# CH2MHILL • BWXT West Valley, LLC

West Valley Demonstration Project

Mr. Bryan C. Bower, Contracting Officer's Representative U. S. Department of Energy West Valley Demonstration Project 10282 Rock Springs Road West Valley, New York 14171-9799 AC-PRES WD:2020:0753 September 8, 2020

ATTENTION: Stephen M. Bousquet

SUBJECT: Contract No. DE-EM0001529, Main Plant Process Building and Vitrification Facility Characterization Data Packages

REFERENCE: Letter JJP:379953 – 547.1 (DW:2019:0063), Bryan C. Bower to Scott A. Anderson, "Main Plant Process Building (MPPB) and Vitrification Facility Characterization Data Packages," dated January 16, 2019

Dear Mr. Bower:

In response to your request for information in the above referenced letter, CH2M HILL BWXT West Valley, LLC (CHBWV) is transmitting the data packages described in Attachment A (i.e., Radiological Controls survey reports and analytical data packages) for the Main Plant Process Building. This information was gathered at the request of DOE and in accordance with WVDP-584, Revision 1 and is in addition to data packages transmitted on February 13, 2019.

Transmittal of the remaining data packages listed in Attachment A will be made prior to the end of this contract.

Please direct any questions regarding this information to Scott Chase at Extension 2184.

Sincerely,

Approval Obtained Electronically

John D. Rendall President & General Manager

JDR:CD:bnj

- Attachments: A) MPPB Sample Status, August 27, 2020 B) SAP Data Packages, August 27, 2020
- cc: S. W. Chase, CHBWV A. M. Cooney, DOE-EMCBC T. D. Dogal, CHBWV L. K. Hollfelder, CHBWV L. J. Ortega, CHBWV J. D. Rendall, CHBWV K. R. Whitham, CHBWV K. A. Wooley, CHBWV

### MPPB Sample Status – Part 2 August 27, 2020

## Areas Included in this Data Package

Acronym	Area Sampled
САА	Cell Access Aisle
СРС	Chemical Process Cell
GCRE	General Purpose Cell Crane Room Extension
HEV	Head-End Ventilation
Mini Cell	Miniature Cell
Mini Cell Airlock	Miniature Cell Airlock
MRR	Manipulator Repair Room
OGC	Off-Gas Cell
RER	Ram Equipment Room
XC-2	Extraction Cell - 2
XC-3	Extraction Cell - 3

## Areas Remaining to be transmitted prior to Contract Completion

Acronym	Area to Sample	Status	Samples requiring Analysis
MOA PITS	Mechanical Operating Aisle Pits	Surveys and Sample to be taken	1
PPH	Product Packaging and Handling Area	Survey to be taken	0
EDR	Equipment Decontamination Room	Survey	0
FRS	Fuel Receiving and Storage Area – Obtain information after Proposal work	Survey and Sample	2
GCR	General Purpose Cell Crane Room – Obtain information after Proposal work	Survey and Sample	2
GPC	General Purpose Cell – Obtain information after Proposal work	Survey	0
LI/LO	Load In/Load Out Building – Obtain information after Proposal work	Survey	0
PPCN	Product Purification Cell North – Obtain information after Proposal work	Survey and Sample	1
PPCS	Product Purification Cell South – Obtain information after Proposal work	Samples obtained Need Surveys after Nitrocision	2
SRR	Scrap Removal Room – Obtain information after Proposal work	Survey and Sample	1

**MPPB Data Packages** 

### CAA - Cell Access Aisle

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a member of The GEL Group INC



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

gel.com

May 04, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 476214 SDG: 420-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 11, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

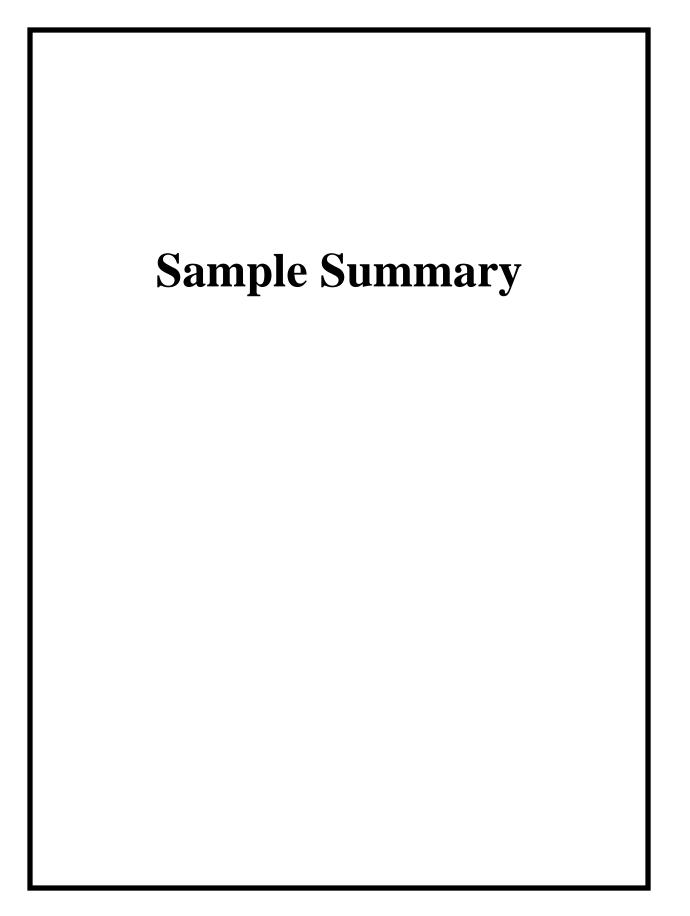
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

May 4, 2019

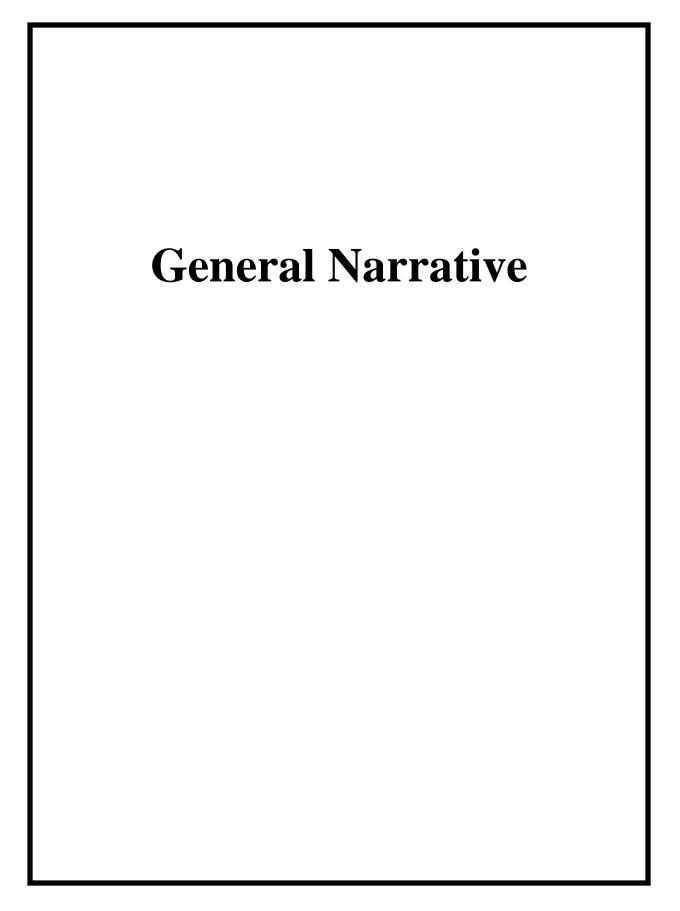
**Release Number** 420

**Purchase Order Number** CH-003169

**Description** 

Charge # WV01.02.06.01.04.10.01

CAA Floor



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 420-003169 Work Order: 476214

#### May 04, 2019

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

#### Release Number

420

#### Charge Number

WV01.02.06.01.04.10.01

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on April 11, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

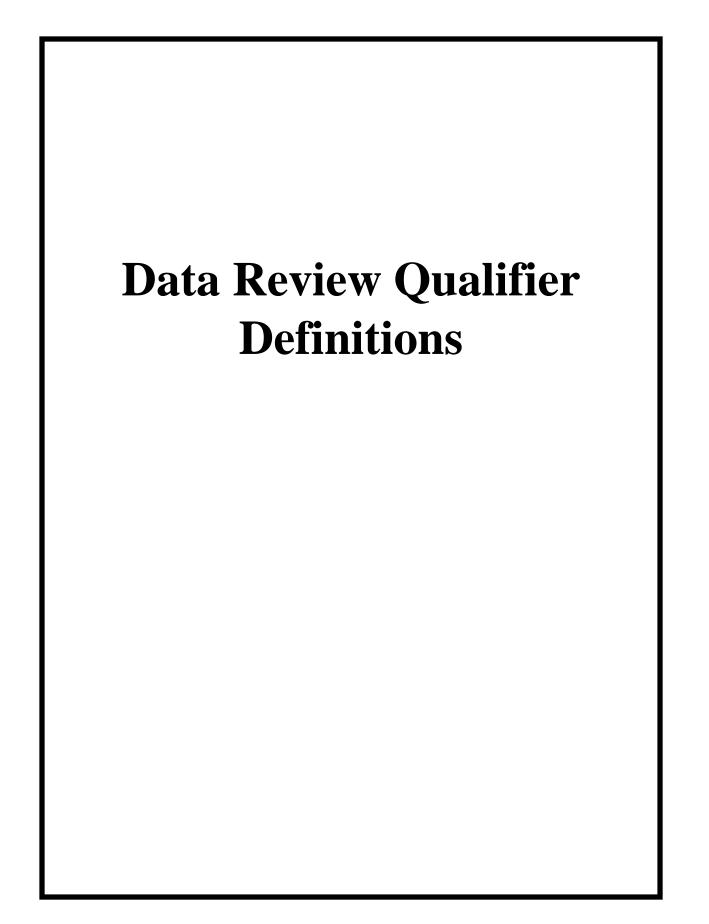
<u>Laboratory ID</u>	<u>Client ID</u>
476214001	CAA Floor

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Kenzon

Kerry OBarr for Katherine Cates Project Manager



420

#### Data Review Qualifier Definitions

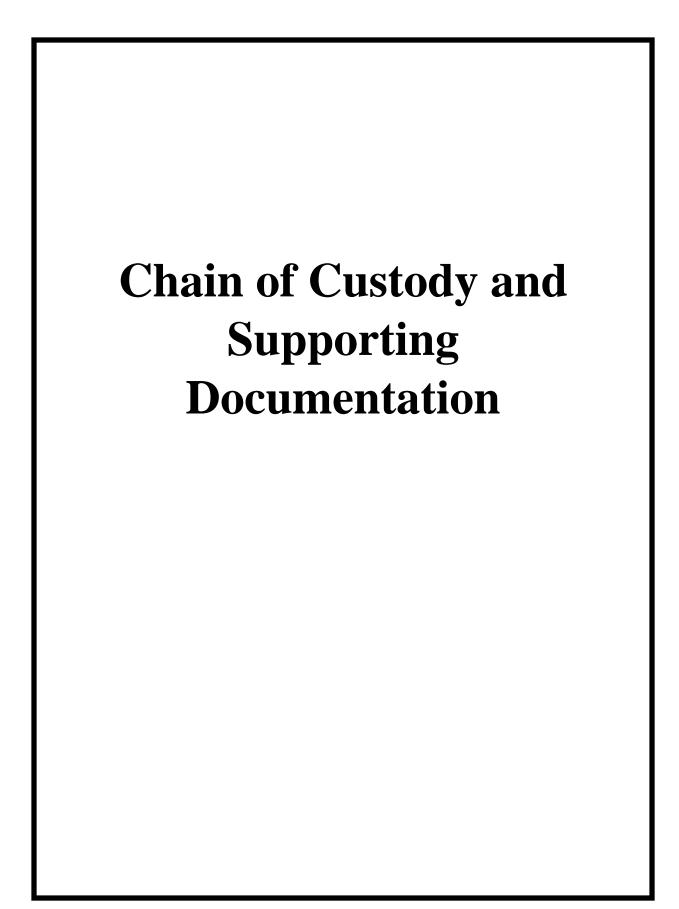
Qualifier Explanation

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



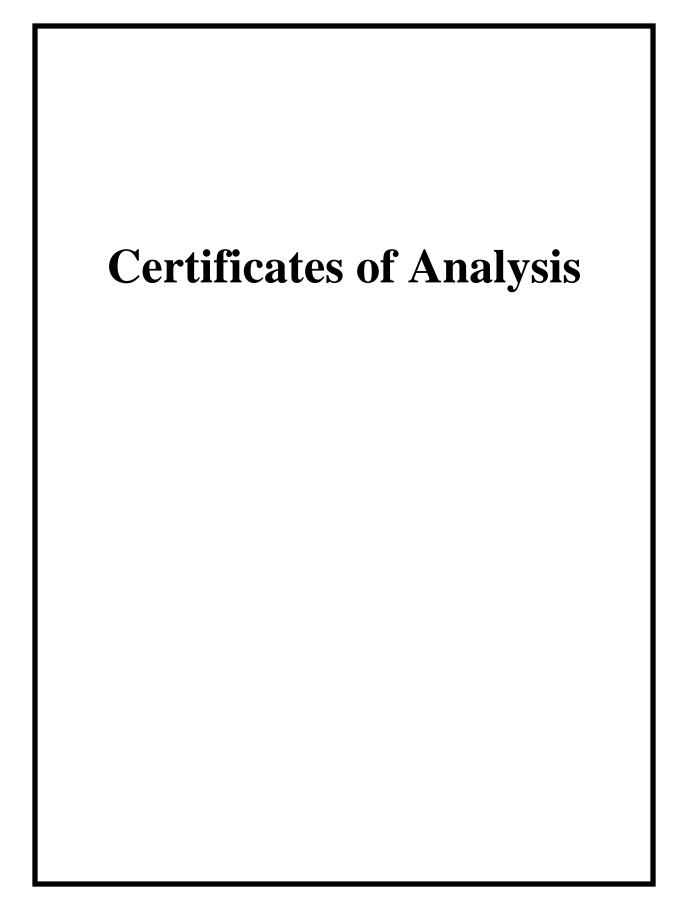
- Segurar S										ケービットア	
			CHAIN	-OF-CUS	Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS (Page 1 of 2)	JIX B QUEST-F of 2)	OR-ANAI	YSIS	•		WD:
				CH2M I 10 We:	CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road West Valley, NY 14171-9799	, West Va prings R Y 14171-	illey LLC oad 9799			2020:0753 -	2020:0753 -
1. Lab: GEL		2. Char	2. Charge #: WVØ\。C2. 06. 0\ 。 04. 10. 0}	. 06°D1.	04.10.0	****	3. Analysi	Analysis Requested	sted	4. Electronic Disk? Yes [ ] No [ x]	Attac
5. PO #: CH-003169	5169	6. Release #:	ase #: \$20				. <b>- '</b> g	-n		7. Report Format Level: I[x] II[	chmęi
8. Cognizant Engineer/Project:		MPPB Demo	0			37 &	e(D-	43) se (Pi		9. Priority Code: Routine [ x ]	nt B
10. DQO/SAP#: WVDP-584	P-584					r-so	14, 23 topes	7- '0i		1[] 2[] 3[]	
12.			13.			a for 1	osi 5 33/23	asi ed 29/24		11. Report Data To: W. Connors	
Sample ID# Type	e # Cont.	Pres.	Date	Time	Ħ,	mmsව \$2-mA	238) 238) -2 238)	qla u9 2- ,852	06-1S	Comments	<b>T</b>
DA LLAN Grab		na	3-28-18	10:00	na	×	×	× ×		** The five smears are to be	Т
2 5 Stachment B - Pag						۰				composited by the lab to form a composite sample and analyzed for composite sample and analyzed for <sup>241</sup> Am, <sup>137</sup> Cs, <sup>233</sup> U, <sup>235</sup> U, <sup>235</sup> U, <sup>235</sup> U, <sup>239</sup> U, <sup>242</sup> Pu, <sup>90</sup> Sr, <sup>238</sup> U, <sup>239</sup> Pu, <sup>240</sup> Pu, <sup>242</sup> Pu, <sup>90</sup> Sr, Report units in uCi per composite sample.	
e 12											
18. Gross Wt (g)	148		14. Phase (Circle one ):	le ):	$\langle$	Liquid S	Sludge	Other :			
Tare Wt (g)	103.8		Type (Circle one):		Debris Col	Coupon P	Pipe Section	n Filter	er Particulate	ulate Other: Smear	1
Net Wt (g)	44.2		15. Sample Bottle Size:		1000 WT	Sample E	Sample Bottle Type (Circle One):	e (Circle		Glass Poly	
17. Chain-of-Custody Reviewed by:	Reviewed b	$\succ$	iantshe D.	j						16. $\frac{Z}{D}$ mci Alpha NA []	
	i	49. S	49. Sample Custodian Signature/Date/Time	Signatur	e/Date/Time	Ð				20. Sample Receipt:	
Released by: C. OU	anaig	3-38-18	/ 131	ceived by	: Reard Thes	oo Oad	3.88.1	18 [310	Q	Temperature 20 °C	
Released by: Com	et ella	9.017	<u> </u>	C Received by:	$\mathcal{A}$		4/11/4	057	<u>,</u>	Cooler Seals Intact? Yes [ 4 No [ ]	
Released by:			Rec	Received by:							
Released by:			Rec	Received by:	)						
WV-2865, Rev. 4 (SOP 300-08)	300-08)	x									

Page 9 of 30 SDG: 420-003169

CH-003169

420

CEEL Laboratories LLC				SAMPLE RECEIPT & REVIEW FORM
Client: WVDS			SD	G/AR/COC/Work Order: 476212 476214
Received By: Grag Anstru				te Received: 4/11/19
Carrier and Tracking Number				FedEx Express FedEx Ground UPS Field Services Courier Other 810714709760
Suspected Hazard Information	Yes	0N	*If	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?	1		Haz If U	ard Class Shipped: UN#: 2910 N2910, Is the Radioactive Shipment Survey Compliant? Yes No
B) Did the client designate the samples are to be received as radioactive?	$\checkmark$	Ĺ	co	C notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?	/	Ĺ	Ma) Cla	imum Net Counts Observed* (Observed Counts - Area Background Counts): 3000 (CPM) mR/Hr sified as: Rad 1 (Rad 2) Rad 3
D) Did the client designate samples are hazardous?		1	的建制的	notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		/	PCE	or E is yes, select Hazards below. S Flammable Foreign Soil RCRA Asbestos Beryllium Other:
	Yes	VN	Ň	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	1			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	4		-	Circle Applicable: Client contacted and provided COC COC created upon receipt Preservation Method: Wet Ice Ice Packs Dry ice None/ Other.
3 Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?* Daily check performed and passed on IR				Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius Temperature Device Serial #: 263-/8
4 temperature gun?	$\checkmark$			Secondary Temperature Device Serial # (If Applicable): Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Sample containers intact and sealed?	1			Sample ID's and Containers Affected:
6 Samples requiring chemical preservation at proper pH?				If Preservation added, Lot#:
				If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer)
7 Do any samples require Volatile				Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No)
Analysis?			4	Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:
8 Samples received within holding time?				D's and tests affected:
9 Sample ID's on COC match ID's on bottles?				D's and containers affected:
10 Date & time on COC match date & time on bottles?	4			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11         Number of containers received match number indicated on COC?			ſ	Circle Applicable: No container count on COC Other (describe)
12 Are sample containers identifiable as GEL provided?			7	
COC form is properly signed in relinquished/received sections?	7		ľ	Circle Applicable: Not relinquished Other (describe)
Comments (Use Continuation Form if needed):	revi	ew: I	nitial	s Date V12_ Page of (
				GL-CHL-SR-001 Rev 6



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	LLC.	L BWXT W k Springs Ro	-										
	West Valle	y, New York	x 14171-9799					Re	port Date:	J	May 4,	2019	
Contact:	Mr. Willian	n Connors											
Project:	CH-003169	Haz Waste											
Client Sample I Sample ID: Matrix: Collect Date: Receive Date: Collector:	47621 Misc	14001 Solid AR-18 PR-19					oject: ient ID:		NS02501 NS025				_
Parameter	Qualifier	r Result	Uncertainty	DL	TPU	RL	Units	PF	DF Analys	t Date	Time	Batch	Mtd.
High Rad Testing Alphaspec Pu242, So	lid High Pa	d "As Dooring	ad"										
Plutonium-238	Hh	0.0144	+/-0.00189	0.00051	+/-0.00422	1.00E-06	uCi/g		IXB7	04/23/19	2022	1870155	1
Plutonium-239/240	Hh	0.0314	+/-0.00189	0.000421	+/-0.00422		uCi/g uCi/g		JAD/	04/23/15	/ 2022	1870155	1
Plutonium-242	HUh		+/-0.000277	0.000421	+/-0.000281		uCi/g uCi/g						
Alphaspec U232, Sol				0.000121	17 0.000201	1.001 00	ueng						
Uranium-232	HUh	-3.43E-05	+/-0.000112	0.000262	+/-0.000112	1.00F-06	uCi/g		IXB7	04/18/19	9 1601	1864678	2
Uranium-233/234	HUh	-1.54E-06	+/-6.46E-05	0.000145	+/-6.46E-05		uCi/g uCi/g		JAD/	04/10/12	, 1001	1004070	2
Uranium-235/234	HUh	5.74E-05	+/-8.62E-05	0.000134	+/-8.68E-05		uCi/g						
Uranium-238	HUh	5.66E-05	+/-7.73E-05	0.000105	+/-7.80E-05		uCi/g						
GFPC, Sr90, solid H													
Strontium-90	HUh		+/-6.36E-05	8.73E-05	+/-6.54E-05	1.00E-04	uCi/g		JXB7	04/19/19	9 0727	1864681	3
Gammaspec, Cs137				01/02/00	17 010 12 00	11002 01	uong		01127	0	0.2.	1001001	5
Americium-241	H	-	+/-9.50E-05	3.15E-05	+/-0.00441		uCi/g		AXM6	04/19/19	9 0803	1866818	4
Cesium-137	Н		+/-4.23E-06	7.59E-07	+/-1.84E-05	1.00E-05	uCi/g		111110	01/19/19	0005	1000010	•
Cobalt-60	Н		+/-1.20E-06	6.49E-07	+/-1.45E-06	11002 00	uCi/g						
The following Prep M	lethods wer	e performed	ł				-						
Method De	scription				Analyst	Date	Tir	ne I	Prep Batch				
Client Requested Prc Dis	solution Soil F	Prep GL-RAD	-A-015		AXM6	04/12/19	141	15 1	866819				
The following Analyti		s were perfo	ormed										
Method Des	scription												
1 DO	E EML HASL	2-300, Pu-11-F	RC Modified										
2 DO	E EML HASL	-300, U-02-R	C Modified										
3 EPA	A 905.0 Modif	ied/DOE RP5	01 Rev. 1 Mod	ified									
4 DO	E HASL 300,	4.5.2.3/Ga-01	-R										
Surrogate/Tracer Re	covery	Test					]	Batch I	D Recover	y% A	ccepta	ble Limi	ts
Plutonium-236 Trac	er	Alphaspe	c Pu242, Soli	d High Rad "A	As Received"			187015	5 82	.9	(15%-	-125%)	
Uranium-232 Trace	r	Alphaspe	c U232, Solic	l High Rad "A	s Received"			186467	8 82	.6	(15%-	125%)	
Uranium-235/236 T	racer			l High Rad "A				186467	8 63	.2		125%)	
Strontium Carrier				h Rad "As Rec				186468				-125%)	
Submann Currer		0.10,01						200100	- 11	-	(_0/0		

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

# **Certificate of Analysis**

	Client ID:	WVNS025	
Client Sample ID: CAA Floor Sample ID: 476214001	Project:	WVNS02501	
Project: CH-003169 Haz Waste			
Contact: Mr. William Connors			
West Valley, New York 14171-9799		Report Date:	May 4, 2019
Company :CH2M HILL BWXT West ValleyAddress :LLC.10282 Rock Springs Road			

Surrogate/Tracer Recovery Test

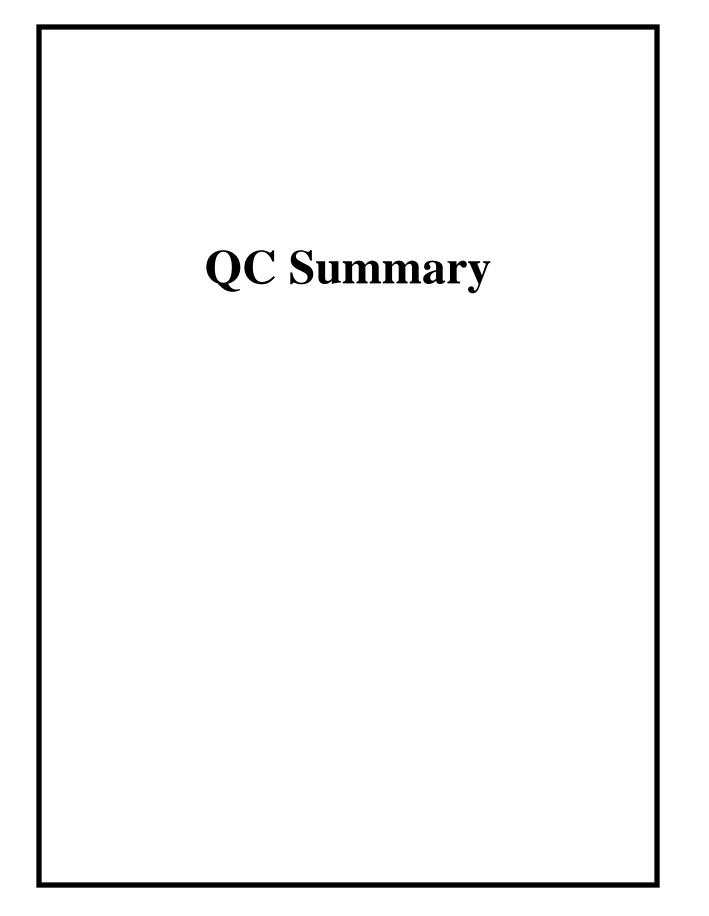
Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit TPU: Total Propagated Uncertainty



# **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: May 4, 2019

Page 1 of 5

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 476214

**Contact:** 

Parmname			NON	M	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 186	54678													
QC1204254055 Uranium-232	474903001	DUP		Hh	0.000279	Н	0.000412	uCi/g	38.5		(0% - 100%)	JXB7	04/23/1	9 22:19
Uranium-233/234				Hh	0.000573	Н	0.000834	uCi/g	37.1*		(0%-20%)			
Uranium-235/236				HUh	2.40E-05	Н	7.87E-05	uCi/g	74.6		(0% - 100%)			
Uranium-238				HUh	6.02E-05	HU	8.86E-05	uCi/g	N/A		N/A	A		
QC1204254057 Uranium-232	LCS					U	3.77E-05	uCi/g					04/18/1	19 23:20
Uranium-233/234							0.00329	uCi/g						
Uranium-235/236							0.000262	uCi/g						
Uranium-238			0.00359				0.00359	uCi/g		100	(75%-125%)			
QC1204254054 Uranium-232	MB					U	4.35E-05	uCi/g					04/18/1	19 16:01
Uranium-233/234						U	6.24E-07	uCi/g						
Uranium-235/236						U	4.96E-06	uCi/g						
Uranium-238						U	9.53E-06	uCi/g						
QC1204254056 Uranium-232	474903001	MS		Hh	0.000279	Н	0.000269	uCi/g					04/23/1	19 22:19

# **GEL LABORATORIES LLC**

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

# **QC Summary**

					<u> </u>	$\frac{1}{2}$	Summai	<u>ry</u>					
Workorder: 476	214												Page 2 of 5
Parmname			NON	М	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
High Rad Testing Batch 18646	78												
Uranium-233/234				Hh	0.000573	Н	0.00391	uCi/g				JXB7	04/23/19 22:19
Uranium-235/236				HUh	2.40E-05	Н	0.000196	uCi/g					
Uranium-238			0.00359	HUh	6.02E-05	Н	0.00311	uCi/g		84.9	(75%-125%)		
Batch 18646	81												
QC1204254061 4 Strontium-90	74903001	DUP		Hh	0.141	Н	0.124	uCi/g	12.7		(0%-20%)	JXB7	04/19/19 07:28
QC1204254063 Strontium-90	LCS		0.00302				0.00258	uCi/g		85.4	(75%-125%)		04/19/19 07:28
QC1204254060 Strontium-90	MB					U	3.13E-05	uCi/g					04/19/19 07:28
QC1204254062 4 Strontium-90	74903001	MS	0.00317	Hh	0.141	Н	0.129	uCi/g		N/A	(75%-125%)	1	04/19/19 07:28
Batch 18668	10												
QC1204259093 4 Americium-241		DUP		Н	0.000167	Н	0.000153	uCi/g	8.51		(0%-20%)	AXM6	04/19/19 10:49
Cobalt-60				Н	5.31E-06	Н	5.51E-06	uCi/g	3.74		(0%-20%)		
Cesium-137				Н	0.042	Н	0.0474	uCi/g	12.1		(0%-20%)		
QC1204259094 Americium-241	LCS		0.00346				0.00367	uCi/g		106	(75%-125%)		04/19/19 10:50
Cobalt-60			0.00105				0.00118	uCi/g		112	(75%-125%)		
Cesium-137			0.00131				0.00148	uCi/g		113	(75%-125%)		

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

# **QC Summary**

		<u>V</u> C 2	Summar	<u>ry</u>					
Workorder: 476214									Page 3 of 5
Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
High Rad Testing Batch 1866818									
QC1204259092 MB Americium-241		U	3.81E-07	uCi/g				AXM6	04/19/19 08:14
Cobalt-60		U	4.04E-08	uCi/g					
Cesium-137		U	8.17E-09	uCi/g					
Batch 1870155									
QC1204266874 476212001 DUP Plutonium-238	Hh	0.000117 HU	8.83E-05	uCi/g	22.2		(0% - 100%)	JXB7	04/24/19 08:35
Plutonium-239/240	Hh	0.000199 H	0.000136	uCi/g	37.7		(0% - 100%)		
Plutonium-242	HUh	2.73E-05 HU	2.25E-05	uCi/g	N/A		N/A	L	
QC1204266876 LCS Plutonium-238		U	3.53E-05	uCi/g					04/23/19 20:22
Plutonium-239/240	0.00352		0.00376	uCi/g		107	(75%-125%)		
Plutonium-242		U	6.30E-05	uCi/g					
QC1204266873 MB Plutonium-238		U	2.82E-05	uCi/g					04/24/19 08:35
Plutonium-239/240		U	3.26E-05	uCi/g					
Plutonium-242		U	3.65E-05	uCi/g					
QC1204266875 476212001 MS Plutonium-238	Hh	0.000117 H	0.000136	uCi/g					04/23/19 20:22
Plutonium-239/240	0.00352 Hh	0.000199 H	0.00405	uCi/g		110	(75%-125%)		

# **GEL LABORATORIES LLC**

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# **QC Summary**

workorder: 476214									Page	e 4 of 5
Parmname	NOM	Sample Qua	d QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1870155										
Plutonium-242	HUh	2.73E-05 HU	5.31E-05	uCi/g				JXB7	04/23/1	9 20:22

#### Notes:

**XX**/ o -- **l** - o -- **- l** o --- **-**

The Qualifiers in this report are defined as follows:

\*\* Analyte is a Tracer compound

45/014

- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification
- UJ Gamma Spectroscopy--Uncertain identification
- UL Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

# **GEL LABORATORIES LLC**

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# **QC Summary**

workorder:	476214								Page 5 of 5
Parmname		NOM	Sample Qual	QC	Units	RPD%	REC%	Range An	lst Date Time

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

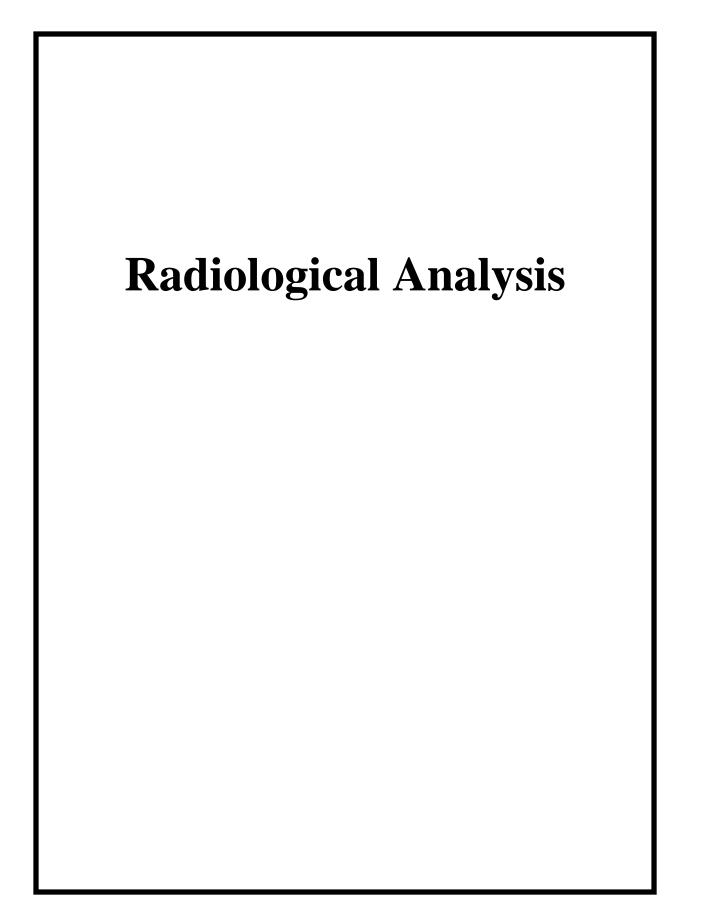
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

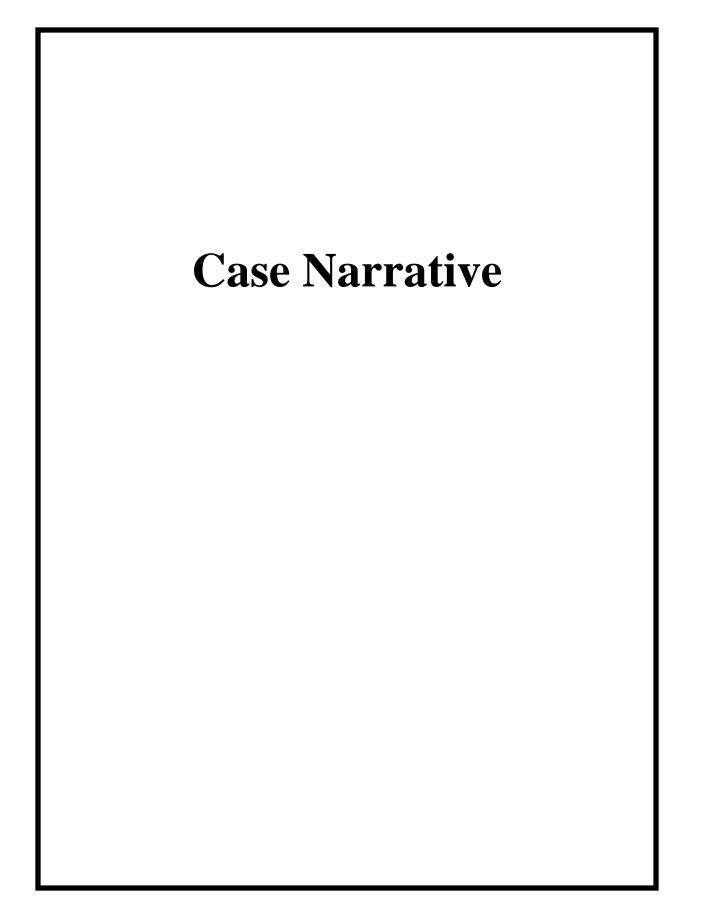
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Workorder: 476214

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

# List of current GEL Certifications as of 04 May 2019





#### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 420-003169 Work Order #: 476214

**Product:** Alphaspec U232, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1864678

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
476214001	CAA Floor
1204254054	Method Blank (MB)
1204254055	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254056	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254057	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-233/234	RPD 37.1* (0.00%-20.00%) RER 1.38 (0-3)

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204254054 (MB)	Uranium-232	Result 0.0000435 < MDA 0.000147 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.000000624 < MDA 0.0000713 > RDL 0.000001 uCi/g

		Result 0.00000496 < MDA 0.0000654 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.00000953 < MDA 0.0000713 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-238	Result 0.0000886 < MDA 0.000109 > RDL 0.000001 uCi/g
476214001 (CAA Floor)	Uranium-232	Result -0.0000343 < MDA 0.000262 > RDL 0.000001 uCi/g
	Uranium-233/234	Result -0.00000154 < MDA 0.000145 > RDL 0.000001 uCi/g
	Uranium-235/236	Result 0.0000574 < MDA 0.000134 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.0000566 < MDA 0.000105 > RDL 0.000001 uCi/g

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204254055 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254056 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
476214001 (CAA Floor)	Received 11-APR-19, out of holding 24-SEP-18

### Recounts

The U-232 and U-236 traced portions of samples 1204254055 (XC-2 Floor DebrisDUP) and 1204254056 (XC-2 Floor DebrisMS) were given additional clean-up steps and recounted in order to remove suspected Plutonium interference. The recounts are being reported.

Product: Alphaspec Pu242, Solid High Rad Analytical Method: DOE EML HASL-300, Pu-11-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1870155

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476214001	CAA Floor
1204266873	Method Blank (MB)
1204266874	476212001(RER Floor) Sample Duplicate (DUP)
1204266875	476212001(RER Floor) Matrix Spike (MS)
1204266876	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

## Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

## **Preparation Information**

## Aliquot Reduced

Aliquots were reduced due to high activity based on Gamma data.

## Quality Control (QC) Information

## RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204266873 (MB)	Plutonium-238	Result 0.0000282 < MDA 0.0000767 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result 0.0000326 < MDA 0.000105 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000365 < MDA 0.0000977 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g
476214001 (CAA Floor)	Plutonium-242	Result 0.000176 < MDA 0.000421 > RDL 0.000001 uCi/g

### **Technical Information**

### Holding Time

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204266874 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
1204266875 (RER FloorMS)	Received 11-APR-19, out of holding 24-SEP-18

WD:2020:0753 - Attachment B	
476214001 (CAA Floor)	Received 11-APR-19, out of holding 24-SEP-18

### Sample Re-prep/Re-analysis

Samples were reprepep due to high activity. The reanalysis is being reported.

#### Recounts

Samples 1204266873 (MB) and 1204266874 (RER FloorDUP) were recounted due to high MDCs. The recounts are reported.

