

FEBRUARY 5, 2014

**WSCF Laboratory**

PO Box 650 S3-30  
Richland, WA 99352



February 5, 2014

Scot Fitzgerald  
CH2M-HILL PRC  
PO Box 1600  
Richland, WA 99352

Dear Scot Fitzgerald,

**FINAL RESULT FOR SAMPLE DELIVERY GROUP WSCF140145**

Reference: (1) SOW, Mod 2, #36587, Release 3  
(2) MSC-SD-CD-QAPP-017, current version, Waste Sampling & Characterization Facility Quality Assurance Program Plan

This letter contains the following information for sample delivery group WSCF140145

- \* Cover Sheet (Attachment 1)
- \* Narrative (Attachment 2)
- \* Analytical Results (Attachment 3)
- \* Sample Receipt Information (Attachment 4)

Very truly yours,

A handwritten signature in black ink, appearing to read "Joseph Hale", is positioned above the typed name.

Electronically signed by Joseph Hale

For Lab Manager, Dan T. Smith

WSCF Analytical Lab

(509) 373-4804

Attachments 4

CC: w/Attachments

File/LB

ATTACHMENT 1

**COVER SHEET**

Consisting of 2 pages  
Including cover page

**WSCF SAF Number Cross Reference**

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Group # WSCF140145  
Data Deliverable Date 02/05/14

<b>SAF #</b>	<b>Sample ID</b>	<b>Sample #</b>	<b>Matrix</b>	<b>Sampled</b>	<b>Received</b>
F11-031	B2VW54	140145001	OTHERSOLID	01/21/14	01/21/14
F11-031	B2VW51	140145002	OTHERSOLID	01/21/14	01/21/14

ATTACHMENT 2

**NARRATIVE**

Consisting of 6 pages  
Including cover page

### Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW)*, to Contract 39818, Revision 4, "WSCF ANALYTICAL SERVICES FOR GROUNDWATER."

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, C, D, J and U) may be applicable to this report, as appropriate.

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **C** – Analyte was detected in the blank and was evaluated. Affected sample results in the batch were C flagged (applies to inorganic and wet chemical analyses).
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **B (organic analyses)** – Analyte was detected in the blank and was evaluated. Affected sample results in the batch were B flagged.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.
- **o** – LCS recovery outside established laboratory acceptance limits.

### Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report* for a complete listing of approved analytical methods.

**Inorganic Comments**

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

**Organic Comments**

**Semi-VOA** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- 1,4-Dichlorobenzene and 2-Methylphenol did not meet the MS and/or MSD acceptance limits. Sample results for this analytes were “T” Flagged.
- The MS did not meet the acceptance limits for surrogate Phenol-d5, 2,4,6-Tribromophenol, Terphenyl-d14, 2-Fluorophenol and Fluoranthene-d10. The MSD did not meet the acceptance limits for surrogate Phenol-d5, 2-Methylnaphthalene-d10, 2,4,6-Tribromophenol, Terphenyl-d14, 2-Fluorophenol and Fluoranthene-d10. Sample B2VW54 (140145001) did not meet the acceptance limits for surrogate Phenol-d5, 2-Methylnaphthalene-d10, 2-Fluorobiphenyl, 2,4,6-Tribromophenol, Terphenyl-d14, 2-Fluorophenol and Fluoranthene-d10. Sample B2VW51 (140145002) did not meet the acceptance limits for surrogate Phenol-d5, 2-Methylnaphthalene-d10, 2,4,6-Tribromophenol, Terphenyl-d14, 2-Fluorophenol and Fluoranthene-d10. Sample results were not flagged. The quality control report was flagged for surrogate recovery failure.
- Due to the nature of the charcoal sample matrix, it was expected that the routine manner of spiking the samples would produce MS and MSD recovery failures and low surrogate recoveries. Therefore, the samples were prepped as routine and then they were re-prepped using post extraction addition of surrogate and matrix spike. The samples, MS and MSD that were processed using the post extraction addition of surrogate and matrix spike have no QC problems. A table with this information is provided below:

Analyte	CAS #	Original Found	QC Found	Units	% Recovery	Recovery Limits	RPD	RPD Limit	RQ	Analyzed
<b>MS</b>	<b>Original #140145001</b>									
1,4-Dichlorobenzene	106-46-7	ND	20.7	ug/mL	103.57	52-116				1/29/2014
2-Methylphenol	95-48-7	ND	27.9	ug/mL	93.2	34-121				1/29/2014
Hexachloroethane	67-72-1	ND	30.1	ug/mL	100.35	51-116				1/29/2014
<b>MSD</b>	<b>Original #140145001</b>									
1,4-Dichlorobenzene	106-46-7	ND	17.9	ug/mL	89.63	52-116	8.7	30		1/29/2014
2-Methylphenol	95-48-7	ND	23.6	ug/mL	78.58	34-121	6.1	30		1/29/2014
Hexachloroethane	67-72-1	ND	26.2	ug/mL	87.33	51-116	3.0	30		1/29/2014
<b>SAMPLE</b>	<b>Sample #140145001</b>									
2-Fluorophenol	367-12-4		15.2	ug/mL	76.1	38-151				1/29/2014
Phenol-d5	4165-62-2		15.7	ug/mL	78.7	38-153				1/29/2014
Nitrobenzene-d5	4165-60-0		21.9	ug/mL	109.7	42-153				1/29/2014
2-Methylnaphthalene-d10	7297-45-2		19.5	ug/mL	97.3	27-197				1/29/2014
2-Fluorobiphenyl	321-60-8		19.6	ug/mL	98.2	34-160				1/29/2014
2,4,6-Tribromophenol	118-79-6		6.79	ug/mL	33.9	21-147				1/29/2014
Fluoranthene-d10	93951-69-0		17.6	ug/mL	88.3	39-168				1/29/2014
Terphenyl-d14	98904-43-9		23.5	ug/mL	117.4	51-155				1/29/2014
<b>SAMPLE</b>	<b>Sample #140145002</b>									
2-Fluorophenol	367-12-4		15.4	ug/mL	77.1	38-151				1/29/2014
Phenol-d5	4165-62-2		15.8	ug/mL	79.2	38-153				1/29/2014
Nitrobenzene-d5	4165-60-0		22.1	ug/mL	110.3	42-153				1/29/2014
2-Methylnaphthalene-d10	7297-45-2		19.4	ug/mL	97.0	27-197				1/29/2014
2-Fluorobiphenyl	321-60-8		20.1	ug/mL	100.3	34-160				1/29/2014
2,4,6-Tribromophenol	118-79-6		7.28	ug/mL	36.4	21-147				1/29/2014
Fluoranthene-d10	93951-69-0		17.6	ug/mL	88.1	39-168				1/29/2014
Terphenyl-d14	98904-43-9		23.4	ug/mL	117.1	51-155				1/29/2014
<b>MS</b>	<b>Original #140145001</b>									
2-Fluorophenol	367-12-4		16.3	ug/mL	81.7	38-151				1/29/2014
Phenol-d5	4165-62-2		17.9	ug/mL	89.4	38-153				1/29/2014
Nitrobenzene-d5	4165-60-0		24.3	ug/mL	121.3	42-153				1/29/2014
2-Methylnaphthalene-d10	7297-45-2		22.5	ug/mL	112.5	27-197				1/29/2014
2-Fluorobiphenyl	321-60-8		21.2	ug/mL	106.2	34-160				1/29/2014
2,4,6-Tribromophenol	118-79-6		15.3	ug/mL	76.7	21-147				1/29/2014
Fluoranthene-d10	93951-69-0		21.1	ug/mL	105.7	39-168				1/29/2014
Terphenyl-d14	98904-43-9		23.6	ug/mL	117.9	51-155				1/29/2014
<b>MSD</b>	<b>Original #140145001</b>									
2-Fluorophenol	367-12-4		14.3	ug/mL	71.4	38-151				1/29/2014
Phenol-d5	4165-62-2		15.5	ug/mL	77.5	38-153				1/29/2014
Nitrobenzene-d5	4165-60-0		21.4	ug/mL	107	42-153				1/29/2014
2-Methylnaphthalene-d10	7297-45-2		19.6	ug/mL	98.2	27-197				1/29/2014

Analyte	CAS #	Original Found	QC Found	Units	% Recovery	Recovery Limits	RPD	RPD Limit	RQ	Analyzed
2-Fluorobiphenyl	321-60-8		18.7	ug/mL	93.7	34-160				1/29/2014
2,4,6-Tribromophenol	118-79-6		13.2	ug/mL	65.9	21-147				1/29/2014
Fluoranthene-d10	93951-69-0		17.9	ug/mL	89.4	39-168				1/29/2014
Terphenyl-d14	98904-43-9		20.6	ug/mL	102.9	51-155				1/29/2014

- All other applicable QC controls are within the established limits.

