1.7454E+03			58.1	ug/Kg	87.27	% Recovery	
2	LCS	S1102280004		0 0	O		Pentachlorophenol	SOLID	4000	4.2297E+03			37.5	ug/Kg	105.74	% Recovery	
2	LCS	S1102280004		0 0	O		Pyrene	SOLID	2000	2.0876E+03			62.9	ug/Kg	104.38	% Recovery	
Sample Sequence 3																	
3	SAMPLE	S11V004104		0 0	O		1,2,4-Trichlorobenzene	SOLID	N/A	<7.5920E+01			75.92	ug/Kg			Ub
3	SAMPLE	S11V004104		0 0	O		1,2-Dichlorobenzene	SOLID	N/A	<9.8774E+01			98.774	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2,4-Dinitrotoluene	SOLID	N/A	<3.7371E+01			37.371	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2,4,5-Trichlorophenol	SOLID	N/A	<4.3158E+01			43.158	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2,4,6-Trichlorophenol	SOLID	N/A	<4.8553E+01			48.553	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2-Methylphenol	SOLID	N/A	<5.6400E+01			56.4	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2-Nitrophenol	SOLID	N/A	<5.2673E+01			52.673	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		3 & 4 Methylphenol Total	SOLID	N/A	<5.0417E+01			50.417	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Acenaphthene	SOLID	N/A	<1.7263E+01			17.263	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Benzo(a)anthracene	SOLID	N/A	<3.7077E+01			37.077	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Benzo(b)fluoranthene	SOLID	N/A	<4.7965E+01			47.965	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Benzo(a)pyrene	SOLID	N/A	<4.0412E+01			40.412	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		bis(2-Ethylhexyl)phthalate	SOLID	N/A	<5.7891E+02			578.91	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Benzo(k)fluoranthene	SOLID	N/A	<3.8352E+01			38.352	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Butylbenzylphthalate	SOLID	N/A	<4.9044E+01			49.044	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		4-Chloro-3-methylphenol	SOLID	N/A	<4.2374E+01			42.374	ug/Kg			Ub
3	SAMPLE	S11V004104		0 0	O		2-Chlorophenol	SOLID	N/A	<6.5228E+01			65.228	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Chrysene	SOLID	N/A	<7.9843E+01			79.843	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Dibenz(a,h)anthracene	SOLID	N/A	<5.0123E+01			50.123	ug/Kg			U

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LABCORE Completed Batch Report for Batch# 00025983

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
3	SAMPLE	S11V004104		0 0	O		Di-n-butylphthalate	SOLID	N/A	<5.5154E+02			551.54	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Di-n-octylphthalate	SOLID	N/A	<4.6788E+01			46.788	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		N-Nitrosodipropylamine	SOLID	N/A	<5.6989E+01			56.989	ug/Kg			Ub
3	SAMPLE	S11V004104		0 0	O		Fluoranthene	SOLID	N/A	<3.4723E+01			34.723	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Hexachlorobutadiene	SOLID	N/A	<6.8367E+01			68.367	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Hexachloroethane	SOLID	N/A	<1.0966E+02			109.66	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Indeno(1,2,3-cd)pyrene	SOLID	N/A	<5.0025E+01			50.025	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Naphthalene	SOLID	N/A	<6.1403E+01			61.403	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Nitrobenzene	SOLID	N/A	<6.3364E+01			63.364	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Pentachlorophenol	SOLID	N/A	<3.6783E+01			36.783	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Pyrene	SOLID	N/A	<6.1697E+01			61.697	ug/Kg			Ub
3	SAMPLE	S11V004104		0 0	O		Pyridine	SOLID	N/A	<6.3757E+01			63.757	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Tri-n-butylphosphate	SOLID	N/A	<1.0574E+02			105.74	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2,6 bis-4Methylphenol	SOLID	N/A	<2.3109E+02			231.09	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2-Ethoxyethanol	SOLID	N/A	<1.7891E+02			178.91	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Methylphenols, Total	SOLID	N/A	<1.0456E+02			104.56	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Cyclohexanone	SOLID	N/A	<5.4743E+02			547.43	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		N-Nitrosomorpholine	SOLID	N/A	<1.8764E+02			187.64	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		Isobutanol	SOLID	N/A	<4.5150E+02			451.5	ug/Kg			U
3	SAMPLE	S11V004104		0 0	O		2-Fluorobiphenyl	SOLID	1961.745	1.9570E+03				ug/Kg	99.758	% Recovery	
3	SAMPLE	S11V004104		0 0	O		2-Fluorophenol	SOLID	3923.491	2.9326E+03				ug/Kg	74.745	% Recovery	
3	SAMPLE	S11V004104		0 0	O		Nitrobenzene-d5	SOLID	1961.745	1.7075E+03				ug/Kg	87.04	% Recovery	
3	SAMPLE	S11V004104		0 0	O		2,4,6-Tribromophenol	SOLID	3923.491	3.5386E+03				ug/Kg	90.19	% Recovery	
3	SAMPLE	S11V004104		0 0	O		Terphenyl-d14	SOLID	1961.745	2.3714E+03				ug/Kg	120.88	% Recovery	
3	SAMPLE	S11V004104		0 0	O		Phenol-d6	SOLID	3923.491	3.4857E+03				ug/Kg	88.8	% Recovery	
3	SAMPLE	S11V004104		0 0	O		1-Docosene	SOLID		724.4903				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Benzene, 1,2-dichloro-	SOLID		260.97368				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Bromacil	SOLID		936.60498				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Eicosane	SOLID		340.57167				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Ethyl trans-13,14-dihy	SOLID		367.11862				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Heptane	SOLID		422.51194				ug/Kg			BJNT
3	SAMPLE	S11V004104		0 0	O		Naphthalene, 1,6-dimet	SOLID		783.64545				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Naphthalene, 2,3,6-tri	SOLID		291.50381				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Octadecanoic acid	SOLID		305.5182				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Stigmast-4-en-3-one	SOLID		1011.3826				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Stigmastane	SOLID		738.38128				ug/Kg			JNT
3	SAMPLE	S11V004104		0 0	O		Unknown-1	SOLID		225.9362				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-10	SOLID		290.55026				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-11	SOLID		581.35389				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-12	SOLID		299.31685				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-13	SOLID		342.90714				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-14	SOLID		413.19473				ug/Kg			JT

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LABCORE Completed Batch Report for Batch# 00025983

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
3	SAMPLE	S11V004104		0 0	O		Unknown-15	SOLID		358.93754				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-16	SOLID		1101.5557				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-2	SOLID		202.87598				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-3	SOLID		1452.9025				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-4	SOLID		251.10453				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-5	SOLID		289.65871				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-6	SOLID		1098.2948				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-7	SOLID		309.65711				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-8	SOLID		247.89386				ug/Kg			JT
3	SAMPLE	S11V004104		0 0	O		Unknown-9	SOLID		252.53845				ug/Kg			JT
Sample Sequence 4																	
4	MS	S1102280006	S11V004104	0 0	O		1,2,4-Trichlorobenzene	SOLID	1977.163	1.9094E+03			76.516	ug/Kg	96.573	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		2,4-Dinitrotoluene	SOLID	1977.163	1.7791E+03			37.665	ug/Kg	89.982	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		Acenaphthene	SOLID	1977.163	2.0080E+03			17.399	ug/Kg	101.56	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		4-Chloro-3-methylphenol	SOLID	3954.327	3.8510E+03			42.707	ug/Kg	97.387	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		2-Chlorophenol	SOLID	3954.327	3.6116E+03			65.741	ug/Kg	91.333	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		N-Nitrosodipropylamine	SOLID	1977.163	2.0180E+03			57.437	ug/Kg	102.07	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		Pentachlorophenol	SOLID	3954.327	3.8005E+03			37.072	ug/Kg	96.11	% Recovery	
4	MS	S1102280006	S11V004104	0 0	O		Pyrene	SOLID	1977.163	2.2612E+03			62.182	ug/Kg	114.37	% Recovery	
Sample Sequence 5																	
5	MSD	S1102280007	S11V004104	0 0	O		1,2,4-Trichlorobenzene	SOLID	1984.914	1.9817E+03			76.816	ug/Kg	99.838	% Recovery	
															3.3247	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		2,4-Dinitrotoluene	SOLID	1984.914	1.8897E+03			37.813	ug/Kg	95.203	% Recovery	
															5.6387	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		Acenaphthene	SOLID	1984.914	2.0718E+03			17.467	ug/Kg	104.38	% Recovery	
															2.7387	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		4-Chloro-3-methylphenol	SOLID	3969.829	4.1534E+03			42.874	ug/Kg	104.62	% Recovery	
															7.1611	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		2-Chlorophenol	SOLID	3969.829	3.6682E+03			65.998	ug/Kg	92.402	% Recovery	
															1.1636	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		N-Nitrosodipropylamine	SOLID	1984.914	2.0792E+03			57.662	ug/Kg	104.75	% Recovery	
															2.5916	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		Pentachlorophenol	SOLID	3969.829	3.8043E+03			37.217	ug/Kg	95.83	% Recovery	
															0.29176	% RPD	
5	MSD	S1102280007	S11V004104	0 0	O		Pyrene	SOLID	1984.914	2.5035E+03			62.426	ug/Kg	126.13	% Recovery	
															9.7796	% RPD	
Sample Sequence 6																	
6	SAMPLE	S11V004121		0 0	O		1,2,4-Trichlorobenzene	SOLID	N/A	<7.7126E+01			77.126	ug/Kg			Ub
6	SAMPLE	S11V004121		0 0	O		1,2-Dichlorobenzene	SOLID	N/A	<1.0034E+02			100.34	ug/Kg			U
6	SAMPLE	S11V004121		0 0	O		2,4-Dinitrotoluene	SOLID	N/A	<3.7965E+01			37.965	ug/Kg			U
6	SAMPLE	S11V004121		0 0	O		2,4,5-Trichlorophenol	SOLID	N/A	<4.3844E+01			43.844	ug/Kg			U

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LABCORE Completed Batch Report for Batch# 00026836

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104060005	BLNK				
2	S1104060006	LCS				
3	S11V004339	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
4	S1104060008	MS	S11V004339			
5	S1104060009	MSD	S11V004339			

LABCORE Completed Batch Report for Batch# 00026836

Analyst: Ojanen, Carol

Book#:

Instrument: GCMSD5 (TUVOK) for SVOA

Method: SVOA 222S #2, LA-523-135 Rev/Mod D-0-A

Specification: C Farm WMC 2011-C8100

Prep Batch: 00026800

Batch Comment:

C Farm WMC 2011-C8100 SVOA SOL

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	BLNK	S1104060005		0 0	O		1,2,4-Trichlorobenzene	SOLID		<7.7400E+01			77.4	ug/Kg			U
1	BLNK	S1104060005		0 0	O		1,2-Dichlorobenzene	SOLID		<1.0070E+02			100.7	ug/Kg			U
1	BLNK	S1104060005		0 0	O		1,4-Dichlorobenzene	SOLID		<1.1330E+02			113.3	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2,4-Dinitrotoluene	SOLID		<3.8100E+01			38.1	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2,4,5-Trichlorophenol	SOLID		<4.4000E+01			44	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2,4,6-Trichlorophenol	SOLID		<4.9500E+01			49.5	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2-Methylphenol	SOLID		<5.7500E+01			57.5	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2-Nitrophenol	SOLID		<5.3700E+01			53.7	ug/Kg			U
1	BLNK	S1104060005		0 0	O		3 & 4 Methylphenol Total	SOLID		<5.1400E+01			51.4	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Acenaphthene	SOLID		<1.7600E+01			17.6	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Benzo(a)anthracene	SOLID		<3.7800E+01			37.8	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Benzo(b)fluoranthene	SOLID		<4.8900E+01			48.9	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Benzo(a)pyrene	SOLID		<4.1200E+01			41.2	ug/Kg			U
1	BLNK	S1104060005		0 0	O		bis(2-Ethylhexyl)phthalate	SOLID		<5.9020E+02			590.2	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Benzo(k)fluoranthene	SOLID		<3.9100E+01			39.1	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Butylbenzylphthalate	SOLID		<5.0000E+01			50	ug/Kg			U
1	BLNK	S1104060005		0 0	O		4-Chloro-3-methylphenol	SOLID		<4.3200E+01			43.2	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2-Chlorophenol	SOLID		<6.6500E+01			66.5	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Chrysene	SOLID		<8.1400E+01			81.4	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Dibenz(a,h)anthracene	SOLID		<5.1100E+01			51.1	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Di-n-butylphthalate	SOLID		<5.6230E+02			562.3	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Di-n-octylphthalate	SOLID		<4.7700E+01			47.7	ug/Kg			U
1	BLNK	S1104060005		0 0	O		N-Nitrosodipropylamine	SOLID		<5.8100E+01			58.1	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Fluoranthene	SOLID		<3.5400E+01			35.4	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Hexachlorobutadiene	SOLID		<6.9700E+01			69.7	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Hexachloroethane	SOLID		<1.1180E+02			111.8	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Indeno(1,2,3-cd)pyrene	SOLID		<5.1000E+01			51	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Phenol	SOLID		<5.9400E+01			59.4	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Naphthalene	SOLID		<6.2600E+01			62.6	ug/Kg			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026836

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
1	BLNK	S1104060005		0 0	O		Nitrobenzene	SOLID		<6.4600E+01			64.6	ug/Kg			U
1	BLNK	S1104060005		0 0	O		4-Nitrophenol	SOLID		<5.2600E+01			52.6	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Pentachlorophenol	SOLID		<3.7500E+01			37.5	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Pyrene	SOLID		<6.2900E+01			62.9	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Pyridine	SOLID		<6.5000E+01			65	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Tri-n-butylphosphate	SOLID		<1.0780E+02			107.8	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2,6 bis-4Methylphenol	SOLID		<2.3560E+02			235.6	ug/Kg			U
1	BLNK	S1104060005		0 0	O		2-Ethoxyethanol	SOLID		<1.8240E+02			182.4	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Methylphenols, Total	SOLID		<1.0660E+02			106.6	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Cyclohexanone	SOLID		<5.5910E+02			559.1	ug/Kg			U
1	BLNK	S1104060005		0 0	O		N-Nitrosomorpholine	SOLID		<1.9130E+02			191.3	ug/Kg			U
1	BLNK	S1104060005		0 0	O		Oxirane, trimethyl-	SOLID		207.58966				ug/Kg			JNT
Sample Sequence 2																	
2	LCS	S1104060006		0 0	O		1,2,4-Trichlorobenzene	SOLID	2000	1.5002E+03			77.4	ug/Kg	75.01	% Recovery	
2	LCS	S1104060006		0 0	O		1,4-Dichlorobenzene	SOLID	2000	1.4385E+03			113.3	ug/Kg	71.925	% Recovery	
2	LCS	S1104060006		0 0	O		2,4-Dinitrotoluene	SOLID	2000	1.9142E+03			38.1	ug/Kg	95.71	% Recovery	
2	LCS	S1104060006		0 0	O		Acenaphthene	SOLID	2000	1.6989E+03			17.6	ug/Kg	84.945	% Recovery	
2	LCS	S1104060006		0 0	O		4-Chloro-3-methylphenol	SOLID	4000	3.1789E+03			43.2	ug/Kg	79.472	% Recovery	
2	LCS	S1104060006		0 0	O		2-Chlorophenol	SOLID	4000	3.0815E+03			66.5	ug/Kg	77.038	% Recovery	
2	LCS	S1104060006		0 0	O		N-Nitrosodipropylamine	SOLID	2000	1.5339E+03			58.1	ug/Kg	76.695	% Recovery	
2	LCS	S1104060006		0 0	O		Phenol	SOLID	4000	3.1840E+03			59.4	ug/Kg	79.6	% Recovery	
2	LCS	S1104060006		0 0	O		4-Nitrophenol	SOLID	4000	3.6172E+03			52.6	ug/Kg	90.43	% Recovery	
2	LCS	S1104060006		0 0	O		Pentachlorophenol	SOLID	4000	3.5634E+03			37.5	ug/Kg	89.085	% Recovery	
2	LCS	S1104060006		0 0	O		Pyrene	SOLID	2000	2.0671E+03			62.9	ug/Kg	103.36	% Recovery	
Sample Sequence 3																	
3	SAMPLE	S11V004339		0 0	O		1,2,4-Trichlorobenzene	SOLID	N/A	<7.2195E+01			72.195	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		1,2-Dichlorobenzene	SOLID	N/A	<9.3928E+01			93.928	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		1,4-Dichlorobenzene	SOLID	N/A	<1.0568E+02			105.68	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2,4-Dinitrotoluene	SOLID	N/A	<3.5538E+01			35.538	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2,4,5-Trichlorophenol	SOLID	N/A	<4.1041E+01			41.041	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2,4,6-Trichlorophenol	SOLID	N/A	<4.6171E+01			46.171	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2-Methylphenol	SOLID	N/A	<5.3633E+01			53.633	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2-Nitrophenol	SOLID	N/A	<5.0089E+01			50.089	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		3 & 4 Methylphenol Total	SOLID	N/A	<4.7943E+01			47.943	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Acenaphthene	SOLID	N/A	<1.6416E+01			16.416	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Benzo(a)anthracene	SOLID	N/A	<3.5258E+01			35.258	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Benzo(b)fluoranthene	SOLID	N/A	<4.5611E+01			45.611	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Benzo(a)pyrene	SOLID	N/A	<3.8429E+01			38.429	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		bis(2-Ethylhexyl)phthalate	SOLID	N/A	<5.5051E+02			550.51	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Benzo(k)fluoranthene	SOLID	N/A	<3.6470E+01			36.47	ug/Kg			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026836

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
3	SAMPLE	S11V004339		0 0	O		Butylbenzylphthalate	SOLID	N/A	<4.6637E+01			46.637	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		4-Chloro-3-methylphenol	SOLID	N/A	<4.0295E+01			40.295	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2-Chlorophenol	SOLID	N/A	<6.2028E+01			62.028	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Chrysene	SOLID	N/A	<7.5926E+01			75.926	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Dibenz(a,h)anthracene	SOLID	N/A	<4.7663E+01			47.663	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Di-n-butylphthalate	SOLID	N/A	<5.2448E+02			524.48	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Di-n-octylphthalate	SOLID	N/A	<4.4492E+01			44.492	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		N-Nitrosodipropylamine	SOLID	N/A	<5.4193E+01			54.193	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Fluoranthene	SOLID	N/A	<3.3019E+01			33.019	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Hexachlorobutadiene	SOLID	N/A	<6.5013E+01			65.013	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Hexachloroethane	SOLID	N/A	<1.0428E+02			104.28	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Indeno(1,2,3-cd)pyrene	SOLID	N/A	<4.7570E+01			47.57	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Phenol	SOLID	N/A	<5.5405E+01			55.405	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Naphthalene	SOLID	N/A	<5.8390E+01			58.39	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Nitrobenzene	SOLID	N/A	<6.0256E+01			60.256	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		4-Nitrophenol	SOLID	N/A	<4.9063E+01			49.063	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Pentachlorophenol	SOLID	N/A	<3.4978E+01			34.978	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Pyrene	SOLID	N/A	<5.8670E+01			58.67	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Pyridine	SOLID	N/A	<6.0629E+01			60.629	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Tri-n-butylphosphate	SOLID	N/A	<1.0055E+02			100.55	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2,6 bis-4Methylphenol	SOLID	N/A	<2.1976E+02			219.76	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2-Ethoxyethanol	SOLID	N/A	<1.7013E+02			170.13	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Methylphenols, Total	SOLID	N/A	<9.9431E+01			99.431	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Cyclohexanone	SOLID	N/A	<5.2150E+02			521.5	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		N-Nitrosomorpholine	SOLID	N/A	<1.7843E+02			178.43	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		Isobutanol	SOLID	N/A	<4.2934E+02			429.34	ug/Kg			U
3	SAMPLE	S11V004339		0 0	O		2-Fluorobiphenyl	SOLID	1865.497	1.5938E+03				ug/Kg	85.436	% Recovery	
3	SAMPLE	S11V004339		0 0	O		2-Fluorophenol	SOLID	3730.995	2.8266E+03				ug/Kg	75.76	% Recovery	
3	SAMPLE	S11V004339		0 0	O		Nitrobenzene-d5	SOLID	1865.497	1.2856E+03				ug/Kg	68.915	% Recovery	
3	SAMPLE	S11V004339		0 0	O		2,4,6-Tribromophenol	SOLID	3730.995	3.4505E+03				ug/Kg	92.482	% Recovery	
3	SAMPLE	S11V004339		0 0	O		Terphenyl-d14	SOLID	1865.497	1.7825E+03				ug/Kg	95.551	% Recovery	
3	SAMPLE	S11V004339		0 0	O		Phenol-d6	SOLID	3730.995	3.0284E+03				ug/Kg	81.2	% Recovery	
Sample Sequence 4																	
4	MS	S1104060008	S11V004339	0 0	O		1,2,4-Trichlorobenzene	SOLID	1904.761	1.4393E+03			73.714	ug/Kg	75.563	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		1,4-Dichlorobenzene	SOLID	1904.761	1.3214E+03			107.9	ug/Kg	69.374	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		2,4-Dinitrotoluene	SOLID	1904.761	1.8293E+03			36.286	ug/Kg	96.038	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		Acenaphthene	SOLID	1904.761	1.6629E+03			16.762	ug/Kg	87.302	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		4-Chloro-3-methylphenol	SOLID	3809.523	3.2109E+03			41.143	ug/Kg	84.286	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		2-Chlorophenol	SOLID	3809.523	2.9787E+03			63.333	ug/Kg	78.191	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		N-Nitrosodipropylamine	SOLID	1904.761	1.4246E+03			55.333	ug/Kg	74.792	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		Phenol	SOLID	3809.523	3.0818E+03			56.571	ug/Kg	80.897	% Recovery	

LABCORE Completed Batch Report for Batch# 00026836

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
4	MS	S1104060008	S11V004339	0 0	O		4-Nitrophenol	SOLID	3809.523	3.6000E+03			50.095	ug/Kg	94.5	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		Pentachlorophenol	SOLID	3809.523	3.4709E+03			35.714	ug/Kg	91.111	% Recovery	
4	MS	S1104060008	S11V004339	0 0	O		Pyrene	SOLID	1904.761	1.8188E+03			59.905	ug/Kg	95.487	% Recovery	
Sample Sequence 5																	
5	MSD	S1104060009	S11V004339	0 0	O		1,2,4-Trichlorobenzene	SOLID	1862.197	1.3664E+03			72.067	ug/Kg	73.376	% Recovery	
															2.9368	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		1,4-Dichlorobenzene	SOLID	1862.197	1.3027E+03			105.49	ug/Kg	69.955	% Recovery	
															0.83400	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		2,4-Dinitrotoluene	SOLID	1862.197	1.7909E+03			35.475	ug/Kg	96.171	% Recovery	
															0.13839	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		Acenaphthene	SOLID	1862.197	1.5942E+03			16.387	ug/Kg	85.609	% Recovery	
															1.9582	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		4-Chloro-3-methylphenol	SOLID	3724.394	3.0823E+03			40.223	ug/Kg	82.76	% Recovery	
															1.8270	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		2-Chlorophenol	SOLID	3724.394	2.9081E+03			61.918	ug/Kg	78.083	% Recovery	
															0.13822	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		N-Nitrosodipropylamine	SOLID	1862.197	1.4187E+03			54.097	ug/Kg	76.184	% Recovery	
															1.8440	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		Phenol	SOLID	3724.394	2.9793E+03			55.307	ug/Kg	79.994	% Recovery	
															1.1225	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		4-Nitrophenol	SOLID	3724.394	3.2979E+03			48.976	ug/Kg	88.549	% Recovery	
															6.5021	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		Pentachlorophenol	SOLID	3724.394	3.5284E+03			34.916	ug/Kg	94.738	% Recovery	
															3.9032	% RPD	
5	MSD	S1104060009	S11V004339	0 0	O		Pyrene	SOLID	1862.197	1.8486E+03			58.566	ug/Kg	99.27	% Recovery	
															3.8848	% RPD	

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00026836

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

SVOA 222S #2 Analysis Matrix Spike/Matrix Spike Duplicate Summary for C Farm WMC 2011-C8100

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
B2B1L6	S11V004104	1,2,4-Trichlorobenzene	96.6	99.8	46	94	3.32	30
		2,4-Dinitrotoluene	90.0	95.2	60	99	5.64	30
		2-Chlorophenol	91.3	92.4	48	93	1.16	30
		4-Chloro-3-methylphenol	97.4	105	52	94	7.16	30
		Acenaphthene	102	104	49	102	2.74	30
		N-Nitrosodipropylamine	102	105	43	89	2.59	30
		Pentachlorophenol	96.1	95.8	46	115	0.292	30
		Pyrene	114	126	63	106	9.78	30
B2B1N6	S11V004090	1,2,4-Trichlorobenzene	39.6	39.7	24	79	0.452	30
		1,4-Dichlorobenzene	37.1	38.4	22	135	3.53	30
		2,4-Dinitrotoluene	88.0	91.4	55	105	3.74	30
		2-Chlorophenol	76.1	76.0	40	106	0.135	30
		4-Chloro-3-methylphenol	80.1	80.4	50	97	0.284	30
		4-Nitrophenol	92.0	87.9	46	97	4.57	30
		Acenaphthene	69.0	69.5	34	106	0.752	30
		N-Nitrosodipropylamine	76.7	81.3	44	99	5.82	30
		Pentachlorophenol	80.8	82.1	50	96	1.48	30
		Phenol	81.0	81.4	41	107	0.523	30
		Pyrene	83.6	90.6	65	111	8.07	30
B2C1M5	S11V004206	1,2,4-Trichlorobenzene	70.5	73.6	46	94	4.37	30
		1,4-Dichlorobenzene	68.8	68.8	41	97	0.0596	30
		2,4-Dinitrotoluene	96.2	97.9	60	99	1.74	30
		2-Chlorophenol	70.3	75.4	48	93	7.00	30
		4-Chloro-3-methylphenol	75.6	84.4	52	94	10.9	30
		4-Nitrophenol	93.0	100	54	110	7.34	30
		Acenaphthene	83.3	85.9	49	102	3.10	30
		N-Nitrosodipropylamine	70.7	76.1	43	89	7.43	30
		Pentachlorophenol	90.4	98.3	46	115	8.36	30
		Phenol	72.8	78.9	47	96	8.02	30
		Pyrene	94.9	102	63	106	7.38	30
B2C1M7	S11V004248	1,2,4-Trichlorobenzene	80.5	82.0	46	94	1.86	30
		1,4-Dichlorobenzene	78.7	80.6	41	97	2.43	30
		2,4-Dinitrotoluene	98.3	99.6	60	99	1.32	30
		2-Chlorophenol	80.1	84.2	48	93	5.03	30
		4-Chloro-3-methylphenol	85.2	85.5	52	94	0.334	30
		4-Nitrophenol	103	92.6	54	110	10.6	30
		Acenaphthene	88.9	91.6	49	102	3.04	30
		N-Nitrosodipropylamine	79.3	79.6	43	89	0.403	30
		Pentachlorophenol	90.9	96.3	46	115	5.76	30
		Phenol	82.5	87.0	47	96	5.33	30
		Pyrene	99.6	105	63	106	5.43	30
B2C1M8	S11V004269	1,2,4-Trichlorobenzene	78.0	77.9	46	94	0.158	30
		1,4-Dichlorobenzene	72.1	73.8	41	97	2.29	30

SVOA 222S #2 Analysis Matrix Spike/Matrix Spike Duplicate Summary for C Farm WMC 2011-C8100

Client Sample Id	Sample Id	Analyte	MS Recovery %	MSD Recovery %	Lower Limit	Upper Limit	RPD %	RPD Limit
B2C1M8	S11V004269	2,4-Dinitrotoluene	97.2	95.7	60	99	1.56	30
		2-Chlorophenol	80.0	80.5	48	93	0.643	30
		4-Chloro-3-methylphenol	85.6	84.7	52	94	1.09	30
		4-Nitrophenol	98.2	96.9	54	110	1.29	30
		Acenaphthene	89.3	87.8	49	102	1.70	30
		N-Nitrosodipropylamine	78.1	76.5	43	89	2.00	30
		Pentachlorophenol	95.5	97.1	46	115	1.67	30
		Phenol	83.4	82.7	47	96	0.938	30
		Pyrene	98.9	96.2	63	106	2.79	30
B2C1N1	S11V004339	1,2,4-Trichlorobenzene	75.6	73.4	46	94	2.94	30
		1,4-Dichlorobenzene	69.4	70.0	41	97	0.834	30
		2,4-Dinitrotoluene	96.0	96.2	60	99	0.138	30
		2-Chlorophenol	78.2	78.1	48	93	0.138	30
		4-Chloro-3-methylphenol	84.3	82.8	52	94	1.83	30
		4-Nitrophenol	94.5	88.5	54	110	6.50	30
		Acenaphthene	87.3	85.6	49	102	1.96	30
		N-Nitrosodipropylamine	74.8	76.2	43	89	1.84	30
		Pentachlorophenol	91.1	94.7	46	115	3.90	30
		Phenol	80.9	80.0	47	96	1.12	30
		Pyrene	95.5	99.3	63	106	3.88	30

25983

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: 222-S Contract:

Lab Code: Case No.: SAS No.: SDG No.: 2011C8100

Level: (low/med) LOW

	CHG SAMPLE NO.	S1 (FBP)#	S2 (2FP)#	S3 (NBZ)#	S4 #	S5 (TBP)#	S6 (TPH)#	S7 #	S8 #	TOT OUT
01	BLANK	79	77	77	80	85	107			0
02	LCS	86	89	86	93	95	103			0
03	S11V004104	100	75	87	89	90	121			0
04	S11V004104MS	105	79	96	89	86	119			0
05	S11V004104MS	106	88	98	99	96	130*			1
06	S11V004121	101	77	86	90	93	118			0
07										
08										
09										
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		QC LIMITS
S1 (FBP)	= 2-Fluorobiphenyl	(48-108)
S2 (2FP)	= 2-Fluorophenol	(42- 99)
S3 (NBZ)	= Nitrobenzene-d5	(44-100)
S4	= Phenol-d6	(45-103)
S5 (TBP)	= 2,4,6-Tribromophenol	(49-111)
S6 (TPH)	= Terphenyl-d14	(55-122)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

Data File: 11030205LCS.D Page 3
Report Date: 21-Apr-2011 11:19

WSCF

RECOVERY REPORT

Client Name: CHG Client SDG: 2011C8100
Sample Matrix: SOLID Fraction: SV
Lab Smp Id: LCS Client Smp ID: LCS
Level: LOW Operator: cjo
Data Type: MS DATA SampleType: LCS
SpikeList File: 222solid.spk Quant Type: ISTD
Sublist File: all.sub
Method File: \\APWSCF02\slab\chem\tuvok.i\2011\110302.b\CFarm110223.m
Misc Info: Added 2.5uL Int Std HNF-N-1895-24.02

SPIKE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
19 1,2,4-Trichloroben	2000.0	1726.4	86.32	46-94
8 2-Chlorophenol	4000.0	3440.3	86.01	48-93
13 N-Nitroso-di-n-pro	2000.0	1745.4	87.27	43-89
23 4-Chloro-3-Methylp	4000.0	3493.1	87.33	52-94
29 Acenaphthene	2000.0	1746.3	87.32	49-102
30 2,4-Dinitrotoluene	2000.0	1861.9	93.10	60-99
195 Pentachlorophenol	4000.0	4229.7	105.74	46-115
36 Pyrene	2000.0	2087.6	104.38	63-106

SURROGATE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 5 2-Fluorophenol	4000.0	3551.5	88.79	42-99
$ 7 Phenol-d6	4000.0	3706.1	92.65	45-103
$ 16 Nitrobenzene-d5	2000.0	1718.9	85.95	44-100
$ 26 2-Fluorobiphenyl	2000.0	1727.1	86.36	48-108
$ 32 2,4,6-Tribromophen	4000.0	3814.3	95.36	49-111
$ 37 Terphenyl-d14	2000.0	2065.6	103.28	55-122

26836

FORM 2
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: 222-S Contract:

Lab Code: Case No.: SAS No.: SDG No.: CFARM041211

Level:(low/med) LOW

	CHG SAMPLE NO.	S1 (FBP)#	S2 (2FP)#	S3 (NBZ)#	S4 #	S5 (TBP)#	S6 (TPH)#	S7 #	S8 #	TOT OUT
01	BLANK	87	78	76	82	86	104			0
02	LCS	89	79	79	84	97	106			0
03	S11V004339	85	76	69	81	92	96			0
04	4339MS	85	78	76	84	100	97			0
05	4339MSD	84	79	73	84	99	100			0
06										
07										
08										
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		QC LIMITS
S1 (FBP)	= 2-Fluorobiphenyl	(48-108)
S2 (2FP)	= 2-Fluorophenol	(42- 99)
S3 (NBZ)	= Nitrobenzene-d5	(44-100)
S4	= Phenol-d6	(45-103)
S5 (TBP)	= 2,4,6-Tribromophenol	(49-111)
S6 (TPH)	= Terphenyl-d14	(55-122)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

Data File: 11041206LCS.D
Report Date: 18-Apr-2011 10:30

WSCF

RECOVERY REPORT

Client Name: CHG
Sample Matrix: SOLID
Lab Smp Id: LCS
Level: LOW
Data Type: MS DATA
SpikeList File: 222LCS_2010S.spk
Sublist File: NTC+TC.sub
Method File: \\APWSCF02\slab\chem\tuvok.i\2011\110412.B\TCNTC110323.m
Misc Info: Added 2.5ul Int.Std. HNF-N-1895-55.01

Client SDG: CFARM041211
Fraction: SV
Client Smp ID: LCS
Operator: cjo
SampleType: LCS
Quant Type: ISTD

SPIKE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
11 Phenol	4000.0	3184.0	79.60	47-96
16 1,4-Dichlorobenzen	2000.0	1438.5	71.92	41-97
31 1,2,4-Trichloroben	2000.0	1500.2	75.01	46-94
14 2-Chlorophenol	4000.0	3081.5	77.04	48-93
21 N-Nitroso-di-n-pro	2000.0	1533.9	76.70	43-89
36 4-Chloro-3-Methylp	4000.0	3178.9	79.47	52-94
47 Acenaphthene	2000.0	1698.9	84.95	49-102
52 4-Nitrophenol	4000.0	3617.2	90.43	54-110
53 2,4-Dinitrotoluene	2000.0	1914.2	95.71	60-99
65 Pentachlorophenol	4000.0	3563.4	89.09	46-115
72 Pyrene	2000.0	2067.1	103.35	63-106

SURROGATE COMPOUND	CONC ADDED ug/Kg	CONC RECOVERED ug/Kg	% RECOVERED	LIMITS
$ 7 2-Fluorophenol	4000.0	3177.2	79.43	42-99
$ 10 Phenol-d6	4000.0	3346.6	83.66	45-103
$ 24 Nitrobenzene-d5	2000.0	1586.2	79.31	44-100
$ 41 2-Fluorobiphenyl	2000.0	1787.6	89.38	48-108
$ 62 2,4,6-Tribromophen	4000.0	3879.9	97.00	49-111
$ 73 Terphenyl-d14	2000.0	2123.9	106.19	55-122

Date: 03 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: C Farm C8100
Subject: PCBs - Sample Data Group (SDG) 20110264

INTRODUCTION

This memorandum presents the results of data validation for SDG 20110264 prepared by 222-S Laboratory. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Method
B2B1L6	02/24/11	Soil	C	8082A

Data validation was conducted in accordance with the CHPRC validation statement of work and the Field Sampling and Analysis Plan for Waste Management Area C, RPP-PLAN-40564, Rev. 3, (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for PCBs are extraction within one year days of sample collection and analysis within one year of sample extraction. Sample preservation requires chilling to 6 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved. It should be noted that the SAP states that no holding time is required for PCB.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

The MS/MSD recoveries were acceptable. It should be noted that aroclor-1254 was the only analyte reported for the MS/MSD. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for MS/MSD analyses. No sample data are qualified as a result.

Laboratory Control Samples (LCSs)

The LCS recovery was acceptable. It should be noted that aroclor-1254 was the only analyte reported for the LCS. Method 8082A guidance specifies aroclor-1016 and aroclor-1260 for LCS analyses. No sample data are qualified as a result.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%.

MS/MSD Samples

The MS/MSD RPD was acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs with associated non-detected sample results were below the CRDLs with the following exceptions. The reported MDL for aroclor-1016 was greater than the CRDL.

- **Completeness**

SDG 20110264 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

RPP-PLAN-40564, Rev. 3, *Field Sampling and Analysis Plan for Waste Management Area C,* September 2011.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **C** — This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS).

- **X** — This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful. The data should be considered unusable for decision-making purposes.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R ─** Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

PCB Data Qualification Summary			
SDG: 20110264	Reviewer: AQA	Project: C Farm C8100	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
PCBs	None	N/A	N/A

Comments: None

Appendix 3

Annotated Laboratory Reports

02 - Aug - 2011 16:30:19
DSRHardcopyWOLimits 2.7.26a
DSR.Jar v. 2.7.27

Data Summary Report

Sample Group: 20110264
Core Number: C8100
Customer Sample ID: B2B1L6
Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004098		%WATERA	%WATER-APD	%	n/a	n/a	6.970	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004098		57-12-5	Cyanide	ug/g	92.0	<0.0370	<0.480	<0.480	n/a	n/a	87.7	0.480	n/a	U
S11V004098		WT%SOLID	Weight percent solids	%	n/a	n/a	93.0	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004098		7439-97-6	Mercury	ug/g	97.0	<1.00E-04	0.0104	n/a	n/a	n/a	91.8	9.15E-03	n/a	B
S11V004098		PH	pH	unitless	n/a	n/a	8.69	8.62	8.66	0.809	n/a	0.0100	n/a	
S11V004099		13966-00-2	Potassium-40	uCi/g	n/a	n/a	9.26E-06	9.29E-06	9.28E-06	0.339	n/a	2.39E-06	7.16	
S11V004099		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.47E-08	<8.49E-08	n/a	n/a	n/a	8.47E-08	n/a	U
S11V004099		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.53E-07	<2.25E-07	n/a	n/a	n/a	2.53E-07	n/a	U
S11V004099		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	4.84E-06	6.45E-06	5.64E-06	28.6	n/a	9.82E-08	1.27	
S11V004099		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<2.09E-07	<2.07E-07	n/a	n/a	n/a	2.09E-07	n/a	U
S11V004099		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.50E-07	<1.50E-07	n/a	n/a	n/a	1.50E-07	n/a	U
S11V004099		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.90E-07	<2.85E-07	n/a	n/a	n/a	2.90E-07	n/a	U
S11V004099		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.53E-07	2.57E-07	2.55E-07	1.66	n/a	9.44E-08	10.71	
S11V004099		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.10E-07	6.30E-07	5.70E-07	21.1	n/a	1.51E-07	9.95	
S11V004099		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	9.54E-07	1.19E-06	1.07E-06	22.2	n/a	2.05E-07	8.80	
S11V004099		15067-28-4	Lead-214	uCi/g	n/a	n/a	8.12E-07	9.83E-07	8.98E-07	19.1	n/a	2.13E-07	10.28	
S11V004099		13982-63-3	Radium-226	uCi/g	n/a	n/a	1.88E-06	1.98E-06	1.93E-06	5.01	n/a	1.53E-06	27.51	
S11V004099		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<4.37E-05	<4.51E-05	n/a	n/a	n/a	4.37E-05	n/a	U
S11V004099		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<1.14E-05	<1.16E-05	n/a	n/a	n/a	1.14E-05	43.18	U
S11V004099		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<2.13E-06	<1.81E-06	n/a	n/a	n/a	2.13E-06	n/a	U
S11V004101		CONDUCT	Conductivity	uMHO/cm	98.7	<1.00	312	296	304	5.29	n/a	1.00	n/a	
S11V004101	WV	14133-76-7	Technetium-99	ug/g	100	<6.00E-06	<6.27E-06	<6.29E-06	n/a	n/a	105	6.27E-06	n/a	U
S11V004102	O	12674-11-2	Aroclor 1016	ug/kg	n/a	<19.7	<21.0	n/a	n/a	n/a	n/a	21.0	n/a	U
S11V004102	O	11104-28-2	Aroclor 1221	ug/kg	n/a	<3.26	<3.48	n/a	n/a	n/a	n/a	3.48	n/a	U
S11V004102	O	11141-16-5	Aroclor 1232	ug/kg	n/a	<5.53	<5.90	n/a	n/a	n/a	n/a	5.90	n/a	U
S11V004102	O	53469-21-9	Aroclor 1242	ug/kg	n/a	<13.2	<14.0	n/a	n/a	n/a	n/a	14.0	n/a	U
S11V004102	O	12672-29-6	Aroclor 1248	ug/kg	n/a	<7.45	<7.95	n/a	n/a	n/a	n/a	7.95	n/a	U
S11V004102	O	11097-69-1	Aroclor 1254	ug/kg	94.4	<4.77	<5.09	n/a	n/a	n/a	n/a	5.09	n/a	U
S11V004102	O	11096-82-5	Aroclor 1260	ug/kg	n/a	<7.72	<8.23	n/a	n/a	n/a	n/a	8.23	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
B - Blank Contamination
T - MS/MSD Outside Range
J - Estimated
C - Blank Contamination
U - Less Than Detection Limit
N - MS/MSD Outside Range
B - Estimated
M - RPD Outside Range

EH
09/03/12

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

222-S LABORATORY

FINAL ANALYTICAL REPORT FOR SOIL SAMPLES FROM WASTE MANAGEMENT AREA C, CORE HOLE C8100, IN SUPPORT OF RCRA CLOSURE

1.0 INTRODUCTION

This final report presents the results for the samples taken from C Farm between February 24, 2011 and April 4, 2011. The samples were analyzed in accordance with RPP-PLAN-40564, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* (FSAP), RPP-PLAN-38777, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C* (SAP); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory* (QAPP); SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*; and the additional guidance given by the client's point of contact (POC).

Because the 222-S Laboratory facility was designed to analyze hazardous and complex tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative. The following attachments are included in this report.

Attachment 1 Data Summary Report
Attachment 2 Sample Breakdown Diagrams
Attachment 3 Holding Time Report
Attachment 4 Additional QC Results
Attachment 5 Tentatively Identified Compound (TIC) Report
Attachment 6 Analytical Batch and Laboratory Sample Identification Number Index
Attachment 7 Geological Report with Bulk Density Results
Attachment 8 Characterization Change Notices (CCN), and Correspondence
Attachment 9 Receipt Paperwork

2.0 SAMPLE RECEIPT AND BREAKDOWN

2.1 SAMPLE RECEIPT

A total of two grab samples, ten core intervals, and one equipment blank were received by the 222-S Laboratory between February 24, 2011 and April 4, 2011. The samples were delivered in a cooler with ice. The temperatures of the temperature blanks were measured and recorded on the sample receipt check list and the chain of custody form. All temperature blanks were in compliance with the SW-846-specified preservation temperature of 6 ^{o}C.

2.2 SAMPLE BREAKDOWN

The laboratory received each core interval as three liner samples and one shoe sample when complete core recovery was obtained. The liner samples from each core interval were extruded, described, and composited with the shoe sample by the Washington River Protection Solutions (WRPS) geologist. The WRPS geologist measured the bulk density for core liners that had sufficient recovery (see Attachments 1 and 2) and the percent moisture for all composite samples. The geologist's report is included in Attachment 7. The composite for each core interval was analyzed as described in the SAP. All core intervals had complete recovery except for intervals I002, I003, I004, and I005. These core intervals were composited to form two sample extended intervals: I002+I003 and I004+I005 (see Attachment 2).

3.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the SAP. Secondary analytes are reported only if detected. In addition to the required isotopes, all isotopes with positive gamma energy analysis (GEA) results were reported.

The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radionuclide analyses, or the minimum detectable activity (MDA) for radionuclides.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. For solid samples, the aliquot classes are defined as follows:

"A" indicates samples that were prepared by SW-846 3050B.

"E" indicates samples that were prepared by a strong acid digest.

"S" indicates samples that were prepared by a distillation.

"W" indicates samples that were prepared by a standard water digest.

"O" indicates sample s that were prepared by methylene chloride extraction

Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation or with sample preparation performed as a part of the procedure steps.

Additionally the results for ^{99}Tc with units of pCi/g do not have letter identifier in "A#" column. These analysis were performed on the vadose water digest as required in the FSAP

The "Qual Flags" column in Attachment 1 contains data qualifier flags from FEAD CP-15383, *Common Requirements of the Format for Electronic Analytical Data,* that are defined as follows:

"B" for organic or radiochemistry results is used to indicate that the analyte was detected in the method or preparation blank and in the sample.

"B" for inorganic results is used to indicate that the reported result should be considered an estimate because it is below the quantitation limit. The "B" flag is applied to sample concentrations that are greater than the MDL but less than the quantitation limit.

"C" for inorganic results is used to indicate that the analyte was detected in the method or preparation blank and in the sample, and the result for the blank was greater than or equal to 20% of the reported sample result.

"E" for radiochemistry results is used to indicate an estimated result due to interference.

"N" for all but gas chromatography/mass spectrometry (GC/MS) is used to indicate that the matrix spike (MS) recovery or matrix spike duplicate (MSD) recovery was outside of the specified range in the QAPP or SAP.

"M" for inorganic results is used to indicate that the relative percent difference (RPD) between the sample and the duplicate is greater than 30%.

"U" for all results is used to indicate that the reported result is less than the calculated detection limit.

"T" for CG/MS is used to indicate that the MS or MSD recovery was outside of the specified range in the QAPP or SAP.

Manual calculations using rounded results from the Data Summary Report (Attachment 1) or result calculation forms may differ slightly from the actual results derived from the raw data.

3.1 SAMPLE DIGESTIONS

3.1.1 Radiochemistry Strong Acid Digestion

Strong acid digestions with a hot plate for the heat source were performed using a mixture of concentrated nitric and hydrochloric acids. For each digest, approximately 1 to 10 g of sample was digested depending on the analysis being performed. The digestate was then filtered and diluted to a final volume. This digestion was used for all radiochemical analyses except GEA, ^{3}H, ^{14}C, and ^{129}I. This digestion is a leach of the acid soluble species only.

3.1.2 SW-846 3050B – Acid Digestion-Heating Block

This acid digestion follows SW-846 3050B using a heating block and nitric and hydrochloric acids. An aliquot of approximately 1 to 5 g of each sample was digested. All heating-block digestions were filtered and diluted to a final volume of 50 mL. In soil, this digestion is a leach of the acid soluble species only. This digestion was used for all inductively coupled plasma/mass spectrometry (ICP/MS) and inductively coupled plasma/atomic emission spectroscopy (ICP/AES) analyses except for ^{99}Tc, isotopic tin (^{117}Sn and ^{126}Sn), and antimony analysis. The digestion is modified for the ^{99}Tc analysis by using only nitric acid. This is done to eliminate the possibility of the formation of a zinc-chlorine ion pair of mass 99. The laboratory believes this

ion, when present, is responsible for low level false positives. A separate digestion for antimony and isotopic tin was prepared using additional hydrochloric acid to improve MS recoveries.

3.1.3 Water Digestion

A water digestion or leach was prepared for the anions by ion chromatography (IC), ^{14}C, and ^{3}H analyses using approximately 4 to 10 g of sample. Sonification was used, and the leachate was then filtered. In soil, this digestion is a leach of the water soluble species only.

3.1.4 Vadose Water Digestion

An approximately 65-gram sample of soil was leached using a ratio of one part water to one part soil. To maintain a one-to-one ratio, the amount of water added to the sample was adjusted based on the percent moisture of the soil. The slurries were placed on a shaker table for about 1 hour, were transferred to a centrifuge tube and centrifuged at 4,000 rpm for 30 minutes, and then filtered using a disposable vacuum filtration system. The filtrates were transferred to a clean bottle and then analyzed for ^{99}Tc by ICP/MS. A separate unfiltered aliquot was analyzed for conductivity.

3.2 INORGANIC ANALYSES

3.2.1 Cyanide

The cyanide analysis by distillation and spectrophotometry was performed on the grab samples, liner composite samples, and equipment blank. All analyses met the SW-846 holding time of 14 days except for two samples (S11V004098 and S11V004115), which exceeded the holding time by one day. The samples were originally analyzed within the holding time, but due to low MS and continuing calibration verification standard recoveries, reanalysis was necessary. There was no change in the results from the initial analysis. The laboratory believes there was little or no affect on the data usability from the holding time excursion. There was no required reporting limit in the SAP for cyanide. The target detection limit was met. For all batches except for Batch 26248, there were no notable issues and all QC requirements in the SAP and the QAPP were met.

Batch 26248: The analyst failed to include a low level standard (LLS) with this batch. Since the sample result was below the MDL, all other quality control (QC) parameters were within their prescribed limits, all LLSs in the other 10 batches were in control, and a passing LLS was analyzed with the calibration standards the previous day, it is the laboratory's opinion that the data usability was not affected.

3.2.2 Conductivity

The conductivity analysis was performed on the grab samples and liner composite samples. These analyses met all QC requirements in the SAP and QAPP. The SAP lists an administrative holding time requirement of 28 days. SW-846 9050A lists a holding time of 28 days for aqueous samples only. There is not a promulgated holding time for the conductivity measure of a soil

sample. All conductivity measurements were taken on the Vadose water digest portion within 28 days of sampling. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.2.3 pH Analysis

The pH analysis was performed on the grab samples, liner composite samples, and equipment blank. These analyses met all QC requirements in the SAP and QAPP. The SAP lists a pH holding time requirement of "24 hours or as soon as possible." All solid pH measurements were taken as soon as possible after liner extrusion and compositing of the sample. The sampling-to-analysis time varied from 5.5 hours to 145 hours (see Attachment 3). There is no correlation between pH results and time to analysis, and the results fall within an expected range for alkaline soils. This indicates that the variation in time has no apparent effect on the soil results.

3.2.4 Mercury

Analysis for mercury by cold-vapor/atomic absorption was performed on the grab samples, liner composite samples, and equipment blank. For all samples analyzed, results met the QC requirements in the SAP and QAPP and all analyses met the holding time of 28 days. This analysis met the required and target detection limits.

3.2.5 Ion Chromatography – Ammonium

Analysis for ammonium was performed using a distillation preparation of the grab samples, liner composite samples, and equipment blank. The SAP lists an administrative holding time of 7 days for ammonium in soil. The laboratory believes that after distillation and preservation, the holding time is 28 days based on U.S. Environmental Protection Agency drinking water and waste water holding times for preserved aqueous samples. There is no regulatory holding time limit promulgated for ammonium in soil. All samples met the administrative holding times. These analyses met the target detection limit listed in the SAP. There was no required detection limit in the SAP for ammonium.

Batches 25867, 25918, 26004, 26213, and 26815: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26068: Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the sample at less than five times the blank level. This result has been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26517: The RPD exceeded the required 30%. Since the result for this analyte was below the quantitation limit, the criterion does not apply and reanalysis is not required. Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the samples at less than five times the blank level. The results have been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

3.2.6 Ion Chromatography – Anions and Small Organic Acids

Ion chromatography analysis was performed on a standard water digest of subsamples from the grab samples, liner composite samples, and equipment blank.

The laboratory met all of the required and target detection limits. For the standard water digest, all analyses were within the applicable holding times. The sample spikes used for the standard water digestions are predigestion spikes.

Batch 26180: There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

Batch 26531: The results for chloride, formate, and sulfate in the preparation blank were above the MDL but below the quantitation limit. All sample results that were less than five times the blank result have been flagged with a "C". Since all blank results were below the quantitation limit, the usability of the data was not affected. The RPD for nitrite exceeded the 30% requirement in the SAP. Since the result for this analyte was below the quantitation limit reanalysis was not required.

Batch 26818: The RPD for fluoride exceeded the 30% requirement in the SAP at 33%; since the RPDs for chloride and sulfate met this requirement, the laboratory believes this is due to matrix inhomogeneity. All fluoride results in this batch have been flagged with an "M". The RPDs for nitrite and formate exceeded the 30% requirement in the SAP. Since the results for these analytes were below the quantitation limit reanalysis was not required.

The MS recovery for phosphate exceeded the ±25% requirement in the SAP at 74%. The laboratory believes this was due to matrix interference since all other MS recoveries were between 93% and 105% and phosphate MS recoveries are frequently low in Vadose samples. These exceedances were discussed with the client POC (see Attachment 8).

3.2.7 Inductively Coupled Plasma/Atomic Emission Spectroscopy

The ICP/AES analysis was performed on an acid-digest (SW-846 3050B) of the grab samples, liner composite samples, and equipment blank. The ICP/AES analysis was unable to obtain the required detection limit for antimony, arsenic, cadmium, lead, selenium, silver, and thallium. These elements have been reported from separate ICP/MS analyses. Total uranium has not been reported by the ICP/AES analysis since it cannot meet the required detection limits in the SAP. The isotopic uranium analysis by ICP/MS met the required detection limit for ^{238}U, which is essentially total uranium. The overall data usability was not affected. For all other metals reported by ICP/AES, all target and required detection limits were met. SW-846 lists the holding time for ICP/AES metals as 6 months. All analyses met the holding time.

Due to inter-element interferences, the elements europium, niobium, neodymium, and ruthenium have not been reported even though detected in the samples. The laboratory believes that these results are likely due to unmitigated inter-element interferences. These are all secondary analytes.

Batch 26884: The initial and closing LLS recoveries for potassium and iron were above the 130% requirement. This could indicate a high bias. However, since the sample results for these elements were below the quantitation limit the data usability was not affected.

Batch 26878: Results above MDL but below the quantitation limit for manganese in the opening and closing interference check standard "A" (ICSA) and for chromium in the closing ICSA indicate a possible high bias for these elements. However, the recovery of manganese and chromium in the interference check standard "AB" (ICSAB) was within the ±20% requirement; this indicates no significant bias was present. Low levels of iron and calcium were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result. Sulfur was detected in the preparation blank at slightly above the MDL. Three samples have sulfur results at less than five times the blank result and have been flagged with a "C". Sulfur is a secondary analyte.

The MS recoveries for aluminum, barium, calcium, iron, magnesium, sodium, and phosphorous exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for boron, silicon, sulfur, and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes. The MS recovery for strontium exceeded the ±25% requirement at 128%. For all other required elements whose results were less than four times the spike, the MS recoveries were within the requirement. Therefore, the laboratory believes that the high recovery for strontium is due to inhomogeneity.

The RPD for cobalt exceeded the 30% requirement in the FSAP and SAP at 34%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

The laboratory control sample (LCS) recovery for silicon exceeded the ±25% requirement at 16%. Because of this and since silicon is a secondary element, it has not been reported. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

Due to the failure of all instrument quality control samples, thorium has not been reported. Reliable thorium results are reported by ICP/MS.

Batch 26957: The initial and closing LLS recoveries for chromium and iron were below the 70% requirement. This could indicate a low bias. However, since the sample results for chromium were at least 10 times the level of the LLS and the results for iron were at least 5,000 times the LLS level, it is the laboratory's opinion that the data usability was not affected. The LLS for beryllium exceeded the ±30% requirement at 149%. This could indicate a low basis for beryllium. However, since all results were below the quantitation limit, the data usability was not affected.

Results above the MDL but below the quantitation limit for manganese and titanium in the opening and closing ICSA and for barium, phosphorous, strontium, and vanadium in the closing ICSA indicate a possible high bias for these elements. However, the recoveries for these elements in the ICSAB were within the ±20% requirement; this indicates no significant bias was

present. Low levels of calcium and sulfur were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result.

The MS recoveries for aluminum, calcium, iron, phosphorous, and titanium exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for sulfur and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes.

The serial dilution for lanthanum exceeded the ±10% requirement at 14%. This could indicate that the lanthanum results are biased low. Lanthanum is a secondary element.

The LCS recovery for silicon exceeded the ±25% requirement at 78%. Silicon is a secondary element. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

3.2.8 Inductively Coupled Plasma/Mass Spectroscopy

The ICP/MS actinide and trace metal analyses were performed on the standard SW-846 3050B acid digestion of the grab samples, liner composite samples, and equipment blank. ICP/MS analysis for ^{126}Sn and antimony was perform on the same digest with additional hydrochloric acid, which is required to keep tin and antimony in solution. For all samples, the ICP/MS ^{99}Tc analysis was performed on the sample digest without the addition of hydrochloric acid. Hydrochloric acid is not used for ^{99}Tc analysis because of the potential formation of a ZnCl with mass 99. Technetium-99 was also analyzed using the Vadose water digest.

Direct is the most accurate type of calibration; however, standard material is not commercially available for all of the isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's mass-response curve, which is generated by using the intensity/concentration relationship for the available isotope standards. Results estimated in this manner are designated "semi-quantitative."

Table 1. Inductively Coupled Plasma-Mass Spectroscopy Standards and Spikes

Standard Type	Analytes Analyzed
Initial calibration verification (nondigested)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Acid digest standard (laboratory control standard)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Predigest spike (MS)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Post-digest spike	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
No standard or spike of either type	^{126}Sn, ^{230}Th, ^{233}U, ^{234}U, ^{236}U

Technetium-99

For the acid digestion, the required detection limit listed in the SAP for ^{99}Tc was met. The target detection limit for ^{99}Tc was not met. For the water digested samples, both the target and required detection limits were met. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time.

The acid-digested ^{99}Tc analysis is subject to isobaric interference from natural ruthenium and cobalt argide, and zinc chloride ions. However, these samples were analyzed using an ICP/MS with a collision cell, which eliminates the polyatomic interferences. Interference from natural ^{99}Ru seems unlikely since none of the more abundant nature isotopes (100, 101, and 102) were detected.

For the water digest, one sample, B2C1N0, had a positive result above the MDL and slightly below the quantitation level of 10 times the MDL. This result was twice the LLS concentration. The client requested ^{99}Tc analysis by radiochemistry (resin separation followed by liquid scintillation counting), which confirmed the ICP/MS result for this sample. The water digested ^{99}Tc results were originally reported, along with the nitrate results, in ATL Document No. 20110264-D14 as required in the FSAP.

Batches 26871, 26872, and 27327: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met. Batch 27327 contained the equipment blank and also reports the result for ^{126}Sn.

Tin-126 and Antimony

For the solid samples, antimony and ^{126}Sn were analyzed from the same digest because of the need for additional hydrochloric acid, which results in better MS recoveries. However, this appears to cause an isobaric interference with ^{126}Sn. The laboratory has concluded that the most likely interferences are from the polyatomic ions, zirconium chloride, strontium argide, and yttrium chloride—all with mass of 126. A preliminary investigation indicated that using an ICP/MS with a collision cell will eliminate this interference. However, the instrument needed for this analysis is not currently able to operate in a "semi-quantitative" mode. The laboratory is currently working on resolving this issue. Based on the client's earlier instructions (see Attachment 8), samples with a positive result for ^{126}Sn have been flagged with an "E".

Batch 26962: The RPD for ^{126}Sn exceeded the 30% requirement in the FSAP and SAP at 38%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

Actinides

The required and target detection limits were met for all isotopes in all samples. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time (see Attachment 3).

Batches 26835 and 26968: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26833: Laboratory personnel improperly prepared the low level MS. The higher level MS was recovered within the required ±25% for all analytes. Since a low level MS was recovered within the required limits for all analytes in Batch 26968, the SAP requirement for at least on MS per core hole was met and reanalysis of Batch 26833 was unnecessary.

Trace Metals

Arsenic, cadmium, lead, selenium, silver, and thallium were analyzed by ICP/MS to obtain the required detection limits in the SAP. Except for the required detection limit for selenium, all required detection limits were met or the sample results were above the quantitation limit and the sample detection limit criteria do not apply. All target detection limits were met. The required detection limit for selenium was more than an order of magnitude below the detection limit obtained by ICP/MS. The laboratory does not anticipate reaching this detection limit for future projects. The adjusted MDL for selenium soil results was approximately 1.3 µg/g. SW-846 lists the holding time for metals as 6 months. All samples were analyzed within the holding time (see Attachment 3). There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

3.3 RADIOCHEMICAL ANALYSIS

The holding time listed in the SAP for radioactive isotopes is 6 months. All samples were analyzed within the required holding time. The holding time tables for these analytes are included in Attachment 3. With the exception of the ^{14}C and ^{3}H analyses, tracers and spikes are added prior to digestion.

3.3.1 Gamma Energy Analysis

Gamma energy analysis was performed directly on approximately 60 mL of soil from liner grab samples, liner composite samples, and the equipment blank. The SAP requires the reporting of all isotopes with positive results above the MDA; therefore, isotopes additional to those required in the SAP were reported when detected. The GEA analysis met all of the required detection limits in the SAP except for one sample for ^{228}Th, which was only slightly higher. The laboratory was able to meet the target detection limits for all ^{137}Cs and all ^{125}Sb analyses. Seven of the ten ^{154}Eu result met the target detection limit. The laboratory was unable to meet the remaining target detection limits. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.2 Strontium-89/90

Strontium-89/90 analysis was performed on the grab samples, liner composite samples, and equipment blank. All of the sample analyses met the required and target detection limits. The SAP requested ^{90}Sr, not $^{89/90}Sr$, be reported. The 222-S Laboratory only performs the latter analysis. Since the half-life for ^{89}Sr is approximately 51 days and ^{89}Sr has not been produced at Hanford for years, $^{89/90}Sr$ is essentially ^{90}Sr. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.3 Tritium

The ^{3}H analysis by liquid scintillation counting (LSC) was performed directly on the field and equipment blanks and a water leach of the liner composite samples. This method only measured the ^{3}H in the samples that could be dissolved in water. This analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.4 Selenium-79

The ^{79}Se analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the target detection limit in the SAP. No required detection limit was listed. No standard is currently available for ^{79}Se, and a cold carrier is used to monitor recovery and is measured gravimetrically. The ^{14}C LSC curve is used to determine the ^{79}Se results since their energies are similar. All samples have very low positive results, which were caused by an elevated quench from samples, resulting in insufficient background subtraction. These results should be considered very low level false positives and have been flagged with a "E". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26240: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the sample. The sample has been flagged with a "B".

Batch 27781: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the samples. The samples have been flagged with a "B". The RPD for the duplicate exceeded the 30% requirement in the SAP and FSAP. Since the sample result was below the quantitation limit, this criterion does not apply.

3.3.5 Carbon-14

The ^{14}C analysis by LSC was performed on a water leach of the grab samples, liner composite samples, and equipment blank. The analysis achieved the required detection limit in the SAP but exceeded the target detection limit. This analysis will only detect water soluble forms of ^{14}C. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.6 Nickel-63

The ^{63}Ni analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.7 Iodine-129

Analysis for ^{129}I by low energy GEA was performed on the grab samples, liner composite samples, and equipment blank. The required and target detection limits in the SAP were met. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.8 Americium-241, Curium-243/244, and Curium-242

Analysis for ^{241}Am, $^{243/244}Cm$, and ^{242}Cm by alpha energy analysis (AEA) was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met. The SAP requested ^{243}Cm and ^{244}Cm be reported separately. Since it is not possible to resolve these individual isotopes when using AEA, these isotopes have been reported as $^{243/244}Cm$.

3.3.9 Plutonium-238 and Plutonium-239/240

Plutonium isotopic (^{238}Pu and $^{239/240}Pu$) analysis by AEA was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met.

3.4 ORGANIC ANALYSES

3.4.1 Semivolatile Organic Analysis

The semivolatile organic analysis (SVOA) by GC/MS was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. All holding times were met.

The SVOA analysis met the required and target detection limits with two exceptions:

- The adjusted MDLs for cyclohexanone were above the 0.5-mg/kg target detection limit for most samples. This compound obtained detection limits between 0.5 mg/kg and 0.6 mg/kg.

- The adjusted MDLs for di-n-butyl-phthalate were above the target detection limit of 0.33 mg/kg. The analysis achieved a detection limit of between 0.5 mg/kg and 0.6 mg/kg for this compound.

LCS, MS, and MSD recoveries were compared against the laboratory's statistical process control (SPC) limits, as required by SW-846. The use of SPC limits is permitted in the FSAP, SAP, and QAPP. The results of surrogate, LSC, and MS/MSD are contained in Attachment 4. 1,4-dichlorobenzene, phenol, and pentachlorophenol are secondary compounds but have been reported in order to provide QC results for the LCS and MS/MSD.

The SAP and FSAP requested 3-methylphenol and 4-methylpnenol be reported separately. Since it is not possible to resolve these individual compounds when performing SVOA by SW-846 8270C, these compounds have been reported as 3&4 methylphenol.

Batch 26489: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 25983: The MS experienced high recovery for 1,2,4-trichlorobenzene, 4-chloror-3-methylphenol, N-nitroso-di-n-propylamine, and Pyrene; since the result for all of these compounds were below the MDL, the data quality was not affected and reanalysis was not required. The results for these compounds have been flagged with a "T" for both samples in this batch. One sample experienced high recoveries for the surrogate terphenyl-d14; since the results for all primary compounds were below MDL, the data usability was not affected and reanalysis was unnecessary. The LCS and MS/MSD did not contain phenol, 4-nitrophenol, or 1,4-dichlorobenzene. The decision by the client to add these secondary compounds to the spikes was made after this batch was analyzed; these compounds are contained in all subsequent batches.

Batch 26487: The LCS recovery for 2-4-dinitrotoluene exceeded the laboratory statistical control limit of 60%-99% at 101%. Since the recovery is within the ±30% in the SAP and FSAP and the sample result was below the MDL, a qualifier flag was not applied.

Batches 26760 and 26836: There were no notable issues with these batches, and all QC requirements in the FSAP, SAP, and QAPP were met

3.4.2 .Polychlorinated Biphenyls Analysis

Polychlorinated biphenyls (PCB) analysis was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. The accelerated solvent extraction method was used for the solid sample analysis, and solid sample results were corrected to the dry weight of the sample. The LCS, MS, and MSD consisted of only Aroclor-1254 because it is the most common Aroclor detected in Hanford Site samples.

Batch 26470: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 26128: The recoveries for the surrogate tetrachloro-m-xlyene exceeded the laboratory's statistically derived control limit of 53%-115% at 117% and 123%. Since the all sample results were below the MDL, the data usability was not affected.

3.4.3 Tentatively Identified Compounds

Unassigned peaks or TICs were treated as follows. Standards were obtained and analyzed for each secondary analyte identified in the SAP. This data was accumulated in the Hanford library. Following analysis, the largest TICs with instrument responses greater than 10% of the response of the nearest internal standard were evaluated and compared to the Hanford library. The estimated concentration of these TICs was calculated using measured response factors from the Hanford library compound list.

After comparison to the Hanford library, remaining unknowns were compared to the National Institute of Standards and Technology's NIST 02, *HP Mass Spectral Libraries*. The estimated concentration of compounds identified in the NIST library was calculated based on an arbitrary response factor of 1.0. If the compounds were not identified as a result of this comparison, they were reported as "unknown." Summaries of the SVOA TICs from the field samples and method blanks are provided in Attachment 5. TICs that were found in the field samples and were present in the associated batch method blank have been flagged with "B".

4.0 PROCEDURES

Table 2 Lists the procedures used in analyzing the samples contained in this report

Table 2. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
Cyanide	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9010C)	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9014)
Conductivity	LA-504-102, Rev. A-0 Vadose Water Digest	LA-512-107, Rev. G-0
pH (solid)	LA-212-105, Rev. H-0 (SW-846 9045D)	LA-212-105, Rev. H-0 (SW-846 9045D)
Mercury – Cold Vapor Atomic Absorption	LA-325-110, Rev. A-0 (SW-846 7470A, 7471B)	LA-325-106, Rev. G-0 (SW-846 7470A, 7471A)
Ammonia – IC	LA-544-112, Rev. E-0	LA-533-101, Rev. Q-0
Anions & Organic Acids – IC	LA-504-101, Rev. M-0 LA-504-102, Rev. A-0 (Vadose Water Digest)	LA-533-115, Rev. J-0, K-0
Metals – ICP /AES	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-505-161, Rev. J-0-A, K-0 (SW-846 6010C)
^{99}Tc, ^{126}Sn – ICP/MS	Direct	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0
^{99}Tc – ICP/MS	LA-504-102, Rev. A-0 (Vadose Water Digest) LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-103, Rev. B-0
Metals, ^{126}Sn – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0 (SW-846 6020A)
Actinides – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1
Radiochemical Analyses		
GEA	Direct	LA-548-121, Rev. I-0 LA-508-167, Rev. A-0

Analysis	Preparation Method	Analysis Procedure
$^{89/90}$Sr – Separation/GPC	Digestion LA-544-101, Rev. G-0 Separation LA-220-103, Rev. K-0 (solid) LA-220-104, Rev. J-0-A (liquid)	LA-508-124, Rev. B-0
^{3}H – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-218-116, Rev. A-0	LA-508-121, Rev. G-0
^{14}C – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-348-104, Rev. I-0	LA-508-121, Rev. G-0
^{79}Se – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-365-132, Rev. J-0	LA-508-121, Rev. G-0
^{63}Ni – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-285-102, Rev. E-0	LA-508-121, Rev. G-0
^{129}I – Separation/GEA	LA-378-105, Rev. D-0, E-0	LA-508-165, Rev. D-0
^{241}Am, $^{243/244, 242}$Cm – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
$^{239/240, 238}$Pu – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
Analysis	**Preparation Method**	**Analysis Procedure**
Organic Analyses		
SVOC – GC/MS	LA-523-115, Rev. H-0 LA-523-138, Rev. G-0	LA-523-135, Rev. D-0-A SW-846 8270D
PCB – GC/Electron Capture Detector	LA-523-115, Rev. H -0 LA 523-144, Rev. D-0	LA-523-140, Rev. G-0 SW-846 8082A

5.0 REFERENCES

ATL-MP-1011, 2010, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Rev. 10, 10-A, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

FEAD CP-15383, 2007, *Common Requirements of the Format for Electronic Analytical Data,* Version 8, CH2M Hill Plateau Remediation Co., Richland, WA.

RPP-PLAN-3877, 2009, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C*, Rev. 1, Washington River Protection Solutions, Inc., Richland, Washington.

RPP-PLAN-40564, 2009, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* Rev. 2, Washington River Protection Solutions, Inc., Richland, Washington.

NIST 02, 2002, *HP Mass Spectral Libraries*, July 2002 Release, Hewlett-Packard Company, Palo Alto, California.

SW-846, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,* Third Edition, as amended, U.S. Environmental Protection Agency, Washington, D.C.