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
476214001	CAA Floor

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: Gammaspec, Cs137 Only, solid High Rad Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R **Analytical Procedure:** GL-RAD-A-013 REV# 27 **Analytical Batch:** 1866818

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
476214001	CAA Floor
1204259092	Method Blank (MB)
1204259093	476212001(RER Floor) Sample Duplicate (DUP)
1204259094	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

WD:2020:0753 - Attachment B <u>Technical Information</u>

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204259093 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
476214001 (CAA Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	Client Sample	
Cobalt-60	476214001	CAA Floor	

Product: GFPC, Sr90, solid High Rad Analytical Method: EPA 905.0 Modified/DOE RP501 Rev. 1 Modified Analytical Procedure: GL-RAD-A-004 REV# 21 Analytical Batch: 1864681

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476214001	CAA Floor
1204254060	Method Blank (MB)
1204254061	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254062	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254063	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

#### Matrix Spike (MS) Recovery

The Matrix Spike (See Below) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

Sample	Analyte	Value
1204254062 (XC-2 Floor DebrisMS)	Strontium-90	-399* (75%-125%), but result > 5x nominal

### **Technical Information**

### Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204254061 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254062 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
476214001 (CAA Floor)	Received 11-APR-19, out of holding 24-SEP-18

### **<u>Certification Statement</u>**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **GEL LABORATORIES LLC**

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

# Qualifier Definition Report for

# WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 420-003169 GEL Work Order: 476214

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

## **Review/Validation**

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

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

Signature: Land

Name: Theresa Austin Title: Group Leader

Date: 03 MAY 2019

# **Digestion for Soil**

Batch ID:	1866819	Due I	Dates for Lab	: 17-APR-2019	Hold: 24-SEP-2018	Package: 07-MAY-	2019 SDG: 09-MA
Analyst:	Andrew McKenzie (AXM6)	Type	Sample Id	Description		Serial Number	Spike Amount Spike Units
Method:	Client Requested Procedure						
Lab SOP:	GL-RAD-A-015 REV# 18						
Instrument:	R2-38110047						
4 Sample ID	Prop Data Min DDI Initial F	inal	Prop Factor				

# Sample ID	Prep Date	Min RDL ()	Initial Weight	Final Volume	Prep Factor (mL/g)	
			(g)	(mL)		
476212001	12-APR-2019		0.5693	100	175.65431	
2 476214001	12-APR-2019		0.4171	100	239.75066	
Reagent/Solvent Lo	ot ID I	Description		Amount	Comments:	

Analytical Logbook version 1 11-04-2002

**GEL Laboratories LLC** 

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## **CPC – Chemical Process Cell**

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a member of The GEL Group INC



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

gel.com

February 08, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 469209 SDG: 429-433-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 17, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

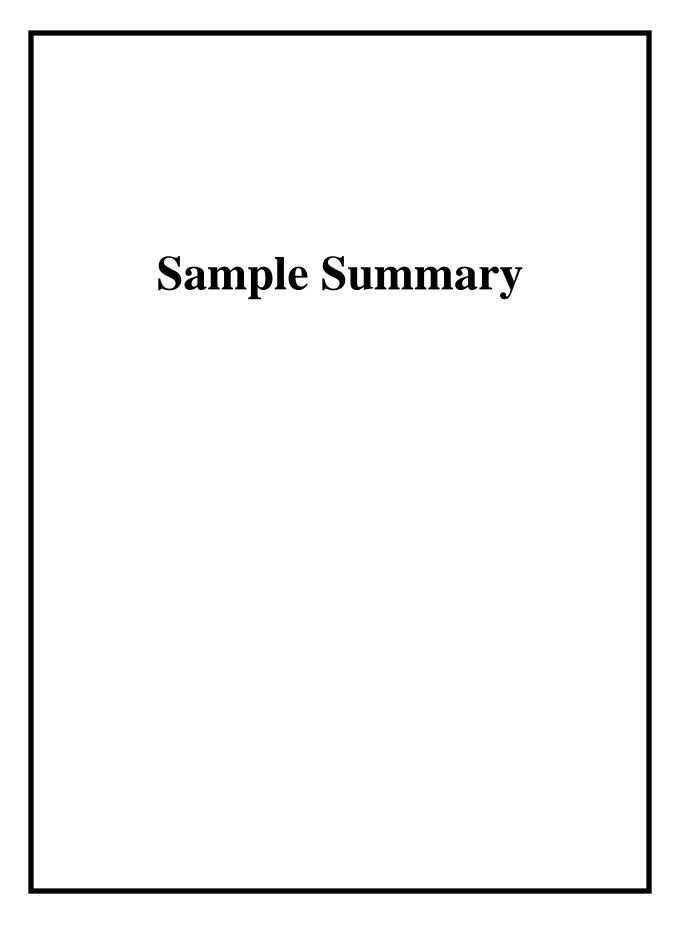
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

February 8, 2019

**Release Number** 

429

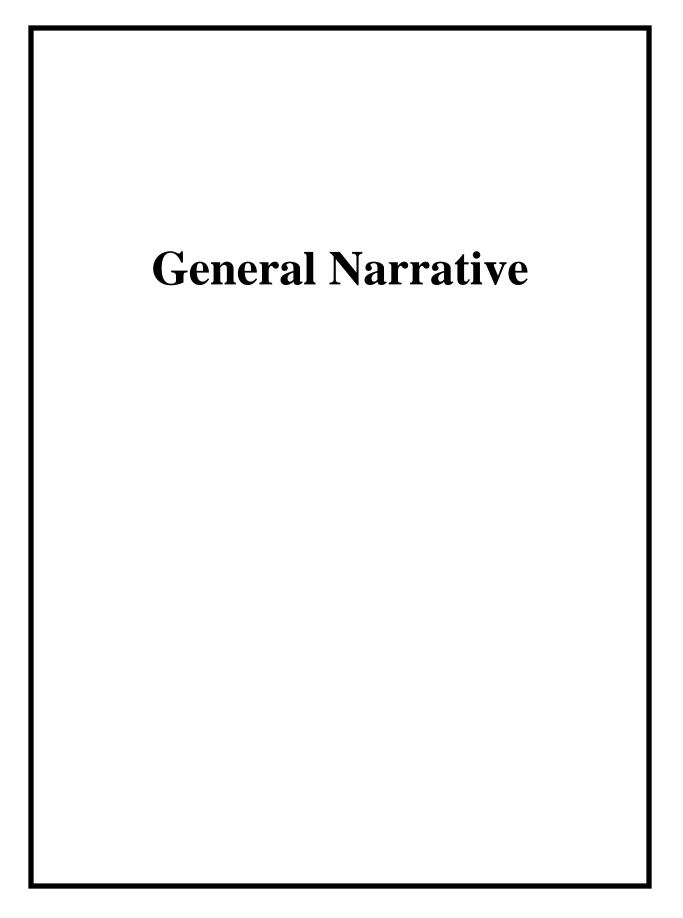
## Purchase Order Number

CH-003169

<u>Charge #</u> WV01.C2.06.01.04.10.01 WV01.C2.06.01.04.10.01 WV01.C2.06.01.04.10.01 WV01.C2.06.01.04.10.01 WV01.C2.06.01.04.10.01

## Description CPC Floor 1 CPC Floor 2 CPC Floor 3 CPC Floor 4

CPC Floor 5



## Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 429-433-003169 Work Order: 469209

### February 08, 2019

### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

### Release Number

429

### Charge Number

WV01.C2.06.01.04.10.01

#### **Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on January 17, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

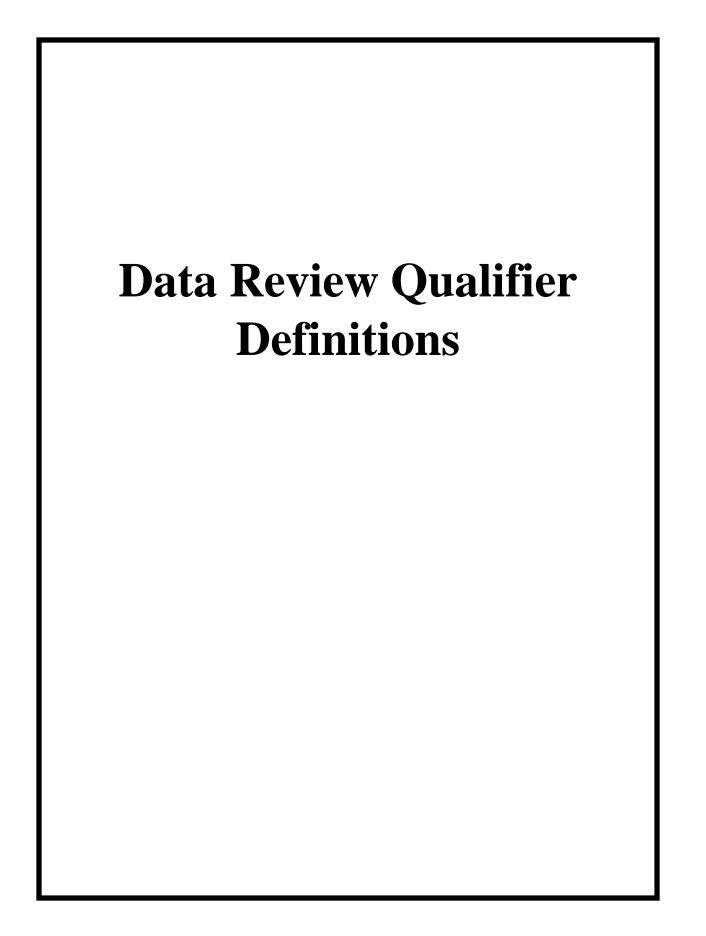
<u>Laboratory ID</u>	<u>Client ID</u>
469209001	CPC Floor 1
469209002	CPC Floor 2
469209003	CPC Floor 3
469209004	CPC Floor 4
469209005	CPC Floor 5

WD:2020:0753 - Attachment B **Case Narrative** 

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Keny OBarr for Kathering C

Katherine Cates Project Manager



429

### Data Review Qualifier Definitions

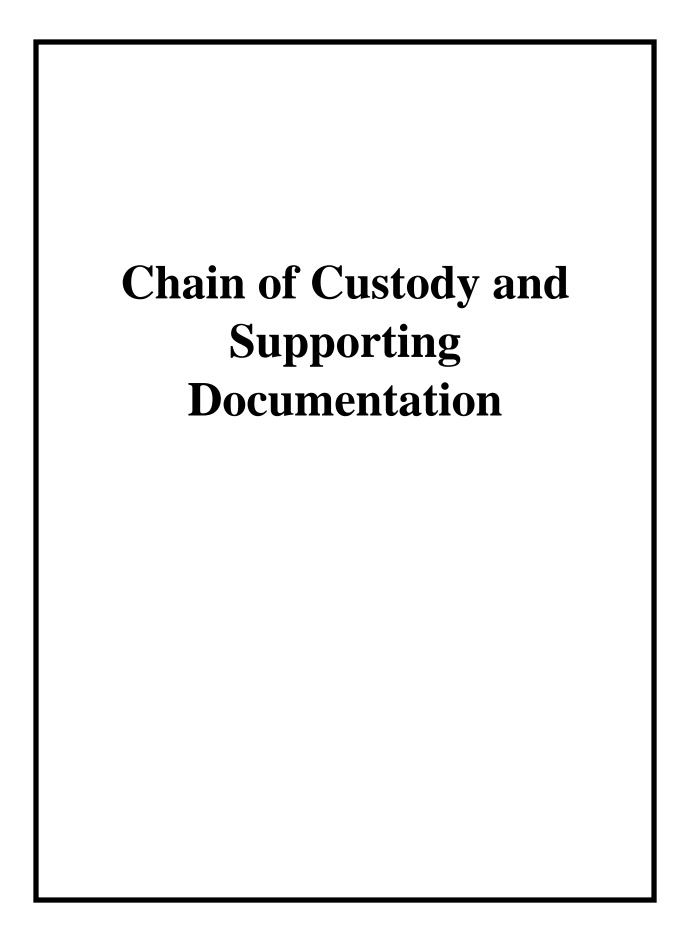
Qualifier Explanation

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- ${\tt C}$  ~ Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
- $\tt ND$   $\,$  Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