### Radiochemistry Comments

**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Neptunium-237), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

Tracers are used to determine chemical yield. RPD is monitored in sample duplicate and is not required for tracer recovery per SOW.

### **Gamma Energy Analysis:**

- All applicable QC controls are within the established limits.

### **Gross Alpha / Gross Beta:**

- Gross Beta – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results with greater than 20% counting uncertainty. No flags issued.
- All other applicable QC controls are within the established limits.

### **Americium-241:**

- All applicable QC controls are within the established limits.

### **Neptunium-237:**

- All applicable QC controls are within the established limits.

### **Isotopic Plutonium analysis:**

- All applicable QC controls are within the established limits.

### **Isotopic Uranium analysis:**

- Uranium-235 – Duplicate Relative Percent Difference(s) (RPD) did not meet the established laboratory limits. Duplicate Relative Percent Difference (RPD) does not apply to results below 5X the minimum detectable activity. No flags issued.

Attachment 2  
**Narrative**  
WSCF140145

- Uranium-234 – Blank contamination is due to Naturally Occurring Radioactive Material.
- All other applicable QC controls are within the established limits.

**Strontium-89/90:**

- Strontium-85 results were made using a recovery based on the mass of carrier added as opposed to using a Strontium-85 tracer. The HVAC for the counting went down prior to being able to count the samples for Sr-85. The chemist did account for the beta results from Sr-85 as well.
- All other applicable QC controls are within the established limits.

We certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

FEBRUARY 5, 2014

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 46 pages  
Including cover page

FEBRUARY 5, 2014

**WSCF ANALYTICAL RESULTS REPORT**

For

CH2M Hill Plateau Remediation

PO Box 1600  
Richland, WA 99352

Attention: Scot Fitzgerald

**Contract #** MOA-FH-CHPRC-2008  
**Group #** WSCF140145  
**Report Date** February 5, 2014

Analytical: Electronically signed by Joseph Hale

Client Services: Electronically signed by Heather Medley

*Solid samples results that have a 'Percent Solid' test are reported on a "dry weight basis", except results of TCLP, Percent Solid, and Total Activity. If no 'Percent Solid' test is reported then the results are reported on an "as received" basis.*

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Batch QC List

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140145

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
226902	226911	4	BLANK	104931	BLANK		ICP-2008 MS All possible metal
226902	226911	5	LCS	104932	LCS		ICP-2008 MS All possible metal
226902	226911	7	MS	104933	B2VPR8(140006001MS)	140006001	ICP-2008 MS All possible metal
226902	226911	8	MSD	104934	B2VPR8(140006001MSD)	140006001	ICP-2008 MS All possible metal
226902	226911	9	SAMPLE	140145001	B2VW54		ICP-2008 MS All possible metal
226902	226911	10	SAMPLE	140145002	B2VW51		ICP-2008 MS All possible metal

Batch QC List

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
226912	227256	1	BLANK	104984	BLANK		SW-846 8270D Semivolatiles
226912	227256	2	LCS	104985	LCS		SW-846 8270D Semivolatiles
226912	227256	3	MS	104986	B2VW54(140145001MS)	140145001	SW-846 8270D Semivolatiles
226912	227256	4	MSD	104987	B2VW54(140145001MSD)	140145001	SW-846 8270D Semivolatiles
226912	227256	5	SAMPLE	140145001	B2VW54		SW-846 8270D Semivolatiles
226912	227256	6	SAMPLE	140145002	B2VW51		SW-846 8270D Semivolatiles

Batch QC List

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
226631	227108	1	BLANK	104506	BLANK		Strontium 89/90 (GPC/GEA)
226631	227108	2	LCS	104507	LCS		Strontium 89/90 (GPC/GEA)
226631	227108	3	DUP	104508	B2VW54(140145001DUP 140145001		Strontium 89/90 (GPC/GEA)
226631	227108	4	SAMPLE	140145001	B2VW54		Strontium 89/90 (GPC/GEA)
226631	227108	5	SAMPLE	140145002	B2VW51		Strontium 89/90 (GPC/GEA)
226632	226841	1	IBLANK	104509	IBLANK		Gamma Energy Analysis-general
226632	226841	2	LCS	104510	LCS		Gamma Energy Analysis-general
226632	226841	3	DUP	104511	B2VW54(140145001DUP 140145001		Gamma Energy Analysis-general
226632	226841	4	SAMPLE	140145001	B2VW54		Gamma Energy Analysis-general
226632	226841	5	SAMPLE	140145002	B2VW51		Gamma Energy Analysis-general
226665	226918	1	DUP	104621	B2VW54(140145001DUP 140145001		Uranium (AEA)
226665	226918	2	SAMPLE	140145001	B2VW54		Uranium (AEA)
226665	226918	3	SAMPLE	140145002	B2VW51		Uranium (AEA)
226665	226918	4	BLANK	104619	BLANK		Uranium (AEA)
226665	226918	5	LCS	104620	LCS		Uranium (AEA)
226665	226920	5	LCS	104620	LCS		Plutonium (AEA)
226665	226920	6	DUP	104621	B2VW54(140145001DUP 140145001		Plutonium (AEA)
226665	226920	7	SAMPLE	140145001	B2VW54		Plutonium (AEA)
226665	226920	8	SAMPLE	140145002	B2VW51		Plutonium (AEA)
226665	226920	9	BLANK	104619	BLANK		Plutonium (AEA)
226665	226921	5	LCS	104620	LCS		Americium/Curium (AEA)
226665	226921	6	DUP	104621	B2VW54(140145001DUP 140145001		Americium/Curium (AEA)
226665	226921	7	SAMPLE	140145001	B2VW54		Americium/Curium (AEA)

Batch QC List

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
226665	226921	8	SAMPLE	140145002	B2VW51		Americium/Curium (AEA)
226665	226921	9	BLANK	104619	BLANK		Americium/Curium (AEA)
226666	226919	1	NpDUP	104625	B2VW54(140145001NpD	140145001	Neptunium (AEA)
226666	226919	2	SAMPLE	140145001	B2VW54		Neptunium (AEA)
226666	226919	3	SAMPLE	140145002	B2VW51		Neptunium (AEA)
226666	226919	4	BLANK	104622	BLANK		Neptunium (AEA)
226666	226919	5	LCS	104623	LCS		Neptunium (AEA)
226666	226919	6	NpSPK	104624	B2VW51(140145002NpS		Neptunium (AEA)
226666	226919	7	NDUPSK	104626	B2VW51(140145002NDU		Neptunium (AEA)
226666	226919	8	NpSPK	104627	B2VW51(140145002NpS		Neptunium (AEA)
226901	227117	1	BLANK	104928	BLANK		GAB Discrete analysis Alpha only
226901	227117	2	LCS	104929	LCS		GAB Discrete analysis Alpha only
226901	227117	3	DUP	104930	B2VW54(140145001DUP	140145001	GAB Discrete analysis Alpha only
226901	227117	4	SAMPLE	140145001	B2VW54		GAB Discrete analysis Alpha only
226901	227117	5	SAMPLE	140145002	B2VW51		GAB Discrete analysis Alpha only
226901	227118	1	BLANK	104928	BLANK		GAB Discrete analysis Beta only
226901	227118	2	LCS	104929	LCS		GAB Discrete analysis Beta only
226901	227118	3	DUP	104930	B2VW54(140145001DUP	140145001	GAB Discrete analysis Beta only
226901	227118	4	SAMPLE	140145001	B2VW54		GAB Discrete analysis Beta only
226901	227118	5	SAMPLE	140145002	B2VW51		GAB Discrete analysis Beta only

Batch QC List

Attention Scot Fitzgerald  
Department Wet Chemistry

Group # WSCF140145

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
226830	226830	1	LCS	104845	LCS		Dry Weight/Percent Moisture
226830	226830	3	DUP	104846	B2VPR8(140006001DUP)	140006001	Dry Weight/Percent Moisture
226830	226830	4	SAMPLE	140145001	B2VW54		Dry Weight/Percent Moisture
226830	226830	5	SAMPLE	140145002	B2VW51		Dry Weight/Percent Moisture

**Method Reference**

**Attention** Scot Fitzgerald  
**Department** Inorganic

**Group #** WSCF140145

The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

<b>LA-505-412</b>	Determination of Trace Elements in Waters & Wastes by ICP Mass Spectrometry		
	EPA-600/R-94-111	200.8	Determination of Trace Elements in Waters and Waste by Inductively Coupled Plasma
	HEIS	200.8_METALS_ICPMS	Determination of Trace Elements in Waters and Waste by Inductively Coupled Plasma, Mass Spec.

Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

**Method Reference**

**Attention** Scot Fitzgerald  
**Department** Organic, Semivolatiles

**Group #** WSCF140145

The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

<b>LA-523-456</b>	Semivolatile Sample Analysis by SW-846 Method 8270D		
	EPA SW-846	8000B	Determinative Chromagraphic Separations
	EPA SW-846	3510C	Separatory Funnel Liquid-Liquid Extraction
	EPA SW-846	8270D	Semivolatile Organic Compounds by Gas
	EPA SW-846	3545	Pressurized Fluid Extraction (PFE)
			Chromatography/Mass Spectrometry (GC/MS)
	HEIS	8270_SVOA_GCMS	Semivolatile Organic Compounds by Gas
			Chromatography/Mass Spectrometry(GC/MS)

Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

**Method Reference**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

<b>LA-220-406</b>	Strontium-89 and 90 in Aqueous Samples by SR-SPEC Separation HEIS	SRTOT_SEP_PRECIP_GPC	Strontium 89/90, by Sr-Spec Sep.
<b>LA-508-471</b>	Thorium, Neptunium, Plutonium, Americium, and Uranium In Soil and Water Using Eichrom Column Separation (Prep) HEIS	PUISO_IE_PRECIP_AEA	Isotopic Plutonium, Alpha Spec
<b>LA-508-471</b>	Determination Of Uranium, Plutonium, And Americium HEIS	AMCMISO_IE_PREC_AEA	Americium/Curium Iso, Alpha Spec
<b>LA-508-481</b>	Gamma Energy Analysis using the Canberra Genie Ssystem HEIS	GAMMA_GS	Gamma Energy Analysis
<b>LA-508-471</b>	Determination Of Uranium, Plutonium, And Americium HEIS	UIISO_IE_PRECIP_AEA	Uranium Iso, Alpha Spec
<b>LA-904-400</b>	Thorium, Neptunium, Plutonium, Americium, and Uranium In Soil and Water Using Eichrom Column Separation HEIS	NP237_IE_PRECIP_AEA	Neptunium-237, Iso, Alpha Spec.
<b>LA-548-401</b>	Alpha and Beta in Liquid and Solid Samples - WSCF N/A	PREP METHOD	
<b>LA-548-421(LSC)</b>	Preparation of Sample Mounts For Gamma Energy Analysis N/A	PREP METHOD	
<b>LA-904-400</b>	Nitric Acid-Hydrochloric Acid Leach of Soil and Vegetation at WSCF N/A	PREP METHOD	
<b>LA-508-415</b>	Operation Of The Protean 2-Inch Alpha/Beta Counting System For Gross Alpha/ Beta Samples HEIS	ALPHA_GPC	Gross Alpha by GPC
	HEIS	BETA_GPC	Gross Beta by GPC
	HEIS	SRTOT_SEP_PRECIP_GPC	Strontium beta isotopic, GPC

Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

**Method Reference**

**Attention** Scot Fitzgerald  
**Department** Wet Chemistry

**Group #** WSCF140145

The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

<b>LA-519-412</b>	Total Residual Percent Solids Dried at 103 - 105 Degrees C		
	EPA-600/4-79-020	160.3	Total Residue
	Standard Methods	2540B	Total Solids Dried at 103-105 C
	HEIS	%SOLIDS	Dry Weight, Percent Solids

Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140145

Sample # 140145001  
 SAF# F11-031  
 Sample ID B2VW54

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>ICPMS Prep (S)</b>										<b>01/28/14</b>
<b>ICP-2008 MS All possible metal</b>										
Chromium	7440-47-3	LA-505-412	B	5.36		mg/kg	1	0.14	6.9	01/28/14
Vanadium	7440-62-2	LA-505-412		10.6		mg/kg	1	0.28	2.8	01/28/14
Zinc	7440-66-6	LA-505-412		106		mg/kg	1	2.8	6.9	01/28/14
Lead	7439-92-1	LA-505-412	B	1.08		mg/kg	1	0.069	1.4	01/28/14
Uranium	7440-61-1	LA-505-412		0.551		mg/kg	1	0.069		01/28/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140145

Sample # 140145002  
 SAF# F11-031  
 Sample ID B2VW51

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>ICPMS Prep (S)</b>										<b>01/28/14</b>
<b>ICP-2008 MS All possible metal</b>										
Chromium	7440-47-3	LA-505-412	B	2.14		mg/kg	1	0.13	6.6	01/28/14
Vanadium	7440-62-2	LA-505-412		4.04		mg/kg	1	0.26	2.6	01/28/14
Zinc	7440-66-6	LA-505-412		20.3		mg/kg	1	2.6	6.6	01/28/14
Lead	7439-92-1	LA-505-412		1.45		mg/kg	1	0.066	1.3	01/28/14
Uranium	7440-61-1	LA-505-412		0.306		mg/kg	1	0.066		01/28/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

Sample # 140145001  
 SAF# F11-031  
 Sample ID B2VW54

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Preparation for 8270 (S) ASE</b>										<b>01/23/14</b>
<b>SW-846 8270D Semivolatiles</b>										
1,4-Dichlorobenzene	106-46-7	LA-523-456	UT	<700		ug/kg	1	700	1.E3	01/31/14
Bis-(2-Chloroethyl) ether	111-44-4	LA-523-456	U	<700		ug/kg	1	700	1.E3	01/31/14
Hexachlorobutadiene	87-68-3	LA-523-456	U	<700		ug/kg	1	700	1.E3	01/31/14
2-Methylphenol	95-48-7	LA-523-456	UT	<700		ug/kg	1	700	1.E3	01/31/14
1,2-Dichlorobenzene	95-50-1	LA-523-456	U	<700		ug/kg	1	700	1.E3	01/31/14
3 & 4 Methylphenol, Total	65794-96-9	LA-523-456	U	<700		ug/kg	1	700	1.E3	01/31/14
Hexachloroethane	67-72-1	LA-523-456	U	<700		ug/kg	1	700	1.E3	01/31/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE  
 D - Analyte was reported at a secondary dilution factor.  
 E - Exceeds the calibration range (GC/MS).  
 J - Analyte < lowest calibration but >= MDL.  
 N - Presumed evidence based on MS library search(GC/MS only)

T - MS/MSD recovery outside control limits(GC/MS only).  
 U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

Sample # 140145002  
 SAF# F11-031  
 Sample ID B2VW51

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Preparation for 8270 (S) ASE</b>										<b>01/23/14</b>
<b>SW-846 8270D Semivolatiles</b>										
1,4-Dichlorobenzene	106-46-7	LA-523-456	UT	<600		ug/kg	1	600	900	01/31/14
Bis-(2-Chloroethyl) ether	111-44-4	LA-523-456	U	<600		ug/kg	1	600	900	01/31/14
Hexachlorobutadiene	87-68-3	LA-523-456	U	<600		ug/kg	1	600	900	01/31/14
2-Methylphenol	95-48-7	LA-523-456	UT	<600		ug/kg	1	600	900	01/31/14
1,2-Dichlorobenzene	95-50-1	LA-523-456	U	<600		ug/kg	1	600	900	01/31/14
3 & 4 Methylphenol, Total	65794-96-9	LA-523-456	U	<600		ug/kg	1	600	900	01/31/14
Hexachloroethane	67-72-1	LA-523-456	U	<600		ug/kg	1	600	900	01/31/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte was detected in both the BLANK and SAMPLE  
 D - Analyte was reported at a secondary dilution factor.  
 E - Exceeds the calibration range (GC/MS).  
 J - Analyte < lowest calibration but >= MDL.  
 N - Presumed evidence based on MS library search(GC/MS only)

T - MS/MSD recovery outside control limits(GC/MS only).  
 U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Sample # 140145001  
 SAF# F11-031  
 Sample ID B2VW54

