

## SOUTHWEST RESEARCH INSTITUTE®

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION  
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRYRegistered to  
ISO 9001:2008

July 25, 2017

CH2M Hill Plateau Remediation Company  
2420 Stevens Center Place  
Mail Stop H8-41  
Richland, WA 99352

Attn: Mr. David Todak

Subject:	SAF No:	F16-037
	SDG Number:	615701
	SwRI Project Number:	20859.01.00X
	SwRI Task Order Number:	170522-7
	SwRI Sample Receipt Number:	59750
	Samples Received	05.2217
	Fraction:	Various Radchem Analysis

Dear Mr. Todak:

Please find the enclosed results for the one (01) overall soil sample received on the above referenced date. If you should have any questions, please do not hesitate to call me at (210) 522-3242, or at [radonna.spies@swri.org](mailto:radonna.spies@swri.org).

Sincerely,

Radonna Spies  
Principal Scientist

APPROVED:

Michael J. Dammann  
DirectorRPS: aa  
Encl

Benefiting government, industry and the public through innovative science and technology

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: CH2M Hill Plateau Remediation**  
**Company**  
**TASK ORDER(s): 170522-7**  
**SRR: 59750**  
**SDG: 614701**  
**VTSR: 05.22.17**  
**PROJECT#: 20859.01.00X**

## **NARRATIVE**

**CLIENT: CH2M Hill Plateau Remediation Company**

**SDG: 615701**

**SwRI Project Number: 20859.01.00X**

**SwRI Sample Receipt Number: 59750**

**Page#: 1**

### SwRI CASE NARRATIVE

1. One (1) sample was received for Radiological Analysis:

<b>SwRI ID</b>	<b>Customer ID</b>	<b>Matrix</b>
615701	B39HW9	Soil

**Client: CH2M Hill Plateau Remediation**  
**SDG: 615701**  
**SwRI Project Number: 20859.01.00X**  
**SwRI Task Order Number: 170522-7**

## RADIOLOGICAL ANALYSIS

The sample SDG 615701 consisted of one soil sample received for radiological analysis. The soil sample for radiological analysis was reported on an "as received" basis. The recommended sample holding time of six months was met.

The samples were analyzed for the following:

Matrix	Analysis	Method
Soil	Total Radioactive Strontium	Gas Proportional Counting
Soil	$^{233/234}\text{U}$ , $^{235/236}\text{U}$ , $^{238}\text{Uranium}$	Alpha Spectroscopy
Soil	Tritium	Liquid Scintillation Spectroscopy
Soil	$^{99}\text{Technetium}$	Liquid Scintillation Spectroscopy

A coverage factor of  $k=2$  was applied to the TPU of all analytes. TPU was calculated using 1 sigma error.

The duplicate error ratios are calculated using 1 sigma TPU with a coverage factor of  $k=1$ .

The reported MDAs are sample-specific.

### *Total Radioactive Strontium Sample Preparation*

A 1 gram aliquot of the sample and a duplicate was used for total radioactive strontium. The samples were digested with nitric acid, perchloric acid, and hydrofluoric acid in Teflon beakers. A preparation blank, laboratory control sample, and a duplicate were digested with the sample. After digesting to dryness, the samples were nitrated a couple times and transferred using an 8M nitric acid solution. Carriers and spikes were added prior to the digestion of the samples.

### *$^{233/234}\text{Uranium}$ , $^{235/236}\text{Uranium}$ , and $^{238}\text{Uranium}$ Preparation*

A 1 gram aliquot of the sample and a duplicate was used for uranium analysis. The samples were digested with nitric acid, perchloric acid, and hydrofluoric acid in Teflon beakers. The digestates were then nitrated a couple times, filtered, and brought to a final volume of 10ml using a 3M nitric acid / 1M aluminum nitrate solution and filtered. A preparation blank, laboratory control sample, and a duplicate were prepared with the sample batch. Tracers and spikes were added prior to the digestion of the samples.