469209	109			CH/	Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS (Page 1 of 2)	Appei TODY / R (Page	Appendix B DY / REQUEST (Page 1 of 2)	FOR-AN	ALYSIS		WD:2	
					CH2M F 10 Wee	CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road West Valley, NY 14171-9799	T, West / Springs NY 1417	/alley LL( Road 1-9799			2020:0753 -	L
1. Lab: GEL	ź		2. Cha	2. Charge #: \wvol . (2, . 66. 0 ). 04 . 10. 0	C2.06.01	.04.10°	01	3. Analysis Requested	sis Req	uested	4. Electronic Disk? Yes [] No [ x ∰	<b>I</b>
5. PO #: CH-003169	03169	~~~	6. Rel	6. Release #: 129 .	29 Hrru 433	ŝ		- 'g	-n		7. Report Format Level: I[x] II[	
8. Cognizant Engineer/Project: MPPB Demo	jineer/Pr	oject: M	IPPB Den				8 78	e\536 ! (N-	(21 13) si		9. Priority Code: Routine [ x ]	
10. DQO/SAP#: WVDP-584	WVDP-5	84					cs-1	rt, 23 topes	0, -24 0 000		1[] 2[] 3[]	
12.				13.			a for 1	33/23	92/65 92/54		11. Report Data To: W. Connors	
Sample ID#	Type	# Cont.	Pres.	Date	Time	Hd	ատեϿ ֆՀ-աA	238) 232, -2 238)	2- '862 2- 862	06-1S	Comments	1
PC Floor	Grab	<b>~</b>	в	8.7.18	1500	BL	×	*	×	×	<ul> <li>The five smears are to be composited by the lab to form a composite sample and analyzed for <sup>241</sup>Am, <sup>137</sup>Cs, <sup>223</sup>U, <sup>224</sup>U, <sup>236</sup>U, <sup>238</sup>U, <sup>238</sup>Pu, <sup>238</sup>Pu, <sup>240</sup>Pu, <sup>242</sup>Pu, <sup>90</sup>Sr, Report units in uCi per composite sample.</li> </ul>	1
												Т
18. Gross Wt (g)	<i>J</i>	طره .اله		14. Phase (Circle one ):	t one ); Solid		Liquid	Sludge	Other :			T
Tare Wt (g)	01	104.90		Type (Circle one):	$\mathcal{D}$	Debris C	Coupon	Pipe Section		Filter Particulate	ulate Other: Smear	Т
Net Wt (g)	<i>41.</i>	41.24		15. Sample Bottle Size:	e Size:	L L	Sample	Sample Bottle Type (Circle One):	pe (Circ		Glass Poly	1
17. Chain-of-Custody Reviewed by:	stody Re	viewed t		beaut halls	ر د د						16/0 mci Alpha NA[]	<u> </u>
~~~			V19. S	19. Sample Custodian Signature/Date/Time	lian Signatur	e/Date/Tir	ne				20. Sample Receipt:	<b></b>
Released by Durd	Dude le	) llo	2.7.18	1612	Received by:	it was:	Theolo	2.20	218 16:12	R	Temperature°C	T
Released by: Jacon	entre	theel	2019	$\mathcal{Q}_{e_1}$ ) [.9.19] [3, $\mathcal{O}7$ Received by: $\overline{\mathcal{V}}$	Received by			1/17/19	Ś	CBIF	Cooler Seals Intact? Yes [ ] No [ ]	
Released by:					Received by:	0				\$		
Released by:					Received by:							

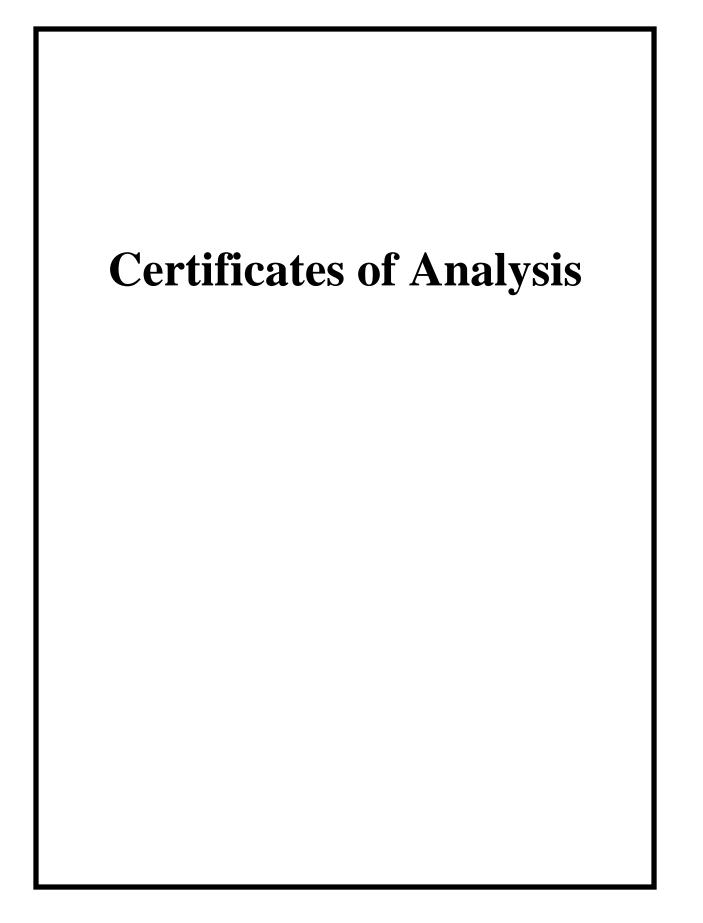
Attachment B - Page 47

CH-003169

WV-2865, Rev. 4 (SOP 300-08)

ł	Client: WVNS			SDG/AR/COC/Work Orgier: 4 69 20 9
$\left  \right $	Received By: ZKW/ESO			Date Received: 1/17/19
	Carrier and Tracking Number			Circle Applicable: FertEx Express FedEx Ground UPS Field Services Courier Other
s	Suspected Hazard Information	<b>1</b> •	Τ_	8107 1470 9895
		Yes	Ž	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigat
A	Shipped as a DOT Hazardous?	L	F	Hazard Class Shipped: UN#: 2910 If UN2910, Is the Radioactive Shipment Survey Compliant? Yes No
B e	) Did the client designate the samples are to be seeived as radioactive?	-		COC notation or radioactive stickers on containers equal client designation.
a	) Did the RSO classify the samples as dioactive?	2		Maximum Net Counts Observed* (Observed Counts - Area Background Counts):
)) a	) Did the client designate samples are zardous?			COC notation or hazard labels on containers equal client designation.
)	Did the RSO identify possible hazards?		T	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Astronometer Dentity
	Sample Receipt Criteria	Y <sub>S</sub>	Z	o
1	Shipping containers received intact and sealed?	Ĵ		Z         Comments/Qualifiers (Required for Non-Conforming Items)           Circle Applicable:         Seals broken         Damaged container         Leaking container         Other (describe)
2	Chain of custody documents included with shipment?	7	-	Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*		4	Preservation Method: Wet Ice Ice Packs Dry ice Kone Other: *all temperatures are recorded in Celsius TEMP: Zic
4	Daily check performed and passed on IR temperature gun?	7		Temperature Device Serial #:       IR3-18         Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	4		Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
	Samples requiring chemical preservation at proper pH?	L	+	Sample ID's and Containers Affected: If Preservation added, Lot#:
	Do any samples require Volatile Analysis?		2	If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:
	Samples received within holding time?			ID's and tests affected:
	Sample ID's on COC match ID's on bottles?	7		ID's and containers affected:
	Date & time on COC match date & time on bottles?	1		Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
ľ	Number of containers received match number indicated on COC?	1		Circle Applicable: No container count on COC Other (describe)
C	Are sample containers identifiable as JEL provided?		~	
r	COC form is properly signed in elinquished/received sections?			Circle Applicable: Not relinquished Other (describe)
	ents (Use Continuation Form if needed):			

Page of Attachment B - Page 48



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

# **Certificate of Analysis**

Company : Address :	LLC	2.	. BWXT W	-										
	102	82 Rock	Springs Ro	oad										
	Wes	st Valley.	New York	x 14171-9799	1				Rep	ort Date:	Febru	ary 8,	2019	
Contact:	Mr.	William	Connors											
Project:	CH-	-003169	Haz Waste											
														_
Client Sample	e ID:	CPC F. 469209						roject: lient ID:	WVN WVN	S02501				
Sample ID: Matrix:		Swipe	001				C.	nem ID:	VV VIN	3023				
Collect Date:		07-FEI	3-18											
Receive Date	e:	17-JAN	N-19											
Collector:		Client												
Parameter	Q	ualifier	Result	Uncertainty	DL	TPU	RL	Units	PF I	<b>OF</b> Analyst	t Date	Time	Batch	Mtd
High Rad Testing														
Alphaspec Pu 238	8, 239, 2	40, 242 1	HIGH RAD	"As Receive	ed''									
Plutonium-238		Hh	0.00202	+/-0.000235	4.64E-05	+/-0.000384	2.00E-06	uCi/sample		AXM6	02/02/19	1027	1844224	• 1
Plutonium-239/240		Hh	0.00222	+/-0.000245	5.41E-05	+/-0.000414	2.00E-06	uCi/sample						
Plutonium-242		Hh	9.32E-05	+/-5.75E-05	6.24E-05	+/-5.92E-05	0.0002	uCi/sample						
Alphaspec U232,	233, 234	4, 235, 2.	38 HIGH R	AD "As Rece	rived"									
Uranium-232		HUh	3.67E-05	+/-4.35E-05	6.36E-05	+/-4.40E-05	2.00E-06	uCi/sample		AXM6	02/02/19	0940	1844223	2
Uranium-233/234		Hh	0.0001	+/-5.18E-05	3.79E-05	+/-5.46E-05	2.00E-06	uCi/sample						
Uranium-235/236		HUh	9.47E-06	+/-2.17E-05	3.45E-05	+/-2.18E-05	2.00E-06	uCi/sample						
Uranium-238		HUh	2.19E-05	+/-2.77E-05	3.44E-05	+/-2.79E-05	2.00E-06	uCi/sample						
GFPC, Sr90, filte	r HIGH	RAD "A.	s Received'	,										
Strontium-90		Hh		+/-0.000327	4.60E-05	+/-0.00515	2.00E-06	uCi/sample		AXM6	02/02/19	1411	1844226	3
Gammaspec, Gan	mma Cs	137 Filt	er HIGH R	AD "As Rece	ived"			1						
Americium-241	<i>una</i> , cs.	Hh		+/-0.000843	0.000838	+/-0.0015		uCi/sample		AXM6	01/23/19	0955	1840729	4
Cesium-137		Hh	0.852	+/-0.00247	0.00036		2 00E-07	uCi/sample		111110	01/25/17	0755	1010729	•
Cobalt-60		Hh		+/-9.20E-05	5.77E-05	+/-9.27E-05	2.001 07	uCi/sample						
The following Prep	Motho	de woro	norformod	1										
	Descrip		performed	1		Analyst	Date	Tim	ie P	rep Batch				
	Filter Pre					AXM6	01/29/19			840728				
riner riep		φ.				AAMO	01/2//1/	100	- 1	040720				
The following Anal	•		were perfo	rmed										
Method 1	Descript	tion												
1	DOE EM	L HASL-	300, Pu-11-F	RC Modified										
2 1	DOE EM	L HASL-	300, U-02-R	C Modified										
3 1	EPA 905.	0 Modifie	d/DOE RP5	01 Rev. 1 Mod	lified									
4 I	DOE HA	SL 300, 4	.5.2.3/Ga-01	-R										
Surrogate/Tracer	Recover	ry	Test					В	atch II	) Recover	y% Ac	cepta	ble Limi	its
Plutonium-236 T	racer		Alphaspe	c Pu 238, 23	9, 240, 242 HI	IGH RAD "As Recei	ved"	1	844224	83.	.7	(15%-	125%)	
Uranium-232 Tra	acer		Alphaspe	c U232, 233.	234, 235, 238	8 HIGH RAD "As Re	ceived"	1	844223	93.	.6	(15%-	125%)	
Uranium-235/23		•	1 1	, ,	, ,	8 HIGH RAD "As Re			844223			(15%-	125%)	
					GH RAD "As								,	
Strontium Carrie	1		UFPU, SI	190, inter HIC	JELKAD AS	Received		1	844226	5 92.	. /	(23%)-	125%)	

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

## **Certificate of Analysis**

Parame	ter	Qualifier	Result Uncertainty	DL	TPU	RL Units	PF	DF Analyst	Date Time	Batch	Mtd.
	ient Sample II mple ID:	D: CPC Flo 4692090				Project: Client ID:		/NS02501 /NS025			
Pro	oject:	CH-003169 H	az Waste								
Co	ontact:	Mr. William C	connors					1	<u> </u>		
		West Valley, N	New York 14171-9799				R	Report Date:	February 8,	2019	
	ldress :	CH2M HILL I LLC. 10282 Rock Sj	3WXT West Valley prings Road								

Surrogate/Tracer Recovery Test

## Notes:

429

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit TPU: Total Propagated Uncertainty

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL LLC. 10282 Rock		-										
	West Valley,	New York	14171-9799					Repo	ort Date:	Februar	y 8, 2019	9	
Contact:	Mr. William	Connors											
Project:	CH-0031691	Haz Waste											
Client Sample II Sample ID: Matrix: Collect Date: Receive Date: Collector:	469209 Swipe 07-FEE 17-JAN Client	9002 3-18 N-19					oject: lient ID:	WVNS WVNS	3025				
Parameter	Qualifier	Result U	ncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date T	ime Bat	tch I	Mtd.
High Rad Testing Alphaspec Pu 238, 2. Plutonium-238 Plutonium-239/240 Plutonium-242 Alphaspec U232, 233 Uranium-232 Uranium-233/234 Uranium-235/236 Uranium-238 <i>GFPC, Sr90, filter H</i> Strontium-90 <i>Gammaspec, Gamma</i> Americium-241 Cesium-137 Cobalt-60	Hh Hh 3, 234, 235, 23 Hh Hh HUh HUh HUh HUh HUh	0.00161 0.00186 0.00011 38 HIGH RA 9.62E-05 0.000154 9.20E-06 -1.27E-05 5 Received" 0.00749 er HIGH RA 0.00489 0.117	+/-0.00024 +/-0.000257 +/-6.80E-05 <b>AD "As Recent</b> +/-5.96E-05 +/-7.62E-05 +/-3.15E-05 +/-2.05E-05 +/-0.000204	4.44E-05 6.05E-05 6.05E-05 <i>ived"</i> 7.60E-05 5.39E-05 5.83E-05 6.53E-05 4.74E-05	+/-0.000852	2.00E-06 0.0002 2.00E-06 2.00E-06 2.00E-06 2.00E-06 2.00E-06	uCi/sample uCi/sample uCi/sample uCi/sample uCi/sample uCi/sample uCi/sample		AXM6( AXM6(	)2/02/19 10 )2/02/19 09 )2/02/19 14 )1/23/19 14	940 1844 411 1844	4223 4226	2 3
The following Prep M	lethods were	performed											
Method Des	scription				Analyst	Date	Tim	e Pr	ep Batch				
Filter Prep Filte	er Prep				AXM6	01/29/19	1004	4 18	40728				
The following Analytic	cal Methods y	were nerfor	med										
	cription	were perior	incu										
1 DOI	E EML HASL-3	300. Pu-11-R	C Modified										
	E EML HASL-3												
	905.0 Modifie			ified									
	E HASL 300, 4.												
Surrogate/Tracer Red							р	otoh ID	Decover	.0/ <b>A</b> co	ntabla I	imit	c
	•	Test	D 020 020	240 242 1		111			Recovery		eptable I		.5
Plutonium-236 Trac				· · ·	HGH RAD "As Recei			844224	73.2		5%-125%	<i>,</i>	
Uranium-232 Tracer	r	Alphaspec	U232, 233,	234, 235, 23	38 HIGH RAD "As Re	ceived"	1	844223	83.1	(1	5%-125%	%)	
Uranium-235/236 T	racer	Alphaspec	U232, 233,	234, 235, 23	38 HIGH RAD "As Re	ceived"	1	844223	104	• (1	5%-125%	%)	
Strontium Carrier		GFPC, Sr9	00, filter HIC	H RAD "A	s Received"		1	844226	92.7	(2	5%-125%	%)	

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

## **Certificate of Analysis**

Parar	neter	Qualifier	Result Uncertainty	DL	TPU	RL Units	PF	DF Analyst	Date Time	Batch	Mtd.
	Client Sample I Sample ID:	D: CPC Flo 4692090	*			Project: Client ID:		NS02501 NS025			
1	Project:	CH-003169 H	az Waste								
(	Contact:	Mr. William C	Connors					-			
		West Valley, I	New York 14171-9799				Re	port Date:	February 8,	2019	
	Company : Address :	CH2M HILL I LLC. 10282 Rock S	BWXT West Valley prings Road								

Surrogate/Tracer Recovery Test

## Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration

# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

oad x 14171-9799	)				Done				
	•				Dana				
					Kepo	rt Date:	February	, 8, 2019	
				oject: lient ID:	WVNS WVNS				
Uncertainty	DL	TPU	RL	Units	PF DI	F Analyst	Date Ti	me Batch	Mtd.
"As Receive +/-0.000329 +/-0.000359	5.76E-05	+/-0.000634 +/-0.000741		-		AXM6(	02/02/19 102	27 184422	4 1
+/-7.55E-05	5.71E-05	+/-7.97E-05	0.0002	uCi/sample					
AD "As Rece +/-6.59E-05 +/-4.53E-05 +/-3.70E-05	eived" 9.24E-05 6.03E-05 5.25E-05	+/-6.75E-05 +/-4.60E-05 +/-3.73E-05	2.00E-06	uCi/sample		AXM6(	02/02/19 094	40 184422	3 2
+/-3.07E-05	5.52E-05	+/-3.08E-05							
"				1					
+/-0.000312	4.85E-05	+/-0.00452	2.00E-06	uCi/sample		AXM6 (	02/02/19 14	11 184422	.6 3
AD "As Rece	vived"								
+/-0.000983	0.000717	+/-0.00215		uCi/sample		AXM6 (	01/23/19 14	31 184072	9 4
+/-0.0021		+/-0.0523	2.00E-07	uCi/sample					
+/-8.21E-05	5.16E-05	+/-9.21E-05		uCi/sample					
d									
		Analyst	Date	Tim	e Pre	ep Batch			
		AXM6	01/29/19	1004	184	40728			
ormed									
лшец									
RC Modified									
C Modified									
501 Rev. 1 Mod	dified								
-R	lilleu								
-K									•.
						Recovery	-	ptable Lin	nits
	9, 240, 242 H	IGH RAD "As Receiv	ved"	1	844224	68.5	5 (15	5%-125%)	
ec Pu 238, 23	234 235 23	8 HIGH RAD "As Re	ceived"	1	844223	96.1	I (15	%-125%)	
,	, 257, 255, 25							(0/ 1050/)	
ec U232, 233		8 HIGH RAD "As Re	ceived"	1	844223	84.6	5 (15	0%-125%)	
	,		, , ,	ec U232, 233, 234, 235, 238 HIGH RAD "As Received"		ec U232, 233, 234, 235, 238 HIGH RAD "As Received" 1844223	ec U232, 233, 234, 235, 238 HIGH RAD "As Received" 1844223 96.1	ec U232, 233, 234, 235, 238 HIGH RAD "As Received" 1844223 96.1 (15	ec U232, 233, 234, 235, 238 HIGH RAD "As Received" 1844223 96.1 (15%-125%)

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

## **Certificate of Analysis**

Par	ameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.
	Client Sample Sample ID:	ID: CPC Floor 3 469209003			Project: Client ID:	WVNS02501 WVNS025	
	Project:	CH-003169 Haz Waste					
	Contact:	Mr. William Connors				*	<b>,</b> ,
		West Valley, New York 14171-9799				Report Date:	February 8, 2019
	Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road					

Surrogate/Tracer Recovery Test

Notes:

429

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

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# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL LLC. 10282 Rock		2										
	West Valley,	New York	14171-9799	)				Reno	ort Date:	Februa	rv 8 7	2019	
Contact:	Mr. William		. 141/1 ////					Керс	nt Date.	reorua	ly 0, 2	2017	
Project:	CH-003169												
Client Sample Sample ID: Matrix: Collect Date: Receive Date:	E ID: CPC Fl 469209 Swipe 07-FEH 17-JAN	loor 4 0004 3-18					oject: lient ID:	WVNS WVNS					
Collector:	Client	D 14 1		DI		DI	TT •4	DE D				<b>D</b> 4 1	
Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date 1	ime	Batch	Mtd.
High Rad Testing Alphaspec Pu 238, Plutonium-238 Plutonium-239/240 Plutonium-242	239, 240, 242 F Hh Hh Hh	0.00499 0.00536	"As Receive +/-0.00041 +/-0.000424 +/-6.20E-05	6.76E-05		2.00E-06	uCi/sample uCi/sample uCi/sample		AXM6	02/02/19 1	027	1844224	1
Alphaspec U232, 2	233, 234, 235, 23	38 HIGH R	AD "As Rece	vived"									
Uranium-232 Uranium-233/234 Uranium-235/236	HUh Hh HUh	0.000114 3.17E-05	+/-5.46E-05 +/-6.01E-05 +/-3.51E-05	8.90E-05 5.90E-05 4.64E-05	+/-5.51E-05 +/-6.32E-05 +/-3.55E-05	2.00E-06 2.00E-06	uCi/sample uCi/sample		AXM6	02/02/19 0	940	1844223	2
Uranium-238	HUh	3.01E-05	+/-3.51E-05	4.87E-05	+/-3.55E-05	2.00E-06	uCi/sample						
GFPC, Sr90, filter													
Strontium-90	Hh		+/-0.000425		+/-0.00826	2.00E-06	uCi/sample		AXM6	02/02/19 1	412	1844226	3
Gammaspec, Gam					10.000		<i></i>						
Americium-241 Cesium-137	Hh	0.0169 12.5	+/-0.00193 +/-0.00657	0.00214 0.00111	+/-0.00299	2 005 07	uCi/sample uCi/sample		AXM6	01/22/19 1	544	1840729	4
Cobalt-60	Hh Hh		+/-0.00037		+/-1.00	2.00E-07	uCi/sample						
The following Prep	Methods were	performed	l										
	Description	•			Analyst	Date	Tim	e Pr	ep Batch				
Filter Prep F	ilter Prep				AXM6	01/29/19	1004	4 18	40728				
The following Analy	tical Mathada	wara narfa	rmod										
	escription	were perio	incu										
	OE EML HASL-3	300 Pu_11_E	C Modified										
5	OE EML HASL-												
	PA 905.0 Modifie			lified									
	OE HASL 300, 4.			inica									
Surrogate/Tracer <b>R</b>	Recoverv	Test					В	atch ID	Recover	v% Acc	eptab	le Limi	ts
Plutonium-236 Tr	•	Alphaspe	c Pu 238. 239	9. 240. 242 F	HIGH RAD "As Recei	ved"		844224	80.		-	25%)	
Uranium-232 Tra			,	, ,	38 HIGH RAD "As Re			844223	99.			25%)	
Uranium-235/236					38 HIGH RAD "As Re			.844223	90.	Ì		25%)	
Strontium Carrier			90, filter HI					844226	90.			25%)	
Suonuun Carrier		UFFC, SI	50, mer fill	σιικάυ Α	S KEUEIVEU		1	044220	90.		J 70 - I	2370)	

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

## **Certificate of Analysis**

Para	ameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.
	Client Sample Sample ID:	ID: CPC Floor 4 469209004			Project: Client ID:	WVNS02501 WVNS025	
	Project:	CH-003169 Haz Waste					
	Contact:	Mr. William Connors				Ĩ	
		West Valley, New York 14171-9799				Report Date:	February 8, 2019
	Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road					

Surrogate/Tracer Recovery Test

## Notes:

429

The MDC is a sample specific MDC.

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Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit TPU: Total Propagated Uncertainty

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

# **Certificate of Analysis**

Company : Address :	CH2M HILI LLC. 10282 Rock											
_	West Valley	·	14171-9799					Repo	ort Date:	February	8, 2019	
Contact:	Mr. William	Connors										
Project:	CH-003169	Haz Waste										
Client Samp Sample ID: Matrix: Collect Date Receive Dat Collector:	469209 Swipe :: 07-FE	9005 B-18					oject: lient ID:	WVNS WVNS				
Parameter	Qualifier	Result I	Jncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Tin	ne Batch	Mtd
	Quanner	Acourt (	incr tamty	DL	110	<u>KL</u>	Units	IF D	r maiyst	Date III	ic Daith	TATIO
High Rad Testing Alphaspec Pu 23	8 239 240 242	HIGH RAD	"As Rocoino	d"								
Plutonium-238	6, 239, 240, 242 Hh	0.00991	+/-0.00118	0.000305	+/-0.00211	2.00E-06	uCi/sample		AXM6	02/02/19 102	7 1844224	4 1
Plutonium-239/240	Hh	0.0121	+/-0.00131	0.00039			uCi/sample					
Plutonium-242	HUh	0.000444	+/-0.000338	0.000474	+/-0.000347		uCi/sample					
Alphaspec U232,	233, 234, 235, 2	38 HIGH R	AD "As Rece	ived"								
Uranium-232	HUh	0.000204	+/-0.000176	0.000249	+/-0.000179	2.00E-06	uCi/sample		AXM6	02/02/19 094	0 184422	3 2
Uranium-233/234	HUh	0.000118	+/-0.000145	0.000218	+/-0.000147	2.00E-06	uCi/sample					
Uranium-235/236	HUh	0.000102	+/-0.000124	0.000166	+/-0.000125	2.00E-06	uCi/sample					
Uranium-238	HUh	0.000142	+/-0.000162	0.000244	+/-0.000164	2.00E-06	uCi/sample					
GFPC, Sr90, filte	er HIGH RAD "A	s Received"										
Strontium-90	Hh	0.0328	+/-0.000425	5.08E-05	+/-0.00867	2.00E-06	uCi/sample		AXM6	02/02/19 141	2 184422	6 3
Gammaspec, Ga	mma, Cs137, Filt	er HIGH RA	AD "As Recei	ived"								
Americium-241	Hh	0.0471	+/-0.00173	0.00135	+/-0.00658		uCi/sample		AXM6	01/24/19 055	3 184072	94
Cesium-137	Hh	2.28	+/-0.00407	0.000602		2.00E-07						
Cobalt-60	Hh	0.00258	+/-0.000199	7.21E-05	+/-0.000305		uCi/sample					
The following Pre	-	performed										
Method	Description				Analyst	Date	Tim	e Pr	ep Batch			
Filter Prep	Filter Prep				AXM6	01/29/19	1004	4 184	40728			
The following Ana	lvtical Methods	were perfo	rmed									
	Description											
1	DOE EML HASL-	300. Pu-11-R	C Modified									
2	DOE EML HASL-	<i>,</i>										
3	EPA 905.0 Modifie			ified								
4	DOE HASL 300, 4											
Surrogate/Tracer		Test					р	oteh ID	Recovery	.₀∠ Accen	table Lim	nite
	-		Du 220 220	240 242 114	CUDAD "As Deed	uad"						nus
Plutonium-236					GH RAD "As Recei			844224	54		%-125%)	
Uranium-232 Ti		• •			HIGH RAD "As Re			844223	76.:		%-125%)	
Uranium-235/23	36 Tracer	Alphaspeo	c U232, 233,	234, 235, 238	HIGH RAD "As Re	ceived"	1	844223	84.:	5 (15)	%-125%)	
Strontium Carri		GEDG G	90, filter HIC					844226	92.2		%-125%)	

Batch ID Recovery% Acceptable Limits

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## **Certificate of Analysis**

Parameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.
Client Sample	Sample ID: CPC Floor 5 e ID: 469209005			Project: Client ID:	WVNS02501 WVNS025	
Project	CH-003169 Haz Waste					
Contac	t: Mr. William Connors				L	
	West Valley, New York 14171-9799				Report Date:	February 8, 2019
Compa Addres	•					

Surrogate/Tracer Recovery Test

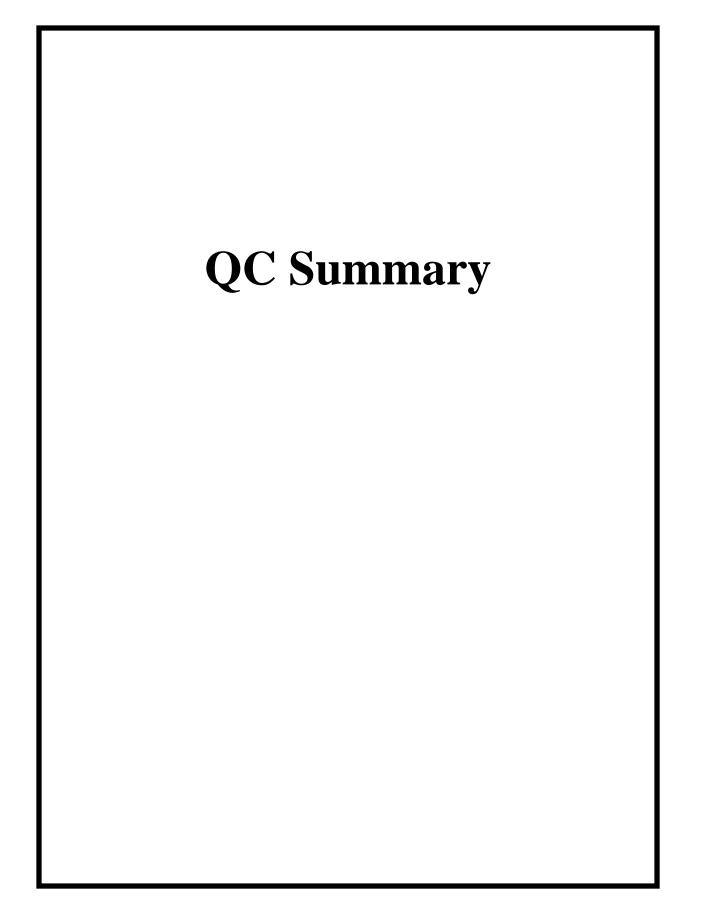
## Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Mtd.: Method **DL: Detection Limit** PF: Prep Factor RL: Reporting Limit Lc/LC: Critical Level TPU: Total Propagated Uncertainty MDA: Minimum Detectable Activity MDC: Minimum Detectable Concentration



## **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: February 8, 2019

Page 1 of 4

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 469209

**Contact:** 

Parmname	NOM	Sample Qua	l QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 1840729								
QC1204199764 LCS Cobalt-60	0.00719		0.00735	uCi/sample		102	(75%-125%) AXM6	01/24/19 09:41
Americium-241	0.0295		0.028	uCi/sample		94.7	(75%-125%)	
Cesium-137	0.0103		0.0102	uCi/sample		99.3	(75%-125%)	
QC1204199765 LCSD Cobalt-60	0.00719		0.00757	uCi/sample	2.94	105	(0%-20%)	01/24/19 10:12
Americium-241	0.0295		0.0279	uCi/sample	0.43	94.3	(0%-20%)	
Cesium-137	0.0103		0.0104	uCi/sample	1.94	101	(0%-20%)	
QC1204199763 MB Cobalt-60		U	-3.48E-05	uCi/sample				01/24/19 07:57
Americium-241		U	-1.47E-06	uCi/sample				
Cesium-137		U	-3.60E-05	uCi/sample				
Batch 1844223								
QC1204207769 LCS Uranium-232		U	-3.91E-05	uCi/sample			(75%-125%) AXM6	02/02/19 09:40
Uranium-233/234			0.00237	uCi/sample				
Uranium-235/236			0.00013	uCi/sample				

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

# **QC Summary**

Workorder: 469209		-	<b>_</b>							Pag	ge 2 of 4
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst		Time
High Rad Testing Batch 1844223											
Uranium-238	0.00273			0.00276	uCi/sample		101	(75%-125%)	AXM6	02/02/1	19 09:40
QC1204207770 LCSD											
Uranium-232			U	-1.42E-05	uCi/sample	0		(0%-20%)		02/02/1	19 09:40
Uranium-233/234				0.0028	uCi/sample	16.5					
Uranium-235/236				0.000152	uCi/sample	16					
Uranium-238	0.00273			0.0029	uCi/sample	4.93	106	(0%-20%)			
QC1204207768 MB Uranium-232			U	2.41E-05	uCi/sample					02/02/1	19 09:40
Uranium-233/234			U	3.12E-05	uCi/sample						
Uranium-235/236			U	1.04E-05	uCi/sample						
Uranium-238			U	8.15E-06	uCi/sample						
Batch 1844224											
QC1204207772 LCS Plutonium-238				5.67E-05	uCi/sample				AXM6	02/02/1	19 10:27
Plutonium-239/240	0.002			0.00201	uCi/sample		100	(75%-125%)			
Plutonium-242			U	2.79E-05	uCi/sample			(75%-125%)			
QC1204207773 LCSD Plutonium-238				9.45E-05	uCi/sample	50				02/02/1	19 10:27
Plutonium-239/240	0.002			0.00193	uCi/sample	4.31	96.1	(0%-20%)			

4/0000

# **GEL LABORATORIES LLC**

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# **QC Summary**

Workorder: 469	9209										Page	e 3 of 4
Parmname		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 18442 Plutonium-242	224				0.000137	uCi/sample	85			AXM6	02/02/1	9 10:27
QC1204207771 Plutonium-238	MB			U	3.65E-05	uCi/sample					02/02/1	9 10:27
Plutonium-239/240				U	1.26E-05	uCi/sample						
Plutonium-242				U	1.76E-05	uCi/sample						
Batch 18442												
QC1204207775 Strontium-90	LCS	0.00232			0.00233	uCi/sample		101	(75%-125%)	AXM6	02/02/1	9 14:12
QC1204207776 Strontium-90	LCSD	0.00232			0.00234	uCi/sample	0.39	101	(0%-20%)		02/02/1	9 14:12
QC1204207774 Strontium-90	MB			U	1.70E-05	uCi/sample					02/02/1	9 14:12

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- M REMP Result > MDC/CL and < RDL
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.

Wardsondam

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## **GEL LABORATORIES LLC**

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## **QC Summary**

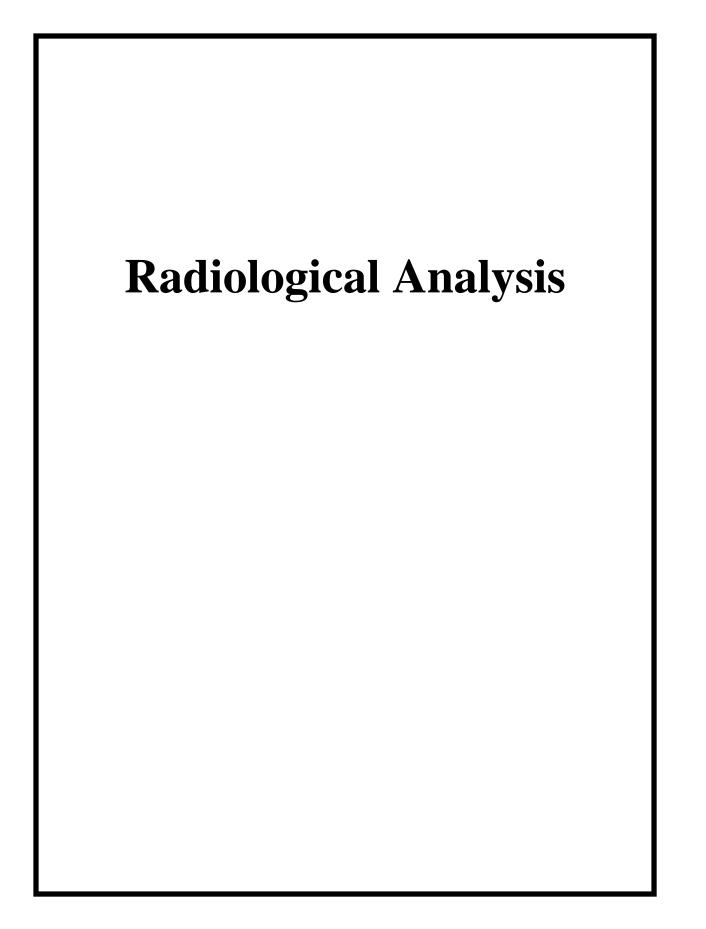
	•		-	$\chi \cup D$	aı	<u>.</u> y						
Workor	der: 469209										Pag	e 4 of 4
Parmna	me	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
N1	See case narrative											
ND	Analyte concentration is not detected above the detection limit											
NJ	Consult Case Narrative, Data S	Summary packag	ge, or Project	Manager c	oncerning t	his qualifie	er					
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.											
R	Sample results are rejected											
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.											
UI	Gamma SpectroscopyUncertain identification											
UJ	Gamma SpectroscopyUncerta	ain identificatior	ı									
UL	Not considered detected. The a	ssociated number	er is the repor	ted concer	tration, wh	ich may be	inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Data S	Summary packag	ge, or Project	Manager c	oncerning t	his qualifie	er					
Y	Other specific qualifiers were r	required to prope	erly define the	e results. C	onsult case	narrative.						
^	RPD of sample and duplicate e	valuated using +	-/-RL. Conce	ntrations a	re <5X the	RL. Quali	ifier Not Ap	plicable for I	Radiochem	istry.		
h	Preparation or preservation hol	ding time was e	xceeded									
^ The R five tim RL is us	licates that spike recovery limits elative Percent Difference (RPD es (5X) the contract required det sed to evaluate the DUP result. tes that a Quality Control param	) obtained from tection limit (RL	the sample do.). In cases wh	uplicate (I here either	OUP) is eva	luated aga	inst the acce	ptance criter	ia when the	e sample is	s greater	

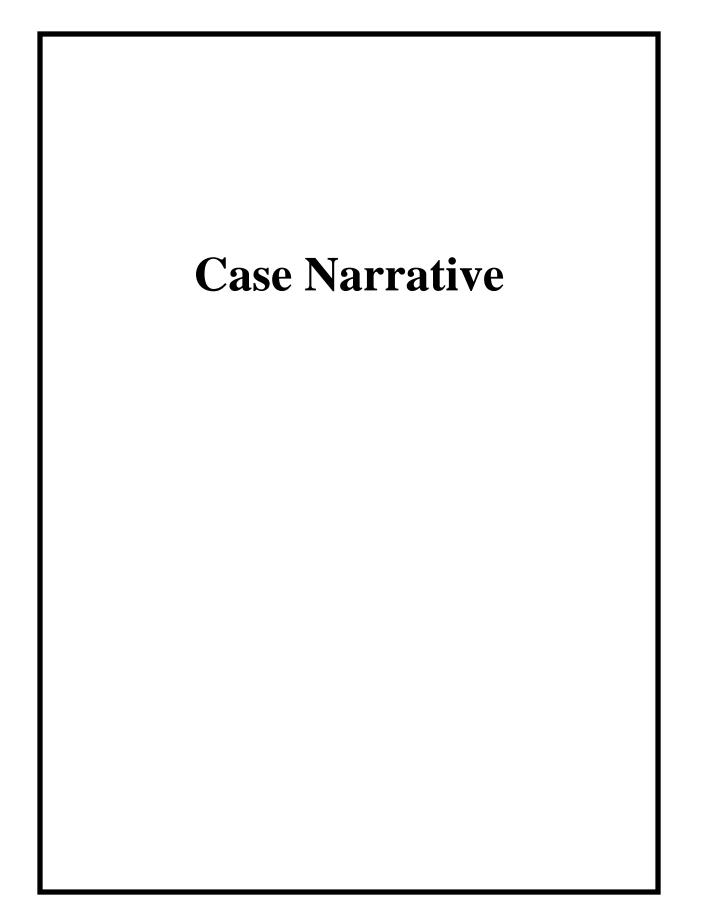
\* Indicates that a Quality Control parameter was not within specifications. For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

## List of current GEL Certifications as of 08 February 2019





## Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC (WVNS) SDG #: 429-433-003169 Work Order #: 469209

**Product:** Alphaspec U232, 233, 234, 235, 238 HIGH RAD Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1844223

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1840728

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
469209001	CPC Floor 1
469209002	CPC Floor 2
469209003	CPC Floor 3
469209004	CPC Floor 4
469209005	CPC Floor 5
1204207768	Method Blank (MB)
1204207769	Laboratory Control Sample (LCS)
1204207770	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

## **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

## Quality Control (QC) Information

## RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204207768 (MB)	Uranium-232	Result 0.0000241 < MDA 0.0000722 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.0000312 < MDA 0.0000657 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000104 < MDA 0.0000609 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.00000815 < MDA 0.0000517 > RDL 0.000002 uCi/sample

The following detection limits were not achieved due to high sample activity.

WD:2020:0753 - Attachment E	3

Sample	Analyte	Value
469209001 (CPC Floor 1)	Uranium-232	Result 0.0000367 < MDA 0.0000636 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.00000947 < MDA 0.0000345 > RDL 0.00002 uCi/sample
	Uranium-238	Result 0.0000219 < MDA 0.0000344 > RDL 0.000002 uCi/sample
469209002 (CPC Floor 2)	Uranium-235/236	Result 0.0000092 < MDA 0.0000583 > RDL 0.000002 uCi/sample
	Uranium-238	Result -0.0000127 < MDA 0.0000653 > RDL 0.000002 uCi/sample
469209003 (CPC Floor 3)	Uranium-232	Result 0.0000849 < MDA 0.0000924 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.0000459 < MDA 0.0000603 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000285 < MDA 0.0000525 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.0000116 < MDA 0.0000552 > RDL 0.000002 uCi/sample
469209004 (CPC Floor 4)	Uranium-232	Result 0.0000424 < MDA 0.000089 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000317 < MDA 0.0000464 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.0000301 < MDA 0.0000487 > RDL 0.000002 uCi/sample
469209005 (CPC Floor 5)	Uranium-232	Result 0.000204 < MDA 0.000249 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.000118 < MDA 0.000218 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.000102 < MDA 0.000166 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.000142 < MDA 0.000244 > RDL 0.000002 uCi/sample

## **Technical Information**

Holding Time Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
469209001 (CPC Floor 1)	Received 17-JAN-19, out of holding 06-AUG-18
469209002 (CPC Floor 2)	Received 17-JAN-19, out of holding 06-AUG-18
469209003 (CPC Floor 3)	Received 17-JAN-19, out of holding 06-AUG-18
469209004 (CPC Floor 4)	Received 17-JAN-19, out of holding 06-AUG-18
469209005 (CPC Floor 5)	Received 17-JAN-19, out of holding 06-AUG-18

**Product:** Alphaspec Pu 238, 239, 240, 242 HIGH RAD Analytical Method: DOE EML HASL-300, Pu-11-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1844224

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1840728