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Am/Cm/Pu/U/Np Prep (AEA) S</b>										<b>01/28/14</b>
<b>Americium/Curium (AEA)</b>										
Americium-241	14596-10-2	LA-508-471	U	-2.2E-3	.033	pCi/g	1	0.082		01/30/14
<b>Plutonium (AEA)</b>										
Plutonium-238	13981-16-3	LA-508-471	U	-5.1E-3	.026	pCi/g	1	0.079		01/30/14
Plutonium-239_240	PU-239/240	LA-508-471	U	0.015	.026	pCi/g	1	0.065		01/30/14
<b>Uranium (AEA)</b>										
Uranium-234	U-233/234	LA-508-471	X	0.33	.076	pCi/g	1	0.023		01/28/14
Uranium-235	15117-96-1	LA-508-471		0.035	.017	pCi/g	1	0.022		01/28/14
Uranium-238	U-238	LA-508-471		0.30	.071	pCi/g	1	0.020		01/28/14
<b>GAB Prep for Discrete Analysis (S)</b>										<b>01/29/14</b>
<b>GAB Discrete analysis Alpha only</b>										
Gross Alpha	12587-46-1	LA-508-415		1.3	.54	pCi/g	1	0.60		02/03/14
<b>GAB Discrete analysis Beta only</b>										
Gross Beta	12587-47-2	LA-508-415		18	3	pCi/g	1	1.1		02/03/14
<b>Np Prep Solid (AEA) S</b>										<b>01/28/14</b>
<b>Neptunium (AEA)</b>										
Neptunium-237	13994-20-2	LA-904-400	U	5.8E-3	.02	pCi/g	1	0.054		01/28/14
<b>Preparation for GEA (S)</b>										<b>01/24/14</b>

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - The associated QC sample Blank ha a result jÃ MDA  
 U - Analyzed for but not detected above limiting criteria.  
 N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Sample # 140145001  
 SAF# F11-031  
 Sample ID B2VW54

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Gamma Energy Analysis-general</b>										
Cesium-137	10045-97-3	LA-508-481	U	-5.3E-3	.0056	pCi/g	1	0.012		01/27/14
Cobalt-60	10198-40-0	LA-508-481	U	0.011	.0055	pCi/g	1	0.013		01/27/14
Europium-152	14683-23-9	LA-508-481	U	-6.6E-3	.017	pCi/g	1	0.035		01/27/14
Europium-154	15585-10-1	LA-508-481	U	-7.1E-3	.015	pCi/g	1	0.033		01/27/14
Europium-155	14391-16-3	LA-508-481	U	0.031	.021	pCi/g	1	0.045		01/27/14
Protactinium-231	14331-85-2	LA-508-481	U	-0.090	.25	pCi/g	1	0.54		01/27/14
<b>Strontium 89/90 SOLID/SOIL PREP</b>										<b>01/28/14</b>
<b>Strontium 89/90 (GPC/GEA)</b>										
Strontium-89_90	SR-RAD	LA-220-406	U	-0.34	.23	pCi/g	1	1.3		02/04/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - The associated QC sample Blank ha a result jÃ MDA  
 U - Analyzed for but not detected above limiting criteria.  
 N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Sample # 140145002  
 SAF# F11-031  
 Sample ID B2VW51

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Am/Cm/Pu/U/Np Prep (AEA) S</b>										<b>01/28/14</b>
<b>Americium/Curium (AEA)</b>										
Americium-241	14596-10-2	LA-508-471	U	-2.4E-3	.039	pCi/g	1	0.092		01/30/14
<b>Plutonium (AEA)</b>										
Plutonium-238	13981-16-3	LA-508-471	U	0.018	.041	pCi/g	1	0.11		01/30/14
Plutonium-239_240	PU-239/240	LA-508-471	U	0.033	.042	pCi/g	1	0.077		01/30/14
<b>Uranium (AEA)</b>										
Uranium-234	U-233/234	LA-508-471	X	0.35	.083	pCi/g	1	0.021		01/28/14
Uranium-235	15117-96-1	LA-508-471		0.023	.014	pCi/g	1	0.020		01/28/14
Uranium-238	U-238	LA-508-471		0.29	.07	pCi/g	1	0.018		01/28/14
<b>GAB Prep for Discrete Analysis (S)</b>										<b>01/29/14</b>
<b>GAB Discrete analysis Alpha only</b>										
Gross Alpha	12587-46-1	LA-508-415		0.62	.36	pCi/g	1	0.52		02/03/14
<b>GAB Discrete analysis Beta only</b>										
Gross Beta	12587-47-2	LA-508-415		2.9	.74	pCi/g	1	1.0		02/03/14
<b>Np Prep Solid (AEA) S</b>										<b>01/28/14</b>
<b>Neptunium (AEA)</b>										
Neptunium-237	13994-20-2	LA-904-400	U	0.010	.02	pCi/g	1	0.047		01/28/14
<b>Preparation for GEA (S)</b>										<b>01/24/14</b>

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - The associated QC sample Blank ha a result  $\geq$  MDA  
 U - Analyzed for but not detected above limiting criteria.  
 N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Sample # 140145002  
 SAF# F11-031  
 Sample ID B2VW51

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Gamma Energy Analysis-general</b>										
Cesium-137	10045-97-3	LA-508-481	U	3.5E-3	.0059	pCi/g	1	0.011		01/27/14
Cobalt-60	10198-40-0	LA-508-481	U	-1.6E-3	.006	pCi/g	1	0.011		01/27/14
Europium-152	14683-23-9	LA-508-481	U	-0.0070	.015	pCi/g	1	0.031		01/27/14
Europium-154	15585-10-1	LA-508-481	U	-3.3E-3	.014	pCi/g	1	0.030		01/27/14
Europium-155	14391-16-3	LA-508-481	U	0.024	.019	pCi/g	1	0.041		01/27/14
Protactinium-231	14331-85-2	LA-508-481	U	-0.18	.23	pCi/g	1	0.48		01/27/14
<b>Strontium 89/90 SOLID/SOIL PREP</b>										<b>01/28/14</b>
<b>Strontium 89/90 (GPC/GEA)</b>										
Strontium-89_90	SR-RAD	LA-220-406	U	-0.067	.24	pCi/g	1	1.3		02/04/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - The associated QC sample Blank ha a result  $\geq$  MDA  
 U - Analyzed for but not detected above limiting criteria.  
 N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

o - LCS recovery outside established laboratory acceptance limits.

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140145

Sample # 140145001  
 SAF# F11-031  
 Sample ID B2VW54

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
										01/24/14
<b>Dry Weight/Percent Moisture</b>										
Percent Solids	%SOLIDS	LA-519-412		76		%	1			01/24/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.  
 Ignitability: <20C listed in the result field indicates sample ignited at room temperature. Maximum temperature tested for ignitability is at 100C

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140145

Sample # 140145002  
 SAF# F11-031  
 Sample ID B2VW51

Matrix OTHERSOLID  
 Sampled 01/21/14  
 Received 01/21/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
										01/24/14
<b>Dry Weight/Percent Moisture</b>										
Percent Solids	%SOLIDS	LA-519-412		80		%	1			01/24/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.  
 Ignitability: <20C listed in the result field indicates sample ignited at room temperature. Maximum temperature tested for ignitability is at 100C



**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 226841 (QC Batch: 226632)      **Test** Gamma Energy Analysis-general  
**Associated Samples** 140145001, 140145002

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>IBLANK</b>		<b>QC Sample #104509</b>								
Cesium-137	10045-97-3		-4.3E-3	pCi/g					U	01/28/14
Cobalt-60	10198-40-0		5.5E-3	pCi/g					U	01/28/14
Europium-152	14683-23-9		-2.8E-4	pCi/g					U	01/28/14
Europium-154	15585-10-1		-5.5E-3	pCi/g					U	01/28/14
Europium-155	14391-16-3		0.014	pCi/g					U	01/28/14
<b>LCS</b>		<b>QC Sample #104510</b>								
Cesium-137	10045-97-3		6400	pCi/sample	105.9	80 - 120				01/27/14
Cobalt-60	10198-40-0		10000	pCi/sample	102	80 - 120				01/27/14
<b>DUP</b>		<b>QC Sample #104511</b>								
		<b>Original 140145001</b>								
Cesium-137	10045-97-3	-5.3E-3	-2.4E-3	pCi/g			-74.40	30	* U	01/28/14
Cobalt-60	10198-40-0	0.011	0.012	pCi/g			13.90	30	U	01/28/14
Europium-152	14683-23-9	-6.6E-3	4.9E-3	pCi/g			-1385.40	30	* U	01/28/14
Europium-154	15585-10-1	-7.1E-3	-3.8E-3	pCi/g			-61.30	30	* U	01/28/14
Europium-155	14391-16-3	0.031	0.036	pCi/g			12.70	30	U	01/28/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Inorganic