**Client: CH2M Hill Plateau Remediation**

**SDG: 615701**

**SwRI Project Number: 20859.01.00X**

**SwRI Task Order Number: 170522-7**

### *<sup>99</sup>Techmetium Preparation*

A 1 gram aliquot of the sample and a duplicate was digested in 50ml flip-top containers for <sup>99</sup>Techmetium with nitric acid and hydrogen peroxide. A preparation blank, laboratory control sample, duplicate, matrix spike, and a matrix spike duplicate were also digested with the sample batch. Spikes were added prior to the digestion of the samples. The technetium preparation blank, laboratory control samples, and samples were digested with 50ml of 1M nitric acid for 4 hours. Hydrogen peroxide was then added to each sample and allowed to digest for an additional hour. The digestates were then brought to a final volume of 50ml with deionized water.

### *Gas Flow Proportional Counting*

Daily instrument checks were within control limits and the weekly four hour background was within date and control limits.

### *Total Radioactive Strontium*

Note: The reported results for total radioactive strontium were reported from a re-preparation batch. The initial preparation had tracer results greater than the acceptable limits. The re-preparation met all applicable control limits.

A small portion of the digestion was taken for Sr carrier recovery determination, by ICP, prior to separation. The remaining portion of the digestate was separated using resins and then eluted from the resin, with another small portion taken for post-separation Sr carrier recovery determination by ICP. The elute was evaporated on tarred stainless steel planchets. After flaming and weighing the planchets, they were placed on the Gas Proportional Counter (GPC) for analysis.

For beta GPC analysis, daily instrument checks were within control limits. The weekly four hour background was within date and control limits.

For Sr carrier recovery, all ICP instrument QC criteria were met. The percent recoveries were within 90-110% for the initial and continuing calibration verifications. Strontium was not detected above the laboratory's reporting limit in the initial and continuing calibration blanks.

Results for stable Sr carrier were within the control limits of 40-110%. The result for the preparation blank was less than the MDA and the RL. The result for the laboratory control sample was within the control limits of 80-120% recovery. SwRI sample ID 615701R was analyzed in duplicate and the RPD was less than 20%.

**Client: CH2M Hill Plateau Remediation**

**SDG: 615701**

**SwRI Project Number: 20859.01.00X**

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### *Alpha Spectroscopy (U)*

For all alpha analysis, daily pulser checks were within control limits. The weekly secondary or monthly primary calibration check standards were within date and control limits. The monthly alpha detector background was within date.

### *<sup>233/234</sup>Uranium, <sup>235/236</sup>Uranium, <sup>238</sup>Uranium*

<sup>232</sup>Uranium was used as a tracer to follow chemical separation efficiency and losses. All tracer FWHM were within the control limits of 100keV. All results for the tracers were within the control limits of 30-110%. The preparation blank results for <sup>233/234</sup>Uranium, <sup>235/236</sup>Uranium, and <sup>238</sup>Uranium were less than the MDA and the RL. The results for the laboratory control sample were within the control limits of 80-120% recovery. SwRI sample ID 615701 was analyzed in duplicate and the RPD was less than 20% for all three isotopes.

### *Liquid Scintillation Counting (<sup>3</sup>H, <sup>99</sup>Tc)*

For all liquid scintillation analysis, the daily instrument performance checks were within the running statistical control limits.

The sample vials were inspected prior to counting to ensure homogeneity of the scintillation fluid with the sample.

### *<sup>3</sup>H - Tritium*

For all liquid scintillation analysis, the daily instrument performance checks were within the running statistical control limits.

For <sup>3</sup>Hydrogen analysis, a 40ml aliquot was distilled using sodium hydroxide and potassium permanganate with heat. 10ml of Ultima Gold LLT was added as the liquid scintillator and mixed 10ml of distillate prior to counting. The samples were counted on a liquid scintillation counter programmed to count only the <sup>3</sup>Hydrogen region of interest. The liquid scintillation counter <sup>3</sup>Hydrogen program was standardized using <sup>3</sup>Hydrogen as the radioisotope to establish a specific efficiency quench curve.

The result for the preparation blank was less than the MDA and the RL. The result for the laboratory control sample was within the recovery control limits of 80-120%. SwRI sample ID 615701 was analyzed as a duplicate; however, the RPD was greater than 20%. The activities of both the sample and duplicate were less than their respective MDAs. SwRI sample ID 615701 was also analyzed as a matrix spike and matrix spike duplicate. Both the matrix spike and matrix spike duplicate were within the recovery limits of 75-125%.