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
469209001	CPC Floor 1
469209002	CPC Floor 2
469209003	CPC Floor 3
469209004	CPC Floor 4
469209005	CPC Floor 5
1204207771	Method Blank (MB)
1204207772	Laboratory Control Sample (LCS)
1204207773	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### Quality Control (QC) Information

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204207771 (MB)	Plutonium-238	Result 0.0000365 < MDA 0.0000442 > RDL 0.000002 uCi/sample
	Plutonium-239/240	Result 0.0000126 < MDA 0.0000189 > RDL 0.000002 uCi/sample

Sample (See Below) did not meet the detection limit due to the small sample aliquot used. The aliquot was reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
469209005 (CPC Floor 5)	Plutonium-242	Result 0.000444 < MDA 0.000474 > RDL 0.0002 uCi/sample

# **Technical Information**

# Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
469209001 (CPC Floor 1)	Received 17-JAN-19, out of holding 06-AUG-18
469209002 (CPC Floor 2)	Received 17-JAN-19, out of holding 06-AUG-18
469209003 (CPC Floor 3)	Received 17-JAN-19, out of holding 06-AUG-18
469209004 (CPC Floor 4)	Received 17-JAN-19, out of holding 06-AUG-18
469209005 (CPC Floor 5)	Received 17-JAN-19, out of holding 06-AUG-18

# **Miscellaneous Information**

# **Additional Comments**

Sample 1204207772 (LCS) did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1840728

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
469209001	CPC Floor 1
469209002	CPC Floor 2
469209003	CPC Floor 3
469209004	CPC Floor 4
469209005	CPC Floor 5

The samples in this SDG were analyzed on an "as received" basis.

# Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

# **Technical Information**

# Holding Time

Samples were received and analyzed outside the hold time.

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### **Product:** Gammaspec, Gamma, Cs137, Filter HIGH RAD Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R Analytical Procedure: GL-RAD-A-013 REV# 27 Analytical Batch: 1840729

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1840728

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
469209001	CPC Floor 1
469209002	CPC Floor 2
469209003	CPC Floor 3
469209004	CPC Floor 4
469209005	CPC Floor 5
1204199763	Method Blank (MB)
1204199764	Laboratory Control Sample (LCS)
1204199765	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### Quality Control (QC) Information

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204199763 (MB)	Cesium-137	Result -0.000036 < MDA 0.0000548 > RDL 0.0000002 uCi/sample

### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
469209001 (CPC Floor 1)	Received 17-JAN-19, out of holding 06-AUG-18
469209002 (CPC Floor 2)	Received 17-JAN-19, out of holding 06-AUG-18
469209003 (CPC Floor 3)	Received 17-JAN-19, out of holding 06-AUG-18
469209004 (CPC Floor 4)	Received 17-JAN-19, out of holding 06-AUG-18

### **Additional Identified Radionuclides**

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The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	<b>Client Sample</b>
Cobalt-60	469209001	CPC Floor 1
	469209002	CPC Floor 2
	469209003	CPC Floor 3
	469209004	CPC Floor 4
	469209005	CPC Floor 5

Product: GFPC, Sr90, filter HIGH RAD Analytical Method: EPA 905.0 Modified/DOE RP501 Rev. 1 Modified Analytical Procedure: GL-RAD-A-004 REV# 20 Analytical Batch: 1844226

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1840728

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
469209001	CPC Floor 1
469209002	CPC Floor 2
469209003	CPC Floor 3
469209004	CPC Floor 4
469209005	CPC Floor 5
1204207774	Method Blank (MB)
1204207775	Laboratory Control Sample (LCS)
1204207776	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204207774 (MB)	Strontium-90	Result 0.000017 < MDA 0.0000414 > RDL 0.000002 uCi/sample

### **Technical Information**

### Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
469209001 (CPC Floor 1)	Received 17-JAN-19, out of holding 06-AUG-18
469209002 (CPC Floor 2)	Received 17-JAN-19, out of holding 06-AUG-18
469209003 (CPC Floor 3)	Received 17-JAN-19, out of holding 06-AUG-18
469209004 (CPC Floor 4)	Received 17-JAN-19, out of holding 06-AUG-18
469209005 (CPC Floor 5)	Received 17-JAN-19, out of holding 06-AUG-18

### **<u>Certification Statement</u>**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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

# Qualifier Definition Report for

# WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 429-433-003169 GEL Work Order: 469209

# The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

# **Review/Validation**

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

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

Signature:	86-
------------	-----

Name: Spencer Collins Title: Analyst I

Date: 05 FEB 2019

# Prep Logbook

# WD:2020:0753 - Attachment B The Preparation of Special Matrices for the Determination of Radionuclides

A N L		<b>1840728</b> Andrew McKenz Filter Prep GL-RAD-A-026 R2-38110047	· · · ·		Due I Type	Dates for Lab: Sample Id	10-FEB-2019 Description	Hold: 06-A	AUG-2018	Package: 12-FEB-201 Serial Number	9 SDG: Spike Amount	14-FEB Spike Units
#	Sample ID	Prep Date	<b>Min RDL</b> ()	Number of Filters	Container Wt (g)	Weight of total filter with container (g)	Weight of filter Diluted with container (g)	Not Saved Final Volume of filter diluted to in Liters (mL)		Weight of Filter Diluted (g)		
1	469209001	29-JAN-2019		1	0	0.6632	0.6632	100	0.6632	0.6632		
2	469209002	29-JAN-2019		1	0	1.0624	1.0624	100	1.0624	1.0624		
3	469209003	29-JAN-2019		1	0	1.1219	1.1219	100	1.1219	1.1219		
4	469209004	29-JAN-2019		1	0	1.1205	1.1205	100	1.1205	1.1205		
5	469209005	29-JAN-2019		1	0	1.0603	1.0603	100	1.0603	1.0603		

**Comments:** 

Reagent/Solvent Lot ID Description Amount
-------------------------------------------

Analytical Logbook version 1 11-04-2002

**GEL Laboratories LLC** 

# GCRE – General Purpose Cell Crane Room Extension

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a member of The GEL Group INC



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

gel.com

December 05, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 495554 SDG: 479-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on November 07, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

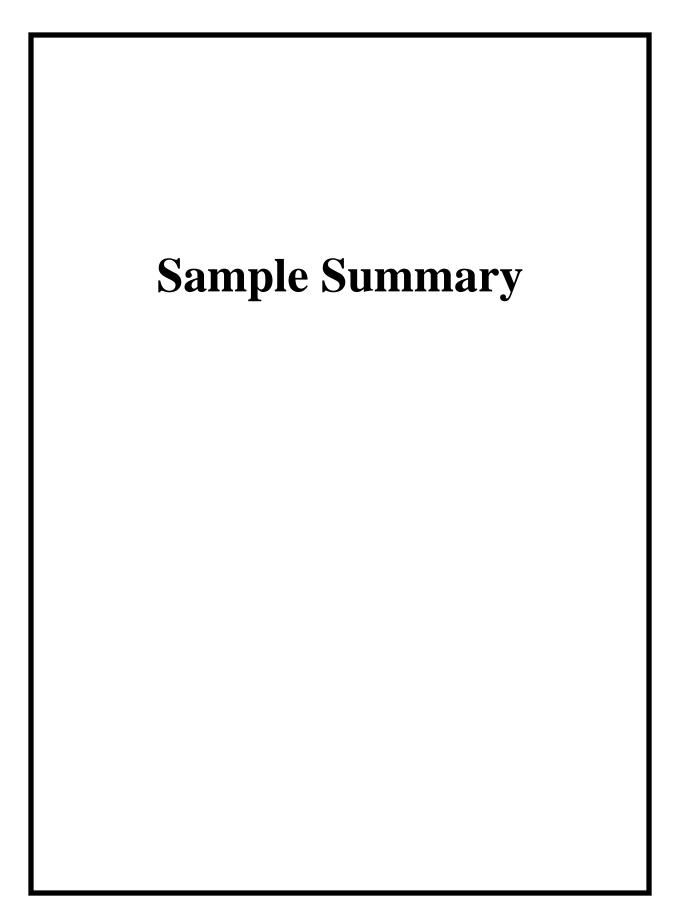
Sincerely,

Hattane Cates

Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





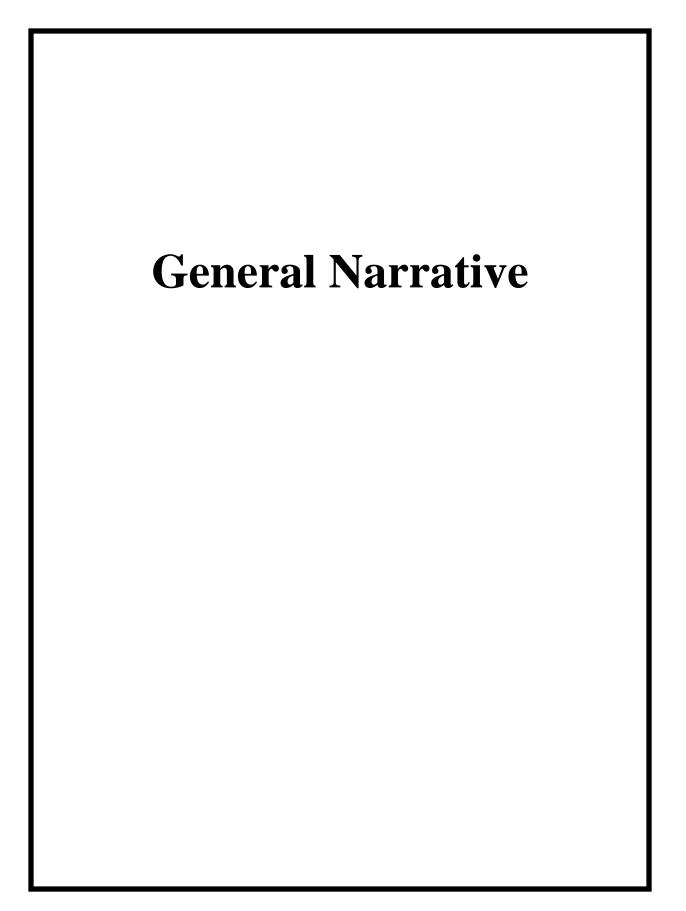
# **Sample Summary Sheet**

December 5, 2019

Release Number 479 Purchase Order Number

CH-003169

<u>Charge #</u> WV01.C2.06.01.04.10.02 Description GCR Floor Smear Sample



### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 479-003169 Work Order: 495554

#### December 05, 2019

#### **Laboratory Identification:**

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

#### Release Number

479

### Charge Number

WV01.C2.06.01.04.10.02

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on November 07, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

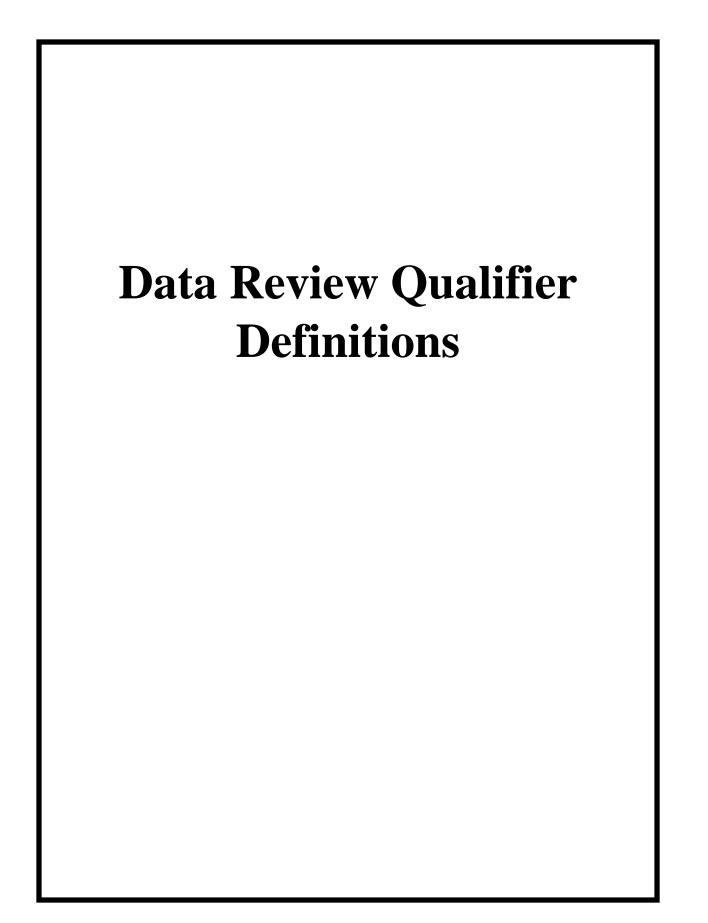
Laboratory IDClient ID495554001GCR Floor Smear Sample

#### **Case Narrative**

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Hatthewe Costes

Katherine Cates Project Manager



### Data Review Qualifier Definitions

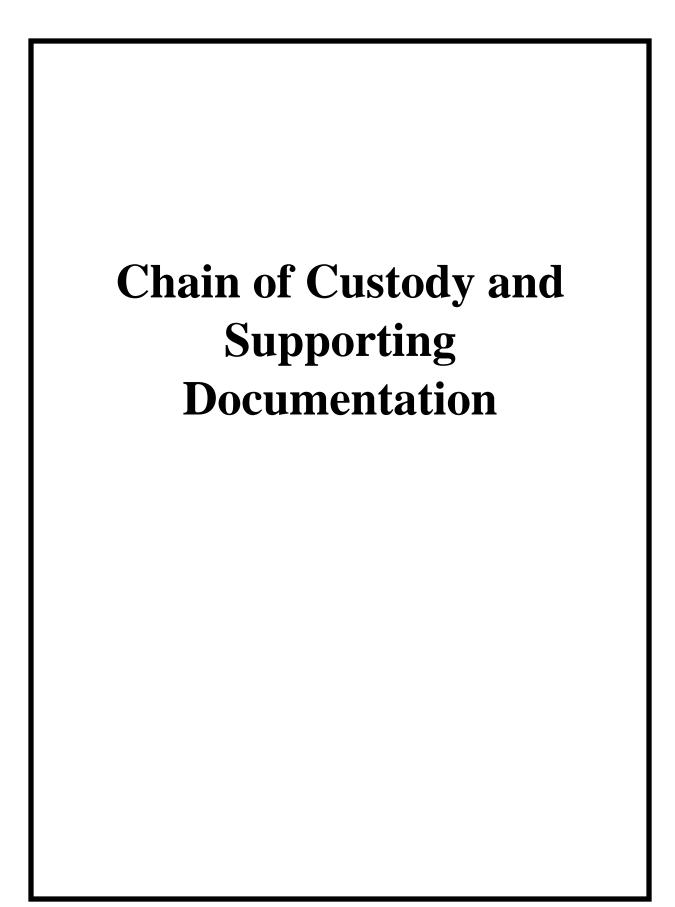
Qualifier Explanation

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



WD:2020:0753 - Attachment B 4. Electronic Disk? Yes [ ] No [ X ] = Polv Cooler Seals Intact? Yes [ Y No [ NAL 11. Report Data To: W. Connors 2[]3[ 9. Priority Code: Routine [X] 7. Report Format Level: I[X] ပ္ mCi Alpha Omears 495554 Comments Glass 22 report in uCi/sample 20. Sample Receipt: Sample Bottle Type (Circle One): Temperature Other: 0 V <u>1</u>6. Particulate 1515 Analysis Requested Filter S. S 5.30.19 Other: CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS Pipe Section いまた CH2M HILL BWXT, West Valley LLC Sludge 10282 Rock Springs Road West Valley, NY 14171-9799 \*Am-241, Cs-137, Pu-238, Pu-239, Pu-240, Pu-241, Sr-90, U-232, U-233, U-234, U-235, U-238 12-MOV rad isotopes\* Appendix B (Page 1 of 2)  $\times$ Coupon Liquid 000 Sample Custodian Signature/Date/Time Received by; Teak H n/a 2. Charge #:WV01.C2.06.01.04.10.02 Ē Debris Phase (Circle one ): Solid Received by: Received by. Received by: 10,00 Time Sample Bottle Size: Type (Circle one): 419 Der 1 Tholes 5.30.19 Date 14.2 Release #: ξ 5. 4. 1515 <u>e-19</u> Pres. none ю. 5.30.19 140.2 17. Chain-of-Custody Reviewed by: 8. Cognizant Engineer/Project: FDP 36,3 OVOO hai # Cont. 10. DQO/SAP#: WVDP-584 Type | Z Grab 5. PO #: CH-003169 Smear Sante Sample ID# Released by: Released by: Released by: Released by: Gross Wt (g) GEL GCR Floor Tare Wt (g) Net Wt (g) 1. Lab: Ř ά.

Page 9 of 32 SDG: 479-003169

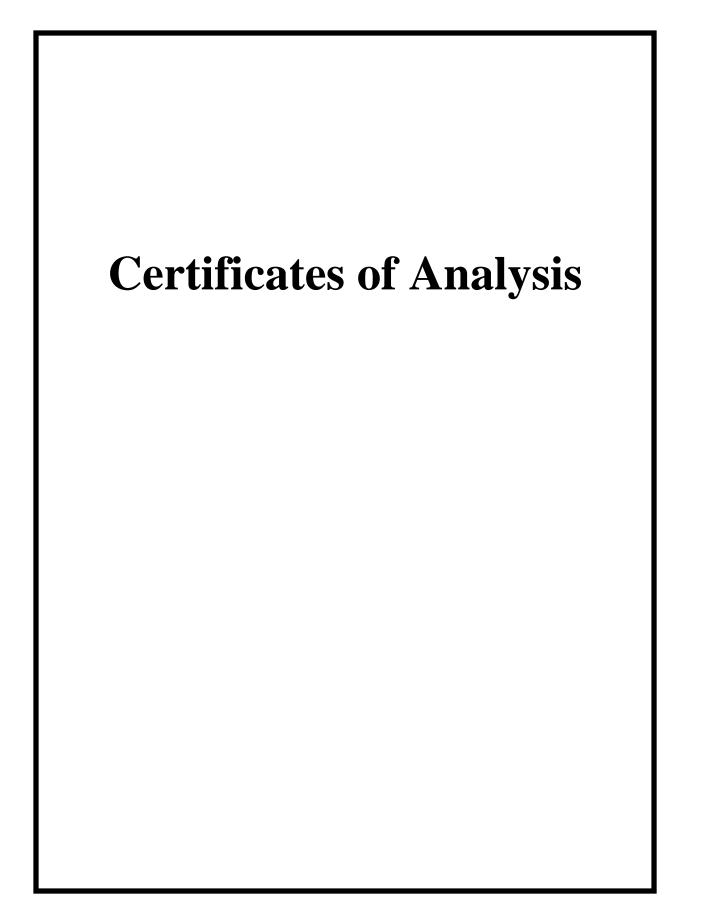
Attachment B - Page 88

WV-2865, Rev. 4 (SOP 300-08)

CH-003169

I Tracking Number I Tracking Number I Information I Hazardous? Essignate the samples are to be ive? Stify the samples as	Yes	No	D	DG/AR/COC/Work Order: <u>495554</u> Tate Received: <u>N</u> 719 FedEx Express FedEx Ground UPS Field Services Courier Other 8/0714709601 f Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
I Information T Hazardous? esignate the samples are to be tive?	Yes	No		FedEx Express FedEx Ground UPS Field Services Courier Other 8/07/14709601
T Hazardous? signate the samples are to be ive?	Yes	No		Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
signate the samples are to be tive?	~	F		
ive?		ļ	LL I	unzard Class Shipped: UN#: 2910 UN2910, Is the Radioactive Shipment Survey Compliant? Yes No
ssify the samples as	Ľ	ľ	cc	DC notation or radioactive stickers on containers equal client designation.
	2	ľ	Ma Cla	uximum Net Counts Observed* (Observed Counts - Area Background Counts): D, 3 CPM (nR/Hr)
signate samples are hazardous	,	/		C notation or hazard labels on containers equal client designation.
ntify possible hazards?		$\checkmark$	PC	D or E is yes, select Hazards below. B's Flammable Foreign Soil RCRA Asbestos Beryllium Other:
	Yes	NA	2	
	1			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
!?	4			Circle Applicable: Client contacted and provided COC COC created upon receipt
deg. C)?*			[	Preservation Method: Wet Ice Ice Packs Dry ice None Other. *all temperatures are recorded in Celsius TEMP: 22°2
	1			Temperature Device Serial #:
iners intact and sealed?	7			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
ring chemical preservation		-		Sample ID's and Containers Affected: If Preservation added, Lot#:
mples require Volatile Analysis?			7	If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:
ed within holding time?	7			ID's and tests affected:
a COC match ID's on	$\overline{}$			ID's and containers affected:
	1			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
ed on COC?	~		ľ	Circle Applicable: No container count on COC Other (describe)
?			7	
roperly signed in ceived sections?			1	Circle Applicable: Not relinquished Other (describe)
	e Receipt Criteria tainers received intact and tody documents included tt? ining cold preservation deg. C)?* performed and passed on IR gun? iners intact and sealed? ining chemical preservation chemical preservation ch	tainers received intact and tody documents included at? ining cold preservation deg. C)?* performed and passed on IR gun? iners intact and sealed? ining chemical preservation amples require Volatile Analysis? ved within holding time? n COC match ID's on n COC match date & time ntainers received match ted on COC? Intainers identifiable as ? rooperly signed in received sections?	tainers received intact and tody documents included tr? tring cold preservation deg. C)?* performed and passed on IR gun? timers intact and scaled? tring chemical preservation amples require Volatile Analysis? ved within holding time? n COC match ID's on n COC match date & time ntainers received match ted on COC? Intainers identifiable as ? properly signed in received sections?	tainers received intact and tody documents included trining cold preservation deg. C)?* performed and passed on IR gun? iners intact and sealed? iring chemical preservation amples require Volatile Analysis? ved within holding time? n COC match ID's on n COC match date & time phainers received match ted on COC? mainers identifiable as ? properly signed in received sections?

17



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M LLC.	1 HILL	BWXT W	/est Valley									
Address .		Rock S	Springs Ro	bad									
	West	Valley,	New York	x 14171-9799					R	eport Date:	December 5	, 2019	
Contact:	Mr. W	villiam (	Connors										
Project:	CH-00	)3169 H	Haz Waste										
Client Samp Sample ID: Matrix: Collect Date Receive Date Collector:	4 5 : 3 e: 0	GCR Fl 95554 wipe 0-MA 0-NOV Client	001 Y-19	ar Sample				oject: lient ID:		NS02501 NS025			
Parameter	Qu	alifier	Result	Uncertainty	DL	TPU	RL	Units	PF	DF Analys	t Date Time	e Batch	Mte
High Rad Testing					•								
Alphaspec Am24						10.00071		<i>C</i> . ( 1			10/04/10 1010	1044050	
Americium-241 Curium-243/244		H H		+/-0.000638 +/-7.85E-05	7.32E-05 2.71E-05	+/-0.00271 +/-8.75E-05		uCi/sample		AXM6	12/04/19 1012	1944059	1
Alphaspec Pu 23						T/-0.75E-05	2.00E-00	uci/sample					
Plutonium-238		, <i>242 п</i> Н		+/-0.000364	a 4.17E-05	1/ 0.00112	2 00E 06	uCi/sample		A YM6	12/04/19 1404	1044056	
Plutonium-239/240		H	0.0072	+/-0.000304	4.17E-05 3.35E-05			uCi/sample		AANIO	12/04/19 1404	1944050	2
Plutonium-242		HU		+/-3.05E-05	4.76E-05	+/-3.07E-05		uCi/sample					
Alphaspec U232,	233 234	235.23	8 HIGH R	AD "As Rece	ived"			1					
Uranium-232		н		+/-7.53E-05	6.93E-05	+/-7.96E-05	2.00E-06	uCi/sample		AXM6	12/04/19 0821	1944054	. 3
Uranium-233/234		Н	0.000122	+/-5.49E-05	3.84E-05	+/-5.90E-05		-					
Uranium-235/236	I	HU	8.88E-06	+/-2.04E-05	3.24E-05	+/-2.05E-05	2.00E-06	uCi/sample					
Uranium-238	I	HU	1.33E-05	+/-2.35E-05	3.56E-05	+/-2.36E-05	2.00E-06	uCi/sample					
GFPC, Sr90, filte	er HIGH R	AD "As	Received'	<i></i>									
Strontium-90		Н	0.757	+/-0.00266	2.47E-05	+/-0.199	2.00E-06	uCi/sample		AXM6	12/04/19 0749	1944061	4
Gammaspec, Gar	nma, Cs13	7, Filte	r HIGH R	AD "As Recei	ved"								
Americium-241			0.0297	+/-0.0013	0.000891	+/-0.00432		uCi/sample		JXB7	11/25/19 1121	1942907	5
Cesium-137			0.304	+/-0.00116	0.000143	+/-0.0298	2.00E-07	uCi/sample					
Cobalt-60				+/-3.98E-05	3.41E-05	+/-4.12E-05		uCi/sample					
Europium-154				+/-0.000137	7.68E-05	+/-0.000142		uCi/sample					
Liquid Scint Pu2-				10.0007	0.0102	(0.0174		<i>C</i> . ( 1			10/04/10 1000	1011050	
Plutonium-241		Н	0.0682	+/-0.0087	0.0103	+/-0.0174	25.0	uCi/sample		AXM6	12/04/19 1832	1944060	6
The following Pre	p Methods	s were j	performed	1									
Method	Description	n				Analyst	Date	Tim	ie	<b>Prep Batch</b>			
Filter Prep	Filter Prep					AXM6	11/26/19	140	6	1942902			-
The following Ana	lytical Me	thods v	vere perfo	ormed									
Method	Descriptio	n											
1	DOE EML	HASL-3	00, Am-05-	RC Modified									
2	DOE EML	HASL-3	00, Pu-11-F	RC Modified									
3	DOE EML	HASL-3	00, U-02-R	C Modified									
4	EPA 905.0	Modified	d/DOE RP5	01 Rev. 1 Mod	ified								
5	DOE HASL	300, 4.5	5.2.3/Ga-01	-R									
6	DOE EML	HASL-3	00, Pu-11-F	RC Modified									
Surrogate/Tracer	Recovery	1	Гest					В	atch	ID Recove	ry% Accepta	able Limi	its
Americium-243	<b>m</b>		A 1 1	A 241 C	042 1044	HIGH RAD "As Rec	• 10		9440	59 10	1.50	-125%)	

# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road			
	West Valley, New York 14171-9799		Report Date:	December 5, 2019
Contact:	Mr. William Connors			
Project:	CH-003169 Haz Waste			
Client Sample Sample ID:	ID: GCR Floor Smear Sample 495554001	Project: Client ID:	WVNS02501 WVNS025	

Parameter Qualifie	er Result Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Time Batch Mtd.
Surrogate/Tracer Recovery	Test					Batch ID	Recovery%	6 Acceptable Limits
Plutonium-236 Tracer	Alphaspec Pu 238, 239,	240, 242 HIGH RA	D "As Received'	'		1944056	68.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U232, 233, 2	34, 235, 238 HIGH	RAD "As Receiv	ed"		1944054	95.9	(15%-125%)
Uranium-235/236 Tracer	Alphaspec U232, 233, 2	34, 235, 238 HIGH	RAD "As Receiv	ed"		1944054	82.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, filter HIGH	I RAD "As Receive	d"			1944061	79.1	(25%-125%)
Plutonium-236 Tracer	Liquid Scint Pu241, Filt	er "As Received"				1944060	68.7	(15%-125%)

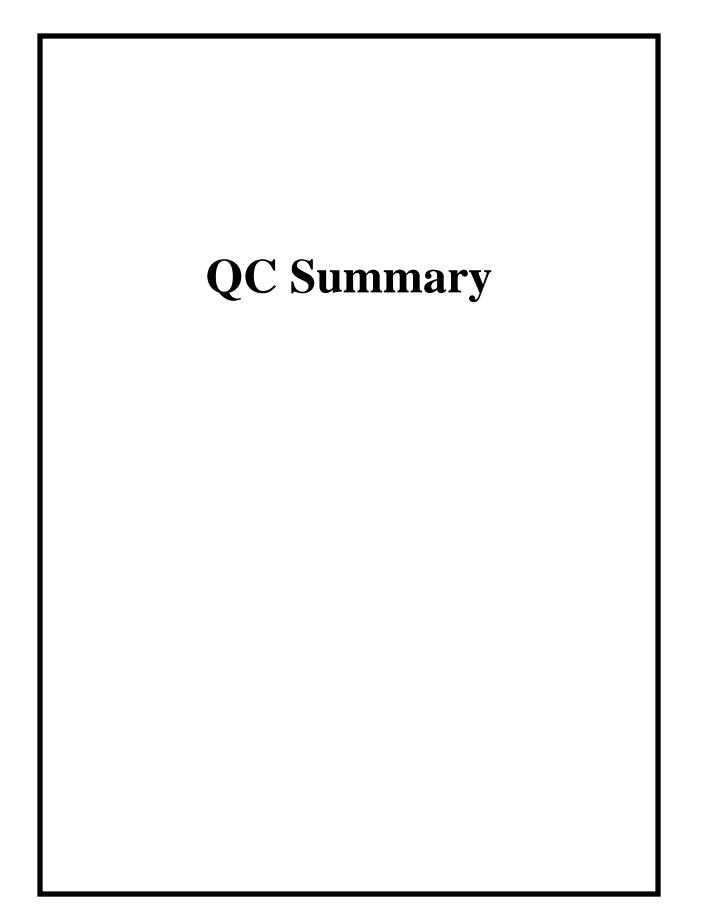
#### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated Uncertainty



# **GEL LABORATORIES LLC**

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

# **QC Summary**

Report Date: December 5, 2019

Page 1 of 5

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 495554

**Contact:** 

Parmname	NOM	Sample Qual	QC Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 1942907 ——							
QC1204441587 495554001 DUP Cobalt-60		0.000106	0.000128 uCi/sample	18.4		(0% - 100%) JXB7	11/25/19 13:28
Americium-241		0.0297	0.0282 uCi/sample	5.42		(0%-20%)	
Cesium-137		0.304	0.305 uCi/sample	0.493		(0%-20%)	
Europium-154		0.000405	0.00047 uCi/sample	14.9		(0%-20%)	
QC1204441588 LCS Cobalt-60	0.00644		0.00722 uCi/sample		112	(75%-125%)	11/25/19 18:18
Americium-241	0.0295		0.0324 uCi/sample		110	(75%-125%)	
Cesium-137	0.0101		0.0104 uCi/sample		103	(75%-125%)	
Europium-154		U	-8.94E-06 uCi/sample				
QC1204441586 MB Cobalt-60		U	-2.63E-05 uCi/sample				11/25/19 16:10
Americium-241		U	0.000117 uCi/sample				
Cesium-137		U	-1.30E-05 uCi/sample				
Europium-154		U	9.06E-06 uCi/sample				

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

# **QC Summary**

			<u> </u>		Summa	<u>ry</u>						
Workorder: 49	95554										Page	e 2 of 5
Parmname		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>High Rad Testing</b> Batch 1944	4054											
QC1204444105 Uranium-232	LCS			U	-3.14E-05	uCi/sample			(75%-125%)	AXM6	12/04/1	9 08:21
Uranium-233/234					0.0027	uCi/sample						
Uranium-235/236					0.000195	uCi/sample						
Uranium-238		0.00243			0.00268	uCi/sample		110	(75%-125%)			
QC1204444106 Uranium-232	LCSD			U	5.46E-06	uCi/sample	0		(0%-20%)		12/04/1	9 08:21
Uranium-233/234					0.00226	uCi/sample	17.7					
Uranium-235/236					0.0001	uCi/sample	64					
Uranium-238		0.00243			0.00256	uCi/sample	4.61	105	(0%-20%)			
QC1204444104 Uranium-232	MB			U	-9.21E-07	uCi/sample					12/04/1	9 08:21
Uranium-233/234				U	-7.69E-06	uCi/sample						
Uranium-235/236				U	-3.30E-06	uCi/sample						
Uranium-238				U	2.74E-07	uCi/sample						
Batch 1944	4056 ——											
QC1204444108 Plutonium-238	LCS			U	8.86E-06	uCi/sample				AXM6	12/04/1	9 09:04
Plutonium-239/240		0.00179			0.00159	uCi/sample		88.9	(75%-125%)			

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

# **QC Summary**

			<u> </u>	<u>20 î</u>	Suiiiiia	<u>.ry</u>				
Workorder: 49	95554		_							Page 3 of 5
Parmname		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 1944	4056									
Plutonium-242				U	2.35E-05	uCi/sample			(75%-125%) AXM6	12/04/19 09:04
QC1204444109 Plutonium-238	LCSD			U	3.23E-05	uCi/sample	0			12/04/19 14:04
Di		0.00170			0.00190	Cilcomple	17	105	(00/ 200/)	
Plutonium-239/240		0.00179			0.00189	uCi/sample	17	105	(0%-20%)	
Plutonium-242				U	-1.88E-05	uCi/sample	0			
QC1204444107 Plutonium-238	MB			U	1.86E-05	uCi/sample				12/04/19 09:04
Plutonium-239/240				U	1.41E-05	uCi/sample				
<b>T</b>				• •	1.000 0.5					
Plutonium-242				U	1.00E-05	uCi/sample				
Batch 1944	1059									
QC1204444114 Americium-241	LCS	0.00175			0 00196	uCi/sample		112	(75%-125%) AXM6	12/04/19 09:04
Amenenum-2+1		0.00175			0.00170	uCi/sampic		112	(7370-12370) AANIO	12/04/17 07.04
Curium-243/244		0.00206			0.00207	uCi/sample		101	(75%-125%)	
QC1204444115 Americium-241	LCSD	0.00175			0.00182	uCi/sample	7.49	104	(0%-20%)	12/04/19 09:04
Curium-243/244		0.00206			0.00206	uCi/sample	0.31	100	(0%-20%)	
0.01004444110										
QC1204444113 Americium-241	MB				6.43E-05	uCi/sample				12/04/19 10:12
Curium-243/244				U	-2.09E-06	uCi/sample				

......

# **GEL LABORATORIES LLC**

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

# **QC Summary**

Workorder: 49	95554								Page 4 of 5
Parmname		NOM	Sample Qual	QC	Units	RPD%	REC%	Range Anls	st Date Time
High Rad Testing Batch 1944	4060								
QC1204444117 Plutonium-241	LCS	0.0737		0.0677 uC	Ci/sample		91.9	(75%-125%) AX	TM6 12/04/19 19:04
QC1204444118 Plutonium-241	LCSD	0.0737		0.0771 uC	Ci/sample	12.9	105	(0%-20%)	12/04/19 19:21
QC1204444116 Plutonium-241	MB		U	0.00145 u <b>C</b>	Ci/sample				12/04/19 18:48
Batch 1944	4061								
QC1204444120 Strontium-90	LCS	0.00124		0.00149 u <b>C</b>	Ci/sample		121	(75%-125%) AX	CM6 12/04/19 07:49
QC1204444121 Strontium-90	LCSD	0.00124		0.00145 uC	Ci/sample	2.9	117	(0%-20%)	12/04/19 07:49
QC1204444119 Strontium-90	MB			0.000199 uC	Ci/sample				12/04/19 07:49

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- $BD \quad \text{Results are either below the MDC or tracer recovery is low}$

FA Failed analysis.

- H Analytical holding time was exceeded
- J See case narrative for an explanation
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- $M \qquad M \ if above \ MDC \ and \ less \ than \ LLD$
- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- N/A RPD or %Recovery limits do not apply.

# **GEL LABORATORIES LLC**

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

# **QC Summary**

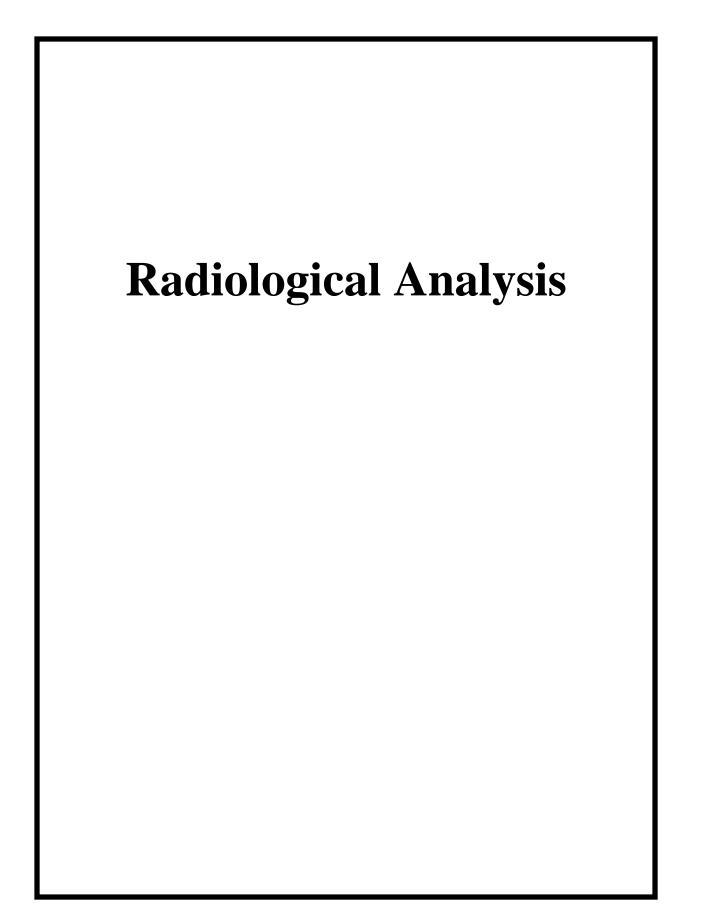
		-	QC Du	iiiiiai	<u>.</u>						
Workor	korder: 495554									Pag	e 5 of 5
Parmna	iname NOM Sa	mple	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
N1	1 See case narrative										
ND	D Analyte concentration is not detected above the detect	ion lir	nit								
NJ	J Consult Case Narrative, Data Summary package, or Pr	oject	Manager c	oncerning t	his qualifie	er					
Q	One or more quality control criteria have not been met	. Refe	er to the app	olicable nai	rative or D	DER.					
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the I	MDL,	MDA, ME	C or LOD							
UI	Gamma SpectroscopyUncertain identification										
UJ	J Gamma SpectroscopyUncertain identification										
UL	L Not considered detected. The associated number is the	repor	ted concen	tration, wh	ich may be	inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Data Summary package, or Pr	roject	Manager c	oncerning t	his qualifie	er					
Y	Other specific qualifiers were required to properly def	ine the	e results. C	onsult case	narrative.						
^	RPD of sample and duplicate evaluated using +/-RL.	Conce	entrations a	re <5X the	RL. Quali	ifier Not Ap	plicable for F	Radiochem	istry.		
h	Preparation or preservation holding time was exceeded	1									
^ The R five tim RL is us	indicates that spike recovery limits do not apply when sam e Relative Percent Difference (RPD) obtained from the san times (5X) the contract required detection limit (RL). In ca s used to evaluate the DUP result.	nple d ses wl	uplicate (I nere either	OUP) is eva	luated aga	inst the acce	ptance criter	ia when the	e sample is	greater	

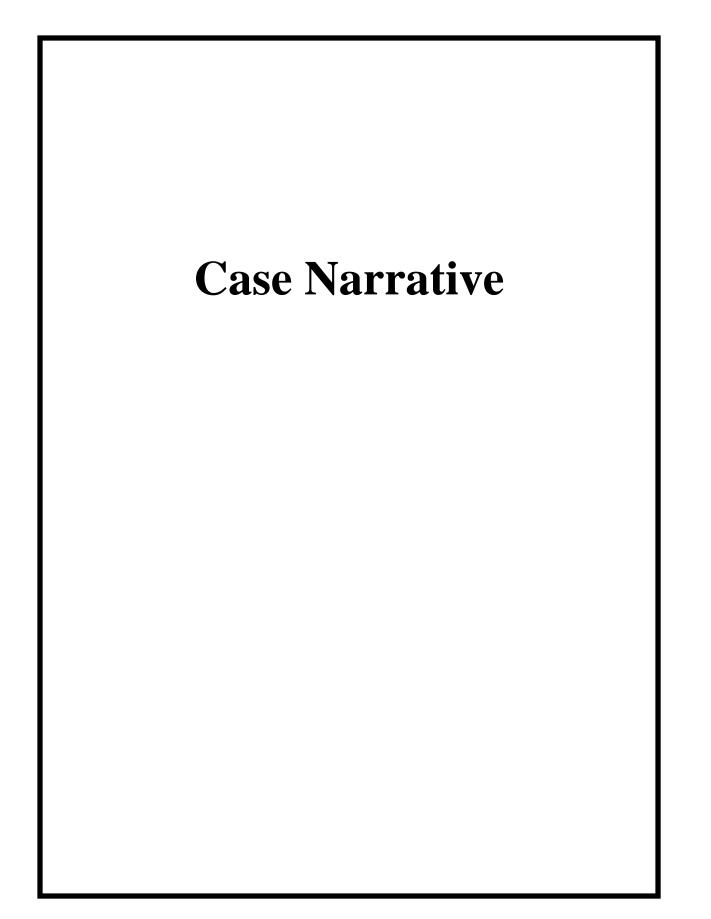
\* Indicates that a Quality Control parameter was not within specifications. For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification	
Alaska	17-018	
Alaska Drinking Water	SC00012	
Arkansas	88-0651	
CLIA	42D0904046	
California	2940	
Colorado	SC00012	
Connecticut	PH-0169	
DoD ELAP/ ISO17025 A2LA	2567.01	
Florida NELAP	E87156	
Foreign Soils Permit	P330-15-00283, P330-15-00253	
Georgia	SC00012	
Georgia SDWA	967	
Hawaii	SC00012	
Idaho	SC00012	
Illinois NELAP	200029	
Indiana	C-SC-01	
Kansas NELAP	E-10332	
Kentucky SDWA	90129	
Kentucky Wastewater	90129	
Louisiana Drinking Water	LA024	
Louisiana NELAP	03046 (AI33904)	
Maine	2019020	
Maryland	270	
Massachusetts	M–SC012	
Massachusetts PFAS Approv	Letter	
Michigan	9976	
Mississippi	SC00012	
Nebraska	NE-OS-26-13	
Nevada	SC000122020-1	
New Hampshire NELAP	2054	
New Jersey NELAP	SC002	
New Mexico	SC00012	
New York NELAP	11501	
North Carolina	233	
North Carolina SDWA	45709	
North Dakota	R-158	
Oklahoma	2019–165	
Pennsylvania NELAP	68-00485	
Puerto Rico	SC00012	
S. Carolina Radiochem	10120002	
Sanitation Districts of L	9255651	
South Carolina Chemistry	10120001	
Tennessee	TN 02934	
Texas NELAP	T104704235–19–15	
Utah NELAP	SC000122019–29	
Vermont	VT87156	
Virginia NELAP	460202	
Washington	C780	

### List of current GEL Certifications as of 05 December 2019





### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 479-003169 Work Order #: 495554

**Product:** Alphaspec U232, 233, 234, 235, 238 HIGH RAD Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1944054

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
495554001	GCR Floor Smear Sample
1204444104	Method Blank (MB)
1204444105	Laboratory Control Sample (LCS)
1204444106	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Aliquot Reduced

aliquots were reduced due to high activity based on Gamma data.

### **Quality Control (QC) Information**

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204444104 (MB)	Uranium-232	Result -0.000000921 < MDA 0.0000727 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result -0.00000769 < MDA 0.0000328 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result -0.0000033 < MDA 0.000038 > RDL 0.000002 uCi/sample

	Uranium-238	Result 0.000000274 < MDA 0.0000451 > RDL 0.000002 uCi/sample
495554001 (GCR Floor Smear Sample)	Uranium-235/236	Result 0.00000888 < MDA 0.0000324 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.0000133 < MDA 0.0000356 > RDL 0.000002 uCi/sample

Sample (See Below) did not meet the detection limit due to the small sample aliquot used. The aliquot was reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
495554001 (GCR Floor Smear Sample)	Uranium-235/236	Result 0.00000888 < MDA 0.0000324 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.0000133 < MDA 0.0000356 > RDL 0.000002 uCi/sample

# **Technical Information**

# Holding Time

Sample (See Below) was received with in the hold time, however, the analysis was performed outside the hold time.

Sample	Value
495554001 (GCR Floor Smear Sample)	Received 07-NOV-19, within holding, analyzed 04-DEC-19, out of holding 26-NOV-19

### Recounts

The U-236 traced portion of sample 495554001 (GCR Floor Smear Sample) was recounted due to a peak shift. The recount is being reported.

**Product:** Alphaspec Pu 238, 239, 240, 242 HIGH RAD <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1944056

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
495554001	GCR Floor Smear Sample
1204444107	Method Blank (MB)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### **Aliquot Reduced**

aliquots were reduced due to high activity based on Gamma data.

### **Quality Control (QC) Information**

### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204444107 (MB)	Plutonium-238	Result 0.0000186 < MDA 0.0000279 > RDL 0.000002 uCi/sample
	Plutonium-239/240	Result 0.0000141 < MDA 0.0000515 > RDL 0.000002 uCi/sample

### **Technical Information**

### Holding Time

Sample (See Below) was received with in the hold time, however, the analysis was performed outside the hold time.

Sample	Value
495554001 (GCR Floor Smear Sample)	Received 07-NOV-19, within holding, analyzed 04-DEC-19, out of holding 26-NOV-19

### Recounts

Sample 1204444109 (LCSD) was recounted due to high recovery. The recount is reported. Sample 495554001 (GCR Floor Smear Sample) was recounted due to a peak shift. The recount is reported.

**Product:** Alphaspec Am241, Cm243 and 244 HIGH RAD Analytical Method: DOE EML HASL-300, Am-05-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1944059

<u>Preparation Method:</u> Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17

### WD:2020:0753 - Attachment B **Preparation Batch:** 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
495554001	GCR Floor Smear Sample
1204444113	Method Blank (MB)
1204444114	Laboratory Control Sample (LCS)
1204444115	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Aliquot Reduced

aliquots were reduced due to high activity based on Gamma data.

### **Quality Control (QC) Information**

### **Method Blank Criteria**

The blank (See Below) activity is greater than the MDC but is less than five percent of the lowest activity in the batch.

Sample	Analyte	Value
1204444113 (MB)	Americium-241	Result: 6.43E-05 uCi/sample > MDA: 5.40E-05 uCi/sample <= RDL: 0.0002 uCi/sample

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204444113 (MB)	Curium-243/244	Result -0.00000209 < MDA 0.0000417 > RDL 0.000002 uCi/sample

### **Technical Information**

### Holding Time

Sample (See Below) was received with in the hold time, however, the analysis was performed outside the hold time.

Sample	Value
495554001 (GCR Floor Smear Sample)	Received 07-NOV-19, within holding, analyzed 04-DEC-19, out of holding 26-NOV-19