**Group #** WSCF140145

**Analytical Batch** 226911 (QC Batch: 226902)  
**Associated Samples** 140145001, 140145002

**Test** ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104931</b>								
Chromium	7440-47-3		<0.10	ug/L					U	01/28/14
Vanadium	7440-62-2		<0.20	ug/L					U	01/28/14
Zinc	7440-66-6		<2.0	ug/L					U	01/28/14
Lead	7439-92-1		<0.050	ug/L					U	01/28/14
Uranium	7440-61-1		<0.050	ug/L					U	01/28/14
<b>LCS</b>		<b>QC Sample #104932</b>								
Chromium	7440-47-3		73.1	mg/kg	102.6	68 - 119				01/28/14
Vanadium	7440-62-2		61.3	mg/kg	103.6	67 - 122				01/28/14
Zinc	7440-66-6		149	mg/kg	105.8	73 - 131				01/28/14
Lead	7439-92-1		99.7	mg/kg	107.9	79 - 124				01/28/14
Uranium	7440-61-1		440	mg/kg	110.8	86 - 113				01/28/14
<b>MS</b>		<b>QC Sample #104933</b>								
		<b>Original 140006001</b>								
Chromium	7440-47-3		48.3	mg/kg	99.3	70 - 130				01/28/14
Vanadium	7440-62-2		60.0	mg/kg	123.4	70 - 130				01/28/14
Zinc	7440-66-6		59.9	mg/kg	123.3	70 - 130				01/28/14
Lead	7439-92-1		48.8	mg/kg	100.5	70 - 130				01/28/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140145

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Uranium	7440-61-1		50.0	mg/kg	102.8	70 - 130				01/28/14
<b>MSD</b>			<b>QC Sample #104934</b>							
			<b>Original 140006001</b>					<b>Paired 104933</b>		
Chromium	7440-47-3		55.6	mg/kg	114.2	70 - 130	13.30	30		01/28/14
Vanadium	7440-62-2		39.9	mg/kg	82	70 - 130	25.50	30		01/28/14
Zinc	7440-66-6		39.4	mg/kg	81	70 - 130	28.40	30		01/28/14
Lead	7439-92-1		45.2	mg/kg	92.9	70 - 130	7.50	30		01/28/14
Uranium	7440-61-1		46.1	mg/kg	94.6	70 - 130	8.10	30		01/28/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 226918 (QC Batch: 226665)  
**Associated Samples** 140145001, 140145002

**Test** Uranium (AEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104619</b>								
Uranium-234	U-233/234		0.030	pCi/g					X	01/28/14
Uranium-235	15117-96-1		3.2E-3	pCi/g					U	01/28/14
Uranium-238	U-238		8.7E-3	pCi/g					U	01/28/14
<b>LCS</b>		<b>QC Sample #104620</b>								
Uranium-234	U-233/234		34	pCi/sample	103.9	80 - 120				01/28/14
<b>DUP</b>		<b>QC Sample #104621</b>								
		<b>Original 140145001</b>								
Uranium-234	U-233/234	0.33	0.29	pCi/g			13.80	30		01/28/14
Uranium-235	15117-96-1	0.035	0.016	pCi/g			49.40	30	* X	01/28/14
Uranium-238	U-238	0.30	0.21	pCi/g			11.20	30		01/28/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Analytical Batch 226919 (QC Batch: 226666) Test Neptunium (AEA)  
 Associated Samples 140145001, 140145002

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
Neptunium-237	13994-20-2		7.0E-8	pCi/g					U	01/28/14
<b>LCS</b>										
Neptunium-237	13994-20-2		5.6	pCi/sample	98	80 - 120				01/28/14
<b>NpSPK</b>										
Neptunium-237	13994-20-2		6.1	pCi/g	108.2	75 - 125				01/28/14
<b>NpDUP</b>										
Neptunium-237	13994-20-2	5.8E-3	5.7E-3	pCi/g			1.90	30	U	01/28/14
<b>NDUPSK</b>										
Neptunium-237	13994-20-2		6.1	pCi/g	109.1	75 - 125				01/28/14
<b>NpSPK</b>										
Neptunium-237	13994-20-2		5.9	pCi/g	104.7	75 - 125				01/28/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Analytical Batch 226920 (QC Batch: 226665)  
 Associated Samples 140145001, 140145002

Test Plutonium (AEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104619</b>								
Plutonium-238	13981-16-3		-2.7E-3	pCi/g					U	01/30/14
Plutonium-239_240	PU-239/240		9.5E-3	pCi/g					U	01/30/14
<b>LCS</b>		<b>QC Sample #104620</b>								
Plutonium-239_240	PU-239/240		21	pCi/sample	94.1	80 - 120				01/28/14
<b>DUP</b>		<b>QC Sample #104621</b>								
		<b>Original 140145001</b>								
Plutonium-238	13981-16-3	-5.1E-3	-1.4E-3	pCi/g			-95.80	30	* U	01/30/14
Plutonium-239_240	PU-239/240	0.015	0.014	pCi/g			15.70	30	U	01/30/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Analytical Batch 226921 (QC Batch: 226665) Test Americium/Curium (AEA)  
 Associated Samples 140145001, 140145002

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104619</b>								
Americium-241	14596-10-2		0.011	pCi/g					U	01/30/14
<b>LCS</b>		<b>QC Sample #104620</b>								
Americium-241	14596-10-2		22	pCi/sample	100.6	80 - 120				01/28/14
<b>DUP</b>		<b>QC Sample #104621</b>								
		<b>Original 140145001</b>								
Americium-241	14596-10-2	-2.2E-3	0.010	pCi/g			277.90	30	* U	01/30/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 227108 (QC Batch: 226631)  
**Associated Samples** 140145001, 140145002

**Test** Strontium 89/90 (GPC/GEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104506</b>								
Strontium-89_90	SR-RAD		-0.026	pCi/g					U	02/04/14
<b>LCS</b>		<b>QC Sample #104507</b>								
Strontium-89_90	SR-RAD		18	pCi/g	88.9	80 - 120				02/04/14
<b>DUP</b>		<b>QC Sample #104508</b>								
		<b>Original 140145001</b>								
Strontium-89_90	SR-RAD	-0.34	-0.39	pCi/g			-14.00	30	U	02/04/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140145

Analytical Batch 227117 (QC Batch: 226901)  
 Associated Samples 140145001, 140145002

Test GAB Discrete analysis Alpha only

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104928</b>								
Gross Alpha <b>LCS</b>	12587-46-1		0.045	pCi/g					U	02/03/14
		<b>QC Sample #104929</b>								
Gross Alpha <b>DUP</b>	12587-46-1		14	pCi/g	92.5	80 - 120				02/03/14
		<b>QC Sample #104930</b>								
		<b>Original 140145001</b>								
Gross Alpha	12587-46-1	1.3	0.57	pCi/g			75.10	30	* U	02/03/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 227118 (QC Batch: 226901)  
**Associated Samples** 140145001, 140145002

**Test** GAB Discrete analysis Beta only

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104928</b>								
Gross Beta <b>LCS</b>	12587-47-2		-5.1E-3	pCi/g					U	02/03/14
		<b>QC Sample #104929</b>								
Gross Beta <b>DUP</b>	12587-47-2		24	pCi/g	96.7	80 - 120				02/03/14
		<b>QC Sample #104930</b>								
		<b>Original 140145001</b>								
Gross Beta	12587-47-2	18	13	pCi/g			32.60	30	* X	02/03/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

Analytical Batch 227256 (QC Batch: 226912) Test SW-846 8270D Semivolatiles  
 Associated Samples 140145001, 140145002

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104984</b>								
1,4-Dichlorobenzene	106-46-7		<200	ug/kg					U	01/30/14
Bis-(2-Chloroethyl) ether	111-44-4		<200	ug/kg					U	01/30/14
Hexachlorobutadiene	87-68-3		<200	ug/kg					U	01/30/14
2-Methylphenol	95-48-7		<200	ug/kg					U	01/30/14
1,2-Dichlorobenzene	95-50-1		<200	ug/kg					U	01/30/14
3 & 4 Methylphenol, Total	65794-96-9		<200	ug/kg					U	01/30/14
Hexachloroethane	67-72-1		<200	ug/kg					U	01/30/14
<b>LCS</b>		<b>QC Sample #104985</b>								
1,4-Dichlorobenzene	106-46-7		3800	ug/kg	96	64 - 125				01/31/14
2-Methylphenol	95-48-7		5200	ug/kg	86	73 - 122				01/31/14
Hexachloroethane	67-72-1		5500	ug/kg	91.4	59 - 114				01/31/14
<b>MS</b>		<b>QC Sample #104986</b>								
		<b>Original 140145001</b>								
1,4-Dichlorobenzene	106-46-7	<700	5700	ug/kg	58.2	55 - 130				01/31/14
2-Methylphenol	95-48-7	<700	750	ug/kg	5.1	61 - 129			T	01/31/14
Hexachloroethane	67-72-1	<700	12000	ug/kg	79.7	38 - 132				01/31/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>MSD</b>		<b>QC Sample #104987</b>								
		<b>Original 140145001</b>					<b>Paired 104986</b>			
1,4-Dichlorobenzene	106-46-7	<700	5300	ug/kg	53	55 - 130	8.20	30	T	01/31/14
2-Methylphenol	95-48-7	<700	590	ug/kg	4	61 - 129	24.00	30	JT	01/31/14
Hexachloroethane	67-72-1	<700	11000	ug/kg	75.4	38 - 132	4.20	30		01/31/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 226918 (QC Batch: 226665)  
**Associated Samples** 140145001, 140145002