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 1 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Gs
NO. OF CONTAINER(S)	2
VOLUME	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE / SAMPLE TIME	
B2B1L6	SOIL	2-24-11 B 2-24-11 1108 26	✓

S11V004098

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
Cpbll C-bell	2-24-11 0920	RLSteele RLSteele	2.24.11 0920	Grp 20110264
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	-1°C Temp
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RLSteele S11V004098
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

PRINTED ON 2/15/2011

A-6003-618 (REV 2)

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 2 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	**60 Days / 120 Days**
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** n/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** n/A		**BILL OF LADING/AIR BILL NO.** n/A		

SPECIAL INSTRUCTIONS

**Only samples from intervals within the top 15 ft. will be analyzed for pesticides,and PCBs.
(1) pH (Soil) - 9045; Semi-VOA - 8270 Complete (TF) {1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4-Dinitrotoluene, 2,6-bis(1,1-dimethylethyl)-4-methyl phenol, 2-Chlorophenol, 2-Methylphenol (cresol, o-), 2-Nitrophenol, 3+4 Methylphenol (cresol, m+p), 4-Chloro-3-methylphenol, Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Bis(2-ethylhexyl) phthalate, Butylbenzylphthalate, Cellosolve Solvent, Chrysene, Cyclohexanone, Di-n-butylphthalate, Di-n-octylphthalate, Dibenz[a,h]anthracene, Fluoranthene, Hexachlorobutadiene, Hexachloroethane, Indeno(1,2,3-cd)pyrene, Isobutyl alcohol, n-Nitrosodi-n-dipropylamine, n-Nitrosomorpholine, Naphthalene, Nitrobenzene, Pyrene, Pyridine, Total cresols, Tributyl phosphate}; 6010_Metals_ICP; 6020_METALS_ICPMS (TF) {Antimony, Arsenic, Cadmium, Selenium, Silver, Thallium}; Mercury - 7471 - (CV) (TF); IC Anions - 9056; 300.7_AMMONIUM (TF); ~~Sulfide - 9215 cat 2/10/11~~ Total Cyanide - 9014 (TF); GAMMA ENERGY ANALYSIS (TF) {Antimony-125, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Thorium-228, Thorium-234}; GAMMA ENERGY ANALYSIS (TF); Americium-241 (TF); I129_SEP_GEA (TF); C-14; CURIUM {Curium-242, Curium-243/244}; H3 - TRITIUM; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Nickel-63 (TF); Selenium-79 (TF); Strontium-89,90 -- Total Sr; Actinides ICPMS (TF) {Neptunium-237, Thorium-230, Thorium-232, Uranium-233, Uranium-234, Uranium-235, Uranium-236, Uranium-238}; RADISO_ICPMS (TF) {Technetium-99, Tin-126}; Conductivity - 9050_WE; Percent Solids (TF); Percent Water (TF); PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};

CAT 2/10/11

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10 Effective Date: 08/16/10

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: C Farm C8100			DATA PACKAGE: VSR12-023		
VALIDATOR: Eyda Hergenreder		LAB: 222-S Laboratory		DATE: 09-03-2012	
			SDG: 20110264		
ANALYSES PERFORMED					
SW-846 8081	SW-846 8081 (TCLP)	SW-846 8082 X	SW-846 8081 (TCLP)	SW-846 8310	
SAMPLES/MATRIX Soil samples SDG 20110264: B2B1L6					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? ..... Yes (No) N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable?	Yes	No	N/A
Continuing calibrations acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Calculation check acceptable?	Yes	No	N/A
DDT and endrin breakdowns acceptable?	Yes	No	N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E)	Yes	No	N/A
Calibration blank results acceptable? (Levels D, E)	Yes	No	N/A
Laboratory blanks analyzed?	Yes	No	N/A
Laboratory blank results acceptable?	Yes	No	N/A
Field/trip blanks analyzed? (Levels C, D, E)	Yes	No	N/A
Field/trip blank results acceptable? (Levels C, D, E)	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments: None

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed?	(Yes)	No	N/A
Surrogate recoveries acceptable?	(Yes)	No	N/A
Surrogates traceable? (Levels D, E)	Yes	No	(N/A)
Surrogates expired? (Levels D, E)	Yes	No	(N/A)
MS/MSD samples analyzed?	(Yes)	No	N/A
MS/MSD results acceptable?	(Yes)	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	No	(N/A)
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments:

Aroclor-1254 was the analyte reported in the MS/MSD and LCS

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A

Duplicate results acceptable? ..... (Yes) No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

Field duplicate RPD values acceptable? ..... Yes No (N/A)

Field split RPD values acceptable? ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? ..... Yes No (N/A)

Positive results resolved acceptably? ..... Yes No (N/A)

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A

Sample holding times acceptable? ..... (Yes) No N/A

Comments: None

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) ..... Yes No (N/A)

Compound quantitation acceptable? (Levels D, E) ..... Yes No (N/A)

Results reported for all requested analyses? ..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E) ..... Yes No (N/A)

Detection limits meet RDL? ..... Yes (No) N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments:

Aroclor-1016 MDL > CRDL

9. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed?	Yes	No	N/A
Lot check performed?	Yes	No	N/A
Check recoveries acceptable?	Yes	No	N/A
GPC cleanup performed?	Yes	No	N/A
GPC check performed?	Yes	No	N/A
GPC check recoveries acceptable?	Yes	No	N/A
GPC calibration performed?	Yes	No	N/A
GPC calibration check performed?	Yes	No	N/A
GPC calibration check retention times acceptable?	Yes	No	N/A
Check/calibration materials traceable?	Yes	No	N/A
Check/calibration materials Expired?	Yes	No	N/A
Analytical batch QC given similar cleanup?	Yes	No	N/A
Transcription/Calculation Errors?	Yes	No	N/A

Comments:

Comments:

More

Appendix 6

Additional Documentation Requested By Client

LABCORE Completed Batch Report for Batch# 00026128

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1103020002	BLNK				
2	S1103020003	LCS				
3	S11V004119	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
4	S1103020005	MS	S11V004119			
5	S1103020006	MSD	S11V004119			
6	S11V004140	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004102	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00026128

Analyst: Ojanen, Carol **Book#:**

Instrument: GCECD1 for PCB's

Method: PCB 222S, LA-523-140 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00025953

Batch Comment:

C-Farm WMC 2011-C8100, PCB ASE, SOL, prep # 25953

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	BLNK	S1103020002		0 0	O		Aroclor-1016	SOLID		<1.9709E+01			19.709	ug/Kg			U
1	BLNK	S1103020002		0 0	O		Aroclor-1221	SOLID		<3.2582E+00			3.2582	ug/Kg			U
1	BLNK	S1103020002		0 0	O		Aroclor-1232	SOLID		<5.5273E+00			5.5273	ug/Kg			U
1	BLNK	S1103020002		0 0	O		Aroclor-1242	SOLID		<1.3171E+01			13.171	ug/Kg			U
1	BLNK	S1103020002		0 0	O		Aroclor-1248	SOLID		<7.4509E+00			7.4509	ug/Kg			U
1	BLNK	S1103020002		0 0	O		Aroclor-1254	SOLID		<4.7745E+00			4.7745	ug/Kg			U
1	BLNK	S1103020002		0 0	O		Aroclor-1260	SOLID		<7.7164E+00			7.7164	ug/Kg			U
Sample Sequence 2																	
2	LCS	S1103020003		0 0	O		Aroclor-1254	SOLID	181.8181	1.7170E+02			4.7745	ug/Kg	94.435	% Recovery	
Sample Sequence 3																	
3	SAMPLE	S11V004119		0 0	O		Aroclor-1016	SOLID	N/A	<2.0644E+01			20.644	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Aroclor-1221	SOLID	N/A	<3.4128E+00			3.4128	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Aroclor-1232	SOLID	N/A	<5.7896E+00			5.7896	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Aroclor-1242	SOLID	N/A	<1.3796E+01			13.796	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Aroclor-1248	SOLID	N/A	<7.8045E+00			7.8045	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Aroclor-1254	SOLID	N/A	<5.0011E+00			5.0011	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Aroclor-1260	SOLID	N/A	<8.0825E+00			8.0825	ug/Kg			U
3	SAMPLE	S11V004119		0 0	O		Tetrachloro-m-xylene	SOLID	76.17841	8.9240E+01				ug/Kg	117	% Recovery	
3	SAMPLE	S11V004119		0 0	O		Decachlorobiphenyl	SOLID	76.17841	7.2730E+01				ug/Kg	95.5	% Recovery	
Sample Sequence 4																	
4	MS	S1103020005	S11V004119	0 0	O		Aroclor-1254	SOLID	186.4896	1.8750E+02			4.8972	ug/Kg	100.54	% Recovery	
Sample Sequence 5																	
5	MSD	S1103020006	S11V004119	0 0	O		Aroclor-1254	SOLID	188.3963	1.8590E+02			4.9473	ug/Kg	98.675	% Recovery	
															1.8723	% RPD	
Sample Sequence 6																	
6	SAMPLE	S11V004140		0 0	O		Aroclor-1016	SOLID	N/A	<2.0834E+01			20.834	ug/Kg			U
6	SAMPLE	S11V004140		0 0	O		Aroclor-1221	SOLID	N/A	<3.4442E+00			3.4442	ug/Kg			U
6	SAMPLE	S11V004140		0 0	O		Aroclor-1232	SOLID	N/A	<5.8428E+00			5.8428	ug/Kg			U
6	SAMPLE	S11V004140		0 0	O		Aroclor-1242	SOLID	N/A	<1.3923E+01			13.923	ug/Kg			U
6	SAMPLE	S11V004140		0 0	O		Aroclor-1248	SOLID	N/A	<7.8762E+00			7.8762	ug/Kg			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026128

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
6	SAMPLE	S11V004140		0 0	O		Aroclor-1254	SOLID	N/A	<5.0471E+00			5.0471	ug/Kg			U
6	SAMPLE	S11V004140		0 0	O		Aroclor-1260	SOLID	N/A	<8.1568E+00			8.1568	ug/Kg			U
6	SAMPLE	S11V004140		0 0	O		Tetrachloro-m-xylene	SOLID	76.87878	6.7230E+01				ug/Kg	87.4	% Recovery	
6	SAMPLE	S11V004140		0 0	O		Decachlorobiphenyl	SOLID	76.87878	8.4400E+01				ug/Kg	110	% Recovery	
Sample Sequence 7																	
7	SAMPLE	S11V004102		0 0	O		Aroclor-1016	SOLID	N/A	<2.1025E+01			21.025	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Aroclor-1221	SOLID	N/A	<3.4757E+00			3.4757	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Aroclor-1232	SOLID	N/A	<5.8964E+00			5.8964	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Aroclor-1242	SOLID	N/A	<1.4050E+01			14.05	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Aroclor-1248	SOLID	N/A	<7.9484E+00			7.9484	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Aroclor-1254	SOLID	N/A	<5.0934E+00			5.0934	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Aroclor-1260	SOLID	N/A	<8.2316E+00			8.2316	ug/Kg			U
7	SAMPLE	S11V004102		0 0	O		Tetrachloro-m-xylene	SOLID	77.58369	8.6060E+01				ug/Kg	111	% Recovery	
7	SAMPLE	S11V004102		0 0	O		Decachlorobiphenyl	SOLID	77.58369	7.8440E+01				ug/Kg	101	% Recovery	

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00026128

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

Date: 14 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: C Farm C8100
Subject: Inorganics - Sample Data Group (SDG) 20110264

INTRODUCTION

This memorandum presents the results of data validation for SDG 20110264 prepared by 222-S Laboratory. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2B1L6	02/24/11	Soil	C	200.7, 200.8, Hg
B2C1N1	04/04/11	Soil	C	200.7, 200.8, Hg

Data validation was conducted in accordance with the CHPRC validation statement of work and the Field Sampling and Analysis Plan for Waste Management Area C, RPP-PLAN-40564, Rev. 3, (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP metals are analysis within 180 days of sample collection, and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation for all analytes requires chilling to 6 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

The Ca, Fe and sulfur laboratory blank results associated with sample B2B1L6 were > the method detection limits (MDLs) but < the reporting limits (RLs). The Ca, Fe and sulfur sample results were well above the RLs and should not be qualified.

The Ca and sulfur laboratory blank results associated with sample B2C1N1 were > the MDLs but < the RLs. The Ca and sulfur sample results were detects well above the RLs and should not be qualified.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the matrix spike sample accuracy limits are 75% to 125% and the laboratory control sample accuracy limits were 80% to 120%. The interference check sample limits are ones specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

The MS recoveries for sulfur and zirconium associated with sample B2C1N1 were below the lower acceptance limit but ≥30%; however the PDS were within the acceptance limit. The sulfur and zirconium sample results were detects and should be qualified as estimates and flagged "J."

The MS recoveries for B, sulfur and Sr associated with sample B2B1L6, were above the acceptance limit; however the post digestion spike (PDS) were within the acceptance limit. The B, sulfur and Sr sample results were detects and should be qualified as estimates and flagged "J." The MS recoveries for silicon and zirconium were <30%; however the PDS were within the acceptance limit. The silicon and zirconium sample results were detects and should be qualified as estimates and flagged "J."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

The LCS recovery for silicon associated with sample B2C1N1 was below the lower acceptance limit but >40%. The silicon sample result was detect and should be qualified as an estimate and flagged " J-."

The LCS recovery for silicon associated with sample B2B1L6 was <40%. The sample result was a detect and should be qualified as an estimate and would be flagged J-, but was further flagged "J" due to spike infraction.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate sample results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the SAP required detection limits with differences <2X the required detection limits no precision infraction occurred. The serial dilution limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable with the following exception.

The Co RPD associated with sample B2B1L6 was above the acceptance limit. The sample result was a detection and should be qualified as an estimate and flagged "J."

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs with associated non-detected sample results were below the CRDLs with the following exceptions. The Se MDLs for samples B2B1L6 and B2C1N1 were greater than the CRDL.

- **Completeness**

SDG 20110264 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to matrix spike and LCS recovery infractions and poor precision data. See the table in Appendix 2 for a listing of all affected sample results.

It should be noted that a Chain-of-Custody was not included for sample B2C1N1, since the sample was a composite from three other samples. The COC that included the three composite samples was included.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

RPP-PLAN-40564, Rev. 3, *Field Sampling and Analysis Plan for Waste Management Area C*, September 2011.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDG: 20110264	Reviewer: AQA	Project: C Farm C8100	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
B, sulfur, Sr	J	B2B1L6	High matrix spike recoveries
Zirconium	J	B2B1L6	Very low matrix spike recovery
Silicon	J	B2B1L6	Very low matrix spike recovery and very low LCS recovery
Silicon	J-	B2C1N1	Low LCS recovery
Sulfur, Zirconium	J	B2C1N1	Low matrix spike recoveries
Co	J	B2B1L6	Poor duplicate precision

Comments: None

Appendix 3

Annotated Laboratory Reports

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DSR.Jar v. 2.7.27

Data Summary Report

Sample Group: 20110264
Core Number: C8100
Customer Sample ID: B2B1L6
Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004098		%WATERA	%WATER-APD	%	n/a	n/a	6.970	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004098		57-12-5	Cyanide	ug/g	92.0	<0.0370	<0.480	<0.480	n/a	n/a	87.7	0.480	n/a	U
S11V004098		WT%SOLID	Weight percent solids	%	n/a	n/a	93.0	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004098		7439-97-6	Mercury	ug/g	97.0	<1.00E-04	0.0104	n/a	n/a	n/a	91.8	9.15E-03	n/a	B
S11V004098		PH	pH	unitless	n/a	n/a	8.69	8.62	8.66	0.809	n/a	0.0100	n/a	
S11V004099		13966-00-2	Potassium-40	uCi/g	n/a	n/a	9.26E-06	9.29E-06	9.28E-06	0.339	n/a	2.39E-06	7.16	
S11V004099		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.47E-08	<8.49E-08	n/a	n/a	n/a	8.47E-08	n/a	U
S11V004099		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.53E-07	<2.25E-07	n/a	n/a	n/a	2.53E-07	n/a	U
S11V004099		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	4.84E-06	6.45E-06	5.64E-06	28.6	n/a	9.82E-08	1.27	
S11V004099		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<2.09E-07	<2.07E-07	n/a	n/a	n/a	2.09E-07	n/a	U
S11V004099		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.50E-07	<1.50E-07	n/a	n/a	n/a	1.50E-07	n/a	U
S11V004099		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.90E-07	<2.85E-07	n/a	n/a	n/a	2.90E-07	n/a	U
S11V004099		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.53E-07	2.57E-07	2.55E-07	1.66	n/a	9.44E-08	10.71	
S11V004099		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.10E-07	6.30E-07	5.70E-07	21.1	n/a	1.51E-07	9.95	
S11V004099		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	9.54E-07	1.19E-06	1.07E-06	22.2	n/a	2.05E-07	8.80	
S11V004099		15067-28-4	Lead-214	uCi/g	n/a	n/a	8.12E-07	9.83E-07	8.98E-07	19.1	n/a	2.13E-07	10.28	
S11V004099		13982-63-3	Radium-226	uCi/g	n/a	n/a	1.88E-06	1.98E-06	1.93E-06	5.01	n/a	1.53E-06	27.51	
S11V004099		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<4.37E-05	<4.51E-05	n/a	n/a	n/a	4.37E-05	n/a	U
S11V004099		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<1.14E-05	<1.16E-05	n/a	n/a	n/a	1.14E-05	43.18	U
S11V004099		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<2.13E-06	<1.81E-06	n/a	n/a	n/a	2.13E-06	n/a	U
S11V004101		CONDUCT	Conductivity	uMHO/cm	98.7	<1.00	312	296	304	5.29	n/a	1.00	n/a	
S11V004101	WV	14133-76-7	Technetium-99	ug/g	100	<6.00E-06	<6.27E-06	<6.29E-06	n/a	n/a	105	6.27E-06	n/a	U
S11V004102	O	12674-11-2	Aroclor 1016	ug/kg	n/a	<19.7	<21.0	n/a	n/a	n/a	n/a	21.0	n/a	U
S11V004102	O	11104-28-2	Aroclor 1221	ug/kg	n/a	<3.26	<3.48	n/a	n/a	n/a	n/a	3.48	n/a	U
S11V004102	O	11141-16-5	Aroclor 1232	ug/kg	n/a	<5.53	<5.90	n/a	n/a	n/a	n/a	5.90	n/a	U
S11V004102	O	53469-21-9	Aroclor 1242	ug/kg	n/a	<13.2	<14.0	n/a	n/a	n/a	n/a	14.0	n/a	U
S11V004102	O	12672-29-6	Aroclor 1248	ug/kg	n/a	<7.45	<7.95	n/a	n/a	n/a	n/a	7.95	n/a	U
S11V004102	O	11097-69-1	Aroclor 1254	ug/kg	94.4	<4.77	<5.09	n/a	n/a	n/a	n/a	5.09	n/a	U
S11V004102	O	11096-82-5	Aroclor 1260	ug/kg	n/a	<7.72	<8.23	n/a	n/a	n/a	n/a	8.23	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
B - Blank Contamination
T - MS/MSD Outside Range
J - Estimated
C - Blank Contamination
U - Less Than Detection Limit
N - MS/MSD Outside Range
B - Estimated
M - RPD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004103	A	7440-36-0	Antimony	ug/g	102	<2.00E-04	0.219	0.183	0.201	17.8	99.5	9.76E-03	n/a	
S11V004103	A	SN-117	Tin-117	ug/g	105	<1.00E-03	<0.0488	<0.0494	n/a	n/a	107	0.0488	n/a	U
S11V004103	A	15832-50-5	Tin-126	ug/g	n/a	<2.00E-05	<9.76E-04	<9.89E-04	n/a	n/a	n/a	9.76E-04	n/a	U
S11V004104	O	120-82-1	1,2,4-Trichlorobenzene	ug/kg	86.3	<77.4	<75.9	n/a	n/a	n/a	96.6	75.9	n/a	UT
S11V004104	O	95-50-1	1,2-Dichlorobenzene	ug/kg	n/a	<101	<98.8	n/a	n/a	n/a	n/a	98.8	n/a	U
S11V004104	O	121-14-2	2,4-Dinitrotoluene	ug/kg	93.1	<38.1	<37.4	n/a	n/a	n/a	90.0	37.4	n/a	U
S11V004104	O	95-95-4	2,4,5-Trichlorophenol	ug/kg	n/a	<44.0	<43.2	n/a	n/a	n/a	n/a	43.2	n/a	U
S11V004104	O	88-06-2	2,4,6-Trichlorophenol	ug/kg	n/a	<49.5	<48.6	n/a	n/a	n/a	n/a	48.6	n/a	U
S11V004104	O	95-48-7	2-Methylphenol	ug/kg	n/a	<57.5	<56.4	n/a	n/a	n/a	n/a	56.4	n/a	U
S11V004104	O	88-75-5	2-Nitrophenol	ug/kg	n/a	<53.7	<52.7	n/a	n/a	n/a	n/a	52.7	n/a	U
S11V004104	O	65794-96-9	3 &4 Methylphenol	ug/kg	n/a	<51.4	<50.4	n/a	n/a	n/a	n/a	50.4	n/a	U
S11V004104	O	83-32-9	Acenaphthene	ug/kg	87.3	<17.6	<17.3	n/a	n/a	n/a	102	17.3	n/a	U
S11V004104	O	56-55-3	Benzo(a)anthracene	ug/kg	n/a	<37.8	<37.1	n/a	n/a	n/a	n/a	37.1	n/a	U
S11V004104	O	205-99-2	Benzo(b)fluoranthene	ug/kg	n/a	<48.9	<48.0	n/a	n/a	n/a	n/a	48.0	n/a	U
S11V004104	O	50-32-8	Benzo(a)pyrene	ug/kg	n/a	<41.2	<40.4	n/a	n/a	n/a	n/a	40.4	n/a	U
S11V004104	O	117-81-7	Bis(2-ethylhexyl) phthalate	ug/kg	n/a	<590	<579	n/a	n/a	n/a	n/a	579	n/a	U
S11V004104	O	207-08-9	Benzo(k)fluoranthene	ug/kg	n/a	<39.1	<38.4	n/a	n/a	n/a	n/a	38.4	n/a	U
S11V004104	O	85-68-7	Butylbenzylphthalate	ug/kg	n/a	<50.0	<49.0	n/a	n/a	n/a	n/a	49.0	n/a	U
S11V004104	O	59-50-7	4-Chloro-3-methylphenol	ug/kg	87.3	<43.2	<42.4	n/a	n/a	n/a	97.4	42.4	n/a	UT
S11V004104	O	95-57-8	2-Chlorophenol	ug/kg	86.0	<66.5	<65.2	n/a	n/a	n/a	91.3	65.2	n/a	U
S11V004104	O	218-01-9	Chrysene	ug/kg	n/a	<81.4	<79.8	n/a	n/a	n/a	n/a	79.8	n/a	U
S11V004104	O	53-70-3	Dibenz[a,h]anthracene	ug/kg	n/a	<51.1	<50.1	n/a	n/a	n/a	n/a	50.1	n/a	U
S11V004104	O	84-74-2	Di-n-butylphthalate	ug/kg	n/a	<562	<552	n/a	n/a	n/a	n/a	552	n/a	U
S11V004104	O	117-84-0	Di-n-octylphthalate	ug/kg	n/a	<47.7	<46.8	n/a	n/a	n/a	n/a	46.8	n/a	U
S11V004104	O	621-64-7	N-Nitroso-di-n-dipropylamine	ug/kg	87.3	<58.1	<57.0	n/a	n/a	n/a	102	57.0	n/a	UT
S11V004104	O	206-44-0	Fluoranthene	ug/kg	n/a	<35.4	<34.7	n/a	n/a	n/a	n/a	34.7	n/a	U
S11V004104	O	87-68-3	Hexachlorobutadiene	ug/kg	n/a	<69.7	<68.4	n/a	n/a	n/a	n/a	68.4	n/a	U
S11V004104	O	67-72-1	Hexachloroethane	ug/kg	n/a	<112	<110	n/a	n/a	n/a	n/a	110	n/a	U
S11V004104	O	193-39-5	Indeno(1,2,3-cd)pyrene	ug/kg	n/a	<51.0	<50.0	n/a	n/a	n/a	n/a	50.0	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
U - Less Than Detection Limit
B - Estimated
B - Blank Contamination
C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004104	O	91-20-3	Naphthalene	ug/kg	n/a	<62.6	<61.4	n/a	n/a	n/a	n/a	61.4	n/a	U
S11V004104	O	98-95-3	Nitrobenzene	ug/kg	n/a	<64.6	<63.4	n/a	n/a	n/a	n/a	63.4	n/a	U
S11V004104	O	87-86-5	Pentachlorophenol	ug/kg	106	<37.5	<36.8	n/a	n/a	n/a	96.1	36.8	n/a	U
S11V004104	O	129-00-0	Pyrene	ug/kg	104	<62.9	<61.7	n/a	n/a	n/a	114	61.7	n/a	UT
S11V004104	O	110-86-1	Pyridine	ug/kg	n/a	<65.0	<63.8	n/a	n/a	n/a	n/a	63.8	n/a	U
S11V004104	O	126-73-8	Tributyl phosphate	ug/kg	n/a	<108	<106	n/a	n/a	n/a	n/a	106	n/a	U
S11V004104	O	128-37-0	BHT	ug/kg	n/a	<236	<231	n/a	n/a	n/a	n/a	231	n/a	U
S11V004104	O	110-80-5	2-Ethoxyethanol	ug/kg	n/a	<182	<179	n/a	n/a	n/a	n/a	179	n/a	U
S11V004104	O	1319-77-3	Total Methylphenols	ug/kg	n/a	<107	<105	n/a	n/a	n/a	n/a	105	n/a	U
S11V004104	O	108-94-1	Cyclohexanone	ug/kg	n/a	<558	<547	n/a	n/a	n/a	n/a	547	n/a	U
S11V004104	O	59-89-2	N-Nitrosomorpholine	ug/kg	n/a	<191	<188	n/a	n/a	n/a	n/a	188	n/a	U
S11V004104	O	78-83-1	Isobutanol	ug/kg	n/a	<460	<452	n/a	n/a	n/a	n/a	452	n/a	U
S11V004105	W	16984-48-8	Fluoride	ug/g	103	<1.61E-03	0.502	0.438	0.470	13.8	108	0.0142	n/a	
S11V004105	W	GLYCOLAT	Glycolate	ug/g	101	<9.37E-03	<0.0826	<0.0821	n/a	n/a	103	0.0826	n/a	U
S11V004105	W	71-50-1	Acetate	ug/g	103	<6.04E-03	3.22	<0.0529	n/a	n/a	105	0.0532	n/a	
S11V004105	W	FORMATE	Formate	ug/g	103	0.0206	0.236	0.189	0.213	22.3	105	0.0412	n/a	B
S11V004105	W	16887-00-6	Chloride	ug/g	102	0.0207	0.354	0.312	0.333	12.9	107	0.0880	n/a	C
S11V004105	W	14797-65-0	Nitrite	ug/g	102	0.0637	0.613	0.854	0.734	32.8	102	0.169	n/a	CB
S11V004105	W	14808-79-8	Sulfate	ug/g	105	0.0350	2.94	2.57	2.75	13.7	107	0.165	n/a	
S11V004105	W	338-70-5	Oxalate	ug/g	101	<0.0231	<0.204	<0.202	n/a	n/a	104	0.204	n/a	U
S11V004105	W	24959-67-9	Bromide	ug/g	103	<0.0580	<0.511	<0.508	n/a	n/a	106	0.511	n/a	U
S11V004105	W	14797-55-8	Nitrate	ug/g	102	<0.0208	3.24	3.01	3.13	7.40	105	0.183	n/a	
S11V004105	W	14265-44-2	Phosphate	ug/g	102	<0.0167	1.77	1.53	1.65	14.1	105	0.147	n/a	B
S11V004106	A	7429-90-5	Aluminum	ug/g	91.6	<0.0300	7.74E+03	8.43E+03	8.09E+03	8.54	2.81E+03	2.74	n/a	
S11V004106	A	7440-42-8	Boron J	ug/g	89.1	<0.0300	43.9	47.5	45.7	7.89	134	2.74	n/a	N
S11V004106	A	7440-39-3	Barium	ug/g	96.7	<3.00E-03	244	272	258	10.6	179	0.274	n/a	
S11V004106	A	7440-41-7	Beryllium	ug/g	101	<1.00E-03	0.328	0.368	0.348	11.4	97.7	0.0915	n/a	B
S11V004106	A	7440-70-2	Calcium	ug/g	90.8	0.139	1.53E+04	1.94E+04	1.74E+04	23.5	6.45E+03	4.57	n/a	
S11V004106	A	7440-45-1	Cerium	ug/g	98.7	<0.0300	20.3	22.4	21.4	10.0	103	2.74	n/a	B

NA = Not Analyzed, ND = Not Detected

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N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004106	A	7440-48-4	Cobalt J	ug/g	92.1	<0.0100	6.34	8.92	7.63	33.8	102	0.915	n/a	B
S11V004106	A	7440-47-3	Chromium	ug/g	92.9	<5.00E-03	10.5	8.56	9.53	20.5	98.5	0.457	n/a	
S11V004106	A	7440-50-8	Copper	ug/g	97.0	<5.00E-03	11.8	13.0	12.4	9.32	111	0.457	n/a	
S11V004106	A	7439-89-6	Iron	ug/g	92.3	0.0102	1.87E+04	2.02E+04	1.94E+04	7.71	3.44E+03	0.457	n/a	
S11V004106	A	7440-09-7	Potassium	ug/g	91.1	<0.500	950	958	954	0.896	127	45.7	n/a	
S11V004106	A	7439-91-0	Lanthanum	ug/g	95.2	<3.00E-03	9.38	10.0	9.71	6.73	101	0.274	n/a	
S11V004106	A	7439-93-2	Lithium	ug/g	103	<3.00E-03	8.68	8.82	8.75	1.61	100	0.274	n/a	
S11V004106	A	7439-95-4	Magnesium	ug/g	91.9	<0.0500	6.05E+03	6.83E+03	6.44E+03	12.1	1.15E+03	4.57	n/a	
S11V004106	A	7439-96-5	Manganese	ug/g	91.9	<3.00E-03	240	256	248	6.52	160	0.274	n/a	
S11V004106	A	7439-98-7	Molybdenum	ug/g	92.0	<0.0200	<1.83	<1.93	n/a	n/a	95.2	1.83	n/a	U
S11V004106	A	7440-23-5	Sodium	ug/g	100	<0.100	515	542	529	5.15	525	9.15	n/a	
S11V004106	A	7440-02-0	Nickel	ug/g	91.6	<0.0200	13.7	13.3	13.5	3.16	92.1	1.83	n/a	B
S11V004106	A	7723-14-0	Phosphorus	ug/g	95.2	<0.0500	763	833	798	8.76	343	4.57	n/a	
S11V004106	A	7440-10-0	Praseodymium	ug/g	103	<0.0100	2.26	2.08	2.17	8.23	100	0.915	n/a	B
S11V004106	A	7704-34-9	Sulfur J	ug/g	99.5	0.239	129	142	135	9.64	136	9.15	n/a	N
S11V004106	A	7440-21-3	Silicon J	ug/g	16.0	<0.0300	68.6	84.7	76.7	20.9	-6.93	2.74	n/a	N
S11V004106	A	7440-31-5	Tin	ug/g	88.8	<0.0300	3.03	<2.89	n/a	n/a	94.1	2.74	n/a	B
S11V004106	A	7440-24-6	Strontium J	ug/g	95.7	<3.00E-03	125	140	132	11.5	128	0.274	n/a	N
S11V004106	A	13494-80-9	Tellurium	ug/g	90.4	<0.100	11.3	<9.63	n/a	n/a	88.2	9.15	n/a	B
S11V004106	A	7440-32-6	Titanium	ug/g	93.4	<5.00E-03	1.18E+03	1.18E+03	1.18E+03	0.677	91.6	0.457	n/a	
S11V004106	A	7440-62-2	Vanadium	ug/g	94.1	<5.00E-03	41.9	42.5	42.2	1.34	107	0.457	n/a	
S11V004106	A	7440-65-5	Yttrium	ug/g	94.2	<2.00E-03	8.99	9.63	9.31	6.90	98.3	0.183	n/a	
S11V004106	A	7440-66-6	Zinc	ug/g	91.4	<5.00E-03	34.3	35.5	34.9	3.70	111	0.457	n/a	
S11V004106	A	7440-67-7	Zirconium J	ug/g	92.4	<5.00E-03	15.7	13.3	14.5	16.8	-9.18	0.457	n/a	N
S11V004106	A	14269-63-7	Thorium-230	ug/g	n/a	<7.00E-06	<6.40E-05	7.92E-05	n/a	n/a	n/a	6.40E-05	n/a	U
S11V004106	A	TH-232	Thorium-232	ug/g	109	<5.00E-04	2.59	2.77	2.68	6.57	113	4.57E-03	n/a	
S11V004106	A	13968-55-3	Uranium-233	ug/g	102	<2.00E-04	<1.83E-03	<1.93E-03	n/a	n/a	98.7	1.83E-03	n/a	U
S11V004106	A	13966-29-5	Uranium-234	ug/g	n/a	<5.00E-06	<4.57E-05	<4.81E-05	n/a	n/a	n/a	4.57E-05	n/a	U
S11V004106	A	15117-96-1	Uranium-235	ug/g	109	<1.00E-05	4.49E-03	4.66E-03	4.57E-03	3.68	102	9.15E-05	n/a	

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004106	A	13982-70-2	Uranium-236	ug/g	n/a	<4.00E-06	<3.66E-05	<3.85E-05	n/a	n/a	n/a	3.66E-05	n/a	U
S11V004106	A	13994-20-2	Neptunium-237	ug/g	107	<1.00E-04	<9.15E-04	<9.63E-04	n/a	n/a	107	9.15E-04	n/a	U
S11V004106	A	U-238	Uranium-238	ug/g	109	<5.00E-04	0.646	0.689	0.668	6.52	112	4.57E-03	n/a	
S11V004106	A	7440-22-4	Silver	ug/g	109	<2.00E-03	0.0624	0.0783	0.0704	22.6	102	0.0183	n/a	B
S11V004106	A	7440-38-2	Arsenic	ug/g	94.1	<0.0420	3.27	3.49	3.38	6.74	98.0	0.384	n/a	B
S11V004106	A	7440-43-9	Cadmium	ug/g	107	<6.00E-03	0.102	0.0968	0.0994	5.10	105	0.0549	n/a	B
S11V004106	A	7439-92-1	Lead	ug/g	101	<0.0150	5.29	5.42	5.36	2.47	102	0.137	n/a	
S11V004106	A	7782-49-2	Selenium	ug/g	103	<0.135	<1.23	<1.30	n/a	n/a	101	1.23	n/a	U
S11V004106	A	7440-28-0	Thallium	ug/g	101	<4.00E-03	0.0617	0.0675	0.0646	9.12	101	0.0366	n/a	B
~~S11V004107~~	~~S~~	~~14798-03-9~~	~~Ammonium~~	~~ug/g~~	~~103~~	~~<0.120~~	~~3.82~~	~~3.22~~	~~3.52~~	~~17.1~~	~~98.7~~	~~0.472~~	~~n/a~~	~~B~~
S11V004108	A	14133-76-7	Technetium-99	ug/g	107	<6.00E-05	<5.71E-04	<5.74E-04	n/a	n/a	102	5.71E-04	n/a	U
~~S11V004109~~	~~E~~	~~CM-243/244~~	~~Curium-243/244~~	~~uCi/g~~	~~n/a~~	~~<4.58E-08~~	~~<3.37E-08~~	~~<4.15E-08~~	~~n/a~~	~~n/a~~	~~n/a~~	~~3.37E-08~~	~~n/a~~	~~U~~
S11V004109	E	14596-10-2	Americium-241	uCi/g	103	<5.32E-08	<4.76E-08	<3.63E-08	n/a	n/a	n/a	4.76E-08	n/a	U
S11V004109	E	15510-73-3	Curium-242	uCi/g	n/a	<2.34E-08	<1.16E-08	<1.08E-08	n/a	n/a	n/a	1.16E-08	n/a	U
S11V004109	E	PU-239/240	Plutonium-239/240	uCi/g	107	<6.34E-08	3.78E-08	<5.18E-08	n/a	n/a	n/a	3.71E-08	33.33	
S11V004109	E	13981-16-3	Plutonium-238	uCi/g	n/a	<6.58E-08	<4.04E-08	9.40E-08	6.72E-08	79.7	n/a	4.04E-08	n/a	U
S11V004110	E	SR-89/90	Strontium-89/90	uCi/g	111	<4.70E-07	3.95E-06	3.97E-06	3.96E-06	0.542	n/a	2.22E-07	14.727	
S11V004111	E	13981-37-8	Nickel-63	uCi/g	102	<1.02E-05	<6.24E-06	<5.03E-06	n/a	n/a	n/a	6.24E-06	n/a	U
S11V004112	E	15758-45-9	Selenium-79	uCi/g	n/a	4.77E-06	9.19E-06	5.96E-06	7.58E-06	42.6	n/a	1.66E-06	123.242	BE
S11V004113	W	14762-75-5	Carbon-14	uCi/g	92.2	<4.26E-06	<4.23E-06	5.29E-06	n/a	n/a	92.0	4.23E-06	n/a	U
~~S11V004113~~	~~W~~	~~10028-17-8~~	~~Tritium~~	~~uCi/g~~	~~99.3~~	~~<3.91E-06~~	~~<4.08E-06~~	~~<2.65E-06~~	~~n/a~~	~~n/a~~	~~102~~	~~4.08E-06~~	~~n/a~~	~~U~~

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004334		%WATERA	%WATER-APD	%	n/a	n/a	3.870	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004334		57-12-5	Cyanide	ug/g	97.9	<0.0370	<0.479	<0.480	n/a	n/a	98.0	0.479	n/a	U
S11V004334		WT%SOLID	Weight percent solids	%	n/a	n/a	96.1	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004334		7439-97-6	Mercury	ug/g	95.0	<1.00E-04	<9.97E-03	n/a	n/a	n/a	n/a	9.97E-03	n/a	U
S11V004334		PH	pH	unitless	n/a	n/a	8.75	8.72	8.74	0.343	n/a	0.0100	n/a	
S11V004335		13966-00-2	Potassium-40	uCi/g	n/a	n/a	1.34E-05	n/a	n/a	n/a	n/a	2.16E-06	4.68	
S11V004335		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.58E-08	n/a	n/a	n/a	n/a	8.58E-08	n/a	U
S11V004335		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.02E-07	n/a	n/a	n/a	n/a	2.02E-07	n/a	U
S11V004335		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	<6.60E-08	n/a	n/a	n/a	n/a	6.60E-08	n/a	U
S11V004335		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<1.87E-07	n/a	n/a	n/a	n/a	1.87E-07	n/a	U
S11V004335		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.31E-07	n/a	n/a	n/a	n/a	1.31E-07	n/a	U
S11V004335		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.49E-07	n/a	n/a	n/a	n/a	2.49E-07	n/a	U
S11V004335		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.07E-07	n/a	n/a	n/a	n/a	8.95E-08	15.47	
S11V004335		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.67E-07	n/a	n/a	n/a	n/a	1.19E-07	6.51	
S11V004335		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	4.13E-07	n/a	n/a	n/a	n/a	1.90E-07	17.34	
S11V004335		15067-28-4	Lead-214	uCi/g	n/a	n/a	4.09E-07	n/a	n/a	n/a	n/a	1.63E-07	11.50	
S11V004335		13982-63-3	Radium-226	uCi/g	n/a	n/a	<1.39E-06	n/a	n/a	n/a	n/a	1.39E-06	40.38	U
S11V004335		14331-83-0	Actinium-228	uCi/g	n/a	n/a	5.26E-07	n/a	n/a	n/a	n/a	3.37E-07	14.29	
S11V004335		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<3.92E-05	n/a	n/a	n/a	n/a	3.92E-05	n/a	U
S11V004335		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<4.16E-06	n/a	n/a	n/a	n/a	4.16E-06	n/a	U
S11V004335		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<1.84E-06	n/a	n/a	n/a	n/a	1.84E-06	n/a	U
S11V004336		CONDUCT	Conductivity	uMHO/cm	98.5	<1.00	370	n/a	n/a	n/a	n/a	1.00	n/a	
S11V004336	WV	14133-76-7	Technetium-99	ug/g	99.8	<6.00E-06	<5.76E-06	n/a	n/a	n/a	n/a	5.76E-06	n/a	U
S11V004338	A	7440-36-0	Antimony	ug/g	110	<2.00E-04	0.121	n/a	n/a	n/a	n/a	1.99E-03	n/a	
S11V004338	A	SN-117	Tin-117	ug/g	105	<1.00E-03	0.0324	n/a	n/a	n/a	n/a	9.96E-03	n/a	
S11V004338	A	15832-50-5	Tin-126	ug/g	n/a	<2.00E-05	3.92E-04	n/a	n/a	n/a	n/a	1.99E-04	n/a	E
S11V004339	O	120-82-1	1,2,4-Trichlorobenzene	ug/kg	75.0	<77.4	<72.2	n/a	n/a	n/a	75.6	72.2	n/a	U
S11V004339	O	95-50-1	1,2-Dichlorobenzene	ug/kg	n/a	<101	<93.9	n/a	n/a	n/a	n/a	93.9	n/a	U
S11V004339	O	106-46-7	1,4-Dichlorobenzene	ug/kg	71.9	<113	<106	n/a	n/a	n/a	69.4	106	n/a	U

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004339	O	129-00-0	Pyrene	ug/kg	103	<62.9	<58.7	n/a	n/a	n/a	95.5	58.7	n/a	U
S11V004339	O	110-86-1	Pyridine	ug/kg	n/a	<65.0	<60.6	n/a	n/a	n/a	n/a	60.6	n/a	U
S11V004339	O	126-73-8	Tributyl phosphate	ug/kg	n/a	<108	<101	n/a	n/a	n/a	n/a	101	n/a	U
S11V004339	O	128-37-0	BHT	ug/kg	n/a	<236	<220	n/a	n/a	n/a	n/a	220	n/a	U
S11V004339	O	110-80-5	2-Ethoxyethanol	ug/kg	n/a	<182	<170	n/a	n/a	n/a	n/a	170	n/a	U
S11V004339	O	1319-77-3	Total Methylphenols	ug/kg	n/a	<107	<99.4	n/a	n/a	n/a	n/a	99.4	n/a	U
S11V004339	O	108-94-1	Cyclohexanone	ug/kg	n/a	<559	<522	n/a	n/a	n/a	n/a	522	n/a	U
S11V004339	O	59-89-2	N-Nitrosomorpholine	ug/kg	n/a	<191	<178	n/a	n/a	n/a	n/a	178	n/a	U
S11V004339	O	78-83-1	Isobutanol	ug/kg	n/a	n/a	<429	n/a	n/a	n/a	n/a	429	n/a	U
S11V004340	W	16984-48-8	Fluoride	ug/g	104	<1.61E-03	1.14	n/a	n/a	n/a	n/a	0.0157	n/a	M
S11V004340	W	GLYCOLAT	Glycolate	ug/g	101	<9.37E-03	<0.0913	n/a	n/a	n/a	n/a	0.0913	n/a	U
S11V004340	W	71-50-1	Acetate	ug/g	105	<6.04E-03	0.494	n/a	n/a	n/a	n/a	0.0589	n/a	B
S11V004340	W	FORMATE	Formate	ug/g	103	<4.67E-03	0.270	n/a	n/a	n/a	n/a	0.0455	n/a	B
S11V004340	W	16887-00-6	Chloride	ug/g	104	<9.98E-03	14.0	n/a	n/a	n/a	n/a	0.0973	n/a	
S11V004340	W	14797-65-0	Nitrite	ug/g	103	0.0518	0.435	n/a	n/a	n/a	n/a	0.187	n/a	CB
S11V004340	W	14808-79-8	Sulfate	ug/g	105	<0.0187	95.8	n/a	n/a	n/a	n/a	0.182	n/a	
S11V004340	W	338-70-5	Oxalate	ug/g	101	<0.0231	<0.225	n/a	n/a	n/a	n/a	0.225	n/a	U
S11V004340	W	24959-67-9	Bromide	ug/g	104	<0.0580	<0.565	n/a	n/a	n/a	n/a	0.565	n/a	U
S11V004340	W	14797-55-8	Nitrate	ug/g	103	<0.0208	7.59	n/a	n/a	n/a	n/a	0.203	n/a	
S11V004340	W	14265-44-2	Phosphate	ug/g	103	<0.0167	<0.163	n/a	n/a	n/a	n/a	0.163	n/a	UN
S11V004341	A	7429-90-5	Aluminum	ug/g	88.6	<0.0300	6.38E+03	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341	A	7440-42-8	Boron	ug/g	87.4	<0.0300	3.46	n/a	n/a	n/a	n/a	1.50	n/a	B
S11V004341	A	7440-39-3	Barium	ug/g	93.9	<3.00E-03	60.0	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341	A	7440-41-7	Beryllium	ug/g	96.2	<1.00E-03	0.119	n/a	n/a	n/a	n/a	0.0499	n/a	B
S11V004341	A	7440-69-9	Bismuth	ug/g	87.5	<0.100	7.23	n/a	n/a	n/a	n/a	4.99	n/a	B
S11V004341	A	7440-70-2	Calcium	ug/g	84.4	0.0523	5.71E+03	n/a	n/a	n/a	n/a	2.49	n/a	
S11V004341	A	7440-45-1	Cerium	ug/g	96.7	<0.0300	16.8	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341	A	7440-48-4	Cobalt	ug/g	88.8	<0.0100	5.80	n/a	n/a	n/a	n/a	0.499	n/a	
S11V004341	A	7440-47-3	Chromium	ug/g	89.2	<5.00E-03	27.4	n/a	n/a	n/a	n/a	0.249	n/a	

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample#	R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004341		A	7440-50-8	Copper	ug/g	94.4	<5.00E-03	13.7	n/a	n/a	n/a	n/a	0.249	n/a	
S11V004341		A	7439-89-6	Iron	ug/g	88.2	<5.00E-03	1.80E+04	n/a	n/a	n/a	n/a	0.249	n/a	
S11V004341		A	7440-09-7	Potassium	ug/g	85.4	<0.500	1.10E+03	n/a	n/a	n/a	n/a	24.9	n/a	
S11V004341		A	7439-91-0	Lanthanum	ug/g	93.6	<3.00E-03	7.85	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341		A	7439-93-2	Lithium	ug/g	104	<3.00E-03	7.12	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341		A	7439-95-4	Magnesium	ug/g	87.3	<0.0500	4.17E+03	n/a	n/a	n/a	n/a	2.49	n/a	
S11V004341		A	7439-96-5	Manganese	ug/g	88.3	<3.00E-03	239	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341		A	7439-98-7	Molybdenum	ug/g	87.5	<0.0200	3.58	n/a	n/a	n/a	n/a	0.997	n/a	B
S11V004341		A	7440-23-5	Sodium	ug/g	102	<0.100	505	n/a	n/a	n/a	n/a	4.99	n/a	
S11V004341		A	7440-02-0	Nickel	ug/g	88.0	<0.0200	16.5	n/a	n/a	n/a	n/a	0.997	n/a	
S11V004341		A	7723-14-0	Phosphorus	ug/g	88.4	<0.0500	563	n/a	n/a	n/a	n/a	2.49	n/a	
S11V004341		A	7440-10-0	Praseodymium	ug/g	99.3	<0.0100	1.74	n/a	n/a	n/a	n/a	0.499	n/a	B
S11V004341		A	7704-34-9	Sulfur	ug/g	92.1	0.189	84.6	n/a	n/a	n/a	n/a	4.99	n/a	N
S11V004341		A	7440-21-3	Silicon	ug/g	78.3	<0.0300	147	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341		A	7440-31-5	Tin	ug/g	83.2	<0.0300	5.49	n/a	n/a	n/a	n/a	1.50	n/a	B
S11V004341		A	7440-24-6	Strontium	ug/g	93.7	<3.00E-03	27.7	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341		A	7440-25-7	Tantalum	ug/g	64.7	<0.0500	5.41	n/a	n/a	n/a	n/a	2.49	n/a	B
S11V004341		A	7440-32-6	Titanium	ug/g	89.7	<5.00E-03	1.30E+03	n/a	n/a	n/a	n/a	0.249	n/a	
S11V004341		A	7440-62-2	Vanadium	ug/g	91.1	<5.00E-03	46.6	n/a	n/a	n/a	n/a	0.249	n/a	
S11V004341		A	7440-65-5	Yttrium	ug/g	90.1	<2.00E-03	6.79	n/a	n/a	n/a	n/a	0.0997	n/a	
S11V004341		A	7440-66-6	Zinc	ug/g	87.3	<5.00E-03	31.5	n/a	n/a	n/a	n/a	0.249	n/a	
S11V004341		A	7440-67-7	Zirconium	ug/g	90.0	<5.00E-03	9.18	n/a	n/a	n/a	n/a	0.249	n/a	N
S11V004341		A	14269-63-7	Thorium-230	ug/g	n/a	<7.00E-06	<6.98E-05	n/a	n/a	n/a	n/a	6.98E-05	n/a	U
S11V004341		A	TH-232	Thorium-232	ug/g	102	<5.00E-04	2.35	n/a	n/a	n/a	n/a	4.99E-03	n/a	
S11V004341		A	13968-55-3	Uranium-233	ug/g	95.7	<2.00E-04	<1.99E-03	n/a	n/a	n/a	n/a	1.99E-03	n/a	U
S11V004341		A	13966-29-5	Uranium-234	ug/g	n/a	<5.00E-06	<4.99E-05	n/a	n/a	n/a	n/a	4.99E-05	n/a	U
S11V004341		A	15117-96-1	Uranium-235	ug/g	100	<1.00E-05	3.20E-03	n/a	n/a	n/a	n/a	9.97E-05	n/a	
S11V004341		A	13982-70-2	Uranium-236	ug/g	n/a	<4.00E-06	<3.99E-05	n/a	n/a	n/a	n/a	3.99E-05	n/a	U
S11V004341		A	13994-20-2	Neptunium-237	ug/g	107	<1.00E-04	<9.97E-04	n/a	n/a	n/a	n/a	9.97E-04	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
U - Less Than Detection Limit
B - Estimated
B - Blank Contamination
C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/14/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004341	A	U-238	Uranium-238	ug/g	101	<5.00E-04	0.480	n/a	n/a	n/a	n/a	4.99E-03	n/a	
S11V004341	A	7440-22-4	Silver	ug/g	107	<2.00E-03	0.0507	n/a	n/a	n/a	n/a	0.0199	n/a	B
S11V004341	A	7440-38-2	Arsenic	ug/g	94.1	<0.0420	2.16	n/a	n/a	n/a	n/a	0.419	n/a	B
S11V004341	A	7440-43-9	Cadmium	ug/g	105	<6.00E-03	0.0780	n/a	n/a	n/a	n/a	0.0598	n/a	B
S11V004341	A	7439-92-1	Lead	ug/g	98.5	<0.0150	2.55	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341	A	7782-49-2	Selenium	ug/g	103	<0.135	<1.35	n/a	n/a	n/a	n/a	1.35	n/a	U
S11V004341	A	7440-28-0	Thallium	ug/g	98.7	<4.00E-03	0.0608	n/a	n/a	n/a	n/a	0.0399	n/a	B
S11V004342	S	14798-03-9	Ammonium	ug/g	97.1	<0.120	6.69	5.17	5.93	25.7	95.4	0.482	n/a	
S11V004343	A	14133-76-7	Technetium-99	ug/g	101	<6.00E-05	<5.94E-04	n/a	n/a	n/a	n/a	5.94E-04	n/a	U
S11V004344	E	CM-243/244	Curium-243/244	uCi/g	n/a	<4.58E-08	<3.45E-08	n/a	n/a	n/a	n/a	3.45E-08	n/a	U
S11V004344	E	14596-10-2	Americium-241	uCi/g	103	<5.32E-08	<4.24E-08	n/a	n/a	n/a	n/a	4.24E-08	n/a	U
S11V004344	E	15510-73-3	Curium-242	uCi/g	n/a	<2.34E-08	<1.01E-08	n/a	n/a	n/a	n/a	1.01E-08	n/a	U
S11V004344	E	PU-239/240	Plutonium-239/240	uCi/g	107	<6.34E-08	4.39E-08	n/a	n/a	n/a	n/a	3.03E-08	44.7	
S11V004344	E	13981-16-3	Plutonium-238	uCi/g	n/a	<6.58E-08	<2.88E-08	n/a	n/a	n/a	n/a	2.88E-08	n/a	U
S11V004345	E	SR-89/90	Strontium-89/90	uCi/g	111	<4.70E-07	<7.35E-07	n/a	n/a	n/a	n/a	7.35E-07	n/a	U
S11V004346	E	13981-37-8	Nickel-63	uCi/g	102	<1.02E-05	<5.03E-06	n/a	n/a	n/a	n/a	5.03E-06	n/a	U
S11V004347	E	15758-45-9	Selenium-79	uCi/g	n/a	4.77E-06	1.40E-05	n/a	n/a	n/a	n/a	1.96E-06	2785.151	BE
S11V004348	W	14762-75-5	Carbon-14	uCi/g	92.2	<4.26E-06	<2.65E-06	n/a	n/a	n/a	n/a	2.65E-06	n/a	U
S11V004348	W	10028-17-8	Tritium	uCi/g	99.3	<3.91E-06	<2.61E-06	n/a	n/a	n/a	n/a	2.61E-06	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
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C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

222-S LABORATORY

FINAL ANALYTICAL REPORT FOR SOIL SAMPLES FROM WASTE MANAGEMENT AREA C, CORE HOLE C8100, IN SUPPORT OF RCRA CLOSURE

1.0 INTRODUCTION

This final report presents the results for the samples taken from C Farm between February 24, 2011 and April 4, 2011. The samples were analyzed in accordance with RPP-PLAN-40564, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* (FSAP), RPP-PLAN-38777, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C* (SAP); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory* (QAPP); SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*; and the additional guidance given by the client's point of contact (POC).

Because the 222-S Laboratory facility was designed to analyze hazardous and complex tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative. The following attachments are included in this report.

Attachment 1 Data Summary Report
Attachment 2 Sample Breakdown Diagrams
Attachment 3 Holding Time Report
Attachment 4 Additional QC Results
Attachment 5 Tentatively Identified Compound (TIC) Report
Attachment 6 Analytical Batch and Laboratory Sample Identification Number Index
Attachment 7 Geological Report with Bulk Density Results
Attachment 8 Characterization Change Notices (CCN), and Correspondence
Attachment 9 Receipt Paperwork

2.0 SAMPLE RECEIPT AND BREAKDOWN

2.1 SAMPLE RECEIPT

A total of two grab samples, ten core intervals, and one equipment blank were received by the 222-S Laboratory between February 24, 2011 and April 4, 2011. The samples were delivered in a cooler with ice. The temperatures of the temperature blanks were measured and recorded on the sample receipt check list and the chain of custody form. All temperature blanks were in compliance with the SW-846-specified preservation temperature of 6 ^{o}C.

2.2 SAMPLE BREAKDOWN

The laboratory received each core interval as three liner samples and one shoe sample when complete core recovery was obtained. The liner samples from each core interval were extruded, described, and composited with the shoe sample by the Washington River Protection Solutions (WRPS) geologist. The WRPS geologist measured the bulk density for core liners that had sufficient recovery (see Attachments 1 and 2) and the percent moisture for all composite samples. The geologist's report is included in Attachment 7. The composite for each core interval was analyzed as described in the SAP. All core intervals had complete recovery except for intervals I002, I003, I004, and I005. These core intervals were composited to form two sample extended intervals: I002+I003 and I004+I005 (see Attachment 2).

3.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the SAP. Secondary analytes are reported only if detected. In addition to the required isotopes, all isotopes with positive gamma energy analysis (GEA) results were reported.

The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radionuclide analyses, or the minimum detectable activity (MDA) for radionuclides.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. For solid samples, the aliquot classes are defined as follows:

"A" indicates samples that were prepared by SW-846 3050B.

"E" indicates samples that were prepared by a strong acid digest.

"S" indicates samples that were prepared by a distillation.

"W" indicates samples that were prepared by a standard water digest.

"O" indicates sample s that were prepared by methylene chloride extraction

Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation or with sample preparation performed as a part of the procedure steps.

Additionally the results for ^{99}Tc with units of pCi/g do not have letter identifier in "A#" column. These analysis were performed on the vadose water digest as required in the FSAP

The "Qual Flags" column in Attachment 1 contains data qualifier flags from FEAD CP-15383, *Common Requirements of the Format for Electronic Analytical Data,* that are defined as follows:

"B" for organic or radiochemistry results is used to indicate that the analyte was detected in the method or preparation blank and in the sample.

"B" for inorganic results is used to indicate that the reported result should be considered an estimate because it is below the quantitation limit. The "B" flag is applied to sample concentrations that are greater than the MDL but less than the quantitation limit.

"C" for inorganic results is used to indicate that the analyte was detected in the method or preparation blank and in the sample, and the result for the blank was greater than or equal to 20% of the reported sample result.

"E" for radiochemistry results is used to indicate an estimated result due to interference.

"N" for all but gas chromatography/mass spectrometry (GC/MS) is used to indicate that the matrix spike (MS) recovery or matrix spike duplicate (MSD) recovery was outside of the specified range in the QAPP or SAP.

"M" for inorganic results is used to indicate that the relative percent difference (RPD) between the sample and the duplicate is greater than 30%.

"U" for all results is used to indicate that the reported result is less than the calculated detection limit.

"T" for CG/MS is used to indicate that the MS or MSD recovery was outside of the specified range in the QAPP or SAP.

Manual calculations using rounded results from the Data Summary Report (Attachment 1) or result calculation forms may differ slightly from the actual results derived from the raw data.

3.1 SAMPLE DIGESTIONS

3.1.1 Radiochemistry Strong Acid Digestion

Strong acid digestions with a hot plate for the heat source were performed using a mixture of concentrated nitric and hydrochloric acids. For each digest, approximately 1 to 10 g of sample was digested depending on the analysis being performed. The digestate was then filtered and diluted to a final volume. This digestion was used for all radiochemical analyses except GEA, ^{3}H, ^{14}C, and ^{129}I. This digestion is a leach of the acid soluble species only.

3.1.2 SW-846 3050B – Acid Digestion-Heating Block

This acid digestion follows SW-846 3050B using a heating block and nitric and hydrochloric acids. An aliquot of approximately 1 to 5 g of each sample was digested. All heating-block digestions were filtered and diluted to a final volume of 50 mL. In soil, this digestion is a leach of the acid soluble species only. This digestion was used for all inductively coupled plasma/mass spectrometry (ICP/MS) and inductively coupled plasma/atomic emission spectroscopy (ICP/AES) analyses except for ^{99}Tc, isotopic tin (^{117}Sn and ^{126}Sn), and antimony analysis. The digestion is modified for the ^{99}Tc analysis by using only nitric acid. This is done to eliminate the possibility of the formation of a zinc-chlorine ion pair of mass 99. The laboratory believes this

ion, when present, is responsible for low level false positives. A separate digestion for antimony and isotopic tin was prepared using additional hydrochloric acid to improve MS recoveries.

3.1.3 Water Digestion

A water digestion or leach was prepared for the anions by ion chromatography (IC), ^{14}C, and ^{3}H analyses using approximately 4 to 10 g of sample. Sonification was used, and the leachate was then filtered. In soil, this digestion is a leach of the water soluble species only.

3.1.4 Vadose Water Digestion

An approximately 65-gram sample of soil was leached using a ratio of one part water to one part soil. To maintain a one-to-one ratio, the amount of water added to the sample was adjusted based on the percent moisture of the soil. The slurries were placed on a shaker table for about 1 hour, were transferred to a centrifuge tube and centrifuged at 4,000 rpm for 30 minutes, and then filtered using a disposable vacuum filtration system. The filtrates were transferred to a clean bottle and then analyzed for ^{99}Tc by ICP/MS. A separate unfiltered aliquot was analyzed for conductivity.

3.2 INORGANIC ANALYSES

3.2.1 Cyanide

The cyanide analysis by distillation and spectrophotometry was performed on the grab samples, liner composite samples, and equipment blank. All analyses met the SW-846 holding time of 14 days except for two samples (S11V004098 and S11V004115), which exceeded the holding time by one day. The samples were originally analyzed within the holding time, but due to low MS and continuing calibration verification standard recoveries, reanalysis was necessary. There was no change in the results from the initial analysis. The laboratory believes there was little or no affect on the data usability from the holding time excursion. There was no required reporting limit in the SAP for cyanide. The target detection limit was met. For all batches except for Batch 26248, there were no notable issues and all QC requirements in the SAP and the QAPP were met.

Batch 26248: The analyst failed to include a low level standard (LLS) with this batch. Since the sample result was below the MDL, all other quality control (QC) parameters were within their prescribed limits, all LLSs in the other 10 batches were in control, and a passing LLS was analyzed with the calibration standards the previous day, it is the laboratory's opinion that the data usability was not affected.

3.2.2 Conductivity

The conductivity analysis was performed on the grab samples and liner composite samples. These analyses met all QC requirements in the SAP and QAPP. The SAP lists an administrative holding time requirement of 28 days. SW-846 9050A lists a holding time of 28 days for aqueous samples only. There is not a promulgated holding time for the conductivity measure of a soil

sample. All conductivity measurements were taken on the Vadose water digest portion within 28 days of sampling. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.2.3 pH Analysis

The pH analysis was performed on the grab samples, liner composite samples, and equipment blank. These analyses met all QC requirements in the SAP and QAPP. The SAP lists a pH holding time requirement of "24 hours or as soon as possible." All solid pH measurements were taken as soon as possible after liner extrusion and compositing of the sample. The sampling-to-analysis time varied from 5.5 hours to 145 hours (see Attachment 3). There is no correlation between pH results and time to analysis, and the results fall within an expected range for alkaline soils. This indicates that the variation in time has no apparent effect on the soil results.

3.2.4 Mercury

Analysis for mercury by cold-vapor/atomic absorption was performed on the grab samples, liner composite samples, and equipment blank. For all samples analyzed, results met the QC requirements in the SAP and QAPP and all analyses met the holding time of 28 days. This analysis met the required and target detection limits.

3.2.5 Ion Chromatography – Ammonium

Analysis for ammonium was performed using a distillation preparation of the grab samples, liner composite samples, and equipment blank. The SAP lists an administrative holding time of 7 days for ammonium in soil. The laboratory believes that after distillation and preservation, the holding time is 28 days based on U.S. Environmental Protection Agency drinking water and waste water holding times for preserved aqueous samples. There is no regulatory holding time limit promulgated for ammonium in soil. All samples met the administrative holding times. These analyses met the target detection limit listed in the SAP. There was no required detection limit in the SAP for ammonium.

Batches 25867, 25918, 26004, 26213, and 26815: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26068: Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the sample at less than five times the blank level. This result has been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26517: The RPD exceeded the required 30%. Since the result for this analyte was below the quantitation limit, the criterion does not apply and reanalysis is not required. Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the samples at less than five times the blank level. The results have been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

3.2.6 Ion Chromatography – Anions and Small Organic Acids

Ion chromatography analysis was performed on a standard water digest of subsamples from the grab samples, liner composite samples, and equipment blank.

The laboratory met all of the required and target detection limits. For the standard water digest, all analyses were within the applicable holding times. The sample spikes used for the standard water digestions are predigestion spikes.

Batch 26180: There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

Batch 26531: The results for chloride, formate, and sulfate in the preparation blank were above the MDL but below the quantitation limit. All sample results that were less than five times the blank result have been flagged with a "C". Since all blank results were below the quantitation limit, the usability of the data was not affected. The RPD for nitrite exceeded the 30% requirement in the SAP. Since the result for this analyte was below the quantitation limit reanalysis was not required.

Batch 26818: The RPD for fluoride exceeded the 30% requirement in the SAP at 33%; since the RPDs for chloride and sulfate met this requirement, the laboratory believes this is due to matrix inhomogeneity. All fluoride results in this batch have been flagged with an "M". The RPDs for nitrite and formate exceeded the 30% requirement in the SAP. Since the results for these analytes were below the quantitation limit reanalysis was not required.

The MS recovery for phosphate exceeded the ±25% requirement in the SAP at 74%. The laboratory believes this was due to matrix interference since all other MS recoveries were between 93% and 105% and phosphate MS recoveries are frequently low in Vadose samples. These exceedances were discussed with the client POC (see Attachment 8).

3.2.7 Inductively Coupled Plasma/Atomic Emission Spectroscopy

The ICP/AES analysis was performed on an acid-digest (SW-846 3050B) of the grab samples, liner composite samples, and equipment blank. The ICP/AES analysis was unable to obtain the required detection limit for antimony, arsenic, cadmium, lead, selenium, silver, and thallium. These elements have been reported from separate ICP/MS analyses. Total uranium has not been reported by the ICP/AES analysis since it cannot meet the required detection limits in the SAP. The isotopic uranium analysis by ICP/MS met the required detection limit for ^{238}U, which is essentially total uranium. The overall data usability was not affected. For all other metals reported by ICP/AES, all target and required detection limits were met. SW-846 lists the holding time for ICP/AES metals as 6 months. All analyses met the holding time.

Due to inter-element interferences, the elements europium, niobium, neodymium, and ruthenium have not been reported even though detected in the samples. The laboratory believes that these results are likely due to unmitigated inter-element interferences. These are all secondary analytes.

Batch 26884: The initial and closing LLS recoveries for potassium and iron were above the 130% requirement. This could indicate a high bias. However, since the sample results for these elements were below the quantitation limit the data usability was not affected.

Batch 26878: Results above MDL but below the quantitation limit for manganese in the opening and closing interference check standard "A" (ICSA) and for chromium in the closing ICSA indicate a possible high bias for these elements. However, the recovery of manganese and chromium in the interference check standard "AB" (ICSAB) was within the ±20% requirement; this indicates no significant bias was present. Low levels of iron and calcium were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result. Sulfur was detected in the preparation blank at slightly above the MDL. Three samples have sulfur results at less than five times the blank result and have been flagged with a "C". Sulfur is a secondary analyte.

The MS recoveries for aluminum, barium, calcium, iron, magnesium, sodium, and phosphorous exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for boron, silicon, sulfur, and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes. The MS recovery for strontium exceeded the ±25% requirement at 128%. For all other required elements whose results were less than four times the spike, the MS recoveries were within the requirement. Therefore, the laboratory believes that the high recovery for strontium is due to inhomogeneity.

The RPD for cobalt exceeded the 30% requirement in the FSAP and SAP at 34%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

The laboratory control sample (LCS) recovery for silicon exceeded the ±25% requirement at 16%. Because of this and since silicon is a secondary element, it has not been reported. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

Due to the failure of all instrument quality control samples, thorium has not been reported. Reliable thorium results are reported by ICP/MS.

Batch 26957: The initial and closing LLS recoveries for chromium and iron were below the 70% requirement. This could indicate a low bias. However, since the sample results for chromium were at least 10 times the level of the LLS and the results for iron were at least 5,000 times the LLS level, it is the laboratory's opinion that the data usability was not affected. The LLS for beryllium exceeded the ±30% requirement at 149%. This could indicate a low basis for beryllium. However, since all results were below the quantitation limit, the data usability was not affected.

Results above the MDL but below the quantitation limit for manganese and titanium in the opening and closing ICSA and for barium, phosphorous, strontium, and vanadium in the closing ICSA indicate a possible high bias for these elements. However, the recoveries for these elements in the ICSAB were within the ±20% requirement; this indicates no significant bias was

present. Low levels of calcium and sulfur were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result.

The MS recoveries for aluminum, calcium, iron, phosphorous, and titanium exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for sulfur and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes.

The serial dilution for lanthanum exceeded the ±10% requirement at 14%. This could indicate that the lanthanum results are biased low. Lanthanum is a secondary element.

The LCS recovery for silicon exceeded the ±25% requirement at 78%. Silicon is a secondary element. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

3.2.8 Inductively Coupled Plasma/Mass Spectroscopy

The ICP/MS actinide and trace metal analyses were performed on the standard SW-846 3050B acid digestion of the grab samples, liner composite samples, and equipment blank. ICP/MS analysis for ^{126}Sn and antimony was perform on the same digest with additional hydrochloric acid, which is required to keep tin and antimony in solution. For all samples, the ICP/MS ^{99}Tc analysis was performed on the sample digest without the addition of hydrochloric acid. Hydrochloric acid is not used for ^{99}Tc analysis because of the potential formation of a ZnCl with mass 99. Technetium-99 was also analyzed using the Vadose water digest.

Direct is the most accurate type of calibration; however, standard material is not commercially available for all of the isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's mass-response curve, which is generated by using the intensity/concentration relationship for the available isotope standards. Results estimated in this manner are designated "semi-quantitative."

Table 1. Inductively Coupled Plasma-Mass Spectroscopy Standards and Spikes

Standard Type	Analytes Analyzed
Initial calibration verification (nondigested)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Acid digest standard (laboratory control standard)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Predigest spike (MS)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Post-digest spike	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
No standard or spike of either type	^{126}Sn, ^{230}Th, ^{233}U, ^{234}U, ^{236}U

Technetium-99

For the acid digestion, the required detection limit listed in the SAP for ^{99}Tc was met. The target detection limit for ^{99}Tc was not met. For the water digested samples, both the target and required detection limits were met. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time.

The acid-digested ^{99}Tc analysis is subject to isobaric interference from natural ruthenium and cobalt argide, and zinc chloride ions. However, these samples were analyzed using an ICP/MS with a collision cell, which eliminates the polyatomic interferences. Interference from natural ^{99}Ru seems unlikely since none of the more abundant nature isotopes (100, 101, and 102) were detected.

For the water digest, one sample, B2C1N0, had a positive result above the MDL and slightly below the quantitation level of 10 times the MDL. This result was twice the LLS concentration. The client requested ^{99}Tc analysis by radiochemistry (resin separation followed by liquid scintillation counting), which confirmed the ICP/MS result for this sample. The water digested ^{99}Tc results were originally reported, along with the nitrate results, in ATL Document No. 20110264-D14 as required in the FSAP.

Batches 26871, 26872, and 27327: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met. Batch 27327 contained the equipment blank and also reports the result for ^{126}Sn.

Tin-126 and Antimony

For the solid samples, antimony and ^{126}Sn were analyzed from the same digest because of the need for additional hydrochloric acid, which results in better MS recoveries. However, this appears to cause an isobaric interference with ^{126}Sn. The laboratory has concluded that the most likely interferences are from the polyatomic ions, zirconium chloride, strontium argide, and yttrium chloride—all with mass of 126. A preliminary investigation indicated that using an ICP/MS with a collision cell will eliminate this interference. However, the instrument needed for this analysis is not currently able to operate in a "semi-quantitative" mode. The laboratory is currently working on resolving this issue. Based on the client's earlier instructions (see Attachment 8), samples with a positive result for ^{126}Sn have been flagged with an "E".