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
495554001	GCR Floor Smear Sample

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Gamma, Cs137, Filter HIGH RAD Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R Analytical Procedure: GL-RAD-A-013 REV# 27 Analytical Batch: 1942907

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
495554001	GCR Floor Smear Sample
1204441586	Method Blank (MB)
1204441587	495554001(GCR Floor Smear Sample) Sample Duplicate (DUP)
1204441588	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204441586 (MB)	Cesium-137	Result -0.000013 < MDA 0.0000406 > RDL 0.0000002 uCi/sample

### **Technical Information**

### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	Client Sample
Cobalt-60	495554001	GCR Floor Smear Sample
Europium-154	495554001	GCR Floor Smear Sample

### <u>Product:</u> GFPC, Sr90, filter HIGH RAD <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1944061

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
495554001	GCR Floor Smear Sample
1204444119	Method Blank (MB)
1204444120	Laboratory Control Sample (LCS)
1204444121	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Preparation Information

Performed additional column separation to minimize interference.

### Quality Control (QC) Information

#### Method Blank Criteria

The blank (See Below) activity is greater than the MDC but is less than five percent of the lowest activity in the batch.

Sample	Analyte	Value
1204444119 (MB)	Strontium-90	Result: 0.000199 uCi/sample > MDA: 2.44E-05 uCi/sample > RDL: 2.00E-06 uCi/sample

#### **Technical Information**

#### **Holding Time**

Sample (See Below) was received with in the hold time, however, the analysis was performed outside the hold time.

Sample	Value
495554001 (GCR Floor Smear Sample)	Received 07-NOV-19, within holding, analyzed 04-DEC-19, out of holding 26-NOV-19

**Product: Liquid Scint Pu241, Filter Analytical Method:** DOE EML HASL-300, Pu-11-RC Modified **Analytical Procedure:** GL-RAD-A-035 REV# 21 **Analytical Batch:** 1944060

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1942902

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
495554001	GCR Floor Smear Sample
1204444116	Method Blank (MB)
1204444117	Laboratory Control Sample (LCS)
1204444118	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Preparation Information**

#### **Preparation Information**

WD:2020:0753 - Attachment B Performed second columns for removal of iron interferences.

#### **Aliquot Reduced**

aliquots were reduced due to high activity based on Gamma data.

#### **Technical Information**

#### **Holding Time**

Sample (See Below) was received with in the hold time, however, the analysis was performed outside the hold time.

Sample	Value
495554001 (GCR Floor Smear Sample)	Received 07-NOV-19, within holding, analyzed 04-DEC-19, out of holding 26-NOV-19

#### **Miscellaneous Information**

#### **Manual Integration**

Manual integrations of alpha spectroscopy spectra 1204444117 (LCS) and 495554001 (GCR Floor Smear Sample) were performed to fully separate counts in Regions of Interest which would have been biased.

#### **Additional Comments**

The tracer peak centroid for sample 495554001 (GCR Floor Smear Sample) is greater than 50 keV from the expected library energy value for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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

# Qualifier Definition Report for

# WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 479-003169 GEL Work Order: 495554

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

### **Review/Validation**

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

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

Lart Signature:

Name: Theresa Austin

Date: 05 DEC 2019

Title: Group Leader

# Prep Logbook

# WD:2020:0753 - Attachment B The Preparation of Special Matrices for the Determination of Radionuclides

Batch ID: Analyst: Method: Lab SOP: Instrument:	<b>1942902</b> Andrew McKenz Filter Prep GL-RAD-A-026 R2-38110047	· · ·		Due I Type	Dates for Lab: Sample Id	26-NOV-2019 Description	9 Hold: 26-1	NOV-2019	Package: 04-DEC- Serial Number	DG: 05-DE unt Spike Units
# Sample ID	Prep Date	<b>Min RDL</b> ()	Number of Filters	Container Wt (g)	Weight of total filter with container (g)	Weight of filter Diluted with container (g)	Not Saved Final Volume of filter diluted to in Liters (mL)		Weight of Filter Diluted (g)	
<b>1</b> 495554001	26-NOV-2019	)	1	0	3.7394	1.3934	100	3.7394	1.3934	 
<b>2</b> 497207001	26-NOV-2019	)	1	0	0.0628	0.0148	100	0.0628	0.0148	
Reagent/Solven	t Lot ID	Description		Amount	Comments:					 

Analytical Logbook version 1 11-04-2002

GEL Laboratories LLC

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### HEV – Head End Ventilation

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a member of The GEL Group INC



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

gel.com

February 25, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 470349 SDG: 436-437-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 01, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

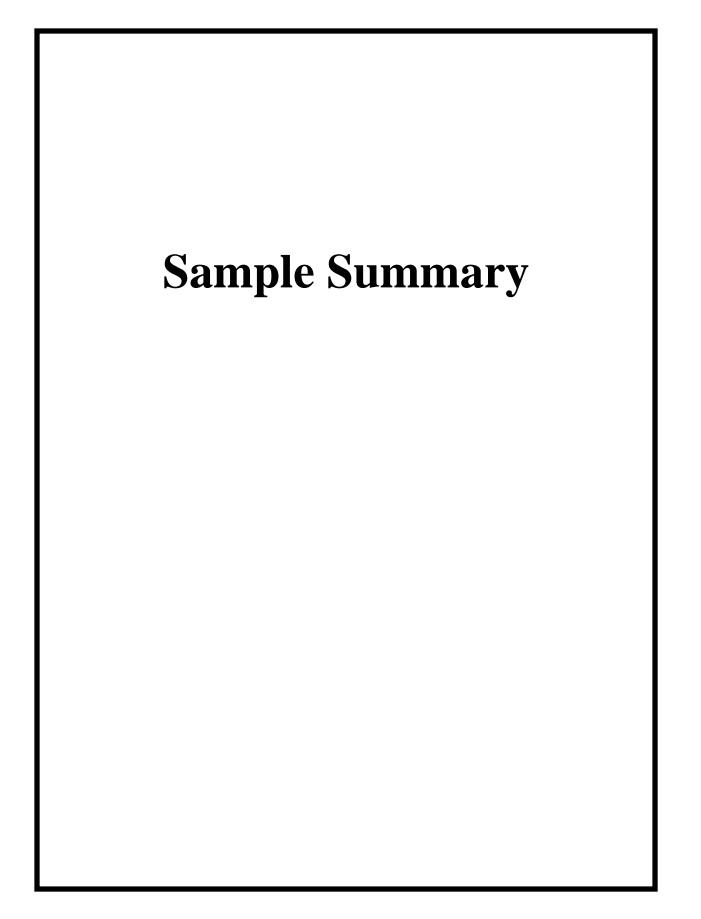
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

February 25, 2019

Release Number

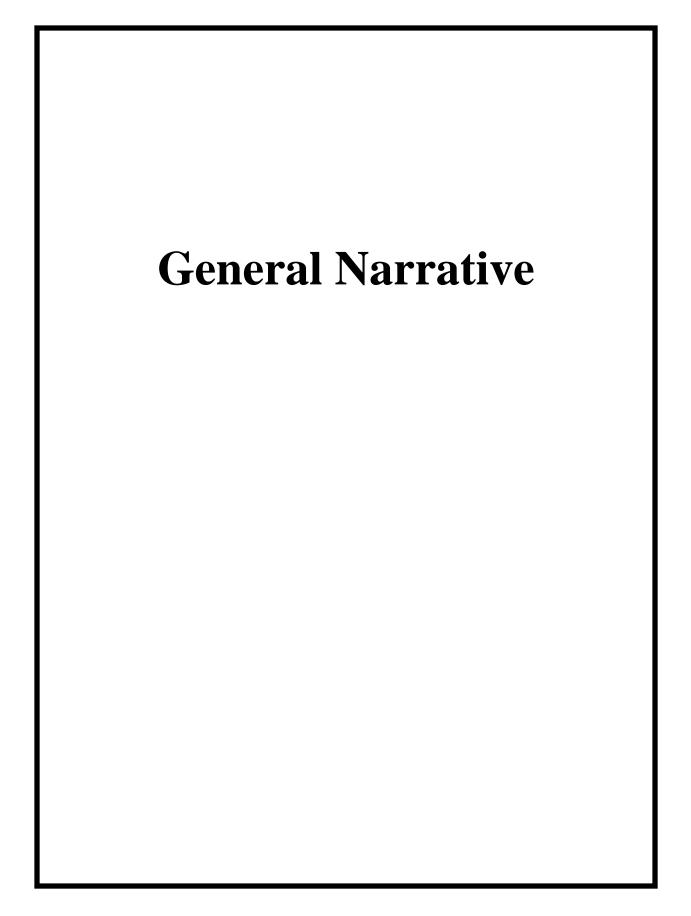
Purchase Order Number CH–003169

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# **Description**

<u>Charge #</u> WV01.02.06.01.04.10.02 WV01.02.06.01.04.10.02

HEV Floor North HEV Floor South



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 436-437-003169 Work Order: 470349

#### February 25, 2019

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### Purchase Order

CH-003169

#### Release Number

436 and 437

#### Charge Number

WV01.02.06.01.04.10.02

#### **Summary**

**Sample Receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on February 01, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

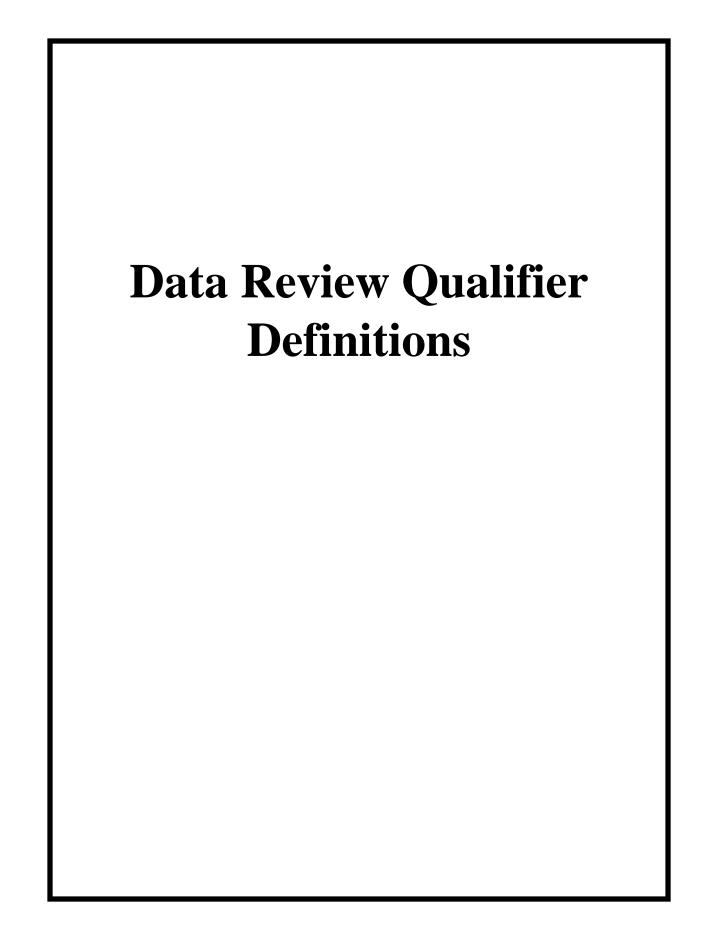
<u>Laboratory ID</u>	<u>Client ID</u>
470349001	HEV Floor North
470349002	HEV Floor South

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Keny O. Kerry OBarr for

Kerry OBarr Tor Katherine Cates Project Manager



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#### Data Review Qualifier Definitions

Qualifier Explanation

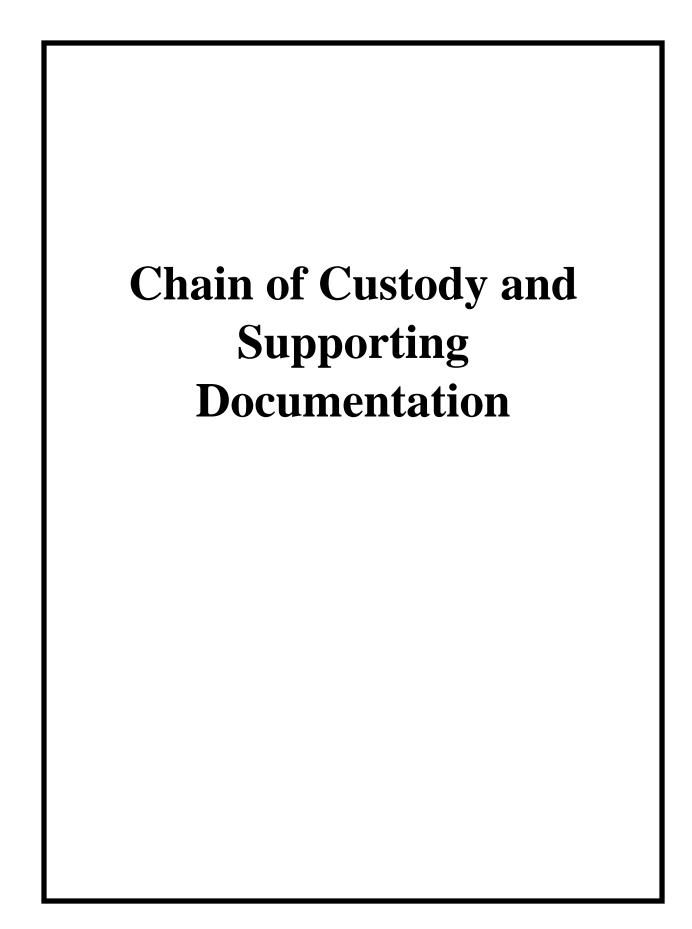
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- ${\tt C}$  ~ Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- $\tt ND$   $\,$  Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

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P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



436								. 10 - 20-		~									C	CH-0031
	470349	2020:0753 -	4. Electronic Disk? Yes [ ] No [ x]	7. Report Format Level: I[x] III	9. Priority Code: Routine [ x ] a	1[] 2[] 3[]	11. Report Data To: W. Connors	Comments	** The five smears are to be composited by the lab-to form a composite sample and analyzed for 241Am, <sup>137</sup> Cs, <sup>233</sup> U, <sup>234</sup> U, <sup>235</sup> U, <sup>236</sup> U, <sup>238</sup> U, <sup>239</sup> Pu, <sup>240</sup> Pu, <sup>242</sup> Pu, <sup>90</sup> Sr, Report units in uCi per composite sample.	1	for all parameters 7-1/28/19	ulate Other: Smear	Glass (Poly)	16. <u>∠/</u> 0 mCi Alpha NA []	20. Sample Receipt:	Temperature°C	Cooler Seals Intact? Yes [ ] No [ ]			
	ST-FOR-ANALYSIS	est Valley LLC ngs Road 14171-9799	3. Analysis Requested		-U) ; 5/236	ofobes tobes	02/22 23/22	Gamme Ar-24 U alphi 232, -2 238, -2 238, -2 238, -2	×	and a second	Sludge Other :	on Pipe Section Filter Particulate	Sample Bottle Type (Circle One): GI			Du 3-2218 1534	2/1/18 220			
	Appendix B CHAIN-OF-CUSTODY / REQUE (Page 1 of 2)	CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road West Valley, NY 14171-9799	2. Charge #: WVOI, C2, 06, 01, 04, 10, 02	436 and 437	_			e Time pH	1060 na		14. Phase (Circle one ): Solid Liquid	Type (Circle one): Debris Coupon	15. Sample Bottle Size: $000 m$ / Sa	horlan)	Sample Custodian Signature/Date/Time	536 Received by: Japath Ja	S Received by:	Received by:	Received by:	
·			2. Charge #: W	3169 6. Release #: •		584	13.	# Pres. Date Cont.	l na 3-22-18		14.		15. 1,しか Sample	eviewed by: TRON ()	9. Sample C	3-22-18 Timbertaneyon 1536 Received	2 1.30.19 @ 1345			300-08)
			1. Lab: GEL	5. PO # CH-DO	8. Cognizant Engineer/Project: MPPB Demo	10. DQO/SAP#: WVDP-584	12.	Sample ID# Type	HEV F. The Grab room floor		18. Gross Wt (g)	Tare Wt (g)	Net Wt (g)	17. Chain-of-Custody Reviewed by:		Released by: Tw 3.	Released by:	Released by:	Released by:	WV-2865, Rev. 4 (SOP 300-08)

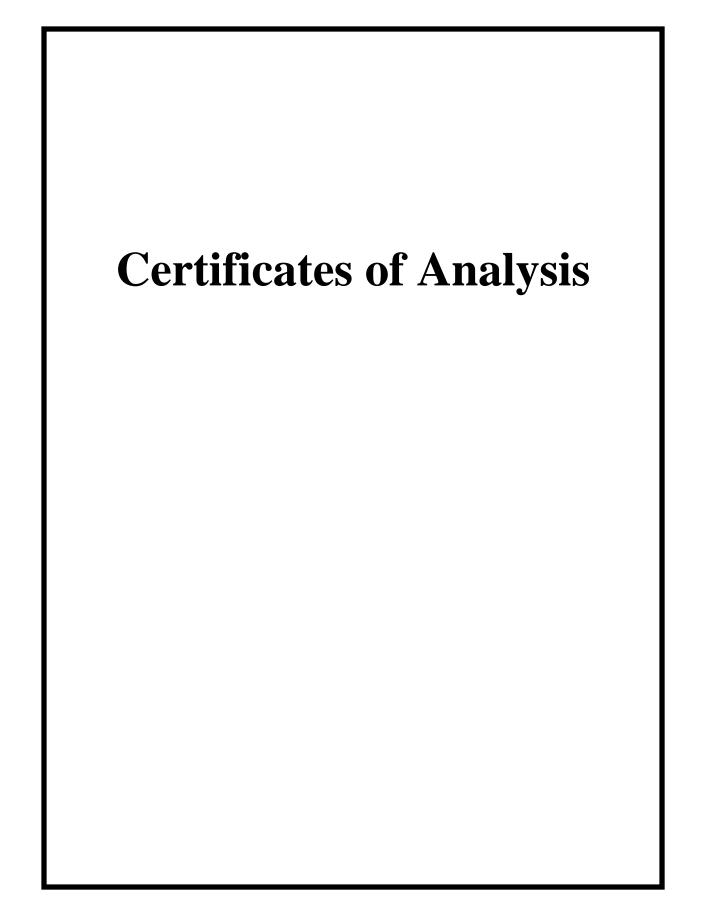
Page 9 of 32 SDG: 436-437-003169

Attachment B - Page 124

	<b>GEL</b> Laboratories LLC				SAMPLE RECEIPT & REVIEW FORM
Cli	ent: WVNS			SD	G/AR/COC/Work Order: 470.349
Re	ceived By: GM			Da	te Received: 2////9
	Carrier and Tracking Number				Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other
Sus	pected Hazard Information	Yes	°Ž	*If }	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)S	hipped as a DOT Hazardous?	/			ard Class Shipped: UN#: 2.970 N2910, Is the Radioactive Shipment Survey Compliant? Yes L/No
	Did the client designate the samples are to be ived as radioactive?			сся	notation or radioactive stickers on containers equal client designation.
	Did the RSO classify the samples as oactive?	/			sified as: Rad 1 Rad 2 Rad 3
	Did the client designate samples are rdous?				notation or hazard labels on containers equal client designation. or E is yes, select Hazards below.
E) [	oid the RSO identify possible hazards?		/	PCE	
	Sample Receipt Criteria	Yes	NA	°Z	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	.~			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	~			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*				Preservation Method: Wet Ice Ice Packs Dry ice Kone Other: *all temperatures are recorded in Celsius TEMP: 14°C
4	Daily check performed and passed on IR temperature gun?	~			Temperature Device Serial #:
5	Sample containers intact and sealed?	~			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		~		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			~	If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:
8	Samples received within holding time?	5			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	~			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	~			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	~			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?			$\leq$	
	COC form is properly signed in relinquished/received sections?	~			Circle Applicable: Not relinquished Other (describe)
Con	iments (Use Continuation Form if needed):				

GL-CHL-SR-001 Rev 6

••••••



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	LLC.	L BWXT W c Springs Ro	5										
	West Valley	y, New York	14171-9799					R	eport l	Date:	February 2	5. 2019	
Contact:	Mr. Willian	n Connors							1		,	,	
Project:	CH-003169	Haz Waste											
Client Sampl Sample ID: Matrix: Collect Date: Receive Date Collector:	47034 Filter 22-M	AR-18 2B-19	1				oject: lient ID:		'NS02 'NS02				
Parameter	Qualifier		Uncertainty	DL	TPU	RL	Units	PF	DF A	Analyst	Date Tin	ne Batch	h Mtd
High Rad Testing													
Alphaspec Pu 238	8, 239, 240, 242	HIGH RAD	"As Receive	d''									
Plutonium-238	Hh	0.00301	+/-0.000324	0.000117	+/-0.000592	2.00E-06	uCi/sample			JXB7	02/22/19 090	5 184909	94 1
Plutonium-239/240	Hh	0.00432	+/-0.000382	6.14E-05	+/-0.000808	2.00E-06	uCi/sample						
Plutonium-242	Hh	0.000151	+/-7.75E-05	6.77E-05	+/-8.14E-05	0.0002	uCi/sample						
Alphaspec U232,	233, 234, 235, 2	238 HIGH R	AD "As Rece	ived"									
Uranium-232	HUh	-1.30E-05	+/-3.15E-05	8.09E-05	+/-3.16E-05	2.00E-06	uCi/sample			JXB7	02/22/19 084	5 184909	95 2
Uranium-233/234	HUh	4.67E-06	+/-3.25E-05	6.69E-05	+/-3.25E-05	2.00E-06	uCi/sample						
Uranium-235/236	HUh	2.42E-06	+/-2.53E-05	5.29E-05	+/-2.54E-05	2.00E-06	uCi/sample						
Uranium-238	HUh	-4.14E-06	+/-1.83E-05	4.78E-05	+/-1.84E-05	2.00E-06	uCi/sample						
GFPC, Sr90, filte	r HIGH RAD "A	As Received"	,										
Strontium-90	Hh	0.0193	+/-0.000117	5.38E-06	+/-0.00508	2.00E-06	uCi/sample			JXB7	02/21/19 162	5 184909	96 3
Gammaspec, Gan	ıma, Cs137, Fil	ter HIGH RA	AD "As Recei	ved"									
Americium-241	Н	0.00838	+/-0.000438	0.000261	+/-0.00122		uCi/sample			AXM6	02/11/19 152	8 184909	92 4
Cesium-137	Н	0.0735	+/-0.000733	0.000137	+/-0.00629	2.00E-07	uCi/sample						
The following Prep	Methods were	e performed	l										
Method	Description				Analyst	Date	Tim	ne	Prep	Batch			
Filter Prep	Filter Prep				JXB7	02/15/19	0944	4	18490	93			
The following Anal	vtical Methods	were perfo	rmed										
	Description	<b>-</b>											
1 ]	DOE EML HASL	-300, Pu-11-R	C Modified										
2	DOE EML HASL	-300 U-02-R	C Modified										
	EPA 905.0 Modifi			ified									
	DOE HASL 300,			incu									
Surrogate/Tracer		Test					R	latch	пр	ecover	v% Accen	table Liı	mits
Plutonium-236 T	-		c Pu 238 230	) 240 242 HIG	GH RAD "As Recei	ved"		18490		76	-	%-125%)	
Uranium-232 Tracer Alphaspec U232, 233, 234, 235, 238 HIGH								18490		66.		%-125%)	
Uranium-235/236 Tracer Alphaspec U232, 233, 234, 235, 238					ceived"		18490		85.		%-125%)		
Strontium Carrie		app a a	00 61 110	GH RAD "As F			1	18490	~ <	97.	0 (05)	6-125%)	

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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# **Certificate of Analysis**

Parameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.
Client Sample II Sample ID:	D: HEV Floor North 470349001			Project: Client ID:	WVNS02501 WVNS025	
Project:	CH-003169 Haz Waste					
Contact:	Mr. William Connors					
	West Valley, New York 14171-9799				Report Date:	February 25, 2019
Address :	LLC. 10282 Rock Springs Road					
Company :	CH2M HILL BWXT West Valley					

Surrogate/Tracer Recovery Test

Notes:

436

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration

# **GEL LABORATORIES LLC**

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# **Certificate of Analysis**

Company : Address :	CH2M HILI LLC. 10282 Rock		-									
	West Valley	, New York	14171-9799					Repo	ort Date:	February 25	5, 2019	
Contact:	Mr. William							1		5	,	
Project:	CH-003169	Haz Waste										
Client Sample Sample ID: Matrix: Collect Date: Receive Date: Collector:		Floor South 9002 AR-18	1				oject: lient ID:	WVNS WVNS				
Parameter	Qualifier	Result 1	Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Tim	e Batch	Mtd
High Rad Testing												
Alphaspec Pu 238,	239, 240, 242	HIGH RAD	"As Receive	d''								
Plutonium-238	Hh	0.000414	+/-0.00012	7.25E-05	+/-0.000137		-		JXB7	02/22/19 0906	1849094	4 1
Plutonium-239/240	Hh	0.000515	+/-0.000132		+/-0.000156		-					
Plutonium-242	HUh	2.32E-05	+/-3.75E-05	5.81E-05	+/-3.77E-05	0.0002	uCi/sample					
Alphaspec U232, 2.	33, 234, 235, 2	38 HIGH R	AD "As Rece	ived"								
Uranium-232	HUh	8.52E-06	+/-5.47E-05	0.000106	+/-5.47E-05				JXB7	02/22/19 0845	184909	5 2
Uranium-233/234	HUh		+/-2.85E-05	5.62E-05	+/-2.85E-05							
Uranium-235/236	HUh		+/-2.67E-05	5.11E-05	+/-2.67E-05		-					
Uranium-238	Hh		+/-5.75E-05	5.09E-05	+/-5.93E-05	2.00E-06	uCi/sample					
GFPC, Sr90, filter		s Received'	1									
Strontium-90	Hh	0.00366	+/-5.06E-05	4.85E-06	+/-0.000962	2.00E-06	uCi/sample		JXB7	02/21/19 1626	1849090	63
Gammaspec, Gamn	1a, Cs137, Filt	er HIGH RA	AD "As Recei	ived"								
Americium-241	Н		+/-0.000254	0.000238	+/-0.000355		uCi/sample		AXM6	02/13/19 0509	1849092	2 4
Cesium-137	Н	0.0792	+/-0.000753	0.00013	+/-0.00677	2.00E-07	uCi/sample					
The following Prep	Methods were	performed	l									
Method D	escription				Analyst	Date	Tim	e Pr	ep Batch			
Filter Prep Fi	lter Prep				JXB7	02/15/19	0944	4 184	49093			
The following Analy	tical Methods	were perfo	rmed									
	escription	<b>i</b>										
1 D0	DE EML HASL-	300. Pu-11-F	RC Modified									
	DE EML HASL-	,										
	A 905.0 Modifie			ified								
	DE HASL 300, 4			inted								
			ĸ				р		D	0/		•
Surrogate/Tracer R	-	Test	D 220 220	240 242 110		111			Recover	-	able Lim	nts
Plutonium-236 Tra					HRAD "As Recei			849094	86.		5-125%)	
Uranium-232 Tracer Alphaspec U232, 233, 234, 235, 238 HI							849095	76.		5-125%)		
Uranium-235/236 Tracer Alphaspec U232, 233, 234, 235, 238 HIC				HIGH RAD "As Re	ceived"	1	849095	79.	9 (15%	5-125%)		

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

# **Certificate of Analysis**

Company :	CH2M HILL BWXT West Valley					
Address :	LLC.					
	10282 Rock Springs Road					
	West Valley, New York 14171-9799				Report Date:	February 25, 2019
Contact:	Mr. William Connors					
Project:	CH-003169 Haz Waste					
Client Sample	ID: HEV Floor South			Project:	WVNS02501	
Sample ID:	470349002			Client ID:	WVNS025	
Parameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.

Surrogate/Tracer Recovery Test

### Notes:

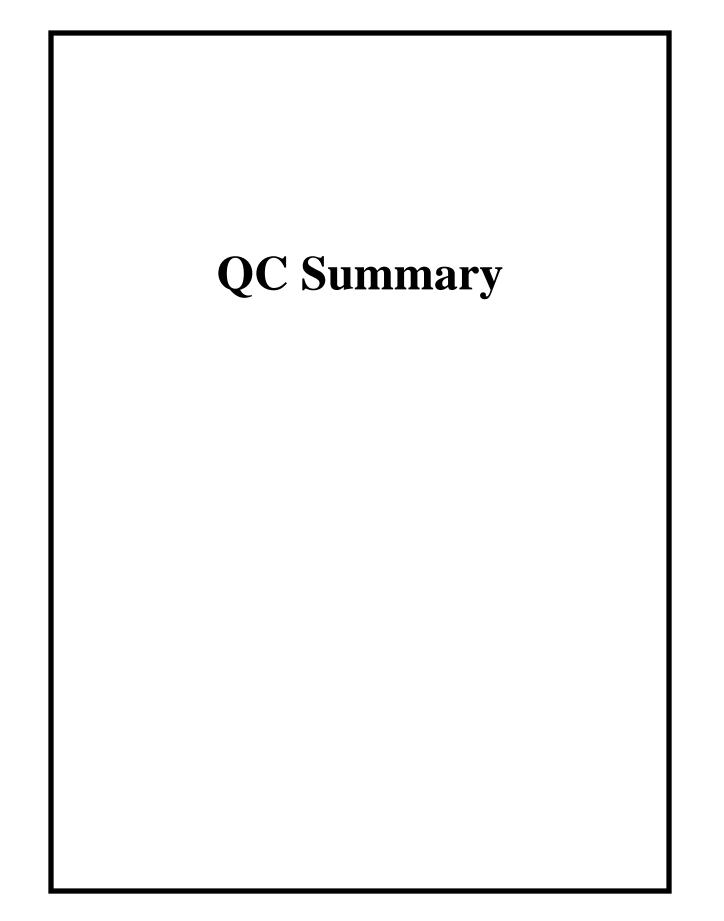
The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: ReportingMDA: Minimum Detectable ActivityTPU: Total PrMDC: Minimum Detectable ConcentrationPrep Factor

Mtd.: Method PF: Prep Factor RL: Reporting Limit TPU: Total Propagated Uncertainty



# **GEL LABORATORIES LLC**

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

# **QC Summary**

Report Date: February 25, 2019

Page 1 of 4

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 470349

**Contact:** 

Parmname		NOM		Sample	Qual	QC	Units	RPD%	REC%	Range A	Anlst	Date Time
High Rad Testing Batch 1849092												
QC1204218777 470349001 Americium-241	DUP		Н	0.00838	Н	0.0091 u	Ci/sample	8.25		(0%-20%)	AXM6	02/12/19 11:38
Cesium-137			Н	0.0735	Н	0.0761 u	Ci/sample	3.54		(0%-20%)		
QC1204218778 LCS Cobalt-60	C	).00714				0.0073 u	Ci/sample		102	(75%-125%)		02/13/19 09:49
Americium-241		0.0295				0.0273 u	Ci/sample		92.5	(75%-125%)		
Cesium-137		0.0103				0.00963 u	Ci/sample		93.6	(75%-125%)		
QC1204218776 MB Americium-241					U	6.69E-05 u	Ci/sample					02/13/19 07:41
Cesium-137					U	-2.20E-05 u	Ci/sample					
Batch 1849094												
QC1204218786 470349001 Plutonium-238	DUP		Hh	0.00301	Н	0.00222 u	Ci/sample	30.2*		(0%-20%)	JXB7	02/22/19 09:06
Plutonium-239/240			Hh	0.00432	Н	0.00302 u	Ci/sample	35.5*		(0%-20%)		
Plutonium-242			Hh	0.000151	Н	8.89E-05 u	Ci/sample	52		(0% - 100%)		
QC1204218787 LCS Plutonium-238					U	-1.01E-05 u	Ci/sample					02/22/19 09:06
Plutonium-239/240		0.002				0.0023 u	Ci/sample		115	(75%-125%)		

Attachment B - Page 132

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

# **QC Summary**

		$\underline{\mathbf{v}}$	Summa	<u>.ry</u>					
Workorder: 470349									Page 2 of 4
Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
<b>High Rad Testing</b> Batch 1849094									
Plutonium-242		U	3.66E-05	uCi/sample			(75%-125%)	JXB7	02/22/19 09:06
QC1204218785 MB									
Plutonium-238		U	-5.76E-06	uC1/sample					02/22/19 09:06
Plutonium-239/240		U	-1.54E-05	uCi/sample					
Plutonium-242		U	7.68E-06	uCi/sample					
Batch 1849095									
QC1204218789 470349001 DUP Uranium-232	HUh	-1.30E-05 HU	3.66E-06	uCi/sample	N/A		N/#	A JXB7	02/22/19 08:45
Uranium-233/234	HUh	4.67E-06 HU	3.60E-05	uCi/sample	N/A		N/A	A	
			0.002	uci sullir	* ···				
Uranium-235/236	HUh	2.42E-06 HU	1 60E-05	uCi/sample	N/A		N/A	٨	
01allium-235/250	1101	2.42E-00 IIC	1.001-05	uCi/sampic	11/14		13/2:	L	
T	ստե		2 43E 05	Ci/comple	NI/A		N//		
Uranium-238	HUII	-4.14E-06 HU	3.43E-UJ	uCi/sample	N/A		N/A	1	
001004010700 I 00									
QC1204218790 LCS Uranium-232		U	0.000118	uCi/sample			(75%-125%)	ł	02/22/19 08:45
Uranium-233/234			0.00294	uCi/sample					
				r r					
Uranium-235/236			0.000118	uCi/sample					
Ordinam 255,250			0.000110	uci/sumple					
Uranium-238	0.00273		0.00201	uCi/sample		107	(75%-125%)	ι.	
Orallium-236	0.00273		0.00271	uCi/sample		107	(1570-12570)		
QC1204218788 MB									
Uranium-232		U	-2.16E-05	uCi/sample					02/22/19 08:45
Uranium-233/234		U	3.71E-05	uCi/sample					

# **GEL LABORATORIES LLC**

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# **QC Summary**

					-									
Worko	rder:	470349											Pag	e 3 of 4
Parmna	me		NOM	1	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Batch		<b>;</b> 1849095												
Uraniun	n-235/23	36				U	1.48E-05	uCi/sample				JXB7	02/22/	19 08:45
Uraniun	n-238					U	-5.59E-06	uCi/sample						
Batch		1849096												
QC12 Strontiu		92 470349001 I	DUP	Hh	0.0193	Н	0.0203	uCi/sample	4.74		(0%-20%)	JXB7	02/21/	19 16:26
QC12 Strontiu	20421879 1m-90	93 LCS	0.000231				0.000223	uCi/sample		96.4	(75%-125%)	1	02/21/	19 16:26
QC12 Strontiu	20421879 1m-90	91 MB				U	4.73E-06	uCi/sample					02/21/2	19 16:26
Notes:														
The Qu	ualifiers	in this report are	e defined as follows	s:										
**	Analy	te is a Tracer con	mpound											
<	Result	is less than valu	e reported											
>	Result	is greater than v	value reported											
BD	Result	s are either belo	w the MDC or trac	er recover	ry is low									
FA	Failed	analysis.												
Н	Analy	tical holding tim	e was exceeded											
	<b>T</b> 7 1													

- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- $U \quad \ \ \, Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.$

# **GEL LABORATORIES LLC**

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

# **QC Summary**

*** *	1		-			<u></u>						
Worko	order: 470349										Pag	e 4 of 4
Parmna	ame	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
UI	Gamma SpectroscopyUncertain	identification										
UJ	Gamma SpectroscopyUncertain	identification										
UL	Not considered detected. The asso	ciated number	is the report	ted concen	tration, wh	ch may be	e inaccurate o	due to a low	bias.			
Х	Consult Case Narrative, Data Sum	mary package,	or Project 1	Manager c	oncerning t	his qualifie	er					
Y	Other specific qualifiers were requ	uired to properly	y define the	results. C	onsult case	narrative.						
٨	RPD of sample and duplicate eval	uated using +/-	RL. Conce	ntrations a	re <5X the	RL. Quali	ifier Not Ap	plicable for F	Radiochem	istry.		
h	Preparation or preservation holdin	g time was exc	eeded									
^ The F	dicates that spike recovery limits do Relative Percent Difference (RPD) of nes (5X) the contract required detect	btained from th	e sample di	uplicate (I	OUP) is eva	luated aga	inst the acce	ptance criter	ia when the	e sample is	s greater	

e times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

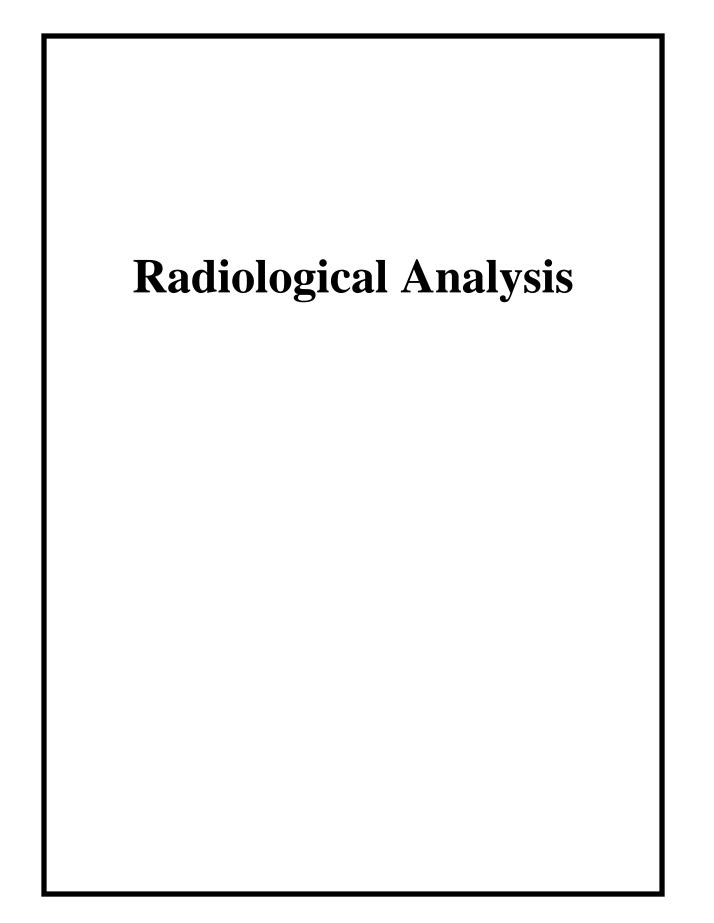
\* Indicates that a Quality Control parameter was not within specifications.

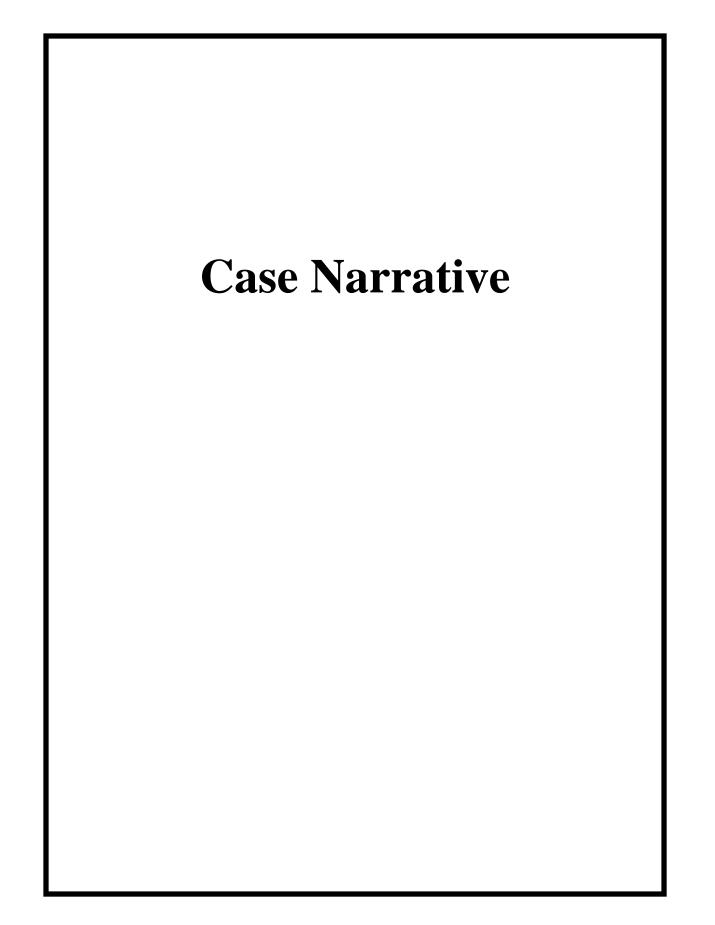
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17–018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-14
Utah NELAP	SC000122018-27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

# List of current GEL Certifications as of 25 February 2019





### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC (WVNS) SDG #: 436-437-003169 Work Order #: 470349

**Product:** Alphaspec Pu 238, 239, 240, 242 HIGH RAD Analytical Method: DOE EML HASL-300, Pu-11-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1849094

<u>Preparation Method:</u> Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1849093

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
470349001	HEV Floor North
470349002	HEV Floor South
1204218785	Method Blank (MB)
1204218786	470349001(HEV Floor North) Sample Duplicate (DUP)
1204218787	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

### Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204218786 (HEV Floor NorthDUP)	Plutonium-238	RPD 30.2* (0.00%-20.00%) RER 2.14 (0-3)
	Plutonium-239/240	RPD 35.5* (0.00%-20.00%) RER 2.63 (0-3)

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204218785 (MB)	Plutonium-238	Result -0.00000576 < MDA 0.0000956 > RDL 0.000002 uCi/sample

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# **Technical Information**

# Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204218786 (HEV Floor NorthDUP)	Received 01-FEB-19, out of holding 18-SEP-18
470349001 (HEV Floor North)	Received 01-FEB-19, out of holding 18-SEP-18
470349002 (HEV Floor South)	Received 01-FEB-19, out of holding 18-SEP-18

**Product:** Alphaspec U232, 233, 234, 235, 238 HIGH RAD Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1849095

<u>Preparation Method:</u> Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1849093

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
470349001	HEV Floor North
470349002	HEV Floor South
1204218788	Method Blank (MB)
1204218789	470349001(HEV Floor North) Sample Duplicate (DUP)
1204218790	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

# Quality Control (QC) Information

# RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

|--|

WD:2020:0753 - Attachment B		
1204218788 (MB)	Uranium-232	Result -0.0000216 < MDA 0.0000729 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.0000371 < MDA 0.0000637 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000148 < MDA 0.0000578 > RDL 0.000002 uCi/sample
	Uranium-238	Result -0.00000559 < MDA 0.0000637 > RDL 0.000002 uCi/sample
1204218789 (HEV Floor NorthDUP)	Uranium-232	Result 0.00000366 < MDA 0.000083 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.000036 < MDA 0.0000588 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.000016 < MDA 0.0000461 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.0000343 < MDA 0.0000344 > RDL 0.000002 uCi/sample
470349001 (HEV Floor North)	Uranium-232	Result -0.000013 < MDA 0.0000809 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.00000467 < MDA 0.0000669 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.00000242 < MDA 0.0000529 > RDL 0.000002 uCi/sample
	Uranium-238	Result -0.00000414 < MDA 0.0000478 > RDL 0.000002 uCi/sample
470349002 (HEV Floor South)	Uranium-232	Result 0.00000852 < MDA 0.000106 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.00000502 < MDA 0.0000562 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000048 < MDA 0.0000511 > RDL 0.000002 uCi/sample

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204218788 (MB)	Uranium-232	Result -0.0000216 < MDA 0.0000729 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.0000371 < MDA 0.0000637 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000148 < MDA 0.0000578 > RDL 0.000002 uCi/sample
	Uranium-238	Result -0.00000559 < MDA 0.0000637 > RDL 0.000002 uCi/sample
1204218789 (HEV Floor NorthDUP)	Uranium-232	Result 0.00000366 < MDA 0.000083 > RDL 0.000002 uCi/sample

WD:2020:0753 - Attachment B		
	Uranium-233/234	Result 0.000036 < MDA 0.0000588 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.000016 < MDA 0.0000461 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.0000343 < MDA 0.0000344 > RDL 0.000002 uCi/sample
470349001 (HEV Floor North)	Uranium-232	Result -0.000013 < MDA 0.0000809 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.00000467 < MDA 0.0000669 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.00000242 < MDA 0.0000529 > RDL 0.000002 uCi/sample
	Uranium-238	Result -0.00000414 < MDA 0.0000478 > RDL 0.000002 uCi/sample
470349002 (HEV Floor South)	Uranium-232	Result 0.00000852 < MDA 0.000106 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result 0.00000502 < MDA 0.0000562 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.0000048 < MDA 0.0000511 > RDL 0.000002 uCi/sample

### **Technical Information**

#### Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204218789 (HEV Floor NorthDUP)	Received 01-FEB-19, out of holding 18-SEP-18
470349001 (HEV Floor North)	Received 01-FEB-19, out of holding 18-SEP-18
470349002 (HEV Floor South)	Received 01-FEB-19, out of holding 18-SEP-18

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1849093

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
470349001	HEV Floor North
470349002	HEV Floor South

The samples in this SDG were analyzed on an "as received" basis.

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There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: Gammaspec, Gamma, Cs137, Filter HIGH RAD** <u>Analytical Method:</u> DOE HASL 300, 4.5.2.3/Ga-01-R <u>Analytical Procedure:</u> GL-RAD-A-013 REV# 27 <u>Analytical Batch:</u> 1849092

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
470349001	HEV Floor North
470349002	HEV Floor South
1204218776	Method Blank (MB)
1204218777	470349001(HEV Floor North) Sample Duplicate (DUP)
1204218778	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### Quality Control (QC) Information

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204218776 (MB)	Cesium-137	Result -0.000022 < MDA 0.0000634 > RDL 0.0000002 uCi/sample

### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204218777 (HEV Floor NorthDUP)	Received 01-FEB-19, out of holding 18-SEP-18
470349001 (HEV Floor North)	Received 01-FEB-19, out of holding 18-SEP-18
470349002 (HEV Floor South)	Received 01-FEB-19, out of holding 18-SEP-18