**Test** Uranium (AEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #104619</b>							
Uranium-232 Tracer	14158-29-3				97.9	25 - 105				01/28/14
<b>LCS</b>			<b>QC Sample #104620</b>							
Uranium-232 Tracer	14158-29-3				71	25 - 105				01/28/14
<b>DUP</b>			<b>QC Sample #104621</b>							
			<b>Original 140145001</b>							
Uranium-232 Tracer	14158-29-3				100.4	25 - 105	n/a			01/28/14
<b>SAMPLE</b>			<b>Sample #140145001</b>							
Uranium-232 Tracer	14158-29-3				99.9	25 - 105				01/28/14
<b>SAMPLE</b>			<b>Sample #140145002</b>							
Uranium-232 Tracer	14158-29-3				114.6	25 - 105				01/28/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 226920 (QC Batch: 226665)  
**Associated Samples** 140145001, 140145002

**Test** Plutonium (AEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
										<b>QC Sample #104619</b>
Plutonium-242 Tracer	13982-10-0				99.6	25 - 105				01/30/14
<b>LCS</b>										<b>QC Sample #104620</b>
Plutonium-242 Tracer	13982-10-0				99.6	25 - 105				01/28/14
<b>DUP</b>										<b>QC Sample #104621</b>
										<b>Original 140145001</b>
Plutonium-242 Tracer	13982-10-0				99.5	25 - 105	n/a			01/30/14
<b>SAMPLE</b>										<b>Sample #140145001</b>
Plutonium-242 Tracer	13982-10-0				99.5	25 - 105				01/30/14
<b>SAMPLE</b>										<b>Sample #140145002</b>
Plutonium-242 Tracer	13982-10-0				99.6	25 - 105				01/30/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 226921 (QC Batch: 226665)  
**Associated Samples** 140145001, 140145002

**Test** Americium/Curium (AEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #104619</b>							
Americium-243 Tracer	14993-75-0				100.2	25 - 105				01/30/14
<b>LCS</b>			<b>QC Sample #104620</b>							
Americium-243 Tracer	14993-75-0				100.5	25 - 105				01/28/14
<b>DUP</b>			<b>QC Sample #104621</b>							
			<b>Original 140145001</b>							
Americium-243 Tracer	14993-75-0				100.3	25 - 105	n/a			01/30/14
<b>SAMPLE</b>			<b>Sample #140145001</b>							
Americium-243 Tracer	14993-75-0				100.4	25 - 105				01/30/14
<b>SAMPLE</b>			<b>Sample #140145002</b>							
Americium-243 Tracer	14993-75-0				100.4	25 - 105				01/30/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140145

**Analytical Batch** 227108 (QC Batch: 226631)  
**Associated Samples** 140145001, 140145002

**Test** Strontium 89/90 (GPC/GEA)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #104506</b>							
Strontium-85	13967-73-2				81	25 - 105			X	02/04/14
<b>LCS</b>			<b>QC Sample #104507</b>							
Strontium-85	13967-73-2				84.3	25 - 105			X	02/04/14
<b>DUP</b>			<b>QC Sample #104508</b>							
			<b>Original 140145001</b>							
Strontium-85	13967-73-2				86.8	25 - 105	n/a		X	02/04/14
<b>SAMPLE</b>			<b>Sample #140145001</b>							
Strontium-85	13967-73-2				86	25 - 105			X	02/04/14
<b>SAMPLE</b>			<b>Sample #140145002</b>							
Strontium-85	13967-73-2				83.5	25 - 105			X	02/04/14

\* - QC result out of range

n/a - Not Applicable

**Quality Control Report**

**Attention** Scot Fitzgerald  
**Department** Organic, Semivolatiles

**Group #** WSCF140145

**Analytical Batch** 227256 (QC Batch: 226912)      **Test** SW-846 8270D Semivolatiles  
**Associated Samples** 140145001, 140145002

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #104984</b>								
2-Fluorophenol	367-12-4				85	38 - 151				01/30/14
Phenol-d5	4165-62-2				88.6	38 - 153				01/30/14
Nitrobenzene-d5	4165-60-0				108.5	42 - 153				01/30/14
2-Methylnaphthalene-d10	7297-45-2				98.6	27 - 197				01/30/14
2-Fluorobiphenyl	321-60-8				96.9	34 - 160				01/30/14
2,4,6-Tribromophenol	118-79-6				40.2	21 - 147				01/30/14
Fluoranthene-d10	93951-69-0				88	39 - 168				01/30/14
Terphenyl-d14	98904-43-9				112.9	51 - 155				01/30/14
<b>LCS</b>		<b>QC Sample #104985</b>								
2-Fluorophenol	367-12-4			ug/kg	79.6	38 - 151				01/31/14
Phenol-d5	4165-62-2			ug/kg	86	38 - 153				01/31/14
Nitrobenzene-d5	4165-60-0			ug/kg	114.3	42 - 153				01/31/14
2,4,6-Tribromophenol	118-79-6			ug/kg	71	21 - 147				01/31/14
2-Fluorobiphenyl	321-60-8			ug/kg	102.1	34 - 160				01/31/14
Terphenyl-d14	98904-43-9			ug/kg	108.3	51 - 155				01/31/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
2-Methylnaphthalene-d10	7297-45-2			ug/kg	104	27 - 197				01/31/14
Fluoranthene-d10	93951-69-0			ug/kg	95.9	39 - 168				01/31/14
<b>MS</b>			<b>QC Sample #104986</b>							
			<b>Original 140145001</b>							
2-Fluorophenol	367-12-4			ug/kg	13.6	38 - 151			X	01/31/14
Phenol-d5	4165-62-2			ug/kg	15	38 - 153			X	01/31/14
Nitrobenzene-d5	4165-60-0			ug/kg	61.1	42 - 153				01/31/14
2,4,6-Tribromophenol	118-79-6			ug/kg	8.2	21 - 147			X	01/31/14
2-Fluorobiphenyl	321-60-8			ug/kg	43.3	34 - 160				01/31/14
Terphenyl-d14	98904-43-9			ug/kg	6.3	51 - 155			X	01/31/14
2-Methylnaphthalene-d10	7297-45-2			ug/kg	28.7	27 - 197				01/31/14
Fluoranthene-d10	93951-69-0			ug/kg	1.5	39 - 168			X	01/31/14
<b>MSD</b>			<b>QC Sample #104987</b>							
			<b>Original 140145001</b>							
			<b>Paired 104986</b>							
2-Fluorophenol	367-12-4			ug/kg	10.3	38 - 151	n/a		X	01/31/14
Phenol-d5	4165-62-2			ug/kg	12.4	38 - 153	n/a		X	01/31/14
Nitrobenzene-d5	4165-60-0			ug/kg	53.9	42 - 153	n/a			01/31/14
2,4,6-Tribromophenol	118-79-6			ug/kg	6.3	21 - 147	n/a		X	01/31/14
2-Fluorobiphenyl	321-60-8			ug/kg	35.7	34 - 160	n/a			01/31/14
Terphenyl-d14	98904-43-9			ug/kg	5	51 - 155	n/a		X	01/31/14
2-Methylnaphthalene-d10	7297-45-2			ug/kg	23.2	27 - 197	n/a		X	01/31/14
Fluoranthene-d10	93951-69-0			ug/kg	1.3	39 - 168	n/a		X	01/31/14