Batch 26962: The RPD for ^{126}Sn exceeded the 30% requirement in the FSAP and SAP at 38%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

Actinides

The required and target detection limits were met for all isotopes in all samples. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time (see Attachment 3).

Batches 26835 and 26968: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26833: Laboratory personnel improperly prepared the low level MS. The higher level MS was recovered within the required ±25% for all analytes. Since a low level MS was recovered within the required limits for all analytes in Batch 26968, the SAP requirement for at least on MS per core hole was met and reanalysis of Batch 26833 was unnecessary.

Trace Metals

Arsenic, cadmium, lead, selenium, silver, and thallium were analyzed by ICP/MS to obtain the required detection limits in the SAP. Except for the required detection limit for selenium, all required detection limits were met or the sample results were above the quantitation limit and the sample detection limit criteria do not apply. All target detection limits were met. The required detection limit for selenium was more than an order of magnitude below the detection limit obtained by ICP/MS. The laboratory does not anticipate reaching this detection limit for future projects. The adjusted MDL for selenium soil results was approximately 1.3 µg/g. SW-846 lists the holding time for metals as 6 months. All samples were analyzed within the holding time (see Attachment 3). There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

3.3 RADIOCHEMICAL ANALYSIS

The holding time listed in the SAP for radioactive isotopes is 6 months. All samples were analyzed within the required holding time. The holding time tables for these analytes are included in Attachment 3. With the exception of the ^{14}C and ^{3}H analyses, tracers and spikes are added prior to digestion.

3.3.1 Gamma Energy Analysis

Gamma energy analysis was performed directly on approximately 60 mL of soil from liner grab samples, liner composite samples, and the equipment blank. The SAP requires the reporting of all isotopes with positive results above the MDA; therefore, isotopes additional to those required in the SAP were reported when detected. The GEA analysis met all of the required detection limits in the SAP except for one sample for ^{228}Th, which was only slightly higher. The laboratory was able to meet the target detection limits for all ^{137}Cs and all ^{125}Sb analyses. Seven of the ten ^{154}Eu result met the target detection limit. The laboratory was unable to meet the remaining target detection limits. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.2 Strontium-89/90

Strontium-89/90 analysis was performed on the grab samples, liner composite samples, and equipment blank. All of the sample analyses met the required and target detection limits. The SAP requested ^{90}Sr, not $^{89/90}Sr$, be reported. The 222-S Laboratory only performs the latter analysis. Since the half-life for ^{89}Sr is approximately 51 days and ^{89}Sr has not been produced at Hanford for years, $^{89/90}Sr$ is essentially ^{90}Sr. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.3 Tritium

The ^{3}H analysis by liquid scintillation counting (LSC) was performed directly on the field and equipment blanks and a water leach of the liner composite samples. This method only measured the ^{3}H in the samples that could be dissolved in water. This analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.4 Selenium-79

The ^{79}Se analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the target detection limit in the SAP. No required detection limit was listed. No standard is currently available for ^{79}Se, and a cold carrier is used to monitor recovery and is measured gravimetrically. The ^{14}C LSC curve is used to determine the ^{79}Se results since their energies are similar. All samples have very low positive results, which were caused by an elevated quench from samples, resulting in insufficient background subtraction. These results should be considered very low level false positives and have been flagged with a "E". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26240: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the sample. The sample has been flagged with a "B".

Batch 27781: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the samples. The samples have been flagged with a "B". The RPD for the duplicate exceeded the 30% requirement in the SAP and FSAP. Since the sample result was below the quantitation limit, this criterion does not apply.

3.3.5 Carbon-14

The ^{14}C analysis by LSC was performed on a water leach of the grab samples, liner composite samples, and equipment blank. The analysis achieved the required detection limit in the SAP but exceeded the target detection limit. This analysis will only detect water soluble forms of ^{14}C. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.6 Nickel-63

The ^{63}Ni analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.7 Iodine-129

Analysis for ^{129}I by low energy GEA was performed on the grab samples, liner composite samples, and equipment blank. The required and target detection limits in the SAP were met. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.8 Americium-241, Curium-243/244, and Curium-242

Analysis for ^{241}Am, $^{243/244}Cm$, and ^{242}Cm by alpha energy analysis (AEA) was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met. The SAP requested ^{243}Cm and ^{244}Cm be reported separately. Since it is not possible to resolve these individual isotopes when using AEA, these isotopes have been reported as $^{243/244}Cm$.

3.3.9 Plutonium-238 and Plutonium-239/240

Plutonium isotopic (^{238}Pu and $^{239/240}Pu$) analysis by AEA was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met.

3.4 ORGANIC ANALYSES

3.4.1 Semivolatile Organic Analysis

The semivolatile organic analysis (SVOA) by GC/MS was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. All holding times were met.

The SVOA analysis met the required and target detection limits with two exceptions:

- The adjusted MDLs for cyclohexanone were above the 0.5-mg/kg target detection limit for most samples. This compound obtained detection limits between 0.5 mg/kg and 0.6 mg/kg.

- The adjusted MDLs for di-n-butyl-phthalate were above the target detection limit of 0.33 mg/kg. The analysis achieved a detection limit of between 0.5 mg/kg and 0.6 mg/kg for this compound.

LCS, MS, and MSD recoveries were compared against the laboratory's statistical process control (SPC) limits, as required by SW-846. The use of SPC limits is permitted in the FSAP, SAP, and QAPP. The results of surrogate, LSC, and MS/MSD are contained in Attachment 4. 1,4-dichlorobenzene, phenol, and pentachlorophenol are secondary compounds but have been reported in order to provide QC results for the LCS and MS/MSD.

The SAP and FSAP requested 3-methylphenol and 4-methylpnenol be reported separately. Since it is not possible to resolve these individual compounds when performing SVOA by SW-846 8270C, these compounds have been reported as 3&4 methylphenol.

Batch 26489: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 25983: The MS experienced high recovery for 1,2,4-trichlorobenzene, 4-chloror-3-methylphenol, N-nitroso-di-n-propylamine, and Pyrene; since the result for all of these compounds were below the MDL, the data quality was not affected and reanalysis was not required. The results for these compounds have been flagged with a "T" for both samples in this batch. One sample experienced high recoveries for the surrogate terphenyl-d14; since the results for all primary compounds were below MDL, the data usability was not affected and reanalysis was unnecessary. The LCS and MS/MSD did not contain phenol, 4-nitrophenol, or 1,4-dichlorobenzene. The decision by the client to add these secondary compounds to the spikes was made after this batch was analyzed; these compounds are contained in all subsequent batches.

Batch 26487: The LCS recovery for 2-4-dinitrotoluene exceeded the laboratory statistical control limit of 60%-99% at 101%. Since the recovery is within the ±30% in the SAP and FSAP and the sample result was below the MDL, a qualifier flag was not applied.

Batches 26760 and 26836: There were no notable issues with these batches, and all QC requirements in the FSAP, SAP, and QAPP were met

3.4.2 .Polychlorinated Biphenyls Analysis

Polychlorinated biphenyls (PCB) analysis was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. The accelerated solvent extraction method was used for the solid sample analysis, and solid sample results were corrected to the dry weight of the sample. The LCS, MS, and MSD consisted of only Aroclor-1254 because it is the most common Aroclor detected in Hanford Site samples.

Batch 26470: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 26128: The recoveries for the surrogate tetrachloro-m-xlyene exceeded the laboratory's statistically derived control limit of 53%-115% at 117% and 123%. Since the all sample results were below the MDL, the data usability was not affected.

3.4.3 Tentatively Identified Compounds

Unassigned peaks or TICs were treated as follows. Standards were obtained and analyzed for each secondary analyte identified in the SAP. This data was accumulated in the Hanford library. Following analysis, the largest TICs with instrument responses greater than 10% of the response of the nearest internal standard were evaluated and compared to the Hanford library. The estimated concentration of these TICs was calculated using measured response factors from the Hanford library compound list.

After comparison to the Hanford library, remaining unknowns were compared to the National Institute of Standards and Technology's NIST 02, *HP Mass Spectral Libraries*. The estimated concentration of compounds identified in the NIST library was calculated based on an arbitrary response factor of 1.0. If the compounds were not identified as a result of this comparison, they were reported as "unknown." Summaries of the SVOA TICs from the field samples and method blanks are provided in Attachment 5. TICs that were found in the field samples and were present in the associated batch method blank have been flagged with "B".

4.0 PROCEDURES

Table 2 Lists the procedures used in analyzing the samples contained in this report

Table 2. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
Cyanide	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9010C)	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9014)
Conductivity	LA-504-102, Rev. A-0 Vadose Water Digest	LA-512-107, Rev. G-0
pH (solid)	LA-212-105, Rev. H-0 (SW-846 9045D)	LA-212-105, Rev. H-0 (SW-846 9045D)
Mercury – Cold Vapor Atomic Absorption	LA-325-110, Rev. A-0 (SW-846 7470A, 7471B)	LA-325-106, Rev. G-0 (SW-846 7470A, 7471A)
Ammonia – IC	LA-544-112, Rev. E-0	LA-533-101, Rev. Q-0
Anions & Organic Acids – IC	LA-504-101, Rev. M-0 LA-504-102, Rev. A-0 (Vadose Water Digest)	LA-533-115, Rev. J-0, K-0
Metals – ICP /AES	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-505-161, Rev. J-0-A, K-0 (SW-846 6010C)
^{99}Tc, ^{126}Sn – ICP/MS	Direct	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0
^{99}Tc – ICP/MS	LA-504-102, Rev. A-0 (Vadose Water Digest) LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-103, Rev. B-0
Metals, ^{126}Sn – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0 (SW-846 6020A)
Actinides – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1
Radiochemical Analyses		
GEA	Direct	LA-548-121, Rev. I-0 LA-508-167, Rev. A-0

Analysis	Preparation Method	Analysis Procedure
$^{89/90}$Sr – Separation/GPC	Digestion LA-544-101, Rev. G-0 Separation LA-220-103, Rev. K-0 (solid) LA-220-104, Rev. J-0-A (liquid)	LA-508-124, Rev. B-0
^{3}H – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-218-116, Rev. A-0	LA-508-121, Rev. G-0
^{14}C – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-348-104, Rev. I-0	LA-508-121, Rev. G-0
^{79}Se – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-365-132, Rev. J-0	LA-508-121, Rev. G-0
^{63}Ni – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-285-102, Rev. E-0	LA-508-121, Rev. G-0
^{129}I – Separation/GEA	LA-378-105, Rev. D-0, E-0	LA-508-165, Rev. D-0
^{241}Am, $^{243/244, 242}$Cm – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
$^{239/240, 238}$Pu – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
Analysis	**Preparation Method**	**Analysis Procedure**
Organic Analyses		
SVOC – GC/MS	LA-523-115, Rev. H-0 LA-523-138, Rev. G-0	LA-523-135, Rev. D-0-A SW-846 8270D
PCB – GC/Electron Capture Detector	LA-523-115, Rev. H -0 LA 523-144, Rev. D-0	LA-523-140, Rev. G-0 SW-846 8082A

5.0 REFERENCES

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From: Anastos, Heather L
To: Ritenour, Gerald P
Cc: Johnson, Jo M; McKinney, Steve G; Hansen, Daniel R
Subject: RE: Sn-126 analysis for S-SX Barrier
Date: Tuesday, March 29, 2011 7:51:58 AM

Can the data be reported with an "E" flag? In the future, it would be preferable to reanalyze…but I think we can accept this with the flag (I'll also flag the data as "suspect"…)

Heather Anastos
Chemist, Closure & Corrective Measures
(509) 373-2616
1200 Jadwin/301

washington river protection solutions
contractor to the United States Department of Energy

From: Ritenour, Gerald P
Sent: Monday, March 28, 2011 2:30 PM
To: Anastos, Heather L
Cc: Johnson, Jo M; McKinney, Steve G; Hansen, Daniel R
Subject: Sn-126 analysis for S-SX Barrier

Heather,
In reviewing the Sn-126 analysis I have found, as expected that the Sn-117 spikes have failed low. In early 2011 we determined that using additional HCL improves the recovery. However the addition of HCl increases the Tn-126 result, which could be caused by an interference. The collision cell ICP/MS instrument is not yet ready for Sn-126/semi-quant analysis. So currently we can only mitigate the potential interference by diluting. Should these samples be reanalyzed now or just reported "as is" with narration.
Thanks, JR

Core Number	Customer Sample ID	Sample Depth	SAMPLE_R	A	ANALYTE	UNITS	LSC %R	BLANK	RESULT	DUP	RPD	MS %R	MDL	Q Flag
C7738	B24HH9	45-47	S10V000500	A	Tin-117	ug/g	105	<1.00E-03	0.0176	0.0166	5.86	34.2	9.96E-03	
C7738	B24HH9	45-47	S10V000500	A	Tin-126	ug/g	n/a	<2.00E-05	2.67E-04	2.37E-04	12.0	n/a	1.99E-04	
C7738	B24HJ0	62-64	S10V000528	A	Tin-117	ug/g	105	<1.00E-03	0.0157	n/a	n/a	n/a	9.97E-03	
C7738	B24HJ0	62-64	S10V000528	A	Tin-126	ug/g	n/a	<2.00E-05	<1.99E-04	n/a	n/a	n/a	1.99E-04	U
C7738	B24KV1	96-98	S10V000539	A	Tin-117	ug/g	105	<1.00E-03	0.0167	n/a	n/a	n/a	9.88E-03	
C7738	B24KV1	96-98	S10V000539	A	Tin-126	ug/g	n/a	<2.00E-05	2.93E-04	n/a	n/a	n/a	1.98E-04	
C7738	B24KV2	127-129	S10V000555	A	Tin-117	ug/g	105	<1.00E-03	0.0177	n/a	n/a	n/a	9.94E-03	
C7738	B24KV2	127-129	S10V000555	A	Tin-126	ug/g	n/a	<2.00E-05	4.37E-04	n/a	n/a	n/a	1.99E-04	
C7738	B24KV3	159-161	S10V000561	A	Tin-117	ug/g	105	<1.00E-03	0.0120	n/a	n/a	n/a	9.99E-03	
C7738	B24KV3	159-161	S10V000561	A	Tin-126	ug/g	n/a	<2.00E-05	3.00E-04	n/a	n/a	n/a	2.00E-04	
C7742	B24YW0	40-42	S10V000749	A	Tin-117	ug/g	105	<1.00E-03	0.0231	n/a	n/a	n/a	0.0100	
C7742	B24YW0	40-42	S10V000749	A	Tin-126	ug/g	n/a	<2.00E-05	2.43E-04	n/a	n/a	n/a	2.01E-04	
C7742	B24YW1	96-98	S10V000750	A	Tin-117	ug/g	105	<1.00E-03	0.0136	n/a	n/a	n/a	9.96E-03	
C7742	B24YW1	96-98	S10V000750	A	Tin-126	ug/g	n/a	<2.00E-05	2.65E-04	n/a	n/a	n/a	1.99E-04	
C7740	B24YW4	40-42	S10V000802	A	Tin-117	ug/g	100	<1.10E-03	0.0129	0.0125	3.20	47.2	0.0120	N
C7740	B24YW4	40-42	S10V000802	A	Tin-126	ug/g	n/a	<2.00E-05	3.24E-04	3.40E-04	4.92	n/a	2.19E-04	
C7740	B24YW5	94-96	S10V000803	A	Tin-117	ug/g	100	<1.10E-03	<0.0114	n/a	n/a	n/a	0.0114	UN
C7740	B24YW5	94-96	S10V000803	A	Tin-126	ug/g	n/a	<2.00E-05	7.36E-04	n/a	n/a	n/a	2.07E-04	
C7742	B24YW6	135-137	S10V000804	A	Tin-117	ug/g	100	<1.10E-03	0.0337	n/a	n/a	n/a	0.0116	N
C7742	B24YW6	135-137	S10V000804	A	Tin-126	ug/g	n/a	<2.00E-05	1.02E-03	n/a	n/a	n/a	2.10E-04	
C7746	B24YX2	44-46	S10V001027	A	Tin-117	ug/g	104	<5.00E-04	0.0132	0.0133	1.31	35.4	4.98E-03	
C7746	B24YX2	44-46	S10V001027	A	Tin-126	ug/g	n/a	<1.00E-05	3.66E-04	3.81E-04	4.02	n/a	9.96E-05	
C7746	B24YX3	94-96	S10V001042	A	Tin-117	ug/g	104	<5.00E-04	0.0126	n/a	n/a	n/a	4.94E-03	
C7746	B24YX3	94-96	S10V001042	A	Tin-126	ug/g	n/a	<1.00E-05	5.49E-04	n/a	n/a	n/a	9.88E-05	
C7746	B24YX4	144-146	S10V001057	A	Tin-117	ug/g	104	<5.00E-04	0.0102	n/a	n/a	n/a	4.98E-03	
C7746	B24YX4	144-146	S10V001057	A	Tin-126	ug/g	n/a	<1.00E-05	1.10E-03	n/a	n/a	n/a	9.97E-05	
C7744	B24YW8	37-39	S10V001083	A	Tin-117	ug/g	102	<5.00E-04	0.0174	0.0108	46.9	22.9	4.95E-03	
C7744	B24YW8	37-39	S10V001083	A	Tin-126	ug/g	n/a	<1.00E-05	2.33E-04	2.16E-04	7.67	n/a	9.89E-05	
C7744	B24YW9	96-98	S10V001098	A	Tin-117	ug/g	102	<5.00E-04	0.0164	n/a	n/a	n/a	5.01E-03	
C7744	B24YW9	96-98	S10V001098	A	Tin-126	ug/g	n/a	<1.00E-05	5.77E-04	n/a	n/a	n/a	1.00E-04	
C7744	B24YX0	127-129	S10V001113	A	Tin-117	ug/g	102	<5.00E-04	0.0166	n/a	n/a	n/a	4.99E-03	
C7744	B24YX0	127-129	S10V001113	A	Tin-126	ug/g	n/a	<1.00E-05	7.50E-04	n/a	n/a	n/a	9.98E-05	

From: Anastos, Heather L
To: Ritenour, Gerald P
Cc: Menjivar, Carolina S; McKinney, Steve G
Subject: RE: C8100 ICP/AES Issue Batch 26878
Date: Monday, July 11, 2011 11:30:45 AM

Agreed.

From: Ritenour, Gerald P
Sent: Monday, July 11, 2011 11:27 AM
To: Anastos, Heather L
Cc: Menjivar, Carolina S; McKinney, Steve G
Subject: C8100 ICP/AES Issue Batch 26878

Heather,
The MS recovery for Sr was 128%. All other required elements with result < 4x the spike were fine. Also if I compare the MS to the dup it recovers at 98%. Looks like a homogeneity issue. I would like to report with narration
Thanks, JR

Batch 26787

Core Number	Customer Sample ID	Sample Depth	SAMPLE_R	A	ANALYTE	RESULT UNIT	LCS	BLANK	RESULT	DUP	RPD	MS	MDL	QUAL Flag
C8100	B2B1L6	SURFACE	S11V004106	A	Strontium	ug/g	95.7	<3.00E-03	125	140	11.5	128	0.274	N
C8100	B2B1L7	SURFACE Dup	S11V004123	A	Strontium	ug/g	95.7	<3.00E-03	118	n/a	n/a	n/a	0.282	N
C8100	B2C1M2	5.7'-7.7'	S11V004144	A	Strontium	ug/g	95.7	<3.00E-03	33.1	n/a	n/a	n/a	0.288	N
C8100	B2C1M3	15'-19'	S11V004165	A	Strontium	ug/g	95.7	<3.00E-03	33.8	n/a	n/a	n/a	0.286	N
C8100	B2C1M5	54'-58'	S11V004208	A	Strontium	ug/g	95.7	<3.00E-03	26.5	n/a	n/a	n/a	0.280	N
C8100	B2C1M7	76'-78'	S11V004250	A	Strontium	ug/g	95.7	<3.00E-03	31.4	n/a	n/a	n/a	0.283	N

ATL Analytical Operations
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
Currently at 509-375-4200, Ext 247

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 1 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Gs
NO. OF CONTAINER(S)	2
VOLUME	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE / SAMPLE TIME	
B2B1L6	SOIL	2-24-11 B 2-24-11 1108 26	✓

S11V004098

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
Cphill C-bell	2-24-11 0920	RLSteele RLSteele	2.24.11 0920	Grp 20110264
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	-1°C Temp
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RLSteele S11V004098
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

PRINTED ON 2/15/2011

A-6003-618 (REV 2)

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 2 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	**60 Days / 120 Days**
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** n/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** n/A		**BILL OF LADING/AIR BILL NO.** n/A		

SPECIAL INSTRUCTIONS

**Only samples from intervals within the top 15 ft. will be analyzed for pesticides,and PCBs.
(1) pH (Soil) - 9045; Semi-VOA - 8270 Complete (TF) {1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4-Dinitrotoluene, 2,6-bis(1,1-dimethylethyl)-4-methyl phenol, 2-Chlorophenol, 2-Methylphenol (cresol, o-), 2-Nitrophenol, 3+4 Methylphenol (cresol, m+p), 4-Chloro-3-methylphenol, Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Bis(2-ethylhexyl) phthalate, Butylbenzylphthalate, Cellosolve Solvent, Chrysene, Cyclohexanone, Di-n-butylphthalate, Di-n-octylphthalate, Dibenz[a,h]anthracene, Fluoranthene, Hexachlorobutadiene, Hexachloroethane, Indeno(1,2,3-cd)pyrene, Isobutyl alcohol, n-Nitrosodi-n-dipropylamine, n-Nitrosomorpholine, Naphthalene, Nitrobenzene, Pyrene, Pyridine, Total cresols, Tributyl phosphate}; 6010_Metals_ICP; 6020_METALS_ICPMS (TF) {Antimony, Arsenic, Cadmium, Selenium, Silver, Thallium}; Mercury - 7471 - (CV) (TF); IC Anions - 9056; 300.7_AMMONIUM (TF); ~~Sulfide - 9215 (TF)~~ CAT 2/16/11; ~~Total Cyanide - 9014 (TF)~~ CAT 2/16/11; GAMMA ENERGY ANALYSIS (TF) {Antimony-125, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Thorium-228, Thorium-234}; GAMMA ENERGY ANALYSIS (TF); Americium-241 (TF); I129_SEP_GEA (TF); C-14; CURIUM {Curium-242, Curium-243/244}; H3 - TRITIUM; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Nickel-63 (TF); Selenium-79 (TF); Strontium-89,90 -- Total Sr; Actinides ICPMS (TF) {Neptunium-237, Thorium-230, Thorium-232, Uranium-233, Uranium-234, Uranium-235, Uranium-236, Uranium-238}; RADISO_ICPMS (TF) {Technetium-99, Tin-126}; Conductivity - 9050_WE; Percent Solids (TF); Percent Water (TF); PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-024	PAGE 1 OF 1
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 I010	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-00004	**ACTUAL SAMPLE DEPTH** 222.8 - ~~224.8~~ 224.8	**COA** BC 4-4-11 N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Liner
NO. OF CONTAINER(S)	1
VOLUME	160g
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B2C1L9	SOIL	4-4-11	1020	✓
B2C1M0	SOIL	4-4-11	1020	✓
B2C1M1	SOIL	4-4-11	1020	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Chad Campbell	4-4-11 1100	RHTeeple	4-4-11 1100
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
Scott Snook 4-4-11
**LABORATORY
Only samples from intervals within the top 15 ft. will be analyzed for pesticides, and PCBs.
After bulk density on liners is performed, the liners shall be composited.
(1) Bulk Density - D2937 (TF) {Bulk density - wet};

Temp blank 0°C Related ATL

GRP # 20110264
SAM # S11V004330 Liner A
4331 Liner B
4332 Liner C

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

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10 Effective Date: 08/16/10

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: C Farm C8100			DATA PACKAGE: VSR12-023		
VALIDATOR: Eyda Hergenreder		LAB: 222-S Laboratory		DATE: 09-14-2012	
			SDG: 20110264		
ANALYSES PERFORMED					
SW-846/ICP X	SW-846/GFAA	SW-846/Hg X		EPA 200.8 X	

SAMPLES/MATRIX Soil samples

SDG 20110264: B2B1L6, B2C1N1

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?..... (Yes) No N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments?	Yes	No	N/A
Initial calibrations acceptable?	Yes	No	N/A
ICP interference checks acceptable?	Yes	No	N/A
ICV and CCV checks performed on all instruments?	Yes	No	N/A
ICV and CCV checks acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Calculation check acceptable?	Yes	No	N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes	No	N/A
ICB and CCB results acceptable? (Levels D, E)	Yes	No	N/A
Laboratory blanks analyzed?	Yes	No	N/A
Laboratory blank results acceptable?	Yes	No	N/A
Field blanks analyzed? (Levels C, D, E)	Yes	No	N/A
Field blank results acceptable? (Levels C, D, E)	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:

For sample B2B1L6: MB: Ca 0.139 ug/ml Fe 0.0102 ug/ml; Sulfur 0.239 ug/ml
For sample B2C1N1: MB: Ca 0.0523 ug/ml; Sulfur 0.189 ug/ml

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed? ..... (Yes) No N/A

MS/MSD results acceptable? ..... Yes (No) N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

LCS/BSS samples analyzed? ..... (Yes) No N/A

LCS/BSS results acceptable? ..... Yes (No) N/A

Standards traceable? (Levels D, E) ..... Yes No (N/A)

Standards expired? (Levels D, E) ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Performance audit sample(s) analyzed? ..... Yes No (N/A)

Performance audit sample results acceptable? ..... Yes No (N/A)

Comments:

Batch 26878: MS%R (Post MS%R) B 134% (96%); Sulfur 136% (99%); Silicon -7% (90%); Sr 128% (94%); Zr -9.2% (85%)
Batch 26957: MS%R (Post MS%R) Sulfur 52% (94%); Zr 54% (87%)

Batch 26957: Silicon LCS 78%
Batch 26878: Silicon LCS 16%

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A

Duplicate results acceptable? ..... Yes (No) N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

Field duplicate RPD values acceptable? ..... Yes No (N/A)

Field split RPD values acceptable? ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments:

Batch 26878: Co RPD 34%

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed?	Yes	No	N/A
ICP serial dilution %D values acceptable?	Yes	No	N/A
ICP post digestion spike required?	Yes	No	N/A
ICP post digestion spike values acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes)	No	N/A
Sample holding times acceptable?	(Yes)	No	N/A

Comments: None

8. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E)..... Yes No (N/A)

Detection limits meet RDL?..... Yes (No) N/A

Transcription/calculation errors? (Levels D, E)..... Yes No (N/A)

Comments:

MDLs > CRDLs for Se

Comments (attach additional sheets as necessary):

More

Appendix 6

Additional Documentation Requested By Client

LABCORE Completed Batch Report for Batch# 00026957

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104130035	ICV				
2	S1104130035	ICV				
3	S1104130035	ICV				
4	S1104130035	ICV				
5	S1104130037	LLS				
6	S1104130037	LLS				
7	S1104130037	LLS				
8	S1104130037	LLS				
9	S1104130037	LLS				
10	S1104130037	LLS				
11	S1104130037	LLS				
12	S1104130036	ICB				
13	S1104130038	ICSA				
14	S1104130039	ICSAB				
15	S1104130039	ICSAB				
16	S1104060052	BLNK-PREP				
17	S1104060053	STD-PREP				
18	S1104080061	STD-PREP				
19	S1104130040	SERDIL	S11V004271			
20	S11V004271	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
21	S1104060054	DUP	S11V004271			
22	S1104060055	SPK-PREDIG	S11V004271			
23	S1104080060	SPK-PREDIG	S11V004271			
24	S1104130042	CCV				
25	S1104130042	CCV				
26	S1104130042	CCV				
27	S1104130042	CCV				
28	S1104130043	CCB				
29	S1104130041	SPK-POST	S11V004271			
30	S1104130041	SPK-POST	S11V004271			
31	S1104130041	SPK-POST	S11V004271			
32	S1104130041	SPK-POST	S11V004271			
33	S11V004292	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
34	S11V004321	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
35	S11V004341	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
14	ICSAB	S1104130039		0 0			Strontium	LIQUID	1	9.1162E-01			3.00E-03	ug/mL	91.162	% Recovery	
14	ICSAB	S1104130039		0 0			Tantalum	LIQUID		5.9440E-02			0.05	ug/mL	N/A		
14	ICSAB	S1104130039		0 0			Tellurium	LIQUID		<1.0000E-01			0.1	ug/mL	N/A		
14	ICSAB	S1104130039		0 0			Thorium	LIQUID	5	4.3739E+00			0.05	ug/mL	87.478	% Recovery	
14	ICSAB	S1104130039		0 0			Titanium	LIQUID	50	4.4999E+01			5.00E-03	ug/mL	89.997	% Recovery	
14	ICSAB	S1104130039		0 0			Thallium	LIQUID	5	4.4207E+00			0.1	ug/mL	88.414	% Recovery	
14	ICSAB	S1104130039		0 0			Uranium	LIQUID	5	4.6345E+00			0.1	ug/mL	92.69	% Recovery	
14	ICSAB	S1104130039		0 0			Vanadium	LIQUID	1	9.1717E-01			5.00E-03	ug/mL	91.717	% Recovery	
14	ICSAB	S1104130039		0 0			Tungsten	LIQUID	5	2.6942E+00			0.2	ug/mL	53.884	% Recovery	
14	ICSAB	S1104130039		0 0			Yttrium	LIQUID		<2.0000E-03			2.00E-03	ug/mL	N/A		
14	ICSAB	S1104130039		0 0			Zinc	LIQUID	5	4.5711E+00			5.00E-03	ug/mL	91.423	% Recovery	
14	ICSAB	S1104130039		0 0			Zirconium	LIQUID	5	4.2859E+00			5.00E-03	ug/mL	85.718	% Recovery	
Sample Sequence 16																	
16	BLNK-PREP	S1104060052		0 0	A		Silver	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Aluminum	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Arsenic	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Boron	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Barium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Beryllium	LIQUID		<1.0000E-03			1.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Bismuth	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Calcium	LIQUID		5.2290E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Cadmium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Cerium	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Cobalt	LIQUID		<1.0000E-02			0.01	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Chromium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Copper	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Europium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Iron	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Potassium	LIQUID		<5.0000E-01			0.5	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Lanthanum	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Lithium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Magnesium	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Manganese	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Molybdenum	LIQUID		<2.0000E-02			0.02	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Sodium	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Neodymium	LIQUID		<1.0000E-02			0.01	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Nickel	LIQUID		<2.0000E-02			0.02	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Niobium	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Phosphorus	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Lead	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Palladium	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Praseodymium	LIQUID		<1.0000E-02			0.01	ug/mL			

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
16	BLNK-PREP	S1104060052		0 0	A		Rubidium	LIQUID		<1.0000E+00			1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Rhodium	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Ruthenium	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Sulfur	LIQUID		1.8862E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Antimony	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Selenium	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Silicon	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Samarium	LIQUID		<2.0000E-02			0.02	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Tin	LIQUID		<3.0000E-02			0.03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Strontium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Tantalum	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Tellurium	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Thorium	LIQUID		<5.0000E-02			0.05	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Titanium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Thallium	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Uranium	LIQUID		<1.0000E-01			0.1	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Vanadium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Tungsten	LIQUID		<2.0000E-01			0.2	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Yttrium	LIQUID		<2.0000E-03			2.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Zinc	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
16	BLNK-PREP	S1104060052		0 0	A		Zirconium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
Sample Sequence 17																	
17	STD-PREP	S1104060053		0 0	A		Silver	LIQUID	1	8.1513E-01			5.00E-03	ug/mL	81.513	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Aluminum	LIQUID	5	4.4278E+00			0.03	ug/mL	88.556	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Arsenic	LIQUID	5	4.3909E+00			0.05	ug/mL	87.818	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Boron	LIQUID	5	4.3695E+00			0.03	ug/mL	87.39	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Barium	LIQUID	5	4.6958E+00			3.00E-03	ug/mL	93.915	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Beryllium	LIQUID	5	4.8125E+00			1.00E-03	ug/mL	96.25	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Bismuth	LIQUID	5	4.3727E+00			0.1	ug/mL	87.454	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Calcium	LIQUID	5	4.2182E+00			0.05	ug/mL	84.365	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Cadmium	LIQUID	5	4.4186E+00			5.00E-03	ug/mL	88.371	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Cobalt	LIQUID	5	4.4411E+00			0.01	ug/mL	88.822	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Chromium	LIQUID	5	4.4623E+00			5.00E-03	ug/mL	89.246	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Copper	LIQUID	5	4.7200E+00			5.00E-03	ug/mL	94.399	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Iron	LIQUID	5	4.4113E+00			5.00E-03	ug/mL	88.226	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Potassium	LIQUID	5	4.2678E+00			0.5	ug/mL	85.355	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Lanthanum	LIQUID	5	4.6782E+00			3.00E-03	ug/mL	93.565	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Lithium	LIQUID	5	5.1938E+00			3.00E-03	ug/mL	103.88	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Magnesium	LIQUID	5	4.3653E+00			0.05	ug/mL	87.307	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Manganese	LIQUID	5	4.4134E+00			3.00E-03	ug/mL	88.269	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Molybdenum	LIQUID	5	4.3734E+00			0.02	ug/mL	87.468	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Sodium	LIQUID	5	5.1028E+00			0.1	ug/mL	102.06	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
17	STD-PREP	S1104060053		0 0	A		Nickel	LIQUID	5	4.3999E+00			0.02	ug/mL	87.997	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Phosphorus	LIQUID	5	4.4204E+00			0.05	ug/mL	88.408	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Lead	LIQUID	5	4.4293E+00			0.05	ug/mL	88.585	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Sulfur	LIQUID	5	4.6068E+00			0.1	ug/mL	92.135	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Antimony	LIQUID	5	4.2840E+00			0.05	ug/mL	85.68	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Selenium	LIQUID	5	4.5727E+00			0.1	ug/mL	91.454	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Silicon	LIQUID	5	3.9168E+00			0.03	ug/mL	78.336	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Strontium	LIQUID	5	4.6849E+00			3.00E-03	ug/mL	93.698	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Titanium	LIQUID	5	4.4856E+00			5.00E-03	ug/mL	89.712	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Vanadium	LIQUID	5	4.5574E+00			5.00E-03	ug/mL	91.147	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Zinc	LIQUID	5	4.3661E+00			5.00E-03	ug/mL	87.322	% Recovery	
17	STD-PREP	S1104060053		0 0	A		Zirconium	LIQUID	5	4.4995E+00			5.00E-03	ug/mL	89.99	% Recovery	
Sample Sequence 18																	
18	STD-PREP	S1104080061		0 0	A		Cerium	LIQUID	5	4.8369E+00			0.03	ug/mL	96.737	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Europium	LIQUID	5	4.6755E+00			5.00E-03	ug/mL	93.51	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Neodymium	LIQUID	5	4.9364E+00			0.01	ug/mL	98.729	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Niobium	LIQUID	5	3.6881E+00			0.03	ug/mL	73.761	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Palladium	LIQUID	5	4.3973E+00			0.1	ug/mL	87.946	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Praseodymium	LIQUID	5	4.9664E+00			0.01	ug/mL	99.329	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Rubidium	LIQUID	5	3.6842E+00			1	ug/mL	73.683	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Rhodium	LIQUID	5	4.8560E+00			0.05	ug/mL	97.119	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Ruthenium	LIQUID	5	4.4611E+00			0.03	ug/mL	89.222	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Samarium	LIQUID	5	5.0184E+00			0.02	ug/mL	100.37	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Tin	LIQUID	5	4.1610E+00			0.03	ug/mL	83.22	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Tantalum	LIQUID	5	3.2373E+00			0.05	ug/mL	64.746	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Tellurium	LIQUID	5	4.4380E+00			0.1	ug/mL	88.761	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Thorium	LIQUID	5	4.5192E+00			0.05	ug/mL	90.383	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Thallium	LIQUID	5	4.5696E+00			0.1	ug/mL	91.392	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Uranium	LIQUID	5	5.0400E+00			0.1	ug/mL	100.8	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Tungsten	LIQUID	5	3.3775E+00			0.2	ug/mL	67.549	% Recovery	
18	STD-PREP	S1104080061		0 0	A		Yttrium	LIQUID	5	4.5074E+00			2.00E-03	ug/mL	90.148	% Recovery	
Sample Sequence 19																	
19	SERDIL	S1104130040	S11V004271	0 0			Aluminum	SOLID		6.3610E+03			7.4166	ug/mL	5.1873	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Boron	SOLID		<7.4166E+00			7.4166	ug/mL	N/A		
19	SERDIL	S1104130040	S11V004271	0 0			Barium	SOLID		6.5309E+01			0.74166	ug/mL	7.5044	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Beryllium	SOLID		<2.4722E-01			0.24722	ug/mL	N/A		
19	SERDIL	S1104130040	S11V004271	0 0			Calcium	SOLID		8.4043E+03			12.361	ug/mL	4.8231	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Cerium	SOLID		2.0984E+01			7.4166	ug/mL	.42876	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Cobalt	SOLID		6.7278E+00			2.4722	ug/mL	21.44	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Chromium	SOLID		1.0158E+01			1.2361	ug/mL	11.675	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Copper	SOLID		8.9659E+00			1.2361	ug/mL	2.0827	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Europium	SOLID		3.4627E+00			1.2361	ug/mL	7.7541	% Diff	

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
19	SERDIL	S1104130040	S11V004271	0 0			Iron	SOLID		1.6487E+04			1.2361	ug/mL	8.7203	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Potassium	SOLID		8.8139E+02			123.61	ug/mL	10.677	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Lanthanum	SOLID		1.0690E+01			0.74166	ug/mL	13.676	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Lithium	SOLID		8.6717E+00			0.74166	ug/mL	9.7798	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Magnesium	SOLID		4.7277E+03			12.361	ug/mL	7.6901	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Manganese	SOLID		2.7277E+02			0.74166	ug/mL	7.2359	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Molybdenum	SOLID		<4.9444E+00			4.9444	ug/mL	N/A		
19	SERDIL	S1104130040	S11V004271	0 0			Sodium	SOLID		2.2850E+02			24.722	ug/mL	14.212	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Nickel	SOLID		9.6843E+00			4.9444	ug/mL	5.4641	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Niobium	SOLID		1.4254E+01			7.4166	ug/mL	19.474	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Phosphorus	SOLID		5.6634E+02			12.361	ug/mL	6.6807	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Praseodymium	SOLID		<2.4722E+00			2.4722	ug/mL	N/A		
19	SERDIL	S1104130040	S11V004271	0 0			Ruthenium	SOLID		2.6484E+01			7.4166	ug/mL	3.6334	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Sulfur	SOLID		8.5449E+01			24.722	ug/mL	1.1964	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Silicon	SOLID		1.5275E+02			7.4166	ug/mL	5.124	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Tin	SOLID		<7.4166E+00			7.4166	ug/mL	N/A		
19	SERDIL	S1104130040	S11V004271	0 0			Strontium	SOLID		2.9431E+01			0.74166	ug/mL	7.1323	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Tellurium	SOLID		<2.4722E+01			24.722	ug/mL	N/A		
19	SERDIL	S1104130040	S11V004271	0 0			Titanium	SOLID		9.4929E+02			1.2361	ug/mL	6.9633	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Vanadium	SOLID		3.4008E+01			1.2361	ug/mL	7.2652	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Yttrium	SOLID		6.3747E+00			0.49444	ug/mL	8.3827	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Zinc	SOLID		3.3683E+01			1.2361	ug/mL	4.8783	% Diff	
19	SERDIL	S1104130040	S11V004271	0 0			Zirconium	SOLID		7.8768E+00			1.2361	ug/mL	6.8398	% Diff	
Sample Sequence 20																	
20	SAMPLE	S11V004271		0 0	A		Aluminum	SOLID	N/A	6.0473E+03			1.4833	ug/g			f
20	SAMPLE	S11V004271		0 0	A		Boron	SOLID	N/A	2.7354E+00			1.4833	ug/g			J
20	SAMPLE	S11V004271		0 0	A		Barium	SOLID	N/A	6.0750E+01			0.14833	ug/g			
20	SAMPLE	S11V004271		0 0	A		Beryllium	SOLID	N/A	1.4309E-01			0.049444	ug/g			J
20	SAMPLE	S11V004271		0 0	A		Calcium	SOLID	N/A	8.0176E+03			2.4722	ug/g			f
20	SAMPLE	S11V004271		0 0	A		Cerium	SOLID	N/A	2.1074E+01			1.4833	ug/g			
20	SAMPLE	S11V004271		0 0	A		Cobalt	SOLID	N/A	5.5400E+00			0.49444	ug/g			
20	SAMPLE	S11V004271		0 0	A		Chromium	SOLID	N/A	1.1501E+01			0.24722	ug/g			
20	SAMPLE	S11V004271		0 0	A		Copper	SOLID	N/A	8.7830E+00			0.24722	ug/g			
20	SAMPLE	S11V004271		0 0	A		Iron	SOLID	N/A	1.5165E+04			0.24722	ug/g			f
20	SAMPLE	S11V004271		0 0	A		Potassium	SOLID	N/A	7.9636E+02			24.722	ug/g			
20	SAMPLE	S11V004271		0 0	A		Lanthanum	SOLID	N/A	9.4042E+00			0.14833	ug/g			e
20	SAMPLE	S11V004271		0 0	A		Lithium	SOLID	N/A	7.8992E+00			0.14833	ug/g			
20	SAMPLE	S11V004271		0 0	A		Magnesium	SOLID	N/A	4.3901E+03			2.4722	ug/g			f
20	SAMPLE	S11V004271		0 0	A		Manganese	SOLID	N/A	2.5436E+02			0.14833	ug/g			
20	SAMPLE	S11V004271		0 0	A		Molybdenum	SOLID	N/A	<9.8888E-01			0.98888	ug/g			U
20	SAMPLE	S11V004271		0 0	A		Sodium	SOLID	N/A	2.0007E+02			4.9444	ug/g			
20	SAMPLE	S11V004271		0 0	A		Nickel	SOLID	N/A	9.1826E+00			0.98888	ug/g			J

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
20	SAMPLE	S11V004271		0 0	A		Phosphorus	SOLID	N/A	5.3087E+02			2.4722	ug/g			f
20	SAMPLE	S11V004271		0 0	A		Praseodymium	SOLID	N/A	1.8351E+00			0.49444	ug/g			J
20	SAMPLE	S11V004271		0 0	A		Sulfur	SOLID	N/A	8.4439E+01			4.9444	ug/g			b
20	SAMPLE	S11V004271		0 0	A		Silicon	SOLID	N/A	1.4530E+02			1.4833	ug/g			a
20	SAMPLE	S11V004271		0 0	A		Tin	SOLID	N/A	3.8532E+00			1.4833	ug/g			J
20	SAMPLE	S11V004271		0 0	A		Strontium	SOLID	N/A	2.7472E+01			0.14833	ug/g			
20	SAMPLE	S11V004271		0 0	A		Tellurium	SOLID	N/A	5.9838E+00			4.9444	ug/g			J
20	SAMPLE	S11V004271		0 0	A		Titanium	SOLID	N/A	8.8749E+02			0.24722	ug/g			f
20	SAMPLE	S11V004271		0 0	A		Vanadium	SOLID	N/A	3.1705E+01			0.24722	ug/g			
20	SAMPLE	S11V004271		0 0	A		Yttrium	SOLID	N/A	5.8817E+00			0.098888	ug/g			
20	SAMPLE	S11V004271		0 0	A		Zinc	SOLID	N/A	3.2116E+01			0.24722	ug/g			
20	SAMPLE	S11V004271		0 0	A		Zirconium	SOLID	N/A	7.3725E+00			0.24722	ug/g			b
Sample Sequence 21																	
21	DUP	S1104060054	S11V004271	0 0	A		Aluminum	SOLID	6.0473E+03	6.0359E+03			1.4847	ug/g	0.18808	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Barium	SOLID	6.0750E+01	5.5515E+01			0.14847	ug/g	9.0056	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Beryllium	SOLID	1.4309E-01	1.5015E-01			0.04949	ug/g	4.8140	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Calcium	SOLID	8.0176E+03	7.9553E+03			2.4745	ug/g	0.78000	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Cobalt	SOLID	5.5400E+00	5.2175E+00			0.4949	ug/g	5.9964	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Chromium	SOLID	1.1501E+01	1.1359E+01			0.24745	ug/g	1.2426	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Copper	SOLID	8.7830E+00	7.7883E+00			0.24745	ug/g	12.005	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Iron	SOLID	1.5165E+04	1.4752E+04			0.24745	ug/g	2.7601	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Potassium	SOLID	7.9636E+02	8.5382E+02			24.745	ug/g	6.9639	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Lithium	SOLID	7.8992E+00	8.3121E+00			0.14847	ug/g	5.0938	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Magnesium	SOLID	4.3901E+03	4.4749E+03			2.4745	ug/g	1.9132	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Manganese	SOLID	2.5436E+02	2.4244E+02			0.14847	ug/g	4.7985	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Molybdenum	SOLID	<9.8888E-01	1.1008E+00			0.98981	ug/g	10.712	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Sodium	SOLID	2.0007E+02	2.2309E+02			4.949	ug/g	10.878	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Nickel	SOLID	9.1826E+00	1.1565E+01			0.98981	ug/g	22.966	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Phosphorus	SOLID	5.3087E+02	4.8233E+02			2.4745	ug/g	9.5815	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Strontium	SOLID	2.7472E+01	2.9734E+01			0.14847	ug/g	7.9082	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Vanadium	SOLID	3.1705E+01	3.0088E+01			0.24745	ug/g	5.2325	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Zinc	SOLID	3.2116E+01	3.0691E+01			0.24745	ug/g	4.5378	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Boron	SOLID	2.7354E+00	2.8822E+00			1.4847	ug/g	5.2281	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Cerium	SOLID	2.1074E+01	1.7998E+01			1.4847	ug/g	15.744	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Europium	SOLID		3.0968E+00			0.24745	ug/g			
21	DUP	S1104060054	S11V004271	0 0	A		Lanthanum	SOLID	9.4042E+00	7.9990E+00			0.14847	ug/g	16.149	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Niobium	SOLID		1.4277E+01			1.4847	ug/g			
21	DUP	S1104060054	S11V004271	0 0	A		Praseodymium	SOLID	1.8351E+00	1.6484E+00			0.4949	ug/g	10.718	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Ruthenium	SOLID		2.5410E+01			1.4847	ug/g			
21	DUP	S1104060054	S11V004271	0 0	A		Silicon	SOLID	1.4530E+02	1.3034E+02			1.4847	ug/g	10.855	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Sulfur	SOLID	8.4439E+01	6.4188E+01			4.949	ug/g	27.251	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Tellurium	SOLID	5.9838E+00	<4.9490E+00			4.949	ug/g			

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
21	DUP	S1104060054	S11V004271	0 0	A		Tin	SOLID	3.8532E+00	2.9922E+00			1.4847	ug/g	25.155	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Titanium	SOLID	8.8749E+02	8.0984E+02			0.24745	ug/g	9.1493	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Yttrium	SOLID	5.8817E+00	5.5757E+00			0.098981	ug/g	5.3414	% RPD	
21	DUP	S1104060054	S11V004271	0 0	A		Zirconium	SOLID	7.3725E+00	7.0146E+00			0.24745	ug/g	4.9757	% RPD	
Sample Sequence 22																	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Aluminum	SOLID	49.4335	5.9972E+03			1.483	ug/g	-101.44	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Boron	SOLID	49.4335	5.1138E+01			1.483	ug/g	97.915	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Barium	SOLID	49.4335	1.1337E+02			0.1483	ug/g	106.45	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Beryllium	SOLID	49.4335	4.7971E+01			0.049433	ug/g	96.752	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Calcium	SOLID	49.4335	8.3370E+03			2.4717	ug/g	646.12	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Cobalt	SOLID	49.4335	5.2132E+01			0.49433	ug/g	94.251	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Chromium	SOLID	49.4335	6.0271E+01			0.24717	ug/g	98.659	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Copper	SOLID	49.4335	5.8894E+01			0.24717	ug/g	101.37	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Iron	SOLID	49.4335	1.3416E+04			0.24717	ug/g	-3537.9	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Potassium	SOLID	49.4335	8.3664E+02			24.717	ug/g	81.489	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Lanthanum	SOLID	49.4335	5.5531E+01			0.1483	ug/g	93.311	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Lithium	SOLID	49.4335	5.6592E+01			0.1483	ug/g	98.502	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Magnesium	SOLID	49.4335	4.4413E+03			2.4717	ug/g	103.48	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Manganese	SOLID	49.4335	2.9590E+02			0.1483	ug/g	84.022	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Molybdenum	SOLID	49.4335	4.7319E+01			0.98867	ug/g	95.723	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Sodium	SOLID	49.4335	2.5977E+02			4.9433	ug/g	120.76	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Nickel	SOLID	49.4335	5.9448E+01			0.98867	ug/g	101.68	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Phosphorus	SOLID	49.4335	5.0319E+02			2.4717	ug/g	-55.997	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Sulfur	SOLID	49.4335	1.1027E+02			4.9433	ug/g	52.264	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Silicon	SOLID	49.4335	1.9453E+02			1.483	ug/g	99.592	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Strontium	SOLID	49.4335	7.5511E+01			0.1483	ug/g	97.179	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Titanium	SOLID	49.4335	8.3211E+02			0.24717	ug/g	-112.03	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Vanadium	SOLID	49.4335	7.7417E+01			0.24717	ug/g	92.472	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Zinc	SOLID	49.4335	7.8068E+01			0.24717	ug/g	92.957	% Recovery	
22	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Zirconium	SOLID	49.4335	3.4182E+01			0.24717	ug/g	54.234	% Recovery	
Sample Sequence 23																	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Cerium	SOLID	49.326	6.6906E+01			1.4798	ug/g	92.917	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Europium	SOLID	49.326	4.9664E+01			0.24663	ug/g	94.17	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Niobium	SOLID	49.326	1.8034E+01			1.4798	ug/g	.67421	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Praseodymium	SOLID	49.326	5.0490E+01			0.49326	ug/g	98.64	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Ruthenium	SOLID	49.326	7.1583E+01			1.4798	ug/g	93.313	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Tin	SOLID	49.326	5.1096E+01			1.4798	ug/g	95.776	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Tellurium	SOLID	49.326	5.1769E+01			4.9326	ug/g	92.821	% Recovery	
23	SPK-PREDIG	S1104080060	S11V004271	0 0	A		Yttrium	SOLID	49.326	5.2361E+01			0.098652	ug/g	94.228	% Recovery	
Sample Sequence 24																	
24	CCV	S1104130042		0 0			Silver	LIQUID	1	9.5055E-01			5.00E-03	ug/mL	95.055	% Recovery	
24	CCV	S1104130042		0 0			Aluminum	LIQUID	5	4.9718E+00			0.03	ug/mL	99.436	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
28	CCB	S1104130043		0 0			Silicon	LIQUID		<3.0000E-02			0.03	ug/mL			
28	CCB	S1104130043		0 0			Samarium	LIQUID		<2.0000E-02			0.02	ug/mL			
28	CCB	S1104130043		0 0			Tin	LIQUID		<3.0000E-02			0.03	ug/mL			
28	CCB	S1104130043		0 0			Strontium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
28	CCB	S1104130043		0 0			Tantalum	LIQUID		<5.0000E-02			0.05	ug/mL			
28	CCB	S1104130043		0 0			Tellurium	LIQUID		<1.0000E-01			0.1	ug/mL			
28	CCB	S1104130043		0 0			Thorium	LIQUID		<5.0000E-02			0.05	ug/mL			
28	CCB	S1104130043		0 0			Titanium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
28	CCB	S1104130043		0 0			Thallium	LIQUID		<1.0000E-01			0.1	ug/mL			
28	CCB	S1104130043		0 0			Uranium	LIQUID		<1.0000E-01			0.1	ug/mL			
28	CCB	S1104130043		0 0			Vanadium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
28	CCB	S1104130043		0 0			Tungsten	LIQUID		<2.0000E-01			0.2	ug/mL			
28	CCB	S1104130043		0 0			Yttrium	LIQUID		<2.0000E-03			2.00E-03	ug/mL			
28	CCB	S1104130043		0 0			Zinc	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
28	CCB	S1104130043		0 0			Zirconium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
Sample Sequence 29																	
32	SPK-POST	S1104130041	S11V004271	0 3			Aluminum	SOLID	500	1.0806E+03			0.03	ug/mL	93.815	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Boron	SOLID	50	4.6070E+01			0.03	ug/mL	91.588	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Barium	SOLID	50	5.2741E+01			3.00E-03	ug/mL	93.196	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Beryllium	SOLID	50	4.4697E+01			1.00E-03	ug/mL	89.366	% Recovery	
31	SPK-POST	S1104130041	S11V004271	0 2			Calcium	SOLID	500	1.2393E+03			0.05	ug/mL	85.698	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Cerium	SOLID	50	4.7667E+01			0.03	ug/mL	91.071	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Cobalt	SOLID	50	4.5263E+01			0.01	ug/mL	89.406	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Chromium	SOLID	50	4.5296E+01			5.00E-03	ug/mL	88.265	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Copper	SOLID	50	5.1479E+01			5.00E-03	ug/mL	101.18	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Europium	SOLID	50	4.5998E+01			5.00E-03	ug/mL	91.346	% Recovery	
31	SPK-POST	S1104130041	S11V004271	0 2			Iron	SOLID	500	1.8758E+03			5.00E-03	ug/mL	68.45	% Recovery	
31	SPK-POST	S1104130041	S11V004271	0 2			Potassium	SOLID	500	6.0668E+02			0.5	ug/mL	105.23	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Lanthanum	SOLID	50	4.6204E+01			3.00E-03	ug/mL	90.506	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Lithium	SOLID	50	5.2398E+01			3.00E-03	ug/mL	103.2	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Magnesium	SOLID	50	4.7379E+02			0.05	ug/mL	59.683	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Manganese	SOLID	50	6.8961E+01			3.00E-03	ug/mL	86.479	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Molybdenum	SOLID	50	4.3901E+01			0.02	ug/mL	87.802	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Sodium	SOLID	50	7.5547E+01			0.1	ug/mL	110.63	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Nickel	SOLID	50	4.5417E+01			0.02	ug/mL	88.978	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Niobium	SOLID	50	4.7171E+01			0.03	ug/mL	90.762	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Phosphorus	SOLID	50	9.7865E+01			0.05	ug/mL	88.363	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Praseodymium	SOLID	50	4.7068E+01			0.01	ug/mL	93.766	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Ruthenium	SOLID	50	4.7640E+01			0.03	ug/mL	90.111	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Sulfur	SOLID	50	5.5640E+01			0.1	ug/mL	94.203	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Silicon	SOLID	50	5.7321E+01			0.03	ug/mL	85.256	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Tin	SOLID	50	4.6396E+01			0.03	ug/mL	92.014	% Recovery	

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
29	SPK-POST	S1104130041	S11V004271	0 0			Strontium	SOLID	50	4.8457E+01			3.00E-03	ug/mL	91.358	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Tellurium	SOLID	50	4.7256E+01			0.1	ug/mL	93.303	% Recovery	
32	SPK-POST	S1104130041	S11V004271	0 3			Titanium	SOLID	250	3.0823E+02			5.00E-03	ug/mL	87.394	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Vanadium	SOLID	50	4.8364E+01			5.00E-03	ug/mL	90.315	% Recovery	
30	SPK-POST	S1104130041	S11V004271	0 1			Yttrium	SOLID	50	4.4441E+01			2.00E-03	ug/mL	87.693	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Zinc	SOLID	50	4.8573E+01			5.00E-03	ug/mL	90.651	% Recovery	
29	SPK-POST	S1104130041	S11V004271	0 0			Zirconium	SOLID	50	4.4406E+01			5.00E-03	ug/mL	87.32	% Recovery	
Sample Sequence 33																	
33	SAMPLE	S11V004292		0 0	A		Aluminum	SOLID	N/A	6.6466E+03			1.4961	ug/g			f
33	SAMPLE	S11V004292		0 0	A		Boron	SOLID	N/A	2.8312E+00			1.4961	ug/g			J
33	SAMPLE	S11V004292		0 0	A		Barium	SOLID	N/A	6.3456E+01			0.14961	ug/g			
33	SAMPLE	S11V004292		0 0	A		Beryllium	SOLID	N/A	1.6447E-01			0.049869	ug/g			J
33	SAMPLE	S11V004292		0 0	A		Calcium	SOLID	N/A	8.5126E+03			2.4935	ug/g			f
33	SAMPLE	S11V004292		0 0	A		Cerium	SOLID	N/A	1.7880E+01			1.4961	ug/g			
33	SAMPLE	S11V004292		0 0	A		Cobalt	SOLID	N/A	4.5024E+00			0.49869	ug/g			J
33	SAMPLE	S11V004292		0 0	A		Chromium	SOLID	N/A	1.4326E+01			0.24935	ug/g			
33	SAMPLE	S11V004292		0 0	A		Copper	SOLID	N/A	9.2151E+00			0.24935	ug/g			
33	SAMPLE	S11V004292		0 0	A		Iron	SOLID	N/A	1.4636E+04			0.24935	ug/g			f
33	SAMPLE	S11V004292		0 0	A		Potassium	SOLID	N/A	1.4101E+03			24.935	ug/g			
33	SAMPLE	S11V004292		0 0	A		Lanthanum	SOLID	N/A	8.4706E+00			0.14961	ug/g			
33	SAMPLE	S11V004292		0 0	A		Lithium	SOLID	N/A	1.0297E+01			0.14961	ug/g			
33	SAMPLE	S11V004292		0 0	A		Magnesium	SOLID	N/A	4.7645E+03			2.4935	ug/g			f
33	SAMPLE	S11V004292		0 0	A		Manganese	SOLID	N/A	2.7316E+02			0.14961	ug/g			
33	SAMPLE	S11V004292		0 0	A		Molybdenum	SOLID	N/A	<9.9739E-01			0.99739	ug/g			U
33	SAMPLE	S11V004292		0 0	A		Sodium	SOLID	N/A	2.2322E+02			4.9869	ug/g			
33	SAMPLE	S11V004292		0 0	A		Nickel	SOLID	N/A	1.1265E+01			0.99739	ug/g			
33	SAMPLE	S11V004292		0 0	A		Phosphorus	SOLID	N/A	4.5746E+02			2.4935	ug/g			f
33	SAMPLE	S11V004292		0 0	A		Praseodymium	SOLID	N/A	1.6620E+00			0.49869	ug/g			J
33	SAMPLE	S11V004292		0 0	A		Sulfur	SOLID	N/A	6.9826E+01			4.9869	ug/g			b
33	SAMPLE	S11V004292		0 0	A		Silicon	SOLID	N/A	1.4680E+02			1.4961	ug/g			a
33	SAMPLE	S11V004292		0 0	A		Tin	SOLID	N/A	2.0194E+00			1.4961	ug/g			J
33	SAMPLE	S11V004292		0 0	A		Strontium	SOLID	N/A	3.2653E+01			0.14961	ug/g			
33	SAMPLE	S11V004292		0 0	A		Titanium	SOLID	N/A	7.8763E+02			0.24935	ug/g			f
33	SAMPLE	S11V004292		0 0	A		Vanadium	SOLID	N/A	3.0167E+01			0.24935	ug/g			
33	SAMPLE	S11V004292		0 0	A		Yttrium	SOLID	N/A	5.2363E+00			0.099739	ug/g			
33	SAMPLE	S11V004292		0 0	A		Zinc	SOLID	N/A	3.1788E+01			0.24935	ug/g			
33	SAMPLE	S11V004292		0 0	A		Zirconium	SOLID	N/A	6.1561E+00			0.24935	ug/g			b
Sample Sequence 34																	
34	SAMPLE	S11V004321		0 0	A		Aluminum	SOLID	N/A	5.7406E+03			1.4944	ug/g			f
34	SAMPLE	S11V004321		0 0	A		Boron	SOLID	N/A	3.0027E+00			1.4944	ug/g			J
34	SAMPLE	S11V004321		0 0	A		Barium	SOLID	N/A	5.5382E+01			0.14944	ug/g			
34	SAMPLE	S11V004321		0 0	A		Beryllium	SOLID	N/A	1.1378E-01			0.049815	ug/g			J

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
34	SAMPLE	S11V004321		0 0	A		Calcium	SOLID	N/A	6.4635E+03			2.4907	ug/g			f
34	SAMPLE	S11V004321		0 0	A		Cerium	SOLID	N/A	1.7082E+01			1.4944	ug/g			
34	SAMPLE	S11V004321		0 0	A		Cobalt	SOLID	N/A	5.5091E+00			0.49815	ug/g			
34	SAMPLE	S11V004321		0 0	A		Chromium	SOLID	N/A	1.4195E+01			0.24907	ug/g			
34	SAMPLE	S11V004321		0 0	A		Copper	SOLID	N/A	1.1125E+01			0.24907	ug/g			
34	SAMPLE	S11V004321		0 0	A		Iron	SOLID	N/A	1.5889E+04			0.24907	ug/g			f
34	SAMPLE	S11V004321		0 0	A		Potassium	SOLID	N/A	9.8773E+02			24.907	ug/g			
34	SAMPLE	S11V004321		0 0	A		Lanthanum	SOLID	N/A	7.9695E+00			0.14944	ug/g			
34	SAMPLE	S11V004321		0 0	A		Lithium	SOLID	N/A	7.3327E+00			0.14944	ug/g			
34	SAMPLE	S11V004321		0 0	A		Magnesium	SOLID	N/A	4.1046E+03			2.4907	ug/g			f
34	SAMPLE	S11V004321		0 0	A		Manganese	SOLID	N/A	2.3060E+02			0.14944	ug/g			
34	SAMPLE	S11V004321		0 0	A		Molybdenum	SOLID	N/A	<9.9629E-01			0.99629	ug/g			U
34	SAMPLE	S11V004321		0 0	A		Sodium	SOLID	N/A	2.8009E+02			4.9815	ug/g			
34	SAMPLE	S11V004321		0 0	A		Nickel	SOLID	N/A	1.1427E+01			0.99629	ug/g			
34	SAMPLE	S11V004321		0 0	A		Phosphorus	SOLID	N/A	6.0904E+02			2.4907	ug/g			f
34	SAMPLE	S11V004321		0 0	A		Praseodymium	SOLID	N/A	1.6748E+00			0.49815	ug/g			J
34	SAMPLE	S11V004321		0 0	A		Sulfur	SOLID	N/A	7.1036E+01			4.9815	ug/g			b
34	SAMPLE	S11V004321		0 0	A		Silicon	SOLID	N/A	1.3938E+02			1.4944	ug/g			a
34	SAMPLE	S11V004321		0 0	A		Tin	SOLID	N/A	3.8121E+00			1.4944	ug/g			J
34	SAMPLE	S11V004321		0 0	A		Strontium	SOLID	N/A	2.6061E+01			0.14944	ug/g			
34	SAMPLE	S11V004321		0 0	A		Tantalum	SOLID	N/A	6.7544E+00			2.4907	ug/g			Ja
34	SAMPLE	S11V004321		0 0	A		Titanium	SOLID	N/A	1.1370E+03			0.24907	ug/g			f
34	SAMPLE	S11V004321		0 0	A		Vanadium	SOLID	N/A	3.8997E+01			0.24907	ug/g			
34	SAMPLE	S11V004321		0 0	A		Yttrium	SOLID	N/A	6.7619E+00			0.099629	ug/g			
34	SAMPLE	S11V004321		0 0	A		Zinc	SOLID	N/A	3.2160E+01			0.24907	ug/g			
34	SAMPLE	S11V004321		0 0	A		Zirconium	SOLID	N/A	8.5154E+00			0.24907	ug/g			b
Sample Sequence 35																	
35	SAMPLE	S11V004341		0 0	A		Aluminum	SOLID	N/A	6.3779E+03			1.4956	ug/g			f
35	SAMPLE	S11V004341		0 0	A		Boron	SOLID	N/A	3.4607E+00			1.4956	ug/g			J
35	SAMPLE	S11V004341		0 0	A		Barium	SOLID	N/A	6.0041E+01			0.14956	ug/g			
35	SAMPLE	S11V004341		0 0	A		Beryllium	SOLID	N/A	1.1945E-01			0.049853	ug/g			J
35	SAMPLE	S11V004341		0 0	A		Bismuth	SOLID	N/A	7.2308E+00			4.9853	ug/g			J
35	SAMPLE	S11V004341		0 0	A		Calcium	SOLID	N/A	5.7141E+03			2.4927	ug/g			f
35	SAMPLE	S11V004341		0 0	A		Cerium	SOLID	N/A	1.6850E+01			1.4956	ug/g			
35	SAMPLE	S11V004341		0 0	A		Cobalt	SOLID	N/A	5.7967E+00			0.49853	ug/g			
35	SAMPLE	S11V004341		0 0	A		Chromium	SOLID	N/A	2.7405E+01			0.24927	ug/g			
35	SAMPLE	S11V004341		0 0	A		Copper	SOLID	N/A	1.3718E+01			0.24927	ug/g			
35	SAMPLE	S11V004341		0 0	A		Iron	SOLID	N/A	1.7965E+04			0.24927	ug/g			f
35	SAMPLE	S11V004341		0 0	A		Potassium	SOLID	N/A	1.0961E+03			24.927	ug/g			
35	SAMPLE	S11V004341		0 0	A		Lanthanum	SOLID	N/A	7.8507E+00			0.14956	ug/g			
35	SAMPLE	S11V004341		0 0	A		Lithium	SOLID	N/A	7.1208E+00			0.14956	ug/g			
35	SAMPLE	S11V004341		0 0	A		Magnesium	SOLID	N/A	4.1702E+03			2.4927	ug/g			f

LABCORE Completed Batch Report for Batch# 00026957

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
35	SAMPLE	S11V004341		0 0	A		Manganese	SOLID	N/A	2.3920E+02			0.14956	ug/g			
35	SAMPLE	S11V004341		0 0	A		Molybdenum	SOLID	N/A	3.5846E+00			0.99707	ug/g			J
35	SAMPLE	S11V004341		0 0	A		Sodium	SOLID	N/A	5.0503E+02			4.9853	ug/g			
35	SAMPLE	S11V004341		0 0	A		Nickel	SOLID	N/A	1.6512E+01			0.99707	ug/g			
35	SAMPLE	S11V004341		0 0	A		Phosphorus	SOLID	N/A	5.6264E+02			2.4927	ug/g			f
35	SAMPLE	S11V004341		0 0	A		Praseodymium	SOLID	N/A	1.7397E+00			0.49853	ug/g			J
35	SAMPLE	S11V004341		0 0	A		Sulfur	SOLID	N/A	8.4626E+01			4.9853	ug/g			b
35	SAMPLE	S11V004341		0 0	A		Silicon	SOLID	N/A	1.4733E+02			1.4956	ug/g			a
35	SAMPLE	S11V004341		0 0	A		Tin	SOLID	N/A	5.4887E+00			1.4956	ug/g			J
35	SAMPLE	S11V004341		0 0	A		Strontium	SOLID	N/A	2.7746E+01			0.14956	ug/g			
35	SAMPLE	S11V004341		0 0	A		Tantalum	SOLID	N/A	5.4058E+00			2.4927	ug/g			Ja
35	SAMPLE	S11V004341		0 0	A		Titanium	SOLID	N/A	1.2976E+03			0.24927	ug/g			f
35	SAMPLE	S11V004341		0 0	A		Vanadium	SOLID	N/A	4.6610E+01			0.24927	ug/g			
35	SAMPLE	S11V004341		0 0	A		Yttrium	SOLID	N/A	6.7860E+00			0.099707	ug/g			
35	SAMPLE	S11V004341		0 0	A		Zinc	SOLID	N/A	3.1494E+01			0.24927	ug/g			
35	SAMPLE	S11V004341		0 0	A		Zirconium	SOLID	N/A	9.1830E+00			0.24927	ug/g			b
Sample Sequence 36																	
36	ICSA	S1104130044		0 0			Silver	LIQUID		<5.0000E-03			5.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Aluminum	LIQUID	200	1.8850E+02			0.03	ug/mL	94.25	% Recovery	
36	ICSA	S1104130044		0 0			Arsenic	LIQUID		<5.0000E-02			0.05	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Boron	LIQUID		<3.0000E-02			0.03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Barium	LIQUID		8.7800E-03			3.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Beryllium	LIQUID		<1.0000E-03			1.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Bismuth	LIQUID		<1.0000E-01			0.1	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Calcium	LIQUID	200	1.8635E+02			0.05	ug/mL	93.174	% Recovery	
36	ICSA	S1104130044		0 0			Cadmium	LIQUID		<5.0000E-03			5.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Cerium	LIQUID		<3.0000E-02			0.03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Cobalt	LIQUID		<1.0000E-02			0.01	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Chromium	LIQUID		<5.0000E-03			5.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Copper	LIQUID		<5.0000E-03			5.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Europium	LIQUID		5.3150E-02			5.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Iron	LIQUID	200	1.7497E+02			5.00E-03	ug/mL	87.485	% Recovery	
36	ICSA	S1104130044		0 0			Potassium	LIQUID		<5.0000E-01			0.5	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Lanthanum	LIQUID		<3.0000E-03			3.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Lithium	LIQUID		<3.0000E-03			3.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Magnesium	LIQUID	200	1.8516E+02			0.05	ug/mL	92.582	% Recovery	
36	ICSA	S1104130044		0 0			Manganese	LIQUID		4.2420E-02			3.00E-03	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Molybdenum	LIQUID		<2.0000E-02			0.02	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Sodium	LIQUID	200	1.7662E+02			0.1	ug/mL	88.312	% Recovery	
36	ICSA	S1104130044		0 0			Neodymium	LIQUID		2.9140E-02			0.01	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Nickel	LIQUID		<2.0000E-02			0.02	ug/mL	N/A		
36	ICSA	S1104130044		0 0			Niobium	LIQUID		1.9356E-01			0.03	ug/mL	N/A		

LABCORE Completed Batch Report for Batch# 00027017

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104180007	ICV				
2	S1104180007	ICV				
3	S1104180009	LLS				
4	S1104180009	LLS				
5	S1104180009	LLS				
6	S1104180009	LLS				
7	S1104180008	ICB				
8	S1104180008	ICB				
9	S1104050134	BLNK-PREP				
10	S1104050134	BLNK-PREP				
11	S1104180010	SERDIL	S11V004106			
12	S1104180010	SERDIL	S11V004106			
13	S11V004106	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
14	S11V004106	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
15	S1104050136	DUP	S11V004106			
16	S1104050136	DUP	S11V004106			
17	S11V004123	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
18	S11V004123	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
19	S11V004144	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
20	S11V004144	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
21	S11V004165	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
22	S11V004165	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
23	S11V004208	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
24	S11V004208	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
25	S11V004250	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
26	S11V004250	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
27	S1104180012	CCV				
28	S1104180012	CCV				
29	S1104180013	CCB				
30	S1104180013	CCB				
31	S1104050141	STD-PREP				
32	S1104050141	STD-PREP				
33	S1104050141	STD-PREP				
34	S1104050137	SPK-PREDIG	S11V004106			
35	S1104050137	SPK-PREDIG	S11V004106			