**Client: CH2M Hill Plateau Remediation**  
**SDG: 615701**  
**SwRI Project Number: 20859.01.00X**  
**SwRI Task Order Number: 170522-7**

*<sup>99</sup>Techneium*

For all liquid scintillation analysis, the daily instrument performance checks were within the running statistical control limits.

For <sup>99</sup>Tc analysis, the <sup>99</sup>Tc was separated from the digestion using chemical separation resins. After chemical separation, the resin containing the <sup>99</sup>Tc was placed into a liquid scintillation vial and 15 ml of scintillation cocktail was added. The samples were counted on a liquid scintillation counter programmed to count only the <sup>99</sup>Tc region of interest. The liquid scintillation counter <sup>99</sup>Tc program was standardized using <sup>99</sup>Tc as the radioisotope to establish a specific efficiency quench curve.

The result for the preparation blank was less than the MDA and the RL. The result for the laboratory control sample was within the recovery control limits of 80-120%. SwRI laboratory sample ID 615701 was analyzed in duplicate and the RPD was less than 20%. SwRI sample ID 615701 was also analyzed as a matrix spike and matrix spike duplicate. Both the matrix spike and matrix spike duplicate were within the control limits of 75-125% recovery. The RPD of the matrix spike and matrix spike duplicate results was less than 20%.

**"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."**

Walter A. Nageli  
Research Scientist

07/18/17  
Date

**SOUTHWEST RESEARCH INSTITUTE  
CLIENT: CH2M Hill Plateau Remediation  
Company  
TASK ORDER(s): 170522-7  
SRR: 59750  
SDG: 614701  
VTSR: 05.22.17  
PROJECT#: 20859.01.00X**

**SAMPLE RECEIPT, TASK ORDER  
&  
CHAIN OF CUSTODY**



Sample Receipt

Southwest Research Institute

Project: 20859.01.00X  
 Case #: CHPRC  
 Client: CH2M Hill Plateau Remediation Company

Sample Receipt Number: 59750  
 Revision: 2

*This Receipt was Revised 06/26/2017*

VTSR: 05/22/17

Time: 08:30:00

Manager: SPIES, RADONNA  
 Logged in by: DXGARCIA  
 Creation Date: 05/22/17

Notes

Samples were received intact.

Fed Ex Tracking #(s):  
 779175966274 - 18.0 °C (no ice)  
 779189276310 - 1.1 °c (wet ice)

NOTE \_ Samples were scheduled for delivery on 05/20/17 (Saturday) but FED EX did not deliver the coolers until 05/22/17 (Monday).

pH Test Paper 0.0 to 3.0  
 lot - 230315  
 Exp: 10/30/2018

Ice Chest No.:  
 GWS-560  
 GWS-654

Test requirements located on the applicable Task Order.

See chain-of-custody as part of the SRR system for more information.  
 REVISION 1, DRmz 05/22/17: SRR revised to add a note regarding cooler delivery.

REVISION 2, Corrected COC # S17-005-284 on sample id 615697.

Background CPM: <150 cpm  
 Container Wide CPM: <150 cpm  
 Total CPM: <150

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
615697	B39C74	05/18/17	Water	1	
615698	B39FX2	05/19/17	Water	2	
615699	B39HP8	05/19/17	Water	1	
615700	B39HP9	05/17/17	Water	1	
615701	B39HW9	05/17/17	Soil	4	
615702	B39KR5	05/19/17	Water	1	
615703	B39KV1	05/19/17	Water	1	
615704	B39KX6	05/19/17	Water	1	

Containers: 12

Samples: 8

These documents are associated with this receipt: 221965[COC for SRR 59750], 221966[Paperwork for SRR 59750]

Thermometer: 021055  
 Temperature: 1.1

59750 CH2M Hill Plateau Remediation

Southwest Research Institute

# Laboratory Task Order

TO #: 170522-7 Revision: 2

Project(s): 20859.01.00X  
 Manager(s): SPIES, RADONNA  
 To Client: 06/20/17

SDG: 615701  
 VTSR: 05/22/17  
 SAF: F16-037

SRR #s: 59750  
 Client(s): CH2M Hill Plateau Remediation Company

## Instructions

CH2MHill Plateau Remediation Company. 300071  
 SAF No. F16-037

SDG 615701 is open until \_ 06/05/2017

15-day TAT.  
 FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 06/20/2017.