<u>Product:</u> GFPC, Sr90, filter HIGH RAD <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1849096

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1849093

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
470349001	HEV Floor North
470349002	HEV Floor South
1204218791	Method Blank (MB)
1204218792	470349001(HEV Floor North) Sample Duplicate (DUP)
1204218793	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204218791 (MB)	Strontium-90	Result 0.00000473 < MDA 0.0000048 > RDL 0.000002 uCi/sample

### **Technical Information**

### Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204218792 (HEV Floor NorthDUP)	Received 01-FEB-19, out of holding 18-SEP-18
470349001 (HEV Floor North)	Received 01-FEB-19, out of holding 18-SEP-18
470349002 (HEV Floor South)	Received 01-FEB-19, out of holding 18-SEP-18

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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

# Qualifier Definition Report for

# WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 436-437-003169 GEL Work Order: 470349

## The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

## **Review/Validation**

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

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

Signature:	9 ( o tull o	Millery
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Name: Heather McCarty Title: Analyst II

Date: 23 FEB 2019

# Prep Logbook WD:2020:0753 - Attachment B The Preparation of Special Matrices for the Determination of Radionuclides

Batch ID: Analyst: Method: Lab SOP: Instrument:	<b>1849093</b> Jon Burgess (JXH Filter Prep GL-RAD-A-026 R2-38110047			Due I Type	Dates for Lab: Sample Id	25-FEB-2019 Description	Hold: 18-S	EP-2018	Package: 27-FEB-2019 Serial Number	<b>SDG: 01-MAR</b> Spike Amount Spike Units
# Sample ID	Prep Date	Min RDL ()	Number of Filters	Container Wt (g)	Weight of total filter with container (g)	Weight of filter Diluted with container (g)	Not Saved Final Volume of filter diluted to in Liters (mL)		Weight of Filter Diluted (g)	
1 470349001	15-FEB-2019		1	78.2157	78.9202	78.9202	100	0.7045	0.7045	
<b>2</b> 470349002	15-FEB-2019		1	73.6762	74.32	74.32	100	0.6438	0.6438	
Reagent/Solvent	Lot ID	Description		Amount	Comments:					

Analytical Logbook version 1 11-04-2002

GEL Laboratories LLC

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### Mini Cell – Miniature Cell

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a member of The GEL Group INC



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

gel.com

March 02, 2020

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 503537 SDG: 452-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 06, 2020. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

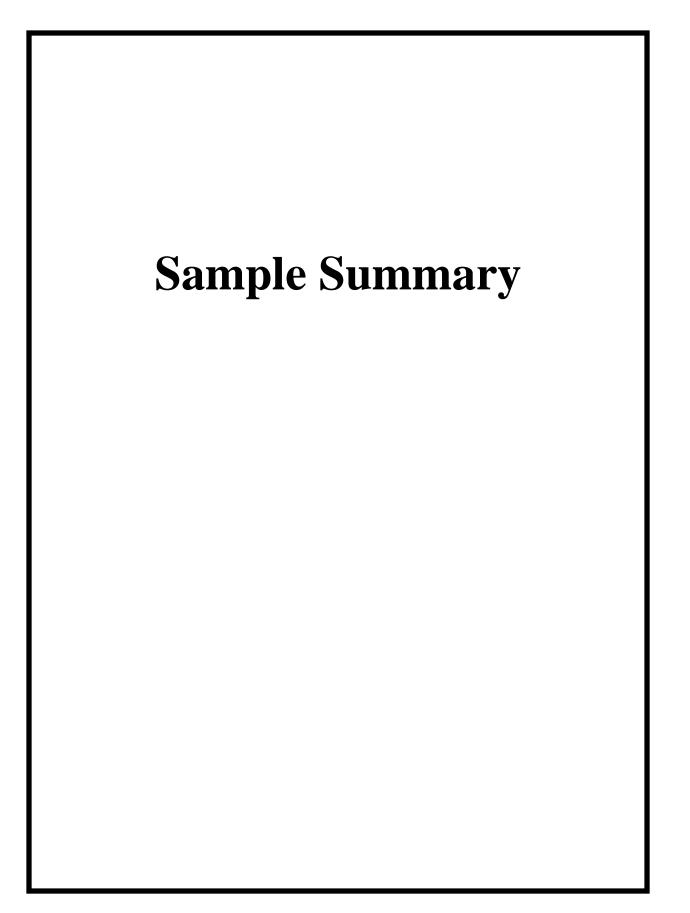
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4708.

Sincerely,

Kerry OBarr for Taylor Cannon Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

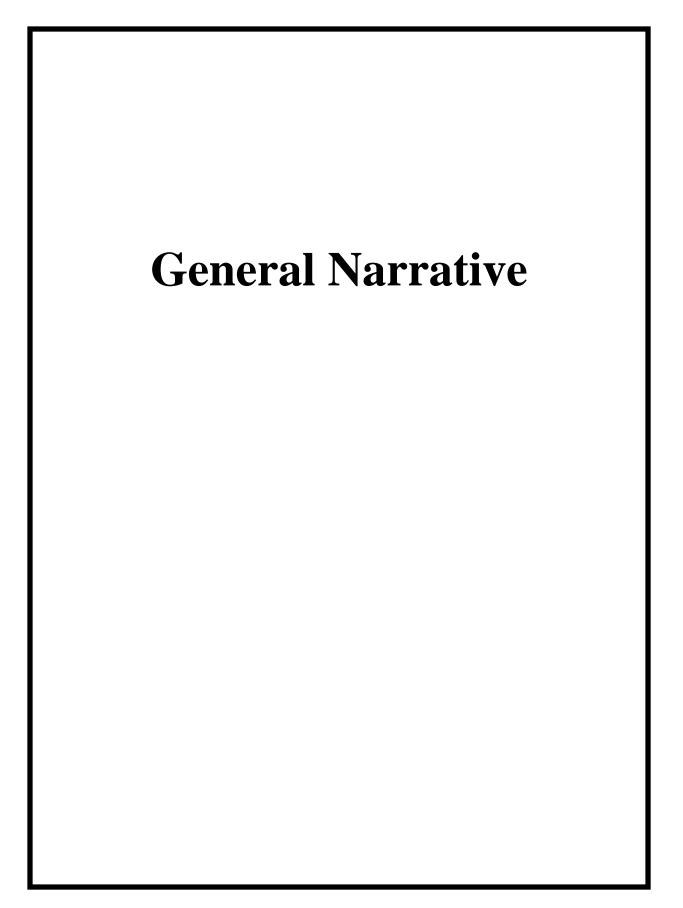
March 2, 2020

Release Number 452 **Purchase Order Number** 

CH-003169

<u>Charge #</u> WV01.C2.06.01.04.10.02

Description Mini Cell B floor sample



### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 452-003169 Work Order: 503537

March 02, 2020

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

### Release Number

452

### Charge Number

WV01.C2.06.01.04.10.02

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on February 06, 2020 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

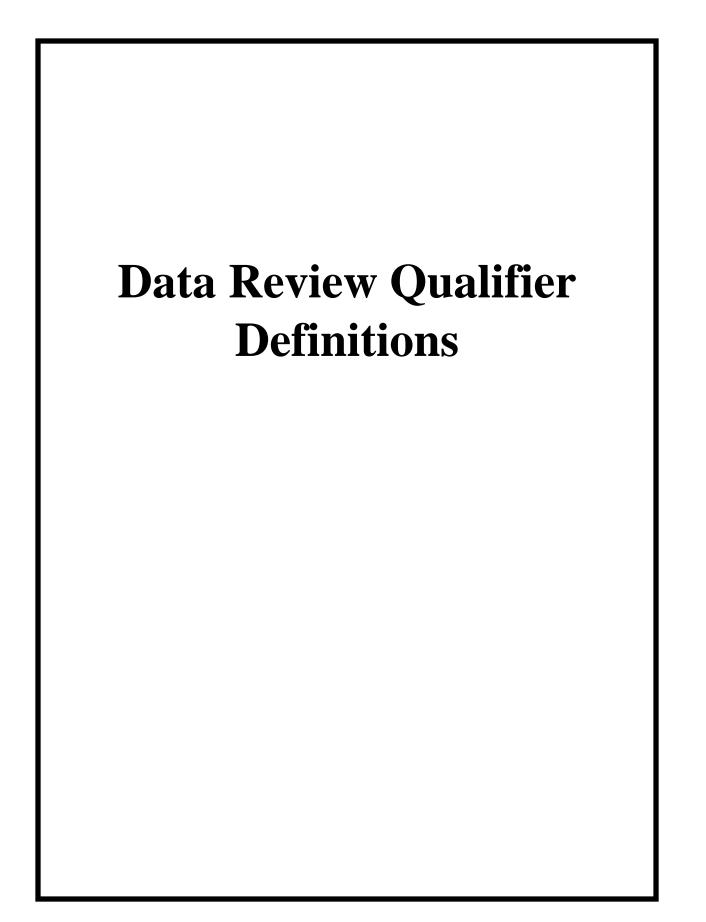
Laboratory IDClient ID503537001Mini Cell B floor sample

### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

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Kerry OBarr for Taylor Cannon Project Manager



#### Data Review Qualifier Definitions

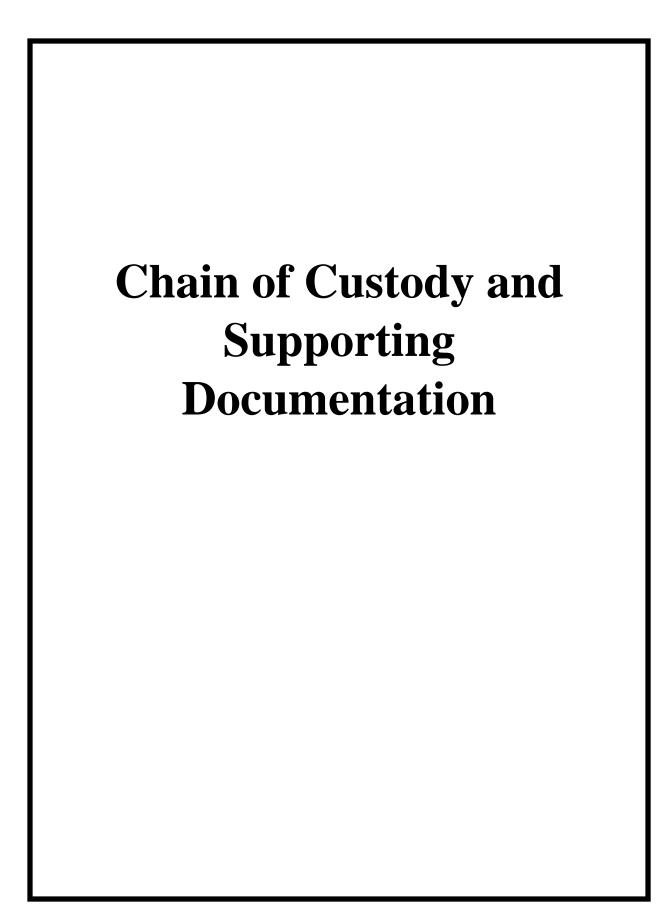
Qualifier Explanation

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



WV-2865, Rev. 4 (SOP 300-08)

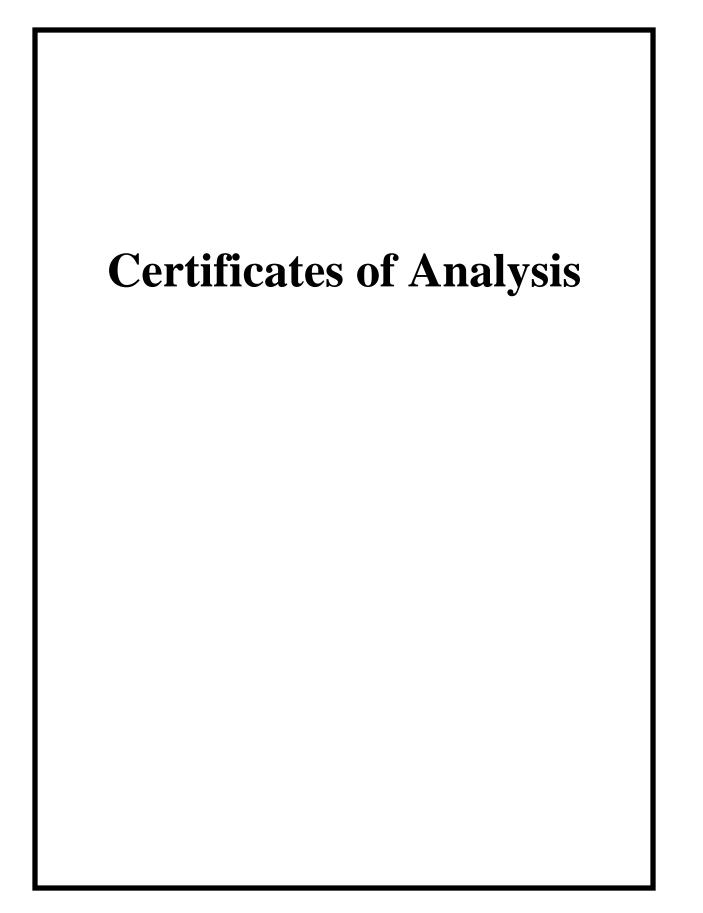
			Ъ Г	ŝ	ç.	12.
Page 9 of 33	SDG: 45	52-0	031	69		

CHAIN-OF-CUSTODY / REQUEST-FOR-A (Page 1 of 2)         5: PO #: CH-003169       6. Release #: 452       3. Ant         5: PO #: CH-003169       6. Release #: 452       3. Ant         6: Release #: 452       10. 04. 10. 02       3. Ant         10. DQO/SAP#: WVDP-584       13.       13.         7: Sample ID#       Type       # (A)       13.         8: ample ID#       Type       # (A)       13.         10. DQO/SAP#: WVDP-584       13.       13.       13.         Ann       Cognizant Engineen/Project: FDP       13.       13.         10. DQO/SAP#: WVDP-584       13.       13.       13.         Ann       Cognizant Engineen/Project: FDP       13.       13.         10. DQO/SAP#: WVDP-584       13. $\mathcal{X} \sim \mathcal{X}$ 13. $\mathcal{X} \sim \mathcal{X}$ 13. $\mathcal{X} \sim \mathcal{X}$ Ann (I)       Ann-241, S33, Pu-233, Pu-233, Pu-233, U-233, U-233, U-233, U-233, U-233, U-233	ab: GEL () #: CH-003169 () #: CH-003169 () #: CH-003169 () #: CH-003169 () #: CH-003169 () #: CH-003169 () #: Chonter mple ID# Type # Cont. mple ID# Type Cont. # Cont. Type # Cont. # Cont	2. Charge         2. Charge           6. Release         6. Release           DP         39, Pu-240,           by:         19, S.           13.37.19, S.         37.19, S.	CHAIN-OF-CUSTODY / REQ (Page 1 c CH2M HILL BWXT, 10282 Rock Sp West Valley, NY         2. Charge #:WV01.C2.06.01.04.10.02       0.282 Rock Sp West Valley, NY         6. Release #: 452       10.282 Rock Sp West Valley, NY         6. Release #: 452       10.23.04.10.02         6. Release #: 452       13.574         Pres.       Date         7. 32.7, 13.       11.04.10.02         Pres.       Date         7. 32.7, 13.         Pu-240, Pu-241, Sr-90, U-232, U-233, U-233, U-234, 13.574         Pu-240, Pu-241, Sr-90, U-232, U-233, U-233, U-234, 14.         7. 14.         7. 3.57.17       Coul         7. 3.57.17       Cold         7. 15.       Sample Bottle Size: [25 ml         7. 16.       Debris         7. 15.       Sample Bottle Size: [25 ml         7.19.       Coul         7.15.       Sample Cutcle one):         7.15.       Sample Cutcle one):         7.15.       Sample Cutcle one):         7.16.       Debris         7.17.       C73.7	Appendix B (Page 1 of 2) (Page 1 of 2) CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road West Valley, NY 14171-9799 01.C2.06.01.04.10.02       3. Analysis Req         01.C2.06.01.04.10.02       3. Analysis Req         01.C2.05.01.04.10.02       3. Analysis Req         01.C2.05.01.04.10.02       1.3.54         01.C2.05.01.04.10.02       1.3.54         01.C2.05.01       F         01.C2.05.01       F         01.C2.05       1.3.54         01.C2.05       1.3.54         01.C2.05       1.233         01.C2.05       1.235         01.C2.05       1.235         01.C2.05       1.235         01.C2.05 <td< th=""><th>Appendix B       Appendix B         (Page 1 of 2)       (Page 1 of 2)         CH2M HILL BWXT, West Valley LLC       10282 Rock Springs Road         West Valley, NY 14171-9799       3. Analys         .01.04.10.02       3. Analys         .02.04       Y         .03.54       Y         .04       Y         .05       .02         .06       .06         .07       .02         .08       .02</th><th>dix B GQUEST-FG Springs Ro Springs Ro NY 14171-9 A, U-235, U A, U-235, U Pi Oupon Pi</th><th></th><th>ALYSIS C vsis Requested vsis Requested Other : C Other : C Sample Bott</th><th>SGSS33       quested     4. Electronic Disk? Yes [] No [X]       quested     4. Electronic Disk? Yes [] No [X]       7. Report Format Level:     1[X]       9. Priority Code:     Routine [X]       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     Report Data To: W. Connors       11.     Report In uCigg       report in uCig     Comments       11.     Particulate       11.     Comments       11.     Sample Bottle Type (Circle One):       Sample Bottle Type (Circle One):     Glass       16.     -10       16.     -10</th><th>WD:2020:0753 - Attachment B</th></td<>	Appendix B       Appendix B         (Page 1 of 2)       (Page 1 of 2)         CH2M HILL BWXT, West Valley LLC       10282 Rock Springs Road         West Valley, NY 14171-9799       3. Analys         .01.04.10.02       3. Analys         .02.04       Y         .03.54       Y         .04       Y         .05       .02         .06       .06         .07       .02         .08       .02	dix B GQUEST-FG Springs Ro Springs Ro NY 14171-9 A, U-235, U A, U-235, U Pi Oupon Pi		ALYSIS C vsis Requested vsis Requested Other : C Other : C Sample Bott	SGSS33       quested     4. Electronic Disk? Yes [] No [X]       quested     4. Electronic Disk? Yes [] No [X]       7. Report Format Level:     1[X]       9. Priority Code:     Routine [X]       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     2. [] 3. []       11.     Report Data To: W. Connors       11.     Report In uCigg       report in uCig     Comments       11.     Particulate       11.     Comments       11.     Sample Bottle Type (Circle One):       Sample Bottle Type (Circle One):     Glass       16.     -10       16.     -10	WD:2020:0753 - Attachment B
Released by: Released by: Released by:		2-5-6	20 13:46	Received by: Received by: Received by:	M		2/u/ze	6:02	Cooler Seals Intact? Yes [ W No [	,

D TWP	2020:0753 - Attachment B
	LL ADORATORIES LLC

<b></b>					SAMPLE RECEIPT & REVIEW FORM
Cli	ent: WVNS			SD	G/AR/COC/Work Order: 503537
Re	ceived By: Hw/RSO			Da	te Received: 2/6/20
	Carrier and Tracking Number				Circle Applicable: FOREXENTIESS FEDEX Ground UPS Field Services Courier Other 8107 1740 9564
Sus	pected Hazard Information	Yes	ŝ	*If	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)S	hipped as a DOT Hazardous?	~	 	Haz	ard Class Shipped: Vellow # UN#: 2915 N2910, Is the Radioactive Shipment Survey Compliant? YesNo
	Did the client designate the samples are to be sived as radioactive?	~		co	C notation or radioactive stickers on containers equal client designation
	Did the RSO classify the samples as oactive?	Ľ		Ma; Cla	simum Net Counts Observed* (Observed Counts - Area Background Counts): 2200CPM / rather
	Did the client designate samples are ardous?		v	co	C notation or hazard labels on containers equal client designation.
E) I	Did the RSO identify possible hazards?	ĺ	i	If D PCE	or E is yes, select Hazards below. 3's Flammable Foreign Soil RCRA Asbestos Beryllium Other:
	Sample Receipt Criteria	Yes	VN	Ν°	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	r			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	-			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*		2-	-	Preservation Method: Wet Ice (ce Packer Dry ice None Other: *all temperatures are recorded in Celsius TEMP:
4	Daily check performed and passed on IR temperature gun?	~			Temperature Device Serial #:
5	Sample containers intact and sealed?				Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		~		Sample ID's and Containers Affected:
7	Do any samples require Volatile Analysis?	, ,		>	If Preservation added. Lot#       If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer)         Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No)         Are liquid VOA vials free of headspace? Yes No NA         Sample ID's and containers affected:
8	Samples received within holding time?	7			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	~			1D's and containers affected:
10	Date & time on COC match date & time on bottles?	~			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	-			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?			~	
	COC form is properly signed in relinquished/received sections? ments (Use Continuation Form if needed):	/			Circle Applicable: Not relinquished Other (describe)
COL	ments (Use Continuation Form if needed):				

Page \_\_\_\_\_ of



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL LLC. 10282 Rock S		-								
	West Valley,							Report Date:	March 2,	2020	
Contact:	Mr. William							Report Dute.	10141011 2,	2020	
Project:											
Floject.	CH-003169 I	Haz waste									_
Client Sample Sample ID: Matrix: Collect Date: Receive Date: Collector: Moisture:	503537 Solid 30-DE0	C-19	sample				oject: ient ID:	WVNS02501 WVNS025			
Parameter	Qualifier	Result I	Uncertainty	DL	TPU	RL	Units	PF DF Analy	st Date Time	Batch	Mtd.
High Rad Testing "As Received" Alphaspec Am241	Solid High Rad	"As Receiv	ed"					·			
Americium-241		1.94	+/-0.135	0.0180	+/-0.405	1.00E-05	uCi/g	JXB7	02/19/20 1525	1970427	2
Alphaspec Pu242,	Solid High Rad	"As Receiv	ed"								
Plutonium-238		0.469	+/-0.0148	0.000784	+/-0.157	1.00E-06	uCi/g	AXM6	02/20/20 2215	1971891	3
Plutonium-239/240		0.527	+/-0.0157	0.000541		1.00E-06	uCi/g				
Plutonium-242	Х	0.00351	+/-0.00131	0.000540	+/-0.00176	1.00E-06	uCi/g				
Alphaspec U232, 2	33, 234, 235, 23	88 Solid Hi	gh Rad "As R	Received"							
Uranium-232	U	-0.00502	+/-0.00962	0.0223	+/-0.00962	1.00E-06	uCi/g	JXB7	02/19/20 1521	1970434	4
Uranium-233/234	U	0.00122	+/-0.00584	0.0110	+/-0.00585	1.00E-06	uCi/g				
Uranium-235/236	U	0.00810	+/-0.0107	0.0160	+/-0.0108		uCi/g				
Uranium-238	U	-0.000950	+/-0.00420	0.0110	+/-0.00421	1.00E-06	uCi/g				
GFPC, Sr90, solid	High Rad "As R	leceived"									
Strontium-90		6.72	+/-0.0343	0.00140	+/-1.24	1.00E-04	uCi/g	AXM6	02/21/20 0639	1971823	5
Gammaspec, Cs13	7 Only, solid Hi	gh Rad "As	Received"								
Americium-241		2.51	+/-0.0269	0.0137	+/-0.196		uCi/g	JXB7	02/18/20 1434	1967079	6
Cesium-137		20.5	+/-0.0421	0.00465	+/-1.72	1.00E-05	uCi/g				
Cobalt-60		0.000823	+/-0.000595	0.000649	+/-0.000599		uCi/g				
Europium-154		0.0394	+/-0.00419	0.00153	+/-0.00528	1.00E-06	uCi/g				
Liquid Scint Pu241	, Solid High Ra	d "As Rece	ived"								
Plutonium-241	0	4.02	+/-0.0787	0.00667	+/-2.76	1.00E-05	uCi/g	JXB7	02/20/20 0703	1970438	7
The following Prep	Methods were	performed	l								
	Description				Analyst	Date	Tim	e Prep Batch	l		
Client Requested Pro D	Dissolution Soil Pre	ep GL-RAD	-A-015		AXM6	02/14/20	1552				
-		-									
The following Analy		vere perfo	rmed								
Method D	escription										

1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Am-05-RC Modified
3	DOE EML HASL-300, Pu-11-RC Modified
4	DOE EML HASL-300, U-02-RC Modified
5	EPA 905.0 Modified/DOE RP501 Rev. 1 Modified
6	DOE HASL 300, 4.5.2.3/Ga-01-R
7	DOE EML HASL-300, Pu-11-RC Modified

# GEL LABORATORIES LLC

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# **Certificate of Analysis**

Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road			
	West Valley, New York 14171-9799		Report Date:	March 2, 2020
Contact:	Mr. William Connors			
Project:	CH-003169 Haz Waste			
Client Sample Sample ID:	ID: Mini Cell B floor sample 503537001	Project: Client ID:	WVNS02501 WVNS025	

Parameter Qualifier	· Result Uncertainty	DL	TPU I	RL U	J <b>nits</b>	PF D	<b>DF</b> Analyst	Date Time Batch Mtd.
Surrogate/Tracer Recovery	Test				I	Batch ID	Recovery	% Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Solid	High Rad "As Received"				1970427	94.9	(15%-125%)
Curium-243/244 Tracer	Alphaspec Am241 Solid	High Rad "As Received"				1970427	106	(15%-125%)
Plutonium-236 Tracer	Alphaspec Pu242, Solid	High Rad "As Received"				1971891	100	(15%-125%)
Uranium-232 Tracer	Alphaspec U232, 233, 23	34, 235, 238 Solid High R	ad "As Recei	ived"		1970434	82.7	(15%-125%)
Uranium-235/236 Tracer	Alphaspec U232, 233, 23	34, 235, 238 Solid High R	ad "As Recei	ived"		1970434	95.3	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid High	Rad "As Received"				1971823	81.4	(25%-125%)
Plutonium-236 Tracer	Liquid Scint Pu241, Soli	d High Rad "As Received	["			1970438	118	(15%-125%)

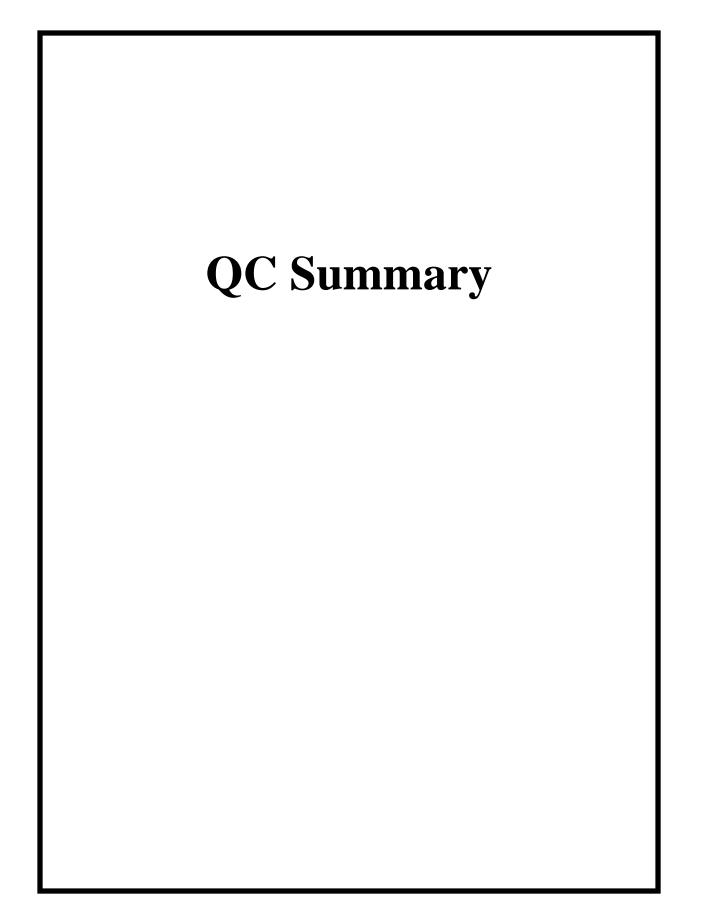
#### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit TPU: Total Propagated Uncertainty



# **GEL LABORATORIES LLC**

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

# **QC Summary**

Report Date: March 2, 2020

Page 1 of 6

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 503537

**Contact:** 

Parmname	NOM	Sample (	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1967079 ——											
QC1204493539 502038001 DUP Americium-241		0.00220		0.00213	uCi/g	3.09		(0% - 100%)	JXB7	02/18/2	0 16:55
Cobalt-60	U	1.80E-05	U	8.58E-06	uCi/g	N/A		N/A	L		
Cesium-137		2.06		2.08	uCi/g	1.06		(0%-20%)			
Europium-154		0.000372	U	7.20E-05	uCi/g	62.8		(0% - 100%)			
QC1204493540 LCS Americium-241	0.0827			0.0899	uCi/g		109	(75%-125%)		02/18/2	0 16:55
Cobalt-60	0.0353			0.0367	uCi/g		104	(75%-125%)			
Cesium-137	0.0315			0.0304	uCi/g		96.3	(75%-125%)			
Europium-154			U	0.000132	uCi/g						
QC1204493538 MB Americium-241			U	5.53E-06	uCi/g					02/18/2	0 16:54
Cobalt-60			U	1.14E-06	uCi/g						
Cesium-137			U	6.18E-07	uCi/g						
Europium-154			U	2.57E-06	uCi/g						

# **GEL LABORATORIES LLC**

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# **QC Summary**

				Jummai	<u>_y</u>				
Workorder: 503537									Page 2 of 6
Parmname	NOM	Sample Q	Jual	QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad TestingBatch1970427—									
QC1204501314 502022001 DUF Americium-241	P U	6.98E-07	U	-1.17E-06	uCi/g	N/A		N/A JXB7	02/19/20 15:17
**Americium-243 Tracer	0.000280	0.000292		0.000243	uCi/g		86.7	(15%-125%)	
**Curium-243/244 Tracer	0.000288	0.000317		0.000326	uCi/g		113	(15%-125%)	
QC1204501316 LCS Americium-241	0.000246			0.000257	uCi/g		105	(75%-125%)	02/19/20 15:17
**Americium-243 Tracer	0.000280			0.000238	uCi/g		85	(15%-125%)	
**Curium-243/244 Tracer	0.000286			0.000300	uCi/g		105	(15%-125%)	
QC1204501313 MB Americium-241			U	4.07E-06	uCi/g				02/19/20 15:17
**Americium-243 Tracer	0.000280			0.000223	uCi/g		79.8	(15%-125%)	
**Curium-243/244 Tracer	0.000286			0.000192	uCi/g		67.3	(15%-125%)	
QC1204501315 502022001 MS Americium-241	0.000246 U	6.98E-07		0.000245	uCi/g		99.4	(75%-125%)	02/20/20 11:21
**Americium-243 Tracer	0.000280	0.000292		0.000290	uCi/g		104	(15%-125%)	
**Curium-243/244 Tracer	0.000288	0.000317		0.000317	uCi/g		109	(15%-125%)	
Batch 1970434 — QC1204501318 502022001 DUF Uranium-232	P U	1.27E-06	U	-1.19E-06	uCi/g	N/A		N/A JXB7	02/19/20 15:21
Uranium-233/234	U	5.78E-07	U	5.10E-06	uCi/g	N/A		N/A	

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# **QC Summary**

Workorder: 5	503537				-							Page 3 of 6
Parmname			NON	M	Sample	Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 197	70434											
Uranium-235/236				U	1.89E-06	U	3.49E-06	uCi/g	N/A		N/A JXB7	02/19/20 15:21
Uranium-238				U	-1.88E-07	U	-1.63E-07	uCi/g	N/A		N/A	
QC1204501320 Uranium-232	LCS					U	2.33E-06	uCi/g				02/19/20 15:21
Uranium-233/234							0.000309	uCi/g				
Uranium-235/236							1.36E-05	uCi/g				
Uranium-238			0.000341				0.000310	uCi/g		90.8	(75%-125%)	
QC1204501317 Uranium-232	MB					U	-3.21E-07	uCi/g				02/19/20 15:21
Uranium-233/234						U	2.26E-06	uCi/g				
Uranium-235/236						U	3.04E-07	uCi/g				
Uranium-238						U	-1.36E-06	uCi/g				
QC1204501319 Uranium-232	502022001	MS		U	1.27E-06	U	-1.14E-06	uCi/g				02/19/20 15:21
Uranium-233/234				U	5.78E-07		0.000288	uCi/g				
Uranium-235/236				U	1.89E-06		1.83E-05	uCi/g				
Uranium-238			0.000341	U	-1.88E-07		0.000318	uCi/g		93.3	(75%-125%)	

# **GEL LABORATORIES LLC**

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# **QC Summary**

					Y	$\underline{\mathcal{C}}$	Summar	<u>- y</u>				
Workorder:	503537											Page 4 of 6
Parmname			NON	М	Sample	Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch	<b>g</b> 1970438											
QC120450132 Plutonium-241	29 502022001	DUP		U	-0.000453	U	0.000187	uCi/g	N/A		N/A JXB	7 02/20/20 07:22
QC120450133 Plutonium-241	31 LCS		0.0102				0.00988	uCi/g		96.8	(75%-125%)	02/20/20 07:54
QC120450132 Plutonium-241	28 MB					U	0.000145	uCi/g				02/20/20 07:06
QC120450133 Plutonium-241	30 502022001	MS	0.0103	U	-0.000453		0.0123	uCi/g		119	(75%-125%)	02/20/20 07:38
	1071000											
	1971823 15 502022001	DUP			4.53E-05		5.04E-05	uCi/g	10.7		(0% - 100%) AXM	6 02/21/20 06:39
QC120450461 Strontium-90	17 LCS		0.000573				0.000663	uCi/g		116	(75%-125%)	02/21/20 06:39
QC120450461 Strontium-90	14 MB						6.64E-05	uCi/g				02/21/20 06:39
QC120450461 Strontium-90	16 502022001	MS	0.000575		4.53E-05		0.000654	uCi/g		106	(75%-125%)	02/21/20 06:39
Datah	1071001											
	1971891 12 502038001	DUP			0.000730	U	-2.25E-07	uCi/g	98.3		(0% - 100%) AXM	6 02/20/20 22:15
Plutonium-239/2	240				0.00141	U	-1.41E-05	uCi/g	121*		(0%-20%)	
Plutonium-242				U	0.000119	U	0.000124	uCi/g	N/A		N/A	

# **GEL LABORATORIES LLC**

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# **QC Summary**

			$\chi \sim r$		<u> </u>						
Workorder: 503537 Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst		ge 5 of 6 Time
High Rad Testing Batch 1971891		Sampe	Quai	<u> </u>	Omts	<u> </u>	KEC 70	Kange	Allist	Date	<u></u>
QC1204504814 LCS Plutonium-238			U	3.00E-06	uCi/g				AXM6	02/20/2	20 22:15
Plutonium-239/240	0.000251			0.000211	uCi/g		84.3	(75%-125%)	)		
Plutonium-242			U	2.60E-06	uCi/g						
QC1204504811 MB Plutonium-238			U	7.29E-06	uCi/g					02/20/2	20 22:15
Plutonium-239/240			U	-5.22E-07	uCi/g						
Plutonium-242			U	-6.95E-07	uCi/g						
QC1204504813 502038001 MS Plutonium-238		0.000730	U	5.63E-05	uCi/g					02/20/2	20 22:15
Plutonium-239/240	0.00647	0.00141		0.00719	uCi/g		89.4	(75%-125%)	)		
Plutonium-242	U	0.000119		0.000559	uCi/g						

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J See case narrative for an explanation
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.

# **GEL LABORATORIES LLC**

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# **QC Summary**

			-	<b>Y</b> U N		<u>.</u>						1
Workor	rder: 503537										Pag	ge 6 of 6
Parmnar	me	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
М	M if above MDC and less th	ian LLD										
М	REMP Result > MDC/CL ar	nd < RDL										ļ
N/A	RPD or %Recovery limits de	o not apply.										I
N1	See case narrative											I
ND	Analyte concentration is not	detected above the	detection lir	nit								ļ
NJ	Consult Case Narrative, Data	a Summary package	, or Project	Manager (	concerning t	his qualifi	ier					ļ
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.											
R	Sample results are rejected											
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.											
UI	Gamma SpectroscopyUncertain identification											
UJ	Gamma SpectroscopyUncertain identification											
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.											
Х	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier											
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.											
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.											
h	Preparation or preservation holding time was exceeded											
^ The Re five time	licates that spike recovery lim telative Percent Difference (Ri les (5X) the contract required of sed to evaluate the DUP result	PD) obtained from the detection limit (RL).	the sample du	uplicate (	(DUP) is eva	luated aga	ainst the acce	eptance criter	ria when the	e sample is	is greater	

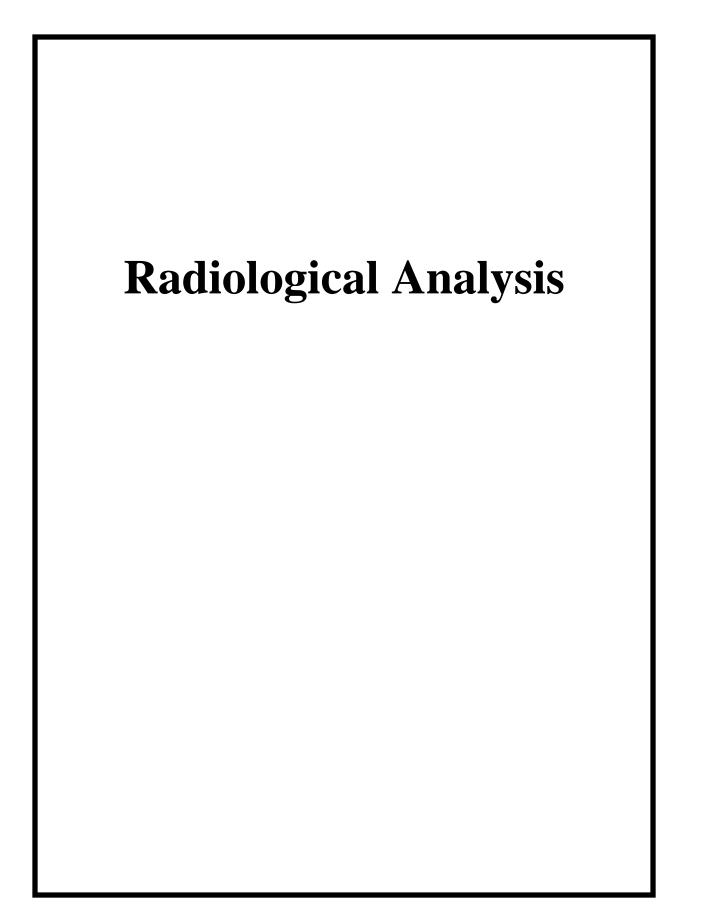
\* Indicates that a Quality Control parameter was not within specifications.

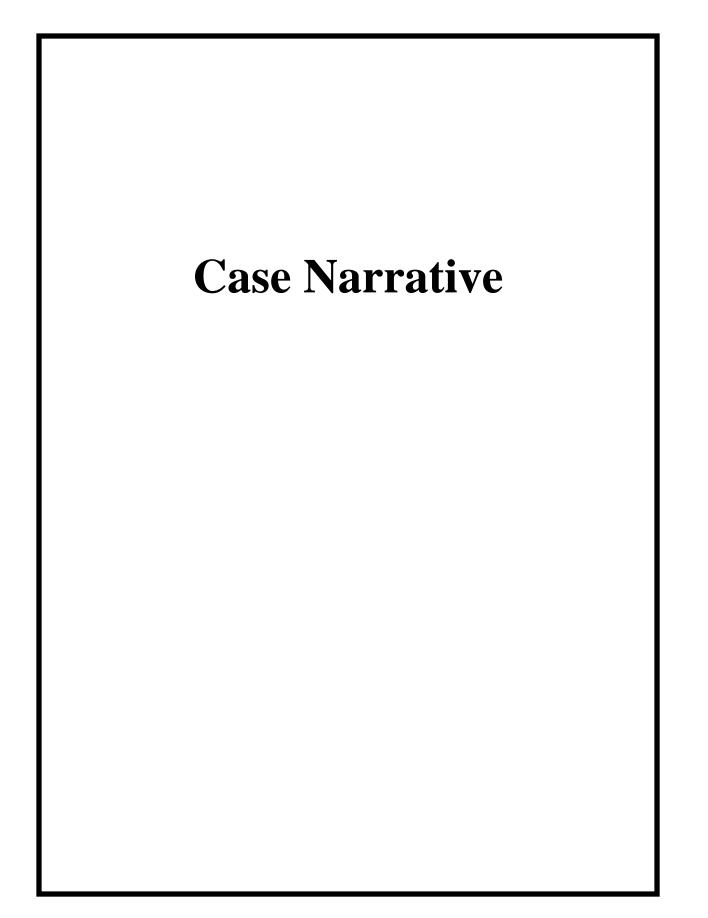
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122020-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019–165
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-20-16
Utah NELAP	SC000122019–30
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
tt ushington	6700

### List of current GEL Certifications as of 02 March 2020





### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 452-003169 Work Order #: 503537

**Product: Alphaspec Am241 Solid High Rad Analytical Method:** DOE EML HASL-300, Am-05-RC Modified **Analytical Procedure:** GL-RAD-A-011 REV# 27 **Analytical Batch:** 1970427

**Preparation Method:** Client Requested Procedure **Preparation Procedure:** GL-RAD-A-015 REV# 18 **Preparation Batch:** 1968509

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
503537001	Mini Cell B floor sample
1204501313	Method Blank (MB)
1204501314	502022001(SNWSACOMP) Sample Duplicate (DUP)
1204501315	502022001(SNWSACOMP) Matrix Spike (MS)
1204501316	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Aliquot Reduced

503537001 (Mini Cell B floor sample) aliquot was reduced due to high activity based on Gamma data.

### **Technical Information**

### Recounts

The Am-243 traced portion of sample 1204501315 (SNWSACOMPMS) was recounted due to a peak shift. The recount is reported.

**Product:** Alphaspec U232, 233, 234, 235, 238 Solid High Rad Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1970434

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1968509

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
503537001	Mini Cell B floor sample
1204501317	Method Blank (MB)
1204501318	502022001(SNWSACOMP) Sample Duplicate (DUP)
1204501319	502022001(SNWSACOMP) Matrix Spike (MS)
1204501320	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Preparation Information**

#### **Aliquot Reduced**

503537001 (Mini Cell B floor sample) aliquot was reduced due to high activity based on Gamma data.

#### **Quality Control (QC) Information**

#### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204501317 (MB)	Uranium-232	Result -0.000000321 < MDA 0.0000109 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.00000226 < MDA 0.00000578 > RDL 0.000001 uCi/g
	Uranium-235/236	Result 0.000000304 < MDA 0.00000735 > RDL 0.000001 uCi/g
	Uranium-238	Result -0.00000136 < MDA 0.000007 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204501318 (SNWSACOMPDUP)	Uranium-232	Result -0.00000119 < MDA 0.00000994 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.0000051 < MDA 0.0000063 > RDL 0.000001 uCi/g
	Uranium-235/236	Result 0.00000349 < MDA 0.00000498 > RDL 0.000001 uCi/g

	Uranium-238	Result -0.000000163 < MDA 0.0000057 > RDL 0.000001 uCi/g
503537001 (Mini Cell B floor sample)	Uranium-232	Result -0.00502 < MDA 0.0223 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.00122 < MDA 0.011 > RDL 0.000001 uCi/g
	Uranium-235/236	Result 0.0081 < MDA 0.016 > RDL 0.000001 uCi/g
	Uranium-238	Result -0.00095 < MDA 0.011 > RDL 0.000001 uCi/g

### Miscellaneous Information

## **Additional Comments**

The tracer peak centroid for sample 1204501319 (SNWSACOMPMS) is greater than 50 keV from the expected library energy value for the U-232 tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

**Product:** Alphaspec Pu242, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1971891

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1968509

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
503537001	Mini Cell B floor sample
1204504811	Method Blank (MB)
1204504812	502038001(OGC floor core) Sample Duplicate (DUP)
1204504813	502038001(OGC floor core) Matrix Spike (MS)
1204504814	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

# Quality Control (QC) Information

# Duplication Criteria between QC Sample and Duplicate Sample

The Sample and Duplicate, (See Below), did not meet the duplication criteria list below due to the extremely small aliquot size used not being a true representation of the samples. The aliquots were reduced due to the high levels of activity in the samples.

	Sample	Analyte	Value
120	04504812 (OGC floor coreDUP)	Plutonium-239/240	RPD 121* (0.00%-20.00%)

#### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204504811 (MB)	Plutonium-238	Result 0.00000729 < MDA 0.0000155 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result -0.000000522 < MDA 0.0000129 > RDL 0.000001 uCi/g
	Plutonium-242	Result -0.000000695 < MDA 0.0000135 > RDL 0.000001 uCi/g

The following detection limit was not achieved due to high sample activity.

Sample	Analyte	Value
1204504812 (OGC floor coreDUP)	Plutonium-238	Result -0.000000225 < MDA 0.000249 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result -0.0000141 < MDA 0.000347 > RDL 0.000001 uCi/g

#### **Technical Information**

#### Sample Re-prep/Re-analysis

Samples were reprepped due to high blank activity. The re-analysis is being reported.

#### **Miscellaneous Information**

#### **Manual Integration**

Manual integration of alpha spectroscopy spectra 503537001 (Mini Cell B floor sample) was performed to fully separate counts in Regions of Interest which would have been biased.

#### **Additional Comments**

Sample 1204504814 (LCS) did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

#### **Qualifier Information**

Qualifier	Reason	Analyte	Sample	Client Sample
Х	Resut may be biased high due to tailing from high levels of Pu-239/240 activity into the Pu-242 ROI.	Plutonium-242	503537001	Mini Cell B floor sample

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1968509

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
503537001	Mini Cell B floor sample

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

<u>Product:</u> Dry Weight <u>Analytical Method:</u> ASTM D 2216 (Modified) <u>Analytical Procedure:</u> GL-OA-E-020 REV# 13 <u>Analytical Batch:</u> 1968514