LABCORE Completed Batch Report for Batch# 00027017

36	S1104050138	SPK-PREDIG	S11V004106			
37	S1104180011	SPK-POST	S11V004106			
38	S1104180011	SPK-POST	S11V004106			
39	S1104180018	SPK-POST	S11V004271			
40	S1104180018	SPK-POST	S11V004271			
41	S1104180014	CCV				
42	S1104180014	CCV				
43	S1104180015	CCB				
44	S1104180015	CCB				
45	S1104060052	BLNK-PREP				
46	S1104060052	BLNK-PREP				
47	S11V004271	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
48	S11V004271	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
49	S1104060054	DUP	S11V004271			
50	S1104060054	DUP	S11V004271			
51	S11V004292	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
52	S11V004292	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
53	S11V004321	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
54	S11V004321	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
55	S11V004341	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
56	S11V004341	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
57	S1104060053	STD-PREP				
58	S1104060053	STD-PREP				
59	S1104060053	STD-PREP				
60	S1104060055	SPK-PREDIG	S11V004271			
61	S1104060055	SPK-PREDIG	S11V004271			
62	S1104080060	SPK-PREDIG	S11V004271			
63	S1104180019	CCV				
64	S1104180019	CCV				
65	S1104180020	LLS				
66	S1104180020	LLS				
67	S1104180020	LLS				
68	S1104180020	LLS				
69	S1104180021	CCB				
70	S1104180021	CCB				

LABCORE Completed Batch Report for Batch# 00027017

Analyst: Mull, Bryanna **Book#:**

Instrument: ICP/MS PQ-EXCELL

Method: MS PERIODIC TABLE, LA-506-102 Rev/Mod F-1, LA-506-103 Rev/Mod B-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00026784, 00026810

Batch Comment:

Periodic Table on C Farm solids

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
2	ICV	S1104180007		0 1			Silver	LIQUID	.0004	4.0730E-04			2.00E-06	ug/mL	101.82	% Recovery	
1	ICV	S1104180007		0 0			Arsenic	LIQUID	.002	1.9220E-03			4.20E-05	ug/mL	96.1	% Recovery	
2	ICV	S1104180007		0 1			Cadmium	LIQUID	.002	1.9920E-03			6.00E-06	ug/mL	99.6	% Recovery	
2	ICV	S1104180007		0 1			Lead	LIQUID	.002	1.9920E-03			1.50E-05	ug/mL	99.6	% Recovery	
2	ICV	S1104180007		0 1			Selenium	LIQUID	.002	2.0440E-03			1.35E-04	ug/mL	102.2	% Recovery	
2	ICV	S1104180007		0 1			Thallium	LIQUID	.002	1.9440E-03			4.00E-06	ug/mL	97.2	% Recovery	
Sample Sequence 3																	
5	LLS	S1104180009		0 2			Silver	LIQUID	.00001	1.0670E-05			2.00E-06	ug/mL	106.7	% Recovery	
3	LLS	S1104180009		0 0			Arsenic	LIQUID	.0002	1.8920E-04			4.20E-05	ug/mL	94.6	% Recovery	
6	LLS	S1104180009		0 3			Cadmium	LIQUID	.00002	1.9950E-05			6.00E-06	ug/mL	99.75	% Recovery	
5	LLS	S1104180009		0 2			Lead	LIQUID	.00005	5.0860E-05			1.50E-05	ug/mL	101.72	% Recovery	
4	LLS	S1104180009		0 1			Selenium	LIQUID	.0005	4.7070E-04			1.35E-04	ug/mL	94.14	% Recovery	
6	LLS	S1104180009		0 3			Thallium	LIQUID	.00002	2.1020E-05			4.00E-06	ug/mL	105.1	% Recovery	
Sample Sequence 7																	
8	ICB	S1104180008		0 1			Silver	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
7	ICB	S1104180008		0 0			Arsenic	LIQUID		<4.2000E-05			4.20E-05	ug/mL			
8	ICB	S1104180008		0 1			Cadmium	LIQUID		<6.0000E-06			6.00E-06	ug/mL			
8	ICB	S1104180008		0 1			Lead	LIQUID		<1.5000E-05			1.50E-05	ug/mL			
8	ICB	S1104180008		0 1			Selenium	LIQUID		<1.3500E-04			1.35E-04	ug/mL			
8	ICB	S1104180008		0 1			Thallium	LIQUID		<4.0000E-06			4.00E-06	ug/mL			
Sample Sequence 9																	
10	BLNK-PREP	S1104050134		0 1	A		Silver	LIQUID		<2.0000E-03			2.00E-03	ug/mL			
9	BLNK-PREP	S1104050134		0 0	A		Arsenic	LIQUID		<4.2000E-02			0.042	ug/mL			
10	BLNK-PREP	S1104050134		0 1	A		Cadmium	LIQUID		<6.0000E-03			6.00E-03	ug/mL			
10	BLNK-PREP	S1104050134		0 1	A		Lead	LIQUID		<1.5000E-02			0.015	ug/mL			
10	BLNK-PREP	S1104050134		0 1	A		Selenium	LIQUID		<1.3500E-01			0.135	ug/mL			
10	BLNK-PREP	S1104050134		0 1	A		Thallium	LIQUID		<4.0000E-03			4.00E-03	ug/mL			
Sample Sequence 11																	
12	SERDIL	S1104180010	S11V004106	0 1			Silver	SOLID		<9.1471E-02			0.091471	ug/mL	N/A		
11	SERDIL	S1104180010	S11V004106	0 0			Arsenic	SOLID		3.1617E+00			1.9209	ug/mL	3.1786	% Diff	
12	SERDIL	S1104180010	S11V004106	0 1			Cadmium	SOLID		<2.7441E-01			0.27441	ug/mL	N/A		

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027017

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
12	SERDIL	S1104180010	S11V004106	0 1			Lead	SOLID		5.2962E+00			0.68603	ug/mL	.10365	% Diff	
12	SERDIL	S1104180010	S11V004106	0 1			Selenium	SOLID		<6.1743E+00			6.1743	ug/mL	N/A		
12	SERDIL	S1104180010	S11V004106	0 1			Thallium	SOLID		<1.8294E-01			0.18294	ug/mL	N/A		
Sample Sequence 13																	
14	SAMPLE	S11V004106		0 1	A		Silver	SOLID	N/A	6.2411E-02			0.018294	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Arsenic	SOLID	N/A	3.2655E+00			0.38418	ug/g			J
14	SAMPLE	S11V004106		0 1	A		Cadmium	SOLID	N/A	1.0190E-01			0.054883	ug/g			J
14	SAMPLE	S11V004106		0 1	A		Lead	SOLID	N/A	5.2907E+00			0.13721	ug/g			
14	SAMPLE	S11V004106		0 1	A		Selenium	SOLID	N/A	<1.2349E+00			1.2349	ug/g			U
14	SAMPLE	S11V004106		0 1	A		Thallium	SOLID	N/A	6.1652E-02			0.036588	ug/g			J
Sample Sequence 15																	
16	DUP	S1104050136	S11V004106	0 1	A		Silver	SOLID	6.2411E-02	7.8305E-02			0.019252	ug/g	22.591	% RPD	
15	DUP	S1104050136	S11V004106	0 0	A		Arsenic	SOLID	3.2655E+00	3.4932E+00			0.40428	ug/g	6.7376	% RPD	
16	DUP	S1104050136	S11V004106	0 1	A		Cadmium	SOLID	1.0190E-01	9.6835E-02			0.057755	ug/g	5.0972	% RPD	
16	DUP	S1104050136	S11V004106	0 1	A		Lead	SOLID	5.2907E+00	5.4231E+00			0.14439	ug/g	2.4725	% RPD	
16	DUP	S1104050136	S11V004106	0 1	A		Selenium	SOLID	<1.2349E+00	<1.2995E+00			1.2995	ug/g			
16	DUP	S1104050136	S11V004106	0 1	A		Thallium	SOLID	6.1652E-02	6.7544E-02			0.038503	ug/g	9.1209	% RPD	
Sample Sequence 17																	
18	SAMPLE	S11V004123		0 1	A		Silver	SOLID	N/A	6.2206E-02			0.018799	ug/g			J
17	SAMPLE	S11V004123		0 0	A		Arsenic	SOLID	N/A	2.9176E+00			0.39478	ug/g			J
18	SAMPLE	S11V004123		0 1	A		Cadmium	SOLID	N/A	8.6758E-02			0.056397	ug/g			J
18	SAMPLE	S11V004123		0 1	A		Lead	SOLID	N/A	5.2224E+00			0.14099	ug/g			
18	SAMPLE	S11V004123		0 1	A		Selenium	SOLID	N/A	<1.2689E+00			1.2689	ug/g			U
18	SAMPLE	S11V004123		0 1	A		Thallium	SOLID	N/A	6.7367E-02			0.037598	ug/g			J
Sample Sequence 19																	
20	SAMPLE	S11V004144		0 1	A		Silver	SOLID	N/A	5.7657E-02			0.019203	ug/g			J
19	SAMPLE	S11V004144		0 0	A		Arsenic	SOLID	N/A	5.2876E+00			0.40326	ug/g			
20	SAMPLE	S11V004144		0 1	A		Cadmium	SOLID	N/A	1.1301E-01			0.057609	ug/g			J
20	SAMPLE	S11V004144		0 1	A		Lead	SOLID	N/A	4.8977E+00			0.14402	ug/g			
20	SAMPLE	S11V004144		0 1	A		Selenium	SOLID	N/A	<1.2962E+00			1.2962	ug/g			U
20	SAMPLE	S11V004144		0 1	A		Thallium	SOLID	N/A	8.2266E-02			0.038406	ug/g			J
Sample Sequence 21																	
22	SAMPLE	S11V004165		0 1	A		Silver	SOLID	N/A	5.8777E-02			0.019093	ug/g			J
21	SAMPLE	S11V004165		0 0	A		Arsenic	SOLID	N/A	7.8853E+00			0.40095	ug/g			
22	SAMPLE	S11V004165		0 1	A		Cadmium	SOLID	N/A	8.4037E-02			0.057278	ug/g			J
22	SAMPLE	S11V004165		0 1	A		Lead	SOLID	N/A	5.0032E+00			0.1432	ug/g			
22	SAMPLE	S11V004165		0 1	A		Selenium	SOLID	N/A	<1.2888E+00			1.2888	ug/g			U
22	SAMPLE	S11V004165		0 1	A		Thallium	SOLID	N/A	8.1745E-02			0.038185	ug/g			J
Sample Sequence 23																	
24	SAMPLE	S11V004208		0 1	A		Silver	SOLID	N/A	4.8434E-02			0.018683	ug/g			J
23	SAMPLE	S11V004208		0 0	A		Arsenic	SOLID	N/A	3.6664E+00			0.39233	ug/g			J

LABCORE Completed Batch Report for Batch# 00027017

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
24	SAMPLE	S11V004208		0 1	A		Cadmium	SOLID	N/A	9.5935E-02			0.056048	ug/g			J
24	SAMPLE	S11V004208		0 1	A		Lead	SOLID	N/A	4.7977E+00			0.14012	ug/g			
24	SAMPLE	S11V004208		0 1	A		Selenium	SOLID	N/A	<1.2611E+00			1.2611	ug/g			U
24	SAMPLE	S11V004208		0 1	A		Thallium	SOLID	N/A	7.4795E-02			0.037365	ug/g			J
Sample Sequence 25																	
26	SAMPLE	S11V004250		0 1	A		Silver	SOLID	N/A	4.6679E-02			0.018883	ug/g			J
25	SAMPLE	S11V004250		0 0	A		Arsenic	SOLID	N/A	3.5585E+00			0.39655	ug/g			J
26	SAMPLE	S11V004250		0 1	A		Cadmium	SOLID	N/A	5.9237E-02			0.05665	ug/g			J
26	SAMPLE	S11V004250		0 1	A		Lead	SOLID	N/A	3.7351E+00			0.14162	ug/g			
26	SAMPLE	S11V004250		0 1	A		Selenium	SOLID	N/A	<1.2746E+00			1.2746	ug/g			U
26	SAMPLE	S11V004250		0 1	A		Thallium	SOLID	N/A	7.4683E-02			0.037766	ug/g			J
Sample Sequence 27																	
28	CCV	S1104180012		0 1			Silver	LIQUID	.0004	4.0600E-04			2.00E-06	ug/mL	101.5	% Recovery	
27	CCV	S1104180012		0 0			Arsenic	LIQUID	.002	1.8090E-03			4.20E-05	ug/mL	90.45	% Recovery	
28	CCV	S1104180012		0 1			Cadmium	LIQUID	.002	2.0100E-03			6.00E-06	ug/mL	100.5	% Recovery	
28	CCV	S1104180012		0 1			Lead	LIQUID	.002	1.9340E-03			1.50E-05	ug/mL	96.7	% Recovery	
28	CCV	S1104180012		0 1			Selenium	LIQUID	.002	1.8760E-03			1.35E-04	ug/mL	93.8	% Recovery	
28	CCV	S1104180012		0 1			Thallium	LIQUID	.002	1.8730E-03			4.00E-06	ug/mL	93.65	% Recovery	
Sample Sequence 29																	
30	CCB	S1104180013		0 1			Silver	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
29	CCB	S1104180013		0 0			Arsenic	LIQUID		<4.2000E-05			4.20E-05	ug/mL			
30	CCB	S1104180013		0 1			Cadmium	LIQUID		<6.0000E-06			6.00E-06	ug/mL			
30	CCB	S1104180013		0 1			Lead	LIQUID		<1.5000E-05			1.50E-05	ug/mL			
30	CCB	S1104180013		0 1			Selenium	LIQUID		<1.3500E-04			1.35E-04	ug/mL			
30	CCB	S1104180013		0 1			Thallium	LIQUID		<4.0000E-06			4.00E-06	ug/mL			
Sample Sequence 31																	
32	STD-PREP	S1104050141		0 1	A		Silver	LIQUID	1	1.0890E+00			4.00E-03	ug/mL	108.9	% Recovery	
31	STD-PREP	S1104050141		0 0	A		Arsenic	LIQUID	5	4.7060E+00			0.084	ug/mL	94.12	% Recovery	
32	STD-PREP	S1104050141		0 1	A		Cadmium	LIQUID	5	5.3520E+00			0.012	ug/mL	107.04	% Recovery	
32	STD-PREP	S1104050141		0 1	A		Lead	LIQUID	5	5.0410E+00			0.03	ug/mL	100.82	% Recovery	
32	STD-PREP	S1104050141		0 1	A		Selenium	LIQUID	5	5.1450E+00			0.27	ug/mL	102.9	% Recovery	
33	STD-PREP	S1104050141		0 2	A		Thallium	LIQUID	5	5.0730E+00			8.00E-03	ug/mL	101.46	% Recovery	
Sample Sequence 34																	
35	SPK-PREDIG	S1104050137	S11V004106	0 1	A		Silver	SOLID	9.6200096	9.8316E+00			0.03848	ug/g	101.55	% Recovery	
34	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Arsenic	SOLID	48.100048	5.0390E+01			0.80808	ug/g	97.971	% Recovery	
35	SPK-PREDIG	S1104050137	S11V004106	0 1	A		Cadmium	SOLID	48.100048	5.0736E+01			0.11544	ug/g	105.27	% Recovery	
35	SPK-PREDIG	S1104050137	S11V004106	0 1	A		Lead	SOLID	48.100048	5.4430E+01			0.2886	ug/g	102.16	% Recovery	
35	SPK-PREDIG	S1104050137	S11V004106	0 1	A		Selenium	SOLID	48.100048	4.8793E+01			2.5974	ug/g	101.44	% Recovery	
Sample Sequence 36																	
36	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Thallium	SOLID	46.6609425	4.7408E+01			0.074658	ug/g	101.47	% Recovery	
Sample Sequence 37																	

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* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027017

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
38	SPK-POST	S1104180011	S11V004106	0 1			Silver	SOLID	.2	2.0810E-01			2.00E-06	ug/mL	100.64	% Recovery	
37	SPK-POST	S1104180011	S11V004106	0 0			Arsenic	SOLID	1	1.3350E+00			4.20E-05	ug/mL	97.8	% Recovery	
38	SPK-POST	S1104180011	S11V004106	0 1			Cadmium	SOLID	1	1.0230E+00			6.00E-06	ug/mL	101.19	% Recovery	
38	SPK-POST	S1104180011	S11V004106	0 1			Lead	SOLID	1	1.5120E+00			1.50E-05	ug/mL	93.36	% Recovery	
38	SPK-POST	S1104180011	S11V004106	0 1			Selenium	SOLID	1	9.8900E-01			1.35E-04	ug/mL	98.9	% Recovery	
38	SPK-POST	S1104180011	S11V004106	0 1			Thallium	SOLID	1	9.8270E-01			4.00E-06	ug/mL	97.596	% Recovery	
Sample Sequence 39																	
40	SPK-POST	S1104180018	S11V004271	0 1			Silver	SOLID	.2	2.1430E-01			2.00E-06	ug/mL	104.68	% Recovery	
39	SPK-POST	S1104180018	S11V004271	0 0			Arsenic	SOLID	1	1.3150E+00			4.20E-05	ug/mL	96.91	% Recovery	
40	SPK-POST	S1104180018	S11V004271	0 1			Cadmium	SOLID	1	1.0530E+00			6.00E-06	ug/mL	104.66	% Recovery	
40	SPK-POST	S1104180018	S11V004271	0 1			Lead	SOLID	1	1.4230E+00			1.50E-05	ug/mL	102.32	% Recovery	
40	SPK-POST	S1104180018	S11V004271	0 1			Selenium	SOLID	1	1.0190E+00			1.35E-04	ug/mL	101.9	% Recovery	
40	SPK-POST	S1104180018	S11V004271	0 1			Thallium	SOLID	1	1.0370E+00			4.00E-06	ug/mL	103.03	% Recovery	
Sample Sequence 41																	
42	CCV	S1104180014		0 1			Silver	LIQUID	.0004	4.0780E-04			2.00E-06	ug/mL	101.95	% Recovery	
41	CCV	S1104180014		0 0			Arsenic	LIQUID	.002	1.8450E-03			4.20E-05	ug/mL	92.25	% Recovery	
42	CCV	S1104180014		0 1			Cadmium	LIQUID	.002	2.0240E-03			6.00E-06	ug/mL	101.2	% Recovery	
42	CCV	S1104180014		0 1			Lead	LIQUID	.002	1.9310E-03			1.50E-05	ug/mL	96.55	% Recovery	
42	CCV	S1104180014		0 1			Selenium	LIQUID	.002	1.8360E-03			1.35E-04	ug/mL	91.8	% Recovery	
42	CCV	S1104180014		0 1			Thallium	LIQUID	.002	1.8800E-03			4.00E-06	ug/mL	94	% Recovery	
Sample Sequence 43																	
44	CCB	S1104180015		0 1			Silver	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
43	CCB	S1104180015		0 0			Arsenic	LIQUID		<4.2000E-05			4.20E-05	ug/mL			
44	CCB	S1104180015		0 1			Cadmium	LIQUID		<6.0000E-06			6.00E-06	ug/mL			
44	CCB	S1104180015		0 1			Lead	LIQUID		<1.5000E-05			1.50E-05	ug/mL			
44	CCB	S1104180015		0 1			Selenium	LIQUID		<1.3500E-04			1.35E-04	ug/mL			
44	CCB	S1104180015		0 1			Thallium	LIQUID		<4.0000E-06			4.00E-06	ug/mL			
Sample Sequence 45																	
46	BLNK-PREP	S1104060052		0 1	A		Silver	LIQUID		<2.0000E-03			2.00E-03	ug/mL			
45	BLNK-PREP	S1104060052		0 0	A		Arsenic	LIQUID		<4.2000E-02			0.042	ug/mL			
46	BLNK-PREP	S1104060052		0 1	A		Cadmium	LIQUID		<6.0000E-03			6.00E-03	ug/mL			
46	BLNK-PREP	S1104060052		0 1	A		Lead	LIQUID		<1.5000E-02			0.015	ug/mL			
46	BLNK-PREP	S1104060052		0 1	A		Selenium	LIQUID		<1.3500E-01			0.135	ug/mL			
46	BLNK-PREP	S1104060052		0 1	A		Thallium	LIQUID		<4.0000E-03			4.00E-03	ug/mL			
Sample Sequence 47																	
48	SAMPLE	S11V004271		0 1	A		Silver	SOLID	N/A	4.8920E-02			0.019778	ug/g			J
47	SAMPLE	S11V004271		0 0	A		Arsenic	SOLID	N/A	3.4206E+00			0.41533	ug/g			J
48	SAMPLE	S11V004271		0 1	A		Cadmium	SOLID	N/A	6.2873E-02			0.059333	ug/g			J
48	SAMPLE	S11V004271		0 1	A		Lead	SOLID	N/A	3.9536E+00			0.14833	ug/g			
48	SAMPLE	S11V004271		0 1	A		Selenium	SOLID	N/A	<1.3350E+00			1.335	ug/g			U
48	SAMPLE	S11V004271		0 1	A		Thallium	SOLID	N/A	6.6206E-02			0.039555	ug/g			J

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027017

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 49																	
50	DUP	S1104060054	S11V004271	0 1	A		Silver	SOLID	4.8920E-02	4.3947E-02			0.019796	ug/g	10.709	% RPD	
49	DUP	S1104060054	S11V004271	0 0	A		Arsenic	SOLID	3.4206E+00	3.2050E+00			0.41572	ug/g	6.5084	% RPD	
50	DUP	S1104060054	S11V004271	0 1	A		Cadmium	SOLID	6.2873E-02	<5.9388E-02			0.059388	ug/g			
50	DUP	S1104060054	S11V004271	0 1	A		Lead	SOLID	3.9536E+00	3.4029E+00			0.14847	ug/g	14.970	% RPD	
50	DUP	S1104060054	S11V004271	0 1	A		Selenium	SOLID	<1.3350E+00	<1.3362E+00			1.3362	ug/g			
50	DUP	S1104060054	S11V004271	0 1	A		Thallium	SOLID	6.6206E-02	6.2378E-02			0.039592	ug/g	5.9549	% RPD	
Sample Sequence 51																	
52	SAMPLE	S11V004292		0 1	A		Silver	SOLID	N/A	4.5092E-02			0.019948	ug/g			J
51	SAMPLE	S11V004292		0 0	A		Arsenic	SOLID	N/A	3.8549E+00			0.4189	ug/g			J
52	SAMPLE	S11V004292		0 1	A		Cadmium	SOLID	N/A	6.6625E-02			0.059843	ug/g			J
52	SAMPLE	S11V004292		0 1	A		Lead	SOLID	N/A	4.1860E+00			0.14961	ug/g			
52	SAMPLE	S11V004292		0 1	A		Selenium	SOLID	N/A	<1.3465E+00			1.3465	ug/g			U
52	SAMPLE	S11V004292		0 1	A		Thallium	SOLID	N/A	8.0669E-02			0.039895	ug/g			J
Sample Sequence 53																	
54	SAMPLE	S11V004321		0 1	A		Silver	SOLID	N/A	5.0761E-02			0.019926	ug/g			J
53	SAMPLE	S11V004321		0 0	A		Arsenic	SOLID	N/A	2.6651E+00			0.41844	ug/g			J
54	SAMPLE	S11V004321		0 1	A		Cadmium	SOLID	N/A	7.0418E-02			0.059778	ug/g			J
54	SAMPLE	S11V004321		0 1	A		Lead	SOLID	N/A	2.9072E+00			0.14944	ug/g			
54	SAMPLE	S11V004321		0 1	A		Selenium	SOLID	N/A	<1.3450E+00			1.345	ug/g			U
54	SAMPLE	S11V004321		0 1	A		Thallium	SOLID	N/A	5.5862E-02			0.039852	ug/g			J
Sample Sequence 55																	
56	SAMPLE	S11V004341		0 1	A		Silver	SOLID	N/A	5.0731E-02			0.019941	ug/g			J
55	SAMPLE	S11V004341		0 0	A		Arsenic	SOLID	N/A	2.1597E+00			0.41877	ug/g			J
56	SAMPLE	S11V004341		0 1	A		Cadmium	SOLID	N/A	7.8011E-02			0.059824	ug/g			J
56	SAMPLE	S11V004341		0 1	A		Lead	SOLID	N/A	2.5475E+00			0.14956	ug/g			
56	SAMPLE	S11V004341		0 1	A		Selenium	SOLID	N/A	<1.3460E+00			1.346	ug/g			U
56	SAMPLE	S11V004341		0 1	A		Thallium	SOLID	N/A	6.0771E-02			0.039883	ug/g			J
Sample Sequence 57																	
58	STD-PREP	S1104060053		0 1	A		Silver	LIQUID	1	1.0680E+00			4.00E-03	ug/mL	106.8	% Recovery	
57	STD-PREP	S1104060053		0 0	A		Arsenic	LIQUID	5	4.7040E+00			0.084	ug/mL	94.08	% Recovery	
58	STD-PREP	S1104060053		0 1	A		Cadmium	LIQUID	5	5.2540E+00			0.012	ug/mL	105.08	% Recovery	
58	STD-PREP	S1104060053		0 1	A		Lead	LIQUID	5	4.9270E+00			0.03	ug/mL	98.54	% Recovery	
58	STD-PREP	S1104060053		0 1	A		Selenium	LIQUID	5	5.1660E+00			0.27	ug/mL	103.32	% Recovery	
59	STD-PREP	S1104060053		0 2	A		Thallium	LIQUID	5	4.9370E+00			8.00E-03	ug/mL	98.74	% Recovery	
Sample Sequence 60																	
61	SPK-PREDIG	S1104060055	S11V004271	0 1	A		Silver	SOLID	9.8866984	1.0490E+01			0.039547	ug/g	105.61	% Recovery	
60	SPK-PREDIG	S1104060055	S11V004271	0 0	A		Arsenic	SOLID	49.433492	4.9018E+01			0.83048	ug/g	92.24	% Recovery	
61	SPK-PREDIG	S1104060055	S11V004271	0 1	A		Cadmium	SOLID	49.433492	5.2973E+01			0.11864	ug/g	107.03	% Recovery	
61	SPK-PREDIG	S1104060055	S11V004271	0 1	A		Lead	SOLID	49.433492	5.3843E+01			0.2966	ug/g	100.92	% Recovery	
61	SPK-PREDIG	S1104060055	S11V004271	0 1	A		Selenium	SOLID	49.433492	5.1767E+01			2.6694	ug/g	104.72	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026830

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104070021	ICV				
2	S1104070022	ICB				
3	S1104070023	LLS				
4	S10V003619	SAMPLE		20101217	B29J42	BY Barrier East
5	S1104070033	SPK-PREDIG	S10V003619			
6	S1104070034	SPKPRE-DUP	S10V003619			
7	S10V003638	SAMPLE		20101217	B29J43	BY Barrier East
8	S11V004068	SAMPLE		20101217	B2BH80	BY Barrier East
9	S1104070027	CCV				
10	S1104070028	CCB				
11	S11V004314	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
12	S1104070031	SPK-PREDIG	S11V004314			
13	S1104070032	SPKPRE-DUP	S11V004314			
14	S11V004334	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
15	S1104070030	CCV				
16	S1104070029	CCB				

LABCORE Completed Batch Report for Batch# 00026830

Analyst: Hexum, Troy

Book#: 120N11E, 122N11C

Instrument: Hg by FIMS

Method: HG, LA-325-110 Rev/Mod A-0

Specification: BY Barrier East, C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

HG SOLIDS FOR BY BARRIER/C FARM WMC 2011-C8100

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1104070021		0 0			Mercury	LIQUID	.01	9.8820E-03			1.00E-04	ug/mL	98.82	% Recovery	
Sample Sequence 2																	
2	ICB	S1104070022		0 0			Mercury	LIQUID		<1.0000E-04			1.00E-04	ug/mL			
Sample Sequence 3																	
3	LLS	S1104070023		0 0			Mercury	LIQUID	.001	9.8100E-04			1.00E-04	ug/mL	98.1	% Recovery	
Sample Sequence 4																	
4	SAMPLE	S10V003619		0 0			Mercury	SOLID	N/A	<9.5740E-03			9.57E-03	ug/g			U
Sample Sequence 5																	
5	SPK-PREDIG	S1104070033	S10V003619	0 0			Mercury	SOLID	.47825	4.2373E-01			9.57E-03	ug/g	88.6	% Recovery	
Sample Sequence 6																	
6	SPKPRE-DUP	S1104070034	S10V003619	0 0			Mercury	SOLID	.4764	4.4296E-01			9.53E-03	ug/g	92.98	% Recovery	
															4.8243	% RPD	
Sample Sequence 7																	
7	SAMPLE	S10V003638		0 0			Mercury	SOLID	N/A	<9.9700E-03			9.97E-03	ug/g			U
Sample Sequence 8																	
8	SAMPLE	S11V004068		0 0			Mercury	SOLID	N/A	<9.4880E-03			9.49E-03	ug/g			U
Sample Sequence 9																	
9	CCV	S1104070027		0 0			Mercury	LIQUID	.01	9.4960E-03			1.00E-04	ug/mL	94.96	% Recovery	
Sample Sequence 10																	
10	CCB	S1104070028		0 0			Mercury	LIQUID		<1.0000E-04			1.00E-04	ug/mL			
Sample Sequence 11																	
11	SAMPLE	S11V004314		0 0			Mercury	SOLID	N/A	<9.6520E-03			9.65E-03	ug/g			U
Sample Sequence 12																	
12	SPK-PREDIG	S1104070031	S11V004314	0 0			Mercury	SOLID	.4771	4.5220E-01			9.54E-03	ug/g	94.78	% Recovery	
Sample Sequence 13																	
13	SPKPRE-DUP	S1104070032	S11V004314	0 0			Mercury	SOLID	.4764	4.3591E-01			9.53E-03	ug/g	91.5	% Recovery	
															3.5216	% RPD	
Sample Sequence 14																	
14	SAMPLE	S11V004334		0 0			Mercury	SOLID	N/A	<9.9700E-03			9.97E-03	ug/g			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026830

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 15																	
15	CCV	S1104070030		0 0			Mercury	LIQUID	.01	9.7000E-03			1.00E-04	ug/mL	97	% Recovery	
Sample Sequence 16																	
16	CCB	S1104070029		0 0			Mercury	LIQUID		<1.0000E-04			1.00E-04	ug/mL			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00026830

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026962

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104130078	ICV				
2	S1104130080	LLS				
3	S1104130080	LLS				
4	S1104130079	ICB				
5	S1103300093	BLNK-PREP				
6	S1103300094	STD-PREP				
7	S1103300097	STD-PREP				
8	S1104130081	SERDIL	S11V004103			
9	S11V004103	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
10	S1103300095	DUP	S11V004103			
11	S11V004120	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
12	S11V004141	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
13	S11V004162	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
14	S11V004205	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
15	S11V004247	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
16	S1104130083	CCV				
17	S1104130084	CCB				
18	S1104070017	BLNK-PREP				
19	S1104070018	STD-PREP				
20	S1104130077	STD-PREP				
21	S11V004268	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
22	S1104070019	DUP	S11V004268			
23	S11V004289	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
24	S11V004318	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
25	S11V004338	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
26	S1104070020	SPK-PREDIG	S11V004268			
27	S1104110009	SPK-PREDIG	S11V004268			
28	S1104130085	CCV				
29	S1104130086	CCB				
30	S1104130082	SPK-POST	S11V004268			
31	S1103300096	SPK-PREDIG	S11V004103			
32	S1103300098	SPK-PREDIG	S11V004103			
33	S1104130095	SPK-POST	S11V004103			
34	S1104130096	CCV				
35	S1104130097	LLS				

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026962

Analyst: Mull, Bryanna **Book#:**

Instrument: ICP/MS PQ-EXCELL

Method: MS ANTIMONY, LA-506-102 Rev/Mod F-1

Specification: C Farm WMC 2010-1, C Farm WMC 2011-C8100

Prep Batch: 00026628, 00026829

Batch Comment:

Sb/Sn 117/126 on C FARM solids

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1104130078		0 0			Antimony	LIQUID	.001	1.0490E-03			2.00E-06	ug/mL	104.9	% Recovery	
1	ICV	S1104130078		0 0			Tin-117	LIQUID	.001	1.0440E-03			1.00E-05	ug/mL	104.4	% Recovery	
Sample Sequence 2																	
2	LLS	S1104130080		0 0			Antimony	LIQUID	.00001	1.2410E-05			2.00E-06	ug/mL	124.1	% Recovery	
3	LLS	S1104130080		0 1			Tin-117	LIQUID	.00005	5.4220E-05			1.00E-05	ug/mL	108.44	% Recovery	
Sample Sequence 4																	
4	ICB	S1104130079		0 0			Antimony	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
4	ICB	S1104130079		0 0			Tin-117	LIQUID		<1.0000E-05			1.00E-05	ug/mL			
4	ICB	S1104130079		0 0			Tin-126	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
Sample Sequence 5																	
5	BLNK-PREP	S1103300093		0 0	A		Antimony	LIQUID		<2.0000E-04			2.00E-04	ug/mL			
5	BLNK-PREP	S1103300093		0 0	A		Tin-117	LIQUID		<1.0000E-03			1.00E-03	ug/mL			
5	BLNK-PREP	S1103300093		0 0	A		Tin-126	LIQUID		<2.0000E-05			2.00E-05	ug/mL			
Sample Sequence 6																	
6	STD-PREP	S1103300094		0 0	A		Tin-117	LIQUID	.077	8.0800E-02			1.00E-03	ug/mL	104.94	% Recovery	
Sample Sequence 7																	
7	STD-PREP	S1103300097		0 0	A		Antimony	LIQUID	1	1.0240E+00			2.00E-03	ug/mL	102.4	% Recovery	
Sample Sequence 8																	
8	SERDIL	S1104130081	S11V004103	0 0			Antimony	SOLID		2.0658E-01			1.00E-03	ug/g	5.5	% Diff	
8	SERDIL	S1104130081	S11V004103	0 0			Tin-117	SOLID		<5.0000E-03			5.00E-03	ug/g	N/A		
8	SERDIL	S1104130081	S11V004103	0 0			Tin-126	SOLID		<1.0000E-04			1.00E-04	ug/g	N/A		
Sample Sequence 9																	
9	SAMPLE	S11V004103		0 0	A		Antimony	SOLID	N/A	2.1853E-01			9.76E-03	ug/g			
9	SAMPLE	S11V004103		0 0	A		Tin-117	SOLID	N/A	<4.8790E-02			0.04879	ug/g			U
9	SAMPLE	S11V004103		0 0	A		Tin-126	SOLID	N/A	<9.7580E-04			9.76E-04	ug/g			U
Sample Sequence 10																	
10	DUP	S1103300095	S11V004103	0 0	A		Antimony	SOLID	2.1853E-01	1.8285E-01			9.89E-03	ug/g	17.779	% RPD	
10	DUP	S1103300095	S11V004103	0 0	A		Tin-117	SOLID	<4.8790E-02	<4.9432E-02			0.049432	ug/g			
10	DUP	S1103300095	S11V004103	0 0	A		Tin-126	SOLID	<9.7580E-04	<9.8863E-04			9.89E-04	ug/g			
Sample Sequence 11																	

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LABCORE Completed Batch Report for Batch# 00026962

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
11	SAMPLE	S11V004120		0 0	A		Antimony	SOLID	N/A	1.7764E-01			9.68E-03	ug/g			
11	SAMPLE	S11V004120		0 0	A		Tin-117	SOLID	N/A	<4.8417E-02			0.048417	ug/g			U
11	SAMPLE	S11V004120		0 0	A		Tin-126	SOLID	N/A	<9.6834E-04			9.68E-04	ug/g			U
Sample Sequence 12																	
12	SAMPLE	S11V004141		0 0	A		Antimony	SOLID	N/A	2.3264E-01			9.87E-03	ug/g			
12	SAMPLE	S11V004141		0 0	A		Tin-117	SOLID	N/A	<4.9329E-02			0.049329	ug/g			U
12	SAMPLE	S11V004141		0 0	A		Tin-126	SOLID	N/A	<9.8658E-04			9.87E-04	ug/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004162		0 0	A		Antimony	SOLID	N/A	2.1646E+00			9.62E-03	ug/g			
13	SAMPLE	S11V004162		0 0	A		Tin-117	SOLID	N/A	7.0198E-02			0.048114	ug/g			J
13	SAMPLE	S11V004162		0 0	A		Tin-126	SOLID	N/A	<9.6228E-04			9.62E-04	ug/g			U
Sample Sequence 14																	
14	SAMPLE	S11V004205		0 0	A		Antimony	SOLID	N/A	1.6045E-01			9.79E-03	ug/g			
14	SAMPLE	S11V004205		0 0	A		Tin-117	SOLID	N/A	<4.8962E-02			0.048962	ug/g			U
14	SAMPLE	S11V004205		0 0	A		Tin-126	SOLID	N/A	<9.7924E-04			9.79E-04	ug/g			U
Sample Sequence 15																	
15	SAMPLE	S11V004247		0 0	A		Antimony	SOLID	N/A	1.5166E-01			9.77E-03	ug/g			
15	SAMPLE	S11V004247		0 0	A		Tin-117	SOLID	N/A	<4.8828E-02			0.048828	ug/g			U
15	SAMPLE	S11V004247		0 0	A		Tin-126	SOLID	N/A	<9.7656E-04			9.77E-04	ug/g			U
Sample Sequence 16																	
16	CCV	S1104130083		0 0			Antimony	LIQUID	.001	1.0500E-03			2.00E-06	ug/mL	105	% Recovery	
16	CCV	S1104130083		0 0			Tin-117	LIQUID	.001	1.0500E-03			1.00E-05	ug/mL	105	% Recovery	
Sample Sequence 17																	
17	CCB	S1104130084		0 0			Antimony	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
17	CCB	S1104130084		0 0			Tin-117	LIQUID		<1.0000E-05			1.00E-05	ug/mL			
17	CCB	S1104130084		0 0			Tin-126	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
Sample Sequence 18																	
18	BLNK-PREP	S1104070017		0 0	A		Antimony	LIQUID		<2.0000E-04			2.00E-04	ug/mL			
18	BLNK-PREP	S1104070017		0 0	A		Tin-117	LIQUID		<1.0000E-03			1.00E-03	ug/mL			
18	BLNK-PREP	S1104070017		0 0	A		Tin-126	LIQUID		<2.0000E-05			2.00E-05	ug/mL			
Sample Sequence 19																	
19	STD-PREP	S1104070018		0 0	A		Tin-117	LIQUID	.077	8.0750E-02			1.00E-03	ug/mL	104.87	% Recovery	
Sample Sequence 20																	
20	STD-PREP	S1104130077		0 0	A		Antimony	LIQUID	1	1.0950E+00			2.00E-03	ug/mL	109.5	% Recovery	
Sample Sequence 21																	
21	SAMPLE	S11V004268		0 0	A		Antimony	SOLID	N/A	1.6175E-01			2.00E-03	ug/g			
21	SAMPLE	S11V004268		0 0	A		Tin-117	SOLID	N/A	1.6754E-02			9.98E-03	ug/g			J
21	SAMPLE	S11V004268		0 0	A		Tin-126	SOLID	N/A	3.6892E-04			2.00E-04	ug/g			EJ
Sample Sequence 22																	
22	DUP	S1104070019	S11V004268	0 0	A		Antimony	SOLID	1.6175E-01	1.6052E-01			1.99E-03	ug/g	0.76190	% RPD	
22	DUP	S1104070019	S11V004268	0 0	A		Tin-117	SOLID	1.6754E-02	1.8523E-02			9.96E-03	ug/g	10.030	% RPD	

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LABCORE Completed Batch Report for Batch# 00026962

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
22	DUP	S1104070019	S11V004268	0 0	A		Tin-126	SOLID	3.6892E-04	5.4113E-04			1.99E-04	ug/g	37.845	% RPD	
Sample Sequence 23																	
23	SAMPLE	S11V004289		0 0	A		Antimony	SOLID	N/A	2.4078E-01			1.98E-03	ug/g			
23	SAMPLE	S11V004289		0 0	A		Tin-117	SOLID	N/A	1.7935E-02			9.88E-03	ug/g			J
23	SAMPLE	S11V004289		0 0	A		Tin-126	SOLID	N/A	4.1727E-04			1.98E-04	ug/g			EJ
Sample Sequence 24																	
24	SAMPLE	S11V004318		0 0	A		Antimony	SOLID	N/A	1.3035E-01			1.98E-03	ug/g			
24	SAMPLE	S11V004318		0 0	A		Tin-117	SOLID	N/A	2.0872E-02			9.92E-03	ug/g			J
24	SAMPLE	S11V004318		0 0	A		Tin-126	SOLID	N/A	7.0621E-04			1.98E-04	ug/g			EJ
Sample Sequence 25																	
25	SAMPLE	S11V004338		0 0	A		Antimony	SOLID	N/A	1.2084E-01			1.99E-03	ug/g			
25	SAMPLE	S11V004338		0 0	A		Tin-117	SOLID	N/A	3.2407E-02			9.96E-03	ug/g			J
25	SAMPLE	S11V004338		0 0	A		Tin-126	SOLID	N/A	3.9182E-04			1.99E-04	ug/g			EJ
Sample Sequence 26																	
26	SPK-PREDIG	S1104070020	S11V004268	0 0	A		Tin-117	SOLID	.7646019073	8.2369E-01			9.91E-03	ug/g	105.54	% Recovery	
Sample Sequence 27																	
27	SPK-PREDIG	S1104110009	S11V004268	0 0	A		Antimony	SOLID	9.9096242	9.9696E+00			0.01986	ug/g	98.973	% Recovery	
Sample Sequence 28																	
28	CCV	S1104130085		0 0			Antimony	LIQUID	.001	1.0420E-03			2.00E-06	ug/mL	104.2	% Recovery	
28	CCV	S1104130085		0 0			Tin-117	LIQUID	.001	1.0430E-03			1.00E-05	ug/mL	104.3	% Recovery	
Sample Sequence 29																	
29	CCB	S1104130086		0 0			Antimony	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
29	CCB	S1104130086		0 0			Tin-117	LIQUID		<1.0000E-05			1.00E-05	ug/mL			
29	CCB	S1104130086		0 0			Tin-126	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
Sample Sequence 30																	
30	SPK-POST	S1104130082	S11V004268	0 0			Antimony	SOLID	.1	1.2020E-01			2.00E-06	ug/mL	104	% Recovery	
30	SPK-POST	S1104130082	S11V004268	0 0			Tin-117	SOLID	.1	1.0590E-01			1.00E-05	ug/mL	104.22	% Recovery	
Sample Sequence 31																	
31	SPK-PREDIG	S1103300096	S11V004103	0 0	A		Tin-117	SOLID	3.760132761	4.0160E+00			0.048833	ug/g	106.81	% Recovery	
Sample Sequence 32																	
32	SPK-PREDIG	S1103300098	S11V004103	0 0	A		Antimony	SOLID	48.685491	4.8661E+01			0.097371	ug/g	99.501	% Recovery	
Sample Sequence 33																	
33	SPK-POST	S1104130095	S11V004103	0 0			Antimony	SOLID	.1	1.0790E-01			2.00E-06	ug/mL	103.42	% Recovery	
33	SPK-POST	S1104130095	S11V004103	0 0			Tin-117	SOLID	.1	1.0300E-01			1.00E-05	ug/mL	103	% Recovery	
Sample Sequence 34																	
34	CCV	S1104130096		0 0			Antimony	LIQUID	.001	1.0310E-03			2.00E-06	ug/mL	103.1	% Recovery	
34	CCV	S1104130096		0 0			Tin-117	LIQUID	.001	1.0310E-03			1.00E-05	ug/mL	103.1	% Recovery	
Sample Sequence 35																	
35	LLS	S1104130097		0 0			Antimony	LIQUID	.00001	1.1550E-05			2.00E-06	ug/mL	115.5	% Recovery	
36	LLS	S1104130097		0 1			Tin-117	LIQUID	.00005	5.3480E-05			1.00E-05	ug/mL	106.96	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026962

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 37																	
37	CCB	S1104130098		0 0			Antimony	LIQUID		<2.0000E-06			2.00E-06	ug/mL			
37	CCB	S1104130098		0 0			Tin-117	LIQUID		<1.0000E-05			1.00E-05	ug/mL			
37	CCB	S1104130098		0 0			Tin-126	LIQUID		<2.0000E-07			2.00E-07	ug/mL			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00026962

Reviewer Signature **Date**

LABCORE Completed Batch Report for Batch# 00026878

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104110111	ICV				
2	S1104110111	ICV				
3	S1104110111	ICV				
4	S1104110113	LLS				
5	S1104110113	LLS				
6	S1104110113	LLS				
7	S1104110113	LLS				
8	S1104110113	LLS				
9	S1104110112	ICB				
10	S1104110114	ICSA				
11	S1104110115	ICSAB				
12	S1104110116	SERDIL	S11V004106			
13	S11V004106	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
14	S1104050136	DUP	S11V004106			
15	S1104050137	SPK-PREDIG	S11V004106			
16	S1104050138	SPK-PREDIG	S11V004106			
17	S1104050134	BLNK-PREP				
18	S1104050135	STD-PREP				
19	S1104050139	STD-PREP				
20	S1104110122	CCV				
21	S1104110122	CCV				
22	S1104110122	CCV				
23	S1104110122	CCV				
24	S1104110123	CCB				
25	S1104110117	SPK-POST	S11V004106			
26	S1104110117	SPK-POST	S11V004106			
27	S1104110117	SPK-POST	S11V004106			
28	S11V004123	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
29	S11V004144	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
30	S11V004165	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
31	S11V004208	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
32	S11V004250	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
33	S1104110120	ICSA				
34	S1104110121	ICSAB				
35	S1104110124	CCV				

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026878

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
12	SERDIL	S1104110116	S11V004106	0 0			Titanium	SOLID		1.2368E+03			2.2868	ug/mL	4.4147	% Diff	
12	SERDIL	S1104110116	S11V004106	0 0			Vanadium	SOLID		4.3739E+01			2.2868	ug/mL	4.422	% Diff	
12	SERDIL	S1104110116	S11V004106	0 0			Yttrium	SOLID		9.6967E+00			0.91471	ug/mL	7.9148	% Diff	
12	SERDIL	S1104110116	S11V004106	0 0			Zinc	SOLID		3.4229E+01			2.2868	ug/mL	.083883	% Diff	
12	SERDIL	S1104110116	S11V004106	0 0			Zirconium	SOLID		1.5684E+01			2.2868	ug/mL	.36772	% Diff	
Sample Sequence 13																	
13	SAMPLE	S11V004106		0 0	A		Aluminum	SOLID	N/A	7.7426E+03			2.7441	ug/g			
13	SAMPLE	S11V004106		0 0	A		Boron	SOLID	N/A	4.3901E+01			2.7441	ug/g			b
13	SAMPLE	S11V004106		0 0	A		Barium	SOLID	N/A	2.4437E+02			0.27441	ug/g			
13	SAMPLE	S11V004106		0 0	A		Beryllium	SOLID	N/A	3.2783E-01			0.091471	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Calcium	SOLID	N/A	1.5314E+04			4.5736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Cerium	SOLID	N/A	2.0311E+01			2.7441	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Cobalt	SOLID	N/A	6.3415E+00			0.91471	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Chromium	SOLID	N/A	1.0513E+01			0.45736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Copper	SOLID	N/A	1.1829E+01			0.45736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Iron	SOLID	N/A	1.8674E+04			0.45736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Potassium	SOLID	N/A	9.4958E+02			45.736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Lanthanum	SOLID	N/A	9.3849E+00			0.27441	ug/g			
13	SAMPLE	S11V004106		0 0	A		Lithium	SOLID	N/A	8.6837E+00			0.27441	ug/g			
13	SAMPLE	S11V004106		0 0	A		Magnesium	SOLID	N/A	6.0482E+03			4.5736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Manganese	SOLID	N/A	2.4011E+02			0.27441	ug/g			
13	SAMPLE	S11V004106		0 0	A		Molybdenum	SOLID	N/A	<1.8294E+00			1.8294	ug/g			U
13	SAMPLE	S11V004106		0 0	A		Sodium	SOLID	N/A	5.1514E+02			9.1471	ug/g			
13	SAMPLE	S11V004106		0 0	A		Nickel	SOLID	N/A	1.3678E+01			1.8294	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Phosphorus	SOLID	N/A	7.6269E+02			4.5736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Praseodymium	SOLID	N/A	2.2588E+00			0.91471	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Sulfur	SOLID	N/A	1.2883E+02			9.1471	ug/g			b
13	SAMPLE	S11V004106		0 0	A		Silicon	SOLID	N/A	6.8647E+01			2.7441	ug/g			ab
13	SAMPLE	S11V004106		0 0	A		Tin	SOLID	N/A	3.0325E+00			2.7441	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Strontium	SOLID	N/A	1.2458E+02			0.27441	ug/g			b
13	SAMPLE	S11V004106		0 0	A		Tellurium	SOLID	N/A	1.1282E+01			9.1471	ug/g			J
13	SAMPLE	S11V004106		0 0	A		Titanium	SOLID	N/A	1.1845E+03			0.45736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Vanadium	SOLID	N/A	4.1887E+01			0.45736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Yttrium	SOLID	N/A	8.9855E+00			0.18294	ug/g			
13	SAMPLE	S11V004106		0 0	A		Zinc	SOLID	N/A	3.4258E+01			0.45736	ug/g			
13	SAMPLE	S11V004106		0 0	A		Zirconium	SOLID	N/A	1.5742E+01			0.45736	ug/g			b
Sample Sequence 14																	
14	DUP	S1104050136	S11V004106	0 0	A		Aluminum	SOLID	7.7426E+03	8.4334E+03			2.8877	ug/g	8.5413	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Barium	SOLID	2.4437E+02	2.7177E+02			0.28877	ug/g	10.618	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Beryllium	SOLID	3.2783E-01	3.6761E-01			0.096258	ug/g	11.440	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Calcium	SOLID	1.5314E+04	1.9393E+04			4.8129	ug/g	23.503	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Cobalt	SOLID	6.3415E+00	8.9219E+00			0.96258	ug/g	33.812	% RPD	

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LABCORE Completed Batch Report for Batch# 00026878

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
14	DUP	S1104050136	S11V004106	0 0	A		Chromium	SOLID	1.0513E+01	8.5555E+00			0.48129	ug/g	20.532	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Copper	SOLID	1.1829E+01	1.2985E+01			0.48129	ug/g	9.3184	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Iron	SOLID	1.8674E+04	2.0172E+04			0.48129	ug/g	7.7107	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Potassium	SOLID	9.4958E+02	9.5812E+02			48.129	ug/g	0.89557	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Lithium	SOLID	8.6837E+00	8.8243E+00			0.28877	ug/g	1.6062	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Magnesium	SOLID	6.0482E+03	6.8253E+03			4.8129	ug/g	12.073	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Manganese	SOLID	2.4011E+02	2.5629E+02			0.28877	ug/g	6.5179	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Molybdenum	SOLID	<1.8294E+00	<1.9252E+00			1.9252	ug/g			
14	DUP	S1104050136	S11V004106	0 0	A		Sodium	SOLID	5.1514E+02	5.4237E+02			9.6258	ug/g	5.1493	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Nickel	SOLID	1.3678E+01	1.3253E+01			1.9252	ug/g	3.1560	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Phosphorus	SOLID	7.6269E+02	8.3260E+02			4.8129	ug/g	8.7644	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Strontium	SOLID	1.2458E+02	1.3983E+02			0.28877	ug/g	11.535	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Vanadium	SOLID	4.1887E+01	4.2452E+01			0.48129	ug/g	1.3407	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Zinc	SOLID	3.4258E+01	3.5548E+01			0.48129	ug/g	3.6962	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Boron	SOLID	4.3901E+01	4.7508E+01			2.8877	ug/g	7.8920	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Cerium	SOLID	2.0311E+01	2.2448E+01			2.8877	ug/g	9.9974	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Lanthanum	SOLID	9.3849E+00	1.0039E+01			0.28877	ug/g	6.7320	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Praseodymium	SOLID	2.2588E+00	2.0803E+00			0.96258	ug/g	8.2267	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Silicon	SOLID	6.8647E+01	8.4692E+01			2.8877	ug/g	20.927	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Sulfur	SOLID	1.2883E+02	1.4187E+02			9.6258	ug/g	9.6354	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Tellurium	SOLID	1.1282E+01	<9.6258E+00			9.6258	ug/g			
14	DUP	S1104050136	S11V004106	0 0	A		Tin	SOLID	3.0325E+00	<2.8877E+00			2.8877	ug/g			
14	DUP	S1104050136	S11V004106	0 0	A		Titanium	SOLID	1.1845E+03	1.1765E+03			0.48129	ug/g	0.67681	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Yttrium	SOLID	8.9855E+00	9.6280E+00			0.19252	ug/g	6.9032	% RPD	
14	DUP	S1104050136	S11V004106	0 0	A		Zirconium	SOLID	1.5742E+01	1.3306E+01			0.48129	ug/g	16.773	% RPD	
Sample Sequence 15																	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Aluminum	SOLID	48.1000481	9.0959E+03			2.886	ug/g	2813.5	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Boron	SOLID	48.1000481	1.0859E+02			2.886	ug/g	134.49	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Barium	SOLID	48.1000481	3.3037E+02			0.2886	ug/g	178.8	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Beryllium	SOLID	48.1000481	4.7336E+01			0.0962	ug/g	97.729	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Calcium	SOLID	48.1000481	1.8416E+04			4.81	ug/g	6449.2	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Cobalt	SOLID	48.1000481	5.5421E+01			0.962	ug/g	102.04	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Chromium	SOLID	48.1000481	5.7899E+01			0.481	ug/g	98.514	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Copper	SOLID	48.1000481	6.5343E+01			0.481	ug/g	111.26	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Iron	SOLID	48.1000481	2.0331E+04			0.481	ug/g	3444	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Potassium	SOLID	48.1000481	1.0104E+03			48.1	ug/g	126.53	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Lanthanum	SOLID	48.1000481	5.7771E+01			0.2886	ug/g	100.59	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Lithium	SOLID	48.1000481	5.6860E+01			0.2886	ug/g	100.16	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Magnesium	SOLID	48.1000481	6.5990E+03			4.81	ug/g	1145.2	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Manganese	SOLID	48.1000481	3.1725E+02			0.2886	ug/g	160.37	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Molybdenum	SOLID	48.1000481	4.5780E+01			1.924	ug/g	95.178	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Sodium	SOLID	48.1000481	7.6752E+02			9.62	ug/g	524.69	% Recovery	

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LABCORE Completed Batch Report for Batch# 00026878

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Nickel	SOLID	48.1000481	5.7984E+01			1.924	ug/g	92.112	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Phosphorus	SOLID	48.1000481	9.2748E+02			4.81	ug/g	342.6	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Sulfur	SOLID	48.1000481	1.9417E+02			9.62	ug/g	135.84	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Silicon	SOLID	48.1000481	6.5316E+01			2.886	ug/g	-6.9255	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Strontium	SOLID	48.1000481	1.8605E+02			0.2886	ug/g	127.79	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Vanadium	SOLID	48.1000481	9.3144E+01			0.481	ug/g	106.56	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Zinc	SOLID	48.1000481	8.7652E+01			0.481	ug/g	111.01	% Recovery	
15	SPK-PREDIG	S1104050137	S11V004106	0 0	A		Zirconium	SOLID	48.1000481	1.1324E+01			0.481	ug/g	-9.1844	% Recovery	
Sample Sequence 16																	
16	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Cerium	SOLID	46.660942925	6.8454E+01			2.7997	ug/g	103.18	% Recovery	
16	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Praseodymium	SOLID	46.660942925	4.9007E+01			0.93322	ug/g	100.19	% Recovery	
16	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Tin	SOLID	46.660942925	4.6935E+01			2.7997	ug/g	94.089	% Recovery	
16	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Tellurium	SOLID	46.660942925	5.2449E+01			9.3322	ug/g	88.226	% Recovery	
16	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Yttrium	SOLID	46.660942925	5.4867E+01			0.18664	ug/g	98.33	% Recovery	
Sample Sequence 17																	
17	BLNK-PREP	S1104050134		0 0	A		Silver	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Aluminum	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Arsenic	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Boron	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Barium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Beryllium	LIQUID		<1.0000E-03			1.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Bismuth	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Calcium	LIQUID		1.3901E-01			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Cadmium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Cerium	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Cobalt	LIQUID		<1.0000E-02			0.01	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Chromium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Copper	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Europium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Iron	LIQUID		1.0220E-02			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Potassium	LIQUID		<5.0000E-01			0.5	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Lanthanum	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Lithium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Magnesium	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Manganese	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Molybdenum	LIQUID		<2.0000E-02			0.02	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Sodium	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Neodymium	LIQUID		<1.0000E-02			0.01	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Nickel	LIQUID		<2.0000E-02			0.02	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Niobium	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Phosphorus	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Lead	LIQUID		<5.0000E-02			0.05	ug/mL			

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LABCORE Completed Batch Report for Batch# 00026878

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
17	BLNK-PREP	S1104050134		0 0	A		Palladium	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Praseodymium	LIQUID		<1.0000E-02			0.01	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Rubidium	LIQUID		<1.0000E+00			1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Rhodium	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Ruthenium	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Sulfur	LIQUID		2.3917E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Antimony	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Selenium	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Silicon	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Samarium	LIQUID		<2.0000E-02			0.02	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Tin	LIQUID		<3.0000E-02			0.03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Strontium	LIQUID		<3.0000E-03			3.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Tantalum	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Tellurium	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Thorium	LIQUID		<5.0000E-02			0.05	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Titanium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Thallium	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Uranium	LIQUID		<1.0000E-01			0.1	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Vanadium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Tungsten	LIQUID		<2.0000E-01			0.2	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Yttrium	LIQUID		<2.0000E-03			2.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Zinc	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
17	BLNK-PREP	S1104050134		0 0	A		Zirconium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
Sample Sequence 18																	
18	STD-PREP	S1104050135		0 0	A		Silver	LIQUID	1	8.5519E-01			5.00E-03	ug/mL	85.519	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Aluminum	LIQUID	5	4.5775E+00			0.03	ug/mL	91.551	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Arsenic	LIQUID	5	4.6575E+00			0.05	ug/mL	93.149	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Boron	LIQUID	5	4.4548E+00			0.03	ug/mL	89.096	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Barium	LIQUID	5	4.8327E+00			3.00E-03	ug/mL	96.655	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Beryllium	LIQUID	5	5.0421E+00			1.00E-03	ug/mL	100.84	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Bismuth	LIQUID	5	4.6204E+00			0.1	ug/mL	92.408	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Calcium	LIQUID	5	4.5376E+00			0.05	ug/mL	90.753	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Cadmium	LIQUID	5	4.6375E+00			5.00E-03	ug/mL	92.751	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Cobalt	LIQUID	5	4.6074E+00			0.01	ug/mL	92.149	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Chromium	LIQUID	5	4.6436E+00			5.00E-03	ug/mL	92.873	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Copper	LIQUID	5	4.8523E+00			5.00E-03	ug/mL	97.046	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Iron	LIQUID	5	4.6145E+00			5.00E-03	ug/mL	92.291	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Potassium	LIQUID	5	4.5550E+00			0.5	ug/mL	91.1	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Lanthanum	LIQUID	5	4.7608E+00			3.00E-03	ug/mL	95.215	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Lithium	LIQUID	5	5.1257E+00			3.00E-03	ug/mL	102.51	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Magnesium	LIQUID	5	4.5938E+00			0.05	ug/mL	91.876	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Manganese	LIQUID	5	4.5962E+00			3.00E-03	ug/mL	91.925	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026878

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
18	STD-PREP	S1104050135		0 0	A		Molybdenum	LIQUID	5	4.5987E+00			0.02	ug/mL	91.974	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Sodium	LIQUID	5	5.0069E+00			0.1	ug/mL	100.14	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Nickel	LIQUID	5	4.5775E+00			0.02	ug/mL	91.551	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Phosphorus	LIQUID	5	4.7576E+00			0.05	ug/mL	95.153	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Lead	LIQUID	5	4.4662E+00			0.05	ug/mL	89.325	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Sulfur	LIQUID	5	4.9739E+00			0.1	ug/mL	99.478	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Antimony	LIQUID	5	4.5754E+00			0.05	ug/mL	91.508	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Selenium	LIQUID	5	4.7319E+00			0.1	ug/mL	94.639	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Silicon	LIQUID	5	7.9814E-01			0.03	ug/mL	15.963	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Strontium	LIQUID	5	4.7858E+00			3.00E-03	ug/mL	95.715	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Titanium	LIQUID	5	4.6695E+00			5.00E-03	ug/mL	93.389	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Vanadium	LIQUID	5	4.7074E+00			5.00E-03	ug/mL	94.148	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Zinc	LIQUID	5	4.5679E+00			5.00E-03	ug/mL	91.358	% Recovery	
18	STD-PREP	S1104050135		0 0	A		Zirconium	LIQUID	5	4.6208E+00			5.00E-03	ug/mL	92.416	% Recovery	
Sample Sequence 19																	
19	STD-PREP	S1104050139		0 0	A		Cerium	LIQUID	5	4.9369E+00			0.03	ug/mL	98.737	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Europium	LIQUID	5	4.8740E+00			5.00E-03	ug/mL	97.481	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Neodymium	LIQUID	5	4.9742E+00			0.01	ug/mL	99.483	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Niobium	LIQUID	5	2.1921E+00			0.03	ug/mL	43.842	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Palladium	LIQUID	5	4.6781E+00			0.1	ug/mL	93.561	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Praseodymium	LIQUID	5	5.1485E+00			0.01	ug/mL	102.97	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Rubidium	LIQUID	5	4.0108E+00			1	ug/mL	80.215	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Rhodium	LIQUID	5	4.9111E+00			0.05	ug/mL	98.222	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Ruthenium	LIQUID	5	4.6102E+00			0.03	ug/mL	92.205	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Samarium	LIQUID	5	5.0726E+00			0.02	ug/mL	101.45	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Tin	LIQUID	5	4.4389E+00			0.03	ug/mL	88.778	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Tantalum	LIQUID	5	1.5421E+00			0.05	ug/mL	30.841	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Tellurium	LIQUID	5	4.5206E+00			0.1	ug/mL	90.413	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Thorium	LIQUID	5	7.0076E+00			0.05	ug/mL	140.15	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Thallium	LIQUID	5	4.8266E+00			0.1	ug/mL	96.532	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Uranium	LIQUID	5	5.0895E+00			0.1	ug/mL	101.79	% Recovery	
19	STD-PREP	S1104050139		0 0	A		Yttrium	LIQUID	5	4.7125E+00			2.00E-03	ug/mL	94.25	% Recovery	
Sample Sequence 20																	
20	CCV	S1104110122		0 0			Silver	LIQUID	1	1.0133E+00			5.00E-03	ug/mL	101.33	% Recovery	
20	CCV	S1104110122		0 0			Aluminum	LIQUID	5	5.0222E+00			0.03	ug/mL	100.44	% Recovery	
20	CCV	S1104110122		0 0			Arsenic	LIQUID	5	4.9960E+00			0.05	ug/mL	99.92	% Recovery	
20	CCV	S1104110122		0 0			Boron	LIQUID	5	5.0753E+00			0.03	ug/mL	101.51	% Recovery	
20	CCV	S1104110122		0 0			Barium	LIQUID	5	5.1352E+00			3.00E-03	ug/mL	102.7	% Recovery	
20	CCV	S1104110122		0 0			Beryllium	LIQUID	5	5.0174E+00			1.00E-03	ug/mL	100.35	% Recovery	
20	CCV	S1104110122		0 0			Bismuth	LIQUID	5	5.1656E+00			0.1	ug/mL	103.31	% Recovery	
20	CCV	S1104110122		0 0			Calcium	LIQUID	5	5.1663E+00			0.05	ug/mL	103.33	% Recovery	
20	CCV	S1104110122		0 0			Cadmium	LIQUID	5	5.2266E+00			5.00E-03	ug/mL	104.53	% Recovery	

LABCORE Completed Batch Report for Batch# 00026878

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
24	CCB	S1104110123		0 0			Titanium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
24	CCB	S1104110123		0 0			Thallium	LIQUID		<1.0000E-01			0.1	ug/mL			
24	CCB	S1104110123		0 0			Uranium	LIQUID		<1.0000E-01			0.1	ug/mL			
24	CCB	S1104110123		0 0			Vanadium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
24	CCB	S1104110123		0 0			Tungsten	LIQUID		<2.0000E-01			0.2	ug/mL			
24	CCB	S1104110123		0 0			Yttrium	LIQUID		<2.0000E-03			2.00E-03	ug/mL			
24	CCB	S1104110123		0 0			Zinc	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
24	CCB	S1104110123		0 0			Zirconium	LIQUID		<5.0000E-03			5.00E-03	ug/mL			
Sample Sequence 25																	
25	SPK-POST	S1104110117	S11V004106	0 0			Aluminum	SOLID	100	9.3985E+02			0.03	ug/mL	93.395	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Boron	SOLID	100	1.0116E+02			0.03	ug/mL	96.357	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Barium	SOLID	100	1.2398E+02			3.00E-03	ug/mL	97.266	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Beryllium	SOLID	100	9.2295E+01			1.00E-03	ug/mL	92.259	% Recovery	
27	SPK-POST	S1104110117	S11V004106	0 2			Calcium	SOLID	1000	2.7022E+03			0.05	ug/mL	102.81	% Recovery	
26	SPK-POST	S1104110117	S11V004106	0 1			Cerium	SOLID	100	9.8363E+01			0.03	ug/mL	96.142	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Cobalt	SOLID	100	9.4413E+01			0.01	ug/mL	93.72	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Chromium	SOLID	100	9.4616E+01			5.00E-03	ug/mL	93.467	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Copper	SOLID	100	1.0249E+02			5.00E-03	ug/mL	101.19	% Recovery	
27	SPK-POST	S1104110117	S11V004106	0 2			Iron	SOLID	1000	2.9633E+03			5.00E-03	ug/mL	92.179	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Potassium	SOLID	100	1.8762E+02			0.5	ug/mL	83.812	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Lanthanum	SOLID	100	9.2194E+01			3.00E-03	ug/mL	91.168	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Lithium	SOLID	100	9.5178E+01			3.00E-03	ug/mL	94.229	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Magnesium	SOLID	100	7.4366E+02			0.05	ug/mL	82.443	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Manganese	SOLID	100	1.2102E+02			3.00E-03	ug/mL	94.773	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Molybdenum	SOLID	100	9.2910E+01			0.02	ug/mL	92.91	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Sodium	SOLID	100	1.4751E+02			0.1	ug/mL	91.197	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Nickel	SOLID	100	9.5235E+01			0.02	ug/mL	93.739	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Phosphorus	SOLID	100	1.7929E+02			0.05	ug/mL	95.906	% Recovery	
26	SPK-POST	S1104110117	S11V004106	0 1			Praseodymium	SOLID	100	9.7998E+01			0.01	ug/mL	97.751	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Sulfur	SOLID	100	1.1315E+02			0.1	ug/mL	99.065	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Silicon	SOLID	100	9.7054E+01			0.03	ug/mL	89.55	% Recovery	
26	SPK-POST	S1104110117	S11V004106	0 1			Tin	SOLID	100	9.8241E+01			0.03	ug/mL	97.909	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Strontium	SOLID	100	1.0731E+02			3.00E-03	ug/mL	93.686	% Recovery	
26	SPK-POST	S1104110117	S11V004106	0 1			Tellurium	SOLID	100	9.9407E+01			0.1	ug/mL	98.174	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Titanium	SOLID	100	2.2111E+02			5.00E-03	ug/mL	91.614	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Vanadium	SOLID	100	9.8912E+01			5.00E-03	ug/mL	94.332	% Recovery	
26	SPK-POST	S1104110117	S11V004106	0 1			Yttrium	SOLID	100	9.3047E+01			2.00E-03	ug/mL	92.064	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Zinc	SOLID	100	9.9135E+01			5.00E-03	ug/mL	95.39	% Recovery	
25	SPK-POST	S1104110117	S11V004106	0 0			Zirconium	SOLID	100	8.6953E+01			5.00E-03	ug/mL	85.232	% Recovery	
Sample Sequence 28																	
28	SAMPLE	S11V004123		0 0	A		Aluminum	SOLID	N/A	7.6222E+03			2.8199	ug/g			
28	SAMPLE	S11V004123		0 0	A		Boron	SOLID	N/A	4.1698E+01			2.8199	ug/g			b

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026142

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1103110023	ICV				
2	S1103110024	ICB				
3	S1103110025	LLS				
4	S11V004098	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
5	S1103110031	SPK-PREDIG	S11V004098			
6	S1103110032	SPKPRE-DUP	S11V004098			
7	S11V004115	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
8	S1103150002	CCV				
9	S1103150001	CCB				
10	S11V004136	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
11	S11V004157	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
12	S11V004200	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
13	S11V004242	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
14	S1103110029	CCV				
15	S1103110030	CCB				

LABCORE Completed Batch Report for Batch# 00026142

Analyst: Hexum, Troy

Book#: 121N11C, 122N11C

Instrument: Hg by FIMS

Method: HG, LA-325-110 Rev/Mod A-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

HG FOR C-FARM 2011-C8100 SOLIDS

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1103110023		0 0			Mercury	LIQUID	.01	9.6980E-03			1.00E-04	ug/mL	96.98	% Recovery	
Sample Sequence 2																	
2	ICB	S1103110024		0 0			Mercury	LIQUID		<1.0000E-04			1.00E-04	ug/mL			
Sample Sequence 3																	
3	LLS	S1103110025		0 0			Mercury	LIQUID	.001	9.9800E-04			1.00E-05	ug/mL	99.8	% Recovery	
Sample Sequence 4																	
4	SAMPLE	S11V004098		0 0			Mercury	SOLID	N/A	1.0430E-02			9.15E-03	ug/g			J
Sample Sequence 5																	
5	SPK-PREDIG	S1103110031	S11V004098	0 0			Mercury	SOLID	.47824	4.4964E-01			9.56E-03	ug/g	91.839	% Recovery	
Sample Sequence 6																	
6	SPKPRE-DUP	S1103110032	S11V004098	0 0			Mercury	SOLID	.464037	4.5104E-01			4.64E-03	ug/g	94.952	% Recovery	
															3.3331	% RPD	
Sample Sequence 7																	
7	SAMPLE	S11V004115		0 0			Mercury	SOLID	N/A	1.6167E-02			9.08E-03	ug/g			J
Sample Sequence 8																	
8	CCV	S1103150002		0 0			Mercury	LIQUID	.01	9.3400E-03			1.00E-04	ug/mL	93.4	% Recovery	
Sample Sequence 9																	
9	CCB	S1103150001		0 0			Mercury	LIQUID		<1.0000E-04			1.00E-04	ug/mL			
Sample Sequence 10																	
10	SAMPLE	S11V004136		0 0			Mercury	SOLID	N/A	<9.1408E-03			9.14E-03	ug/g			U
Sample Sequence 11																	
11	SAMPLE	S11V004157		0 0			Mercury	SOLID	N/A	1.1487E-02			9.26E-03	ug/g			J
Sample Sequence 12																	
12	SAMPLE	S11V004200		0 0			Mercury	SOLID	N/A	<9.1366E-03			9.14E-03	ug/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004242		0 0			Mercury	SOLID	N/A	<9.9157E-03			9.92E-03	ug/g			U
Sample Sequence 14																	
14	CCV	S1103110029		0 0			Mercury	LIQUID	.01	9.2200E-03			1.00E-04	ug/mL	92.2	% Recovery	
Sample Sequence 15																	