8 overall samples (12 containers) were received on 05/22/2017.  
 OUT of the 8 samples, only the 1 soil sample under SAF F16-037 is ALL listed here.

Sample Analysis REQUIRED  
 UIISO\_IE\_PRECIP\_AEA: COMMON  
 Uranium-233/234, Uranium-235, Uranium-238  
 TRITIUM\_DIST\_LSC: COMMON  
 Tritium

TAT corrected. 6/14/17 rss  
 TC99\_EIE\_LSC: COMMON  
 Technetium-99  
 SRTOT\_SEP\_PRECIP\_GPC: COMMON  
 Total beta radiostrontium

DATA DELIVERABLE \_ Summary (Narrative / Results only)  
 REQUESTTER \_ D Todak

ATTACHMENT C - QC Requirements for Chemical and Radiochemical Analysis  
 Section 7.2.2 Sample Data Packages  
 Section 7.2.3 Hard Copy Deliverable format  
 Section 7.2.4 Final Data Package Requirements  
 Section 8.8 CHPRC Electronic Address  
 Electronic copies of all sample receipt information, COCs, priority data packages, final data packages, corrected/revised data packages, closure reports, status reports, invoices, etc. shall be sent to: [mailto:CPP\\_Sample\\_Management@rl.gov](mailto:CPP_Sample_Management@rl.gov)

Documents Related to this task order: 221965[COC for SRR 59750], 221966[Paperwork for SRR 59750]

Deliverables --> Hard Copy: no EDD: -YES- PDF: -YES-

Test: ALPHA-U\_SWRI Holding: 180 days from CED  
 Section: RADCHEM **Alpha Spec Analysis for isotopic Uranium** Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		1	Soil	B39HW9	17 May 17	13 Nov 17

Test: DIG-H3 Holding: 180 days from CED  
 Section: RADPREP **Digestion for H3** Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		2	Soil	B39HW9	17 May 17	13 Nov 17

Test: DIG-PRECIP-U Holding: 180 days from CED  
 Section: RADPREP **Digestion for U with Precip** Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		1	Soil	B39HW9	17 May 17	13 Nov 17



Southwest Research Institute

# Laboratory Task Order

TO #: 170522-7 Revision: 2

Project(s): 20859.01.00X  
 Manager(s): SPIES, RADONNA  
 To Client: 06/20/17

SDG: 615701  
 VTSR: 05/22/17  
 SAF: F16-037

SRR #: 59750  
 Client(s): CH2M Hill Plateau Remediation Company

Test: DIG-Tc99 Holding: 180 days from CED

Section: RADPREP

Digestion for Tc99

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		3	Soil	B39HW9	17 May 17	13 Nov 17

Test: GPC-Sr90\_905.0 Holding: 180 days from CED

Section: RADCHEM

Strontium-90 by gas flow proportional counting EPA 905.0

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		4	Soil	B39HW9	17 May 17	13 Nov 17

Test: LSC-H3\_906 Holding: 180 days from CED

Section: RADCHEM

EPA Method 906 Tritium by liquid scintillation counting

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		2	Soil	B39HW9	17 May 17	13 Nov 17

Test: LSC-TC99\_SWRI Holding: 180 days from CED

Section: RADCHEM

Technetium-99 by liquid scintillation counting

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		3	Soil	B39HW9	17 May 17	13 Nov 17

Test: SEP-Sr90 Holding: 180 days from CED

Section: RADPREP

Separation for Sr90

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		4	Soil	B39HW9	17 May 17	13 Nov 17

Test: SEP-Tc99 Holding: 180 days from CED

Section: RADPREP

Separation for Tc99

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		3	Soil	B39HW9	17 May 17	13 Nov 17