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
503537001	Mini Cell B floor sample

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Cs137 Only, solid High Rad Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R Analytical Procedure: GL-RAD-A-013 REV# 27 Analytical Batch: 1967079

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
503537001	Mini Cell B floor sample
1204493538	Method Blank (MB)
1204493539	502038001(OGC floor core) Sample Duplicate (DUP)

WD:2020:0753 - Attachment B 1204493540 Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204493538 (MB)	Cesium-137	Result 0.000000618 < MDA 0.0000164 > RDL 0.00001 uCi/g

#### **Technical Information**

#### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	Client Sample
Cobalt-60	503537001	Mini Cell B floor sample
Europium-154	503537001	Mini Cell B floor sample

<u>Product:</u> GFPC, Sr90, solid High Rad <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1971823

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1968509

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
503537001	Mini Cell B floor sample
1204504614	Method Blank (MB)
1204504615	502022001(SNWSACOMP) Sample Duplicate (DUP)
1204504616	502022001(SNWSACOMP) Matrix Spike (MS)
1204504617	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

# WD:2020:0753 - Attachment B Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### Quality Control (QC) Information

#### **Method Blank Criteria**

The blank result (See Below) is greater than the MDC but less than the required detection limit.

Sample	Analyte	Value
1204504614 (MB)	Strontium-90	Result: 6.64E-05 uCi/g > MDA: 1.18E-05 uCi/g <= RDL: 1.00E-04 uCi/g

#### **Technical Information**

#### Sample Re-prep/Re-analysis

Samples were reprepped due to high blank activity. The re-analysis is being reported.

#### Product: Liquid Scint Pu241, Solid High Rad

<u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-035 REV# 21 <u>Analytical Batch:</u> 1970438

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1968509

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
503537001	Mini Cell B floor sample
1204501328	Method Blank (MB)
1204501329	502022001(SNWSACOMP) Sample Duplicate (DUP)
1204501330	502022001(SNWSACOMP) Matrix Spike (MS)
1204501331	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the

WD:2020:0753 - Attachment B other sample aliquots.

Sample	Analyte	Value								
1204501328 (MB)	Plutonium-241	Result 0.000145 < MDA 0.00146 > RDL 0.00001 uCi/g								

Sample (See Below) did not meet the detection limit due to the small sample aliquot used. The aliquot was reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204501329 (SNWSACOMPDUP)	Plutonium-241	Result 0.000187 < MDA 0.00139 > RDL 0.00001 uCi/g

### **Miscellaneous Information**

### **Additional Comments**

Sample 1204501331 (LCS) did not meet the resolution requirement of having a full width half maximum of 100 keV or less for the tracer; however, the tracer yield requirement was met and the tracer peak is within the tracer region of interest.

## **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

## **GEL LABORATORIES LLC**

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

## Qualifier Definition Report for

## WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 452-003169 GEL Work Order: 503537

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

### **Review/Validation**

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

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

Lant Signature:

Name: Theresa Austin

Date: 28 FEB 2020

Title: Group Leader

## Moisture LogBook

Analyst: AXM6			
Date/Time: 15-FEB-2020			
Procedure Code DRY WEIGHT	Sample St	Sample Id	<b>Rpd(%)</b>
Procedure Description Dry Weight-Percent Moisture			
Lab Sop: GL-OA-E-020			

Sample	Sample	Original	Balance	Run Time	Container	Initial	Final Wt	Net Initial	Net Final	Moisture
Id	Туре	Hsn			Wt	Wt	( <b>g</b> )	Wt (g)	Wt (g)	(%)
503537001	SAMPLE		R2-38110047	15:04	8.9828	9.383	9.3781	0.4002	0.3953	1.224

**Comments:** 

A) Result = (Net Initial - Net Final) /Net Initial \* 100

### Note: Aliquot is used for the determination of the effective MDL and PQL in LIMS

Evaporative Loss LogBook

Batch: 196%512020:0753 - Attachment B

**GEL Laboratories LLC** 

### Mini Cell Airlock – Miniature Cell Airlock

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a member of The GEL Group INC



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

gel.com

July 17, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 482537 SDG: 453-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 20, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

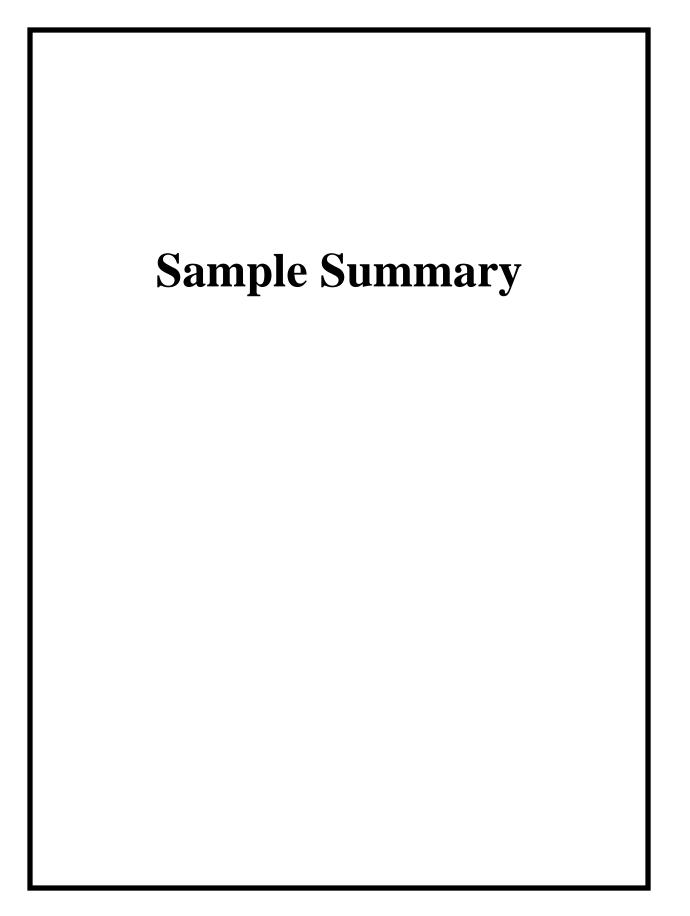
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

July 17, 2019

**Release Number** 453

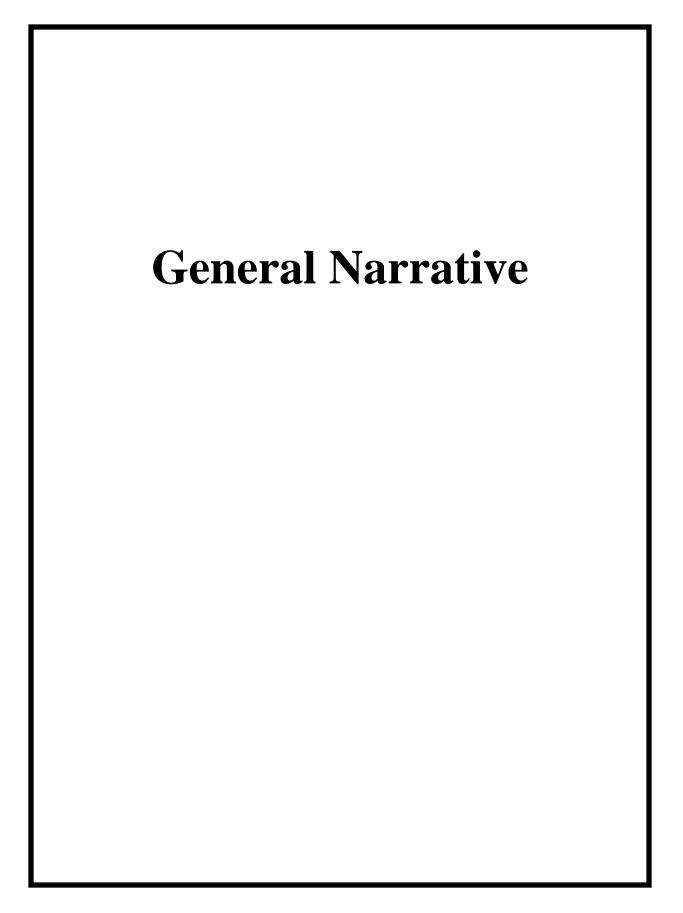
**Purchase Order Number** CH-003169

Charge #

**Description** 

WV01.C2.06.01.04.10.02

Mini Cell A. L. floor sample



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 453-003169 Work Order: 482537

July 17, 2019

#### **Laboratory Identification:**

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

**Release Number** 

453

#### Charge Number

WV01.C2.06.01.04.10.02

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on June 20, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

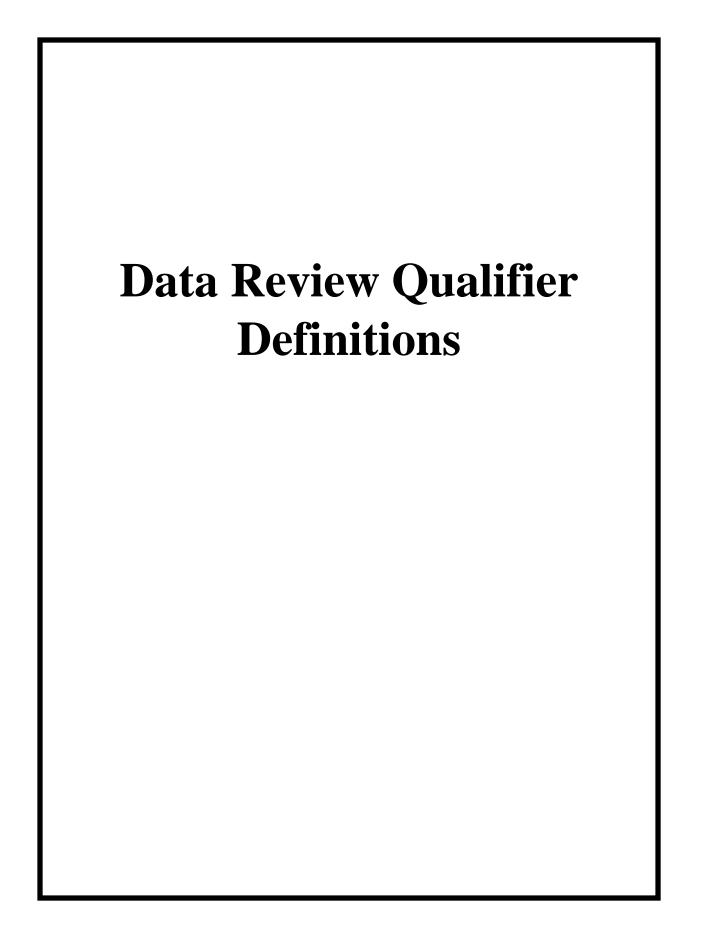
Laboratory IDClient ID482537001Mini Cell A. L. floor sample

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

enjo Sm

Kerry OBarr for Katherine Cates Project Manager



453

#### Data Review Qualifier Definitions

Qualifier Explanation

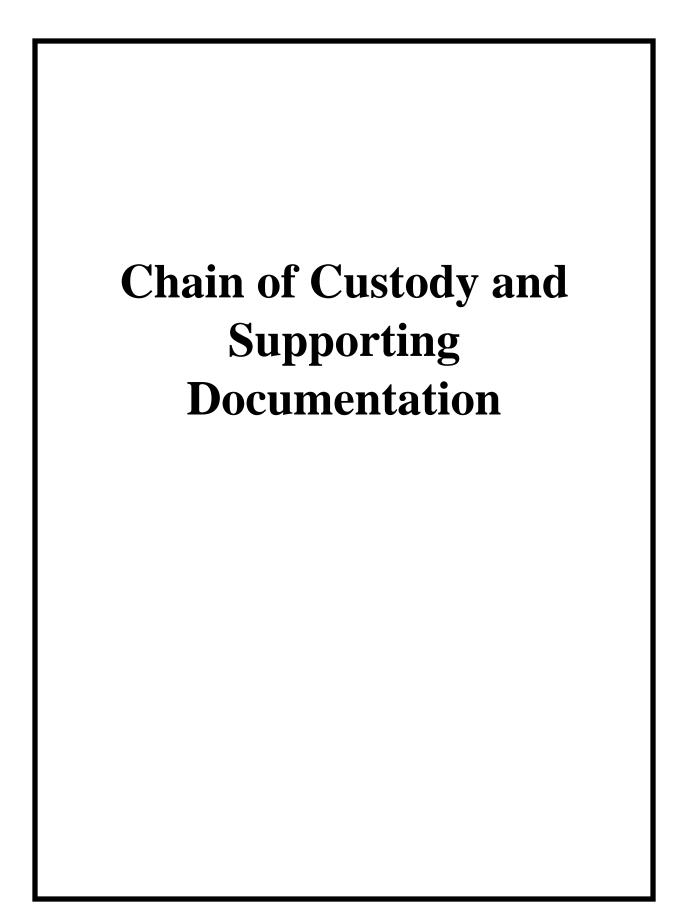
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

453

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



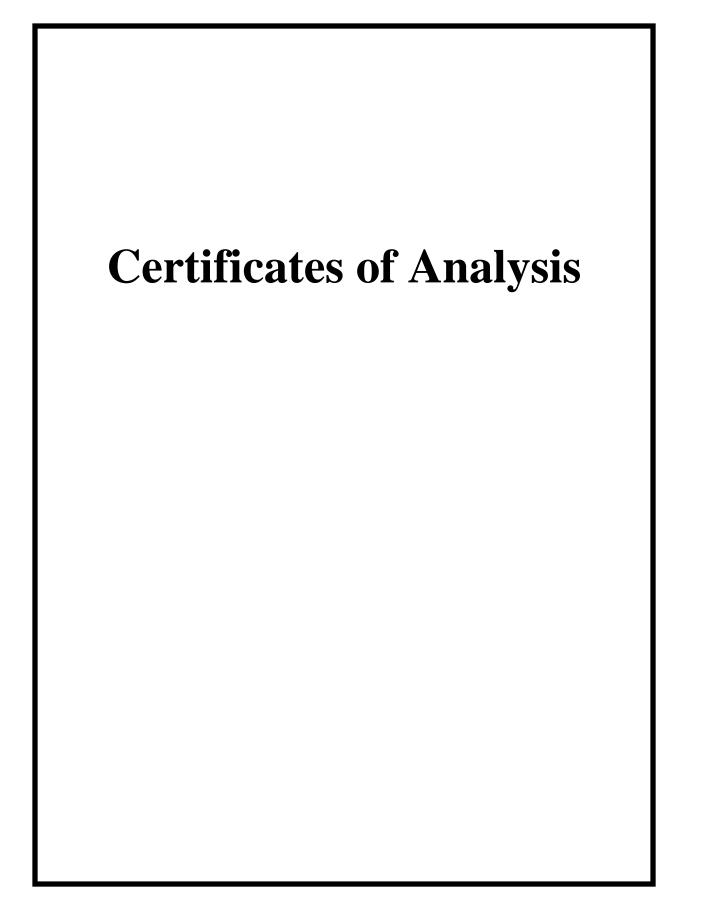
CH-003169

WV-2865, Rev. 4 (SOP 300-08)

453

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Clic	nt: WVNS			SD	G/AR/COC/Work Order: 492537
Rec	eived By: Crang Arest	<u> </u>	-	Da	te Received: 6/20/19
	Carrier and Tracking Number				Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 8107-1470 9520
Susj	ected Hazard Information	Yes	N0	*1f ]	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)SI	nipped as a DOT Hazardous?	V	ľ		eard Class Shipped: UN#: Z910 IN2910, Is the Radioactive Shipment Survey Compliant? Yes_UNo
	id the client designate the samples are to be ved as radioactive?	~	Ł	co	C notation or radioactive stickers on containers equal client designation.
	id the RSO classify the samples as active?	/		Max Clas	ximum Net Counts Observed* (Observed Counts - Area Background Counts): <u><i>i</i></u> , <u>i</u> CPM / <u>(R/Hr</u> ) ssified as: Rad 1 (Rad 2) Rad 3
D) D	id the client designate samples are hazardous?		/	<u> </u>	C notation or hazard labels on containers equal client designation.
E) D	id the RSO identify possible hazards?			PCE	) or E is yes, select Hazards below. B's Flammable Foreign Soil RCRA Asbestos Beryllium Other:
	Sample Receipt Criteria	Yes	NA	ů	
	Shipping containers received intact and sealed?	/			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	$\checkmark$			Circle Applicable: Client contacted and provided COC COC created upon receipt
	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*	~			Preservation Method: Wet Ice <u>Ge Packs</u> Dry ice None Other. *all temperatures are recorded in Celsius TEMP: <u>ZO</u>
	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #: <u>IAZ-1'î</u> Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	V			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
	Samples requiring chemical preservation at proper pH?		v		Sample ID's and Containers Affected: If Preservation added; Lot#:
7	Do any samples require Volatile Analysis?				If Yes, are Encores or Soil Kits present for solids? Yes <u>No</u> <u>NA</u> (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes <u>No</u> <u>NA</u> (If unknown, select No) Are liquid VOA vials free of headspace? Yes <u>No</u> <u>NA</u> Sample ID's and containers affected:
8	Samples received within holding time?	く			ID's and tests affected:
	Sample ID's on COC match ID's on pottles?	く			ID's and containers affected:
	Date & time on COC match date & time on bottles?	~			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
	Number of containers received match number indicated on COC?	$\checkmark$		<i>ъ</i> с	Circle Applicable: No container count on COC Other (describe)
	GEL provided?	•		レ	-
	COC form is properly signed in relinquished/received sections?	7			Circle Applicable: Not relinquished Other (describe)
12 13	Are sample containers identifiable as GEL provided? COC form is properly signed in	<u>×</u> . ン			



## **GEL LABORATORIES LLC**

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

## **Certificate of Analysis**

Company : Address :	CH2M LLC.	HILL BV	WXT W	/est Valley										
nuuroos .		Rock Spr	ings Ro	ad										
	West V	allev. Ne	w York	x 14171-9799					Re	port Date:		July 17.	2019	
Contact:		lliam Co							100	poir Dute.		July 17,	, 2017	
Project:	CH-003	3169 Haz	Waste											
110jeet.	Сп-003	5109 Haz	waste											_
Client Samj Sample ID: Matrix: Collect Dat Receive Da Collector:	48 M e: 22 te: 20	ini Cell 253700 isc Solid -APR-1 -JUN-1 ient	1 1 9	loor sample				oject: ient ID:		NS02501 NS025				
Parameter	Qual		Result	Uncertainty	DL	TPU	RL	Units	PF	DF Analys	st Da	te Time	Batch	Mt
High Rad Testing				c neer tunity			THE .	0.1115		DI many.	. 24		2000	
Alphaspec Am24		4 Solid H	ligh Ra	d "As Receive	ed"									
Americium-241			0	+/-4.65E-06	5.52E-06	+/-4.73E-06	1.00E-05	uCi/g		JXB7	07/16/	19 1409	1895766	1
Curium-243/244	U			+/-1.32E-06	3.92E-06	+/-1.32E-06		uCi/g						
Alphaspec Pu24	2, Solid High	Rad "As	Receiv	ved"				-						
Plutonium-238	, 0			+/-2.60E-06	1.44E-06	+/-2.96E-06	1.00E-06	uCi/g		JXB7	07/11/	19 1317	1890821	2
Plutonium-239/240		5.8	87E-06	+/-2.26E-06	1.52E-06	+/-2.49E-06	1.00E-06	uCi/g						
Plutonium-242	U	9.4	45E-07	+/-1.18E-06	1.78E-06	+/-1.19E-06	1.00E-06	uCi/g						
Alphaspec U232	, Solid High	Rad "As	Receive	ed"										
Uranium-232	U	1.0	08E-06	+/-1.08E-06	1.44E-06	+/-1.09E-06	1.00E-06	uCi/g		JXB7	07/12/	19 0810	1890121	3
Uranium-233/234	U	1.9	92E-07	+/-3.74E-07	5.86E-07	+/-3.75E-07	1.00E-06	uCi/g						
Uranium-235/236	U			+/-3.33E-07	4.61E-07	+/-3.34E-07	1.00E-06	uCi/g						
Uranium-238	U		0E-08	+/-1.99E-07	4.60E-07	+/-1.99E-07	1.00E-06	uCi/g						
GFPC, Sr90, so	lid High Rad													
Strontium-90				+/-7.57E-05	5.25E-05	+/-0.000172	1.00E-04	uCi/g		JXB7	07/11/	19 1506	1890118	4
Gammaspec, Cs	-	-												
Americium-241	U	9.4	45E-05	+/-0.000189	0.000339	+/-0.000194	1.005.05	uCi/g		AXM6	07/01/	19 0938	1889961	5
Cesium-137			0.0142	+/-0.000389	8.26E-05	+/-0.00145	1.00E-05	uCi/g						
The following Pro			formed	1			<b>.</b>							
Method	Description					Analyst	Date	Tim		Prep Batch				
Client Requested Pro	Dissolution S	oil Prep C	GL-RAD	-A-015		AXM6	06/24/19	135	2 1	1890110				
The following An	alvtical Metl	ods wer	e nerfa	rmed										
Method	Description		e perio	// IIIeu										
1	DOE EML H	ASL-300	Am-05-	RC Modified										
2	DOE EML H													
	DOE EML H													
	DOL LIVIL II				ified									
3	EDA 005 0 M													
3 4	EPA 905.0 M				inted									
3 4 5	DOE HASL 3	300, 4.5.2.	.3/Ga-01		inted									
3 4 5 Surrogate/Trace	DOE HASL 3 r <b>Recovery</b>	300, 4.5.2. <b>Tes</b>	.3/Ga-01 st	-R						D Recove	-		ıble Limi	ts
3 4 5	DOE HASL 3 r <b>Recovery</b>	300, 4.5.2. <b>Tes</b>	.3/Ga-01 st	-R		High Rad "As Rece	ived"		atch I 89576		<b>ry%</b> 8		able Limi -125%)	ts
3 4 5 Surrogate/Trace	DOE HASL 3 r <b>Recovery</b> 3 Tracer	300, 4.5.2. Tes	3/Ga-01 it lphaspe	-R ec Am241,Cn		0	ived"	1		6 9	-	(15%)		ts
3 4 5 <b>Surrogate/Trace</b> Americium-243	DOE HASL 3 r <b>Recovery</b> 3 Tracer Tracer	800, 4.5.2. Tes A	3/Ga-01 e <b>t</b> lphaspe lphaspe	-R cc Am241,Cn cc Pu242, Sol	1243/244 Solid	s Received"	ived"	1	89576	6 9 1 63	8	(15%)	-125%)	ts
3 4 5 <b>Surrogate/Trace</b> Americium-243 Plutonium-232 T	DOE HASL 3 <b>r Recovery</b> 3 Tracer Tracer Yracer	300, 4.5.2. <b>Tes</b> A A A	3/Ga-01 it lphaspe lphaspe lphaspe	-R ec Am241,Cm ec Pu242, Sol ec U232, Solid	243/244 Solid id High Rad "A l High Rad "As	as Received" s Received"	ived"	1 1 1	89576 89082 89012	6 9 1 63 1 1(	8 8.2 09	(15%) (15%) (15%)	-125%) -125%) -125%)	ts
3 4 5 Surrogate/Trace Americium-243 Plutonium-236	DOE HASL 3 <b>r Recovery</b> 3 Tracer Tracer Yracer 36 Tracer	300, 4.5.2. Tes A A A A A	3/Ga-01 it lphaspe lphaspe lphaspe lphaspe	-R ec Am241,Cn ec Pu242, Sol ec U232, Solid ec U232, Solid	1243/244 Solid id High Rad "A	s Received" s Received" s Received"	ived"	1	89576 89082	6 9 1 63 1 10 1 69	8 3.2	(15%) (15%) (15%) (15%)	-125%) -125%)	ts

Batch ID Recovery% Acceptable Limits

## GEL LABORATORIES LLC

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

## **Certificate of Analysis**

Company : Address :	CH2M HILL BWXT West Valley LLC.					
Address .	10282 Rock Springs Road					
	West Valley, New York 14171-9799				Report Date:	July 17, 2019
Contact:	Mr. William Connors					
Project:	CH-003169 Haz Waste					
Client Sample Sample ID:	ID: Mini Cell A. L. floor sample 482537001			Project: Client ID:	WVNS02501 WVNS025	
Parameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.

Surrogate/Tracer Recovery Test

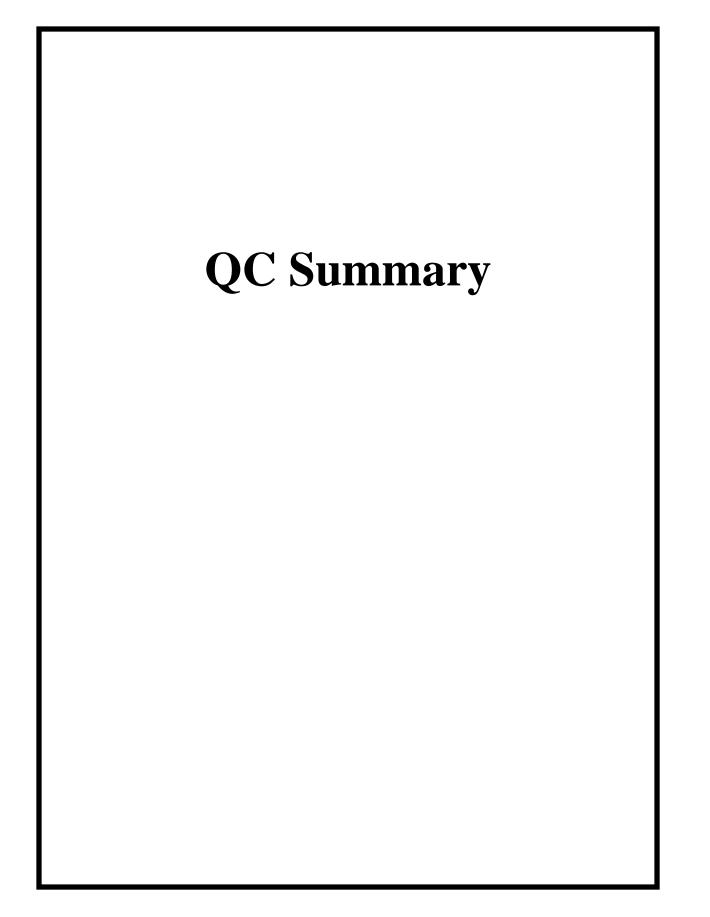
#### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit TPU: Total Propagated Uncertainty



## **GEL LABORATORIES LLC**

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## **QC Summary**

Report Date: July 17, 2019

Page 1 of 5

CH2M HILL BWXT West Valley LLC.
10282 Rock Springs Road
West Valley, New York

Mr. William Connors

Workorder: 482537

**Contact:** 

Parmname	NOM	Sample Qua	l QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 1889961								
QC1204315868 482537001 DUP Americium-241	U	9.45E-05 U	-5.41E-05	uCi/g	N/A		N/AAXM6	07/01/19 13:52
Cesium-137		0.0142	0.0148	uCi/g	4.06		(0%-20%)	
QC1204315869 LCS Americium-241	0.353		0.369	uCi/g		104	(75%-125%)	07/01/19 17:46
Cobalt-60	0.0911		0.0952	uCi/g		105	(75%-125%)	
Cesium-137	0.121		0.129	uCi/g		106	(75%-125%)	
QC1204315867 MB Americium-241		U	4.90E-06	uCi/g				07/01/19 09:39
Cesium-137		U	-1.15E-05	uCi/g				
Batch 1890118								
QC1204316286 482537001 DUP Strontium-90		0.000819	0.000876	uCi/g	6.76		(0%-20%) JXB7	07/11/19 15:06
QC1204316288 LCS Strontium-90	0.00208		0.0023	uCi/g		111	(75%-125%)	07/11/19 15:06
QC1204316285 MB Strontium-90		U	3.94E-05	uCi/g				07/11/19 15:06
QC1204316287 482537001 MS Strontium-90	0.00209	0.000819	0.0032	uCi/g		114	(75%-125%)	07/11/19 15:06

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## **QC Summary**

					<u>v</u> u:	Summa	<u>ry</u>				
Workorder: 4	482537			_							Page 2 of 5
Parmname		NO	Μ	Sample	Qual	QC	Units	RPD%	REC%	6 Range Anlst	Date Time
High Rad Testing Batch 189	90121 -										
QC1204316295 Uranium-232	482537001 DU	JP	U	1.08E-06	U	-9.85E-07	uCi/g	N/A		N/A JXB7	07/12/19 08:10
Uranium-233/234			U	1.92E-07	U	-1.55E-08	uCi/g	N/A		N/A	
Uranium-235/236			U	1.69E-07	U	3.65E-08	uCi/g	N/A		N/A	
Uranium-238			U	-2.30E-08	U	2.34E-07	uCi/g	N/A		N/A	
QC1204316297 Uranium-232	LCS				U	-1.05E-07	uCi/g				07/12/19 08:10
Uranium-233/234						5.22E-05	uCi/g				
Uranium-235/236						2.08E-06	uCi/g				
Uranium-238		4.88E-05				5.57E-05	uCi/g		114	(75%-125%)	
QC1204316294 Uranium-232	MB				U	3.32E-07	uCi/g				07/12/19 08:10
Uranium-233/234					U	1.62E-07	uCi/g				
Uranium-235/236					U	7.21E-08	uCi/g				
Uranium-238					U	3.48E-07	uCi/g				
QC1204316296 Uranium-232	482537001 MS	S	U	1.08E-06	U	-4.92E-07	uCi/g				07/12/19 08:10
Uranium-233/234			U	1.92E-07		4.80E-05	uCi/g				

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## **QC Summary**

Workorder: 482537			-	<u> </u>							Pag	ge 3 of 5
Parmname	NO	M	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst		Time
High Rad Testing Batch 1890121												
Uranium-235/236		U	1.69E-07		2.35E-06	uCi/g				JXB7	07/12/1	19 08:10
Uranium-238	4.88E-05	U	-2.30E-08		4.48E-05	uCi/g		91.9	(75%-125%)	'		
Batch 1890821 QC1204317988 482537001 DUP Plutonium-238			7.99E-06		7.30E-06	uCi/g	8.98		(0%-20%)	JXB7	07/11/	 19 13:17
Plutonium-239/240			5.87E-06		4.76E-06	uCi/g	21		(0% - 100%)	J		
Plutonium-242		U	9.45E-07	U	4.84E-07	uCi/g	N/A		N/A	Ą		
QC1204317990 LCS Plutonium-238					1.53E-06	uCi/g					07/12/	/19 08:31
Plutonium-239/240	3.59E-05				3.87E-05	uCi/g		108	(75%-125%)	J		
Plutonium-242				U	1.41E-06	uCi/g						
QC1204317987 MB Plutonium-238				U	4.44E-07	uCi/g					07/11/	/19 13:17
Plutonium-239/240				U	-5.55E-08	uCi/g						
Plutonium-242				U	2.99E-07	uCi/g						
QC1204317989 482537001 MS Plutonium-238			7.99E-06		9.85E-06	uCi/g					07/12/	/19 08:31
Plutonium-239/240	3.59E-05		5.87E-06		4.76E-05	uCi/g		116	(75%-125%)	1		
Plutonium-242		U	9.45E-07		3.45E-06	uCi/g						

## **GEL LABORATORIES LLC**

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## **QC Summary**

		<u>```</u>	$\mathbf{x} \mathbf{v}$	Jumma	<u> </u>					
Workorder: 482537										Page 4 of 5
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
<b>High Rad Testing</b> Batch 1895766 —										
QC1204329840 482537001 DUP Americium-241		6.65E-06		4.15E-06	uCi/g	46.4		(0% - 100%)	JXB7	07/16/19 14:09
Curium-243/244	U	-5.71E-07	U	-1.52E-07	uCi/g	N/A		N/A	A	
**Americium-243 Tracer	0.000213	0.000208		0.000173	uCi/g		81.4	(15%-125%)		
QC1204329842 LCS Americium-241	0.000176			0.000157	uCi/g		89.4	(75%-125%)		07/16/19 14:09
Curium-243/244	0.000209			0.000179	uCi/g		85.4	(75%-125%)		
**Americium-243 Tracer	0.000213			0.000195	uCi/g		91.5	(15%-125%)		
QC1204329839 MB Americium-241			U	-5.53E-07	uCi/g					07/16/19 14:09
Curium-243/244			U	2.53E-07	uCi/g					
**Americium-243 Tracer	0.000213			0.000232	uCi/g		109	(15%-125%)		
QC1204329841 482537001 MS Americium-241	0.000176	6.65E-06		0.000163	uCi/g		88.8	(75%-125%)		07/16/19 14:09
Curium-243/244	U	-5.71E-07		0.000184	uCi/g			(75%-125%)		
**Americium-243 Tracer	0.000213	0.000208		0.00015	uCi/g		70.6	(15%-125%)		

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported

## **GEL LABORATORIES LLC**

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## **QC Summary**

Workor	rage 5 of 5
Parmnar	ne NOM Sample Qual QC Units RPD% REC% Range Anlst Date Time
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.
Н	Analytical holding time was exceeded
J	Value is estimated
Κ	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
М	M if above MDC and less than LLD
М	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma SpectroscopyUncertain identification
UJ	Gamma SpectroscopyUncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
Х	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

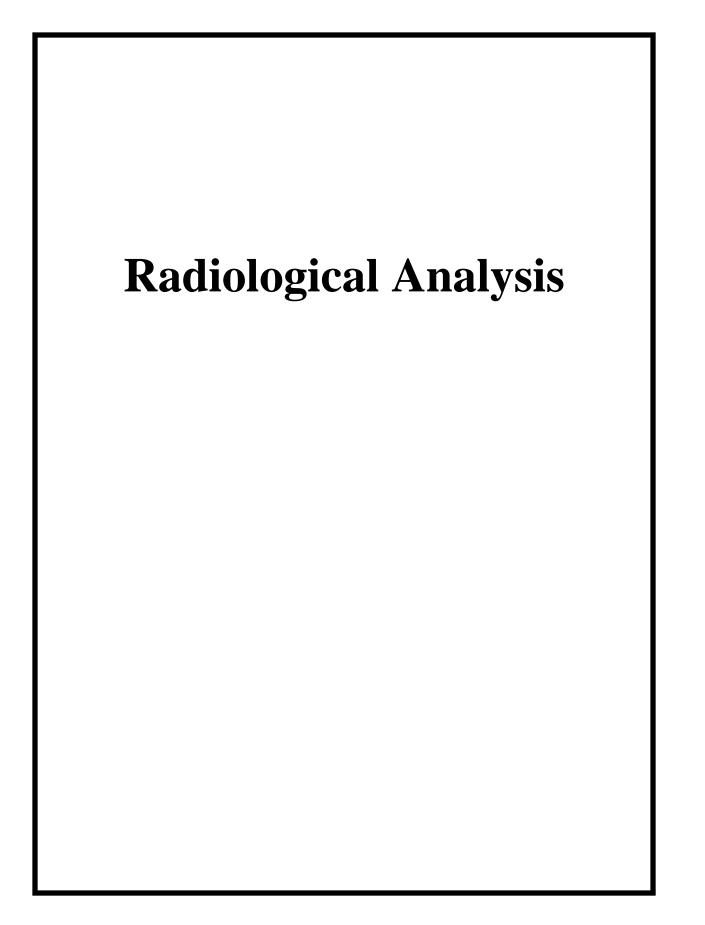
\* Indicates that a Quality Control parameter was not within specifications.

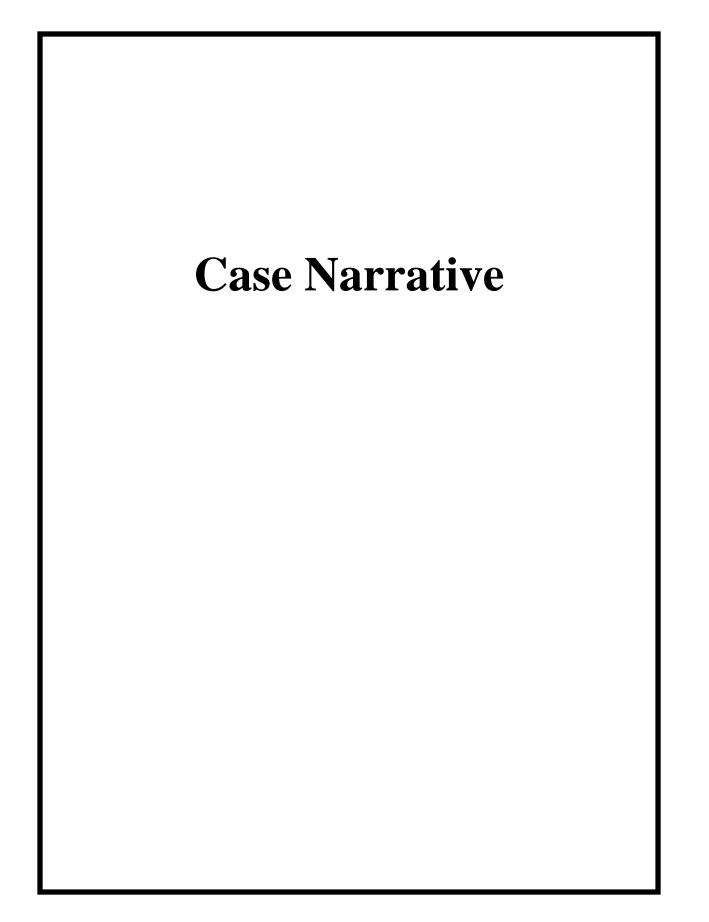
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification	
Alaska	17-018	
Arkansas	88-0651	
CLIA	42D0904046	
California	2940	
Colorado	SC00012	
Connecticut	PH-0169	
DoD ELAP/ ISO17025 A2LA	2567.01	
Florida NELAP	E87156	
Foreign Soils Permit	P330-15-00283, P330-15-00253	
Georgia	SC00012	
Georgia SDWA	967	
Hawaii	SC00012	
Idaho	SC00012	
Illinois NELAP	200029	
Indiana	C-SC-01	
Kansas NELAP	E-10332	
Kentucky SDWA	90129	
Kentucky Wastewater	90129	
Louisiana Drinking Water	LA024	
Louisiana NELAP	03046 (AI33904)	
Maine	2019020	
Maryland	270	
Massachusetts	M–SC012	
Michigan	9976	
Mississippi	SC00012	
Nebraska	NE-OS-26-13	
Nevada	SC000122019–3	
New Hampshire NELAP	2054	
New Jersey NELAP	SC002	
New Mexico	SC00012	
New York NELAP	11501	
North Carolina	233	
North Carolina SDWA	45709	
North Dakota	R-158	
Oklahoma	9904	
Pennsylvania NELAP	68-00485	
Puerto Rico	SC0012	
S. Carolina Radiochem	10120002	
South Carolina Chemistry	10120002	
Tennessee	TN 02934	
Texas NELAP	T104704235–19–15	
Utah NELAP	SC000122019–28	
Vermont	VT87156	
Virginia NELAP	460202	
Washington	C780	
vv asiniigt011	C/00	

## List of current GEL Certifications as of 17 July 2019





#### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 453-003169 Work Order #: 482537

**Product:** Alphaspec U232, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1890121

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1890110

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
482537001	Mini Cell A. L. floor sample
1204316294	Method Blank (MB)
1204316295	482537001(Mini Cell A. L. floor sample) Sample Duplicate (DUP)
1204316296	482537001(Mini Cell A. L. floor sample) Matrix Spike (MS)
1204316297	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### Quality Control (QC) Information

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204316294 (MB)	Uranium-232	Result 0.000000332 < MDA 0.00000151 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the matrix of the samples. The samples were counted the maximum count time in order to achieve the lowest possible MDAs.

Sample	Analyte	Value
1204316295 (Mini Cell A. L. floor sampleDUP)	Uranium-232	Result -0.000000985 < MDA 0.00000214 > RDL 0.000001 uCi/g

**Product:** Alphaspec Pu242, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1890821

**<u>Preparation Method:</u>** Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1890110

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
482537001	Mini Cell A. L. floor sample
1204317987	Method Blank (MB)
1204317988	482537001(Mini Cell A. L. floor sample) Sample Duplicate (DUP)
1204317989	482537001(Mini Cell A. L. floor sample) Matrix Spike (MS)
1204317990	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

## Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

## Quality Control (QC) Information

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204317987 (MB)	Plutonium-238	Result 0.000000444 < MDA 0.00000241 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result -0.0000000555 < MDA 0.00000195 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.000000299 < MDA 0.00000224 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the matrix of the samples. The samples were counted the maximum count time in order to achieve the lowest possible MDAs.

Sample Analyte Value
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WD:2020:0753 - Attachment B		
1204317988 (Mini Cell A. L. floor sampleDUP)	Plutonium-242	Result 0.000000484 < MDA 0.00000129 > RDL 0.000001 uCi/g
		Result 0.000000945 < MDA 0.00000178 > RDL 0.000001 uCi/g

<u>Product:</u> Alphaspec Am241,Cm243/244 Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, Am-05-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1895766

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1890110

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
482537001	Mini Cell A. L. floor sample
1204329839	Method Blank (MB)
1204329840	482537001(Mini Cell A. L. floor sample) Sample Duplicate (DUP)
1204329841	482537001(Mini Cell A. L. floor sample) Matrix Spike (MS)
1204329842	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

## Quality Control (QC) Information

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204329839 (MB)	Curium-243/244	Result 0.000000253 < MDA 0.0000027 > RDL 0.000001 uCi/g

Samples (see below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the matrix of the samples.

Sample Analyte Value
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453

WD:2020:0753 - Attachment B	

1204329840 (Mini Cell A. L. floor sampleDUP)	Curium-243/244	Result -0.000000152 < MDA 0.00000303 > RDL 0.000001 uCi/g
482537001 (Mini Cell A. L. floor sample)	Curium-243/244	Result -0.000000571 < MDA 0.00000392 > RDL 0.000001 uCi/g

#### **Technical Information**

#### Sample Re-prep/Re-analysis

Samples were reprepped due to low carrier/tracer yield. The re-analysis is being reported.

#### **Preparation Method:** Client Requested Procedure **Preparation Procedure:** GL-RAD-A-015 REV# 18 **Preparation Batch:** 1890110

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
482537001	Mini Cell A. L. floor sample

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Cs137 Only, solid High Rad Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R Analytical Procedure: GL-RAD-A-013 REV# 27 Analytical Batch: 1889961

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
482537001	Mini Cell A. L. floor sample
1204315867	Method Blank (MB)
1204315868	482537001(Mini Cell A. L. floor sample) Sample Duplicate (DUP)
1204315869	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where

WD:2020:0753 - Attachment B applicable, with the following exceptions.

### **Quality Control (QC) Information**

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204315867 (MB)	Cesium-137	Result -0.0000115 < MDA 0.0000529 > RDL 0.00001 uCi/g

Product: GFPC, Sr90, solid High Rad <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1890118

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1890110

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
482537001	Mini Cell A. L. floor sample
1204316285	Method Blank (MB)
1204316286	482537001(Mini Cell A. L. floor sample) Sample Duplicate (DUP)
1204316287	482537001(Mini Cell A. L. floor sample) Matrix Spike (MS)
1204316288	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **GEL LABORATORIES LLC**

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

## Qualifier Definition Report for

## WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 453-003169 GEL Work Order: 482537

## The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

## **Review/Validation**

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

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

Signature: 1 9~1

Date: 17 JUL 2019

Name: Theresa Austin

Title: Group Leader

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## MRR – Manipulator Repair Room

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a member of The GEL Group INC



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

gel.com

March 20, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 472050 SDG: 422-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 22, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

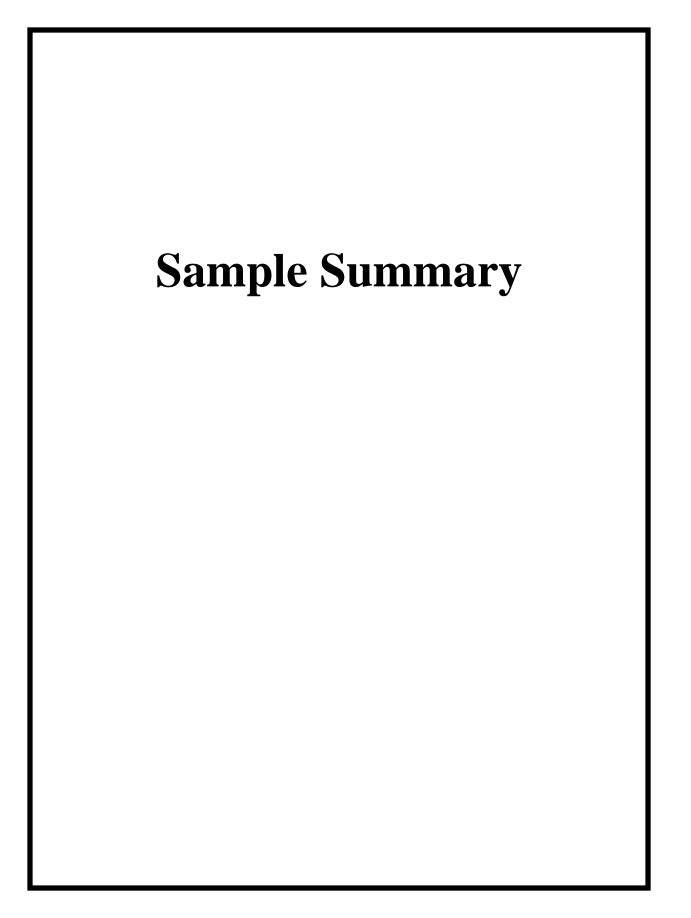
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

March 20, 2019

Release Number

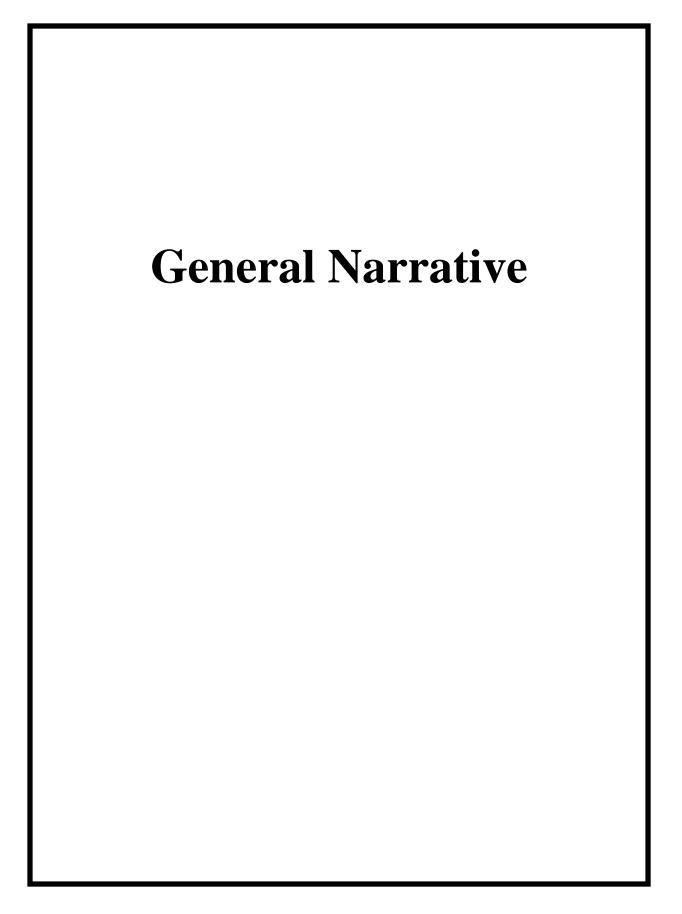
Purchase Order Number CH-003169

422

**Description** 

<u>Charge #</u> WV01.C2.06.01.04.10.02

MRR Floor



## Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 422-003169 Work Order: 472050

March 20, 2019

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

### Release Number

422

### Charge Number

WV01.C2.06.01.04.10.02

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on February 22, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

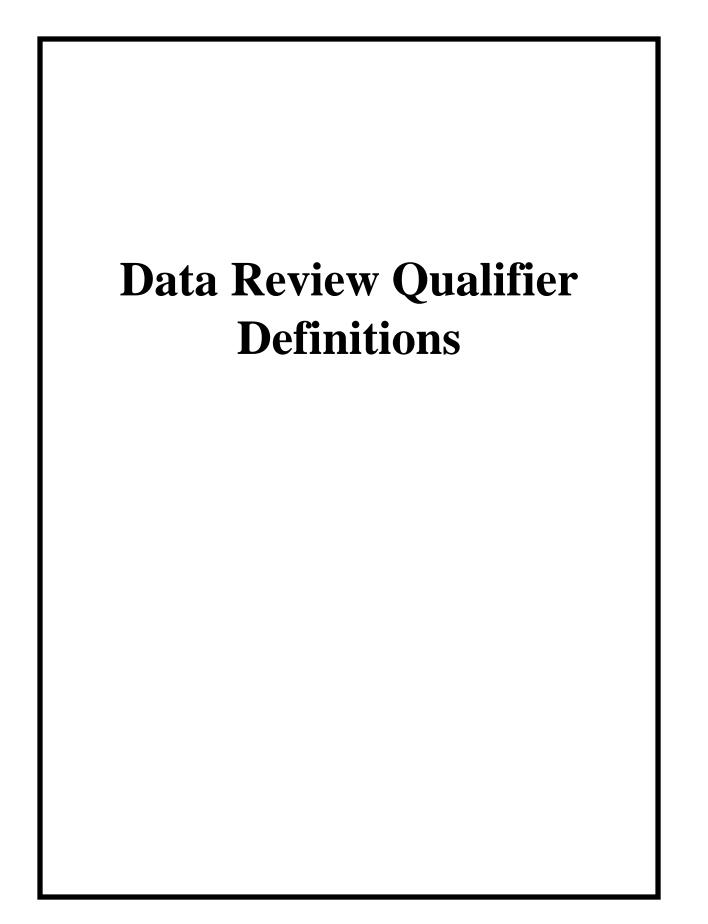
<u>Laboratory ID</u>	<u>Client ID</u>
472050001	MRR Floor

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Kenzom

Kerry OBarr for Katherine Cates Project Manager



#### Data Review Qualifier Definitions

Qualifier Explanation

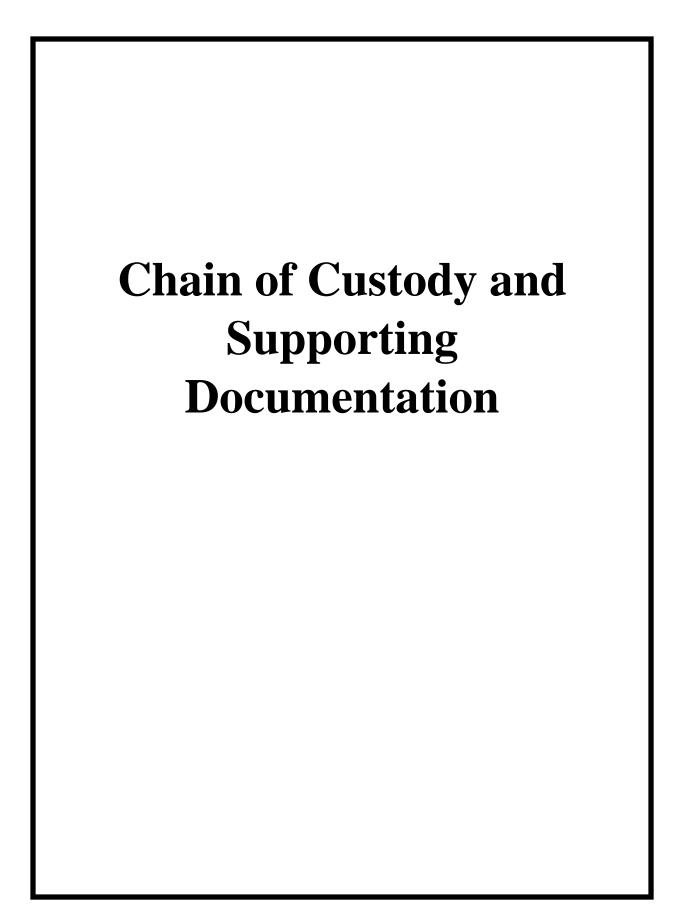
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- ${\tt C}$  ~ Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

422

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



Attachment B - Page 227

<ul> <li>4. Electronic Disk? Yes [] No [</li> <li>7. Report Format Level: 1[ x ]</li> <li>9. Priority Code: Routine [ x ]</li> <li>9. Priority Code: Routine [ x ]</li> <li>11. Report Data To: W. Connors</li> <li>11. Report Data To: W. Connors</li> <li>** The five smears are to be composite sample and analyzed for composite sample and analyzed for composite sample and analyzed for 224 Am, <sup>127</sup>Cs. <sup>232</sup>U, <sup>233</sup>U, <sup>234</sup>U, <sup>234</sup>U</li></ul>	iculate Other Smear Glass Poly Glass Poly 16. 20. Sample Receipt: 20. Sample Receipt: 7 Temperature °C Cooler Seals Intact? Yes [ ] No [ ]
CUSTODY / REQUEST-FOR-ANALYSIS (Page 1 of 2) (Page 1 of 2) 2M HILL BWXT, West Valley, LLC 10282 Rock Springs Road West Valley, NY 14171-9799 DH Cl_sO4 e [b_cO1 DH Cl_sO4 e [b_cO2 DH Cl_sO4 e [b_cO2 DH Cl_sO	Sludge Other : Pipe Section Filter Part ple Bottle Type (Circle One):
CHAIN-OF- CHAIN-OF- CH 422. 422. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Circle one ): Solid Liq Lircle one): Debris Cou Bottle Size: (000 m ( Mac 201 Nac 201
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Released by:     Id.     14.       Tare Wt (g)     Id.7.     Phase (19.       Tare Wt (g)     IoS     Type (0.       Net Wt (g)     Id.7.     Phase (19.       Net Wt (g)     Id.7.     Sample (17.       17. Chain-of-Custody Reviewed by:     19.     Sample (17.       Released by:     Im. With end (19.     7.       Released by:     Im. With end (19.     13.       WV-2865, Rev. 4 (SOP 300-08)     WV-2865, Rev. 4 (SOP 300-08)