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026871

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104110056	ICV				
2	S1104110058	LLS				
3	S1104110057	ICB				
4	S1103310002	BLNK-PREP				
5	S1104110059	SERDIL	S11V004101			
6	S11V004101	SAMPLE		20110264	B2B1L6 WE	C Farm WMC 2011-C8100
7	S1103310003	DUP	S11V004101			
8	S1104110062	CCV				
9	S1104110063	CCB				
10	S11V004118	SAMPLE		20110264	B2B1L7 WE	C Farm WMC 2011-C8100
11	S11V004139	SAMPLE		20110264	B2C1M2 WE	C Farm WMC 2011-C8100
12	S11V004160	SAMPLE		20110264	B2C1M3 WE	C Farm WMC 2011-C8100
13	S11V004203	SAMPLE		20110264	B2C1M5 WE	C Farm WMC 2011-C8100
14	S11V004245	SAMPLE		20110264	B2C1M7 WE	C Farm WMC 2011-C8100
15	S1103310001	STD-PREP				
16	S1104110061	SPK-POST	S11V004101			
17	S1104060019	BLNK-PREP				
18	S11V004266	SAMPLE		20110264	B2C1M8 WE	C Farm WMC 2011-C8100
19	S1104110064	CCV				
20	S1104110065	CCB				
21	S1104060020	DUP	S11V004266			
22	S11V004287	SAMPLE		20110264	B2C1M9 WE	C Farm WMC 2011-C8100
23	S11V004316	SAMPLE		20110264	B2C1N0 WE	C Farm WMC 2011-C8100
24	S11V004336	SAMPLE		20110264	B2C1N1 WE	C Farm WMC 2011-C8100
25	S1104060018	STD-PREP				
26	S1104110066	SPK-POST	S11V004266			
27	S1104110068	CCV				
28	S1104110067	CCB				
29	S1104110070	CCV				
30	S1104110071	LLS				
31	S1104110069	CCB				

LABCORE Completed Batch Report for Batch# 00026871

Analyst: Mull, Bryanna **Book#:**

Instrument: ICP/MS AGILENT

Method: MS TC-99, LA-506-103 Rev/Mod B-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00026651, 00026804

Batch Comment:

ICP-MS analysis of Tc99 for C Farm WMC 2011-C8100 water digestates. bsm

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1104110056		0 0			Technetium-99	LIQUID	.001	1.0540E-03			6.00E-07	ug/mL	105.4	% Recovery	
Sample Sequence 2																	
2	LLS	S1104110058		0 0			Technetium-99	LIQUID	.000004	4.8900E-06			6.00E-07	ug/mL	122.25	% Recovery	
Sample Sequence 3																	
3	ICB	S1104110057		0 0			Technetium-99	LIQUID		<6.0000E-07			6.00E-07	ug/mL			
Sample Sequence 4																	
4	BLNK-PREP	S1103310002		0 0	WV		Technetium-99	LIQUID		<6.0000E-06			6.00E-06	ug/mL			
Sample Sequence 5																	
5	SERDIL	S1104110059	S11V004101	0 0			Technetium-99	SOLID		<3.1370E-05			3.14E-05	ug/g	N/A		
Sample Sequence 6																	
6	SAMPLE	S11V004101		0 0	WV		Technetium-99	SOLID	N/A	<6.2740E-06			6.27E-06	ug/g			U
Sample Sequence 7																	
7	DUP	S1103310003	S11V004101	0 0	WV		Technetium-99	SOLID	<6.2740E-06	<6.2895E-06			6.29E-06	ug/g			
Sample Sequence 8																	
8	CCV	S1104110062		0 0			Technetium-99	LIQUID	.001	1.0670E-03			6.00E-07	ug/mL	106.7	% Recovery	
Sample Sequence 9																	
9	CCB	S1104110063		0 0			Technetium-99	LIQUID		<6.0000E-07			6.00E-07	ug/mL			
Sample Sequence 10																	
10	SAMPLE	S11V004118		0 0	WV		Technetium-99	SOLID	N/A	<5.9918E-06			5.99E-06	ug/g			U
Sample Sequence 11																	
11	SAMPLE	S11V004139		0 0	WV		Technetium-99	SOLID	N/A	<6.3543E-06			6.35E-06	ug/g			U
Sample Sequence 12																	
12	SAMPLE	S11V004160		0 0	WV		Technetium-99	SOLID	N/A	<6.6552E-06			6.66E-06	ug/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004203		0 0	WV		Technetium-99	SOLID	N/A	<6.4791E-06			6.48E-06	ug/g			U
Sample Sequence 14																	
14	SAMPLE	S11V004245		0 0	WV		Technetium-99	SOLID	N/A	<5.8011E-06			5.80E-06	ug/g			U
Sample Sequence 15																	
15	STD-PREP	S1103310001		0 0	WV		Technetium-99	LIQUID	.00101371	1.0150E-03			1.20E-06	ug/mL	100.13	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026871

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 16																	
16	SPK-POST	S1104110061	S11V004101	0 0			Technetium-99	SOLID	.005	5.2710E-03			6.00E-07	ug/mL	105.42	% Recovery	
Sample Sequence 17																	
17	BLNK-PREP	S1104060019		0 0	WV		Technetium-99	LIQUID		<6.0000E-06			6.00E-06	ug/mL			
Sample Sequence 18																	
18	SAMPLE	S11V004266		0 0	WV		Technetium-99	SOLID	N/A	<5.7203E-06			5.72E-06	ug/g			U
Sample Sequence 19																	
19	CCV	S1104110064		0 0			Technetium-99	LIQUID	.001	1.0530E-03			6.00E-07	ug/mL	105.3	% Recovery	
Sample Sequence 20																	
20	CCB	S1104110065		0 0			Technetium-99	LIQUID		<6.0000E-07			6.00E-07	ug/mL			
Sample Sequence 21																	
21	DUP	S1104060020	S11V004266	0 0	WV		Technetium-99	SOLID	<5.7203E-06	<5.6611E-06			5.66E-06	ug/g			
Sample Sequence 22																	
22	SAMPLE	S11V004287		0 0	WV		Technetium-99	SOLID	N/A	<5.8103E-06			5.81E-06	ug/g			U
Sample Sequence 23																	
23	SAMPLE	S11V004316		0 0	WV		Technetium-99	SOLID	N/A	5.3958E-05			5.57E-06	ug/g			J
Sample Sequence 24																	
24	SAMPLE	S11V004336		0 0	WV		Technetium-99	SOLID	N/A	<5.7581E-06			5.76E-06	ug/g			U
Sample Sequence 25																	
25	STD-PREP	S1104060018		0 0	WV		Technetium-99	LIQUID	.001034857	1.0324E-03			1.20E-06	ug/mL	99.763	% Recovery	
Sample Sequence 26																	
26	SPK-POST	S1104110066	S11V004266	0 0			Technetium-99	SOLID	.005	5.1680E-03			6.00E-07	ug/mL	103.36	% Recovery	
Sample Sequence 27																	
27	CCV	S1104110068		0 0			Technetium-99	LIQUID	.001	1.0660E-03			6.00E-07	ug/mL	106.6	% Recovery	
Sample Sequence 28																	
28	CCB	S1104110067		0 0			Technetium-99	LIQUID		<6.0000E-07			6.00E-07	ug/mL			
Sample Sequence 29																	
29	CCV	S1104110070		0 0			Technetium-99	LIQUID	.001	1.0650E-03			6.00E-07	ug/mL	106.5	% Recovery	
Sample Sequence 30																	
30	LLS	S1104110071		0 0			Technetium-99	LIQUID	.000004	4.1970E-06			6.00E-07	ug/mL	104.92	% Recovery	
Sample Sequence 31																	
31	CCB	S1104110069		0 0			Technetium-99	LIQUID		<6.0000E-07			6.00E-07	ug/mL			

Comments Section:

Comments for sample: S1104110059, test: MS TC-99, constituent: Technetium-99

Result was not imported from Instrument Data Entry

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026833

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104070089	ICV				
2	S1104070089	ICV				
3	S1104070091	LLS				
4	S1104070091	LLS				
5	S1104070090	ICB				
6	S1104050134	BLNK-PREP				
7	S1104070092	SERDIL	S11V004106			
8	S11V004106	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
9	S1104050136	DUP	S11V004106			
10	S11V004123	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
11	S11V004144	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
12	S11V004165	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
13	S11V004208	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
14	S11V004250	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
15	S1104070100	CCV				
16	S1104070100	CCV				
17	S1104070099	CCB				
18	S1104050140	SPK-PREDIG	S11V004106			
19	S1104050142	SPK-PREDIG	S11V004106			
20	S1104070093	SPK-POST	S11V004106			
21	S1104050143	STD-PREP				
22	S1104050143	STD-PREP				
23	S1104070096	CCV				
24	S1104070096	CCV				
25	S1104070095	CCB				
26	S1104050138	SPK-PREDIG	S11V004106			
27	S1104070094	CCV				
28	S1104070094	CCV				
29	S1104070098	LLS				
30	S1104070098	LLS				
31	S1104070097	CCB				

LABCORE Completed Batch Report for Batch# 00026833

Analyst: Shaw, Levi **Book#:**

Instrument: ICP/MS PQ-EXCELL

Method: MS ACTINIDES, LA-506-102 Rev/Mod F-1

Specification: C Farm WMC 2011-C8100

Prep Batch: 00026784

Batch Comment:

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1104070089		0 0			Thorium-232	LIQUID	.001	1.0140E-03			5.00E-07	ug/mL	101.4	% Recovery	
2	ICV	S1104070089		0 1			Uranium-233	LIQUID	.001016	1.0330E-03			2.00E-07	ug/mL	101.67	% Recovery	
1	ICV	S1104070089		0 0			Uranium-235	LIQUID	.0000072	7.2830E-06			1.00E-08	ug/mL	101.15	% Recovery	
2	ICV	S1104070089		0 1			Neptunium-237	LIQUID	.00115	1.1750E-03			1.00E-07	ug/mL	102.17	% Recovery	
1	ICV	S1104070089		0 0			Uranium-238	LIQUID	.009928	1.0010E-03			5.00E-07	ug/mL	10.083	% Recovery	
Sample Sequence 3																	
3	LLS	S1104070091		0 0			Thorium-232	LIQUID	.000005	5.1960E-06			5.00E-07	ug/mL	103.92	% Recovery	
4	LLS	S1104070091		0 1			Uranium-233	LIQUID	.00000508	4.9970E-06			2.00E-07	ug/mL	98.366	% Recovery	
3	LLS	S1104070091		0 0			Uranium-235	LIQUID	.000000036	2.8000E-08			1.00E-08	ug/mL	77.778	% Recovery	
4	LLS	S1104070091		0 1			Neptunium-237	LIQUID	.00000575	6.2080E-06			1.00E-07	ug/mL	107.97	% Recovery	
3	LLS	S1104070091		0 0			Uranium-238	LIQUID	.000004964	5.1240E-06			5.00E-07	ug/mL	103.22	% Recovery	
Sample Sequence 5																	
5	ICB	S1104070090		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
5	ICB	S1104070090		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
5	ICB	S1104070090		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
5	ICB	S1104070090		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
5	ICB	S1104070090		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
5	ICB	S1104070090		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
5	ICB	S1104070090		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
5	ICB	S1104070090		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
Sample Sequence 6																	
6	BLNK-PREP	S1104050134		0 0	A		Thorium-230	LIQUID		<7.0000E-06			7.00E-06	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Thorium-232	LIQUID		<5.0000E-04			5.00E-04	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Uranium-233	LIQUID		<2.0000E-04			2.00E-04	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Uranium-234	LIQUID		<5.0000E-06			5.00E-06	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Uranium-235	LIQUID		<1.0000E-05			1.00E-05	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Uranium-236	LIQUID		<4.0000E-06			4.00E-06	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Neptunium-237	LIQUID		<1.0000E-04			1.00E-04	ug/mL			
6	BLNK-PREP	S1104050134		0 0	A		Uranium-238	LIQUID		<5.0000E-04			5.00E-04	ug/mL			
Sample Sequence 7																	
7	SERDIL	S1104070092	S11V004106	0 0			Thorium-230	SOLID		<3.2015E-04			3.20E-04	ug/g	N/A		

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026833

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
7	SERDIL	S1104070092	S11V004106	0 0			Thorium-232	SOLID		2.5886E+00			0.022868	ug/g	.21065	% Diff	
7	SERDIL	S1104070092	S11V004106	0 0			Uranium-233	SOLID		<9.1471E-03			9.15E-03	ug/g	N/A		
7	SERDIL	S1104070092	S11V004106	0 0			Uranium-234	SOLID		<2.2868E-04			2.29E-04	ug/g	N/A		
7	SERDIL	S1104070092	S11V004106	0 0			Uranium-235	SOLID		3.6332E-03			4.57E-04	ug/g	19.087	% Diff	
7	SERDIL	S1104070092	S11V004106	0 0			Uranium-236	SOLID		<1.8294E-04			1.83E-04	ug/g	N/A		
7	SERDIL	S1104070092	S11V004106	0 0			Neptunium-237	SOLID		<4.5736E-03			4.57E-03	ug/g	N/A		
7	SERDIL	S1104070092	S11V004106	0 0			Uranium-238	SOLID		6.5265E-01			0.022868	ug/g	1.0618	% Diff	
Sample Sequence 8																	
8	SAMPLE	S11V004106		0 0	A		Thorium-230	SOLID	N/A	<6.4030E-05			6.40E-05	ug/g			U
8	SAMPLE	S11V004106		0 0	A		Thorium-232	SOLID	N/A	2.5941E+00			4.57E-03	ug/g			
8	SAMPLE	S11V004106		0 0	A		Uranium-233	SOLID	N/A	<1.8294E-03			1.83E-03	ug/g			U
8	SAMPLE	S11V004106		0 0	A		Uranium-234	SOLID	N/A	<4.5736E-05			4.57E-05	ug/g			U
8	SAMPLE	S11V004106		0 0	A		Uranium-235	SOLID	N/A	4.4903E-03			9.15E-05	ug/g			
8	SAMPLE	S11V004106		0 0	A		Uranium-236	SOLID	N/A	<3.6588E-05			3.66E-05	ug/g			U
8	SAMPLE	S11V004106		0 0	A		Neptunium-237	SOLID	N/A	<9.1471E-04			9.15E-04	ug/g			U
8	SAMPLE	S11V004106		0 0	A		Uranium-238	SOLID	N/A	6.4579E-01			4.57E-03	ug/g			
Sample Sequence 9																	
9	DUP	S1104050136	S11V004106	0 0	A		Thorium-230	SOLID	<6.4030E-05	7.9230E-05			6.74E-05	ug/g			
9	DUP	S1104050136	S11V004106	0 0	A		Thorium-232	SOLID	2.5941E+00	2.7703E+00			4.81E-03	ug/g	6.5689	% RPD	
9	DUP	S1104050136	S11V004106	0 0	A		Uranium-233	SOLID	<1.8294E-03	<1.9252E-03			1.93E-03	ug/g			
9	DUP	S1104050136	S11V004106	0 0	A		Uranium-234	SOLID	<4.5736E-05	<4.8129E-05			4.81E-05	ug/g			
9	DUP	S1104050136	S11V004106	0 0	A		Uranium-235	SOLID	4.4903E-03	4.6589E-03			9.63E-05	ug/g	3.6848	% RPD	
9	DUP	S1104050136	S11V004106	0 0	A		Uranium-236	SOLID	<3.6588E-05	<3.8503E-05			3.85E-05	ug/g			
9	DUP	S1104050136	S11V004106	0 0	A		Neptunium-237	SOLID	<9.1471E-04	<9.6258E-04			9.63E-04	ug/g			
9	DUP	S1104050136	S11V004106	0 0	A		Uranium-238	SOLID	6.4579E-01	6.8930E-01			4.81E-03	ug/g	6.5179	% RPD	
Sample Sequence 10																	
10	SAMPLE	S11V004123		0 0	A		Thorium-230	SOLID	N/A	<6.5797E-05			6.58E-05	ug/g			U
10	SAMPLE	S11V004123		0 0	A		Thorium-232	SOLID	N/A	2.4617E+00			4.70E-03	ug/g			
10	SAMPLE	S11V004123		0 0	A		Uranium-233	SOLID	N/A	<1.8799E-03			1.88E-03	ug/g			U
10	SAMPLE	S11V004123		0 0	A		Uranium-234	SOLID	N/A	<4.6998E-05			4.70E-05	ug/g			U
10	SAMPLE	S11V004123		0 0	A		Uranium-235	SOLID	N/A	4.4028E-03			9.40E-05	ug/g			
10	SAMPLE	S11V004123		0 0	A		Uranium-236	SOLID	N/A	<3.7598E-05			3.76E-05	ug/g			U
10	SAMPLE	S11V004123		0 0	A		Neptunium-237	SOLID	N/A	<9.3996E-04			9.40E-04	ug/g			U
10	SAMPLE	S11V004123		0 0	A		Uranium-238	SOLID	N/A	6.2657E-01			4.70E-03	ug/g			
Sample Sequence 11																	
11	SAMPLE	S11V004144		0 0	A		Thorium-230	SOLID	N/A	<6.7211E-05			6.72E-05	ug/g			U
11	SAMPLE	S11V004144		0 0	A		Thorium-232	SOLID	N/A	2.8891E+00			4.80E-03	ug/g			
11	SAMPLE	S11V004144		0 0	A		Uranium-233	SOLID	N/A	<1.9203E-03			1.92E-03	ug/g			U
11	SAMPLE	S11V004144		0 0	A		Uranium-234	SOLID	N/A	<4.8008E-05			4.80E-05	ug/g			U
11	SAMPLE	S11V004144		0 0	A		Uranium-235	SOLID	N/A	3.8598E-03			9.60E-05	ug/g			
11	SAMPLE	S11V004144		0 0	A		Uranium-236	SOLID	N/A	<3.8406E-05			3.84E-05	ug/g			U
11	SAMPLE	S11V004144		0 0	A		Neptunium-237	SOLID	N/A	<9.6015E-04			9.60E-04	ug/g			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026833

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
11	SAMPLE	S11V004144		0 0	A		Uranium-238	SOLID	N/A	5.6774E-01			4.80E-03	ug/g			
Sample Sequence 12																	
12	SAMPLE	S11V004165		0 0	A		Thorium-230	SOLID	N/A	<6.6824E-05			6.68E-05	ug/g			U
12	SAMPLE	S11V004165		0 0	A		Thorium-232	SOLID	N/A	2.6797E+00			4.77E-03	ug/g			
12	SAMPLE	S11V004165		0 0	A		Uranium-233	SOLID	N/A	<1.9093E-03			1.91E-03	ug/g			U
12	SAMPLE	S11V004165		0 0	A		Uranium-234	SOLID	N/A	<4.7732E-05			4.77E-05	ug/g			U
12	SAMPLE	S11V004165		0 0	A		Uranium-235	SOLID	N/A	4.0801E-03			9.55E-05	ug/g			
12	SAMPLE	S11V004165		0 0	A		Uranium-236	SOLID	N/A	<3.8185E-05			3.82E-05	ug/g			U
12	SAMPLE	S11V004165		0 0	A		Neptunium-237	SOLID	N/A	<9.5464E-04			9.55E-04	ug/g			U
12	SAMPLE	S11V004165		0 0	A		Uranium-238	SOLID	N/A	5.7784E-01			4.77E-03	ug/g			
Sample Sequence 13																	
13	SAMPLE	S11V004208		0 0	A		Thorium-230	SOLID	N/A	<6.5389E-05			6.54E-05	ug/g			U
13	SAMPLE	S11V004208		0 0	A		Thorium-232	SOLID	N/A	2.7716E+00			4.67E-03	ug/g			
13	SAMPLE	S11V004208		0 0	A		Uranium-233	SOLID	N/A	<1.8683E-03			1.87E-03	ug/g			U
13	SAMPLE	S11V004208		0 0	A		Uranium-234	SOLID	N/A	<4.6706E-05			4.67E-05	ug/g			U
13	SAMPLE	S11V004208		0 0	A		Uranium-235	SOLID	N/A	4.3241E-03			9.34E-05	ug/g			
13	SAMPLE	S11V004208		0 0	A		Uranium-236	SOLID	N/A	<3.7365E-05			3.74E-05	ug/g			U
13	SAMPLE	S11V004208		0 0	A		Neptunium-237	SOLID	N/A	<9.3413E-04			9.34E-04	ug/g			U
13	SAMPLE	S11V004208		0 0	A		Uranium-238	SOLID	N/A	6.2344E-01			4.67E-03	ug/g			
Sample Sequence 14																	
14	SAMPLE	S11V004250		0 0	A		Thorium-230	SOLID	N/A	<6.6091E-05			6.61E-05	ug/g			U
14	SAMPLE	S11V004250		0 0	A		Thorium-232	SOLID	N/A	3.5349E+00			4.72E-03	ug/g			
14	SAMPLE	S11V004250		0 0	A		Uranium-233	SOLID	N/A	<1.8883E-03			1.89E-03	ug/g			U
14	SAMPLE	S11V004250		0 0	A		Uranium-234	SOLID	N/A	<4.7208E-05			4.72E-05	ug/g			U
14	SAMPLE	S11V004250		0 0	A		Uranium-235	SOLID	N/A	2.9486E-03			9.44E-05	ug/g			
14	SAMPLE	S11V004250		0 0	A		Uranium-236	SOLID	N/A	<3.7766E-05			3.78E-05	ug/g			U
14	SAMPLE	S11V004250		0 0	A		Neptunium-237	SOLID	N/A	<9.4416E-04			9.44E-04	ug/g			U
14	SAMPLE	S11V004250		0 0	A		Uranium-238	SOLID	N/A	4.3413E-01			4.72E-03	ug/g			
Sample Sequence 15																	
15	CCV	S1104070100		0 0			Thorium-232	LIQUID	.001	1.0070E-03			5.00E-07	ug/mL	100.7	% Recovery	
16	CCV	S1104070100		0 1			Uranium-233	LIQUID	.001016	1.0130E-03			2.00E-07	ug/mL	99.705	% Recovery	
15	CCV	S1104070100		0 0			Uranium-235	LIQUID	.0000072	7.1710E-06			1.00E-08	ug/mL	99.597	% Recovery	
16	CCV	S1104070100		0 1			Neptunium-237	LIQUID	.00115	1.1580E-03			1.00E-07	ug/mL	100.7	% Recovery	
15	CCV	S1104070100		0 0			Uranium-238	LIQUID	.0009928	9.8990E-04			5.00E-07	ug/mL	99.708	% Recovery	
Sample Sequence 17																	
17	CCB	S1104070099		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
17	CCB	S1104070099		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
17	CCB	S1104070099		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
17	CCB	S1104070099		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
17	CCB	S1104070099		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
17	CCB	S1104070099		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
17	CCB	S1104070099		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			

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LABCORE Completed Batch Report for Batch# 00026833

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
17	CCB	S1104070099		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
Sample Sequence 18																	
18	SPK-PREDIG	S1104050140	S11V004106	0 0	A		Neptunium-237	SOLID	.16613818725	1.7744E-01			9.49E-04	ug/g	106.8	% Recovery	
Sample Sequence 20																	
20	SPK-POST	S1104070093	S11V004106	0 0			Thorium-232	SOLID	1	1.2760E+00			5.00E-07	ug/g	99.24	% Recovery	
20	SPK-POST	S1104070093	S11V004106	0 0			Uranium-233	SOLID	.9585	9.4650E-01			2.00E-07	ug/g	98.748	% Recovery	
20	SPK-POST	S1104070093	S11V004106	0 0			Uranium-235	SOLID	.0072	8.3700E-03			1.00E-08	ug/g	109.43	% Recovery	
20	SPK-POST	S1104070093	S11V004106	0 0			Neptunium-237	SOLID	1	9.8350E-01			1.00E-07	ug/g	98.35	% Recovery	
20	SPK-POST	S1104070093	S11V004106	0 0			Uranium-238	SOLID	.9928	1.0630E+00			5.00E-07	ug/g	99.96	% Recovery	
Sample Sequence 21																	
22	STD-PREP	S1104050143		0 1	A		Thorium-232	LIQUID	.02	2.1810E-02			1.00E-05	ug/mL	109.05	% Recovery	
22	STD-PREP	S1104050143		0 1	A		Uranium-235	LIQUID	.000144	1.5680E-04			2.00E-07	ug/mL	108.89	% Recovery	
21	STD-PREP	S1104050143		0 0	A		Neptunium-237	LIQUID	.0175	1.8650E-02			2.00E-06	ug/mL	106.57	% Recovery	
22	STD-PREP	S1104050143		0 1	A		Uranium-238	LIQUID	.019856	2.1640E-02			1.00E-05	ug/mL	108.98	% Recovery	
Sample Sequence 23																	
23	CCV	S1104070096		0 0			Thorium-232	LIQUID	.001	9.9370E-04			5.00E-07	ug/mL	99.37	% Recovery	
24	CCV	S1104070096		0 1			Uranium-233	LIQUID	.001016	1.0100E-03			2.00E-07	ug/mL	99.409	% Recovery	
23	CCV	S1104070096		0 0			Uranium-235	LIQUID	.0000072	6.8840E-06			1.00E-08	ug/mL	95.611	% Recovery	
24	CCV	S1104070096		0 1			Neptunium-237	LIQUID	.00115	1.1530E-03			1.00E-07	ug/mL	100.26	% Recovery	
23	CCV	S1104070096		0 0			Uranium-238	LIQUID	.0009928	9.8480E-04			5.00E-07	ug/mL	99.194	% Recovery	
Sample Sequence 25																	
25	CCB	S1104070095		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
25	CCB	S1104070095		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
25	CCB	S1104070095		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
25	CCB	S1104070095		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
25	CCB	S1104070095		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
25	CCB	S1104070095		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
25	CCB	S1104070095		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
25	CCB	S1104070095		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
Sample Sequence 26																	
26	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Thorium-232	SOLID	46.6609425	5.5191E+01			0.02333	ug/g	112.72	% Recovery	
26	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Uranium-235	SOLID	.335958786	3.4772E-01			4.67E-04	ug/g	102.16	% Recovery	
26	SPK-PREDIG	S1104050138	S11V004106	0 0	A		Uranium-238	SOLID	46.324983714	5.2363E+01			0.02333	ug/g	111.64	% Recovery	
Sample Sequence 27																	
27	CCV	S1104070094		0 0			Thorium-232	LIQUID	.001	9.9690E-04			5.00E-07	ug/mL	99.69	% Recovery	
28	CCV	S1104070094		0 1			Uranium-233	LIQUID	.001016	1.0310E-03			2.00E-07	ug/mL	101.48	% Recovery	
27	CCV	S1104070094		0 0			Uranium-235	LIQUID	.0000072	7.0860E-06			1.00E-08	ug/mL	98.417	% Recovery	
28	CCV	S1104070094		0 1			Neptunium-237	LIQUID	.00115	1.1600E-03			1.00E-07	ug/mL	100.87	% Recovery	
27	CCV	S1104070094		0 0			Uranium-238	LIQUID	.0009928	9.8970E-04			5.00E-07	ug/mL	99.688	% Recovery	
Sample Sequence 29																	
29	LLS	S1104070098		0 0			Thorium-232	LIQUID	.000005	5.6020E-06			5.00E-07	ug/mL	112.04	% Recovery	

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LABCORE Completed Batch Report for Batch# 00026833

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
30	LLS	S1104070098		0 1			Uranium-233	LIQUID	.00000508	4.8940E-06			2.00E-07	ug/mL	96.339	% Recovery	
29	LLS	S1104070098		0 0			Uranium-235	LIQUID	.000000036	3.0000E-08			1.00E-08	ug/mL	83.333	% Recovery	
30	LLS	S1104070098		0 1			Neptunium-237	LIQUID	.00000575	5.9510E-06			1.00E-07	ug/mL	103.5	% Recovery	
29	LLS	S1104070098		0 0			Uranium-238	LIQUID	.000004964	4.9660E-06			5.00E-07	ug/mL	100.04	% Recovery	
Sample Sequence 31																	
31	CCB	S1104070097		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
31	CCB	S1104070097		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
31	CCB	S1104070097		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
31	CCB	S1104070097		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
31	CCB	S1104070097		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
31	CCB	S1104070097		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
31	CCB	S1104070097		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
31	CCB	S1104070097		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00026833

Reviewer Signature **Date**

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LABCORE Completed Batch Report for Batch# 00026968

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104140001	ICV				
2	S1104140001	ICV				
3	S1104140003	LLS				
4	S1104140003	LLS				
5	S1104140002	ICB				
6	S1104060052	BLNK-PREP				
7	S1104140004	SERDIL	S11V004271			
8	S11V004271	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
9	S1104060054	DUP	S11V004271			
10	S11V004292	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
11	S11V004321	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
12	S11V004341	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
13	S1104080062	SPK-PREDIG	S11V004271			
14	S1104140006	CCV				
15	S1104140006	CCV				
16	S1104140007	CCB				
17	S1104080064	SPK-PREDIG	S11V004271			
18	S1104140005	SPK-POST	S11V004271			
19	S1104140005	SPK-POST	S11V004271			
20	S1104060053	STD-PREP				
21	S1104060053	STD-PREP				
22	S1104140008	CCV				
23	S1104140008	CCV				
24	S1104140009	CCB				
25	S1104140011	CCV				
26	S1104140011	CCV				
27	S1104140012	LLS				
28	S1104140012	LLS				
29	S1104140010	CCB				

LABCORE Completed Batch Report for Batch# 00026968

Analyst: Shaw, Levi **Book#:**

Instrument: ICP/MS PQ-EXCELL

Method: MS ACTINIDES, LA-506-102 Rev/Mod F-1

Specification: C Farm WMC 2011-C8100

Prep Batch: 00026810

Batch Comment:

ICP-MS analysis of actinides for C Farm WMC 2011-C8100 acid digestates. bsm

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1104140001		0 0			Thorium-232	LIQUID	.001	1.0150E-03			5.00E-07	ug/mL	101.5	% Recovery	
2	ICV	S1104140001		0 1			Uranium-233	LIQUID	.001016	9.7210E-04			2.00E-07	ug/mL	95.679	% Recovery	
1	ICV	S1104140001		0 0			Uranium-235	LIQUID	.0000072	7.3650E-06			1.00E-08	ug/mL	102.29	% Recovery	
2	ICV	S1104140001		0 1			Neptunium-237	LIQUID	.00115	1.1410E-03			1.00E-07	ug/mL	99.217	% Recovery	
1	ICV	S1104140001		0 0			Uranium-238	LIQUID	.0009928	1.0050E-03			5.00E-07	ug/mL	101.23	% Recovery	
Sample Sequence 3																	
3	LLS	S1104140003		0 0			Thorium-232	LIQUID	.000005	5.7450E-06			5.00E-07	ug/mL	114.9	% Recovery	
4	LLS	S1104140003		0 1			Uranium-233	LIQUID	.00000508	4.6940E-06			2.00E-07	ug/mL	92.402	% Recovery	
3	LLS	S1104140003		0 0			Uranium-235	LIQUID	.000000036	3.9000E-08			1.00E-08	ug/mL	108.33	% Recovery	
4	LLS	S1104140003		0 1			Neptunium-237	LIQUID	.00000575	5.8630E-06			1.00E-07	ug/mL	101.97	% Recovery	
3	LLS	S1104140003		0 0			Uranium-238	LIQUID	.000004964	5.2300E-06			5.00E-07	ug/mL	105.36	% Recovery	
Sample Sequence 5																	
5	ICB	S1104140002		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
5	ICB	S1104140002		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
5	ICB	S1104140002		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
5	ICB	S1104140002		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
5	ICB	S1104140002		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
5	ICB	S1104140002		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
5	ICB	S1104140002		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
5	ICB	S1104140002		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
Sample Sequence 6																	
6	BLNK-PREP	S1104060052		0 0	A		Thorium-230	LIQUID		<7.0000E-06			7.00E-06	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Thorium-232	LIQUID		<5.0000E-04			5.00E-04	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Uranium-233	LIQUID		<2.0000E-04			2.00E-04	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Uranium-234	LIQUID		<5.0000E-06			5.00E-06	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Uranium-235	LIQUID		<1.0000E-05			1.00E-05	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Uranium-236	LIQUID		<4.0000E-06			4.00E-06	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Neptunium-237	LIQUID		<1.0000E-04			1.00E-04	ug/mL			
6	BLNK-PREP	S1104060052		0 0	A		Uranium-238	LIQUID		<5.0000E-04			5.00E-04	ug/mL			
Sample Sequence 7																	
7	SERDIL	S1104140004	S11V004271	0 0			Thorium-230	SOLID		<3.4611E-04			3.46E-04	ug/g	N/A		

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026968

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
7	SERDIL	S1104140004	S11V004271	0 0			Thorium-232	SOLID		3.6332E+00			0.024722	ug/g	.60263	% Diff	
7	SERDIL	S1104140004	S11V004271	0 0			Uranium-233	SOLID		<9.8888E-03			9.89E-03	ug/g	N/A		
7	SERDIL	S1104140004	S11V004271	0 0			Uranium-234	SOLID		<2.4722E-04			2.47E-04	ug/g	N/A		
7	SERDIL	S1104140004	S11V004271	0 0			Uranium-235	SOLID		4.3046E-03			4.94E-04	ug/g	23.699	% Diff	
7	SERDIL	S1104140004	S11V004271	0 0			Uranium-236	SOLID		<1.9778E-04			1.98E-04	ug/g	N/A		
7	SERDIL	S1104140004	S11V004271	0 0			Neptunium-237	SOLID		<4.9444E-03			4.94E-03	ug/g	N/A		
7	SERDIL	S1104140004	S11V004271	0 0			Uranium-238	SOLID		5.2322E-01			0.024722	ug/g	3.1583	% Diff	
Sample Sequence 8																	
8	SAMPLE	S11V004271		0 0	A		Thorium-230	SOLID	N/A	<6.9222E-05			6.92E-05	ug/g			U
8	SAMPLE	S11V004271		0 0	A		Thorium-232	SOLID	N/A	3.6114E+00			4.94E-03	ug/g			
8	SAMPLE	S11V004271		0 0	A		Uranium-233	SOLID	N/A	<1.9778E-03			1.98E-03	ug/g			U
8	SAMPLE	S11V004271		0 0	A		Uranium-234	SOLID	N/A	<4.9444E-05			4.94E-05	ug/g			U
8	SAMPLE	S11V004271		0 0	A		Uranium-235	SOLID	N/A	3.4799E-03			9.89E-05	ug/g			
8	SAMPLE	S11V004271		0 0	A		Uranium-236	SOLID	N/A	<3.9555E-05			3.96E-05	ug/g			U
8	SAMPLE	S11V004271		0 0	A		Neptunium-237	SOLID	N/A	<9.8888E-04			9.89E-04	ug/g			U
8	SAMPLE	S11V004271		0 0	A		Uranium-238	SOLID	N/A	5.0720E-01			4.94E-03	ug/g			
Sample Sequence 9																	
9	DUP	S1104060054	S11V004271	0 0	A		Thorium-230	SOLID	<6.9222E-05	<6.9286E-05			6.93E-05	ug/g			
9	DUP	S1104060054	S11V004271	0 0	A		Thorium-232	SOLID	3.6114E+00	3.3277E+00			4.95E-03	ug/g	8.1769	% RPD	
9	DUP	S1104060054	S11V004271	0 0	A		Uranium-233	SOLID	<1.9778E-03	<1.9796E-03			1.98E-03	ug/g			
9	DUP	S1104060054	S11V004271	0 0	A		Uranium-234	SOLID	<4.9444E-05	<4.9490E-05			4.95E-05	ug/g			
9	DUP	S1104060054	S11V004271	0 0	A		Uranium-235	SOLID	3.4799E-03	3.8474E-03			9.90E-05	ug/g	10.031	% RPD	
9	DUP	S1104060054	S11V004271	0 0	A		Uranium-236	SOLID	<3.9555E-05	5.3905E-05			3.96E-05	ug/g			
9	DUP	S1104060054	S11V004271	0 0	A		Neptunium-237	SOLID	<9.8888E-04	<9.8981E-04			9.90E-04	ug/g			
9	DUP	S1104060054	S11V004271	0 0	A		Uranium-238	SOLID	5.0720E-01	5.4518E-01			4.95E-03	ug/g	7.2179	% RPD	
Sample Sequence 10																	
10	SAMPLE	S11V004292		0 0	A		Thorium-230	SOLID	N/A	<6.9817E-05			6.98E-05	ug/g			U
10	SAMPLE	S11V004292		0 0	A		Thorium-232	SOLID	N/A	3.8868E+00			4.99E-03	ug/g			
10	SAMPLE	S11V004292		0 0	A		Uranium-233	SOLID	N/A	<1.9948E-03			1.99E-03	ug/g			U
10	SAMPLE	S11V004292		0 0	A		Uranium-234	SOLID	N/A	<4.9869E-05			4.99E-05	ug/g			U
10	SAMPLE	S11V004292		0 0	A		Uranium-235	SOLID	N/A	4.1830E-03			9.97E-05	ug/g			
10	SAMPLE	S11V004292		0 0	A		Uranium-236	SOLID	N/A	<3.9895E-05			3.99E-05	ug/g			U
10	SAMPLE	S11V004292		0 0	A		Neptunium-237	SOLID	N/A	<9.9739E-04			9.97E-04	ug/g			U
10	SAMPLE	S11V004292		0 0	A		Uranium-238	SOLID	N/A	5.6831E-01			4.99E-03	ug/g			
Sample Sequence 11																	
11	SAMPLE	S11V004321		0 0	A		Thorium-230	SOLID	N/A	<6.9741E-05			6.97E-05	ug/g			U
11	SAMPLE	S11V004321		0 0	A		Thorium-232	SOLID	N/A	2.4748E+00			4.98E-03	ug/g			
11	SAMPLE	S11V004321		0 0	A		Uranium-233	SOLID	N/A	<1.9926E-03			1.99E-03	ug/g			U
11	SAMPLE	S11V004321		0 0	A		Uranium-234	SOLID	N/A	<4.9815E-05			4.98E-05	ug/g			U
11	SAMPLE	S11V004321		0 0	A		Uranium-235	SOLID	N/A	3.3366E-03			9.96E-05	ug/g			
11	SAMPLE	S11V004321		0 0	A		Uranium-236	SOLID	N/A	<3.9852E-05			3.99E-05	ug/g			U
11	SAMPLE	S11V004321		0 0	A		Neptunium-237	SOLID	N/A	<9.9629E-04			9.96E-04	ug/g			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026968

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
11	SAMPLE	S11V004321		0 0	A		Uranium-238	SOLID	N/A	4.3578E-01			4.98E-03	ug/g			
Sample Sequence 12																	
12	SAMPLE	S11V004341		0 0	A		Thorium-230	SOLID	N/A	<6.9795E-05			6.98E-05	ug/g			U
12	SAMPLE	S11V004341		0 0	A		Thorium-232	SOLID	N/A	2.3511E+00			4.99E-03	ug/g			
12	SAMPLE	S11V004341		0 0	A		Uranium-233	SOLID	N/A	<1.9941E-03			1.99E-03	ug/g			U
12	SAMPLE	S11V004341		0 0	A		Uranium-234	SOLID	N/A	<4.9853E-05			4.99E-05	ug/g			U
12	SAMPLE	S11V004341		0 0	A		Uranium-235	SOLID	N/A	3.1996E-03			9.97E-05	ug/g			
12	SAMPLE	S11V004341		0 0	A		Uranium-236	SOLID	N/A	<3.9883E-05			3.99E-05	ug/g			U
12	SAMPLE	S11V004341		0 0	A		Neptunium-237	SOLID	N/A	<9.9707E-04			9.97E-04	ug/g			U
12	SAMPLE	S11V004341		0 0	A		Uranium-238	SOLID	N/A	4.7969E-01			4.99E-03	ug/g			
Sample Sequence 13																	
13	SPK-PREDIG	S1104080062	S11V004271	0 0	A		Neptunium-237	SOLID	.496477824768	5.1771E-01			9.92E-04	ug/g	104.28	% Recovery	
Sample Sequence 14																	
14	CCV	S1104140006		0 0			Thorium-232	LIQUID	.001	1.0220E-03			5.00E-07	ug/mL	102.2	% Recovery	
15	CCV	S1104140006		0 1			Uranium-233	LIQUID	.001016	9.6790E-04			2.00E-07	ug/mL	95.266	% Recovery	
14	CCV	S1104140006		0 0			Uranium-235	LIQUID	.0000072	7.3900E-06			1.00E-08	ug/mL	102.64	% Recovery	
15	CCV	S1104140006		0 1			Neptunium-237	LIQUID	.00115	1.1370E-03			1.00E-07	ug/mL	98.87	% Recovery	
14	CCV	S1104140006		0 0			Uranium-238	LIQUID	.0009928	1.0060E-03			5.00E-07	ug/mL	101.33	% Recovery	
Sample Sequence 16																	
16	CCB	S1104140007		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
16	CCB	S1104140007		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
16	CCB	S1104140007		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
16	CCB	S1104140007		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
16	CCB	S1104140007		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
16	CCB	S1104140007		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
16	CCB	S1104140007		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
16	CCB	S1104140007		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
Sample Sequence 17																	
17	SPK-PREDIG	S1104080064	S11V004271	0 0	A		Thorium-232	SOLID	1.9840876	5.5356E+00			4.96E-03	ug/g	96.982	% Recovery	
17	SPK-PREDIG	S1104080064	S11V004271	0 0	A		Uranium-235	SOLID	.01428543072	1.9623E-02			9.92E-05	ug/g	113	% Recovery	
17	SPK-PREDIG	S1104080064	S11V004271	0 0	A		Uranium-238	SOLID	1.969802169 28	2.5436E+00			4.96E-03	ug/g	103.38	% Recovery	
Sample Sequence 18																	
18	SPK-POST	S1104140005	S11V004271	0 0			Thorium-232	SOLID	1	1.3270E+00			5.00E-07	ug/mL	96.18	% Recovery	
18	SPK-POST	S1104140005	S11V004271	0 0			Uranium-233	SOLID	.9585	8.9790E-01			2.00E-07	ug/mL	93.678	% Recovery	
18	SPK-POST	S1104140005	S11V004271	0 0			Uranium-235	SOLID	.0072	8.0720E-03			1.00E-08	ug/mL	107.22	% Recovery	
18	SPK-POST	S1104140005	S11V004271	0 0			Neptunium-237	SOLID	1	9.7170E-01			1.00E-07	ug/mL	97.17	% Recovery	
18	SPK-POST	S1104140005	S11V004271	0 0			Uranium-238	SOLID	.9928	1.0070E+00			5.00E-07	ug/mL	96.264	% Recovery	
Sample Sequence 20																	
21	STD-PREP	S1104060053		0 1	A		Thorium-232	LIQUID	.02	2.0420E-02			1.00E-05	ug/mL	102.1	% Recovery	
21	STD-PREP	S1104060053		0 1	A		Uranium-235	LIQUID	.000144	1.4430E-04			2.00E-07	ug/mL	100.21	% Recovery	

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* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026968

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
20	STD-PREP	S1104060053		0 0	A		Neptunium-237	LIQUID	.0175	1.8650E-02			2.00E-06	ug/mL	106.57	% Recovery	
21	STD-PREP	S1104060053		0 1	A		Uranium-238	LIQUID	.019856	2.0080E-02			1.00E-05	ug/mL	101.13	% Recovery	
Sample Sequence 22																	
22	CCV	S1104140008		0 0			Thorium-232	LIQUID	.001	1.0230E-03			5.00E-07	ug/mL	102.3	% Recovery	
23	CCV	S1104140008		0 1			Uranium-233	LIQUID	.001016	9.6470E-04			2.00E-07	ug/mL	94.951	% Recovery	
22	CCV	S1104140008		0 0			Uranium-235	LIQUID	.0000072	7.2880E-06			1.00E-08	ug/mL	101.22	% Recovery	
23	CCV	S1104140008		0 1			Neptunium-237	LIQUID	.00115	1.1310E-03			1.00E-07	ug/mL	98.348	% Recovery	
22	CCV	S1104140008		0 0			Uranium-238	LIQUID	.0009928	1.0020E-03			5.00E-07	ug/mL	100.93	% Recovery	
Sample Sequence 24																	
24	CCB	S1104140009		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
24	CCB	S1104140009		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
24	CCB	S1104140009		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
24	CCB	S1104140009		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
24	CCB	S1104140009		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
24	CCB	S1104140009		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
24	CCB	S1104140009		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
24	CCB	S1104140009		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
Sample Sequence 25																	
25	CCV	S1104140011		0 0			Thorium-232	LIQUID	.001	1.0260E-03			5.00E-07	ug/mL	102.6	% Recovery	
26	CCV	S1104140011		0 1			Uranium-233	LIQUID	.001016	9.6480E-04			2.00E-07	ug/mL	94.961	% Recovery	
25	CCV	S1104140011		0 0			Uranium-235	LIQUID	.0000072	7.2540E-06			1.00E-08	ug/mL	100.75	% Recovery	
26	CCV	S1104140011		0 1			Neptunium-237	LIQUID	.00115	1.1340E-03			1.00E-07	ug/mL	98.609	% Recovery	
25	CCV	S1104140011		0 0			Uranium-238	LIQUID	.0009928	1.0040E-03			5.00E-07	ug/mL	101.13	% Recovery	
Sample Sequence 27																	
27	LLS	S1104140012		0 0			Thorium-232	LIQUID	.000005	5.3850E-06			5.00E-07	ug/mL	107.7	% Recovery	
28	LLS	S1104140012		0 1			Uranium-233	LIQUID	.00000508	4.6690E-06			2.00E-07	ug/mL	91.909	% Recovery	
27	LLS	S1104140012		0 0			Uranium-235	LIQUID	.000000036	2.7000E-08			1.00E-08	ug/mL	75	% Recovery	
28	LLS	S1104140012		0 1			Neptunium-237	LIQUID	.00000575	5.7570E-06			1.00E-07	ug/mL	100.12	% Recovery	
27	LLS	S1104140012		0 0			Uranium-238	LIQUID	.000004964	5.1070E-06			5.00E-07	ug/mL	102.88	% Recovery	
Sample Sequence 29																	
29	CCB	S1104140010		0 0			Thorium-230	LIQUID		<7.0000E-09			7.00E-09	ug/mL			
29	CCB	S1104140010		0 0			Thorium-232	LIQUID		<5.0000E-07			5.00E-07	ug/mL			
29	CCB	S1104140010		0 0			Uranium-233	LIQUID		<2.0000E-07			2.00E-07	ug/mL			
29	CCB	S1104140010		0 0			Uranium-234	LIQUID		<5.0000E-09			5.00E-09	ug/mL			
29	CCB	S1104140010		0 0			Uranium-235	LIQUID		<1.0000E-08			1.00E-08	ug/mL			
29	CCB	S1104140010		0 0			Uranium-236	LIQUID		<4.0000E-09			4.00E-09	ug/mL			
29	CCB	S1104140010		0 0			Neptunium-237	LIQUID		<1.0000E-07			1.00E-07	ug/mL			
29	CCB	S1104140010		0 0			Uranium-238	LIQUID		<5.0000E-07			5.00E-07	ug/mL			

Date: 03 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: C Farm C8100
Subject: General Chemistry - Sample Data Group (SDG) 20110264

INTRODUCTION

This memorandum presents the results of data validation for SDG 20110264 prepared by 222-S Laboratory. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2B1L6	02/24/11	Soil	C	CN, pH, Conductivity, 300.0, Ammonium
B2C1N1	04/04/11	Soil	C	CN, pH, Conductivity, 300.0, Ammonium

Data validation was conducted in accordance with the CHPRC validation statement of work and the Field Sampling and Analysis Plan for Waste Management Area C, RPP-PLAN-40564, Rev. 3 (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements are as follows:

- All anions – analysis within 28 days of sample collection
- Ammonia – analysis within 28 days of sample collection
- Conductivity – analysis within 28 days of sample collection
- pH – analysis as soon as possible (24 hours is a reasonable holding time)
- Total cyanide – analysis within 14 days of sample collection

The samples were analyzed within the prescribed holding times and properly preserved with the following exception.

Sample B2B1L6 was analyzed for total cyanide beyond the holding time but within 2X the holding time. The total cyanide sample result was non-detect and should be qualified as an estimate and based on professional judgment should be flagged "UJ."

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable with the following exceptions.

The laboratory blank result associated with sample B2B1L6 for formate, chloride, nitrite and sulfate were > the method detection limits (MDLs) but < the reporting limits (RLs). The formate and nitrite sample results were detects < the RLs and should be qualified as non-detects at the RLs (10 ug/g formate and 2.5 ug/g nitrite) and flagged "U." The sulfate and chloride sample results were detects > the RLs and >5X the blank value and should not be qualified.

The nitrite laboratory blank result associated with sample B2C1N1 was > the MDL but < the RL. The nitrite sample result was < the RL and should be qualified as non-detect at the RL (2.5 ug/g) and flagged "U."

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the matrix spike sample accuracy limits are 75% to 125% and the laboratory control sample accuracy limits are 80% to 120%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

All MS recoveries for phosphate were < the lower acceptance limit. The phosphate result for sample B2B1L6 was a detect and should be qualified as an estimate and flagged "J-." The phosphate result for sample B2C1N1 was non-detect and should be qualified as an estimate and flagged "UJ."

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions. A matrix-matched LCS sample was not included with the cyanide analysis associated with sample B2B1L6. A liquid LCS was analyzed, but the associate samples were solid. The cyanide result was a non-detect and should be qualified as an estimate and flagged "UJ" due to lack of LCS data.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results <5X the reporting limits with difference <2X the required detection limits no precision infraction occurred

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDG 20110264 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to holding time, laboratory blank, and matrix spike infractions. See the table in Appendix 2 for a listing of all affected sample results.

It should be noted that a Chain-of-Custody was not included for sample B2C1N1, since the sample was a composite from three other samples. The COC that included the three composite samples was included.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

RPP-PLAN-40564, Rev. 3, *Field Sampling and Analysis Plan for Waste Management Area C,* September 2011.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

General Chemistry Data Qualification Summary			
SDG: 20110264	Reviewer: AQA	Project: C Farm C8100	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Cyanide	UJ	B2B1L6	Extraction beyond but within 2X the holding time and lack of matrix-matched LCS data
Formate	10U	B2B1L6	Laboratory blank contamination
Nitrite	2.5U	B2B1L6, B2C1N1	Laboratory blank contamination
Phosphate	J-	B2B1L6	Low MS recovery
Phosphate	UJ	B2C1N1	Low MS recovery

Comments: None

Appendix 3

Annotated Laboratory Reports

02 - Aug - 2011 16:30:19
DSRHardcopyWOLimits 2.7.26a
DSR.Jar v. 2.7.27

Data Summary Report

Sample Group: 20110264
Core Number: C8100
Customer Sample ID: B2B1L6
Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004098		%WATERA	%WATER-APD	%	n/a	n/a	6.970	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004098		57-12-5	Cyanide UJ	ug/g	92.0	<0.0370	<0.480	<0.480	n/a	n/a	87.7	0.480	n/a	U
S11V004098		WT%SOLID	Weight percent solids	%	n/a	n/a	93.0	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004098		7439-97-6	Mercury	ug/g	97.0	<1.00E-04	0.0104	n/a	n/a	n/a	91.8	9.15E-03	n/a	B
S11V004098		PH	pH	unitless	n/a	n/a	8.69	8.62	8.66	0.809	n/a	0.0100	n/a	
S11V004099		13966-00-2	Potassium-40	uCi/g	n/a	n/a	9.26E-06	9.29E-06	9.28E-06	0.339	n/a	2.39E-06	7.16	
S11V004099		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.47E-08	<8.49E-08	n/a	n/a	n/a	8.47E-08	n/a	U
S11V004099		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.53E-07	<2.25E-07	n/a	n/a	n/a	2.53E-07	n/a	U
S11V004099		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	4.84E-06	6.45E-06	5.64E-06	28.6	n/a	9.82E-08	1.27	
S11V004099		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<2.09E-07	<2.07E-07	n/a	n/a	n/a	2.09E-07	n/a	U
S11V004099		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.50E-07	<1.50E-07	n/a	n/a	n/a	1.50E-07	n/a	U
S11V004099		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.90E-07	<2.85E-07	n/a	n/a	n/a	2.90E-07	n/a	U
S11V004099		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.53E-07	2.57E-07	2.55E-07	1.66	n/a	9.44E-08	10.71	
S11V004099		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.10E-07	6.30E-07	5.70E-07	21.1	n/a	1.51E-07	9.95	
S11V004099		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	9.54E-07	1.19E-06	1.07E-06	22.2	n/a	2.05E-07	8.80	
S11V004099		15067-28-4	Lead-214	uCi/g	n/a	n/a	8.12E-07	9.83E-07	8.98E-07	19.1	n/a	2.13E-07	10.28	
S11V004099		13982-63-3	Radium-226	uCi/g	n/a	n/a	1.88E-06	1.98E-06	1.93E-06	5.01	n/a	1.53E-06	27.51	
S11V004099		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<4.37E-05	<4.51E-05	n/a	n/a	n/a	4.37E-05	n/a	U
S11V004099		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<1.14E-05	<1.16E-05	n/a	n/a	n/a	1.14E-05	43.18	U
S11V004099		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<2.13E-06	<1.81E-06	n/a	n/a	n/a	2.13E-06	n/a	U
S11V004101		CONDUCT	Conductivity	uMHO/cm	98.7	<1.00	312	296	304	5.29	n/a	1.00	n/a	
S11V004101	WV	14133-76-7	Technetium-99	ug/g	100	<6.00E-06	<6.27E-06	<6.29E-06	n/a	n/a	105	6.27E-06	n/a	U
S11V004102	O	12674-11-2	Aroclor 1016	ug/kg	n/a	<19.7	<21.0	n/a	n/a	n/a	n/a	21.0	n/a	U
S11V004102	O	11104-28-2	Aroclor 1221	ug/kg	n/a	<3.26	<3.48	n/a	n/a	n/a	n/a	3.48	n/a	U
S11V004102	O	11141-16-5	Aroclor 1232	ug/kg	n/a	<5.53	<5.90	n/a	n/a	n/a	n/a	5.90	n/a	U
S11V004102	O	53469-21-9	Aroclor 1242	ug/kg	n/a	<13.2	<14.0	n/a	n/a	n/a	n/a	14.0	n/a	U
S11V004102	O	12672-29-6	Aroclor 1248	ug/kg	n/a	<7.45	<7.95	n/a	n/a	n/a	n/a	7.95	n/a	U
S11V004102	O	11097-69-1	Aroclor 1254	ug/kg	94.4	<4.77	<5.09	n/a	n/a	n/a	n/a	5.09	n/a	U
S11V004102	O	11096-82-5	Aroclor 1260	ug/kg	n/a	<7.72	<8.23	n/a	n/a	n/a	n/a	8.23	n/a	U

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J - Estimated
C - Blank Contamination
U - Less Than Detection Limit
N - MS/MSD Outside Range
B - Estimated
M - RPD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004104	O	91-20-3	Naphthalene	ug/kg	n/a	<62.6	<61.4	n/a	n/a	n/a	n/a	61.4	n/a	U
S11V004104	O	98-95-3	Nitrobenzene	ug/kg	n/a	<64.6	<63.4	n/a	n/a	n/a	n/a	63.4	n/a	U
S11V004104	O	87-86-5	Pentachlorophenol	ug/kg	106	<37.5	<36.8	n/a	n/a	n/a	96.1	36.8	n/a	U
S11V004104	O	129-00-0	Pyrene	ug/kg	104	<62.9	<61.7	n/a	n/a	n/a	114	61.7	n/a	UT
S11V004104	O	110-86-1	Pyridine	ug/kg	n/a	<65.0	<63.8	n/a	n/a	n/a	n/a	63.8	n/a	U
S11V004104	O	126-73-8	Tributyl phosphate	ug/kg	n/a	<108	<106	n/a	n/a	n/a	n/a	106	n/a	U
S11V004104	O	128-37-0	BHT	ug/kg	n/a	<236	<231	n/a	n/a	n/a	n/a	231	n/a	U
S11V004104	O	110-80-5	2-Ethoxyethanol	ug/kg	n/a	<182	<179	n/a	n/a	n/a	n/a	179	n/a	U
S11V004104	O	1319-77-3	Total Methylphenols	ug/kg	n/a	<107	<105	n/a	n/a	n/a	n/a	105	n/a	U
S11V004104	O	108-94-1	Cyclohexanone	ug/kg	n/a	<558	<547	n/a	n/a	n/a	n/a	547	n/a	U
S11V004104	O	59-89-2	N-Nitrosomorpholine	ug/kg	n/a	<191	<188	n/a	n/a	n/a	n/a	188	n/a	U
S11V004104	O	78-83-1	Isobutanol	ug/kg	n/a	<460	<452	n/a	n/a	n/a	n/a	452	n/a	U
S11V004105	W	16984-48-8	Fluoride	ug/g	103	<1.61E-03	0.502	0.438	0.470	13.8	108	0.0142	n/a	
S11V004105	W	GLYCOLAT	Glycolate	ug/g	101	<9.37E-03	<0.0826	<0.0821	n/a	n/a	103	0.0826	n/a	U
S11V004105	W	71-50-1	Acetate	ug/g	103	<6.04E-03	3.22	<0.0529	n/a	n/a	105	0.0532	n/a	
S11V004105	W	FORMATE	Formate 10U	ug/g	103	0.0206	0.236	0.189	0.213	22.3	105	0.0412	n/a	B
S11V004105	W	16887-00-6	Chloride	ug/g	102	0.0207	0.354	0.312	0.333	12.9	107	0.0880	n/a	C
S11V004105	W	14797-65-0	Nitrite 2.5UJ	ug/g	102	0.0637	0.613	0.854	0.734	32.8	102	0.169	n/a	CB
S11V004105	W	14808-79-8	Sulfate	ug/g	105	0.0350	2.94	2.57	2.75	13.7	107	0.165	n/a	
S11V004105	W	338-70-5	Oxalate	ug/g	101	<0.0231	<0.204	<0.202	n/a	n/a	104	0.204	n/a	U
S11V004105	W	24959-67-9	Bromide	ug/g	103	<0.0580	<0.511	<0.508	n/a	n/a	106	0.511	n/a	U
S11V004105	W	14797-55-8	Nitrate	ug/g	102	<0.0208	3.24	3.01	3.13	7.40	105	0.183	n/a	
S11V004105	W	14265-44-2	Phosphate J-	ug/g	102	<0.0167	1.77	1.53	1.65	14.1	105	0.147	n/a	B
S11V004106	A	7429-90-5	Aluminum	ug/g	91.6	<0.0300	7.74E+03	8.43E+03	8.09E+03	8.54	2.81E+03	2.74	n/a	
S11V004106	A	7440-42-8	Boron	ug/g	89.1	<0.0300	43.9	47.5	45.7	7.89	134	2.74	n/a	N
S11V004106	A	7440-39-3	Barium	ug/g	96.7	<3.00E-03	244	272	258	10.6	179	0.274	n/a	
S11V004106	A	7440-41-7	Beryllium	ug/g	101	<1.00E-03	0.328	0.368	0.348	11.4	97.7	0.0915	n/a	B
S11V004106	A	7440-70-2	Calcium	ug/g	90.8	0.139	1.53E+04	1.94E+04	1.74E+04	23.5	6.45E+03	4.57	n/a	
S11V004106	A	7440-45-1	Cerium	ug/g	98.7	<0.0300	20.3	22.4	21.4	10.0	103	2.74	n/a	B

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004106	A	13982-70-2	Uranium-236	ug/g	n/a	<4.00E-06	<3.66E-05	<3.85E-05	n/a	n/a	n/a	3.66E-05	n/a	U
S11V004106	A	13994-20-2	Neptunium-237	ug/g	107	<1.00E-04	<9.15E-04	<9.63E-04	n/a	n/a	107	9.15E-04	n/a	U
S11V004106	A	U-238	Uranium-238	ug/g	109	<5.00E-04	0.646	0.689	0.668	6.52	112	4.57E-03	n/a	
S11V004106	A	7440-22-4	Silver	ug/g	109	<2.00E-03	0.0624	0.0783	0.0704	22.6	102	0.0183	n/a	B
S11V004106	A	7440-38-2	Arsenic	ug/g	94.1	<0.0420	3.27	3.49	3.38	6.74	98.0	0.384	n/a	B
S11V004106	A	7440-43-9	Cadmium	ug/g	107	<6.00E-03	0.102	0.0968	0.0994	5.10	105	0.0549	n/a	B
S11V004106	A	7439-92-1	Lead	ug/g	101	<0.0150	5.29	5.42	5.36	2.47	102	0.137	n/a	
S11V004106	A	7782-49-2	Selenium	ug/g	103	<0.135	<1.23	<1.30	n/a	n/a	101	1.23	n/a	U
S11V004106	A	7440-28-0	Thallium	ug/g	101	<4.00E-03	0.0617	0.0675	0.0646	9.12	101	0.0366	n/a	B
S11V004107	S	14798-03-9	Ammonium	ug/g	103	<0.120	3.82	3.22	3.52	17.1	98.7	0.472	n/a	B
S11V004108	A	14133-76-7	Technetium-99	ug/g	107	<6.00E-05	<5.71E-04	<5.74E-04	n/a	n/a	102	5.71E-04	n/a	U
S11V004109	E	CM-243/244	Curium-243/244	uCi/g	n/a	<4.58E-08	<3.37E-08	<4.15E-08	n/a	n/a	n/a	3.37E-08	n/a	U
S11V004109	E	14596-10-2	Americium-241	uCi/g	103	<5.32E-08	<4.76E-08	<3.63E-08	n/a	n/a	n/a	4.76E-08	n/a	U
S11V004109	E	15510-73-3	Curium-242	uCi/g	n/a	<2.34E-08	<1.16E-08	<1.08E-08	n/a	n/a	n/a	1.16E-08	n/a	U
S11V004109	E	PU-239/240	Plutonium-239/240	uCi/g	107	<6.34E-08	3.78E-08	<5.18E-08	n/a	n/a	n/a	3.71E-08	33.33	
S11V004109	E	13981-16-3	Plutonium-238	uCi/g	n/a	<6.58E-08	<4.04E-08	9.40E-08	6.72E-08	79.7	n/a	4.04E-08	n/a	U
S11V004110	E	SR-89/90	Strontium-89/90	uCi/g	111	<4.70E-07	3.95E-06	3.97E-06	3.96E-06	0.542	n/a	2.22E-07	14.727	
S11V004111	E	13981-37-8	Nickel-63	uCi/g	102	<1.02E-05	<6.24E-06	<5.03E-06	n/a	n/a	n/a	6.24E-06	n/a	U
S11V004112	E	15758-45-9	Selenium-79	uCi/g	n/a	4.77E-06	9.19E-06	5.96E-06	7.58E-06	42.6	n/a	1.66E-06	123.242	BE
S11V004113	W	14762-75-5	Carbon-14	uCi/g	92.2	<4.26E-06	<4.23E-06	5.29E-06	n/a	n/a	92.0	4.23E-06	n/a	U
S11V004113	W	10028-17-8	Tritium	uCi/g	99.3	<3.91E-06	<4.08E-06	<2.65E-06	n/a	n/a	102	4.08E-06	n/a	U

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004334		%WATERA	%WATER-APD	%	n/a	n/a	3.870	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004334		57-12-5	Cyanide	ug/g	97.9	<0.0370	<0.479	<0.480	n/a	n/a	98.0	0.479	n/a	U
S11V004334		WT%SOLID	Weight percent solids	%	n/a	n/a	96.1	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004334		7439-97-6	Mercury	ug/g	95.0	<1.00E-04	<9.97E-03	n/a	n/a	n/a	n/a	9.97E-03	n/a	U
S11V004334		PH	pH	unitless	n/a	n/a	8.75	8.72	8.74	0.343	n/a	0.0100	n/a	
S11V004335		13966-00-2	Potassium-40	uCi/g	n/a	n/a	1.34E-05	n/a	n/a	n/a	n/a	2.16E-06	4.68	
S11V004335		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.58E-08	n/a	n/a	n/a	n/a	8.58E-08	n/a	U
S11V004335		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.02E-07	n/a	n/a	n/a	n/a	2.02E-07	n/a	U
S11V004335		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	<6.60E-08	n/a	n/a	n/a	n/a	6.60E-08	n/a	U
S11V004335		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<1.87E-07	n/a	n/a	n/a	n/a	1.87E-07	n/a	U
S11V004335		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.31E-07	n/a	n/a	n/a	n/a	1.31E-07	n/a	U
S11V004335		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.49E-07	n/a	n/a	n/a	n/a	2.49E-07	n/a	U
S11V004335		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.07E-07	n/a	n/a	n/a	n/a	8.95E-08	15.47	
S11V004335		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.67E-07	n/a	n/a	n/a	n/a	1.19E-07	6.51	
S11V004335		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	4.13E-07	n/a	n/a	n/a	n/a	1.90E-07	17.34	
S11V004335		15067-28-4	Lead-214	uCi/g	n/a	n/a	4.09E-07	n/a	n/a	n/a	n/a	1.63E-07	11.50	
S11V004335		13982-63-3	Radium-226	uCi/g	n/a	n/a	<1.39E-06	n/a	n/a	n/a	n/a	1.39E-06	40.38	U
S11V004335		14331-83-0	Actinium-228	uCi/g	n/a	n/a	5.26E-07	n/a	n/a	n/a	n/a	3.37E-07	14.29	
S11V004335		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<3.92E-05	n/a	n/a	n/a	n/a	3.92E-05	n/a	U
S11V004335		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<4.16E-06	n/a	n/a	n/a	n/a	4.16E-06	n/a	U
S11V004335		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<1.84E-06	n/a	n/a	n/a	n/a	1.84E-06	n/a	U
S11V004336		CONDUCT	Conductivity	uMHO/cm	98.5	<1.00	370	n/a	n/a	n/a	n/a	1.00	n/a	
S11V004336	WV	14133-76-7	Technetium-99	ug/g	99.8	<6.00E-06	<5.76E-06	n/a	n/a	n/a	n/a	5.76E-06	n/a	U
S11V004338	A	7440-36-0	Antimony	ug/g	110	<2.00E-04	0.121	n/a	n/a	n/a	n/a	1.99E-03	n/a	
S11V004338	A	SN-117	Tin-117	ug/g	105	<1.00E-03	0.0324	n/a	n/a	n/a	n/a	9.96E-03	n/a	
S11V004338	A	15832-50-5	Tin-126	ug/g	n/a	<2.00E-05	3.92E-04	n/a	n/a	n/a	n/a	1.99E-04	n/a	E
S11V004339	O	120-82-1	1,2,4-Trichlorobenzene	ug/kg	75.0	<77.4	<72.2	n/a	n/a	n/a	75.6	72.2	n/a	U
S11V004339	O	95-50-1	1,2-Dichlorobenzene	ug/kg	n/a	<101	<93.9	n/a	n/a	n/a	n/a	93.9	n/a	U
S11V004339	O	106-46-7	1,4-Dichlorobenzene	ug/kg	71.9	<113	<106	n/a	n/a	n/a	69.4	106	n/a	U

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EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004339	O	129-00-0	Pyrene	ug/kg	103	<62.9	<58.7	n/a	n/a	n/a	95.5	58.7	n/a	U
S11V004339	O	110-86-1	Pyridine	ug/kg	n/a	<65.0	<60.6	n/a	n/a	n/a	n/a	60.6	n/a	U
S11V004339	O	126-73-8	Tributyl phosphate	ug/kg	n/a	<108	<101	n/a	n/a	n/a	n/a	101	n/a	U
S11V004339	O	128-37-0	BHT	ug/kg	n/a	<236	<220	n/a	n/a	n/a	n/a	220	n/a	U
S11V004339	O	110-80-5	2-Ethoxyethanol	ug/kg	n/a	<182	<170	n/a	n/a	n/a	n/a	170	n/a	U
S11V004339	O	1319-77-3	Total Methylphenols	ug/kg	n/a	<107	<99.4	n/a	n/a	n/a	n/a	99.4	n/a	U
S11V004339	O	108-94-1	Cyclohexanone	ug/kg	n/a	<559	<522	n/a	n/a	n/a	n/a	522	n/a	U
S11V004339	O	59-89-2	N-Nitrosomorpholine	ug/kg	n/a	<191	<178	n/a	n/a	n/a	n/a	178	n/a	U
S11V004339	O	78-83-1	Isobutanol	ug/kg	n/a	n/a	<429	n/a	n/a	n/a	n/a	429	n/a	U
S11V004340	W	16984-48-8	Fluoride	ug/g	104	<1.61E-03	1.14	n/a	n/a	n/a	n/a	0.0157	n/a	M
S11V004340	W	GLYCOLAT	Glycolate	ug/g	101	<9.37E-03	<0.0913	n/a	n/a	n/a	n/a	0.0913	n/a	U
S11V004340	W	71-50-1	Acetate	ug/g	105	<6.04E-03	0.494	n/a	n/a	n/a	n/a	0.0589	n/a	B
S11V004340	W	FORMATE	Formate	ug/g	103	<4.67E-03	0.270	n/a	n/a	n/a	n/a	0.0455	n/a	B
S11V004340	W	16887-00-6	Chloride	ug/g	104	<9.98E-03	14.0	n/a	n/a	n/a	n/a	0.0973	n/a	
S11V004340	W	14797-65-0	Nitrite 2.5U	ug/g	103	0.0518	0.435	n/a	n/a	n/a	n/a	0.187	n/a	CB
S11V004340	W	14808-79-8	Sulfate	ug/g	105	<0.0187	95.8	n/a	n/a	n/a	n/a	0.182	n/a	
S11V004340	W	338-70-5	Oxalate	ug/g	101	<0.0231	<0.225	n/a	n/a	n/a	n/a	0.225	n/a	U
S11V004340	W	24959-67-9	Bromide	ug/g	104	<0.0580	<0.565	n/a	n/a	n/a	n/a	0.565	n/a	U
S11V004340	W	14797-55-8	Nitrate	ug/g	103	<0.0208	7.59	n/a	n/a	n/a	n/a	0.203	n/a	
S11V004340	W	14265-44-2	Phosphate UJ	ug/g	103	<0.0167	<0.163	n/a	n/a	n/a	n/a	0.163	n/a	UN
S11V004341	A	7429-90-5	Aluminum	ug/g	88.6	<0.0300	6.38E+03	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341	A	7440-42-8	Boron	ug/g	87.4	<0.0300	3.46	n/a	n/a	n/a	n/a	1.50	n/a	B
S11V004341	A	7440-39-3	Barium	ug/g	93.9	<3.00E-03	60.0	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341	A	7440-41-7	Beryllium	ug/g	96.2	<1.00E-03	0.119	n/a	n/a	n/a	n/a	0.0499	n/a	B
S11V004341	A	7440-69-9	Bismuth	ug/g	87.5	<0.100	7.23	n/a	n/a	n/a	n/a	4.99	n/a	B
S11V004341	A	7440-70-2	Calcium	ug/g	84.4	0.0523	5.71E+03	n/a	n/a	n/a	n/a	2.49	n/a	
S11V004341	A	7440-45-1	Cerium	ug/g	96.7	<0.0300	16.8	n/a	n/a	n/a	n/a	1.50	n/a	
S11V004341	A	7440-48-4	Cobalt	ug/g	88.8	<0.0100	5.80	n/a	n/a	n/a	n/a	0.499	n/a	
S11V004341	A	7440-47-3	Chromium	ug/g	89.2	<5.00E-03	27.4	n/a	n/a	n/a	n/a	0.249	n/a	

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
B - Blank Contamination
T - MS/MSD Outside Range

J - Estimated
C - Blank Contamination

U - Less Than Detection Limit
N - MS/MSD Outside Range

B - Estimated
M - RPD Outside Range

EH
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Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004341	A	U-238	Uranium-238	ug/g	101	<5.00E-04	0.480	n/a	n/a	n/a	n/a	4.99E-03	n/a	
S11V004341	A	7440-22-4	Silver	ug/g	107	<2.00E-03	0.0507	n/a	n/a	n/a	n/a	0.0199	n/a	B
S11V004341	A	7440-38-2	Arsenic	ug/g	94.1	<0.0420	2.16	n/a	n/a	n/a	n/a	0.419	n/a	B
S11V004341	A	7440-43-9	Cadmium	ug/g	105	<6.00E-03	0.0780	n/a	n/a	n/a	n/a	0.0598	n/a	B
S11V004341	A	7439-92-1	Lead	ug/g	98.5	<0.0150	2.55	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341	A	7782-49-2	Selenium	ug/g	103	<0.135	<1.35	n/a	n/a	n/a	n/a	1.35	n/a	U
S11V004341	A	7440-28-0	Thallium	ug/g	98.7	<4.00E-03	0.0608	n/a	n/a	n/a	n/a	0.0399	n/a	B
S11V004342	S	14798-03-9	Ammonium	ug/g	97.1	<0.120	6.69	5.17	5.93	25.7	95.4	0.482	n/a	
S11V004343	A	14133-76-7	Technetium-99	ug/g	101	<6.00E-05	<5.94E-04	n/a	n/a	n/a	n/a	5.94E-04	n/a	U
S11V004344	E	CM-243/244	Curium-243/244	uCi/g	n/a	<4.58E-08	<3.45E-08	n/a	n/a	n/a	n/a	3.45E-08	n/a	U
S11V004344	E	14596-10-2	Americium-241	uCi/g	103	<5.32E-08	<4.24E-08	n/a	n/a	n/a	n/a	4.24E-08	n/a	U
S11V004344	E	15510-73-3	Curium-242	uCi/g	n/a	<2.34E-08	<1.01E-08	n/a	n/a	n/a	n/a	1.01E-08	n/a	U
S11V004344	E	PU-239/240	Plutonium-239/240	uCi/g	107	<6.34E-08	4.39E-08	n/a	n/a	n/a	n/a	3.03E-08	44.7	
S11V004344	E	13981-16-3	Plutonium-238	uCi/g	n/a	<6.58E-08	<2.88E-08	n/a	n/a	n/a	n/a	2.88E-08	n/a	U
S11V004345	E	SR-89/90	Strontium-89/90	uCi/g	111	<4.70E-07	<7.35E-07	n/a	n/a	n/a	n/a	7.35E-07	n/a	U
S11V004346	E	13981-37-8	Nickel-63	uCi/g	102	<1.02E-05	<5.03E-06	n/a	n/a	n/a	n/a	5.03E-06	n/a	U
S11V004347	E	15758-45-9	Selenium-79	uCi/g	n/a	4.77E-06	1.40E-05	n/a	n/a	n/a	n/a	1.96E-06	2785.151	BE
S11V004348	W	14762-75-5	Carbon-14	uCi/g	92.2	<4.26E-06	<2.65E-06	n/a	n/a	n/a	n/a	2.65E-06	n/a	U
S11V004348	W	10028-17-8	Tritium	uCi/g	99.3	<3.91E-06	<2.61E-06	n/a	n/a	n/a	n/a	2.61E-06	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
U - Less Than Detection Limit
B - Estimated
B - Blank Contamination
C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

222-S LABORATORY

FINAL ANALYTICAL REPORT FOR SOIL SAMPLES FROM WASTE MANAGEMENT AREA C, CORE HOLE C8100, IN SUPPORT OF RCRA CLOSURE

1.0 INTRODUCTION

This final report presents the results for the samples taken from C Farm between February 24, 2011 and April 4, 2011. The samples were analyzed in accordance with RPP-PLAN-40564, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* (FSAP), RPP-PLAN-38777, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C* (SAP); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory* (QAPP); SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*; and the additional guidance given by the client's point of contact (POC).