Test: SEP-U Holding: 180 days from CED

Section: RADPREP

Separation for U

Cnt: 1

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
615701		1	Soil	B39HW9	17 May 17	13 Nov 17



07/25/2017

REV.0

CH2M Hill Plateau Remediation Company		CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST				F16-037-077010011	PAGE 1 OF 1
COLLECTOR Jeff Tucksen CHPRC	COMPANY CONTACT TODAK, D	TELEPHONE NO. 376-6427	PROJECT COORDINATOR TODAK, D		PRICE CODE 8C	DATA TURNAROUND 15 Days / 15 Days	
SAMPLING LOCATION C9711, I-003 SPLIT	PROJECT DESIGNATION 100-KR-4 Long Term & Interim Action Monitoring - Soil		SAF NO. F16-037	AIR QUALITY <input type="checkbox"/>			
ICE CHEST NO. <b>BWS-054</b>	FIELD LOGBOOK NO. HNF-N-645-7 43	ACTUAL SAMPLE DEPTH 45.0 FT	COA 300085	METHOD OF SHIPMENT FEDERAL EXPRESS		<b>ORIGINAL</b>	
SHIPPED TO Southwest Research Institute		OFFSITE PROPERTY NO. 7923	BILL OF LADING/AIR BILL NO. 7791 7596 6274				

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	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> *Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.	PRESERVATION	None	None	None	None	
	<b>SPECIAL HANDLING AND/OR STORAGE</b> NA	HOLDING TIME	6 Months	6 Months	6 Months	6 Months	
		TYPE OF CONTAINER	G/P	G	G/P	G/P	
		NO. OF CONTAINER(S)	1	1	1	1	
		VOLUME	60mL	60mL	60mL	60mL	
		SAMPLE ANALYSIS	UI50_IE_PRECIP_AEA: COMMON;	TRITIUM_DIST_LSC: COMMON;	TC99_EIE_LSC: COMMON;	SRTOT_SEP_PRCIP_GPC: COMMON;	
SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME				
B39HW9	SOIL	MAY 17 2017	1445	✓	✓	✓	✓

CHPRC  
SRR # 59750  
SDG # 615701

SwRI Prjct # 20859.01.00X  
TO: 170522-7

SwRI

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM Jeff Tucksen CHPRC	DATE/TIME MAY 17 2017 1525	RECEIVED BY/STORED IN SSU-1	DATE/TIME MAY 17 2017 1525	TRVL-17-101	
RELINQUISHED BY/REMOVED FROM SSU-1	DATE/TIME MAY 18 2017 0700	RECEIVED BY/STORED IN Janelle Zunker CHPRC	DATE/TIME MAY 18 2017 0700		
RELINQUISHED BY/REMOVED FROM Janelle Zunker CHPRC	DATE/TIME MAY 18 2017 1400	RECEIVED BY/STORED IN FEDEX	DATE/TIME		
RELINQUISHED BY/REMOVED FROM FED EX	DATE/TIME 05222017 0830	RECEIVED BY/STORED IN Doreen Harmon R.13	DATE/TIME 05222017 10630		
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

Southwest Research Institute

Traffic Report

Sample Custodian Signature:

*David Gorman*



- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present  
Sample Tag Numbers Not on COC *N/A*
- 4. SMO Forms Present

Client: CH2M Hill Plateau Remediation Company

Project: 20859.01.00X

Case: I17-006 / SDG: SEE TO

Sample Receipt: 59750

Airbill: 779189276310,779175966274

Custody Seal #(s): N/A

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
05/22/17	08:30:00	S17-006-206	B39C74	N/A	615697	YES	Intact
05/22/17	08:30:00	I17-006-192	B39FX2	N/A	615698	YES	Intact
05/22/17	08:30:00	I17-006-205	B39HP8	N/A	615699	YES	Intact
05/22/17	08:30:00	I17-006-206	B39HP9	N/A	615700	YES	Intact
05/22/17	08:30:00	F16-037-077	B39HW9	N/A	615701	YES	Intact
05/22/17	08:30:00	F16-046-872	B39KR5	N/A	615702	YES	Intact
05/22/17	08:30:00	F16-046-892	B39KV1	N/A	615703	YES	Intact
05/22/17	08:30:00	F16-046-920	B39KX6	N/A	615704	YES	Intact