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Organic, Semivolatiles

Group # WSCF140145

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>SAMPLE</b>		<b>Sample #140145001</b>								
2-Fluorophenol	367-12-4				4.8	38 - 151			X	01/31/14
Phenol-d5	4165-62-2				4.7	38 - 153			X	01/31/14
Nitrobenzene-d5	4165-60-0				46.6	42 - 153				01/31/14
2-Methylnaphthalene-d10	7297-45-2				14.6	27 - 197			X	01/31/14
2-Fluorobiphenyl	321-60-8				28.5	34 - 160			X	01/31/14
2,4,6-Tribromophenol	118-79-6				3.9	21 - 147			X	01/31/14
Fluoranthene-d10	93951-69-0				0.8	39 - 168			X	01/31/14
Terphenyl-d14	98904-43-9				3.6	51 - 155			X	01/31/14
<b>SAMPLE</b>		<b>Sample #140145002</b>								
2-Fluorophenol	367-12-4				13.6	38 - 151			X	01/31/14
Phenol-d5	4165-62-2				14.9	38 - 153			X	01/31/14
Nitrobenzene-d5	4165-60-0				50.7	42 - 153				01/31/14
2-Methylnaphthalene-d10	7297-45-2				21.4	27 - 197			X	01/31/14
2-Fluorobiphenyl	321-60-8				34.1	34 - 160				01/31/14
2,4,6-Tribromophenol	118-79-6				5	21 - 147			X	01/31/14
Fluoranthene-d10	93951-69-0				2.5	39 - 168			X	01/31/14
Terphenyl-d14	98904-43-9				9.4	51 - 155			X	01/31/14

\* - QC result out of range

n/a - Not Applicable

Tentatively Identified Peak Report

FEBRUARY 5, 2014

Attention Scot Fitzgerald  
Department Organic, Semivolatiles

Group # WSCF140145

Peak Name	CAS #	RT	RQ	Result	Units
<b>140145001</b>	<b>B2VW54</b>				
Carbon Tetrachloride	56-23-5	4.7998		350	ug/kg

Attention: Scot Fitzgerald

Group #

WSCF140145

**140145001** **B2VW54****Department** Organic, Semivolatiles

**Analyte** 2,4,6-Tribromophenol - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** 2-Fluorobiphenyl - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** 2-Fluorophenol - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** 2-Methylnaphthalene-d10 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** Fluoranthene-d10 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** Phenol-d5 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** Terphenyl-d14 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Department** Radiochemistry

**Analyte** Strontium-85 - Strontium 89/90 (GPC/GEA)  
[1] The measurement was made using a recovery based on the mass of carrier added as opposed to using a Sr-85 tracer. The mass recovery was 86.0%.

**Analyte** Uranium-234 - Uranium (AEA)  
[1] Blank activity is NORM

**140145002** **B2VW51****Department** Organic, Semivolatiles

**Analyte** 2,4,6-Tribromophenol - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** 2-Fluorophenol - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** 2-Methylnaphthalene-d10 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** Fluoranthene-d10 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

Attention: Scot Fitzgerald

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WSCF140145

**Analyte** Phenol-d5 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Analyte** Terphenyl-d14 - SW-846 8270D Semivolatiles  
[1] Surrogate recovery outside of established laboratory control limits.

**Department** Radiochemistry

**Analyte** Strontium-85 - Strontium 89/90 (GPC/GEA)  
[1] The measurement was made using a recovery based on the mass of carrier added as opposed to using a Sr-85 tracer. The mass recovery was 83.5%.

**Analyte** Uranium-234 - Uranium (AEA)  
[1] Blank activity is NORM

Attention: Scot Fitzgerald

Group #

WSCF140145

## Quality Control Comments

Department Organic, Semivolatiles

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104986	B2VW54(140145001MS)
<b>Analyte</b>	2,4,6-Tribromophenol - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	2-Fluorophenol - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	Fluoranthene-d10 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	Phenol-d5 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	Terphenyl-d14 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
104987	B2VW54(140145001MSD)
<b>Analyte</b>	2,4,6-Tribromophenol - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	2-Fluorophenol - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	2-Methylnaphthalene-d10 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	Fluoranthene-d10 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	Phenol-d5 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.
<b>Analyte</b>	Terphenyl-d14 - SW-846 8270D Semivolatiles
[1]	Surrogate recovery outside of established laboratory control limits.

Attention: Scot Fitzgerald

Group #

WSCF140145

## Quality Control Comments

Department Radiochemistry

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104506	BLANK for HBN 226631 [RADP/852]
<b>Analyte</b>	Strontium-85 - Strontium 89/90 (GPC/GEA)
[1]	The measurement was made using a recovery based on the mass of carrier added as opposed to using a Sr-85 tracer. The mass recovery was 81.0%.
104507	LCS for HBN 226631 [RADP/8520]
<b>Analyte</b>	Strontium-85 - Strontium 89/90 (GPC/GEA)
[1]	The measurement was made using a recovery based on the mass of carrier added as opposed to using a Sr-85 tracer. The mass recovery was 84.3%.
104508	B2VW54(140145001DUP)
<b>Analyte</b>	Strontium-85 - Strontium 89/90 (GPC/GEA)
[1]	The measurement was made using a recovery based on the mass of carrier added as opposed to using a Sr-85 tracer. The mass recovery was 86.8%.
104619	BLANK for HBN 226665 [RADP/852]
<b>Analyte</b>	Uranium-234 - Uranium (AEA)
[1]	Blank activity is NORM
104621	B2VW54(140145001DUP)
<b>Analyte</b>	Uranium-235 - Uranium (AEA)
[1]	The duplicate is outside of default RPD limits. RPD limit does not apply to results less than 5X the Minimum Detectable Concentration.
104930	B2VW54(140145001DUP)
<b>Analyte</b>	Gross Beta - GAB Discrete analysis Beta only
[1]	The duplicate is outside of default RPD limits. RPD limit does not apply to results with greater than 20% uncertainty.

ATTACHMENT4

**SAMPLE RECEIPT**

Consisting of 6 pages  
Including cover page

**Waste Sampling and Characterization Facility**  
**P.O. Box 650 S3-30, Richland WA 99352**  
**Phone: (509) 373-7005/FAX: (509) 372-0456**

## ACKNOWLEDGEMENT OF SAMPLES RECEIVED

### WSCF Laboratory

PO Box 650 S3-30  
 Richland, WA 99352

ATTN: Scot Fitzgerald

**Customer Code:** CHPRC  
**CA CN:** 401639  
**Work Order #:** 140145  
**Customer Work ID:** F11-031-064  
**Due Date:** 02/05/2014

The following samples were received from you on 1/21/2014 11:30:00 AM. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact WSCF Client Services. Thank you for using Waste Sampling and Characterization Facility.

*The samples in this work order have been designated to be returned to the customer.*

Sample #	Sample ID	Matrix	Collected	Received
140145001	B2VW54	OTHERSOLID	1/21/2014 09:30	1/21/2014 11:30

Procedure	Compound List
Americium/Curium (AE A)	AM-241
Dry Weight/Percent Moisture	% Moisture,% Solid
GAB Discrete analysis Alpha only	Alpha
GAB Discrete analysis Beta only	Beta
Gamma Energy Analysis-general	Not a standard service list. There are too many compounds to list individually.
ICP-2008 M S All possible metal	Cr,V,Zn,Pb,U
Neptunium (AE A)	Np-237
Plutonium (AEA)	Pu-238,Pu-239/240
SW-846 8270D Semivolatiles	Not a standard service list. There are too many compounds to list individually.
Strontium 89/90 (GPC/GE A)	SR89/90
Uranium (AEA)	U-234,U-235,U-238

Sample #	Sample ID	Matrix	Collected	Received
140145002	B2VW51	OTHERSOLID	1/21/2014 10:30	1/21/2014 11:30

Procedure	Compound List
Americium/Curium (AE A)	AM-241
Dry Weight/Percent Moisture	% Moisture,% Solid
GAB Discrete analysis Alpha only	Alpha
GAB Discrete analysis Beta only	Beta
Gamma Energy Analysis-general	Not a standard service list. There are too many compounds to list individually.
ICP-2008 M S All possible metal	Cr,V,Zn,Pb,U
Neptunium (AE A)	Np-237
Plutonium (AEA)	Pu-238,Pu-239/240
SW-846 8270D Semivolatiles	Not a standard service list. There are too many compounds to list individually.
Strontium 89/90 (GPC/GE A)	SR89/90
Uranium (AEA)	U-234,U-235,U-238