Because the 222-S Laboratory facility was designed to analyze hazardous and complex tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative. The following attachments are included in this report.

Attachment 1 Data Summary Report
Attachment 2 Sample Breakdown Diagrams
Attachment 3 Holding Time Report
Attachment 4 Additional QC Results
Attachment 5 Tentatively Identified Compound (TIC) Report
Attachment 6 Analytical Batch and Laboratory Sample Identification Number Index
Attachment 7 Geological Report with Bulk Density Results
Attachment 8 Characterization Change Notices (CCN), and Correspondence
Attachment 9 Receipt Paperwork

2.0 SAMPLE RECEIPT AND BREAKDOWN

2.1 SAMPLE RECEIPT

A total of two grab samples, ten core intervals, and one equipment blank were received by the 222-S Laboratory between February 24, 2011 and April 4, 2011. The samples were delivered in a cooler with ice. The temperatures of the temperature blanks were measured and recorded on the sample receipt check list and the chain of custody form. All temperature blanks were in compliance with the SW-846-specified preservation temperature of 6 ^{o}C.

2.2 SAMPLE BREAKDOWN

The laboratory received each core interval as three liner samples and one shoe sample when complete core recovery was obtained. The liner samples from each core interval were extruded, described, and composited with the shoe sample by the Washington River Protection Solutions (WRPS) geologist. The WRPS geologist measured the bulk density for core liners that had sufficient recovery (see Attachments 1 and 2) and the percent moisture for all composite samples. The geologist's report is included in Attachment 7. The composite for each core interval was analyzed as described in the SAP. All core intervals had complete recovery except for intervals I002, I003, I004, and I005. These core intervals were composited to form two sample extended intervals: I002+I003 and I004+I005 (see Attachment 2).

3.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the SAP. Secondary analytes are reported only if detected. In addition to the required isotopes, all isotopes with positive gamma energy analysis (GEA) results were reported.

The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radionuclide analyses, or the minimum detectable activity (MDA) for radionuclides.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. For solid samples, the aliquot classes are defined as follows:

"A" indicates samples that were prepared by SW-846 3050B.

"E" indicates samples that were prepared by a strong acid digest.

"S" indicates samples that were prepared by a distillation.

"W" indicates samples that were prepared by a standard water digest.

"O" indicates sample s that were prepared by methylene chloride extraction

Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation or with sample preparation performed as a part of the procedure steps.

Additionally the results for ^{99}Tc with units of pCi/g do not have letter identifier in "A#" column. These analysis were performed on the vadose water digest as required in the FSAP

The "Qual Flags" column in Attachment 1 contains data qualifier flags from FEAD CP-15383, *Common Requirements of the Format for Electronic Analytical Data,* that are defined as follows:

"B" for organic or radiochemistry results is used to indicate that the analyte was detected in the method or preparation blank and in the sample.

"B" for inorganic results is used to indicate that the reported result should be considered an estimate because it is below the quantitation limit. The "B" flag is applied to sample concentrations that are greater than the MDL but less than the quantitation limit.

"C" for inorganic results is used to indicate that the analyte was detected in the method or preparation blank and in the sample, and the result for the blank was greater than or equal to 20% of the reported sample result.

"E" for radiochemistry results is used to indicate an estimated result due to interference.

"N" for all but gas chromatography/mass spectrometry (GC/MS) is used to indicate that the matrix spike (MS) recovery or matrix spike duplicate (MSD) recovery was outside of the specified range in the QAPP or SAP.

"M" for inorganic results is used to indicate that the relative percent difference (RPD) between the sample and the duplicate is greater than 30%.

"U" for all results is used to indicate that the reported result is less than the calculated detection limit.

"T" for CG/MS is used to indicate that the MS or MSD recovery was outside of the specified range in the QAPP or SAP.

Manual calculations using rounded results from the Data Summary Report (Attachment 1) or result calculation forms may differ slightly from the actual results derived from the raw data.

3.1 SAMPLE DIGESTIONS

3.1.1 Radiochemistry Strong Acid Digestion

Strong acid digestions with a hot plate for the heat source were performed using a mixture of concentrated nitric and hydrochloric acids. For each digest, approximately 1 to 10 g of sample was digested depending on the analysis being performed. The digestate was then filtered and diluted to a final volume. This digestion was used for all radiochemical analyses except GEA, ^{3}H, ^{14}C, and ^{129}I. This digestion is a leach of the acid soluble species only.

3.1.2 SW-846 3050B – Acid Digestion-Heating Block

This acid digestion follows SW-846 3050B using a heating block and nitric and hydrochloric acids. An aliquot of approximately 1 to 5 g of each sample was digested. All heating-block digestions were filtered and diluted to a final volume of 50 mL. In soil, this digestion is a leach of the acid soluble species only. This digestion was used for all inductively coupled plasma/mass spectrometry (ICP/MS) and inductively coupled plasma/atomic emission spectroscopy (ICP/AES) analyses except for ^{99}Tc, isotopic tin (^{117}Sn and ^{126}Sn), and antimony analysis. The digestion is modified for the ^{99}Tc analysis by using only nitric acid. This is done to eliminate the possibility of the formation of a zinc-chlorine ion pair of mass 99. The laboratory believes this

ion, when present, is responsible for low level false positives. A separate digestion for antimony and isotopic tin was prepared using additional hydrochloric acid to improve MS recoveries.

3.1.3 Water Digestion

A water digestion or leach was prepared for the anions by ion chromatography (IC), ^{14}C, and ^{3}H analyses using approximately 4 to 10 g of sample. Sonification was used, and the leachate was then filtered. In soil, this digestion is a leach of the water soluble species only.

3.1.4 Vadose Water Digestion

An approximately 65-gram sample of soil was leached using a ratio of one part water to one part soil. To maintain a one-to-one ratio, the amount of water added to the sample was adjusted based on the percent moisture of the soil. The slurries were placed on a shaker table for about 1 hour, were transferred to a centrifuge tube and centrifuged at 4,000 rpm for 30 minutes, and then filtered using a disposable vacuum filtration system. The filtrates were transferred to a clean bottle and then analyzed for ^{99}Tc by ICP/MS. A separate unfiltered aliquot was analyzed for conductivity.

3.2 INORGANIC ANALYSES

3.2.1 Cyanide

The cyanide analysis by distillation and spectrophotometry was performed on the grab samples, liner composite samples, and equipment blank. All analyses met the SW-846 holding time of 14 days except for two samples (S11V004098 and S11V004115), which exceeded the holding time by one day. The samples were originally analyzed within the holding time, but due to low MS and continuing calibration verification standard recoveries, reanalysis was necessary. There was no change in the results from the initial analysis. The laboratory believes there was little or no affect on the data usability from the holding time excursion. There was no required reporting limit in the SAP for cyanide. The target detection limit was met. For all batches except for Batch 26248, there were no notable issues and all QC requirements in the SAP and the QAPP were met.

Batch 26248: The analyst failed to include a low level standard (LLS) with this batch. Since the sample result was below the MDL, all other quality control (QC) parameters were within their prescribed limits, all LLSs in the other 10 batches were in control, and a passing LLS was analyzed with the calibration standards the previous day, it is the laboratory's opinion that the data usability was not affected.

3.2.2 Conductivity

The conductivity analysis was performed on the grab samples and liner composite samples. These analyses met all QC requirements in the SAP and QAPP. The SAP lists an administrative holding time requirement of 28 days. SW-846 9050A lists a holding time of 28 days for aqueous samples only. There is not a promulgated holding time for the conductivity measure of a soil

sample. All conductivity measurements were taken on the Vadose water digest portion within 28 days of sampling. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.2.3 pH Analysis

The pH analysis was performed on the grab samples, liner composite samples, and equipment blank. These analyses met all QC requirements in the SAP and QAPP. The SAP lists a pH holding time requirement of "24 hours or as soon as possible." All solid pH measurements were taken as soon as possible after liner extrusion and compositing of the sample. The sampling-to-analysis time varied from 5.5 hours to 145 hours (see Attachment 3). There is no correlation between pH results and time to analysis, and the results fall within an expected range for alkaline soils. This indicates that the variation in time has no apparent effect on the soil results.

3.2.4 Mercury

Analysis for mercury by cold-vapor/atomic absorption was performed on the grab samples, liner composite samples, and equipment blank. For all samples analyzed, results met the QC requirements in the SAP and QAPP and all analyses met the holding time of 28 days. This analysis met the required and target detection limits.

3.2.5 Ion Chromatography – Ammonium

Analysis for ammonium was performed using a distillation preparation of the grab samples, liner composite samples, and equipment blank. The SAP lists an administrative holding time of 7 days for ammonium in soil. The laboratory believes that after distillation and preservation, the holding time is 28 days based on U.S. Environmental Protection Agency drinking water and waste water holding times for preserved aqueous samples. There is no regulatory holding time limit promulgated for ammonium in soil. All samples met the administrative holding times. These analyses met the target detection limit listed in the SAP. There was no required detection limit in the SAP for ammonium.

Batches 25867, 25918, 26004, 26213, and 26815: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26068: Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the sample at less than five times the blank level. This result has been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26517: The RPD exceeded the required 30%. Since the result for this analyte was below the quantitation limit, the criterion does not apply and reanalysis is not required. Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the samples at less than five times the blank level. The results have been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

3.2.6 Ion Chromatography – Anions and Small Organic Acids

Ion chromatography analysis was performed on a standard water digest of subsamples from the grab samples, liner composite samples, and equipment blank.

The laboratory met all of the required and target detection limits. For the standard water digest, all analyses were within the applicable holding times. The sample spikes used for the standard water digestions are predigestion spikes.

Batch 26180: There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

Batch 26531: The results for chloride, formate, and sulfate in the preparation blank were above the MDL but below the quantitation limit. All sample results that were less than five times the blank result have been flagged with a "C". Since all blank results were below the quantitation limit, the usability of the data was not affected. The RPD for nitrite exceeded the 30% requirement in the SAP. Since the result for this analyte was below the quantitation limit reanalysis was not required.

Batch 26818: The RPD for fluoride exceeded the 30% requirement in the SAP at 33%; since the RPDs for chloride and sulfate met this requirement, the laboratory believes this is due to matrix inhomogeneity. All fluoride results in this batch have been flagged with an "M". The RPDs for nitrite and formate exceeded the 30% requirement in the SAP. Since the results for these analytes were below the quantitation limit reanalysis was not required.

The MS recovery for phosphate exceeded the ±25% requirement in the SAP at 74%. The laboratory believes this was due to matrix interference since all other MS recoveries were between 93% and 105% and phosphate MS recoveries are frequently low in Vadose samples. These exceedances were discussed with the client POC (see Attachment 8).

3.2.7 Inductively Coupled Plasma/Atomic Emission Spectroscopy

The ICP/AES analysis was performed on an acid-digest (SW-846 3050B) of the grab samples, liner composite samples, and equipment blank. The ICP/AES analysis was unable to obtain the required detection limit for antimony, arsenic, cadmium, lead, selenium, silver, and thallium. These elements have been reported from separate ICP/MS analyses. Total uranium has not been reported by the ICP/AES analysis since it cannot meet the required detection limits in the SAP. The isotopic uranium analysis by ICP/MS met the required detection limit for ^{238}U, which is essentially total uranium. The overall data usability was not affected. For all other metals reported by ICP/AES, all target and required detection limits were met. SW-846 lists the holding time for ICP/AES metals as 6 months. All analyses met the holding time.

Due to inter-element interferences, the elements europium, niobium, neodymium, and ruthenium have not been reported even though detected in the samples. The laboratory believes that these results are likely due to unmitigated inter-element interferences. These are all secondary analytes.

Batch 26884: The initial and closing LLS recoveries for potassium and iron were above the 130% requirement. This could indicate a high bias. However, since the sample results for these elements were below the quantitation limit the data usability was not affected.

Batch 26878: Results above MDL but below the quantitation limit for manganese in the opening and closing interference check standard "A" (ICSA) and for chromium in the closing ICSA indicate a possible high bias for these elements. However, the recovery of manganese and chromium in the interference check standard "AB" (ICSAB) was within the ±20% requirement; this indicates no significant bias was present. Low levels of iron and calcium were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result. Sulfur was detected in the preparation blank at slightly above the MDL. Three samples have sulfur results at less than five times the blank result and have been flagged with a "C". Sulfur is a secondary analyte.

The MS recoveries for aluminum, barium, calcium, iron, magnesium, sodium, and phosphorous exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for boron, silicon, sulfur, and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes. The MS recovery for strontium exceeded the ±25% requirement at 128%. For all other required elements whose results were less than four times the spike, the MS recoveries were within the requirement. Therefore, the laboratory believes that the high recovery for strontium is due to inhomogeneity.

The RPD for cobalt exceeded the 30% requirement in the FSAP and SAP at 34%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

The laboratory control sample (LCS) recovery for silicon exceeded the ±25% requirement at 16%. Because of this and since silicon is a secondary element, it has not been reported. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

Due to the failure of all instrument quality control samples, thorium has not been reported. Reliable thorium results are reported by ICP/MS.

Batch 26957: The initial and closing LLS recoveries for chromium and iron were below the 70% requirement. This could indicate a low bias. However, since the sample results for chromium were at least 10 times the level of the LLS and the results for iron were at least 5,000 times the LLS level, it is the laboratory's opinion that the data usability was not affected. The LLS for beryllium exceeded the ±30% requirement at 149%. This could indicate a low basis for beryllium. However, since all results were below the quantitation limit, the data usability was not affected.

Results above the MDL but below the quantitation limit for manganese and titanium in the opening and closing ICSA and for barium, phosphorous, strontium, and vanadium in the closing ICSA indicate a possible high bias for these elements. However, the recoveries for these elements in the ICSAB were within the ±20% requirement; this indicates no significant bias was

present. Low levels of calcium and sulfur were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result.

The MS recoveries for aluminum, calcium, iron, phosphorous, and titanium exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for sulfur and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes.

The serial dilution for lanthanum exceeded the ±10% requirement at 14%. This could indicate that the lanthanum results are biased low. Lanthanum is a secondary element.

The LCS recovery for silicon exceeded the ±25% requirement at 78%. Silicon is a secondary element. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

3.2.8 Inductively Coupled Plasma/Mass Spectroscopy

The ICP/MS actinide and trace metal analyses were performed on the standard SW-846 3050B acid digestion of the grab samples, liner composite samples, and equipment blank. ICP/MS analysis for ^{126}Sn and antimony was perform on the same digest with additional hydrochloric acid, which is required to keep tin and antimony in solution. For all samples, the ICP/MS ^{99}Tc analysis was performed on the sample digest without the addition of hydrochloric acid. Hydrochloric acid is not used for ^{99}Tc analysis because of the potential formation of a ZnCl with mass 99. Technetium-99 was also analyzed using the Vadose water digest.

Direct is the most accurate type of calibration; however, standard material is not commercially available for all of the isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's mass-response curve, which is generated by using the intensity/concentration relationship for the available isotope standards. Results estimated in this manner are designated "semi-quantitative."

Table 1. Inductively Coupled Plasma-Mass Spectroscopy Standards and Spikes

Standard Type	Analytes Analyzed
Initial calibration verification (nondigested)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Acid digest standard (laboratory control standard)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Predigest spike (MS)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Post-digest spike	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
No standard or spike of either type	^{126}Sn, ^{230}Th, ^{233}U, ^{234}U, ^{236}U

Technetium-99

For the acid digestion, the required detection limit listed in the SAP for ^{99}Tc was met. The target detection limit for ^{99}Tc was not met. For the water digested samples, both the target and required detection limits were met. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time.

The acid-digested ^{99}Tc analysis is subject to isobaric interference from natural ruthenium and cobalt argide, and zinc chloride ions. However, these samples were analyzed using an ICP/MS with a collision cell, which eliminates the polyatomic interferences. Interference from natural ^{99}Ru seems unlikely since none of the more abundant nature isotopes (100, 101, and 102) were detected.

For the water digest, one sample, B2C1N0, had a positive result above the MDL and slightly below the quantitation level of 10 times the MDL. This result was twice the LLS concentration. The client requested ^{99}Tc analysis by radiochemistry (resin separation followed by liquid scintillation counting), which confirmed the ICP/MS result for this sample. The water digested ^{99}Tc results were originally reported, along with the nitrate results, in ATL Document No. 20110264-D14 as required in the FSAP.

Batches 26871, 26872, and 27327: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met. Batch 27327 contained the equipment blank and also reports the result for ^{126}Sn.

Tin-126 and Antimony

For the solid samples, antimony and ^{126}Sn were analyzed from the same digest because of the need for additional hydrochloric acid, which results in better MS recoveries. However, this appears to cause an isobaric interference with ^{126}Sn. The laboratory has concluded that the most likely interferences are from the polyatomic ions, zirconium chloride, strontium argide, and yttrium chloride—all with mass of 126. A preliminary investigation indicated that using an ICP/MS with a collision cell will eliminate this interference. However, the instrument needed for this analysis is not currently able to operate in a "semi-quantitative" mode. The laboratory is currently working on resolving this issue. Based on the client's earlier instructions (see Attachment 8), samples with a positive result for ^{126}Sn have been flagged with an "E".

Batch 26962: The RPD for ^{126}Sn exceeded the 30% requirement in the FSAP and SAP at 38%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

Actinides

The required and target detection limits were met for all isotopes in all samples. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time (see Attachment 3).

Batches 26835 and 26968: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26833: Laboratory personnel improperly prepared the low level MS. The higher level MS was recovered within the required ±25% for all analytes. Since a low level MS was recovered within the required limits for all analytes in Batch 26968, the SAP requirement for at least on MS per core hole was met and reanalysis of Batch 26833 was unnecessary.

Trace Metals

Arsenic, cadmium, lead, selenium, silver, and thallium were analyzed by ICP/MS to obtain the required detection limits in the SAP. Except for the required detection limit for selenium, all required detection limits were met or the sample results were above the quantitation limit and the sample detection limit criteria do not apply. All target detection limits were met. The required detection limit for selenium was more than an order of magnitude below the detection limit obtained by ICP/MS. The laboratory does not anticipate reaching this detection limit for future projects. The adjusted MDL for selenium soil results was approximately 1.3 µg/g. SW-846 lists the holding time for metals as 6 months. All samples were analyzed within the holding time (see Attachment 3). There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

3.3 RADIOCHEMICAL ANALYSIS

The holding time listed in the SAP for radioactive isotopes is 6 months. All samples were analyzed within the required holding time. The holding time tables for these analytes are included in Attachment 3. With the exception of the ^{14}C and ^{3}H analyses, tracers and spikes are added prior to digestion.

3.3.1 Gamma Energy Analysis

Gamma energy analysis was performed directly on approximately 60 mL of soil from liner grab samples, liner composite samples, and the equipment blank. The SAP requires the reporting of all isotopes with positive results above the MDA; therefore, isotopes additional to those required in the SAP were reported when detected. The GEA analysis met all of the required detection limits in the SAP except for one sample for ^{228}Th, which was only slightly higher. The laboratory was able to meet the target detection limits for all ^{137}Cs and all ^{125}Sb analyses. Seven of the ten ^{154}Eu result met the target detection limit. The laboratory was unable to meet the remaining target detection limits. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.2 Strontium-89/90

Strontium-89/90 analysis was performed on the grab samples, liner composite samples, and equipment blank. All of the sample analyses met the required and target detection limits. The SAP requested ^{90}Sr, not $^{89/90}Sr$, be reported. The 222-S Laboratory only performs the latter analysis. Since the half-life for ^{89}Sr is approximately 51 days and ^{89}Sr has not been produced at Hanford for years, $^{89/90}Sr$ is essentially ^{90}Sr. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.3 Tritium

The ^{3}H analysis by liquid scintillation counting (LSC) was performed directly on the field and equipment blanks and a water leach of the liner composite samples. This method only measured the ^{3}H in the samples that could be dissolved in water. This analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.4 Selenium-79

The ^{79}Se analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the target detection limit in the SAP. No required detection limit was listed. No standard is currently available for ^{79}Se, and a cold carrier is used to monitor recovery and is measured gravimetrically. The ^{14}C LSC curve is used to determine the ^{79}Se results since their energies are similar. All samples have very low positive results, which were caused by an elevated quench from samples, resulting in insufficient background subtraction. These results should be considered very low level false positives and have been flagged with a "E". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26240: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the sample. The sample has been flagged with a "B".

Batch 27781: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the samples. The samples have been flagged with a "B". The RPD for the duplicate exceeded the 30% requirement in the SAP and FSAP. Since the sample result was below the quantitation limit, this criterion does not apply.

3.3.5 Carbon-14

The ^{14}C analysis by LSC was performed on a water leach of the grab samples, liner composite samples, and equipment blank. The analysis achieved the required detection limit in the SAP but exceeded the target detection limit. This analysis will only detect water soluble forms of ^{14}C. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.6 Nickel-63

The ^{63}Ni analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.7 Iodine-129

Analysis for ^{129}I by low energy GEA was performed on the grab samples, liner composite samples, and equipment blank. The required and target detection limits in the SAP were met. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.8 Americium-241, Curium-243/244, and Curium-242

Analysis for ^{241}Am, $^{243/244}Cm$, and ^{242}Cm by alpha energy analysis (AEA) was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met. The SAP requested ^{243}Cm and ^{244}Cm be reported separately. Since it is not possible to resolve these individual isotopes when using AEA, these isotopes have been reported as $^{243/244}Cm$.

3.3.9 Plutonium-238 and Plutonium-239/240

Plutonium isotopic (^{238}Pu and $^{239/240}Pu$) analysis by AEA was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met.

3.4 ORGANIC ANALYSES

3.4.1 Semivolatile Organic Analysis

The semivolatile organic analysis (SVOA) by GC/MS was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. All holding times were met.

The SVOA analysis met the required and target detection limits with two exceptions:

- The adjusted MDLs for cyclohexanone were above the 0.5-mg/kg target detection limit for most samples. This compound obtained detection limits between 0.5 mg/kg and 0.6 mg/kg.

- The adjusted MDLs for di-n-butyl-phthalate were above the target detection limit of 0.33 mg/kg. The analysis achieved a detection limit of between 0.5 mg/kg and 0.6 mg/kg for this compound.

LCS, MS, and MSD recoveries were compared against the laboratory's statistical process control (SPC) limits, as required by SW-846. The use of SPC limits is permitted in the FSAP, SAP, and QAPP. The results of surrogate, LSC, and MS/MSD are contained in Attachment 4. 1,4-dichlorobenzene, phenol, and pentachlorophenol are secondary compounds but have been reported in order to provide QC results for the LCS and MS/MSD.

The SAP and FSAP requested 3-methylphenol and 4-methylpnenol be reported separately. Since it is not possible to resolve these individual compounds when performing SVOA by SW-846 8270C, these compounds have been reported as 3&4 methylphenol.

Batch 26489: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 25983: The MS experienced high recovery for 1,2,4-trichlorobenzene, 4-chloror-3-methylphenol, N-nitroso-di-n-propylamine, and Pyrene; since the result for all of these compounds were below the MDL, the data quality was not affected and reanalysis was not required. The results for these compounds have been flagged with a "T" for both samples in this batch. One sample experienced high recoveries for the surrogate terphenyl-d14; since the results for all primary compounds were below MDL, the data usability was not affected and reanalysis was unnecessary. The LCS and MS/MSD did not contain phenol, 4-nitrophenol, or 1,4-dichlorobenzene. The decision by the client to add these secondary compounds to the spikes was made after this batch was analyzed; these compounds are contained in all subsequent batches.

Batch 26487: The LCS recovery for 2-4-dinitrotoluene exceeded the laboratory statistical control limit of 60%-99% at 101%. Since the recovery is within the ±30% in the SAP and FSAP and the sample result was below the MDL, a qualifier flag was not applied.

Batches 26760 and 26836: There were no notable issues with these batches, and all QC requirements in the FSAP, SAP, and QAPP were met

3.4.2 .Polychlorinated Biphenyls Analysis

Polychlorinated biphenyls (PCB) analysis was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. The accelerated solvent extraction method was used for the solid sample analysis, and solid sample results were corrected to the dry weight of the sample. The LCS, MS, and MSD consisted of only Aroclor-1254 because it is the most common Aroclor detected in Hanford Site samples.

Batch 26470: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 26128: The recoveries for the surrogate tetrachloro-m-xlyene exceeded the laboratory's statistically derived control limit of 53%-115% at 117% and 123%. Since the all sample results were below the MDL, the data usability was not affected.

3.4.3 Tentatively Identified Compounds

Unassigned peaks or TICs were treated as follows. Standards were obtained and analyzed for each secondary analyte identified in the SAP. This data was accumulated in the Hanford library. Following analysis, the largest TICs with instrument responses greater than 10% of the response of the nearest internal standard were evaluated and compared to the Hanford library. The estimated concentration of these TICs was calculated using measured response factors from the Hanford library compound list.

After comparison to the Hanford library, remaining unknowns were compared to the National Institute of Standards and Technology's NIST 02, *HP Mass Spectral Libraries*. The estimated concentration of compounds identified in the NIST library was calculated based on an arbitrary response factor of 1.0. If the compounds were not identified as a result of this comparison, they were reported as "unknown." Summaries of the SVOA TICs from the field samples and method blanks are provided in Attachment 5. TICs that were found in the field samples and were present in the associated batch method blank have been flagged with "B".

4.0 PROCEDURES

Table 2 Lists the procedures used in analyzing the samples contained in this report

Table 2. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
Cyanide	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9010C)	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9014)
Conductivity	LA-504-102, Rev. A-0 Vadose Water Digest	LA-512-107, Rev. G-0
pH (solid)	LA-212-105, Rev. H-0 (SW-846 9045D)	LA-212-105, Rev. H-0 (SW-846 9045D)
Mercury – Cold Vapor Atomic Absorption	LA-325-110, Rev. A-0 (SW-846 7470A, 7471B)	LA-325-106, Rev. G-0 (SW-846 7470A, 7471A)
Ammonia – IC	LA-544-112, Rev. E-0	LA-533-101, Rev. Q-0
Anions & Organic Acids – IC	LA-504-101, Rev. M-0 LA-504-102, Rev. A-0 (Vadose Water Digest)	LA-533-115, Rev. J-0, K-0
Metals – ICP /AES	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-505-161, Rev. J-0-A, K-0 (SW-846 6010C)
^{99}Tc, ^{126}Sn – ICP/MS	Direct	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0
^{99}Tc – ICP/MS	LA-504-102, Rev. A-0 (Vadose Water Digest) LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-103, Rev. B-0
Metals, ^{126}Sn – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0 (SW-846 6020A)
Actinides – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1
Radiochemical Analyses		
GEA	Direct	LA-548-121, Rev. I-0 LA-508-167, Rev. A-0

Analysis	Preparation Method	Analysis Procedure
$^{89/90}$Sr – Separation/GPC	Digestion LA-544-101, Rev. G-0 Separation LA-220-103, Rev. K-0 (solid) LA-220-104, Rev. J-0-A (liquid)	LA-508-124, Rev. B-0
^{3}H – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-218-116, Rev. A-0	LA-508-121, Rev. G-0
^{14}C – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-348-104, Rev. I-0	LA-508-121, Rev. G-0
^{79}Se – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-365-132, Rev. J-0	LA-508-121, Rev. G-0
^{63}Ni – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-285-102, Rev. E-0	LA-508-121, Rev. G-0
^{129}I – Separation/GEA	LA-378-105, Rev. D-0, E-0	LA-508-165, Rev. D-0
^{241}Am, $^{243/244, 242}$Cm – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
$^{239/240, 238}$Pu – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
Analysis	**Preparation Method**	**Analysis Procedure**
Organic Analyses		
SVOC – GC/MS	LA-523-115, Rev. H-0 LA-523-138, Rev. G-0	LA-523-135, Rev. D-0-A SW-846 8270D
PCB – GC/Electron Capture Detector	LA-523-115, Rev. H -0 LA 523-144, Rev. D-0	LA-523-140, Rev. G-0 SW-846 8082A

5.0 REFERENCES

ATL-MP-1011, 2010, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Rev. 10, 10-A, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

FEAD CP-15383, 2007, *Common Requirements of the Format for Electronic Analytical Data,* Version 8, CH2M Hill Plateau Remediation Co., Richland, WA.

RPP-PLAN-3877, 2009, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C*, Rev. 1, Washington River Protection Solutions, Inc., Richland, Washington.

RPP-PLAN-40564, 2009, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* Rev. 2, Washington River Protection Solutions, Inc., Richland, Washington.

NIST 02, 2002, *HP Mass Spectral Libraries*, July 2002 Release, Hewlett-Packard Company, Palo Alto, California.

SW-846, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,* Third Edition, as amended, U.S. Environmental Protection Agency, Washington, D.C.

From: Anastos, Heather L
To: Ritenour, Gerald P
Cc: Menjivar, Carolina S; McKinney, Steve G
Subject: RE: C Farm 8100C IC Anion QC Failures
Date: Saturday, July 09, 2011 8:53:35 AM

Agreed, you can report the results with narration.

Heather Anastos
Chemist, Closure & Corrective Measures
(509) 373-2616
1200 Jadwin/301

washington river protection solutions
contractor to the United States Department of Energy

From: Ritenour, Gerald P
Sent: Friday, July 08, 2011 10:51 AM
To: Anastos, Heather L
Cc: Menjivar, Carolina S; McKinney, Steve G
Subject: C Farm 8100C IC Anion QC Failures

Heather,
In batch 26818 the RPD for F was high and the MS recovery for PO4 was low. The RPDs for the other anions with results above the quant limit, Cl and SO4 were low and all spike recoveries except for PO4 were within ±7%. Since both of these failures are typical of vadose soils I would like to report with narration.
Thanks, JR

Core Number	Customer Sample ID	Sample Depth	SAMPLE_R	A	ANALYTE	RESULT UNIT	LCS	BLANK	RESULT	DUP	RPD	MS	MDL	QUAL Flat
C8100	B2C1M8	118'-120'	S11V004270	W	Acetate	ug/g	105	<6.04E-03	<0.0602	0.313	n/a	104	0.0602	U
C8100	B2C1M8	118'-120'	S11V004270	W	Bromide	ug/g	104	<0.0580	<0.578	<0.580	n/a	103	0.578	U
C8100	B2C1M8	118'-120'	S11V004270	W	Chloride	ug/g	104	<9.98E-03	1.12	1.11	1.12	103	0.0994	
C8100	B2C1M8	118'-120'	S11V004270	W	Fluoride	ug/g	104	<1.61E-03	0.521	0.725	32.7	105	0.0160	M
C8100	B2C1M8	118'-120'	S11V004270	W	Formate	ug/g	103	<4.67E-03	0.166	0.261	44.6	102	0.0465	B
C8100	B2C1M8	118'-120'	S11V004270	W	Glycolate	ug/g	101	<9.37E-03	<0.0933	<0.0937	n/a	100	0.0933	U
C8100	B2C1M8	118'-120'	S11V004270	W	Oxalate	ug/g	101	<0.0231	<0.230	<0.231	n/a	99.7	0.230	U
C8100	B2C1M8	118'-120'	S11V004270	W	Phosphate	ug/g	103	<0.0167	<0.166	0.276	n/a	73.9	0.166	UN
C8100	B2C1M8	118'-120'	S11V004270	W	Sulfate	ug/g	105	<0.0187	38.3	40.3	5.22	93.4	0.186	

ATL Analytical Operations
Advanced Technologies and Laboratories International, Inc.
Contractor to the Office of River Protection
U.S. Department of Energy
Currently at 509-375-4200, Ext 247

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 1 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Gs
NO. OF CONTAINER(S)	2
VOLUME	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE / SAMPLE TIME	
B2B1L6	SOIL	2-24-11 B 2-24-11 1108 26	✓

S11V004098

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
Cpbell C-bell	2-24-11 0920	RLSteele RLSteele	2.24.11 0920	Grp 20110264
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	-1°C Temp
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RLSteele S11V004098
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

PRINTED ON 2/15/2011

A-6003-618 (REV 2)

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 2 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03 **AIR QUALITY** ☐	**DATA TURNAROUND** 60 Days / 120 Days
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001		
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** n/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** n/A		**BILL OF LADING/AIR BILL NO.** n/A		

SPECIAL INSTRUCTIONS

**Only samples from intervals within the top 15 ft. will be analyzed for pesticides,and PCBs.
(1) pH (Soil) - 9045; Semi-VOA - 8270 Complete (TF) {1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4-Dinitrotoluene, 2,6-bis(1,1-dimethylethyl)-4-methyl phenol, 2-Chlorophenol, 2-Methylphenol (cresol, o-), 2-Nitrophenol, 3+4 Methylphenol (cresol, m+p), 4-Chloro-3-methylphenol, Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Bis(2-ethylhexyl) phthalate, Butylbenzylphthalate, Cellosolve Solvent, Chrysene, Cyclohexanone, Di-n-butylphthalate, Di-n-octylphthalate, Dibenz[a,h]anthracene, Fluoranthene, Hexachlorobutadiene, Hexachloroethane, Indeno(1,2,3-cd)pyrene, Isobutyl alcohol, n-Nitrosodi-n-dipropylamine, n-Nitrosomorpholine, Naphthalene, Nitrobenzene, Pyrene, Pyridine, Total cresols, Tributyl phosphate}; 6010_Metals_ICP; 6020_METALS_ICPMS (TF) {Antimony, Arsenic, Cadmium, Selenium, Silver, Thallium}; Mercury - 7471 - (CV) (TF); IC Anions - 9056; 300.7_AMMONIUM (TF); ~~Sulfide - 9215 cat 2/10/11~~ Total Cyanide - 9014 (TF); GAMMA ENERGY ANALYSIS (TF) {Antimony-125, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Thorium-228, Thorium-234}; GAMMA ENERGY ANALYSIS (TF); Americium-241 (TF); I129_SEP_GEA (TF); C-14; CURIUM {Curium-242, Curium-243/244}; H3 - TRITIUM; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Nickel-63 (TF); Selenium-79 (TF); Strontium-89,90 -- Total Sr; Actinides ICPMS (TF) {Neptunium-237, Thorium-230, Thorium-232, Uranium-233, Uranium-234, Uranium-235, Uranium-236, Uranium-238}; RADISO_ICPMS (TF) {Technetium-99, Tin-126}; Conductivity - 9050_WE; Percent Solids (TF); Percent Water (TF); PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};

CAT 2/10/11

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-024	PAGE 1 OF 1
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 I010	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-00004	**ACTUAL SAMPLE DEPTH** 222.8 - ~~224.8~~ 224.8	**COA** BC 4-4-11 N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Liner
NO. OF CONTAINER(S)	1
VOLUME	160g
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B2C1L9	SOIL	4-4-11	1020	✓
B2C1M0	SOIL	4-4-11	1020	✓
B2C1M1	SOIL	4-4-11	1020	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Campbell Campbell	4-4-11 1100	RHStaggs RHStaggs	4.4.11 1100
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
Scott Snook 4-4-11
**LABORATORY
Only samples from intervals within the top 15 ft. will be analyzed for pesticides, and PCBs.
After bulk density on liners is performed, the liners shall be composited.
(1) Bulk Density - D2937 (TF) {Bulk density - wet};

Temp blank
0°C Related
ATL

GRP # 20110264
SAM # S11V004330 Liner A
4331 Liner B
4332 Liner C

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

Appendix 5

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10 Effective Date: 08/16/10

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: C Farm C8100			DATA PACKAGE: VSR12-023		
VALIDATOR: Eyda Hergenreder		LAB: 222-S Laboratory		DATE: 09-14-2012	
			SDG: 20110264		

ANALYSES PERFORMED					
Anions/IC X	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia X	BOD/COD	Chloride	Chromium-VI	pH X	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide X	

SAMPLES/MATRIX Soil samples

SDG 20110264: B2B1L6, B2C1N1

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?..... (Yes) No N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... (Yes) No N/A

Laboratory blank results acceptable? ..... Yes (No) N/A

Field blanks analyzed? (Levels C, D, E) ..... Yes (No) N/A

Field blank results acceptable? (Levels C, D, E) ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments:
Sample B2B1L6: MB (batch 26531) formate 0.0206 ug/ml; chloride 0.0207 ug/ml; nitrite 0.0637; sulfate 0.035 ug/ml
Sample B2C1N1: MB (batch 26818) nitrite 0.0518 ug/ml

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed?	(Yes)	No	N/A
Spike recoveries acceptable?	Yes	(No)	N/A
Spike standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
Spike standards expired? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	Yes	(No)	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	No	(N/A)
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments:

Batch 26531: phosphate MS 70%
Batch 26818: phosphate MS 74%

Matrix-matched LCS was not included with the CN analysis associated with sample B2B1L6

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A

Duplicate results acceptable? ..... (Yes) No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

Field duplicate RPD values acceptable? ..... Yes No (N/A)

Field split RPD values acceptable? ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A

Sample holding times acceptable? ..... Yes (No) N/A

Comments:

Sample B2B1L6 was analyzed 1 day past the 14 day HT for CN.

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E)..... Yes No (N/A)

Detection limits meet RDL?..... (Yes) No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No (N/A)

Comments: None

Comments (attach additional sheets as necessary):

More

Appendix 6

Additional Documentation Requested By Client

LABCORE Completed Batch Report for Batch# 00025867

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1102250006	CCV				
2	S1102250007	CCB				
3	S1102250008	LLS				
4	S1102250002	BLNK-PREP				
5	S1102250001	LCS				
6	S11V004107	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
7	S1102250003	DUP	S11V004107			
8	S1102250004	SPK-PREDIG	S11V004107			
9	S1102250010	SPK-IC	S11V004107			
10	S11V004124	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
11	S1102250012	CCV				
12	S1102250013	CCB				

LABCORE Completed Batch Report for Batch# 00025867

Analyst: LaPlant, Kelsey **Book#:** 47N29F

Instrument: IC-5 (IC-NH4)

Method: IC - NH4, LA-533-101 Rev/Mod Q-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00025866

Batch Comment:

C-Farm WMA C 2011-C8100 NH4 DIST INSTRUMENT BATCH. KJL.

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	CCV	S1102250006		0 0			Ammonium	LIQUID	2.970297	2.9643E+00			0.012	ug/mL	99.799	% Recovery	
Sample Sequence 2																	
2	CCB	S1102250007		0 0			Ammonium	LIQUID		<1.2000E-02			0.012	ug/mL			
Sample Sequence 3																	
3	LLS	S1102250008		0 0			Ammonium	LIQUID	.117648	1.1151E-01			0.012	ug/mL	94.783	% Recovery	
Sample Sequence 4																	
4	BLNK-PREP	S1102250002		0 0	S		Ammonium	LIQUID		<1.2000E-01			0.12	ug/mL			
Sample Sequence 5																	
5	LCS	S1102250001		0 0	S		Ammonium	LIQUID	300	3.0876E+02			0.6	ug/mL	102.92	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004107		0 0	S		Ammonium	SOLID	N/A	3.8228E+00			0.47151	ug/g			J
Sample Sequence 7																	
7	DUP	S1102250003	S11V004107	0 0	S		Ammonium	SOLID	3.8228E+00	3.2203E+00			0.47885	ug/g	17.109	% RPD	
Sample Sequence 8																	
8	SPK-PREDIG	S1102250004	S11V004107	0 0	S		Ammonium	SOLID	119.5695	1.2180E+02			0.47828	ug/g	98.665	% Recovery	
Sample Sequence 9																	
9	SPK-IC	S1102250010	S11V004107	0 0			Ammonium	SOLID	300	3.1196E+00			0.012	ug/g	100.74	% Recovery	
Sample Sequence 10																	
10	SAMPLE	S11V004124		0 0	S		Ammonium	SOLID	N/A	2.7731E+00			0.47525	ug/g			J
Sample Sequence 11																	
11	CCV	S1102250012		0 0			Ammonium	LIQUID	2.970297	2.9963E+00			0.012	ug/mL	100.88	% Recovery	
Sample Sequence 12																	
12	CCB	S1102250013		0 0			Ammonium	LIQUID		<1.2000E-02			0.012	ug/mL			

Comments Section:

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026815

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104060070	CCV				
2	S1104060071	CCB				
3	S1104060072	LLS				
4	S1104060066	BLNK-PREP				
5	S1104060065	LCS				
6	S11V004342	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
7	S1104060067	DUP	S11V004342			
8	S1104060068	SPK-PREDIG	S11V004342			
9	S1104060078	SPK-IC	S11V004342			
10	S1104060076	CCV				
11	S1104060077	CCB				

LABCORE Completed Batch Report for Batch# 00026815

Analyst: Black, Amanda **Book#:** 55N29B

Instrument: IC-5 (IC-NH4)

Method: IC - NH4, LA-533-101 Rev/Mod Q-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00026812

Batch Comment:

IC Inst Run for C-Farm WMC 2011 C8100. LND

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	CCV	S1104060070		0 0			Ammonium	LIQUID	3	2.9544E+00			0.012	ug/mL	98.48	% Recovery	
Sample Sequence 2																	
2	CCB	S1104060071		0 0			Ammonium	LIQUID		<1.2000E-02			0.012	ug/mL			
Sample Sequence 3																	
3	LLS	S1104060072		0 0			Ammonium	LIQUID	.12	1.2171E-01			0.012	ug/mL	101.42	% Recovery	
Sample Sequence 4																	
4	BLNK-PREP	S1104060066		0 0	S		Ammonium	LIQUID		<1.2000E-01			0.12	ug/mL			
Sample Sequence 5																	
5	LCS	S1104060065		0 0	S		Ammonium	LIQUID	6	5.8248E+00			0.012	ug/mL	97.08	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004342		0 0	S		Ammonium	SOLID	N/A	6.6897E+00			0.48173	ug/g			
Sample Sequence 7																	
7	DUP	S1104060067	S11V004342	0 0	S		Ammonium	SOLID	6.6897E+00	5.1666E+00			0.48058	ug/g	25.693	% RPD	
Sample Sequence 8																	
8	SPK-PREDIG	S1104060068	S11V004342	0 0	S		Ammonium	SOLID	118.0173	1.1933E+02			0.47207	ug/g	95.446	% Recovery	
Sample Sequence 9																	
9	SPK-IC	S1104060078	S11V004342	0 0			Ammonium	LIQUID	303	3.0501E+00			0.012	ug/mL	96.114	% Recovery	
Sample Sequence 10																	
10	CCV	S1104060076		0 0			Ammonium	LIQUID	3	2.9583E+00			0.012	ug/mL	98.61	% Recovery	
Sample Sequence 11																	
11	CCB	S1104060077		0 0			Ammonium	LIQUID		<1.2000E-02			0.012	ug/mL			

Comments Section:

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026248

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1103150107	ICV				
2	S1103150101	ICB				
3	S11V004098	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1103150103	DUP	S11V004098			
5	S1103150104	SPK	S11V004098			
6	S11V004115	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
7	S11V004136	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
8	S1103150105	CCV				
9	S1103150106	CCB				

LABCORE Completed Batch Report for Batch# 00026248

Analyst: Mull, Bryanna

Book#:

Instrument: CARY 50-2

Method: CN - EDTA, LA-695-103 Rev/Mod J-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1103150107		0 0			Cyanide	LIQUID	.197	1.8115E-01			0.037	ug/mL	91.954	% Recovery	
Sample Sequence 2																	
2	ICB	S1103150101		0 0			Cyanide	LIQUID		<3.7000E-02			0.037	ug/mL			
Sample Sequence 3																	
3	SAMPLE	S11V004098		0 0			Cyanide	SOLID	N/A	<4.8000E-01			0.48	ug/g			U
Sample Sequence 4																	
4	DUP	S1103150103	S11V004098	0 0			Cyanide	SOLID	<4.8000E-01	<4.8000E-01			0.48	ug/g			
Sample Sequence 5																	
5	SPK	S1103150104	S11V004098	0 0			Cyanide	SOLID	1.292220753	1.1334E+00			0.48	ug/g	87.713	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004115		0 0			Cyanide	SOLID	N/A	<4.8000E-01			0.48	ug/g			U
Sample Sequence 7																	
7	SAMPLE	S11V004136		0 0			Cyanide	SOLID	N/A	<4.8000E-01			0.48	ug/g			U
Sample Sequence 8																	
8	CCV	S1103150105		0 0			Cyanide	LIQUID	.197	1.7956E-01			0.037	ug/mL	91.149	% Recovery	
Sample Sequence 9																	
9	CCB	S1103150106		0 0			Cyanide	LIQUID		<3.7000E-02			0.037	ug/mL			

Comments Section:

Comments for sample: S11V004098, test: CN - EDTA, constituent: Cyanide

Procedure Deviation: An LLS was not analyzed with this batch but a calibration was analyzed within 24 hours before analysis.

Comments for sample: S11V004115, test: CN - EDTA, constituent: Cyanide

Procedure Deviation: An LLS was not analyzed with this batch but a calibration was analyzed within 24 hours before analysis.

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00025910

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1103020001	CCVPH				
2	S10V003665	SAMPLE		20101223	B29J63	BY Barrier East
3	S1103010003	DUP	S10V003665			
4	S11V004098	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
5	S1103010035	DUP	S11V004098			
6	S11V004115	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
7	S11V004136	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
8	S1103010004	CCVPH				

LABCORE Completed Batch Report for Batch# 00025910

Analyst: Boisoneau, Ryan **Book#:**

Instrument: PH02

Method: PH SOLID, LA-212-105 Rev/Mod H-0

Specification: BY Barrier East, C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

pH SOLID ON BY BARRIER EAST AND C-FARM. RJB

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	CCVPH	S1103020001		0 0			pH	LIQUID	8	8.08			0.01	pH			
Sample Sequence 2																	
2	SAMPLE	S10V003665		0 0			pH	SOLID	N/A	8.58			0.01	pH			
Sample Sequence 3																	
3	DUP	S1103010003	S10V003665	0 0			pH	SOLID	8.58	8.48			0.01	pH	1.1723	% RPD	
Sample Sequence 4																	
4	SAMPLE	S11V004098		0 0			pH	SOLID	N/A	8.69			0.01	pH			
Sample Sequence 5																	
5	DUP	S1103010035	S11V004098	0 0			pH	SOLID	8.69	8.62			0.01	pH	0.80878	% RPD	
Sample Sequence 6																	
6	SAMPLE	S11V004115		0 0			pH	SOLID	N/A	8.66			0.01	pH			
Sample Sequence 7																	
7	SAMPLE	S11V004136		0 0			pH	SOLID	N/A	8.85			0.01	pH			
Sample Sequence 8																	
8	CCVPH	S1103010004		0 0			pH	LIQUID	8	8.04			0.01	pH			

Comments Section:

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026325

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1103180018	ICV				
2	S1103180019	ICB				
3	S11V004101	SAMPLE		20110264	B2B1L6 WE	C Farm WMC 2011-C8100
4	S1103180020	DUP	S11V004101			
5	S11V004118	SAMPLE		20110264	B2B1L7 WE	C Farm WMC 2011-C8100
6	S11V004139	SAMPLE		20110264	B2C1M2 WE	C Farm WMC 2011-C8100
7	S11V004160	SAMPLE		20110264	B2C1M3 WE	C Farm WMC 2011-C8100
8	S11V004203	SAMPLE		20110264	B2C1M5 WE	C Farm WMC 2011-C8100
9	S11V004245	SAMPLE		20110264	B2C1M7 WE	C Farm WMC 2011-C8100
10	S1103180021	CCV				
11	S1103180022	CCB				

LABCORE Completed Batch Report for Batch# 00026325

Analyst: Hexum, Troy **Book#:**

Instrument: ORION 3 STAR

Method: CONDUCTIVITY, LA-512-107 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

Conductivity for C-Farm WMC 2011-C8100. AMP

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1103180018		0 0			Conductivity	LIQUID	717.5	708.1			1	uMHO/cm	98.69	% Recovery	
Sample Sequence 2																	
2	ICB	S1103180019		0 0			Conductivity	LIQUID		<1			1	uMHO/cm			
Sample Sequence 3																	
3	SAMPLE	S11V004101		0 0			Conductivity	SOLID	N/A	312.2			1	uMHO/cm			
Sample Sequence 4																	
4	DUP	S1103180020	S11V004101	0 0			Conductivity	SOLID	312.2	296.1			1	uMHO/cm	5.2934	% RPD	
Sample Sequence 5																	
5	SAMPLE	S11V004118		0 0			Conductivity	SOLID	N/A	198.7			1	uMHO/cm			
Sample Sequence 6																	
6	SAMPLE	S11V004139		0 0			Conductivity	SOLID	N/A	225.5			1	uMHO/cm			
Sample Sequence 7																	
7	SAMPLE	S11V004160		0 0			Conductivity	SOLID	N/A	358.5			1	uMHO/cm			
Sample Sequence 8																	
8	SAMPLE	S11V004203		0 0			Conductivity	SOLID	N/A	337.3			1	uMHO/cm			
Sample Sequence 9																	
9	SAMPLE	S11V004245		0 0			Conductivity	SOLID	N/A	189.1			1	uMHO/cm			
Sample Sequence 10																	
10	CCV	S1103180021		0 0			Conductivity	LIQUID	717.5	712.6			1	uMHO/cm	99.317	% Recovery	
Sample Sequence 11																	
11	CCB	S1103180022		0 0			Conductivity	LIQUID		<1			1	uMHO/cm			

Comments Section:

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026531

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1103250108	CCV				
2	S1103250109	CCB				
3	S1103250110	LLS				
4	S1103250101	BLNK-PREP				
5	S1103250114	STD-PREP				
6	S11V004105	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
7	S1103250102	DUP	S11V004105			
8	S1103250115	SPK	S11V004105			
9	S1103250111	SPK-IC	S11V004105			
10	S11V004122	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
11	S11V004143	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
12	S11V004164	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
13	S11V004207	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
14	S11V004249	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
15	S1103250112	CCV				
16	S1103250113	CCB				
17	S1103250117	CCV				
18	S1103250116	CCB				

LABCORE Completed Batch Report for Batch# 00026531

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
3	LLS	S1103250110		0 0			Oxalate	LIQUID	.2625	2.1919E-01			0.0231	ug/mL	83.501	% Recovery	
3	LLS	S1103250110		0 0			Bromide	LIQUID	.3015	2.9944E-01			0.058	ug/mL	99.317	% Recovery	
3	LLS	S1103250110		0 0			Nitrate	LIQUID	.2715	2.3852E-01			0.0208	ug/mL	87.853	% Recovery	
3	LLS	S1103250110		0 0			Phosphate	LIQUID	.264	2.1108E-01			0.0167	ug/mL	79.955	% Recovery	
Sample Sequence 4																	
4	BLNK-PREP	S1103250101		0 0	W		Fluoride	LIQUID		<1.6100E-03			1.61E-03	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Glycolate	LIQUID		<9.3700E-03			9.37E-03	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Acetate	LIQUID		<6.0400E-03			6.04E-03	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Formate	LIQUID		2.0650E-02			4.67E-03	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Chloride	LIQUID		2.0720E-02			9.98E-03	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Nitrite	LIQUID		6.3740E-02			0.0192	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Sulfate	LIQUID		3.5000E-02			0.0187	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Oxalate	LIQUID		<2.3100E-02			0.0231	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Bromide	LIQUID		<5.8000E-02			0.058	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Nitrate	LIQUID		<2.0800E-02			0.0208	ug/mL			
4	BLNK-PREP	S1103250101		0 0	W		Phosphate	LIQUID		<1.6700E-02			0.0167	ug/mL			
Sample Sequence 5																	
5	STD-PREP	S1103250114		0 0			Fluoride	LIQUID	.59	6.1051E-01			1.61E-03	ug/mL	103.48	% Recovery	
5	STD-PREP	S1103250114		0 0			Glycolate	LIQUID	3.8	3.8345E+00			9.37E-03	ug/mL	100.91	% Recovery	
5	STD-PREP	S1103250114		0 0			Acetate	LIQUID	4.5	4.6393E+00			6.04E-03	ug/mL	103.1	% Recovery	
5	STD-PREP	S1103250114		0 0			Formate	LIQUID	4.52	4.6333E+00			4.67E-03	ug/mL	102.51	% Recovery	
5	STD-PREP	S1103250114		0 0			Chloride	LIQUID	.861	8.8172E-01			9.98E-03	ug/mL	102.41	% Recovery	
5	STD-PREP	S1103250114		0 0			Nitrite	LIQUID	5.5	5.5937E+00			0.0192	ug/mL	101.7	% Recovery	
5	STD-PREP	S1103250114		0 0			Sulfate	LIQUID	6.56	6.8622E+00			0.0187	ug/mL	104.61	% Recovery	
5	STD-PREP	S1103250114		0 0			Oxalate	LIQUID	5.25	5.3276E+00			0.0231	ug/mL	101.48	% Recovery	
5	STD-PREP	S1103250114		0 0			Bromide	LIQUID	6.03	6.2272E+00			0.058	ug/mL	103.27	% Recovery	
5	STD-PREP	S1103250114		0 0			Nitrate	LIQUID	5.43	5.5209E+00			0.0208	ug/mL	101.67	% Recovery	
5	STD-PREP	S1103250114		0 0			Phosphate	LIQUID	5.28	5.3897E+00			0.0167	ug/mL	102.08	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004105		0 0	W		Fluoride	SOLID	N/A	5.0249E-01			0.014193	ug/g			
6	SAMPLE	S11V004105		0 0	W		Glycolate	SOLID	N/A	<8.2602E-02			0.082602	ug/g			U
6	SAMPLE	S11V004105		0 0	W		Acetate	SOLID	N/A	3.2245E+00			0.053246	ug/g			
6	SAMPLE	S11V004105		0 0	W		Formate	SOLID	N/A	2.3634E-01			0.041169	ug/g			J
6	SAMPLE	S11V004105		0 0	W		Chloride	SOLID	N/A	3.5447E-01			0.087979	ug/g			B
6	SAMPLE	S11V004105		0 0	W		Nitrite	SOLID	N/A	6.1330E-01			0.16926	ug/g			BJ
6	SAMPLE	S11V004105		0 0	W		Sulfate	SOLID	N/A	2.9421E+00			0.16485	ug/g			
6	SAMPLE	S11V004105		0 0	W		Oxalate	SOLID	N/A	<2.0364E-01			0.20364	ug/g			U
6	SAMPLE	S11V004105		0 0	W		Bromide	SOLID	N/A	<5.1130E-01			0.5113	ug/g			U
6	SAMPLE	S11V004105		0 0	W		Nitrate	SOLID	N/A	3.2439E+00			0.18336	ug/g			
6	SAMPLE	S11V004105		0 0	W		Phosphate	SOLID	N/A	1.7666E+00			0.14722	ug/g			J
Sample Sequence 7																	
7	DUP	S1103250102	S11V004105	0 0	W		Fluoride	SOLID	5.0249E-01	4.3778E-01			0.014108	ug/g	13.763	% RPD	

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LABCORE Completed Batch Report for Batch# 00026531

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
7	DUP	S1103250102	S11V004105	0 0	W		Glycolate	SOLID	<8.2602E-02	<8.2105E-02			0.082105	ug/g			
7	DUP	S1103250102	S11V004105	0 0	W		Acetate	SOLID	3.2245E+00	<5.2926E-02			0.052926	ug/g			
7	DUP	S1103250102	S11V004105	0 0	W		Formate	SOLID	2.3634E-01	1.8892E-01			0.040921	ug/g	22.304	% RPD	
7	DUP	S1103250102	S11V004105	0 0	W		Chloride	SOLID	3.5447E-01	3.1160E-01			0.08745	ug/g	12.873	% RPD	
7	DUP	S1103250102	S11V004105	0 0	W		Nitrite	SOLID	6.1330E-01	8.5391E-01			0.16824	ug/g	32.799	% RPD	
7	DUP	S1103250102	S11V004105	0 0	W		Sulfate	SOLID	2.9421E+00	2.5657E+00			0.16386	ug/g	13.668	% RPD	
7	DUP	S1103250102	S11V004105	0 0	W		Oxalate	SOLID	<2.0364E-01	<2.0241E-01			0.20241	ug/g			
7	DUP	S1103250102	S11V004105	0 0	W		Bromide	SOLID	<5.1130E-01	<5.0823E-01			0.50823	ug/g			
7	DUP	S1103250102	S11V004105	0 0	W		Nitrate	SOLID	3.2439E+00	3.0124E+00			0.18226	ug/g	7.4019	% RPD	
7	DUP	S1103250102	S11V004105	0 0	W		Phosphate	SOLID	1.7666E+00	1.5339E+00			0.14633	ug/g	14.103	% RPD	
Sample Sequence 8																	
8	SPK	S1103250115	S11V004105	0 0			Fluoride	SOLID	.59	6.2725E-01			1.61E-03	ug/g	96.653	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Glycolate	SOLID	3.8	3.6954E+00			9.37E-03	ug/g	97.249	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Acetate	SOLID	4.5	4.5633E+00			6.04E-03	ug/g	93.278	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Formate	SOLID	4.52	4.4644E+00			4.67E-03	ug/g	98.177	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Chloride	SOLID	.861	9.0524E-01			9.98E-03	ug/g	100.47	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Nitrite	SOLID	5.5	5.8840E+00			0.0192	ug/g	105.72	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Sulfate	SOLID	6.56	6.9823E+00			0.0187	ug/g	101.35	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Oxalate	SOLID	5.25	4.9528E+00			0.0231	ug/g	94.339	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Bromide	SOLID	6.03	6.0272E+00			0.058	ug/g	99.954	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Nitrate	SOLID	5.43	5.9346E+00			0.0208	ug/g	102.52	% Recovery	
8	SPK	S1103250115	S11V004105	0 0			Phosphate	SOLID	5.28	3.8728E+00			0.0167	ug/g	69.552	% Recovery	
Sample Sequence 9																	
9	SPK-IC	S1103250111	S11V004105	0 0			Fluoride	SOLID	58.415841	6.9026E-01			1.61E-03	ug/g	108.41	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Glycolate	SOLID	376.23762	3.8871E+00			9.37E-03	ug/g	103.31	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Acetate	SOLID	445.54455	5.0660E+00			6.04E-03	ug/g	105.49	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Formate	SOLID	447.524748	4.7292E+00			4.67E-03	ug/g	105.07	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Chloride	SOLID	85.2475239	9.4856E-01			9.98E-03	ug/g	106.55	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Nitrite	SOLID	544.55445	5.6428E+00			0.0192	ug/g	102.34	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Sulfate	SOLID	649.504944	7.2639E+00			0.0187	ug/g	106.7	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Oxalate	SOLID	519.801975	5.4134E+00			0.0231	ug/g	104.14	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Bromide	SOLID	597.029697	6.3153E+00			0.058	ug/g	105.78	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Nitrate	SOLID	537.623757	6.0206E+00			0.0208	ug/g	105.14	% Recovery	
9	SPK-IC	S1103250111	S11V004105	0 0			Phosphate	SOLID	522.772272	5.6821E+00			0.0167	ug/g	104.86	% Recovery	
Sample Sequence 10																	
10	SAMPLE	S11V004122		0 0	W		Fluoride	SOLID	N/A	4.5901E-01			0.014378	ug/g			
10	SAMPLE	S11V004122		0 0	W		Glycolate	SOLID	N/A	<8.3676E-02			0.083676	ug/g			U
10	SAMPLE	S11V004122		0 0	W		Acetate	SOLID	N/A	1.7423E-01			0.053938	ug/g			J
10	SAMPLE	S11V004122		0 0	W		Formate	SOLID	N/A	2.1397E-01			0.041704	ug/g			BJ
10	SAMPLE	S11V004122		0 0	W		Chloride	SOLID	N/A	2.9353E-01			0.089123	ug/g			BJ
10	SAMPLE	S11V004122		0 0	W		Nitrite	SOLID	N/A	1.5481E+00			0.17146	ug/g			BJ
10	SAMPLE	S11V004122		0 0	W		Sulfate	SOLID	N/A	2.7128E+00			0.16699	ug/g			

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LABCORE Completed Batch Report for Batch# 00026531

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
10	SAMPLE	S11V004122		0 0	W		Oxalate	SOLID	N/A	<2.0629E-01			0.20629	ug/g			U
10	SAMPLE	S11V004122		0 0	W		Bromide	SOLID	N/A	<5.1795E-01			0.51795	ug/g			U
10	SAMPLE	S11V004122		0 0	W		Nitrate	SOLID	N/A	3.0468E+00			0.18575	ug/g			
10	SAMPLE	S11V004122		0 0	W		Phosphate	SOLID	N/A	1.5637E+00			0.14913	ug/g			J
Sample Sequence 11																	
11	SAMPLE	S11V004143		0 0	W		Fluoride	SOLID	N/A	1.0409E+00			0.014851	ug/g			
11	SAMPLE	S11V004143		0 0	W		Glycolate	SOLID	N/A	<8.6431E-02			0.086431	ug/g			U
11	SAMPLE	S11V004143		0 0	W		Acetate	SOLID	N/A	2.7127E+00			0.055714	ug/g			
11	SAMPLE	S11V004143		0 0	W		Formate	SOLID	N/A	3.8686E-01			0.043077	ug/g			BJ
11	SAMPLE	S11V004143		0 0	W		Chloride	SOLID	N/A	6.7669E-01			0.092058	ug/g			J
11	SAMPLE	S11V004143		0 0	W		Nitrite	SOLID	N/A	2.5037E+00			0.17711	ug/g			B
11	SAMPLE	S11V004143		0 0	W		Sulfate	SOLID	N/A	6.6150E+00			0.17249	ug/g			
11	SAMPLE	S11V004143		0 0	W		Oxalate	SOLID	N/A	<2.1308E-01			0.21308	ug/g			U
11	SAMPLE	S11V004143		0 0	W		Bromide	SOLID	N/A	<5.3501E-01			0.53501	ug/g			U
11	SAMPLE	S11V004143		0 0	W		Nitrate	SOLID	N/A	9.2327E+00			0.19186	ug/g			
11	SAMPLE	S11V004143		0 0	W		Phosphate	SOLID	N/A	1.2828E+00			0.15404	ug/g			J
Sample Sequence 12																	
12	SAMPLE	S11V004164		0 0	W		Fluoride	SOLID	N/A	1.5313E+00			0.014221	ug/g			
12	SAMPLE	S11V004164		0 0	W		Glycolate	SOLID	N/A	<8.2762E-02			0.082762	ug/g			U
12	SAMPLE	S11V004164		0 0	W		Acetate	SOLID	N/A	4.1440E+00			0.053349	ug/g			
12	SAMPLE	S11V004164		0 0	W		Formate	SOLID	N/A	8.1923E-01			0.041249	ug/g			BJ
12	SAMPLE	S11V004164		0 0	W		Chloride	SOLID	N/A	3.1395E+00			0.08815	ug/g			
12	SAMPLE	S11V004164		0 0	W		Nitrite	SOLID	N/A	1.2182E+00			0.16959	ug/g			BJ
12	SAMPLE	S11V004164		0 0	W		Sulfate	SOLID	N/A	4.4054E+01			0.16517	ug/g			
12	SAMPLE	S11V004164		0 0	W		Oxalate	SOLID	N/A	1.9409E+00			0.20403	ug/g			
12	SAMPLE	S11V004164		0 0	W		Bromide	SOLID	N/A	<5.1230E-01			0.5123	ug/g			U
12	SAMPLE	S11V004164		0 0	W		Nitrate	SOLID	N/A	8.9200E+00			0.18372	ug/g			
12	SAMPLE	S11V004164		0 0	W		Phosphate	SOLID	N/A	5.8163E-01			0.14751	ug/g			J
Sample Sequence 13																	
13	SAMPLE	S11V004207		0 0	W		Fluoride	SOLID	N/A	1.5521E+00			0.014282	ug/g			
13	SAMPLE	S11V004207		0 0	W		Glycolate	SOLID	N/A	<8.3120E-02			0.08312	ug/g			U
13	SAMPLE	S11V004207		0 0	W		Acetate	SOLID	N/A	8.3817E+00			0.05358	ug/g			
13	SAMPLE	S11V004207		0 0	W		Formate	SOLID	N/A	4.2953E-01			0.041427	ug/g			BJ
13	SAMPLE	S11V004207		0 0	W		Chloride	SOLID	N/A	8.6385E-01			0.088532	ug/g			
13	SAMPLE	S11V004207		0 0	W		Nitrite	SOLID	N/A	8.1258E-01			0.17032	ug/g			BJ
13	SAMPLE	S11V004207		0 0	W		Sulfate	SOLID	N/A	2.3907E+01			0.16589	ug/g			
13	SAMPLE	S11V004207		0 0	W		Oxalate	SOLID	N/A	<2.0492E-01			0.20492	ug/g			U
13	SAMPLE	S11V004207		0 0	W		Bromide	SOLID	N/A	<5.1451E-01			0.51451	ug/g			U
13	SAMPLE	S11V004207		0 0	W		Nitrate	SOLID	N/A	1.6794E+01			0.18451	ug/g			
13	SAMPLE	S11V004207		0 0	W		Phosphate	SOLID	N/A	3.2884E+00			0.14814	ug/g			
Sample Sequence 14																	
14	SAMPLE	S11V004249		0 0	W		Fluoride	SOLID	N/A	7.9783E-01			0.014575	ug/g			