SAMPLE LOG-IN SHEET

Lab Name Southwest Research Institute		Page 1 of 1	
Received By (Print Name) DAVID GARCIA		Log-in Date 05/22/2017	
Received By (Signature) <i>David Garcia</i>			
Case Number I17-006	Sample Delivery Group No. N/A	SAS Number N/A	
Remarks: 20859.01.00X		Remarks: Condition of Sample Shipment, etc	
	EPA Sample #	Corresponding Sample Tag #	Assigned Lab #
1. Custody Seal(s)	<input checked="" type="radio"/> Present <input type="radio"/> Absent* <input checked="" type="radio"/> Intact <input type="radio"/> Broken	B39C74	N/A
2. Custody Seal Nos.	N/A	B39FX2	N/A
		B39HP8	N/A
3. Chain-of-Custody Records	<input checked="" type="radio"/> Present <input type="radio"/> Absent*	B39HP9	N/A
4. Traffic Reports or Packing Lists	<input checked="" type="radio"/> Present <input type="radio"/> Absent*	B39HW9	N/A
5. Airbill	Airbill/Sticker <input checked="" type="radio"/> Present <input type="radio"/> Absent*	B39KR5	N/A
6. Airbill No.	779189276310, 779175966274	B39KV1	N/A
		B39KX6	N/A
7. Sample Tags	Present <input checked="" type="radio"/> Absent		
Sample Tag Numbers	Listed <input checked="" type="radio"/> Not listed on Chain of Custody		
8. Sample Condition	<input checked="" type="radio"/> Intact <input type="radio"/> Broken* / <input type="radio"/> Leaking		
9. Cooler Temperature	1.1C		
10. Does Information on custody records, traffic reports, and sample tags agree?	<input checked="" type="radio"/> Yes <input type="radio"/> No*		
11. Date Received at Lab	05/22/2017		
12. Time Received	08:30:00		
Sample Transfer			
Fraction	Fraction		
Area #	Area #		
By	By		
On	On		

\* Contact SMO and attach record of resolution

Reviewed By <i>Det. Agnew</i>	Logbook No. Sample Receipt (59750)
Date 05.22.17	Logbook Page No. 9828 SEC 1083

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: CH2M Hill Plateau Remediation**  
**Company**  
**TASK ORDER(s): 170522-7**  
**SRR: 59750**  
**SDG: 614701**  
**VTSR: 05.22.17**  
**PROJECT#: 20859.01.00X**

## **RADCHEM ANALYSIS**

**SOUTHWEST RESEARCH INSTITUTE**  
**CLIENT: CH2M Hill Plateau Remediation**  
**Company**  
**TASK ORDER(s): 170522-7**  
**SRR: 59750**  
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**VTSR: 05.22.17**  
**PROJECT#: 20859.01.00X**

## **SAMPLE DATA**



# SOUTHWEST RESEARCH INSTITUTE

## GAS FLOW PROPORTIONAL COUNTING DATA SHEET

Lab Name: Southwest Research Institute

Client: CH2M Hill Plateau Remediation

Lab Code: SwRI

Project No.: 20859.01.00X

Matrix: Soil

SRR #: 59750

Date Received: 05/22/17

SDG: 615701

Task Order #: 170522-7

SAF #: F16-037

STRONTIUM-90									
Sample ID	Lab System ID	Analyte	Results (pCi/g)	Q	TPU (2s) (pCi/g)	MDA (pCi/g)	Counting Error (2s)	Sr Tracer Rec.	Date Analyzed
Prep Blank	pbg13ke5	<sup>90</sup> Sr	2.73E-02	U	7.85E-02	1.41E-01	7.85E-02	96.5%	07/17/17
Lab Control	lcs13ke9	<sup>90</sup> Sr	1.64E+01		2.05E+00	1.42E-01	7.90E-01	95.7%	07/17/17
True Value	-----	<sup>90</sup> Sr	1.90E+01		-----	-----	-----	-----	-----
Recovery	-----	<sup>90</sup> Sr	86.2%		-----	-----	-----	-----	-----
B39HW9	615701R	<sup>90</sup> Sr	-3.16E-02	U	5.42E-02	1.28E-01	5.41E-02	97.6%	07/17/17
Duplicate result	615701DR	<sup>90</sup> Sr	-2.85E-02	U	6.28E-02	1.42E-01	6.27E-02	90.1%	07/17/17
RPD	-----	<sup>90</sup> Sr	10.3%		-----	-----	-----	-----	-----