Chain of Custody

<b>CH2M Hill Parsons Remediation Company</b> COLLECTOR: <i>Karen Floyd</i> SAMPLING LOCATION: <i>200-ZP-1 SET 1 GAC</i> ICE CHEST NO.:		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> COMPANY CONTACT: EVANS, RT TELEPHONE NO.: 373-7924 PROJECT DESIGNATION: 200-PV-1 & 200-ZP-1 Spent GAC Canisters and Filters FIELD LOGBOOK NO.: HNF-N-5856/64 ACTUAL SAMPLE DEPTH: N/A OFFSITE PROPERTY NO.: N/A		PROJECT COORDINATOR: EVANS, RT PRICE CODE: 9C AIR QUALITY: <input type="checkbox"/> METHOD OF SHIPMENT: <input type="checkbox"/> ORIGINAL BILL OF LADING/AIR BILL NO.: N/A		PAGE 1 OF 2 DATA TURNAROUND: 15 Days / 15 Days
SHIPPED TO: Waste Sampling & Characterization		PRESERVATION: Cool-AC HOLDING TIME: 14/48hrs TYPE OF CONTAINER: 2G NO. OF CONTAINER(S): 1 VOLUME: 250mL		Cool-AC 0 MONTHS 3G 1 50mL		None 0 MONTHS Square Bottle - Poly 1 500mL
MATRIX*: A-Air, B-Drum, C-liquid, D-Solid, E-Sediment, F-T-Tissue, G-Vegetation, H-Water, I-Other		POSSIBLE SAMPLE HAZARDS/ REMARKS: Contains Radioactive Material at concentrations that may or may not be regulated for transport per 49 CFR/DATA Dangerous Goods Regulations but are not releasable per D2E Under 49R.1.		SPECIAL HANDLING AND/OR STORAGE:		SEE FROM (1) IN SPECIAL INSTRUCTIONS SEE FROM (2) IN SPECIAL INSTRUCTIONS SEE FROM (3) IN SPECIAL INSTRUCTIONS

CHAIN OF POSSESSION	SIGN/PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: <i>S. K. Evans</i>	RECEIVED BY/STORED IN: <i>K. Floyd</i>	SEE PAGE 2 FOR ALL SPECIAL INSTRUCTIONS  <b>TRM-14-042</b>
DATE/TIME: 1-21-14 1130	DATE/TIME: 2-21-14 1130	
RELINQUISHED BY/REMOVED FROM:	RECEIVED BY/STORED IN:	
DATE/TIME:	DATE/TIME:	
RELINQUISHED BY/REMOVED FROM:	RECEIVED BY/STORED IN:	
DATE/TIME:	DATE/TIME:	
RELINQUISHED BY/REMOVED FROM:	RECEIVED BY/STORED IN:	
DATE/TIME:	DATE/TIME:	
RELINQUISHED BY/REMOVED FROM:	RECEIVED BY/STORED IN:	
DATE/TIME:	DATE/TIME:	
RELINQUISHED BY/REMOVED FROM:	RECEIVED BY/STORED IN:	
DATE/TIME:	DATE/TIME:	
RELINQUISHED BY/REMOVED FROM:	RECEIVED BY/STORED IN:	
DATE/TIME:	DATE/TIME:	
LABORATORY SECTION:	RECEIVED BY:	TITLE:
FINAL SAMPLE DISPOSITION:	DISPOSAL METHOD:	DISPOSED BY:

PRINTED ON 1/24/2014

A-6003-618 (REV 2)

Chain of Custody

CH2MHILL Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		FI1-031-064	PAGE 2 OF 2
COLLECTOR <i>Kavita Foley</i>	COMPANY CONTACT EVANS, RI	TELEPHONE NO. 313-7929	PROJECT COORDINATOR EVANS, RI	PRICE CODE 9C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION 200-ZP-SET 1 GAC	PROJECT DESIGNATION 200-PW-1 & 200-ZP-1 Spent GAC Containers and Filters	FIELD LOGBOOK NO. HNF-N-585-6/ev	ACTUAL SAMPLE DEPTH N/A	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT GOVERNMENT VEHICLE <b>ORIGINAL</b>
ICE CHEST NO.	SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A	BILL OF LADING/AIR BILL NO. N/A		

**SPECIAL INSTRUCTIONS**  
 \*\*\* The MDC for protactinium must be 1.0 pCi/g. Please notify WSCF Counting Room that a longer count-time will be necessary to achieve the low MDC. \*\* The CACN for all analytical work at WSCF laboratory is 401639. \*\* The 200 A-rea S&GR Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. TRVL-14-042. COMPOSITE FROM CANISTERS: PM1-06-070, PM1-06-072, PM1-07-011, PM1-07-014, PM1-10-041, PM1-10-042, PM1-13-001, PM1-13-002  
 (1) 8270\_SVOA\_GCMS: COMMON (1,4-Dichlorobenzene, 2-Methylphenol (Cresol, o-)); 8270\_SVOA\_GCMS: CH 01 (1,2-Dichlorobenzene, Bis(2-chloroethyl) ether, Hexachlorobutadiene, Hexachloroethane); 8270\_SVOA\_GCMS: COMMON (Add-on) (3+4 Methylphenol (Cresol, m+p));  
 (2) 200.8\_METALS\_ICPMS: COMMON (Chromium, Lead); 280.8\_METALS\_ICPMS: COMMON (Add on) (Uranium, Vanadium, Zinc);  
 (3) GAMMA\_GS: COMMON GAMMA\_GS: COMMON (Add-on) (Protactinium-231); ALPHA\_GPC: COMMON (Gross alpha); BETA\_GPC: COMMON (Gross beta);  
 PUISOCTE\_PRECIP\_AEA: COMMON; AMCMISOCTE\_PRECIP\_AEA: COMMON; NP237MTE\_PRECIP\_AEA: COMMON; SRTOT\_VSFP\_PRECIP\_GPC: COMMON; UIISO\_IE\_PRECIP\_AEA: COMMON;

TRVL-14-042

PRINTED ON 3/14/2014

A-60C3-618 (REV 2)



Chain of Custody

CH2MHill Plateau Remediation Company		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		PAGE 2 OF 2	
COLLECTOR <i>R. H. ...</i>	COMPANY CONTACT E/ANS, KI	TELEPHONE NO. 373-7924	PROJECT COORDINATOR E/ANS, KI	PRICE CODE 9C	DATA TURNAROUND 15 Days / 15 Days
SAMPLING LOCATION 20C-PW-1-SET 1 CAC	PROJECT DESIGNATION 200-PW-1 & 200-ZP-1 Spent GAC Canisters and Filters	FIELD LOGBOOK NO. HNF-N-5785-6/64	SAF NO. F11-031	AIR QUALITY <input type="checkbox"/>	METHOD OF SHIPMENT GOVERNMENT VEHICLE <b>ORIGINAL</b>
ICE CHEST NO.	ACTUAL SAMPLE DEPTH N/A	COA 3283SES10	BILL OF LADING/AIR BILL NO. N/A		
SHIPPED TO Waste Sampling & Characterization	OFFSITE PROPERTY NO. N/A				

**SPECIAL INSTRUCTIONS**  
 \*\* \* The MDC for *proctactinulum* must be 1.0 pCi/g. Please notify WSCF Counting Room that a longer count-time will be necessary to achieve the low MDC \*\* The CACH for all analytical work at WSCF laboratory is 401639. \*\* The 200 A-rea S&GR Characterization and Monitoring Sampling and Analysis CKI applies to this SAF. TRVL-14-042. COMPOSITE FROM CANISTERS ZP1-09-004, ZP1-09-005, ZP1-09-006, ZP1-09-007, ZP1-13-001 AND ZP1-13-002.  
 (1) 8270\_SVOA\_GCMS: COMMON (1,4-Dichlorobenzene, 2-Methylphenol (Cresol, o-)); 8270\_SVOA\_GCMS: CH 01 (1,2-Dichlorobenzene, Bis(2-chloromethyl) ether, Hexachlorobutadiene, Hexachloroethane); 8270\_SVOA\_GCMS: COMMON (Add-on) (3+4 Methylphenol (Cresol, m+p));  
 (2) 200.8\_METALS\_ICPMS: COMMON (Chromium, Lead); 200.8\_METALS\_ICPMS: COMMON (Add-on) (Uranium, Vanadium, Zinc);  
 (3) GAMMA\_GS: COMMON; GAMMA\_GS: COMMON (Add-on) (Proctactinulum-231); ALPHA\_GPC: COMMON (Gross alpha); BETA\_GPC: COMMON (Gross beta); PUISO\_JE\_PRECIP\_AEA: COMMON; AMCMISO\_IF\_PRECIP\_AEA: COMMON; NP237\_JE\_PRECIP\_AEA: COMMON; SK101\_SHP\_PRECIP\_GPC: COMMON; UISO\_JE\_PRECIP\_AEA: COMMON;

TRVL-14-042

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A-5003-618 (REV 2)