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Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
14	SAMPLE	S11V004249		0 0	W		Glycolate	SOLID	N/A	<8.4826E-02			0.084826	ug/g			U
14	SAMPLE	S11V004249		0 0	W		Acetate	SOLID	N/A	4.0421E-01			0.054679	ug/g			J
14	SAMPLE	S11V004249		0 0	W		Formate	SOLID	N/A	1.3205E+00			0.042277	ug/g			J
14	SAMPLE	S11V004249		0 0	W		Chloride	SOLID	N/A	9.0529E-01			0.090348	ug/g			
14	SAMPLE	S11V004249		0 0	W		Nitrite	SOLID	N/A	1.8825E+00			0.17382	ug/g			BJ
14	SAMPLE	S11V004249		0 0	W		Sulfate	SOLID	N/A	1.9677E+01			0.16929	ug/g			
14	SAMPLE	S11V004249		0 0	W		Oxalate	SOLID	N/A	<2.0912E-01			0.20912	ug/g			U
14	SAMPLE	S11V004249		0 0	W		Bromide	SOLID	N/A	<5.2507E-01			0.52507	ug/g			U
14	SAMPLE	S11V004249		0 0	W		Nitrate	SOLID	N/A	4.7690E+00			0.1883	ug/g			
14	SAMPLE	S11V004249		0 0	W		Phosphate	SOLID	N/A	<1.5118E-01			0.15118	ug/g			U
Sample Sequence 15																	
15	CCV	S1103250112		0 0			Fluoride	LIQUID	.59	6.0691E-01			1.61E-03	ug/mL	102.87	% Recovery	
15	CCV	S1103250112		0 0			Glycolate	LIQUID	3.8	3.7976E+00			9.37E-03	ug/mL	99.936	% Recovery	
15	CCV	S1103250112		0 0			Acetate	LIQUID	4.5	4.6071E+00			6.04E-03	ug/mL	102.38	% Recovery	
15	CCV	S1103250112		0 0			Formate	LIQUID	4.52	4.5687E+00			4.67E-03	ug/mL	101.08	% Recovery	
15	CCV	S1103250112		0 0			Chloride	LIQUID	.861	8.7344E-01			9.98E-03	ug/mL	101.44	% Recovery	
15	CCV	S1103250112		0 0			Nitrite	LIQUID	5.5	5.5021E+00			0.0192	ug/mL	100.04	% Recovery	
15	CCV	S1103250112		0 0			Sulfate	LIQUID	6.56	6.7732E+00			0.0187	ug/mL	103.25	% Recovery	
15	CCV	S1103250112		0 0			Oxalate	LIQUID	5.25	5.2755E+00			0.0231	ug/mL	100.49	% Recovery	
15	CCV	S1103250112		0 0			Bromide	LIQUID	6.03	6.1655E+00			0.058	ug/mL	102.25	% Recovery	
15	CCV	S1103250112		0 0			Nitrate	LIQUID	5.43	5.4742E+00			0.0208	ug/mL	100.81	% Recovery	
15	CCV	S1103250112		0 0			Phosphate	LIQUID	5.28	5.3529E+00			0.0167	ug/mL	101.38	% Recovery	
Sample Sequence 16																	
16	CCB	S1103250113		0 0			Fluoride	LIQUID		<1.6100E-03			1.61E-03	ug/mL			
16	CCB	S1103250113		0 0			Glycolate	LIQUID		<9.3700E-03			9.37E-03	ug/mL			
16	CCB	S1103250113		0 0			Acetate	LIQUID		<6.0400E-03			6.04E-03	ug/mL			
16	CCB	S1103250113		0 0			Formate	LIQUID		<4.6700E-03			4.67E-03	ug/mL			
16	CCB	S1103250113		0 0			Chloride	LIQUID		<9.9800E-03			9.98E-03	ug/mL			
16	CCB	S1103250113		0 0			Nitrite	LIQUID		<1.9200E-02			0.0192	ug/mL			
16	CCB	S1103250113		0 0			Sulfate	LIQUID		<1.8700E-02			0.0187	ug/mL			
16	CCB	S1103250113		0 0			Oxalate	LIQUID		<2.3100E-02			0.0231	ug/mL			
16	CCB	S1103250113		0 0			Bromide	LIQUID		<5.8000E-02			0.058	ug/mL			
16	CCB	S1103250113		0 0			Nitrate	LIQUID		<2.0800E-02			0.0208	ug/mL			
16	CCB	S1103250113		0 0			Phosphate	LIQUID		<1.6700E-02			0.0167	ug/mL			
Sample Sequence 17																	
17	CCV	S1103250117		0 0			Fluoride	LIQUID	.59	6.0982E-01			1.61E-03	ug/mL	103.36	% Recovery	
17	CCV	S1103250117		0 0			Glycolate	LIQUID	3.8	3.7889E+00			9.37E-03	ug/mL	99.708	% Recovery	
17	CCV	S1103250117		0 0			Acetate	LIQUID	4.5	4.6556E+00			6.04E-03	ug/mL	103.46	% Recovery	
17	CCV	S1103250117		0 0			Formate	LIQUID	4.52	4.6283E+00			4.67E-03	ug/mL	102.4	% Recovery	
17	CCV	S1103250117		0 0			Chloride	LIQUID	.861	8.7568E-01			9.98E-03	ug/mL	101.7	% Recovery	
17	CCV	S1103250117		0 0			Nitrite	LIQUID	5.5	5.5032E+00			0.0192	ug/mL	100.06	% Recovery	
17	CCV	S1103250117		0 0			Sulfate	LIQUID	6.56	6.7991E+00			0.0187	ug/mL	103.64	% Recovery	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026824

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104060101	LCS				
2	S1104060102	ICB				
3	S1104060103	LLS				
4	S11V004334	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
5	S1104060104	DUP	S11V004334			
6	S1104060105	SPK	S11V004334			
7	S1104060107	CCV				
8	S1104060108	CCB				

LABCORE Completed Batch Report for Batch# 00026824

Analyst: Mull, Bryanna

Book#:

Instrument: CARY 50-2

Method: CN - EDTA, LA-695-103 Rev/Mod J-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

C FARM Solids Cyanide

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	LCS	S1104060101		0 0			Cyanide	LIQUID	.1994	1.9530E-01			0.037	ug/mL	97.944	% Recovery	
Sample Sequence 2																	
2	ICB	S1104060102		0 0			Cyanide	LIQUID		<3.7000E-02			0.037	ug/mL			
Sample Sequence 3																	
3	LLS	S1104060103		0 0			Cyanide	LIQUID	.0394	4.1150E-02			0.037	ug/mL	104.44	% Recovery	
Sample Sequence 4																	
4	SAMPLE	S11V004334		0 0			Cyanide	SOLID	N/A	<4.7900E-01			0.479	ug/g			U
Sample Sequence 5																	
5	DUP	S1104060104	S11V004334	0 0			Cyanide	SOLID	<4.7900E-01	<4.8000E-01			0.48	ug/g			
Sample Sequence 6																	
6	SPK	S1104060105	S11V004334	0 0			Cyanide	SOLID	1.278291	1.2523E+00			0.48	ug/g	97.97	% Recovery	
Sample Sequence 7																	
7	CCV	S1104060107		0 0			Cyanide	LIQUID	.1994	1.9130E-01			0.037	ug/mL	95.938	% Recovery	
Sample Sequence 8																	
8	CCB	S1104060108		0 0			Cyanide	LIQUID		<3.7000E-02			0.037	ug/mL			

Comments Section:

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026757

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104050052	ICVPH				
2	S11V004334	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
3	S1104050054	DUP	S11V004334			
4	S1104050055	CCVPH				

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026757

Analyst: Purinton, Tony **Book#:**

Instrument: PH02

Method: PH SOLID, LA-212-105 Rev/Mod H-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

Ph for CFarm Vadose adp

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICVPH	S1104050052		0 0			pH	LIQUID	8	8			0.01	pH			
Sample Sequence 2																	
2	SAMPLE	S11V004334		0 0			pH	SOLID	N/A	8.75			0.01	pH			
Sample Sequence 3																	
3	DUP	S1104050054	S11V004334	0 0			pH	SOLID	8.75	8.72			0.01	pH	0.34345	% RPD	
Sample Sequence 4																	
4	CCVPH	S1104050055		0 0			pH	LIQUID	8	8			0.01	pH			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00026757

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026817

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104060079	ICV				
2	S1104060080	ICB				
3	S11V004266	SAMPLE		20110264	B2C1M8 WE	C Farm WMC 2011-C8100
4	S1104060081	DUP	S11V004266			
5	S11V004316	SAMPLE		20110264	B2C1N0 WE	C Farm WMC 2011-C8100
6	S1104060082	CCV				
7	S1104060083	CCB				
8	S1104070038	ICV				
9	S1104070037	ICB				
10	S11V004287	SAMPLE		20110264	B2C1M9 WE	C Farm WMC 2011-C8100
11	S1104060084	DUP	S11V004287			
12	S11V004336	SAMPLE		20110264	B2C1N1 WE	C Farm WMC 2011-C8100
13	S1104070036	CCV				
14	S1104070035	CCB				

LABCORE Completed Batch Report for Batch# 00026817

Analyst: Dinh, Liem **Book#:**

Instrument: ORION 3 STAR

Method: CONDUCTIVITY, LA-512-107 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

Conductivity for C-Farm WMC 2011 C8100. LND

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	ICV	S1104060079		0 0			Conductivity	LIQUID	147.5	141.1			0.01	uMHO/cm	95.661	% Recovery	
Sample Sequence 2																	
2	ICB	S1104060080		0 0			Conductivity	LIQUID		0.348			0.01	uMHO/cm			
Sample Sequence 3																	
3	SAMPLE	S11V004266		0 0			Conductivity	SOLID	N/A	194.1			0.01	uMHO/cm			
Sample Sequence 4																	
4	DUP	S1104060081	S11V004266	0 0			Conductivity	SOLID	194.1	191.4			0.01	uMHO/cm	1.4008	% RPD	
Sample Sequence 5																	
5	SAMPLE	S11V004316		0 0			Conductivity	SOLID	N/A	286.2			0.01	uMHO/cm			
Sample Sequence 6																	
6	CCV	S1104060082		0 0			Conductivity	LIQUID	147.5	140.4			0.01	uMHO/cm	95.186	% Recovery	
Sample Sequence 7																	
7	CCB	S1104060083		0 0			Conductivity	LIQUID		0.424			0.01	uMHO/cm			
Sample Sequence 8																	
8	ICV	S1104070038		0 0			Conductivity	LIQUID	1413	1392			0.01	uMHO/cm	98.514	% Recovery	
Sample Sequence 9																	
9	ICB	S1104070037		0 0			Conductivity	LIQUID		<1			1	uMHO/cm			
Sample Sequence 10																	
10	SAMPLE	S11V004287		0 0			Conductivity	SOLID	N/A	353			1	uMHO/cm			
Sample Sequence 11																	
11	DUP	S1104060084	S11V004287	0 0			Conductivity	SOLID	353	347			1	uMHO/cm	1.7143	% RPD	
Sample Sequence 12																	
12	SAMPLE	S11V004336		0 0			Conductivity	SOLID	N/A	370			1	uMHO/cm			
Sample Sequence 13																	
13	CCV	S1104070036		0 0			Conductivity	LIQUID	1413	1374			1	uMHO/cm	97.24	% Recovery	
Sample Sequence 14																	
14	CCB	S1104070035		0 0			Conductivity	LIQUID		<1			1	uMHO/cm			

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LABCORE Completed Batch Report for Batch# 00026818

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104060085	CCV				
2	S1104060086	CCB				
3	S1104060087	LLS				
4	S1104060062	BLNK-PREP				
5	S1104060092	STD-PREP				
6	S11V004270	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
7	S1104060063	DUP	S11V004270			
8	S1104060091	SPK-PREDIG	S11V004270			
9	S1104060088	SPK-IC	S11V004270			
10	S11V004291	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
11	S11V004320	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
12	S11V004340	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100
13	S1104060089	CCV				
14	S1104060090	CCB				

LABCORE Completed Batch Report for Batch# 00026818

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
3	LLS	S1104060087		0 0			Oxalate	LIQUID	.263	2.1476E-01			0.0231	ug/mL	81.658	% Recovery	
3	LLS	S1104060087		0 0			Bromide	LIQUID	.3015	3.1264E-01			0.058	ug/mL	103.69	% Recovery	
3	LLS	S1104060087		0 0			Nitrate	LIQUID	.2715	2.3749E-01			0.0208	ug/mL	87.473	% Recovery	
3	LLS	S1104060087		0 0			Phosphate	LIQUID	.264	2.1841E-01			0.0167	ug/mL	82.731	% Recovery	
Sample Sequence 4																	
4	BLNK-PREP	S1104060062		0 0	W		Fluoride	LIQUID		<1.6100E-03			1.61E-03	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Glycolate	LIQUID		<9.3700E-03			9.37E-03	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Acetate	LIQUID		<6.0400E-03			6.04E-03	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Formate	LIQUID		<4.6700E-03			4.67E-03	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Chloride	LIQUID		<9.9800E-03			9.98E-03	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Nitrite	LIQUID		5.1830E-02			0.0192	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Sulfate	LIQUID		<1.8700E-02			0.0187	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Oxalate	LIQUID		<2.3100E-02			0.0231	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Bromide	LIQUID		<5.8000E-02			0.058	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Nitrate	LIQUID		<2.0800E-02			0.0208	ug/mL			
4	BLNK-PREP	S1104060062		0 0	W		Phosphate	LIQUID		<1.6700E-02			0.0167	ug/mL			
Sample Sequence 5																	
5	STD-PREP	S1104060092		0 0			Fluoride	LIQUID	.59	6.1455E-01			1.61E-03	ug/mL	104.16	% Recovery	
5	STD-PREP	S1104060092		0 0			Glycolate	LIQUID	3.8	3.8394E+00			9.37E-03	ug/mL	101.04	% Recovery	
5	STD-PREP	S1104060092		0 0			Acetate	LIQUID	4.5	4.7098E+00			6.04E-03	ug/mL	104.66	% Recovery	
5	STD-PREP	S1104060092		0 0			Formate	LIQUID	4.52	4.6629E+00			4.67E-03	ug/mL	103.16	% Recovery	
5	STD-PREP	S1104060092		0 0			Chloride	LIQUID	.861	8.9200E-01			9.98E-03	ug/mL	103.6	% Recovery	
5	STD-PREP	S1104060092		0 0			Nitrite	LIQUID	5.5	5.6658E+00			0.0192	ug/mL	103.01	% Recovery	
5	STD-PREP	S1104060092		0 0			Sulfate	LIQUID	6.56	6.8660E+00			0.0187	ug/mL	104.66	% Recovery	
5	STD-PREP	S1104060092		0 0			Oxalate	LIQUID	5.26	5.3271E+00			0.0231	ug/mL	101.28	% Recovery	
5	STD-PREP	S1104060092		0 0			Bromide	LIQUID	6.03	6.2770E+00			0.058	ug/mL	104.1	% Recovery	
5	STD-PREP	S1104060092		0 0			Nitrate	LIQUID	5.43	5.5697E+00			0.0208	ug/mL	102.57	% Recovery	
5	STD-PREP	S1104060092		0 0			Phosphate	LIQUID	5.28	5.4466E+00			0.0167	ug/mL	103.16	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004270		0 0	W		Fluoride	SOLID	N/A	5.2109E-01			0.016038	ug/g			c
6	SAMPLE	S11V004270		0 0	W		Glycolate	SOLID	N/A	<9.3340E-02			0.09334	ug/g			U
6	SAMPLE	S11V004270		0 0	W		Acetate	SOLID	N/A	<6.0168E-02			0.060168	ug/g			U
6	SAMPLE	S11V004270		0 0	W		Formate	SOLID	N/A	1.6576E-01			0.04652	ug/g			J
6	SAMPLE	S11V004270		0 0	W		Chloride	SOLID	N/A	1.1194E+00			0.099416	ug/g			
6	SAMPLE	S11V004270		0 0	W		Nitrite	SOLID	N/A	3.9438E-01			0.19126	ug/g			BJ
6	SAMPLE	S11V004270		0 0	W		Sulfate	SOLID	N/A	3.8295E+01			0.18628	ug/g			
6	SAMPLE	S11V004270		0 0	W		Oxalate	SOLID	N/A	<2.3011E-01			0.23011	ug/g			U
6	SAMPLE	S11V004270		0 0	W		Bromide	SOLID	N/A	<5.7777E-01			0.57777	ug/g			U
6	SAMPLE	S11V004270		0 0	W		Nitrate	SOLID	N/A	4.5584E+00			0.2072	ug/g			
6	SAMPLE	S11V004270		0 0	W		Phosphate	SOLID	N/A	<1.6636E-01			0.16636	ug/g			Ub
Sample Sequence 7																	
7	DUP	S1104060063	S11V004270	0 0	W		Fluoride	SOLID	5.2109E-01	7.2499E-01			0.0161	ug/g	32.726	% RPD	

Units shown for QC (BLK/BKG) may not reflect the actual units.

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LABCORE Completed Batch Report for Batch# 00026818

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
7	DUP	S1104060063	S11V004270	0 0	W		Glycolate	SOLID	<9.3340E-02	<9.3698E-02			0.093698	ug/g			
7	DUP	S1104060063	S11V004270	0 0	W		Acetate	SOLID	<6.0168E-02	3.1279E-01			0.060399	ug/g			
7	DUP	S1104060063	S11V004270	0 0	W		Formate	SOLID	1.6576E-01	2.6099E-01			0.046699	ug/g	44.632	% RPD	
7	DUP	S1104060063	S11V004270	0 0	W		Chloride	SOLID	1.1194E+00	1.1069E+00			0.099798	ug/g	1.1249	% RPD	
7	DUP	S1104060063	S11V004270	0 0	W		Nitrite	SOLID	3.9438E-01	1.6341E+00			0.192	ug/g	122.23	% RPD	
7	DUP	S1104060063	S11V004270	0 0	W		Sulfate	SOLID	3.8295E+01	4.0349E+01			0.187	ug/g	5.2248	% RPD	
7	DUP	S1104060063	S11V004270	0 0	W		Oxalate	SOLID	<2.3011E-01	<2.3100E-01			0.231	ug/g			
7	DUP	S1104060063	S11V004270	0 0	W		Bromide	SOLID	<5.7777E-01	<5.7999E-01			0.57999	ug/g			
7	DUP	S1104060063	S11V004270	0 0	W		Nitrate	SOLID	4.5584E+00	4.9560E+00			0.208	ug/g	8.3579	% RPD	
7	DUP	S1104060063	S11V004270	0 0	W		Phosphate	SOLID	<1.6636E-01	2.7619E-01			0.167	ug/g			
Sample Sequence 8																	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Fluoride	SOLID	5.819111	6.6288E+00			1.61E-03	ug/g	104.96	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Glycolate	SOLID	37.47902	3.7494E+01			9.37E-03	ug/g	100.04	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Acetate	SOLID	44.38305	4.6347E+01			6.04E-03	ug/g	104.42	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Formate	SOLID	44.580308	4.5447E+01			4.67E-03	ug/g	101.57	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Chloride	SOLID	8.4919569	9.9056E+00			9.98E-03	ug/g	103.47	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Nitrite	SOLID	54.24595	5.9282E+01			0.0192	ug/g	108.56	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Sulfate	SOLID	64.700624	9.8732E+01			0.0187	ug/g	93.41	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Oxalate	SOLID	51.878854	5.1710E+01			0.0231	ug/g	99.674	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Bromide	SOLID	59.473287	6.1151E+01			0.058	ug/g	102.82	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Nitrate	SOLID	53.555547	6.0849E+01			0.0208	ug/g	105.11	% Recovery	
8	SPK-PREDIG	S1104060091	S11V004270	0 0			Phosphate	SOLID	52.076112	3.8481E+01			0.0167	ug/g	73.893	% Recovery	
Sample Sequence 9																	
9	SPK-IC	S1104060088	S11V004270	0 0			Fluoride	SOLID	59	6.7470E-01			1.61E-03	ug/g	105.49	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Glycolate	SOLID	380	3.8106E+00			9.37E-03	ug/g	100.28	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Acetate	SOLID	450	4.7230E+00			6.04E-03	ug/g	104.96	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Formate	SOLID	452	4.6371E+00			4.67E-03	ug/g	102.22	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Chloride	SOLID	86.1	9.9836E-01			9.98E-03	ug/g	102.9	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Nitrite	SOLID	550	5.5380E+00			0.0192	ug/g	99.97	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Sulfate	SOLID	656	1.0622E+01			0.0187	ug/g	103.31	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Oxalate	SOLID	526	5.3372E+00			0.0231	ug/g	101.47	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Bromide	SOLID	603	6.2098E+00			0.058	ug/g	102.98	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Nitrate	SOLID	543	5.9805E+00			0.0208	ug/g	101.71	% Recovery	
9	SPK-IC	S1104060088	S11V004270	0 0			Phosphate	SOLID	528	5.3964E+00			0.0167	ug/g	102.2	% Recovery	
Sample Sequence 10																	
10	SAMPLE	S11V004291		0 0	W		Fluoride	SOLID	N/A	1.8825E+00			0.015601	ug/g			c
10	SAMPLE	S11V004291		0 0	W		Glycolate	SOLID	N/A	<9.0798E-02			0.090798	ug/g			U
10	SAMPLE	S11V004291		0 0	W		Acetate	SOLID	N/A	2.4478E-01			0.058529	ug/g			J
10	SAMPLE	S11V004291		0 0	W		Formate	SOLID	N/A	2.4827E-01			0.045254	ug/g			J
10	SAMPLE	S11V004291		0 0	W		Chloride	SOLID	N/A	2.4753E+00			0.096709	ug/g			
10	SAMPLE	S11V004291		0 0	W		Nitrite	SOLID	N/A	2.6524E+00			0.18605	ug/g			
10	SAMPLE	S11V004291		0 0	W		Sulfate	SOLID	N/A	1.1720E+02			0.18121	ug/g			

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00026818

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
10	SAMPLE	S11V004291		0 0	W		Oxalate	SOLID	N/A	<2.2385E-01			0.22385	ug/g			U
10	SAMPLE	S11V004291		0 0	W		Bromide	SOLID	N/A	<5.6204E-01			0.56204	ug/g			U
10	SAMPLE	S11V004291		0 0	W		Nitrate	SOLID	N/A	8.5450E+00			0.20156	ug/g			
10	SAMPLE	S11V004291		0 0	W		Phosphate	SOLID	N/A	5.5157E-01			0.16183	ug/g			Jb
Sample Sequence 11																	
11	SAMPLE	S11V004320		0 0	W		Fluoride	SOLID	N/A	1.1306E+00			0.016068	ug/g			c
11	SAMPLE	S11V004320		0 0	W		Glycolate	SOLID	N/A	<9.3511E-02			0.093511	ug/g			U
11	SAMPLE	S11V004320		0 0	W		Acetate	SOLID	N/A	2.9650E-01			0.060278	ug/g			J
11	SAMPLE	S11V004320		0 0	W		Formate	SOLID	N/A	3.5508E-01			0.046606	ug/g			J
11	SAMPLE	S11V004320		0 0	W		Chloride	SOLID	N/A	7.0792E+00			0.099599	ug/g			
11	SAMPLE	S11V004320		0 0	W		Nitrite	SOLID	N/A	1.6100E+00			0.19161	ug/g			BJ
11	SAMPLE	S11V004320		0 0	W		Sulfate	SOLID	N/A	8.0080E+01			0.18662	ug/g			
11	SAMPLE	S11V004320		0 0	W		Oxalate	SOLID	N/A	2.7934E-01			0.23053	ug/g			J
11	SAMPLE	S11V004320		0 0	W		Bromide	SOLID	N/A	<5.7883E-01			0.57883	ug/g			U
11	SAMPLE	S11V004320		0 0	W		Nitrate	SOLID	N/A	1.8764E+01			0.20758	ug/g			
11	SAMPLE	S11V004320		0 0	W		Phosphate	SOLID	N/A	6.0288E-01			0.16666	ug/g			Jb
Sample Sequence 12																	
12	SAMPLE	S11V004340		0 0	W		Fluoride	SOLID	N/A	1.1377E+00			0.015695	ug/g			c
12	SAMPLE	S11V004340		0 0	W		Glycolate	SOLID	N/A	<9.1342E-02			0.091342	ug/g			U
12	SAMPLE	S11V004340		0 0	W		Acetate	SOLID	N/A	4.9424E-01			0.05888	ug/g			J
12	SAMPLE	S11V004340		0 0	W		Formate	SOLID	N/A	2.7003E-01			0.045525	ug/g			J
12	SAMPLE	S11V004340		0 0	W		Chloride	SOLID	N/A	1.4033E+01			0.097288	ug/g			
12	SAMPLE	S11V004340		0 0	W		Nitrite	SOLID	N/A	4.3468E-01			0.18717	ug/g			BJ
12	SAMPLE	S11V004340		0 0	W		Sulfate	SOLID	N/A	9.5764E+01			0.18229	ug/g			
12	SAMPLE	S11V004340		0 0	W		Oxalate	SOLID	N/A	<2.2519E-01			0.22519	ug/g			U
12	SAMPLE	S11V004340		0 0	W		Bromide	SOLID	N/A	<5.6540E-01			0.5654	ug/g			U
12	SAMPLE	S11V004340		0 0	W		Nitrate	SOLID	N/A	7.5913E+00			0.20276	ug/g			
12	SAMPLE	S11V004340		0 0	W		Phosphate	SOLID	N/A	<1.6280E-01			0.1628	ug/g			Ub
Sample Sequence 13																	
13	CCV	S1104060089		0 0			Fluoride	LIQUID	.59	6.0832E-01			1.61E-03	ug/mL	103.11	% Recovery	
13	CCV	S1104060089		0 0			Glycolate	LIQUID	3.8	3.7970E+00			9.37E-03	ug/mL	99.922	% Recovery	
13	CCV	S1104060089		0 0			Acetate	LIQUID	4.5	4.6743E+00			6.04E-03	ug/mL	103.87	% Recovery	
13	CCV	S1104060089		0 0			Formate	LIQUID	4.52	4.5877E+00			4.67E-03	ug/mL	101.5	% Recovery	
13	CCV	S1104060089		0 0			Chloride	LIQUID	.861	8.7775E-01			9.98E-03	ug/mL	101.95	% Recovery	
13	CCV	S1104060089		0 0			Nitrite	LIQUID	5.5	5.5254E+00			0.0192	ug/mL	100.46	% Recovery	
13	CCV	S1104060089		0 0			Sulfate	LIQUID	6.56	6.7936E+00			0.0187	ug/mL	103.56	% Recovery	
13	CCV	S1104060089		0 0			Oxalate	LIQUID	5.26	5.2846E+00			0.0231	ug/mL	100.47	% Recovery	
13	CCV	S1104060089		0 0			Bromide	LIQUID	6.03	6.2030E+00			0.058	ug/mL	102.87	% Recovery	
13	CCV	S1104060089		0 0			Nitrate	LIQUID	5.43	5.4819E+00			0.0208	ug/mL	100.96	% Recovery	
13	CCV	S1104060089		0 0			Phosphate	LIQUID	5.28	5.3589E+00			0.0167	ug/mL	101.49	% Recovery	
Sample Sequence 14																	
14	CCB	S1104060090		0 0			Fluoride	LIQUID		<1.6100E-03			1.61E-03	ug/mL			

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

Date: 14 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: C Farm C8100
Subject: Radiochemical - Sample Data Group (SDG) 20110264

INTRODUCTION

This memorandum presents the results of data validation for SDG 20110264 prepared by 222-S Laboratory. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2B1L6	02/24/11	Soil	C	Sr-89/90, Cm-243/244, Cm-242, Am-241, Iso-Pu, Sr-89/90, Ni-63, Se-79, C14, H3, Gamma, I-129,
B2C1N1	04/04/11	Soil	C	Sr-89/90, Cm-243/244, Cm-242, Am-241, Iso-Pu, Sr-89/90, Ni-63, Se-79, C14, H3, Gamma, I-129

Data validation was conducted in accordance with the CHPRC validation statement of work and the Field Sampling and Analysis Plan for Waste Management Area C, RPP-PLAN-40564, Rev. 3, (SAP). Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Annotated Laboratory Reports
Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
Appendix 5. Data Validation Supporting Documentation
Appendix 6. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time recorded in the COC was 24 hours; however the maximum holding time for radiochemical analysis is 180 days. Sample preservation required chilling to 6 degrees Celsius.

The samples were analyzed within the prescribed holding time and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the matrix spike sample accuracy limits are 75% to 125% and the laboratory control sample accuracy limits are 80% to 120%.

Matrix Spike (MS) Samples

All MS recoveries were acceptable.

MS analyses are not required for Americium, I-129, Ni-63, Plutonium, Se-79, Sr-89/90 and gamma spectrometry.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable with the following exceptions.

LCS analyses were not performed for Se-79. The Se-79 results for samples B2B1L6 and B2C1N1 were detects and should be qualified as estimates and flagged "J."

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ≤30%. When duplicate RPDs exceed the limits and have associated results <5X the MDCs the precision limits are ones specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDCs were below the CRDLs.

- **Completeness**

SDG 20110264 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates was due to lack of LCS analyses for Se-79.

REFERENCES

GRP-GD-002, Rev. 0, Change 0, *Data Validation for Radiochemical Analyses*, August 2010.

RPP-PLAN-40564, Rev. 3, *Field Sampling and Analysis Plan for Waste Management Area C*, September 2011.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U —** The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.

- **UJ —** The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.

- **J —** Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+ —** Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J- —** Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **UR —** Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R —** Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: 20110264	Reviewer: AQA	Project: C Farm C8100	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Se-79	J	B2B1L6, B2C1N1	Lack of LCS data

Comments: None

Appendix 3

Annotated Laboratory Reports

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2B1L6

Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004098		%WATERA	%WATER-APD	%	n/a	n/a	6.970	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004098		57-12-5	Cyanide	ug/g	92.0	<0.0370	<0.480	<0.480	n/a	n/a	87.7	0.480	n/a	U
S11V004098		WT%SOLID	Weight percent solids	%	n/a	n/a	93.0	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004098		7439-97-6	Mercury	ug/g	97.0	<1.00E-04	0.0104	n/a	n/a	n/a	91.8	9.15E-03	n/a	B
S11V004098		PH	pH	unitless	n/a	n/a	8.69	8.62	8.66	0.809	n/a	0.0100	n/a	
S11V004099		13966-00-2	Potassium-40	uCi/g	n/a	n/a	9.26E-06	9.29E-06	9.28E-06	0.339	n/a	2.39E-06	7.16	
S11V004099		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.47E-08	<8.49E-08	n/a	n/a	n/a	8.47E-08	n/a	U
S11V004099		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.53E-07	<2.25E-07	n/a	n/a	n/a	2.53E-07	n/a	U
S11V004099		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	4.84E-06	6.45E-06	5.64E-06	28.6	n/a	9.82E-08	1.27	
S11V004099		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<2.09E-07	<2.07E-07	n/a	n/a	n/a	2.09E-07	n/a	U
S11V004099		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.50E-07	<1.50E-07	n/a	n/a	n/a	1.50E-07	n/a	U
S11V004099		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.90E-07	<2.85E-07	n/a	n/a	n/a	2.90E-07	n/a	U
S11V004099		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.53E-07	2.57E-07	2.55E-07	1.66	n/a	9.44E-08	10.71	
S11V004099		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.10E-07	6.30E-07	5.70E-07	21.1	n/a	1.51E-07	9.95	
S11V004099		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	9.54E-07	1.19E-06	1.07E-06	22.2	n/a	2.05E-07	8.80	
S11V004099		15067-28-4	Lead-214	uCi/g	n/a	n/a	8.12E-07	9.83E-07	8.98E-07	19.1	n/a	2.13E-07	10.28	
S11V004099		13982-63-3	Radium-226	uCi/g	n/a	n/a	1.88E-06	1.98E-06	1.93E-06	5.01	n/a	1.53E-06	27.51	
S11V004099		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<4.37E-05	<4.51E-05	n/a	n/a	n/a	4.37E-05	n/a	U
S11V004099		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<1.14E-05	<1.16E-05	n/a	n/a	n/a	1.14E-05	43.18	U
S11V004099		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<2.13E-06	<1.81E-06	n/a	n/a	n/a	2.13E-06	n/a	U
S11V004101		CONDUCT	Conductivity	uMHO/cm	98.7	<1.00	312	296	304	5.29	n/a	1.00	n/a	
S11V004101	WV	14133-76-7	Technetium-99	ug/g	100	<6.00E-06	<6.27E-06	<6.29E-06	n/a	n/a	105	6.27E-06	n/a	U
S11V004102	O	12674-11-2	Aroclor 1016	ug/kg	n/a	<19.7	<21.0	n/a	n/a	n/a	n/a	21.0	n/a	U
S11V004102	O	11104-28-2	Aroclor 1221	ug/kg	n/a	<3.26	<3.48	n/a	n/a	n/a	n/a	3.48	n/a	U
S11V004102	O	11141-16-5	Aroclor 1232	ug/kg	n/a	<5.53	<5.90	n/a	n/a	n/a	n/a	5.90	n/a	U
S11V004102	O	53469-21-9	Aroclor 1242	ug/kg	n/a	<13.2	<14.0	n/a	n/a	n/a	n/a	14.0	n/a	U
S11V004102	O	12672-29-6	Aroclor 1248	ug/kg	n/a	<7.45	<7.95	n/a	n/a	n/a	n/a	7.95	n/a	U
S11V004102	O	11097-69-1	Aroclor 1254	ug/kg	94.4	<4.77	<5.09	n/a	n/a	n/a	n/a	5.09	n/a	U
S11V004102	O	11096-82-5	Aroclor 1260	ug/kg	n/a	<7.72	<8.23	n/a	n/a	n/a	n/a	8.23	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
U - Less Than Detection Limit
B - Estimated
B - Blank Contamination
C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

02 - Aug - 2011 16:30:19
DSRHardcopyWOLimits 2.7.26a
DSR.Jar v. 2.7.27

Data Summary Report

Sample Group: 20110264
Core Number: C8100
Customer Sample ID: B2B1L6
Sample Depth: SURFACE

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004106	A	13982-70-2	Uranium-236	ug/g	n/a	<4.00E-06	<3.66E-05	<3.85E-05	n/a	n/a	n/a	3.66E-05	n/a	U
S11V004106	A	13994-20-2	Neptunium-237	ug/g	107	<1.00E-04	<9.15E-04	<9.63E-04	n/a	n/a	107	9.15E-04	n/a	U
S11V004106	A	U-238	Uranium-238	ug/g	109	<5.00E-04	0.646	0.689	0.668	6.52	112	4.57E-03	n/a	
S11V004106	A	7440-22-4	Silver	ug/g	109	<2.00E-03	0.0624	0.0783	0.0704	22.6	102	0.0183	n/a	B
S11V004106	A	7440-38-2	Arsenic	ug/g	94.1	<0.0420	3.27	3.49	3.38	6.74	98.0	0.384	n/a	B
S11V004106	A	7440-43-9	Cadmium	ug/g	107	<6.00E-03	0.102	0.0968	0.0994	5.10	105	0.0549	n/a	B
S11V004106	A	7439-92-1	Lead	ug/g	101	<0.0150	5.29	5.42	5.36	2.47	102	0.137	n/a	
S11V004106	A	7782-49-2	Selenium	ug/g	103	<0.135	<1.23	<1.30	n/a	n/a	101	1.23	n/a	U
S11V004106	A	7440-28-0	Thallium	ug/g	101	<4.00E-03	0.0617	0.0675	0.0646	9.12	101	0.0366	n/a	B
S11V004107	S	14798-03-9	Ammonium	ug/g	103	<0.120	3.82	3.22	3.52	17.1	98.7	0.472	n/a	B
S11V004108	A	14133-76-7	Technetium-99	ug/g	107	<6.00E-05	<5.71E-04	<5.74E-04	n/a	n/a	102	5.71E-04	n/a	U
S11V004109	E	CM-243/244	Curium-243/244	uCi/g	n/a	<4.58E-08	<3.37E-08	<4.15E-08	n/a	n/a	n/a	3.37E-08	n/a	U
S11V004109	E	14596-10-2	Americium-241	uCi/g	103	<5.32E-08	<4.76E-08	<3.63E-08	n/a	n/a	n/a	4.76E-08	n/a	U
S11V004109	E	15510-73-3	Curium-242	uCi/g	n/a	<2.34E-08	<1.16E-08	<1.08E-08	n/a	n/a	n/a	1.16E-08	n/a	U
S11V004109	E	PU-239/240	Plutonium-239/240	uCi/g	107	<6.34E-08	3.78E-08	<5.18E-08	n/a	n/a	n/a	3.71E-08	33.33	
S11V004109	E	13981-16-3	Plutonium-238	uCi/g	n/a	<6.58E-08	<4.04E-08	9.40E-08	6.72E-08	79.7	n/a	4.04E-08	n/a	U
S11V004110	E	SR-89/90	Strontium-89/90	uCi/g	111	<4.70E-07	3.95E-06	3.97E-06	3.96E-06	0.542	n/a	2.22E-07	14.727	
S11V004111	E	13981-37-8	Nickel-63	uCi/g	102	<1.02E-05	<6.24E-06	<5.03E-06	n/a	n/a	n/a	6.24E-06	n/a	U
S11V004112	E	15758-45-9	Selenium-79 J	uCi/g	n/a	4.77E-06	9.19E-06	5.96E-06	7.58E-06	42.6	n/a	1.66E-06	123.242	BE
S11V004113	W	14762-75-5	Carbon-14	uCi/g	92.2	<4.26E-06	<4.23E-06	5.29E-06	n/a	n/a	92.0	4.23E-06	n/a	U
S11V004113	W	10028-17-8	Tritium	uCi/g	99.3	<3.91E-06	<4.08E-06	<2.65E-06	n/a	n/a	102	4.08E-06	n/a	U

NA = Not Analyzed, ND = Not Detected

E - Estimated by Interference
J - Estimated
U - Less Than Detection Limit
B - Estimated
B - Blank Contamination
C - Blank Contamination
N - MS/MSD Outside Range
M - RPD Outside Range
T - MS/MSD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004334		%WATERA	%WATER-APD	%	n/a	n/a	3.870	n/a	n/a	n/a	n/a	0.01000	n/a	
S11V004334		57-12-5	Cyanide	ug/g	97.9	<0.0370	<0.479	<0.480	n/a	n/a	98.0	0.479	n/a	U
S11V004334		WT%SOLID	Weight percent solids	%	n/a	n/a	96.1	n/a	n/a	n/a	n/a	0.0100	n/a	
S11V004334		7439-97-6	Mercury	ug/g	95.0	<1.00E-04	<9.97E-03	n/a	n/a	n/a	n/a	9.97E-03	n/a	U
S11V004334		PH	pH	unitless	n/a	n/a	8.75	8.72	8.74	0.343	n/a	0.0100	n/a	
S11V004335		13966-00-2	Potassium-40	uCi/g	n/a	n/a	1.34E-05	n/a	n/a	n/a	n/a	2.16E-06	4.68	
S11V004335		10198-40-0	Cobalt-60	uCi/g	98.8	<1.71E-07	<8.58E-08	n/a	n/a	n/a	n/a	8.58E-08	n/a	U
S11V004335		14234-35-6	Antimony-125	uCi/g	n/a	<4.59E-07	<2.02E-07	n/a	n/a	n/a	n/a	2.02E-07	n/a	U
S11V004335		10045-97-3	Cesium-137	uCi/g	101	<2.03E-07	<6.60E-08	n/a	n/a	n/a	n/a	6.60E-08	n/a	U
S11V004335		14683-23-9	Europium-152	uCi/g	n/a	<4.23E-07	<1.87E-07	n/a	n/a	n/a	n/a	1.87E-07	n/a	U
S11V004335		15585-10-1	Europium-154	uCi/g	n/a	<2.69E-07	<1.31E-07	n/a	n/a	n/a	n/a	1.31E-07	n/a	U
S11V004335		14391-16-3	Europium-155	uCi/g	n/a	<5.69E-07	<2.49E-07	n/a	n/a	n/a	n/a	2.49E-07	n/a	U
S11V004335		14913-50-9	Thallium-208	uCi/g	n/a	n/a	2.07E-07	n/a	n/a	n/a	n/a	8.95E-08	15.47	
S11V004335		15092-94-1	Lead-212	uCi/g	n/a	n/a	5.67E-07	n/a	n/a	n/a	n/a	1.19E-07	6.51	
S11V004335		14733-03-0	Bismuth-214	uCi/g	n/a	n/a	4.13E-07	n/a	n/a	n/a	n/a	1.90E-07	17.34	
S11V004335		15067-28-4	Lead-214	uCi/g	n/a	n/a	4.09E-07	n/a	n/a	n/a	n/a	1.63E-07	11.50	
S11V004335		13982-63-3	Radium-226	uCi/g	n/a	n/a	<1.39E-06	n/a	n/a	n/a	n/a	1.39E-06	40.38	U
S11V004335		14331-83-0	Actinium-228	uCi/g	n/a	n/a	5.26E-07	n/a	n/a	n/a	n/a	3.37E-07	14.29	
S11V004335		14274-82-9	Thorium-228	uCi/g	n/a	<8.56E-05	<3.92E-05	n/a	n/a	n/a	n/a	3.92E-05	n/a	U
S11V004335		15065-10-8	Thorium-234	uCi/g	n/a	<3.63E-06	<4.16E-06	n/a	n/a	n/a	n/a	4.16E-06	n/a	U
S11V004335		15046-84-1	Iodine-129	uCi/g	104	<2.15E-05	<1.84E-06	n/a	n/a	n/a	n/a	1.84E-06	n/a	U
S11V004336		CONDUCT	Conductivity	uMHO/cm	98.5	<1.00	370	n/a	n/a	n/a	n/a	1.00	n/a	
S11V004336	WV	14133-76-7	Technetium-99	ug/g	99.8	<6.00E-06	<5.76E-06	n/a	n/a	n/a	n/a	5.76E-06	n/a	U
S11V004338	A	7440-36-0	Antimony	ug/g	110	<2.00E-04	0.121	n/a	n/a	n/a	n/a	1.99E-03	n/a	
S11V004338	A	SN-117	Tin-117	ug/g	105	<1.00E-03	0.0324	n/a	n/a	n/a	n/a	9.96E-03	n/a	
S11V004338	A	15832-50-5	Tin-126	ug/g	n/a	<2.00E-05	3.92E-04	n/a	n/a	n/a	n/a	1.99E-04	n/a	E
S11V004339	O	120-82-1	1,2,4-Trichlorobenzene	ug/kg	75.0	<77.4	<72.2	n/a	n/a	n/a	75.6	72.2	n/a	U
S11V004339	O	95-50-1	1,2-Dichlorobenzene	ug/kg	n/a	<101	<93.9	n/a	n/a	n/a	n/a	93.9	n/a	U
S11V004339	O	106-46-7	1,4-Dichlorobenzene	ug/kg	71.9	<113	<106	n/a	n/a	n/a	69.4	106	n/a	U

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C - Blank Contamination
N - MS/MSD Outside Range
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T - MS/MSD Outside Range

EH
09/03/12

Data Summary Report

Sample Group: 20110264

Core Number: C8100

Customer Sample ID: B2C1N1

Sample Depth: 222.8'-224.8'

Sample# R	A#	CAS #	Analyte	Unit	STD %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Cnt Err %	Qual Flags
S11V004341	A	U-238	Uranium-238	ug/g	101	<5.00E-04	0.480	n/a	n/a	n/a	n/a	4.99E-03	n/a	
S11V004341	A	7440-22-4	Silver	ug/g	107	<2.00E-03	0.0507	n/a	n/a	n/a	n/a	0.0199	n/a	B
S11V004341	A	7440-38-2	Arsenic	ug/g	94.1	<0.0420	2.16	n/a	n/a	n/a	n/a	0.419	n/a	B
S11V004341	A	7440-43-9	Cadmium	ug/g	105	<6.00E-03	0.0780	n/a	n/a	n/a	n/a	0.0598	n/a	B
S11V004341	A	7439-92-1	Lead	ug/g	98.5	<0.0150	2.55	n/a	n/a	n/a	n/a	0.150	n/a	
S11V004341	A	7782-49-2	Selenium	ug/g	103	<0.135	<1.35	n/a	n/a	n/a	n/a	1.35	n/a	U
S11V004341	A	7440-28-0	Thallium	ug/g	98.7	<4.00E-03	0.0608	n/a	n/a	n/a	n/a	0.0399	n/a	B
S11V004342	S	14798-03-9	Ammonium	ug/g	97.1	<0.120	6.69	5.17	5.93	25.7	95.4	0.482	n/a	
S11V004343	A	14133-76-7	Technetium-99	ug/g	101	<6.00E-05	<5.94E-04	n/a	n/a	n/a	n/a	5.94E-04	n/a	U
S11V004344	E	CM-243/244	Curium-243/244	uCi/g	n/a	<4.58E-08	<3.45E-08	n/a	n/a	n/a	n/a	3.45E-08	n/a	U
S11V004344	E	14596-10-2	Americium-241	uCi/g	103	<5.32E-08	<4.24E-08	n/a	n/a	n/a	n/a	4.24E-08	n/a	U
S11V004344	E	15510-73-3	Curium-242	uCi/g	n/a	<2.34E-08	<1.01E-08	n/a	n/a	n/a	n/a	1.01E-08	n/a	U
S11V004344	E	PU-239/240	Plutonium-239/240	uCi/g	107	<6.34E-08	4.39E-08	n/a	n/a	n/a	n/a	3.03E-08	44.7	
S11V004344	E	13981-16-3	Plutonium-238	uCi/g	n/a	<6.58E-08	<2.88E-08	n/a	n/a	n/a	n/a	2.88E-08	n/a	U
S11V004345	E	SR-89/90	Strontium-89/90	uCi/g	111	<4.70E-07	<7.35E-07	n/a	n/a	n/a	n/a	7.35E-07	n/a	U
S11V004346	E	13981-37-8	Nickel-63	uCi/g	102	<1.02E-05	<5.03E-06	n/a	n/a	n/a	n/a	5.03E-06	n/a	U
S11V004347	E	15758-45-9	Selenium-79 J	uCi/g	n/a	4.77E-06	1.40E-05	n/a	n/a	n/a	n/a	1.96E-06	2785.151	BE
S11V004348	W	14762-75-5	Carbon-14	uCi/g	92.2	<4.26E-06	<2.65E-06	n/a	n/a	n/a	n/a	2.65E-06	n/a	U
S11V004348	W	10028-17-8	Tritium	uCi/g	99.3	<3.91E-06	<2.61E-06	n/a	n/a	n/a	n/a	2.61E-06	n/a	U

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EH
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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

222-S LABORATORY

FINAL ANALYTICAL REPORT FOR SOIL SAMPLES FROM WASTE MANAGEMENT AREA C, CORE HOLE C8100, IN SUPPORT OF RCRA CLOSURE

1.0 INTRODUCTION

This final report presents the results for the samples taken from C Farm between February 24, 2011 and April 4, 2011. The samples were analyzed in accordance with RPP-PLAN-40564, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* (FSAP), RPP-PLAN-38777, *Sampling and Analysis Plan for Phase 2 Characterization of Vadose Zone Soil in Waste Management Area C* (SAP); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory* (QAPP); SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*; and the additional guidance given by the client's point of contact (POC).

Because the 222-S Laboratory facility was designed to analyze hazardous and complex tank waste samples, most SW-846 test methods performed at the 222-S Laboratory contain deviations that are listed in an appendix in the analytical procedures. All other known deviations or variances from SW-846 are documented in this narrative. The following attachments are included in this report.

Attachment 1 Data Summary Report
Attachment 2 Sample Breakdown Diagrams
Attachment 3 Holding Time Report
Attachment 4 Additional QC Results
Attachment 5 Tentatively Identified Compound (TIC) Report
Attachment 6 Analytical Batch and Laboratory Sample Identification Number Index
Attachment 7 Geological Report with Bulk Density Results
Attachment 8 Characterization Change Notices (CCN), and Correspondence
Attachment 9 Receipt Paperwork

2.0 SAMPLE RECEIPT AND BREAKDOWN

2.1 SAMPLE RECEIPT

A total of two grab samples, ten core intervals, and one equipment blank were received by the 222-S Laboratory between February 24, 2011 and April 4, 2011. The samples were delivered in a cooler with ice. The temperatures of the temperature blanks were measured and recorded on the sample receipt check list and the chain of custody form. All temperature blanks were in compliance with the SW-846-specified preservation temperature of 6 ^{o}C.

2.2 SAMPLE BREAKDOWN

The laboratory received each core interval as three liner samples and one shoe sample when complete core recovery was obtained. The liner samples from each core interval were extruded, described, and composited with the shoe sample by the Washington River Protection Solutions (WRPS) geologist. The WRPS geologist measured the bulk density for core liners that had sufficient recovery (see Attachments 1 and 2) and the percent moisture for all composite samples. The geologist's report is included in Attachment 7. The composite for each core interval was analyzed as described in the SAP. All core intervals had complete recovery except for intervals I002, I003, I004, and I005. These core intervals were composited to form two sample extended intervals: I002+I003 and I004+I005 (see Attachment 2).

3.0 ANALYTICAL RESULTS SUMMARY

The Data Summary Report (Attachment 1) presents the final analytical results for those analytes requested in the SAP. Secondary analytes are reported only if detected. In addition to the required isotopes, all isotopes with positive gamma energy analysis (GEA) results were reported.

The "Det Limit" column in Attachment 1 contains the method detection limit (MDL) for non-radionuclide analyses, or the minimum detectable activity (MDA) for radionuclides.

In Attachment 1, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. For solid samples, the aliquot classes are defined as follows:

"A" indicates samples that were prepared by SW-846 3050B.

"E" indicates samples that were prepared by a strong acid digest.

"S" indicates samples that were prepared by a distillation.

"W" indicates samples that were prepared by a standard water digest.

"O" indicates sample s that were prepared by methylene chloride extraction

Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation or with sample preparation performed as a part of the procedure steps.

Additionally the results for ^{99}Tc with units of pCi/g do not have letter identifier in "A#" column. These analysis were performed on the vadose water digest as required in the FSAP

The "Qual Flags" column in Attachment 1 contains data qualifier flags from FEAD CP-15383, *Common Requirements of the Format for Electronic Analytical Data,* that are defined as follows:

"B" for organic or radiochemistry results is used to indicate that the analyte was detected in the method or preparation blank and in the sample.

"B" for inorganic results is used to indicate that the reported result should be considered an estimate because it is below the quantitation limit. The "B" flag is applied to sample concentrations that are greater than the MDL but less than the quantitation limit.

"C" for inorganic results is used to indicate that the analyte was detected in the method or preparation blank and in the sample, and the result for the blank was greater than or equal to 20% of the reported sample result.

"E" for radiochemistry results is used to indicate an estimated result due to interference.

"N" for all but gas chromatography/mass spectrometry (GC/MS) is used to indicate that the matrix spike (MS) recovery or matrix spike duplicate (MSD) recovery was outside of the specified range in the QAPP or SAP.

"M" for inorganic results is used to indicate that the relative percent difference (RPD) between the sample and the duplicate is greater than 30%.

"U" for all results is used to indicate that the reported result is less than the calculated detection limit.

"T" for CG/MS is used to indicate that the MS or MSD recovery was outside of the specified range in the QAPP or SAP.

Manual calculations using rounded results from the Data Summary Report (Attachment 1) or result calculation forms may differ slightly from the actual results derived from the raw data.

3.1 SAMPLE DIGESTIONS

3.1.1 Radiochemistry Strong Acid Digestion

Strong acid digestions with a hot plate for the heat source were performed using a mixture of concentrated nitric and hydrochloric acids. For each digest, approximately 1 to 10 g of sample was digested depending on the analysis being performed. The digestate was then filtered and diluted to a final volume. This digestion was used for all radiochemical analyses except GEA, ^{3}H, ^{14}C, and ^{129}I. This digestion is a leach of the acid soluble species only.

3.1.2 SW-846 3050B – Acid Digestion-Heating Block

This acid digestion follows SW-846 3050B using a heating block and nitric and hydrochloric acids. An aliquot of approximately 1 to 5 g of each sample was digested. All heating-block digestions were filtered and diluted to a final volume of 50 mL. In soil, this digestion is a leach of the acid soluble species only. This digestion was used for all inductively coupled plasma/mass spectrometry (ICP/MS) and inductively coupled plasma/atomic emission spectroscopy (ICP/AES) analyses except for ^{99}Tc, isotopic tin (^{117}Sn and ^{126}Sn), and antimony analysis. The digestion is modified for the ^{99}Tc analysis by using only nitric acid. This is done to eliminate the possibility of the formation of a zinc-chlorine ion pair of mass 99. The laboratory believes this

ion, when present, is responsible for low level false positives. A separate digestion for antimony and isotopic tin was prepared using additional hydrochloric acid to improve MS recoveries.

3.1.3 Water Digestion

A water digestion or leach was prepared for the anions by ion chromatography (IC), ^{14}C, and ^{3}H analyses using approximately 4 to 10 g of sample. Sonification was used, and the leachate was then filtered. In soil, this digestion is a leach of the water soluble species only.

3.1.4 Vadose Water Digestion

An approximately 65-gram sample of soil was leached using a ratio of one part water to one part soil. To maintain a one-to-one ratio, the amount of water added to the sample was adjusted based on the percent moisture of the soil. The slurries were placed on a shaker table for about 1 hour, were transferred to a centrifuge tube and centrifuged at 4,000 rpm for 30 minutes, and then filtered using a disposable vacuum filtration system. The filtrates were transferred to a clean bottle and then analyzed for ^{99}Tc by ICP/MS. A separate unfiltered aliquot was analyzed for conductivity.

3.2 INORGANIC ANALYSES

3.2.1 Cyanide

The cyanide analysis by distillation and spectrophotometry was performed on the grab samples, liner composite samples, and equipment blank. All analyses met the SW-846 holding time of 14 days except for two samples (S11V004098 and S11V004115), which exceeded the holding time by one day. The samples were originally analyzed within the holding time, but due to low MS and continuing calibration verification standard recoveries, reanalysis was necessary. There was no change in the results from the initial analysis. The laboratory believes there was little or no affect on the data usability from the holding time excursion. There was no required reporting limit in the SAP for cyanide. The target detection limit was met. For all batches except for Batch 26248, there were no notable issues and all QC requirements in the SAP and the QAPP were met.

Batch 26248: The analyst failed to include a low level standard (LLS) with this batch. Since the sample result was below the MDL, all other quality control (QC) parameters were within their prescribed limits, all LLSs in the other 10 batches were in control, and a passing LLS was analyzed with the calibration standards the previous day, it is the laboratory's opinion that the data usability was not affected.

3.2.2 Conductivity

The conductivity analysis was performed on the grab samples and liner composite samples. These analyses met all QC requirements in the SAP and QAPP. The SAP lists an administrative holding time requirement of 28 days. SW-846 9050A lists a holding time of 28 days for aqueous samples only. There is not a promulgated holding time for the conductivity measure of a soil

sample. All conductivity measurements were taken on the Vadose water digest portion within 28 days of sampling. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.2.3 pH Analysis

The pH analysis was performed on the grab samples, liner composite samples, and equipment blank. These analyses met all QC requirements in the SAP and QAPP. The SAP lists a pH holding time requirement of "24 hours or as soon as possible." All solid pH measurements were taken as soon as possible after liner extrusion and compositing of the sample. The sampling-to-analysis time varied from 5.5 hours to 145 hours (see Attachment 3). There is no correlation between pH results and time to analysis, and the results fall within an expected range for alkaline soils. This indicates that the variation in time has no apparent effect on the soil results.

3.2.4 Mercury

Analysis for mercury by cold-vapor/atomic absorption was performed on the grab samples, liner composite samples, and equipment blank. For all samples analyzed, results met the QC requirements in the SAP and QAPP and all analyses met the holding time of 28 days. This analysis met the required and target detection limits.

3.2.5 Ion Chromatography – Ammonium

Analysis for ammonium was performed using a distillation preparation of the grab samples, liner composite samples, and equipment blank. The SAP lists an administrative holding time of 7 days for ammonium in soil. The laboratory believes that after distillation and preservation, the holding time is 28 days based on U.S. Environmental Protection Agency drinking water and waste water holding times for preserved aqueous samples. There is no regulatory holding time limit promulgated for ammonium in soil. All samples met the administrative holding times. These analyses met the target detection limit listed in the SAP. There was no required detection limit in the SAP for ammonium.

Batches 25867, 25918, 26004, 26213, and 26815: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26068: Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the sample at less than five times the blank level. This result has been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26517: The RPD exceeded the required 30%. Since the result for this analyte was below the quantitation limit, the criterion does not apply and reanalysis is not required. Ammonium was detected in the preparation blanks at a level below the quantitation limit and above the MDL. Ammonium was also detected in the samples at less than five times the blank level. The results have been flagged with a "C". Since all results were below the quantitation limit, reanalysis was not required.

3.2.6 Ion Chromatography – Anions and Small Organic Acids

Ion chromatography analysis was performed on a standard water digest of subsamples from the grab samples, liner composite samples, and equipment blank.

The laboratory met all of the required and target detection limits. For the standard water digest, all analyses were within the applicable holding times. The sample spikes used for the standard water digestions are predigestion spikes.

Batch 26180: There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

Batch 26531: The results for chloride, formate, and sulfate in the preparation blank were above the MDL but below the quantitation limit. All sample results that were less than five times the blank result have been flagged with a "C". Since all blank results were below the quantitation limit, the usability of the data was not affected. The RPD for nitrite exceeded the 30% requirement in the SAP. Since the result for this analyte was below the quantitation limit reanalysis was not required.

Batch 26818: The RPD for fluoride exceeded the 30% requirement in the SAP at 33%; since the RPDs for chloride and sulfate met this requirement, the laboratory believes this is due to matrix inhomogeneity. All fluoride results in this batch have been flagged with an "M". The RPDs for nitrite and formate exceeded the 30% requirement in the SAP. Since the results for these analytes were below the quantitation limit reanalysis was not required.

The MS recovery for phosphate exceeded the ±25% requirement in the SAP at 74%. The laboratory believes this was due to matrix interference since all other MS recoveries were between 93% and 105% and phosphate MS recoveries are frequently low in Vadose samples. These exceedances were discussed with the client POC (see Attachment 8).

3.2.7 Inductively Coupled Plasma/Atomic Emission Spectroscopy

The ICP/AES analysis was performed on an acid-digest (SW-846 3050B) of the grab samples, liner composite samples, and equipment blank. The ICP/AES analysis was unable to obtain the required detection limit for antimony, arsenic, cadmium, lead, selenium, silver, and thallium. These elements have been reported from separate ICP/MS analyses. Total uranium has not been reported by the ICP/AES analysis since it cannot meet the required detection limits in the SAP. The isotopic uranium analysis by ICP/MS met the required detection limit for ^{238}U, which is essentially total uranium. The overall data usability was not affected. For all other metals reported by ICP/AES, all target and required detection limits were met. SW-846 lists the holding time for ICP/AES metals as 6 months. All analyses met the holding time.

Due to inter-element interferences, the elements europium, niobium, neodymium, and ruthenium have not been reported even though detected in the samples. The laboratory believes that these results are likely due to unmitigated inter-element interferences. These are all secondary analytes.

Batch 26884: The initial and closing LLS recoveries for potassium and iron were above the 130% requirement. This could indicate a high bias. However, since the sample results for these elements were below the quantitation limit the data usability was not affected.

Batch 26878: Results above MDL but below the quantitation limit for manganese in the opening and closing interference check standard "A" (ICSA) and for chromium in the closing ICSA indicate a possible high bias for these elements. However, the recovery of manganese and chromium in the interference check standard "AB" (ICSAB) was within the ±20% requirement; this indicates no significant bias was present. Low levels of iron and calcium were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result. Sulfur was detected in the preparation blank at slightly above the MDL. Three samples have sulfur results at less than five times the blank result and have been flagged with a "C". Sulfur is a secondary analyte.

The MS recoveries for aluminum, barium, calcium, iron, magnesium, sodium, and phosphorous exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for boron, silicon, sulfur, and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes. The MS recovery for strontium exceeded the ±25% requirement at 128%. For all other required elements whose results were less than four times the spike, the MS recoveries were within the requirement. Therefore, the laboratory believes that the high recovery for strontium is due to inhomogeneity.

The RPD for cobalt exceeded the 30% requirement in the FSAP and SAP at 34%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

The laboratory control sample (LCS) recovery for silicon exceeded the ±25% requirement at 16%. Because of this and since silicon is a secondary element, it has not been reported. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

Due to the failure of all instrument quality control samples, thorium has not been reported. Reliable thorium results are reported by ICP/MS.

Batch 26957: The initial and closing LLS recoveries for chromium and iron were below the 70% requirement. This could indicate a low bias. However, since the sample results for chromium were at least 10 times the level of the LLS and the results for iron were at least 5,000 times the LLS level, it is the laboratory's opinion that the data usability was not affected. The LLS for beryllium exceeded the ±30% requirement at 149%. This could indicate a low basis for beryllium. However, since all results were below the quantitation limit, the data usability was not affected.

Results above the MDL but below the quantitation limit for manganese and titanium in the opening and closing ICSA and for barium, phosphorous, strontium, and vanadium in the closing ICSA indicate a possible high bias for these elements. However, the recoveries for these elements in the ICSAB were within the ±20% requirement; this indicates no significant bias was

present. Low levels of calcium and sulfur were detected in the preparation blank, but reanalysis was not required since these levels were less than 20% of the lowest sample result.

The MS recoveries for aluminum, calcium, iron, phosphorous, and titanium exceeded the ±25% requirement in the SAP. Since the sample results for these elements exceeded the MS level by more than four times, this criterion does not apply. The MS recoveries for sulfur and zirconium exceeded the ±25% requirement and have been flagged with an "N". These are secondary analytes.

The serial dilution for lanthanum exceeded the ±10% requirement at 14%. This could indicate that the lanthanum results are biased low. Lanthanum is a secondary element.

The LCS recovery for silicon exceeded the ±25% requirement at 78%. Silicon is a secondary element. It should be noted that silicon is not listed with other elements in SW-846 3050B, section 1.1, under "Scope and Application" for the method and does not perform consistently when using this digest.

3.2.8 Inductively Coupled Plasma/Mass Spectroscopy

The ICP/MS actinide and trace metal analyses were performed on the standard SW-846 3050B acid digestion of the grab samples, liner composite samples, and equipment blank. ICP/MS analysis for ^{126}Sn and antimony was perform on the same digest with additional hydrochloric acid, which is required to keep tin and antimony in solution. For all samples, the ICP/MS ^{99}Tc analysis was performed on the sample digest without the addition of hydrochloric acid. Hydrochloric acid is not used for ^{99}Tc analysis because of the potential formation of a ZnCl with mass 99. Technetium-99 was also analyzed using the Vadose water digest.

Direct is the most accurate type of calibration; however, standard material is not commercially available for all of the isotopes of interest. Concentrations of those isotopes without available standards are estimated based on the instrument's mass-response curve, which is generated by using the intensity/concentration relationship for the available isotope standards. Results estimated in this manner are designated "semi-quantitative."

Table 1. Inductively Coupled Plasma-Mass Spectroscopy Standards and Spikes

Standard Type	Analytes Analyzed
Initial calibration verification (nondigested)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Acid digest standard (laboratory control standard)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Predigest spike (MS)	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
Post-digest spike	^{232}Th, ^{235}U, ^{238}U, ^{237}Np, ^{99}Tc, ^{117}Sn
No standard or spike of either type	^{126}Sn, ^{230}Th, ^{233}U, ^{234}U, ^{236}U

Technetium-99

For the acid digestion, the required detection limit listed in the SAP for ^{99}Tc was met. The target detection limit for ^{99}Tc was not met. For the water digested samples, both the target and required detection limits were met. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time.

The acid-digested ^{99}Tc analysis is subject to isobaric interference from natural ruthenium and cobalt argide, and zinc chloride ions. However, these samples were analyzed using an ICP/MS with a collision cell, which eliminates the polyatomic interferences. Interference from natural ^{99}Ru seems unlikely since none of the more abundant nature isotopes (100, 101, and 102) were detected.

For the water digest, one sample, B2C1N0, had a positive result above the MDL and slightly below the quantitation level of 10 times the MDL. This result was twice the LLS concentration. The client requested ^{99}Tc analysis by radiochemistry (resin separation followed by liquid scintillation counting), which confirmed the ICP/MS result for this sample. The water digested ^{99}Tc results were originally reported, along with the nitrate results, in ATL Document No. 20110264-D14 as required in the FSAP.

Batches 26871, 26872, and 27327: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met. Batch 27327 contained the equipment blank and also reports the result for ^{126}Sn.

Tin-126 and Antimony

For the solid samples, antimony and ^{126}Sn were analyzed from the same digest because of the need for additional hydrochloric acid, which results in better MS recoveries. However, this appears to cause an isobaric interference with ^{126}Sn. The laboratory has concluded that the most likely interferences are from the polyatomic ions, zirconium chloride, strontium argide, and yttrium chloride—all with mass of 126. A preliminary investigation indicated that using an ICP/MS with a collision cell will eliminate this interference. However, the instrument needed for this analysis is not currently able to operate in a "semi-quantitative" mode. The laboratory is currently working on resolving this issue. Based on the client's earlier instructions (see Attachment 8), samples with a positive result for ^{126}Sn have been flagged with an "E".

Batch 26962: The RPD for ^{126}Sn exceeded the 30% requirement in the FSAP and SAP at 38%. Since the result for cobalt was below the quantitation limit, this criterion does not apply.

Actinides

The required and target detection limits were met for all isotopes in all samples. The SAP lists the holding time for isotopic analytes as 6 months. All samples were analyzed within the holding time (see Attachment 3).

Batches 26835 and 26968: There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

Batch 26833: Laboratory personnel improperly prepared the low level MS. The higher level MS was recovered within the required ±25% for all analytes. Since a low level MS was recovered within the required limits for all analytes in Batch 26968, the SAP requirement for at least on MS per core hole was met and reanalysis of Batch 26833 was unnecessary.

Trace Metals

Arsenic, cadmium, lead, selenium, silver, and thallium were analyzed by ICP/MS to obtain the required detection limits in the SAP. Except for the required detection limit for selenium, all required detection limits were met or the sample results were above the quantitation limit and the sample detection limit criteria do not apply. All target detection limits were met. The required detection limit for selenium was more than an order of magnitude below the detection limit obtained by ICP/MS. The laboratory does not anticipate reaching this detection limit for future projects. The adjusted MDL for selenium soil results was approximately 1.3 µg/g. SW-846 lists the holding time for metals as 6 months. All samples were analyzed within the holding time (see Attachment 3). There were no notable issues with this batch, and all QC requirements in the SAP and the QAPP were met.

3.3 RADIOCHEMICAL ANALYSIS

The holding time listed in the SAP for radioactive isotopes is 6 months. All samples were analyzed within the required holding time. The holding time tables for these analytes are included in Attachment 3. With the exception of the ^{14}C and ^{3}H analyses, tracers and spikes are added prior to digestion.

3.3.1 Gamma Energy Analysis

Gamma energy analysis was performed directly on approximately 60 mL of soil from liner grab samples, liner composite samples, and the equipment blank. The SAP requires the reporting of all isotopes with positive results above the MDA; therefore, isotopes additional to those required in the SAP were reported when detected. The GEA analysis met all of the required detection limits in the SAP except for one sample for ^{228}Th, which was only slightly higher. The laboratory was able to meet the target detection limits for all ^{137}Cs and all ^{125}Sb analyses. Seven of the ten ^{154}Eu result met the target detection limit. The laboratory was unable to meet the remaining target detection limits. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.2 Strontium-89/90

Strontium-89/90 analysis was performed on the grab samples, liner composite samples, and equipment blank. All of the sample analyses met the required and target detection limits. The SAP requested ^{90}Sr, not $^{89/90}Sr$, be reported. The 222-S Laboratory only performs the latter analysis. Since the half-life for ^{89}Sr is approximately 51 days and ^{89}Sr has not been produced at Hanford for years, $^{89/90}Sr$ is essentially ^{90}Sr. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.3 Tritium

The ^{3}H analysis by liquid scintillation counting (LSC) was performed directly on the field and equipment blanks and a water leach of the liner composite samples. This method only measured the ^{3}H in the samples that could be dissolved in water. This analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.4 Selenium-79

The ^{79}Se analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the target detection limit in the SAP. No required detection limit was listed. No standard is currently available for ^{79}Se, and a cold carrier is used to monitor recovery and is measured gravimetrically. The ^{14}C LSC curve is used to determine the ^{79}Se results since their energies are similar. All samples have very low positive results, which were caused by an elevated quench from samples, resulting in insufficient background subtraction. These results should be considered very low level false positives and have been flagged with a "E". Since all results were below the quantitation limit, reanalysis was not required.

Batch 26240: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the sample. The sample has been flagged with a "B".

Batch 27781: The preparation blank demonstrated a positive result below the quantitation limit with large counting error, as did the samples. The samples have been flagged with a "B". The RPD for the duplicate exceeded the 30% requirement in the SAP and FSAP. Since the sample result was below the quantitation limit, this criterion does not apply.

3.3.5 Carbon-14

The ^{14}C analysis by LSC was performed on a water leach of the grab samples, liner composite samples, and equipment blank. The analysis achieved the required detection limit in the SAP but exceeded the target detection limit. This analysis will only detect water soluble forms of ^{14}C. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.6 Nickel-63

The ^{63}Ni analysis by LSC was performed on the grab samples, liner composite samples, and equipment blank. The analysis achieved the required and target detection limits in the SAP. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.7 Iodine-129

Analysis for ^{129}I by low energy GEA was performed on the grab samples, liner composite samples, and equipment blank. The required and target detection limits in the SAP were met. There were no notable issues with these batches, and all QC requirements in the SAP and the QAPP were met.

3.3.8 Americium-241, Curium-243/244, and Curium-242

Analysis for ^{241}Am, $^{243/244}$Cm, and ^{242}Cm by alpha energy analysis (AEA) was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met. The SAP requested ^{243}Cm and ^{244}Cm be reported separately. Since it is not possible to resolve these individual isotopes when using AEA, these isotopes have been reported as $^{243/244}$Cm.

3.3.9 Plutonium-238 and Plutonium-239/240

Plutonium isotopic (^{238}Pu and $^{239/240}$Pu) analysis by AEA was performed on the grab samples, liner composite samples, and equipment blank. For this analysis, there were no notable issues with any batches and all QC requirements in the SAP and the QAPP were met. The required and target detection limits in the SAP were met.