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# SOUTHWEST RESEARCH INSTITUTE

## LIQUID SCINTILLATION COUNTING DATA SHEET

Lab Name: Southwest Research Institute

Client: CH2M Hill Plateau Remediation

Lab Code: SwRI

Project No.: 20859.01.00X

Matrix: Soil

SRR #: 59750

Date Received: 05/22/17

SDG: 615701

Task Order #: 170522-7

SAF #: F16-037

TECHNETIUM-99								
Sample ID	Lab System ID	Analyte	Results (pCi/g)	Q	TPU (2s) (pCi/g)	MDA (pCi/g)	Counting Error (2s)	Date Analyzed
Prep Blank	pb17f27ke3	<sup>99</sup> Tc	-7.10E-02	U	5.22E-01	8.83E-01	5.22E-01	07/07/17
Lab Control	lcs17f27ke4	<sup>99</sup> Tc	1.99E+01		2.35E+00	8.81E-01	9.27E-01	07/07/17
True Value	-----	<sup>99</sup> Tc	2.00E+01		-----	-----	-----	-----
Recovery	-----	<sup>99</sup> Tc	99.4%		-----	-----	-----	-----
B39HW9	615701	<sup>99</sup> Tc	2.06E-01	U	4.57E-01	7.60E-01	4.57E-01	07/07/17
Duplicate result	615701D	<sup>99</sup> Tc	1.94E-01	U	4.47E-01	7.44E-01	4.47E-01	07/07/17
RPD	-----	<sup>99</sup> Tc	5.9%		-----	-----	-----	-----
Spike Result	615701MS	<sup>99</sup> Tc	1.72E+01		2.04E+00	7.82E-01	8.17E-01	07/07/17
Spike added	-----	<sup>99</sup> Tc	1.77E+01		-----	-----	-----	-----
Recovery	-----	<sup>99</sup> Tc	96.0%		-----	-----	-----	-----
Spike Duplicate Result	615701MSD	<sup>99</sup> Tc	1.50E+01		1.78E+00	6.96E-01	7.21E-01	07/07/17
Spike added	-----	<sup>99</sup> Tc	1.57E+01		-----	-----	-----	-----
Recovery	-----	<sup>99</sup> Tc	93.9%		-----	-----	-----	-----
RPD	-----	<sup>99</sup> Tc	14.0%		-----	-----	-----	-----

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# SOUTHWEST RESEARCH INSTITUTE

## LIQUID SCINTILLATION COUNTING DATA SHEET

Lab Name: Southwest Research Institute

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Project No.: 20859.01.00X

Matrix: Soil

SRR #: 59750

Date Received: 05/22/17

SDG: 615701

Task Order #: 170522-7

SAF #: F16-037

TRITIUM								
Sample ID	Lab System ID	Analyte	Results (pCi/g)	Q	TPU (2s) (pCi/g)	MDA (pCi/g)	Counting Error (2s)	Date Analyzed
Prep Blank	pbwf27jt1	<sup>3</sup> H	2.25E-01	U	4.33E+00	7.43E+00	4.33E+00	07/05/17
Lab Control	lcswf27jt1	<sup>3</sup> H	4.65E+02		5.64E+01	8.14E+00	1.55E+01	07/05/17
True Value	-----	<sup>3</sup> H	4.61E+02		-----	-----	-----	-----
Recovery	-----	<sup>3</sup> H	100.7%		-----	-----	-----	-----
B39HW9	615701	<sup>3</sup> H	4.98E-01	U	3.97E+00	6.78E+00	3.97E+00	07/05/17
Duplicate result	615701D	<sup>3</sup> H	9.49E-01	U	4.17E+00	7.09E+00	4.17E+00	07/06/17
RPD	-----	<sup>3</sup> H	62.3%		-----	-----	-----	-----
Spike result	615701MS	<sup>3</sup> H	4.54E+02		5.50E+01	7.54E+00	1.47E+01	07/06/17
True Value	-----	<sup>3</sup> H	3.93E+02		-----	-----	-----	-----
Recovery	-----	<sup>3</sup> H	115.5%		-----	-----	-----	-----
Spike Duplicate result	615701MSD	<sup>3</sup> H	4.10E+02		4.96E+01	6.76E+00	1.32E+01	07/06/17
True Value	-----	<sup>3</sup> H	4.06E+02		-----	-----	-----	-----
Recovery	-----	<sup>3</sup> H	100.8%		-----	-----	-----	-----
RPD	-----	<sup>3</sup> H	10.3%		-----	-----	-----	-----