3.4 ORGANIC ANALYSES

3.4.1 Semivolatile Organic Analysis

The semivolatile organic analysis (SVOA) by GC/MS was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. All holding times were met.

The SVOA analysis met the required and target detection limits with two exceptions:

- The adjusted MDLs for cyclohexanone were above the 0.5-mg/kg target detection limit for most samples. This compound obtained detection limits between 0.5 mg/kg and 0.6 mg/kg.

- The adjusted MDLs for di-n-butyl-phthalate were above the target detection limit of 0.33 mg/kg. The analysis achieved a detection limit of between 0.5 mg/kg and 0.6 mg/kg for this compound.

LCS, MS, and MSD recoveries were compared against the laboratory's statistical process control (SPC) limits, as required by SW-846. The use of SPC limits is permitted in the FSAP, SAP, and QAPP. The results of surrogate, LSC, and MS/MSD are contained in Attachment 4. 1,4-dichlorobenzene, phenol, and pentachlorophenol are secondary compounds but have been reported in order to provide QC results for the LCS and MS/MSD.

The SAP and FSAP requested 3-methylphenol and 4-methylpnenol be reported separately. Since it is not possible to resolve these individual compounds when performing SVOA by SW-846 8270C, these compounds have been reported as 3&4 methylphenol.

Batch 26489: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 25983: The MS experienced high recovery for 1,2,4-trichlorobenzene, 4-chloror-3-methylphenol, N-nitroso-di-n-propylamine, and Pyrene; since the result for all of these compounds were below the MDL, the data quality was not affected and reanalysis was not required. The results for these compounds have been flagged with a "T" for both samples in this batch. One sample experienced high recoveries for the surrogate terphenyl-d14; since the results for all primary compounds were below MDL, the data usability was not affected and reanalysis was unnecessary. The LCS and MS/MSD did not contain phenol, 4-nitrophenol, or 1,4-dichlorobenzene. The decision by the client to add these secondary compounds to the spikes was made after this batch was analyzed; these compounds are contained in all subsequent batches.

Batch 26487: The LCS recovery for 2-4-dinitrotoluene exceeded the laboratory statistical control limit of 60%-99% at 101%. Since the recovery is within the ±30% in the SAP and FSAP and the sample result was below the MDL, a qualifier flag was not applied.

Batches 26760 and 26836: There were no notable issues with these batches, and all QC requirements in the FSAP, SAP, and QAPP were met

3.4.2 .Polychlorinated Biphenyls Analysis

Polychlorinated biphenyls (PCB) analysis was performed on methylene chloride extractions of all grab samples, liner composite samples, and the equipment blank. The accelerated solvent extraction method was used for the solid sample analysis, and solid sample results were corrected to the dry weight of the sample. The LCS, MS, and MSD consisted of only Aroclor-1254 because it is the most common Aroclor detected in Hanford Site samples.

Batch 26470: There were no notable issues with this batch, and all QC requirements in the FSAP, SAP, and QAPP were met.

Batch 26128: The recoveries for the surrogate tetrachloro-m-xlyene exceeded the laboratory's statistically derived control limit of 53%-115% at 117% and 123%. Since the all sample results were below the MDL, the data usability was not affected.

3.4.3 Tentatively Identified Compounds

Unassigned peaks or TICs were treated as follows. Standards were obtained and analyzed for each secondary analyte identified in the SAP. This data was accumulated in the Hanford library. Following analysis, the largest TICs with instrument responses greater than 10% of the response of the nearest internal standard were evaluated and compared to the Hanford library. The estimated concentration of these TICs was calculated using measured response factors from the Hanford library compound list.

After comparison to the Hanford library, remaining unknowns were compared to the National Institute of Standards and Technology's NIST 02, *HP Mass Spectral Libraries*. The estimated concentration of compounds identified in the NIST library was calculated based on an arbitrary response factor of 1.0. If the compounds were not identified as a result of this comparison, they were reported as "unknown." Summaries of the SVOA TICs from the field samples and method blanks are provided in Attachment 5. TICs that were found in the field samples and were present in the associated batch method blank have been flagged with "B".

4.0 PROCEDURES

Table 2 Lists the procedures used in analyzing the samples contained in this report

Table 2. Analytical Procedures

Analysis	Preparation Method	Analysis Procedure
Inorganic Analyses		
Cyanide	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9010C)	LA-695-103, Rev. J-0 (solid) LA-695-102, Rev. L-0 (liquid) (SW-846 9014)
Conductivity	LA-504-102, Rev. A-0 Vadose Water Digest	LA-512-107, Rev. G-0
pH (solid)	LA-212-105, Rev. H-0 (SW-846 9045D)	LA-212-105, Rev. H-0 (SW-846 9045D)
Mercury – Cold Vapor Atomic Absorption	LA-325-110, Rev. A-0 (SW-846 7470A, 7471B)	LA-325-106, Rev. G-0 (SW-846 7470A, 7471A)
Ammonia – IC	LA-544-112, Rev. E-0	LA-533-101, Rev. Q-0
Anions & Organic Acids – IC	LA-504-101, Rev. M-0 LA-504-102, Rev. A-0 (Vadose Water Digest)	LA-533-115, Rev. J-0, K-0
Metals – ICP /AES	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-505-161, Rev. J-0-A, K-0 (SW-846 6010C)
^{99}Tc, ^{126}Sn – ICP/MS	Direct	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0
^{99}Tc – ICP/MS	LA-504-102, Rev. A-0 (Vadose Water Digest) LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-103, Rev. B-0
Metals, ^{126}Sn – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1 LA-506-103, Rev. B-0 (SW-846 6020A)
Actinides – ICP/MS	LA-505-163, Rev. G-0 (SW-846 3050B)	LA-506-102, Rev. F-1
Radiochemical Analyses		
GEA	Direct	LA-548-121, Rev. I-0 LA-508-167, Rev. A-0

Analysis	Preparation Method	Analysis Procedure
$^{89/90}$Sr – Separation/GPC	Digestion LA-544-101, Rev. G-0 Separation LA-220-103, Rev. K-0 (solid) LA-220-104, Rev. J-0-A (liquid)	LA-508-124, Rev. B-0
^{3}H – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-218-116, Rev. A-0	LA-508-121, Rev. G-0
^{14}C – LSC	Digestion LA-504-101, Rev. M-0 Separation LA-348-104, Rev. I-0	LA-508-121, Rev. G-0
^{79}Se – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-365-132, Rev. J-0	LA-508-121, Rev. G-0
^{63}Ni – Separation/LSC	Digestion LA-544-101, Rev. G-0 Separation LA-285-102, Rev. E-0	LA-508-121, Rev. G-0
^{129}I – Separation/GEA	LA-378-105, Rev. D-0, E-0	LA-508-165, Rev. D-0
^{241}Am, $^{243/244, 242}$Cm – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
$^{239/240, 238}$Pu – Separation/AEA	Digest LA-544-101, Rev. G-0 Separation LA-953-104, Rev. H-1, I-0	LA-508-161, Rev. F-0
Analysis	**Preparation Method**	**Analysis Procedure**
Organic Analyses		
SVOC – GC/MS	LA-523-115, Rev. H-0 LA-523-138, Rev. G-0	LA-523-135, Rev. D-0-A SW-846 8270D
PCB – GC/Electron Capture Detector	LA-523-115, Rev. H -0 LA 523-144, Rev. D-0	LA-523-140, Rev. G-0 SW-846 8082A

5.0 REFERENCES

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FEAD CP-15383, 2007, *Common Requirements of the Format for Electronic Analytical Data,* Version 8, CH2M Hill Plateau Remediation Co., Richland, WA.

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RPP-PLAN-40564, 2009, *Field Sampling and Analysis Plan for Sites P and L at Waste Management Area C,* Rev. 2, Washington River Protection Solutions, Inc., Richland, Washington.

NIST 02, 2002, *HP Mass Spectral Libraries*, July 2002 Release, Hewlett-Packard Company, Palo Alto, California.

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Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 1 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03	**DATA TURNAROUND**
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐	60 Days / 120 Days
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	**ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A		

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Gs
NO. OF CONTAINER(S)	2
VOLUME	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE / SAMPLE TIME	
B2B1L6	SOIL	2-24-11 B 2-24-11 1108 26	✓

S11V004098

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS
Cphill C-bell	2-24-11 0920	RLSteele RLSteele	2.24.11 0920	Grp 20110264
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	-1°C Temp
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	RLSteele S11V004098
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME	

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

PRINTED ON 2/15/2011

A-6003-618 (REV 2)

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			V11-001-001	PAGE 2 OF 2
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03 **AIR QUALITY** ☐	**DATA TURNAROUND** 60 Days / 120 Days
SAMPLING LOCATION C8100 Surface	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001		
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** Surface	**COA** n/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE	ORIGINAL
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** n/A		**BILL OF LADING/AIR BILL NO.** n/A		

SPECIAL INSTRUCTIONS

**Only samples from intervals within the top 15 ft. will be analyzed for pesticides,and PCBs.
(1) pH (Soil) - 9045; Semi-VOA - 8270 Complete (TF) {1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4-Dinitrotoluene, 2,6-bis(1,1-dimethylethyl)-4-methyl phenol, 2-Chlorophenol, 2-Methylphenol (cresol, o-), 2-Nitrophenol, 3+4 Methylphenol (cresol, m+p), 4-Chloro-3-methylphenol, Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Bis(2-ethylhexyl) phthalate, Butylbenzylphthalate, Cellosolve Solvent, Chrysene, Cyclohexanone, Di-n-butylphthalate, Di-n-octylphthalate, Dibenz[a,h]anthracene, Fluoranthene, Hexachlorobutadiene, Hexachloroethane, Indeno(1,2,3-cd)pyrene, Isobutyl alcohol, n-Nitrosodi-n-dipropylamine, n-Nitrosomorpholine, Naphthalene, Nitrobenzene, Pyrene, Pyridine, Total cresols, Tributyl phosphate}; 6010_Metals_ICP; 6020_METALS_ICPMS (TF) {Antimony, Arsenic, Cadmium, Selenium, Silver, Thallium}; Mercury - 7471 - (CV) (TF); IC Anions - 9056; 300.7_AMMONIUM (TF); ~~Sulfide - 9215~~ CAT 2/10/11 ~~CAT 2/10/11~~ Total Cyanide - 9014 (TF); GAMMA ENERGY ANALYSIS (TF) {Antimony-125, Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155, Thorium-228, Thorium-234}; GAMMA ENERGY ANALYSIS (TF); Americium-241 (TF); I129_SEP_GEA (TF); C-14; CURIUM {Curium-242, Curium-243/244}; H3 - TRITIUM; Isotopic Plutonium {Plutonium-238, Plutonium-239/240}; Nickel-63 (TF); Selenium-79 (TF); Strontium-89,90 -- Total Sr; Actinides ICPMS (TF) {Neptunium-237, Thorium-230, Thorium-232, Uranium-233, Uranium-234, Uranium-235, Uranium-236, Uranium-238}; RADISO_ICPMS (TF) {Technetium-99, Tin-126}; Conductivity - 9050_WE; Percent Solids (TF); Percent Water (TF); PCBs - 8082 {Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, Aroclor-1260};

Washington River Protection Solutions	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		V11-001-024	PAGE 1 OF 1
COLLECTOR Campbell / Snook	**COMPANY CONTACT** ANASTOS, HL	**TELEPHONE NO.** 373-2616	**PROJECT COORDINATOR** SYDNOR, HA	**PRICE CODE** C03 **DATA TURNAROUND**
SAMPLING LOCATION C8100 I010	**PROJECT DESIGNATION** WMA C Sampling for CMS		**SAF NO.** V11-001	**AIR QUALITY** ☐ **60 Days / 120 Days**
ICE CHEST NO. 003	**FIELD LOGBOOK NO.** TFV2-10-000004	**ACTUAL SAMPLE DEPTH** 222.8 - ~~224.8~~ 224.8	**COA** BC 4-4-11 N/A	**METHOD OF SHIPMENT** GOVERNMENT VEHICLE **ORIGINAL**
SHIPPED TO 222-S Lab Operations	**OFFSITE PROPERTY NO.** N/A		**BILL OF LADING/AIR BILL NO.** N/A	

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)

SPECIAL HANDLING AND/OR STORAGE

PRESERVATION	Cool~6C
HOLDING TIME	24 Hours
TYPE OF CONTAINER	Liner
NO. OF CONTAINER(S)	1
VOLUME	160g
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME	
B2C1L9	SOIL	4-4-11	1020	✓
B2C1M0	SOIL	4-4-11	1020	✓
B2C1M1	SOIL	4-4-11	1020	✓

CHAIN OF POSSESSION		SIGN/ PRINT NAMES	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Campbell Campbell	4-4-11 1100	RHStaats RHStaats	4.4.11 1100
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS
Scott Snook 4-4-11
**LABORATORY
Only samples from intervals within the top 15 ft. will be analyzed for pesticides, and PCBs.
After bulk density on liners is performed, the liners shall be composited.
(1) Bulk Density - D2937 (TF) {Bulk density - wet};

Temp blank
0°C Related
ATL

GRP # 20110264
SAM # S11V004330 Liner A
4331 Liner B
4332 Liner C

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

PRINTED ON 2/15/2011

A-6003-618 (REV 2)

Appendix 5

Data Validation Supporting Documentation

Appendix B - Radiochemical Data Validation Checklist

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: C Farm C8100			DATA PACKAGE: VSR12-023		
VALIDATOR: Eyda Hergenreder		LAB: 222-S Laboratory		DATE: 09-03-2012	
			SDG: 20110264		

ANALYSES PERFORMED

Gross Alpha/Beta	Strontium-90 X	Technetium-99	Alpha Spectroscopy X	Gamma Spectroscopy X	Ni-63 X
Total Uranium	Radium-22	Tritium X	C-14 X	I-129 X	Se-79 X

SAMPLES/MATRIX Soil samples

SDG 20110264: B2B1L6, B2C1N1

1. Completeness ..... ☐ N/A

Technical verification forms present? ..... Yes (No) N/A

Comments: None

2. Initial Calibration (Levels D, E) ..... ☒ N/A

Instruments/detectors calibrated? ..... Yes No N/A

Initial calibration acceptable? ..... Yes No N/A

Standards NIST traceable? ..... Yes No N/A

Standards Expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

3. Continuing Calibration (Levels D, E)..... X N/A

Calibration checked within required frequency? ..... Yes No N/A

Calibration check acceptable? ..... Yes No N/A

Calibration check standards traceable? ..... Yes No N/A

Calibration check standards expired? ..... Yes No N/A

Calculation check acceptable?..... Yes No N/A

Comments:

4. Background Counts (Levels D, E) ..... X N/A

Background Counts checked within required frequency? ..... Yes No N/A

Background Counts acceptable? ..... Yes No N/A

Calculation check acceptable?..... Yes No N/A

Comments:

5. Blanks (Levels B, C, D, E) ☐ N/A

Method blank analyzed within required frequency? (Yes) No N/A
Method blank results acceptable? (Yes) No N/A
Analytes detected in method blank? Yes (No) N/A
Field blank(s) analyzed? Yes (No) N/A
Field blank results acceptable? Yes No (N/A)
Analytes detected in field blank(s)? Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)
Comments: None

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E) ☐ N/A

LCS /BSS analyzed within required frequency? Yes (No) N/A
LCS/BSS recoveries acceptable? (Yes) No N/A
LCS/BSS traceable? (Levels D,E) Yes No (N/A)
LCS/BSS expired? (Levels D,E) Yes No (N/A)
LCS/BSS levels correct? (Levels D,E) Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)
Comments:
LCS was not included with Se-79 analysis

7. Chemical Carrier Recovery (Levels C, D, E) ..... ☐ N/A

Chemical carrier added? ..... (Yes) No N/A

Chemical recovery acceptable? ..... (Yes) No N/A

Chemical carrier traceable? (Levels D, E) ..... Yes No (N/A)

Chemical carrier expired? (Levels D, E) ..... Yes No (N/A)

Transcription/Calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

8. Tracer Recovery (Levels C, D, E) ..... ☐ N/A

Tracer added? ..... (Yes) No N/A

Tracer recovery acceptable? ..... (Yes) No N/A

Tracer traceable? (Levels D, E) ..... Yes No (N/A)

Tracer expired? (Levels D, E) ..... Yes No (N/A)

Transcription/Calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

9. Matrix Spikes (Levels C, D, E) ☐ N/A

Matrix spike analyzed? (Yes) No N/A

Spike recoveries acceptable? (Yes) No N/A

Spike source traceable? (Levels D, E) Yes No (N/A)

Spike source expired? Levels D, E) Yes No (N/A)

Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)

Comments: None

10. Duplicates (Levels C, D, E) ☐ N/A

Duplicates Analyzed at required frequency? (Yes) No N/A

RPD Values Acceptable? (Yes) No N/A

Transcription/Calculation Errors? (Levels D, E) Yes No (N/A)

Comments: None

11. Field QC Samples (Levels C, D E) ..... ☐ N/A

Field duplicate sample(s) analyzed? ..... Yes No (N/A)
Field duplicate RPD values acceptable? ..... Yes No (N/A)
Field split sample(s) analyzed? ..... Yes No (N/A)
Field split RPD values acceptable? ..... Yes No (N/A)
Performance audit sample(s) analyzed? ..... Yes No (N/A)
Performance audit sample results acceptable? ..... Yes No (N/A)
Comments: None

12. Holding Times (All levels)

Are sample holding times acceptable? ..... (Yes) No N/A
Comments: None

13. Results and Detection Limits (All Levels) ..... ☐ N/A

Results reported for all required sample analyses? ..... (Yes) No N/A
Results supported in raw data?(Levels D, E) ..... Yes No (N/A)
Results Acceptable? (Levels D, E) ..... Yes No (N/A)
Transcription/Calculation errors? (Levels D, E) ..... Yes No (N/A)
MDA's meet required detection limits? ..... (Yes) No N/A
Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)
Comments: None

Appendix 6

Additional Documentation Requested By Client

LABCORE Completed Batch Report for Batch# 00027752

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105160066	STD				
2	S1105030006	BLNK-PREP				
3	S11V004109	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105030007	DUP	S11V004109			
5	S11V004126	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
6	S11V004147	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004168	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
8	S11V004211	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
9	S11V004253	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
10	S11V004274	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
11	S11V004295	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
12	S11V004324	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
13	S11V004344	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027752

Analyst: Yager, Gary **Book#:** 120B64

Instrument: AEA-Ortec

Method: AMERICIUM, LA-508-168 Rev/Mod A-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027416

Batch Comment:

C Farm WMA C8100 for AM Solid. MOF

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105160066		0 0			Americium-241	LIQUID	.000137	1.4050E-04			4.97E-07	uCi/mL	102.55	% Recovery	
1	STD	S1105160066		0 0			Americium-243T	LIQUID		88.96			4.72E-07	uCi/mL	N/A		
Sample Sequence 2																	
2	BLNK-PREP	S1105030006		0 0	E		Curium-243/244	SOLID		<4.5800E-08			4.58E-08	uCi/g			
2	BLNK-PREP	S1105030006		0 0	E		Americium-241	SOLID		<5.3240E-08			5.32E-08	uCi/g			
2	BLNK-PREP	S1105030006		0 0	E		Americium-243T	SOLID		91.37			4.42E-08	uCi/g			
2	BLNK-PREP	S1105030006		0 0	E		Curium-242	SOLID		<2.3400E-08			2.34E-08	uCi/g			
Sample Sequence 3																	
3	SAMPLE	S11V004109		0 0	E		Curium-243/244	SOLID	N/A	<3.3700E-08			3.37E-08	uCi/g			U
3	SAMPLE	S11V004109		0 0	E		Americium-241	SOLID	N/A	<4.7600E-08			4.76E-08	uCi/g			U
3	SAMPLE	S11V004109		0 0	E		Americium-243T	SOLID		88.73			4.42E-08	uCi/g			
3	SAMPLE	S11V004109		0 0	E		Curium-242	SOLID	N/A	<1.1610E-08			1.16E-08	uCi/g			U
Sample Sequence 4																	
4	DUP	S1105030007	S11V004109	0 0	E		Curium-243/244	SOLID	<3.3700E-08	<4.1500E-08			4.15E-08	uCi/g			
4	DUP	S1105030007	S11V004109	0 0	E		Americium-241	SOLID	<4.7600E-08	<3.6270E-08			3.63E-08	uCi/g			
4	DUP	S1105030007	S11V004109	0 0	E		Americium-243T	SOLID	88.73	93.76			4.70E-08	uCi/g			
4	DUP	S1105030007	S11V004109	0 0	E		Curium-242	SOLID	<1.1610E-08	<1.0830E-08			1.08E-08	uCi/g			
Sample Sequence 5																	
5	SAMPLE	S11V004126		0 0	E		Curium-243/244	SOLID	N/A	<4.4400E-08			4.44E-08	uCi/g			U
5	SAMPLE	S11V004126		0 0	E		Americium-241	SOLID	N/A	<4.7840E-08			4.78E-08	uCi/g			U
5	SAMPLE	S11V004126		0 0	E		Americium-243T	SOLID		88.59			4.95E-08	uCi/g			
5	SAMPLE	S11V004126		0 0	E		Curium-242	SOLID	N/A	<1.1660E-08			1.17E-08	uCi/g			U
Sample Sequence 6																	
6	SAMPLE	S11V004147		0 0	E		Curium-243/244	SOLID	N/A	<4.8200E-08			4.82E-08	uCi/g			U
6	SAMPLE	S11V004147		0 0	E		Americium-241	SOLID	N/A	<4.2290E-08			4.23E-08	uCi/g			U
6	SAMPLE	S11V004147		0 0	E		Americium-243T	SOLID		92.7			3.26E-08	uCi/g			
6	SAMPLE	S11V004147		0 0	E		Curium-242	SOLID	N/A	<1.9770E-08			1.98E-08	uCi/g			U
Sample Sequence 7																	
7	SAMPLE	S11V004168		0 0	E		Curium-243/244	SOLID	N/A	<5.5200E-08			5.52E-08	uCi/g			U
7	SAMPLE	S11V004168		0 0	E		Americium-241	SOLID	N/A	<5.0930E-08			5.09E-08	uCi/g			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027752

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
7	SAMPLE	S11V004168		0 0	E		Americium-243T	SOLID		82.46			5.63E-08	uCi/g			
7	SAMPLE	S11V004168		0 0	E		Curium-242	SOLID	N/A	<2.0820E-08			2.08E-08	uCi/g			U
Sample Sequence 8																	
8	SAMPLE	S11V004211		0 0	E		Curium-243/244	SOLID	N/A	<3.0800E-08			3.08E-08	uCi/g			U
8	SAMPLE	S11V004211		0 0	E		Americium-241	SOLID	N/A	<4.7740E-08			4.77E-08	uCi/g			U
8	SAMPLE	S11V004211		0 0	E		Americium-243T	SOLID		92.01			4.53E-08	uCi/g			
8	SAMPLE	S11V004211		0 0	E		Curium-242	SOLID	N/A	<1.1070E-08			1.11E-08	uCi/g			U
Sample Sequence 9																	
9	SAMPLE	S11V004253		0 0	E		Curium-243/244	SOLID	N/A	<4.7400E-08			4.74E-08	uCi/g			U
9	SAMPLE	S11V004253		0 0	E		Americium-241	SOLID	N/A	4.8970E-08		38.96	2.98E-08	uCi/g			J
9	SAMPLE	S11V004253		0 0	E		Americium-243T	SOLID		90.32			2.93E-08	uCi/g			
9	SAMPLE	S11V004253		0 0	E		Curium-242	SOLID	N/A	<2.0220E-08			2.02E-08	uCi/g			U
Sample Sequence 10																	
10	SAMPLE	S11V004274		0 0	E		Curium-243/244	SOLID	N/A	<5.1100E-08			5.11E-08	uCi/g			U
10	SAMPLE	S11V004274		0 0	E		Americium-241	SOLID	N/A	<3.1660E-08			3.17E-08	uCi/g			U
10	SAMPLE	S11V004274		0 0	E		Americium-243T	SOLID		90.48			2.90E-08	uCi/g			
10	SAMPLE	S11V004274		0 0	E		Curium-242	SOLID	N/A	<3.5470E-08			3.55E-08	uCi/g			U
Sample Sequence 11																	
11	SAMPLE	S11V004295		0 0	E		Curium-243/244	SOLID	N/A	<4.3200E-08			4.32E-08	uCi/g			U
11	SAMPLE	S11V004295		0 0	E		Americium-241	SOLID	N/A	<3.4420E-08			3.44E-08	uCi/g			U
11	SAMPLE	S11V004295		0 0	E		Americium-243T	SOLID		91.62			2.05E-08	uCi/g			
11	SAMPLE	S11V004295		0 0	E		Curium-242	SOLID	N/A	<2.2760E-08			2.28E-08	uCi/g			U
Sample Sequence 12																	
12	SAMPLE	S11V004324		0 0	E		Curium-243/244	SOLID	N/A	<3.7600E-08			3.76E-08	uCi/g			U
12	SAMPLE	S11V004324		0 0	E		Americium-241	SOLID	N/A	<4.2220E-08			4.22E-08	uCi/g			U
12	SAMPLE	S11V004324		0 0	E		Americium-243T	SOLID		96.48			3.59E-08	uCi/g			
12	SAMPLE	S11V004324		0 0	E		Curium-242	SOLID	N/A	<1.0900E-08			1.09E-08	uCi/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004344		0 0	E		Curium-243/244	SOLID	N/A	<3.4500E-08			3.45E-08	uCi/g			U
13	SAMPLE	S11V004344		0 0	E		Americium-241	SOLID	N/A	<4.2390E-08			4.24E-08	uCi/g			U
13	SAMPLE	S11V004344		0 0	E		Americium-243T	SOLID		103.3			4.27E-08	uCi/g			
13	SAMPLE	S11V004344		0 0	E		Curium-242	SOLID	N/A	<1.0070E-08			1.01E-08	uCi/g			U

Comments Section:

Data Flagger Status:
Flagging Completed

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00028087

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105260008	STD				
2	S1105120045	BLNK-PREP				
3	S11V004113	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105120046	DUP	S11V004113			
5	S1105260009	SPK	S11V004113			
6	S11V004130	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
7	S11V004151	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
8	S11V004172	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
9	S11V004215	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
10	S11V004257	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
11	S11V004278	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
12	S11V004299	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
13	S11V004328	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
14	S11V004348	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00028087

Analyst: Barela, Essie **Book#:** 40B64B

Instrument: LSC2 LS6000 B-1A

Method: CARBON-14, LA-508-121 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027710

Batch Comment:

C-Farm WMA C2011-C8100. mcb

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105260008		0 0			Carbon-14	SOLID	.00120809189319137	1.1134E-03		0.664	1.35E-06	uCi/g	92.162	% Recovery	
Sample Sequence 2																	
2	BLNK-PREP	S1105120045		0 0	W		Carbon-14	SOLID		<4.2600E-06			4.26E-06	uCi/g			
Sample Sequence 3																	
3	SAMPLE	S11V004113		0 0	W		Carbon-14	SOLID	N/A	<4.2300E-06			4.23E-06	uCi/g			U
Sample Sequence 4																	
4	DUP	S1105120046	S11V004113	0 0	W		Carbon-14	SOLID	<4.2300E-06	5.2900E-06		50.844	2.70E-06	uCi/g			
Sample Sequence 5																	
5	SPK	S1105260009	S11V004113	0 0			Carbon-14	SOLID	.00120809189319137	1.1114E-03		0.662	1.34E-05	uCi/g	91.992	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004130		0 0	W		Carbon-14	SOLID	N/A	1.3700E-05		22.288	2.63E-06	uCi/g			
Sample Sequence 7																	
7	SAMPLE	S11V004151		0 0	W		Carbon-14	SOLID	N/A	<3.3900E-06			3.39E-06	uCi/g			U
Sample Sequence 8																	
8	SAMPLE	S11V004172		0 0	W		Carbon-14	SOLID	N/A	<3.0600E-06			3.06E-06	uCi/g			U
Sample Sequence 9																	
9	SAMPLE	S11V004215		0 0	W		Carbon-14	SOLID	N/A	<2.7100E-06			2.71E-06	uCi/g			U
Sample Sequence 10																	
10	SAMPLE	S11V004257		0 0	W		Carbon-14	SOLID	N/A	2.7300E-06		64.755	2.61E-06	uCi/g			J
Sample Sequence 11																	
11	SAMPLE	S11V004278		0 0	W		Carbon-14	SOLID	N/A	<2.6700E-06			2.67E-06	uCi/g			U
Sample Sequence 12																	
12	SAMPLE	S11V004299		0 0	W		Carbon-14	SOLID	N/A	<2.7000E-06			2.70E-06	uCi/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004328		0 0	W		Carbon-14	SOLID	N/A	<2.8900E-06			2.89E-06	uCi/g			U
Sample Sequence 14																	
14	SAMPLE	S11V004348		0 0	W		Carbon-14	SOLID	N/A	<2.6500E-06			2.65E-06	uCi/g			U

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027154

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1104210099	STD				
2	S1104210100	BLNK				
3	S11V004099	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1104210101	DUP	S11V004099			
5	S11V004116	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
6	S11V004137	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004158	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
8	S11V004201	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
9	S11V004243	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
10	S11V004264	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
11	S11V004285	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
12	S11V004315	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
13	S11V004335	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027154

Analyst: King, Rob W **Book#:** 120B64

Instrument: GEA150

Method: GEA, LA-508-167 Rev/Mod A-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

C Farm 2011-C8100 for GEA Sol. MOF

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1104210099		0 0			Cobalt-60	LIQUID	.00539	5.3257E-03		0.73	5.73E-05	uCi/mL	98.807	% Recovery	
1	STD	S1104210099		0 0			Cesium-137	LIQUID	.00547	5.5246E-03		0.86	5.14E-05	uCi/mL	101	% Recovery	
Sample Sequence 2																	
2	BLNK	S1104210100		0 0			Cobalt-60	SOLID		<1.7119E-07			1.71E-07	uCi/g			
2	BLNK	S1104210100		0 0			Antimony-125	SOLID		<4.5949E-07			4.59E-07	uCi/g			
2	BLNK	S1104210100		0 0			Cesium-137	SOLID		<2.0317E-07			2.03E-07	uCi/g			
2	BLNK	S1104210100		0 0			Europium-152	SOLID		<4.2314E-07			4.23E-07	uCi/g			
2	BLNK	S1104210100		0 0			Europium-154	SOLID		<2.6858E-07			2.69E-07	uCi/g			
2	BLNK	S1104210100		0 0			Europium-155	SOLID		<5.6894E-07			5.69E-07	uCi/g			
2	BLNK	S1104210100		0 0			Thorium-228	SOLID		<8.5551E-05			8.56E-05	uCi/g			
2	BLNK	S1104210100		0 0			Thorium-234	SOLID		<3.6251E-06			3.63E-06	uCi/g			
2	BLNK	S1104210100		0 0			Cesium-134	SOLID		-2.0010E-07		31.04	2.01E-07	uCi/g			
Sample Sequence 3																	
3	SAMPLE	S11V004099		0 0			Cobalt-60	SOLID	N/A	<8.4729E-08			8.47E-08	uCi/g			U
3	SAMPLE	S11V004099		0 0			Antimony-125	SOLID	N/A	<2.5338E-07			2.53E-07	uCi/g			U
3	SAMPLE	S11V004099		0 0			Cesium-137	SOLID	N/A	4.8358E-06		1.27	9.82E-08	uCi/g			
3	SAMPLE	S11V004099		0 0			Europium-152	SOLID	N/A	<2.0900E-07			2.09E-07	uCi/g			U
3	SAMPLE	S11V004099		0 0			Europium-154	SOLID	N/A	<1.5013E-07			1.50E-07	uCi/g			U
3	SAMPLE	S11V004099		0 0			Europium-155	SOLID	N/A	<2.8972E-07			2.90E-07	uCi/g			U
3	SAMPLE	S11V004099		0 0			Thorium-228	SOLID	N/A	<4.3689E-05			4.37E-05	uCi/g			U
3	SAMPLE	S11V004099		0 0			Thorium-234	SOLID	N/A	<1.1411E-05		43.18	1.14E-05	uCi/g			U
3	SAMPLE	S11V004099		0 0			Bismuth-214	SOLID	N/A	9.5420E-07		8.80	2.05E-07	uCi/g			
3	SAMPLE	S11V004099		0 0			Lead-212	SOLID	N/A	5.0957E-07		9.95	1.51E-07	uCi/g			
3	SAMPLE	S11V004099		0 0			Lead-214	SOLID	N/A	8.1172E-07		10.28	2.13E-07	uCi/g			
3	SAMPLE	S11V004099		0 0			Potassium-40	SOLID	N/A	9.2593E-06		7.16	2.39E-06	uCi/g			
3	SAMPLE	S11V004099		0 0			Radium-226	SOLID	N/A	1.8833E-06		27.51	1.53E-06	uCi/g			
3	SAMPLE	S11V004099		0 0			Thallium-208	SOLID	N/A	2.5291E-07		10.71	9.44E-08	uCi/g			
Sample Sequence 4																	
4	DUP	S1104210101	S11V004099	0 0			Cobalt-60	SOLID	<8.4729E-08	<8.4880E-08			8.49E-08	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Antimony-125	SOLID	<2.5338E-07	<2.2513E-07		16.12	2.25E-07	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Cesium-137	SOLID	4.8358E-06	6.4492E-06		0.84	7.79E-08	uCi/g	28.594	% RPD	

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027154

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
4	DUP	S1104210101	S11V004099	0 0			Europium-152	SOLID	<2.0900E-07	<2.0734E-07		21.25	2.07E-07	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Europium-154	SOLID	<1.5013E-07	<1.5027E-07			1.50E-07	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Europium-155	SOLID	<2.8972E-07	<2.8479E-07			2.85E-07	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Thorium-228	SOLID	<4.3689E-05	<4.5120E-05			4.51E-05	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Thorium-234	SOLID	<1.1411E-05	<1.1615E-05			1.16E-05	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Actinium-228	SOLID		1.2014E-06		12.92	3.73E-07	uCi/g			
4	DUP	S1104210101	S11V004099	0 0			Bismuth-214	SOLID	9.5420E-07	1.1929E-06		6.61	2.01E-07	uCi/g	22.235	% RPD	
4	DUP	S1104210101	S11V004099	0 0			Lead-212	SOLID	5.0957E-07	6.2978E-07		8.70	1.56E-07	uCi/g	21.102	% RPD	
4	DUP	S1104210101	S11V004099	0 0			Lead-214	SOLID	8.1172E-07	9.8348E-07		7.59	2.02E-07	uCi/g	19.135	% RPD	
4	DUP	S1104210101	S11V004099	0 0			Potassium-40	SOLID	9.2593E-06	9.2907E-06		6.96	2.34E-06	uCi/g	0.33854	% RPD	
4	DUP	S1104210101	S11V004099	0 0			Radium-226	SOLID	1.8833E-06	1.9800E-06		27.41	1.57E-06	uCi/g	5.0061	% RPD	
4	DUP	S1104210101	S11V004099	0 0			Thallium-208	SOLID	2.5291E-07	2.5714E-07		16.46	1.09E-07	uCi/g	1.6587	% RPD	
Sample Sequence 5																	
5	SAMPLE	S11V004116		0 0			Cobalt-60	SOLID	N/A	<1.0093E-07			1.01E-07	uCi/g			U
5	SAMPLE	S11V004116		0 0			Antimony-125	SOLID	N/A	<2.6225E-07			2.62E-07	uCi/g			U
5	SAMPLE	S11V004116		0 0			Cesium-137	SOLID	N/A	5.7052E-06		1.16	1.06E-07	uCi/g			
5	SAMPLE	S11V004116		0 0			Europium-152	SOLID	N/A	<2.2298E-07			2.23E-07	uCi/g			U
5	SAMPLE	S11V004116		0 0			Europium-154	SOLID	N/A	<1.5902E-07			1.59E-07	uCi/g			U
5	SAMPLE	S11V004116		0 0			Europium-155	SOLID	N/A	<3.0650E-07			3.07E-07	uCi/g			U
5	SAMPLE	S11V004116		0 0			Thorium-228	SOLID	N/A	<4.6169E-05			4.62E-05	uCi/g			U
5	SAMPLE	S11V004116		0 0			Thorium-234	SOLID	N/A	<1.3287E-05			1.33E-05	uCi/g			U
5	SAMPLE	S11V004116		0 0			Actinium-228	SOLID	N/A	7.2804E-07		12.60	3.92E-07	uCi/g			
5	SAMPLE	S11V004116		0 0			Bismuth-214	SOLID	N/A	7.6738E-07		8.88	2.03E-07	uCi/g			
5	SAMPLE	S11V004116		0 0			Lead-212	SOLID	N/A	6.2335E-07		8.35	1.55E-07	uCi/g			
5	SAMPLE	S11V004116		0 0			Lead-214	SOLID	N/A	7.3610E-07		10.32	2.16E-07	uCi/g			
5	SAMPLE	S11V004116		0 0			Potassium-40	SOLID	N/A	1.0463E-05		6.79	2.52E-06	uCi/g			
5	SAMPLE	S11V004116		0 0			Radium-226	SOLID	N/A	1.9082E-06		30.27	1.68E-06	uCi/g			J
5	SAMPLE	S11V004116		0 0			Thallium-208	SOLID	N/A	2.4087E-07		16.41	1.10E-07	uCi/g			
Sample Sequence 6																	
6	SAMPLE	S11V004137		0 0			Cobalt-60	SOLID	N/A	<9.5816E-08			9.58E-08	uCi/g			U
6	SAMPLE	S11V004137		0 0			Antimony-125	SOLID	N/A	<2.3120E-07			2.31E-07	uCi/g			U
6	SAMPLE	S11V004137		0 0			Cesium-137	SOLID	N/A	<7.6276E-08			7.63E-08	uCi/g			U
6	SAMPLE	S11V004137		0 0			Europium-152	SOLID	N/A	<2.0028E-07			2.00E-07	uCi/g			U
6	SAMPLE	S11V004137		0 0			Europium-154	SOLID	N/A	<1.4254E-07			1.43E-07	uCi/g			U
6	SAMPLE	S11V004137		0 0			Europium-155	SOLID	N/A	<2.7459E-07			2.75E-07	uCi/g			U
6	SAMPLE	S11V004137		0 0			Thorium-228	SOLID	N/A	<4.5612E-05			4.56E-05	uCi/g			U
6	SAMPLE	S11V004137		0 0			Thorium-234	SOLID	N/A	<1.1049E-05			1.10E-05	uCi/g			U
6	SAMPLE	S11V004137		0 0			Actinium-228	SOLID	N/A	7.3562E-07		13.36	3.73E-07	uCi/g			
6	SAMPLE	S11V004137		0 0			Bismuth-214	SOLID	N/A	6.7538E-07		10.84	2.01E-07	uCi/g			
6	SAMPLE	S11V004137		0 0			Lead-212	SOLID	N/A	6.8095E-07		7.71	1.48E-07	uCi/g			
6	SAMPLE	S11V004137		0 0			Potassium-40	SOLID	N/A	1.2476E-05		5.33	2.34E-06	uCi/g			
6	SAMPLE	S11V004137		0 0			Thallium-208	SOLID	N/A	2.2768E-07		16.15	1.01E-07	uCi/g			

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027154

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
12	SAMPLE	S11V004315		0 0			Thorium-234	SOLID	N/A	<6.3580E-06			6.36E-06	uCi/g			U
12	SAMPLE	S11V004315		0 0			Actinium-228	SOLID	N/A	6.7052E-07		12.93	3.33E-07	uCi/g			
12	SAMPLE	S11V004315		0 0			Bismuth-214	SOLID	N/A	6.2892E-07		10.68	1.76E-07	uCi/g			
12	SAMPLE	S11V004315		0 0			Lead-212	SOLID	N/A	4.8305E-07		9.02	1.26E-07	uCi/g			
12	SAMPLE	S11V004315		0 0			Potassium-40	SOLID	N/A	1.0242E-05		5.02	2.08E-06	uCi/g			
12	SAMPLE	S11V004315		0 0			Thallium-208	SOLID	N/A	2.4790E-07		13.76	8.95E-08	uCi/g			
Sample Sequence 13																	
13	SAMPLE	S11V004335		0 0			Cobalt-60	SOLID	N/A	<8.5805E-08			8.58E-08	uCi/g			U
13	SAMPLE	S11V004335		0 0			Antimony-125	SOLID	N/A	<2.0150E-07			2.02E-07	uCi/g			U
13	SAMPLE	S11V004335		0 0			Cesium-137	SOLID	N/A	<6.5988E-08			6.60E-08	uCi/g			U
13	SAMPLE	S11V004335		0 0			Europium-152	SOLID	N/A	<1.8655E-07			1.87E-07	uCi/g			U
13	SAMPLE	S11V004335		0 0			Europium-154	SOLID	N/A	<1.3116E-07			1.31E-07	uCi/g			U
13	SAMPLE	S11V004335		0 0			Europium-155	SOLID	N/A	<2.4932E-07			2.49E-07	uCi/g			U
13	SAMPLE	S11V004335		0 0			Thorium-228	SOLID	N/A	<3.9154E-05			3.92E-05	uCi/g			U
13	SAMPLE	S11V004335		0 0			Thorium-234	SOLID	N/A	<4.1581E-06			4.16E-06	uCi/g			U
13	SAMPLE	S11V004335		0 0			Actinium-228	SOLID	N/A	5.2552E-07		14.29	3.37E-07	uCi/g			
13	SAMPLE	S11V004335		0 0			Bismuth-214	SOLID	N/A	4.1273E-07		17.34	1.90E-07	uCi/g			
13	SAMPLE	S11V004335		0 0			Lead-212	SOLID	N/A	5.6728E-07		6.51	1.19E-07	uCi/g			
13	SAMPLE	S11V004335		0 0			Lead-214	SOLID	N/A	4.0889E-07		11.50	1.63E-07	uCi/g			
13	SAMPLE	S11V004335		0 0			Potassium-40	SOLID	N/A	1.3369E-05		4.68	2.16E-06	uCi/g			
13	SAMPLE	S11V004335		0 0			Radium-226	SOLID	N/A	<1.3874E-06		40.38	1.39E-06	uCi/g			U
13	SAMPLE	S11V004335		0 0			Thallium-208	SOLID	N/A	2.0737E-07		15.47	8.95E-08	uCi/g			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00027154

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

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LABCORE Completed Batch Report for Batch# 00027815

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105170001	STD				
2	S1105170002	BLNK				
3	S11V004099	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105170003	DUP	S11V004099			
5	S11V004116	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
6	S11V004137	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004158	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
8	S11V004201	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
9	S11V004243	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
10	S11V004264	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
11	S11V004285	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
12	S11V004315	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
13	S11V004335	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027815

Analyst: Yager, Gary **Book#:** 82B64

Instrument: GEA03 B-1A

Method: IODINE-129 in SOIL, LA-508-165 Rev/Mod D-0

Specification: C Farm WMC 2011-C8100

Prep Batch:

Batch Comment:

C Farm WMA C8100 for I-129. jp

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105170001		0 0			Iodine-129	LIQUID	.00319699970785397	3.3183E-03		1.16	7.68E-05	uCi/mL	103.8	% Recovery	
1	STD	S1105170001		0 0			Iodine-C	LIQUID		70.578			1	% Recovery	N/A		
Sample Sequence 2																	
2	BLNK	S1105170002		0 0			Iodine-129	LIQUID		<2.1520E-05			2.15E-05	uCi/mL			
2	BLNK	S1105170002		0 0			Iodine-C	LIQUID		72.219			1	% Recovery			
Sample Sequence 3																	
3	SAMPLE	S11V004099		0 0			Iodine-129	SOLID	N/A	<2.1280E-06			2.13E-06	uCi/g			U
3	SAMPLE	S11V004099		0 0			Iodine-C	SOLID		77.8			1	% Recovery			
Sample Sequence 4																	
4	DUP	S1105170003	S11V004099	0 0			Iodine-129	SOLID	<2.1280E-06	<1.8145E-06			1.81E-06	uCi/g			
4	DUP	S1105170003	S11V004099	0 0			Iodine-C	SOLID	77.8	81.082			1	% Recovery			
Sample Sequence 5																	
5	SAMPLE	S11V004116		0 0			Iodine-129	SOLID	N/A	<1.9523E-07			1.95E-07	uCi/g			U
5	SAMPLE	S11V004116		0 0			Iodine-C	SOLID		75.502			1	% Recovery			
Sample Sequence 6																	
6	SAMPLE	S11V004137		0 0			Iodine-129	SOLID	N/A	<2.6339E-06			2.63E-06	uCi/g			U
6	SAMPLE	S11V004137		0 0			Iodine-C	SOLID		77.143			1	% Recovery			
Sample Sequence 7																	
7	SAMPLE	S11V004158		0 0			Iodine-129	SOLID	N/A	<2.2987E-06			2.30E-06	uCi/g			U
7	SAMPLE	S11V004158		0 0			Iodine-C	SOLID		75.502			1	% Recovery			
Sample Sequence 8																	
8	SAMPLE	S11V004201		0 0			Iodine-129	SOLID	N/A	<1.9136E-06			1.91E-06	uCi/g			U
8	SAMPLE	S11V004201		0 0			Iodine-C	SOLID		81.41			1	% Recovery			
Sample Sequence 9																	
9	SAMPLE	S11V004243		0 0			Iodine-129	SOLID	N/A	<2.0399E-06			2.04E-06	uCi/g			U
9	SAMPLE	S11V004243		0 0			Iodine-C	SOLID		81.41			1	% Recovery			
Sample Sequence 10																	
10	SAMPLE	S11V004264		0 0			Iodine-129	SOLID	N/A	<1.7746E-07			1.77E-07	uCi/g			U
10	SAMPLE	S11V004264		0 0			Iodine-C	SOLID		81.739			1	% Recovery			

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027815

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 11																	
11	SAMPLE	S11V004285		0 0			Iodine-129	SOLID	N/A	<1.7967E-06			1.80E-06	uCi/g			U
11	SAMPLE	S11V004285		0 0			Iodine-C	SOLID		81.739			1	% Recovery			
Sample Sequence 12																	
12	SAMPLE	S11V004315		0 0			Iodine-129	SOLID	N/A	<1.7994E-06			1.80E-06	uCi/g			U
12	SAMPLE	S11V004315		0 0			Iodine-C	SOLID		80.754			1	% Recovery			
Sample Sequence 13																	
13	SAMPLE	S11V004335		0 0			Iodine-129	SOLID	N/A	<1.8415E-06			1.84E-06	uCi/g			U
13	SAMPLE	S11V004335		0 0			Iodine-C	SOLID		82.067			1	% Recovery			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00027815

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027845

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105180005	STD				
2	S1105030010	BLNK-PREP				
3	S11V004111	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105030011	DUP	S11V004111			
5	S11V004128	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
6	S11V004149	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004170	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
8	S11V004213	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
9	S11V004255	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
10	S11V004276	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
11	S11V004297	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
12	S11V004326	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
13	S11V004346	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027845

Analyst: Barela, Essie **Book#:** 51B64

Instrument: LSC3 LS6500 B-1A

Method: NICKEL-63, LA-508-121 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027423

Batch Comment:

C Farm WMA C8100 for NI-63 Solid. MOF

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105180005		0 0			Nickel-63	LIQUID	.00350126601 254293	3.5663E-03		1.048	6.15E-06	uCi/mL	101.86	% Recovery	
1	STD	S1105180005		0 0			Nickel-C	LIQUID		75.644				% Recovery	N/A		
Sample Sequence 2																	
2	BLNK-PREP	S1105030010		0 0	E		Nickel-63	SOLID		<1.0200E-05			1.02E-05	uCi/g			
2	BLNK-PREP	S1105030010		0 0	E		Nickel-C	SOLID		75.809				% Recovery			
Sample Sequence 3																	
3	SAMPLE	S11V004111		0 0	E		Nickel-63	SOLID	N/A	<6.2400E-06			6.24E-06	uCi/g			U
3	SAMPLE	S11V004111		0 0	E		Nickel-C	SOLID		84.223				% Recovery			
Sample Sequence 4																	
4	DUP	S1105030011	S11V004111	0 0	E		Nickel-63	SOLID	<6.2400E-06	<5.0300E-06			5.03E-06	uCi/g			
4	DUP	S1105030011	S11V004111	0 0	E		Nickel-C	SOLID	84.223	89.199				% Recovery			
Sample Sequence 5																	
5	SAMPLE	S11V004128		0 0	E		Nickel-63	SOLID	N/A	<1.0800E-05			1.08E-05	uCi/g			U
5	SAMPLE	S11V004128		0 0	E		Nickel-C	SOLID		65.136				% Recovery			
Sample Sequence 6																	
6	SAMPLE	S11V004149		0 0	E		Nickel-63	SOLID	N/A	<1.0500E-05			1.05E-05	uCi/g			U
6	SAMPLE	S11V004149		0 0	E		Nickel-C	SOLID		88.279				% Recovery			
Sample Sequence 7																	
7	SAMPLE	S11V004170		0 0	E		Nickel-63	SOLID	N/A	<4.8700E-06			4.87E-06	uCi/g			U
7	SAMPLE	S11V004170		0 0	E		Nickel-C	SOLID		91.195				% Recovery			
Sample Sequence 8																	
8	SAMPLE	S11V004213		0 0	E		Nickel-63	SOLID	N/A	<1.1500E-05			1.15E-05	uCi/g			U
8	SAMPLE	S11V004213		0 0	E		Nickel-C	SOLID		50.2				% Recovery			
Sample Sequence 9																	
9	SAMPLE	S11V004255		0 0	E		Nickel-63	SOLID	N/A	<1.0300E-05			1.03E-05	uCi/g			U
9	SAMPLE	S11V004255		0 0	E		Nickel-C	SOLID		43.884				% Recovery			
Sample Sequence 10																	
10	SAMPLE	S11V004276		0 0	E		Nickel-63	SOLID	N/A	<5.8100E-06			5.81E-06	uCi/g			U
10	SAMPLE	S11V004276		0 0	E		Nickel-C	SOLID		83.435				% Recovery			

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027845

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 11																	
11	SAMPLE	S11V004297		0 0	E		Nickel-63	SOLID	N/A	<5.6000E-06			5.60E-06	uCi/g			U
11	SAMPLE	S11V004297		0 0	E		Nickel-C	SOLID		82.218				% Recovery			
Sample Sequence 12																	
12	SAMPLE	S11V004326		0 0	E		Nickel-63	SOLID	N/A	<5.5300E-06			5.53E-06	uCi/g			U
12	SAMPLE	S11V004326		0 0	E		Nickel-C	SOLID		82.799				% Recovery			
Sample Sequence 13																	
13	SAMPLE	S11V004346		0 0	E		Nickel-63	SOLID	N/A	<5.0300E-06			5.03E-06	uCi/g			U
13	SAMPLE	S11V004346		0 0	E		Nickel-C	SOLID		91.215				% Recovery			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00027845

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027753

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105160068	STD				
2	S1105030006	BLNK-PREP				
3	S11V004109	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105030007	DUP	S11V004109			
5	S11V004126	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
6	S11V004147	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004168	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
8	S11V004211	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
9	S11V004253	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
10	S11V004274	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
11	S11V004295	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
12	S11V004324	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
13	S11V004344	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027753

Analyst: Bierman, Marcus **Book#:** 120B64

Instrument: AEA-Ortec

Method: PLUTONIUM, LA-508-168 Rev/Mod A-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027416

Batch Comment:

C Farm WMA C8100 for PU Solid. MOF

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105160068		0 0			Pu-239/240	LIQUID	.000142	1.5210E-04		1.81	5.27E-07	uCi/mL	107.11	% Recovery	
1	STD	S1105160068		0 0			Plutonium-236T	LIQUID		76.02		2.47	4.55E-07	uCi/mL	N/A		
Sample Sequence 2																	
2	BLNK-PREP	S1105030006		0 0	E		Pu-239/240	SOLID		<6.3400E-08			6.34E-08	uCi/g			
2	BLNK-PREP	S1105030006		0 0	E		Plutonium-236T	SOLID		53.82		2.91	7.26E-08	uCi/g			
2	BLNK-PREP	S1105030006		0 0	E		Plutonium-238	SOLID		<6.5820E-08			6.58E-08	uCi/g			
Sample Sequence 3																	
3	SAMPLE	S11V004109		0 0	E		Pu-239/240	SOLID	N/A	3.7770E-08		33.33	3.71E-08	uCi/g			J
3	SAMPLE	S11V004109		0 0	E		Plutonium-236T	SOLID		82.89		2.32	3.46E-08	uCi/g			
3	SAMPLE	S11V004109		0 0	E		Plutonium-238	SOLID	N/A	<4.0440E-08			4.04E-08	uCi/g			U
Sample Sequence 4																	
4	DUP	S1105030007	S11V004109	0 0	E		Pu-239/240	SOLID	3.7770E-08	<5.1800E-08			5.18E-08	uCi/g			
4	DUP	S1105030007	S11V004109	0 0	E		Plutonium-236T	SOLID	82.89	79.59		2.39	5.73E-08	uCi/g			
4	DUP	S1105030007	S11V004109	0 0	E		Plutonium-238	SOLID	<4.0440E-08	9.3970E-08		21.32	4.90E-08	uCi/g	79.652	% RPD	
Sample Sequence 5																	
5	SAMPLE	S11V004126		0 0	E		Pu-239/240	SOLID	N/A	<4.5400E-08			4.54E-08	uCi/g			U
5	SAMPLE	S11V004126		0 0	E		Plutonium-236T	SOLID		80.84		2.41	3.98E-08	uCi/g			
5	SAMPLE	S11V004126		0 0	E		Plutonium-238	SOLID	N/A	6.6590E-08		26.7	3.06E-08	uCi/g			
Sample Sequence 6																	
6	SAMPLE	S11V004147		0 0	E		Pu-239/240	SOLID	N/A	<3.1700E-08			3.17E-08	uCi/g			U
6	SAMPLE	S11V004147		0 0	E		Plutonium-236T	SOLID		82.93		2.67	4.16E-08	uCi/g			
6	SAMPLE	S11V004147		0 0	E		Plutonium-238	SOLID	N/A	<2.9780E-08			2.98E-08	uCi/g			U
Sample Sequence 7																	
7	SAMPLE	S11V004168		0 0	E		Pu-239/240	SOLID	N/A	<4.0200E-08			4.02E-08	uCi/g			U
7	SAMPLE	S11V004168		0 0	E		Plutonium-236T	SOLID		80.65		2.36	3.78E-08	uCi/g			
7	SAMPLE	S11V004168		0 0	E		Plutonium-238	SOLID	N/A	<3.8380E-08			3.84E-08	uCi/g			U
Sample Sequence 8																	
8	SAMPLE	S11V004211		0 0	E		Pu-239/240	SOLID	N/A	<4.1800E-08			4.18E-08	uCi/g			U
8	SAMPLE	S11V004211		0 0	E		Plutonium-236T	SOLID		80.84		2.41	4.48E-08	uCi/g			
8	SAMPLE	S11V004211		0 0	E		Plutonium-238	SOLID	N/A	<3.5700E-08			3.57E-08	uCi/g			U

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027753

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 9																	
9	SAMPLE	S11V004253		0 0	E		Pu-239/240	SOLID	N/A	<2.8900E-08			2.89E-08	uCi/g			U
9	SAMPLE	S11V004253		0 0	E		Plutonium-236T	SOLID		86.26		1.92	1.75E-08	uCi/g			
9	SAMPLE	S11V004253		0 0	E		Plutonium-238	SOLID	N/A	<2.2810E-08			2.28E-08	uCi/g			U
Sample Sequence 10																	
10	SAMPLE	S11V004274		0 0	E		Pu-239/240	SOLID	N/A	<3.7300E-08			3.73E-08	uCi/g			U
10	SAMPLE	S11V004274		0 0	E		Plutonium-236T	SOLID		85.05		1.94	3.74E-08	uCi/g			
10	SAMPLE	S11V004274		0 0	E		Plutonium-238	SOLID	N/A	<3.2290E-08			3.23E-08	uCi/g			U
Sample Sequence 11																	
11	SAMPLE	S11V004295		0 0	E		Pu-239/240	SOLID	N/A	<3.2700E-08			3.27E-08	uCi/g			U
11	SAMPLE	S11V004295		0 0	E		Plutonium-236T	SOLID		84.37		1.96	2.91E-08	uCi/g			
11	SAMPLE	S11V004295		0 0	E		Plutonium-238	SOLID	N/A	<2.9360E-08			2.94E-08	uCi/g			U
Sample Sequence 12																	
12	SAMPLE	S11V004324		0 0	E		Pu-239/240	SOLID	N/A	<2.2600E-08			2.26E-08	uCi/g			U
12	SAMPLE	S11V004324		0 0	E		Plutonium-236T	SOLID		88.68		1.91	2.06E-08	uCi/g			
12	SAMPLE	S11V004324		0 0	E		Plutonium-238	SOLID	N/A	<2.1560E-08			2.16E-08	uCi/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004344		0 0	E		Pu-239/240	SOLID	N/A	4.3900E-08		44.7	3.03E-08	uCi/g			J
13	SAMPLE	S11V004344		0 0	E		Plutonium-236T	SOLID		87.65		1.92	2.39E-08	uCi/g			
13	SAMPLE	S11V004344		0 0	E		Plutonium-238	SOLID	N/A	<2.8820E-08			2.88E-08	uCi/g			U

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00027753

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

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N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027781

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105030019	BLNK-PREP				
2	S11V004112	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
3	S1105030020	DUP	S11V004112			
4	S11V004129	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
5	S11V004150	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
6	S11V004171	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
7	S11V004214	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
8	S11V004256	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
9	S11V004277	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
10	S11V004298	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
11	S11V004327	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
12	S11V004347	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027781

Analyst: Bierman, Marcus **Book#:**

Instrument: LSC3 LS6500 B-1A

Method: SELENIUM-79, LA-508-121 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027425

Batch Comment:

C-Farm WMA C8100 for Se-79. gll

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	BLNK-PREP	S1105030019		0 0	E		Selenium-79	SOLID		4.7700E-06		984.859	1.34E-06	uCi/g			
1	BLNK-PREP	S1105030019		0 0	E		Selenium-C	SOLID		72.872				% Recovery			
Sample Sequence 2																	
2	SAMPLE	S11V004112		0 0	E		Selenium-79	SOLID	N/A	9.1900E-06		123.242	1.66E-06	uCi/g			BE
2	SAMPLE	S11V004112		0 0	E		Selenium-C	SOLID		60.394				% Recovery			
Sample Sequence 3																	
3	DUP	S1105030020	S11V004112	0 0	E		Selenium-79	SOLID	9.1900E-06	5.9600E-06		91.796	1.79E-06	uCi/g	42.640	% RPD	
3	DUP	S1105030020	S11V004112	0 0	E		Selenium-C	SOLID	60.394	57.899				% Recovery			
Sample Sequence 4																	
4	SAMPLE	S11V004129		0 0	E		Selenium-79	SOLID	N/A	1.1300E-05		118.774	1.70E-06	uCi/g			BE
4	SAMPLE	S11V004129		0 0	E		Selenium-C	SOLID		64.886				% Recovery			
Sample Sequence 5																	
5	SAMPLE	S11V004150		0 0	E		Selenium-79	SOLID	N/A	3.7600E-06		39.84	1.54E-06	uCi/g			BE
5	SAMPLE	S11V004150		0 0	E		Selenium-C	SOLID		63.888				% Recovery			
Sample Sequence 6																	
6	SAMPLE	S11V004171		0 0	E		Selenium-79	SOLID	N/A	5.1900E-06		59.644	1.63E-06	uCi/g			BE
6	SAMPLE	S11V004171		0 0	E		Selenium-C	SOLID		58.398				% Recovery			
Sample Sequence 7																	
7	SAMPLE	S11V004214		0 0	E		Selenium-79	SOLID	N/A	7.4200E-06		61.144	1.82E-06	uCi/g			BE
7	SAMPLE	S11V004214		0 0	E		Selenium-C	SOLID		65.386				% Recovery			
Sample Sequence 8																	
8	SAMPLE	S11V004256		0 0	E		Selenium-79	SOLID	N/A	1.3600E-05		211.065	1.90E-06	uCi/g			BE
8	SAMPLE	S11V004256		0 0	E		Selenium-C	SOLID		62.391				% Recovery			
Sample Sequence 9																	
9	SAMPLE	S11V004277		0 0	E		Selenium-79	SOLID	N/A	8.8500E-06		120.237	1.55E-06	uCi/g			BE
9	SAMPLE	S11V004277		0 0	E		Selenium-C	SOLID		69.379				% Recovery			
Sample Sequence 10																	
10	SAMPLE	S11V004298		0 0	E		Selenium-79	SOLID	N/A	6.1100E-06		54.058	2.35E-06	uCi/g			BE
10	SAMPLE	S11V004298		0 0	E		Selenium-C	SOLID		48.415				% Recovery			
Sample Sequence 11																	

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LABCORE Completed Batch Report for Batch# 00027781

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
11	SAMPLE	S11V004327		0 0	E		Selenium-79	SOLID	N/A	6.6200E-06		45.996	1.83E-06	uCi/g			BE
11	SAMPLE	S11V004327		0 0	E		Selenium-C	SOLID		57.899				% Recovery			
Sample Sequence 12																	
12	SAMPLE	S11V004347		0 0	E		Selenium-79	SOLID	N/A	1.4000E-05		12785.151	1.96E-06	uCi/g			BE
12	SAMPLE	S11V004347		0 0	E		Selenium-C	SOLID		60.394				% Recovery			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00027781

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

* = Rejected Analyte
N, A = Non-reported Analyte

LABCORE Completed Batch Report for Batch# 00027728

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105130005	STD				
2	S1105030008	BLNK-PREP				
3	S11V004110	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105030009	DUP	S11V004110			
5	S11V004127	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
6	S11V004148	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
7	S11V004169	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
8	S11V004212	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
9	S11V004254	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
10	S11V004275	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
11	S11V004296	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
12	S11V004325	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
13	S11V004345	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027728

Analyst: Barela, Essie **Book#:** 120B64

Instrument: A/B Detector 13 B-1A

Method: SR-90 ENV SOLID, LA-508-114 Rev/Mod F-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027418

Batch Comment:

C Farm WMA C8100 for SR - 90. MOF

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105130005		0 0			Strontium-89/90	LIQUID	.000683673888198886	7.5939E-04		2.361	1.56E-06	uCi/mL	111.08	% Recovery	
1	STD	S1105130005		0 0			Strontium-C	LIQUID		80.619				% Recovery	N/A		
Sample Sequence 2																	
2	BLNK-PREP	S1105030008		0 0	E		Strontium-89/90	SOLID		<4.7040E-07			4.70E-07	uCi/g			
2	BLNK-PREP	S1105030008		0 0	E		Strontium-C	SOLID		80.619				% Recovery			
Sample Sequence 3																	
3	SAMPLE	S11V004110		0 0	E		Strontium-89/90	SOLID	N/A	3.9481E-06		14.727	2.22E-07	uCi/g			
3	SAMPLE	S11V004110		0 0	E		Strontium-C	SOLID		59.341				% Recovery			
Sample Sequence 4																	
4	DUP	S1105030009	S11V004110	0 0	E		Strontium-89/90	SOLID	3.9481E-06	3.9695E-06		13.209	1.88E-07	uCi/g	0.54179	% RPD	
4	DUP	S1105030009	S11V004110	0 0	E		Strontium-C	SOLID	59.341	69.231				% Recovery			
Sample Sequence 5																	
5	SAMPLE	S11V004127		0 0	E		Strontium-89/90	SOLID	N/A	4.0134E-06		13.379	1.94E-07	uCi/g			
5	SAMPLE	S11V004127		0 0	E		Strontium-C	SOLID		68.232				% Recovery			
Sample Sequence 6																	
6	SAMPLE	S11V004148		0 0	E		Strontium-89/90	SOLID	N/A	<7.5423E-07			7.54E-07	uCi/g			U
6	SAMPLE	S11V004148		0 0	E		Strontium-C	SOLID		48.452				% Recovery			
Sample Sequence 7																	
7	SAMPLE	S11V004169		0 0	E		Strontium-89/90	SOLID	N/A	<6.8591E-07			6.86E-07	uCi/g			U
7	SAMPLE	S11V004169		0 0	E		Strontium-C	SOLID		64.635				% Recovery			
Sample Sequence 8																	
8	SAMPLE	S11V004212		0 0	E		Strontium-89/90	SOLID	N/A	<5.0181E-07			5.02E-07	uCi/g			U
8	SAMPLE	S11V004212		0 0	E		Strontium-C	SOLID		73.427				% Recovery			
Sample Sequence 9																	
9	SAMPLE	S11V004254		0 0	E		Strontium-89/90	SOLID	N/A	<7.1926E-07			7.19E-07	uCi/g			U
9	SAMPLE	S11V004254		0 0	E		Strontium-C	SOLID		66.134				% Recovery			
Sample Sequence 10																	
10	SAMPLE	S11V004275		0 0	E		Strontium-89/90	SOLID	N/A	<8.8691E-07			8.87E-07	uCi/g			U
10	SAMPLE	S11V004275		0 0	E		Strontium-C	SOLID		55.145				% Recovery			

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LABCORE Completed Batch Report for Batch# 00027728

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 11																	
11	SAMPLE	S11V004296		0 0	E		Strontium-89/90	SOLID	N/A	<2.5792E-07			2.58E-07	uCi/g			U
11	SAMPLE	S11V004296		0 0	E		Strontium-C	SOLID		51.349				% Recovery			
Sample Sequence 12																	
12	SAMPLE	S11V004325		0 0	E		Strontium-89/90	SOLID	N/A	<2.4654E-07			2.47E-07	uCi/g			U
12	SAMPLE	S11V004325		0 0	E		Strontium-C	SOLID		50.949				% Recovery			
Sample Sequence 13																	
13	SAMPLE	S11V004345		0 0	E		Strontium-89/90	SOLID	N/A	<7.3472E-07			7.35E-07	uCi/g			U
13	SAMPLE	S11V004345		0 0	E		Strontium-C	SOLID		69.131				% Recovery			

Comments Section:

Data Flagger Status:
Flagging Completed

Final Page for Batch# 00027728

Reviewer Signature **Date**

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LABCORE Completed Batch Report for Batch# 00027725

Seq	Sample#	QC Type	Assoc. Sample	Sample Group	Customer Id	Specification
1	S1105130001	STD				
2	S1105120045	BLNK-PREP				
3	S11V004113	SAMPLE		20110264	B2B1L6	C Farm WMC 2011-C8100
4	S1105120046	DUP	S11V004113			
5	S1105120047	SPK-PREDIG	S11V004113			
6	S11V004130	SAMPLE		20110264	B2B1L7	C Farm WMC 2011-C8100
7	S11V004151	SAMPLE		20110264	B2C1M2	C Farm WMC 2011-C8100
8	S11V004172	SAMPLE		20110264	B2C1M3	C Farm WMC 2011-C8100
9	S11V004215	SAMPLE		20110264	B2C1M5	C Farm WMC 2011-C8100
10	S11V004257	SAMPLE		20110264	B2C1M7	C Farm WMC 2011-C8100
11	S11V004278	SAMPLE		20110264	B2C1M8	C Farm WMC 2011-C8100
12	S11V004299	SAMPLE		20110264	B2C1M9	C Farm WMC 2011-C8100
13	S11V004328	SAMPLE		20110264	B2C1N0	C Farm WMC 2011-C8100
14	S11V004348	SAMPLE		20110264	B2C1N1	C Farm WMC 2011-C8100

LABCORE Completed Batch Report for Batch# 00027725

Analyst: Yager, Gary **Book#:** 152B64

Instrument: LSC3 LS6500 B-1A

Method: TRITIUM-LARGE VOLUME, LA-508-121 Rev/Mod G-0

Specification: C Farm WMC 2011-C8100

Prep Batch: 00027710

Batch Comment:

H3 for CFarm WMC 2011-C8100. ACC

Seq	Type	Sample#	Assoc. Sample	RepR	A	*	Test	Matrix	Actual	Found	Blank	CTR	Limit (DL/RL/UL)	Unit	Yield	Yield Unit	Flags
Sample Sequence 1																	
1	STD	S1105130001		0 0			Tritium	LIQUID	.00002235382 12895617	2.2188E-05		2.802	2.68E-07	uCi/mL	99.26	% Recovery	
Sample Sequence 2																	
2	BLNK-PREP	S1105120045		0 0	W		Tritium	SOLID		<3.9100E-06			3.91E-06	uCi/g			
Sample Sequence 3																	
3	SAMPLE	S11V004113		0 0	W		Tritium	SOLID	N/A	<4.0800E-06			4.08E-06	uCi/g			U
Sample Sequence 4																	
4	DUP	S1105120046	S11V004113	0 0	W		Tritium	SOLID	<4.0800E-06	<2.6532E-06			2.65E-06	uCi/g			
Sample Sequence 5																	
5	SPK-PREDIG	S1105120047	S11V004113	0 0	W		Tritium	SOLID	.00002235382 12895617	2.2808E-05		4.331325511	2.67E-07	uCi/g	102.03	% Recovery	
Sample Sequence 6																	
6	SAMPLE	S11V004130		0 0	W		Tritium	SOLID	N/A	<2.6000E-06			2.60E-06	uCi/g			U
Sample Sequence 7																	
7	SAMPLE	S11V004151		0 0	W		Tritium	SOLID	N/A	<3.5200E-06			3.52E-06	uCi/g			U
Sample Sequence 8																	
8	SAMPLE	S11V004172		0 0	W		Tritium	SOLID	N/A	<2.6700E-06			2.67E-06	uCi/g			U
Sample Sequence 9																	
9	SAMPLE	S11V004215		0 0	W		Tritium	SOLID	N/A	<3.6600E-06			3.66E-06	uCi/g			U
Sample Sequence 10																	
10	SAMPLE	S11V004257		0 0	W		Tritium	SOLID	N/A	<2.6000E-06			2.60E-06	uCi/g			U
Sample Sequence 11																	
11	SAMPLE	S11V004278		0 0	W		Tritium	SOLID	N/A	<2.6600E-06			2.66E-06	uCi/g			U
Sample Sequence 12																	
12	SAMPLE	S11V004299		0 0	W		Tritium	SOLID	N/A	<2.6600E-06			2.66E-06	uCi/g			U
Sample Sequence 13																	
13	SAMPLE	S11V004328		0 0	W		Tritium	SOLID	N/A	<2.6800E-06			2.68E-06	uCi/g			U
Sample Sequence 14																	
14	SAMPLE	S11V004348		0 0	W		Tritium	SOLID	N/A	<2.6100E-06			2.61E-06	uCi/g			U

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