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# SOUTHWEST RESEARCH INSTITUTE

## ALPHA SPECTROMETRY ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: CH2M Hill Plateau Remediation

Lab Code: SwRI

Project No.: 20859.01.00X

Matrix: Soil

SRR #: 59750

Date Received: 05/22/17

SDG: 615701

Task Order #: 170522-7

SAF #: F16-037

URANIUM-233/234, 235/236, 238									
Sample ID	Lab System ID	Analyte	Results (pCi/g)	Q	TPU (2s) (pCi/g)	MDA (pCi/g)	Counting Error (2s)	<sup>232</sup> U Tracer Rec.	Date Analyzed
Prep Blank	pb17f27ke1	<sup>233/234</sup> U	7.50E-03	U	1.12E-02	2.39E-02	1.12E-02	84.9%	07/07/17
	pb17f27ke1	<sup>235/236</sup> U	3.11E-03	U	1.08E-02	2.98E-02	1.08E-02	84.9%	07/07/17
	pb17f27ke1	<sup>238</sup> U	7.50E-03	U	1.00E-02	1.91E-02	1.00E-02	84.9%	07/07/17
Lab Control	lcs17f27ke1	<sup>233/234</sup> U	8.51E-01		1.52E-01	4.38E-02	1.03E-01	68.9%	07/07/17
	lcs17f27ke1	<sup>235/236</sup> U	4.54E-02		2.89E-02	3.62E-02	2.83E-02	68.9%	07/07/17
	lcs17f27ke1	<sup>238</sup> U	1.06E+00		1.80E-01	2.91E-02	1.14E-01	68.9%	07/07/17
True Value	-----	<sup>233/234</sup> U	1.01E+00		-----	-----	-----	-----	-----
	-----	<sup>235/236</sup> U	-----		-----	-----	-----	-----	-----
	-----	<sup>238</sup> U	1.00E+00		-----	-----	-----	-----	-----
Recovery	-----	<sup>233/234</sup> U	84.4%		-----	-----	-----	-----	-----
	-----	<sup>235/236</sup> U	-----		-----	-----	-----	-----	-----
	-----	<sup>238</sup> U	106.1%		-----	-----	-----	-----	-----
B39HW9	615701	<sup>233/234</sup> U	4.23E-01		8.40E-02	1.82E-02	6.35E-02	85.0%	07/07/17
	615701	<sup>235/236</sup> U	1.48E-02	U	1.46E-02	2.26E-02	1.45E-02	85.0%	07/07/17
	615701	<sup>238</sup> U	4.30E-01		8.50E-02	1.82E-02	6.40E-02	85.0%	07/07/17
Duplicate result	615701D	<sup>233/234</sup> U	4.10E-01		7.90E-02	1.58E-02	5.84E-02	88.8%	07/07/17
	615701D	<sup>235/236</sup> U	1.29E-02	U	1.55E-02	3.17E-02	1.54E-02	88.8%	07/07/17
	615701D	<sup>238</sup> U	3.91E-01		7.63E-02	1.58E-02	5.71E-02	88.8%	07/07/17
RPD	-----	<sup>233/234</sup> U	3.0%		-----	-----	-----	-----	-----
	-----	<sup>235/236</sup> U	13.7%		-----	-----	-----	-----	-----
	-----	<sup>238</sup> U	9.3%		-----	-----	-----	-----	-----

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