Page 9 of 29 SDG: 422-003169

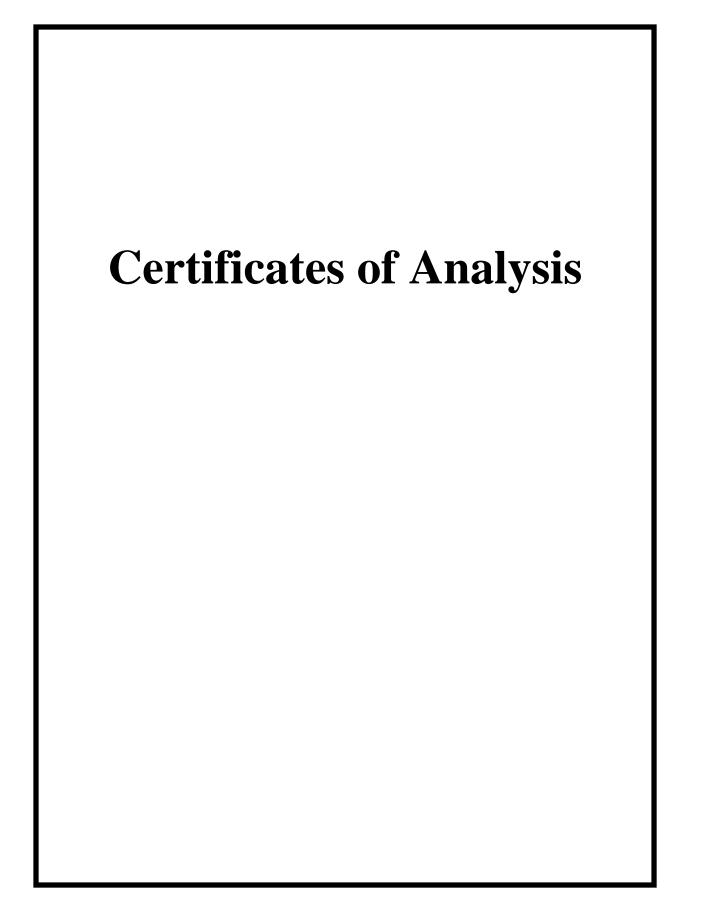
CH-003169

422

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	<b>CEE</b> Laboratories LLC				~	
	ient: $\sqrt{1/1/2}$			1		VIPLE RECEIPT & REVIEW FORM
	ceived By: RSO			-		COC/Work Order: 472051 472050 eived: 2122/19
	Carrier and Tracking Number		******		<u>ite Rec</u>	Circle Applicable: Circle Applic
Sus	spected Hazard Information	Yes	°N N	*1f	Net Co	nts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)5	shipped as a DOT Hazardous?	~	F	Ha: If L	zard Cla JN2910	ss Shipped: UN#: 2910 Is the Radioactive Shipment Survey Compliant? Yes_No_
B)   rece	Did the client designate the samples are to be eived as radioactive?	~	Ł	co	C notat	on or radioactive stickers on containers equal client designation.
	Did the RSO classify the samples as oactive?	~	ł	Ma Cla	ximum issified	Net Counts Observed* (Observed Counts - Area Background Counts): 1.5 CPM / uR/Hr s: Rad 1 Rad 2 Rad 3
D)   haz	Did the client designate samples are ardous?	ļ.	C	家都設	R. C. Stand	on or hazard labels on containers equal client designation.
E) [	Did the RSO identify possible hazards?		l	Per		yes, select Hazards below. Iammable Foreign Soil RCRA Asbestos Beryllium Other:
	Sample Receipt Criteria	Yes	YZ	°2	Τ	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	L				applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	2				ation Method: Wet Ice Ice Packs Dry ice None Other:
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*		レ	ł	*all ter	nperatures are recorded in Celsius TEMP: 17-C
4	Daily check performed and passed on IR temperature gun?	レ			Second	rature Device Serial #:
5	Sample containers intact and sealed?	2		_		pplicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		L	+	,	ID's and Containers Affected:
7	Do any samples require Volatile Analysis?			レ	lf Yes, Do liq Are liq	are Encores or Soil Kits present for solids? YesNoNA(If yes, take to VOA Freezer) itd VOA vials contain acid preservation? YesNoNA(If unknown, select No) itd VOA vials free of headspace? YesNoNA ID's and containers affected:
8	Samples received within holding time?	J			ID's an	I tests affected:
9	Sample ID's on COC match ID's on bottles?	L			ID's an	l containers affected:
10	Date & time on COC match date & time on bottles?	ν	-			Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	2			Circle /	Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided? COC form is properly signed in			~	Circle /	Applicable: Not relinquished Other (describe)
	relinquished/received sections? ments (Use Continuation Form if needed):	1				
	FBoth arr 251	uС	ā /	3		
	PM (or PM	A) re	view	: Iníti	ials	AM Date 2 2 2 1 9 Page of ] GL CHI SP 001 Pov 6
						GL-CHL-SR-001 Rev 6 Attachment B - Page 229
0	£ 20 CDC: 422 0021 CO					

CH-003169



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company :	CH2M HIL LLC.	L BWXT W	est Valley									
Address :		s Springs Ro	ad									
	West Valle	y, New York	14171-9799					Repo	ort Date:	March 20,	2019	
Contact:	Mr. Willian	n Connors										
Project:	CH-003169	Haz Waste										
Client Sample	D: MRR	Floor				Pı	roject:	WVNS	502501			
Sample ID:	47205	0001					lient ID:	WVNS				
Matrix:	Filter	N. 10										
Collect Date: Receive Date:		AR-18										
Collector:	22-FE Client											
Parameter	Oualifie		Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Time	Batch	Mto
High Rad Testing	<u> </u>		<u> </u>									
Alphaspec Pu 238,	239, 240, 242	HIGH RAD	"As Receive	d''								
Plutonium-238	Hh	0.0222	+/-0.000874	8.70E-05	+/-0.00378	2.00E-06	uCi/sample		AXM6	03/09/19 1045	1852253	3 1
Plutonium-239/240	Hh	0.036	+/-0.00111	7.95E-05			uCi/sample					
Plutonium-242	Hh	0.000235	+/-9.23E-05	4.91E-05	+/-0.0001	0.0002	uCi/sample					
Alphaspec U232, 2	233. 234. 235. 2	238 HIGH R	AD "As Rece	ived"			-					
Uranium-232	Hh		+/-1.15E-05	1.81E-06	+/-3.33E-05	2.00E-06	uCi/sample		AXM6	03/09/19 1013	1852254	4 2
Uranium-233/234	Hh		+/-1.41E-05	1.57E-06	+/-4.08E-05		-			00,00,10 1010	100220	
Uranium-235/236	Hh		+/-4.62E-06	9.22E-07	+/-6.17E-06		-					
Uranium-238	Hh		+/-6.20E-06	1.16E-06	+/-9.66E-06							
GFPC, Sr90, filter	HIGH RAD "A						Ĩ					
Strontium-90	Hh		+/-0.000519	0.000579	+/-0.000784	2.00E-06	uCi/sample		JXB7	03/11/19 1337	1856050	53
Gammaspec, Gam												
Americium-241	Hh	0.0604	+/-0.0011	0.000859	+/-0.00824		uCi/sample		JXB7	02/26/19 0749	185224	1 4
Cesium-137	Hh	0.877	+/-0.00251	0.000379	+/-0.0746	2 00E-07	-		571107	02/20/19 07 19	105221	
Cobalt-60	Hh	0.0057	+/-0.000265	6.81E-05	+/-0.000574	2.002 07	uCi/sample					
Europium-154	Hh	0.00137	+/-0.00032	0.000194	+/-0.000342		uCi/sample					
Laboratory Compo	osite- Filters R.	AD III "As R	eceived"				I					
The following Prep	Methods were	e performed	l									
Method D	Description				Analyst	Date	Tim	e Pr	ep Batch			
Filter Prep F	ilter Prep				JXB7	02/28/19	100	7 18	52242			
The following Analy	tical Methods	were perfo	rmed									
Method D	escription											
1 D	OE EML HASL	-300, Pu-11-F	RC Modified									
2 D	OE EML HASL	-300, U-02-R	C Modified									
3 E	PA 905.0 Modif	ied/DOE RP5	01 Rev. 1 Mod	ified								
4 D	OE HASL 300,	4.5.2.3/Ga-01	-R									
	L-RAD-A-026											
Surrogate/Tracer R	Recovery	Test					В	atch ID	Recover	y% Accepta	ble Lim	its
Plutonium-236 Tr	-	Alphaspe	c Pu 238, 239	), 240, 242 H	HIGH RAD "As Recei	ved"		852253	76.		-125%)	
Uranium-232 Tracer Alphaspec U232, 233, 234, 235, 238 HIGH RAD "As Received"						ived"	1	852254	576	* (15%-	-125%)	
Uranium-235/236					38 HIGH RAD "As Re		1	852254	91.	4 (15%-	-125%)	
Strontium Carrier									,			
Subhuan Carrer		0110,51	<i>70</i> , mai me				1	050050	12.	, (2370-	125701	

Batch ID Recovery% Acceptable Limits

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# **Certificate of Analysis**

Parameter	<b>Oualifier</b> Result Uncertainty	DL TPU	RL Units	PF DF Analyst	Date Time Batch Mtd
Client Sam Sample ID:			Project: Client ID:	WVNS02501 WVNS025	
Project:	CH-003169 Haz Waste				
Contact:	Mr. William Connors				
	West Valley, New York 14171-9799			Report Date:	March 20, 2019
Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road				

Surrogate/Tracer Recovery Test

### Notes:

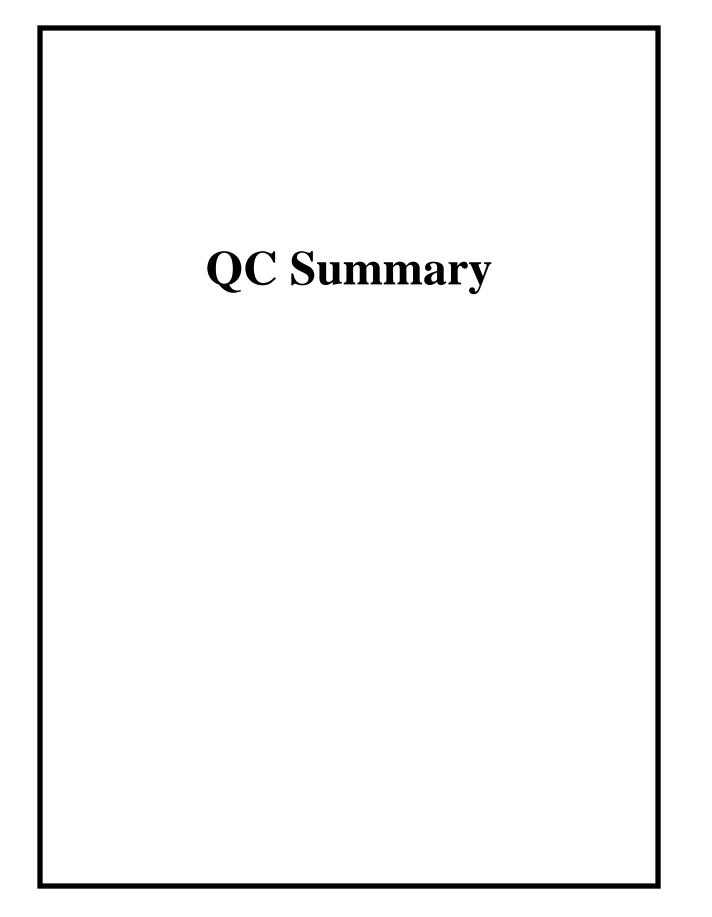
422

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration



# **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: March 20, 2019

Page 1 of 4

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 472050

**Contact:** 

Parmname	NO	M Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1852244											
QC1204226460 LC Cobalt-60	S 0.00545			0.00567	uCi/sample		104	(75%-125%)	JXB7	02/26/1	9 15:56
Americium-241	0.0304			0.0314	uCi/sample		104	(75%-125%)			
Cesium-137	0.00961			0.0101	uCi/sample		105	(75%-125%)			
Europium-154			U	2.07E-05	uCi/sample						
QC1204226461 LC Cobalt-60	SD 0.00545			0.00534	uCi/sample	5.98	97.9	(0%-20%)		02/26/1	9 17:58
Americium-241	0.0304			0.0313	uCi/sample	0.447	103	(0%-20%)			
Cesium-137	0.00961			0.00923	uCi/sample	8.79	96	(0%-20%)			
Europium-154			U	-4.05E-05	uCi/sample	0					
QC1204226459 ME Cobalt-60	3		U	2.31E-06	uCi/sample					02/26/1	9 15:56
Americium-241			U	1.50E-05	uCi/sample						
Cesium-137			U	5.75E-08	uCi/sample						
Europium-154			U	7.61E-06	uCi/sample						

# **GEL LABORATORIES LLC**

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# **QC Summary**

			$\underline{\mathbf{v}}\underline{\mathbf{v}}$	Summa	ry						
Workorder: 47	2050									Page 2	2 of 4
Parmname		NOM	Sample Qual	QC	Units	RPD%	REC%	Range A	Anlst	Date T	ime
High Rad Testing Batch 1852											
QC1204226478 Plutonium-238	LCS		U	4.68E-06	uCi/sample				AXM6	03/09/19	10:45
Plutonium-239/240		0.0002		0.000222	uCi/sample		111	(75%-125%)			
Plutonium-242			U	2.35E-06	uCi/sample			(75%-125%)			
QC1204226479 Plutonium-238	LCSD		U	3.41E-06	uCi/sample	0				03/09/19	10:45
Plutonium-239/240		0.0002		0.000222	uCi/sample	0.304	111	(0%-20%)			
Plutonium-242				8.26E-06	uCi/sample	47.2					
QC1204226477 Plutonium-238	MB		U	2.57E-06	uCi/sample					03/09/19	10:45
Plutonium-239/240			U	3.04E-06	uCi/sample						
Plutonium-242			U	2.36E-07	uCi/sample						
Batch 1852											
QC1204226484 Uranium-232	LCS		U	-9.32E-08	uCi/sample			(75%-125%)	AXM6	03/09/19	10:13
Uranium-233/234				4.71E-05	uCi/sample						
Uranium-235/236				3.59E-06	uCi/sample						
Uranium-238		5.45E-05		5.28E-05	uCi/sample		96.9	(75%-125%)			
QC1204226485 Uranium-232	LCSD		U	1.38E-07	uCi/sample	0		(0%-20%)		03/09/19	10:13

## **GEL LABORATORIES LLC**

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## **QC Summary**

			-	$\overline{\mathbf{x}}$	Juilling	<u>, , , , , , , , , , , , , , , , , , , </u>						
Workorder: 47	/2050										Pag	e 3 of 4
Parmname		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1852	254											
Uranium-233/234					5.84E-05	uCi/sample	21.4			AXM6	03/09/1	19 10:13
Uranium-235/236					3.52E-06	uCi/sample	1.89					
Uranium-238		5.45E-05			5.71E-05	uCi/sample	7.8	105	(0%-20%)			
QC1204226483 Uranium-232	MB			U	-2.76E-07	uCi/sample					03/09/1	19 10:13
Uranium-233/234				U	-3.22E-07	uCi/sample						
Uranium-235/236				U	9.47E-08	uCi/sample						
Uranium-238				U	1.35E-07	uCi/sample						
Batch 1856	i056 —											
QC1204234662 Strontium-90	LCS	0.0231			0.0247	uCi/sample		107	(75%-125%)	JXB7	03/11/1	19 13:37
QC1204234663 Strontium-90	LCSD	0.0231			0.0231	uCi/sample	6.55	100	(0%-20%)		03/11/1	19 13:37
QC1204234661 Strontium-90	MB			U	0.000358	3 uCi/sample					03/12/1	19 07:28

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- Result is less than value reported <
- Result is greater than value reported >
- BD Results are either below the MDC or tracer recovery is low

FA Failed analysis.

Η Analytical holding time was exceeded

## **GEL LABORATORIES LLC**

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## **QC Summary**

Parmnan	ne	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
J	Value is estimated											
Κ	Analyte present. Reported valu	e may be biased	high. Actual	value is e	xpected to b	e lower.						
L	Analyte present. Reported valu	e may be biased	low. Actual v	alue is ex	pected to be	e higher.						
Μ	M if above MDC and less than	LLD										
Μ	REMP Result > MDC/CL and < RDL											
N/A	RPD or %Recovery limits do not apply.											
N1	See case narrative											
ND	Analyte concentration is not detected above the detection limit											
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier											
Q	One or more quality control cr	iteria have not be	en met. Refe	r to the ap	plicable nar	rative or D	DER.					
R	Sample results are rejected											
U	Analyte was analyzed for, but	not detected abov	ve the MDL,	MDA, MI	DC or LOD.							
UI	Gamma SpectroscopyUncert	ain identification										
UJ	Gamma SpectroscopyUncert	ain identification										
UL	Not considered detected. The a	ssociated numbe	r is the report	ted concer	ntration, wh	ch may be	e inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Data S	Summary packag	e, or Project N	Manager c	concerning t	his qualifie	er					
Y	Other specific qualifiers were	required to prope	rly define the	results. C	Consult case	narrative.						
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.											
h	Preparation or preservation hol	lding time was ex	ceeded									
^ The Re	cates that spike recovery limits elative Percent Difference (RPE es (5X) the contract required de	) obtained from	the sample du	iplicate (1	DUP) is eva	luated aga	inst the acce	ptance criter	ia when the	e sample is	s greater	

RL is used to evaluate the DUP result.

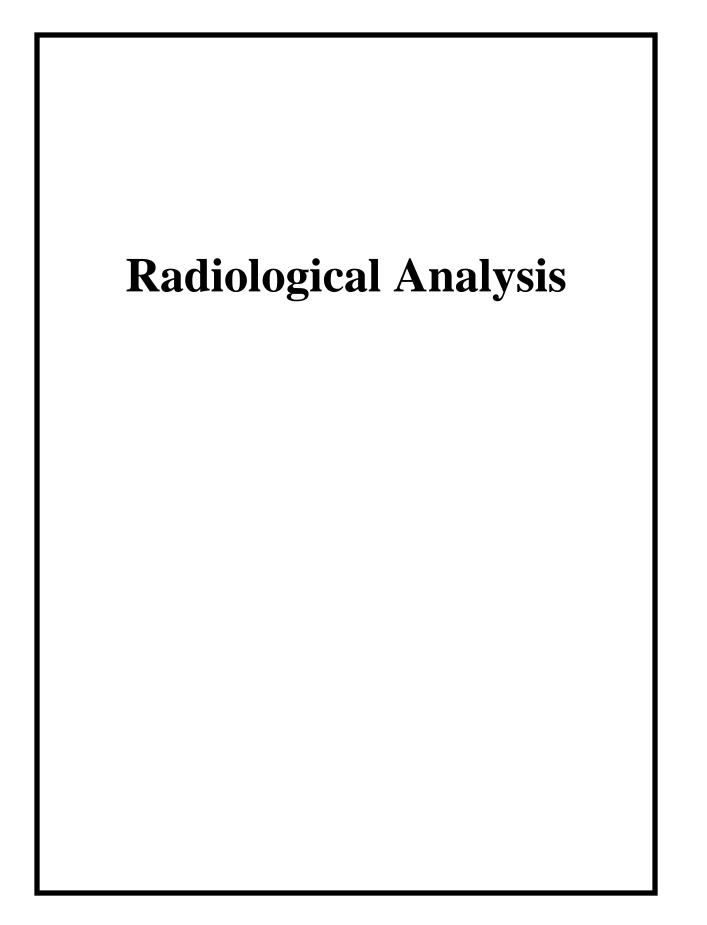
\* Indicates that a Quality Control parameter was not within specifications.

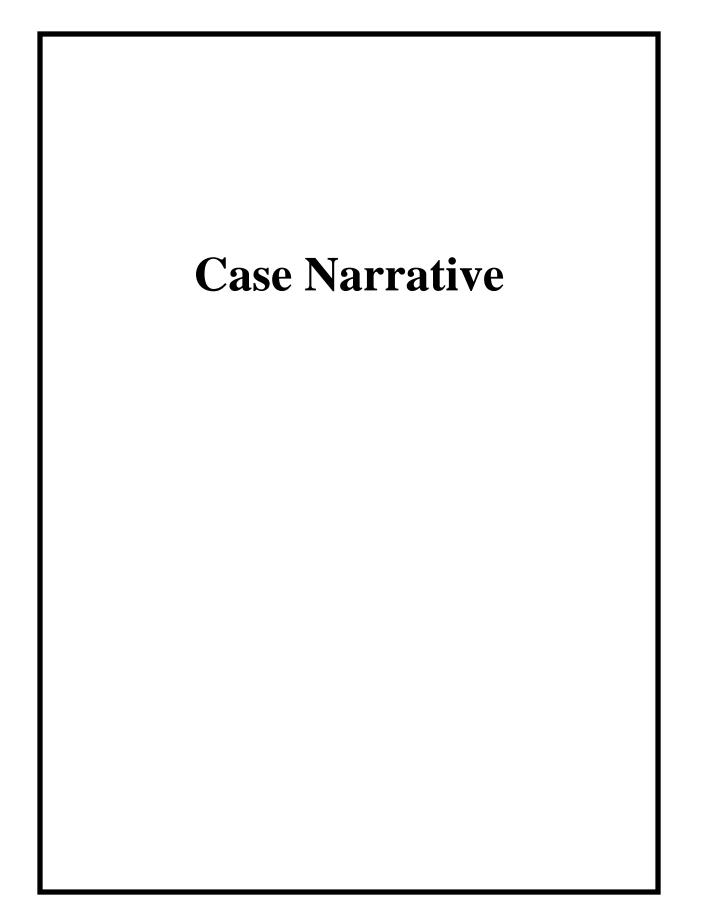
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification							
Alaska	17-018							
Arkansas	88-0651							
CLIA	42D0904046							
California	2940							
Colorado	SC00012							
Connecticut	PH-0169							
DoD ELAP/ ISO17025 A2LA	2567.01							
Florida NELAP	E87156							
Foreign Soils Permit	P330-15-00283, P330-15-00253							
Georgia	SC00012							
Georgia SDWA	967							
Hawaii	SC00012							
Idaho	SC00012							
Illinois NELAP	200029							
Indiana	C-SC-01							
Kansas NELAP	E-10332							
Kentucky SDWA	90129							
Kentucky Wastewater	90129							
Louisiana NELAP	03046 (AI33904)							
Louisiana SDWA	LA024							
Maryland	270							
Massachusetts	M-SC012							
Michigan	9976							
Mississippi	SC00012							
Nebraska	NE-OS-26-13							
Nevada	SC000122019-2							
New Hampshire NELAP	2054							
New Jersey NELAP	SC002							
New Mexico	SC00012							
New York NELAP	11501							
North Carolina	233							
North Carolina SDWA	45709							
North Dakota	R-158							
Oklahoma	9904							
Pennsylvania NELAP	68-00485							
Puerto Rico	SC00012							
S. Carolina Radiochem	10120002							
South Carolina Chemistry	10120001							
Tennessee	TN 02934							
Texas NELAP	T104704235-19-14							
Utah NELAP	SC000122018–27							
Vermont	VT87156							
Virginia NELAP	460202							
Washington	C780							

## List of current GEL Certifications as of 20 March 2019





## Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC (WVNS) SDG #: 422-003169 Work Order #: 472050

**Product:** Alphaspec Pu 238, 239, 240, 242 HIGH RAD Analytical Method: DOE EML HASL-300, Pu-11-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1852253

<u>Preparation Method:</u> Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
472050001	MRR Floor
1204226477	Method Blank (MB)
1204226478	Laboratory Control Sample (LCS)
1204226479	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

## **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

## **Preparation Information**

## Aliquot Reduced

Aliquots were reduced due to high activity based on Gamma data.

## **Quality Control (QC) Information**

## RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204226477 (MB)	Plutonium-238	Result 0.00000257 < MDA 0.00000557 > RDL 0.000002 uCi/sample
	Plutonium-239/240	Result 0.00000304 < MDA 0.00000733 > RDL 0.000002 uCi/sample

## **Technical Information**

## **Holding Time**

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
472050001 (MRR Floor)	Received 22-FEB-19, out of holding 18-SEP-18

#### **Miscellaneous Information**

#### **Manual Integration**

Manual integration of alpha spectroscopy spectra 472050001 (MRR Floor) was performed to fully separate counts in Regions of Interest which would have been biased.

Product: Alphaspec U232, 233, 234, 235, 238 HIGH RAD Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1852254

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
472050001	MRR Floor
1204226483	Method Blank (MB)
1204226484	Laboratory Control Sample (LCS)
1204226485	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### Tracer/Carrier Yield

The U-232 traced portion of sample (See Below) has a high tracer yield recovery due to the presence of U-232 activity in the sample biasing the tracer yield high. A U-236 traced portion of the sample was run in order to compensate for the biased high tracer yield.

Sample	Analyte	Value
472050001 (MRR Floor)	Uranium-232 Tracer	576* (15%-125%)

### **Technical Information**

#### **Holding Time**

Sample (See Below) was received and analyzed outside the hold time.

	Sample	Value
4720	50001 (MRR Floor)	Received 22-FEB-19, out of holding 18-SEP-18

<u>Preparation Method:</u> Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
472050001	MRR Floor

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Gamma, Cs137, Filter HIGH RAD <u>Analytical Method:</u> DOE HASL 300, 4.5.2.3/Ga-01-R <u>Analytical Procedure:</u> GL-RAD-A-013 REV# 27 <u>Analytical Batch:</u> 1852244

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
472050001	MRR Floor
1204226459	Method Blank (MB)
1204226460	Laboratory Control Sample (LCS)
1204226461	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and

procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

## Quality Control (QC) Information

## RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204226459 (MB)	Cesium-137	Result 0.0000000575 < MDA 0.0000234 > RDL 0.0000002 uCi/sample

## **Technical Information**

## Holding Time

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
472050001 (MRR Floor)	Received 22-FEB-19, out of holding 18-SEP-18

## Additional Identified Radionuclides

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	Client Sample
Cobalt-60	472050001	MRR Floor
Europium-154	472050001	MRR Floor

### Product: GFPC, Sr90, filter HIGH RAD Analytical Method: EPA 905.0 Modified/DOE RP501 Rev. 1 Modified Analytical Procedure: GL-RAD-A-004 REV# 21 Analytical Batch: 1856056

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
472050001	MRR Floor
1204234661	Method Blank (MB)
1204234662	Laboratory Control Sample (LCS)
1204234663	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

# WD:2020:0753 - Attachment B **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Aliquot Reduced

Aliquot was reduced due to high activity.

## Quality Control (QC) Information

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204234661 (MB)	Strontium-90	Result 0.000358 < MDA 0.000465 > RDL 0.000002 uCi/sample

### **Technical Information**

## **Holding Time**

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value		
472050001 (MRR Floor)	Received 22-FEB-19, out of holding 18-SEP-18		

### Recounts

Sample 1204234661 (MB) was recounted due to a suspected blank false positive. The recount is reported.

**Product: Laboratory Composite- Filters RAD III** Composite Preparation Method: GL-RAD-A-026 Composite Preparation Procedure: GL-RAD-A-026 REV# 17 Composite Preparation Batch: 1852092

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification				
472050001	MRR Floor				

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

## **<u>Certification Statement</u>**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **GEL LABORATORIES LLC**

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

## Qualifier Definition Report for

## WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 422-003169 GEL Work Order: 472050

## The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

## **Review/Validation**

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

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

Signature:	86-
------------	-----

Name: Spencer Collins Title: Analyst I

Date: 20 MAR 2019

# Prep Logbook

# WD:2020:0753 - Attachment B The Preparation of Special Matrices for the Determination of Radionuclides

Batch ID: Analyst: Method: Lab SOP: Instrument:	<b>1852242</b> Jon Burgess (JXE Filter Prep GL-RAD-A-026 R2-38110047			Due I Type	Dates for Lab: Sample Id	18-MAR-2019 Description	9 Hold: 13-	SEP-2017	Package: 20-MAR- Serial Number	2019 SDG: 22-M Spike Amount Spike Units
# Sample ID	Prep Date	<b>Min RDL</b> ()	Number of Filters	Container Wt (g)	Weight of total filter with container (g)	Weight of filter Diluted with container (g)	Not Saved Final Volume of filter diluted to in Liters (mL)		Weight of Filter Diluted (g)	
1 472050001	28-FEB-2019		1	0	12.6414	12.6414	100	12.6414	12.6414	
<b>2</b> 472051001	28-FEB-2019		1	0	3.1628	3.1628	100	3.1628	3.1628	
Reagent/Solven	t Lot ID	Description		Amount	Comments:					

Analytical Logbook version 1 11-04-2002

GEL Laboratories LLC

## OGC – Off-Gas Cell

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a member of The GEL Group INC



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

gel.com

June 13, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 480030 SDG: 443-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 23, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

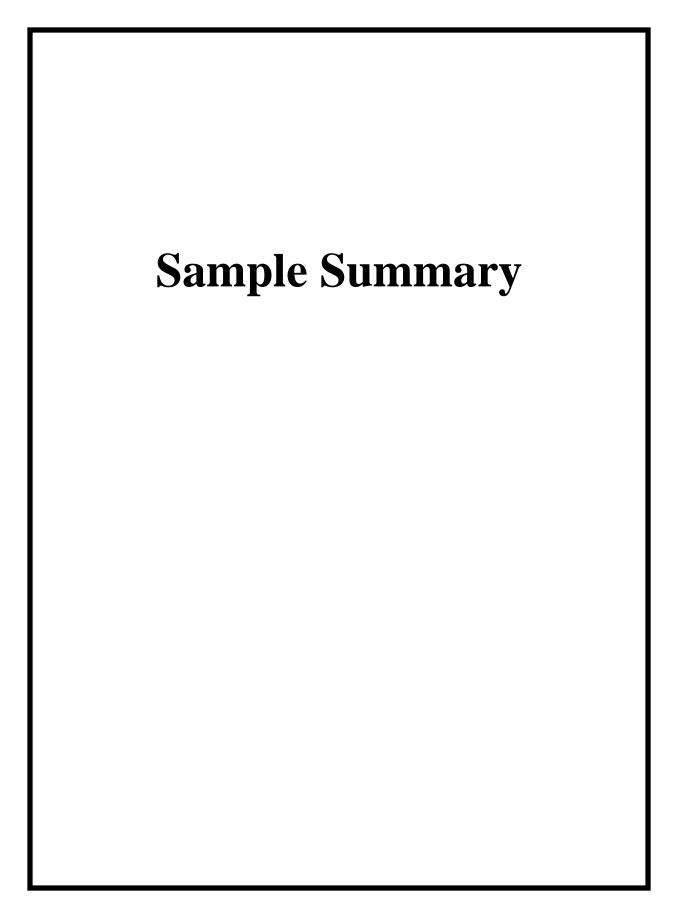
Sincerely,

Hattane Costos

Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





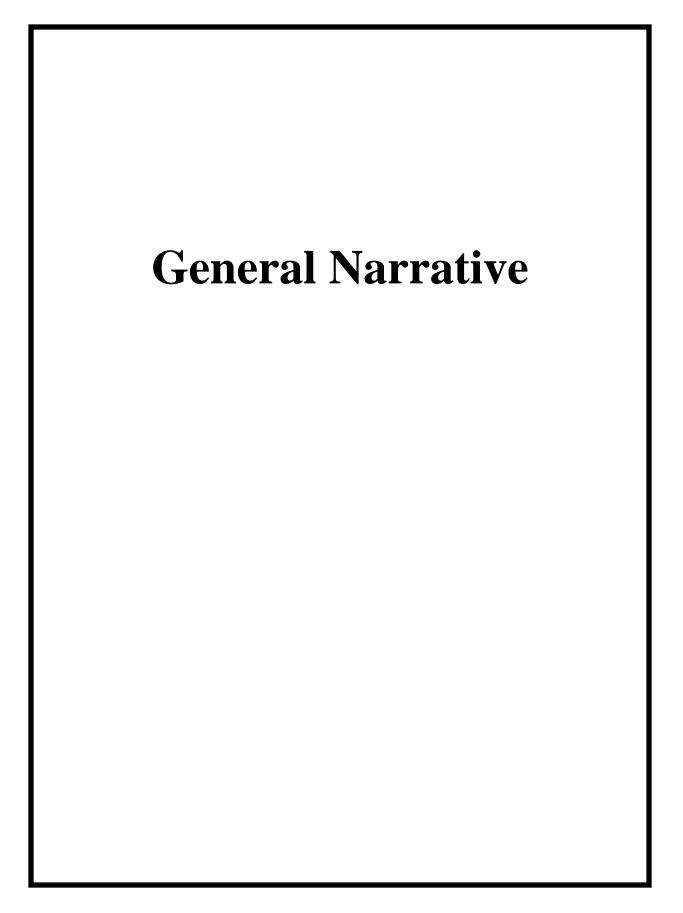
# **Sample Summary Sheet**

June 13, 2019

Release Number 443 Purchase Order Number

CH-003169

<u>Charge #</u> WV01.C2.01.04.10.02 Description OGC Floor Stone



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 443-003169 Work Order: 480030

June 13, 2019

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

Release Number

443

#### Charge Number

WV01.C2.01.04.10.02

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on May 23, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

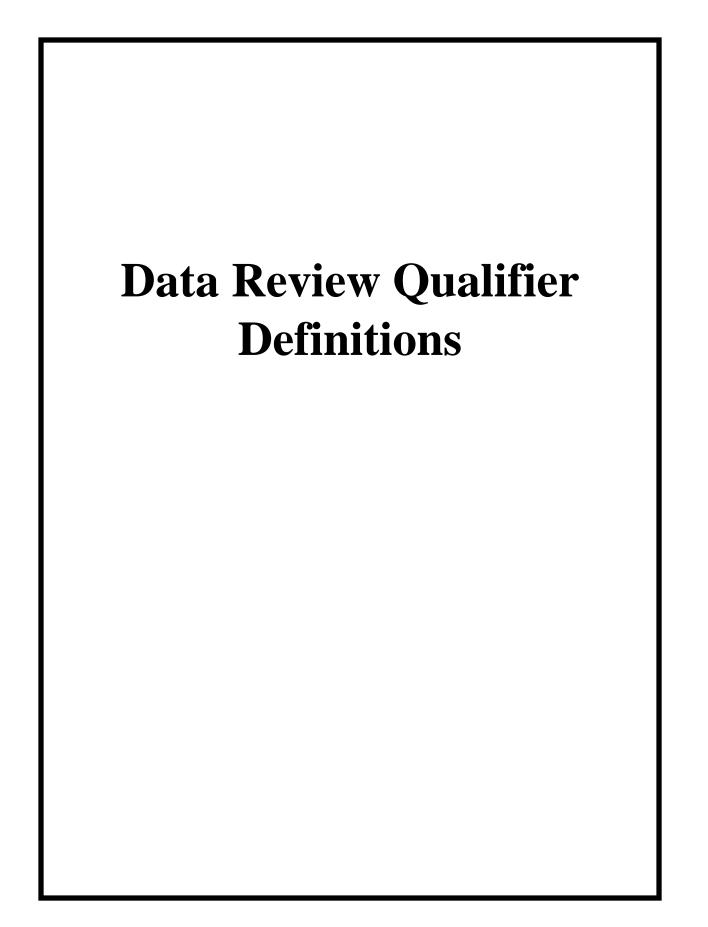
<u>Laboratory ID</u>	<u>Client ID</u>
480030001	OGC Floor Stone

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Hatthewe Costes

Katherine Cates Project Manager



443

#### Data Review Qualifier Definitions

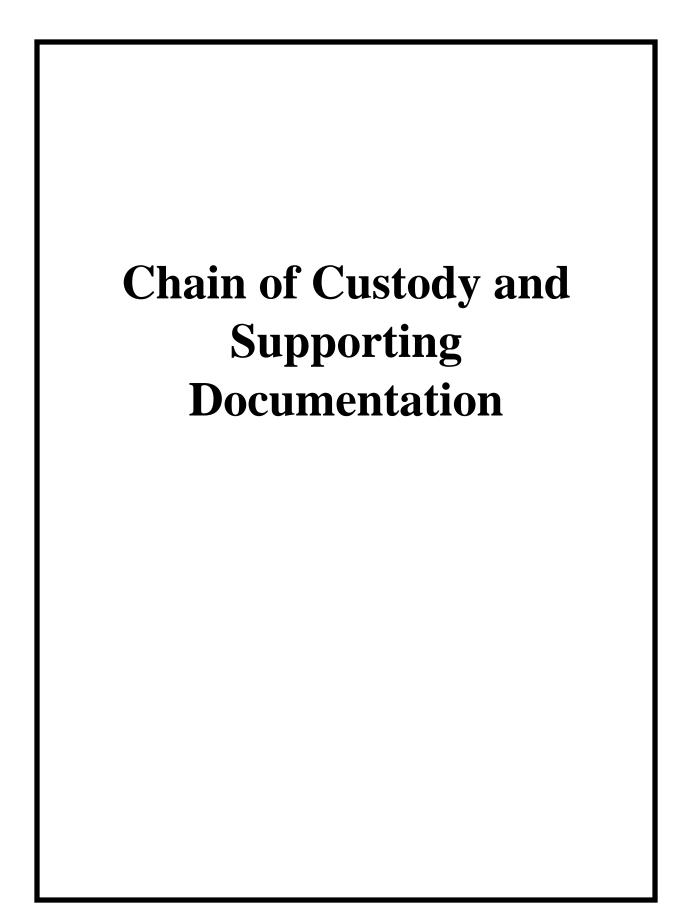
Qualifier Explanation

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



CHAIN-DF-CUSTORY IR COUEST-FOR-ANALYSIS       CICI20M HILL EWXT, West Yalley LLC       UDBER FOR ANALYSIS       OPEN-CUSTORY IR COUEST-FOR-ANALYSIS       OPEN-CUSTORY IR COUEST-FOR-ANALYSIS       OPEN-CUSTORY IR COUEST-FOR-ANALYSIS       OPEN-CUSTORY IR COUEST FOR ANALYSIS       OPEN-CUSTORY INCLUED       INCLUED       INCLUED       INCLUE	
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Liquid     Sludge     Other:     American     American <td>2. Charge #: wvb1, c2. 01, 04.10, 02</td>	2. Charge #: wvb1, c2. 01, 04.10, 02
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Identify       11.1       21.1       31.1         Identify       11.1       11.1       21.1       31.1         Identify       0       alpha isotop.       0       alpha isotop.         X       X       X       X       X       Comments         X       X       X       X       Comments       0         11.1       21.1       31.1       1       21.1       31.1         X       X       X       X       X       Connors       21.3       31.1         X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X       X	
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Mark     X     X     X     The five smears are to be composited by the lab to form a composite and analyzed to 2373, 234, 056, 057, 051, 239, 051, 239, 055, 054, 055, 054, 056, 054, 056, 056, 056, 056, 056, 056, 056, 056	-
X       X       X       The five smears are to be composited by the Jab to form a composite supple and Nysel for 233 U 235	
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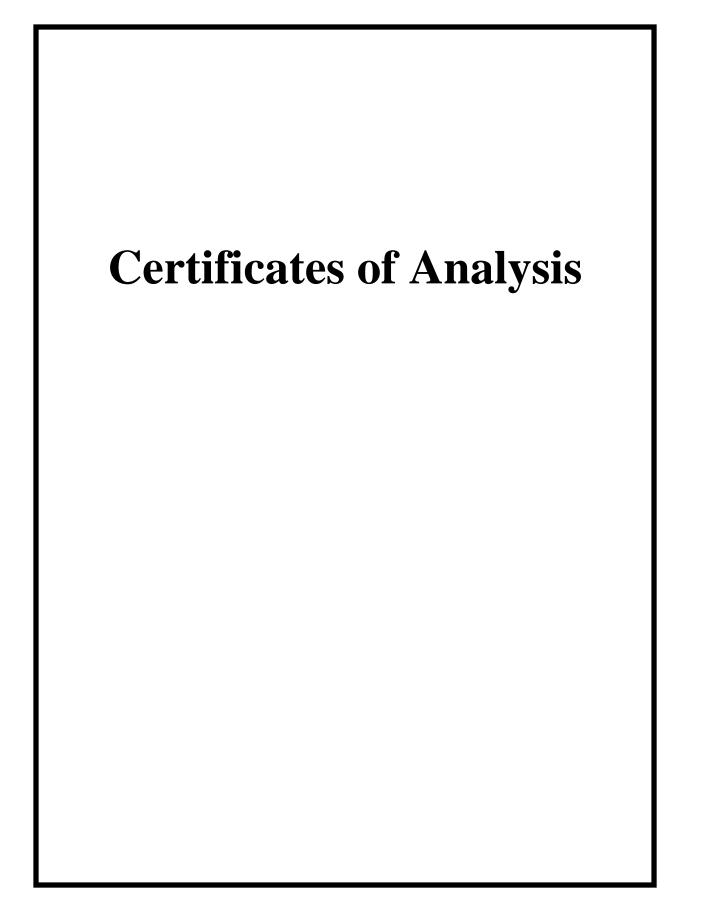
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CH-003169

Attachment B - Page 260

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CEER Laboratories LC				
			SAMPLE RECEIPT & REVIEW FORM	
Received By: Greg Austr			G/AR/COC/Work Order: 480030	
Received By: Cregteisn	<del></del>	Dat	te Received: 5/23/19 Circle Applicable:	
Carrier and Tracking Number			FedEx Express FedEx Ground UPS Field Services 810714709704	Courier Other
Suspected Hazard Information	, Yes		Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety	Group for further investigation.
A)Shipped as a DOT Hazardous?		IfU	ard Class Shipped: N2910, Is the Radioactive Shipment Survey Compliant? Yes_No	
B) Did the client designate the samples are to received as radioactive?	bc .	00	C notation or radioactive stickers on containers equal client designation.	
C) Did the RSO classify the samples as radioactive?		Max Clas	sinum Net Counts Observed * (Observed Counts - Area Background Counts): 0.4 ssified as: Rad 1 (Rad 2 (Rad 3) See be know	CPM / MR/Hr
D) Did the client designate samples are hazar	ious?		C notation or hazard labels on containers equal client designation.	
E) Did the RSO identify possible hazards?	<u> </u>	<b>PCE</b>	or E is yes, select Hazards below. 3's Flammable Foreign Soil RCRA Asbestos Beryllium Other:	
Sample Receipt Criteria		VN VN	Comments/Qualifiers (Required for Non-Conforming	liems)
1         Shipping containers received intact a sealed?			Circle Applicable: Seals broken Damaged container Leaking container Other (describ	¢)
2 Chain of custody documents include with shipment?			Cireb Applicable: Client contacted and provided COC COC created upon receipt	
3 Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*			Preservation Method: Wet Ice (ce Packs) Dry ice None Other. *all temperatures are recorded in Celsius	TEMP: 4°C
4 Daily check performed and passed o temperature gun?			Temperature Device Serial #: <u></u>	
5 Sample containers intact and sealed?	~		Circle Applicable: Seals broken Damaged container Leaking container Other (describ	c)
6 Samples requiring cliemical preserva at proper pH?	tion e	+	Sample ID's and Containers Affected; If Preservation added, Lot#:	
			If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to NA)	o VOA Freezer)
7 Do any samples require Volatile Analysis?	~	4	Do liquid VOA vials contain acid preservation? Yes No NA If unknown, s Are liquid VOA vials free of headspace? Yes No NA Sample LD's and containers affected:	clect No)
8 Samples received within holding tim	27		ID's and tests affected:	
9 Sample ID's on COC match ID's on bottles?			ID's and containers affected:	
10 Date & time on COC match date & t on bottles?	ime 🗸	348	Circle Applicable: No dates on containers No times on containers COC missing info	Other (describe)
11 Number of containers received match number indicated on COC?			Circle Applicable: No container count on COC Other (describe)	
12 Are sample containers identifiable as GEL provided?				· ·
13 COC form is properly signed in relinquished/received sections?	ノ		Circle Applicable: Not relinquished Other (describe)	
Comments (Use Continuation Form if needed Release 4		2	13	
Roleases 45	5 and	145	6=Radz's	
Releases 45 Crogters	fn 5/2	kelig	)	
	•			
PM (o	r PMA) revie	ew: Initia	alsDateS 2.3Pageof	
				GL-CHL-SR-001 Rev 6



## **GEL LABORATORIES LLC**

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

## **Certificate of Analysis**

Company : Address :	LLC.	LL BWXT West Valley									
	10282 Roc	k Springs Road									
	West Valle	y, New York 14171-9799					Repo	rt Date:	June 13,	2019	
Contact:	Mr. Willia	m Connors									
Project:	CH-003169	9 Haz Waste									
Client Sample Sample ID: Matrix: Collect Date: Receive Date: Collector:	48003 Misc 26-JU 23-M	JN-18 AY-19					WVNS WVNS				_
Parameter	Clien Qualifie		DL	TPU	RL	Units	PF D	F Analyst	Date Time	Batch	Mte
High Rad Testing	Quuinte	i itesute checitanity		110				L IIIIIIJ50	Dute Thire	Dutch	
Alphaspec Pu242,	Solid High Ro	ud "As Received"									
Plutonium-238	Hh	8.46E-05 +/-2.59E-05	1.92E-05	+/-2.99E-05	1.00E-06	uCi/g		JXB7	06/10/19 0908	1880188	1
Plutonium-239/240	Hh	0.000186 +/-3.64E-05	1.39E-05	+/-4.89E-05		uCi/g		UTLD /	00,10,19 0900	1000100	-
Plutonium-242	HUh	3.23E-06 +/-7.34E-06	1.26E-05	+/-7.36E-06		uCi/g					
Alphaspec U232, S											
Uranium-232	HUh	-9.52E-07 +/-3.22E-06	8.36E-06	+/-3.22E-06	1.00E-06	uCi/g		IXB7	06/07/19 0852	1880187	2
Uranium-233/234	HUh	1.66E-06 +/-3.53E-06	5.86E-06	+/-3.54E-06		uCi/g		571127	00/01/19 0002	1000107	-
Uranium-235/236	HUh	2.28E-06 +/-4.07E-06	6.60E-06	+/-4.08E-06		uCi/g					
Uranium-238	HUh	3.20E-07 +/-3.78E-06	7.97E-06	+/-3.78E-06		uCi/g					
GFPC, Sr90, solid	High Rad "As	Received"				U					
Strontium-90	Hh	0.000664 +/-4.04E-05	2.21E-05	+/-0.000131	1.00E-04	uCi/g		JXB7	06/06/19 1643	1880190	3
		High Rad "As Received"		.,							
Americium-241	г олиу, зони I Н	0.000421 +/-2.79E-05	2.03E-05	+/-5.19E-05		uCi/g		<b>A XM6</b>	06/06/19 0604	1880186	. 1
Cesium-137	Н	0.00947 +/-4.84E-05	6.03E-06	+/-0.000845	1.00E-05	uCi/g		111110	00/00/19 0004	1000100	т
The following Prep					11001 00						
	Description	e performed		Analyst	Date	Time	Pr	ep Batch			
Client Requested Pro D	Dissolution Soil	Prep GL-RAD-A-015		JXB7	05/30/19	1525	188	30185			
The following Analy	vtical Method	s were performed									
•	escription	s were performed									
1 D	OE EML HASI	L-300, Pu-11-RC Modified									
2 D	OE EML HASI	L-300, U-02-RC Modified									
3 E	PA 905.0 Modif	fied/DOE RP501 Rev. 1 Mod	ified								
	OE HASL 300,	4.5.2.3/Ga-01-R									
Surrogate/Tracer F	Recovery	Test				Ba	tch ID	Recover	y% Accepta	ble Limi	its
Plutonium-236 Tr	acer	Alphaspec Pu242, Soli	d High Rad "A	As Received"		18	80188	57	(15%-	125%)	
Uranium-232 Tra		Alphaspec U232, Solid	-				80187	96.		125%)	
Uranium-235/236		Alphaspec U232, Solid	-				80187	90.		125%)	
Strontium Carrier		GFPC, Sr90, solid Hig	0				80190	99.		125%)	
		511 C, 5170, 5014 Hig				10			. (2370		

Batch ID Recovery% Acceptable Limits

## GEL LABORATORIES LLC

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

## **Certificate of Analysis**

Company :	CH2M HILL BWXT West Valley					
Address :	LLC. 10282 Rock Springs Road					
	West Valley, New York 14171-9799				Report Date:	June 13, 2019
Contact:	Mr. William Connors					
Project:	CH-003169 Haz Waste					
Client Sample Sample ID:	ID: OGC Floor Stone 480030001			Project: Client ID:	WVNS02501 WVNS025	
Parameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.

Surrogate/Tracer Recovery Test

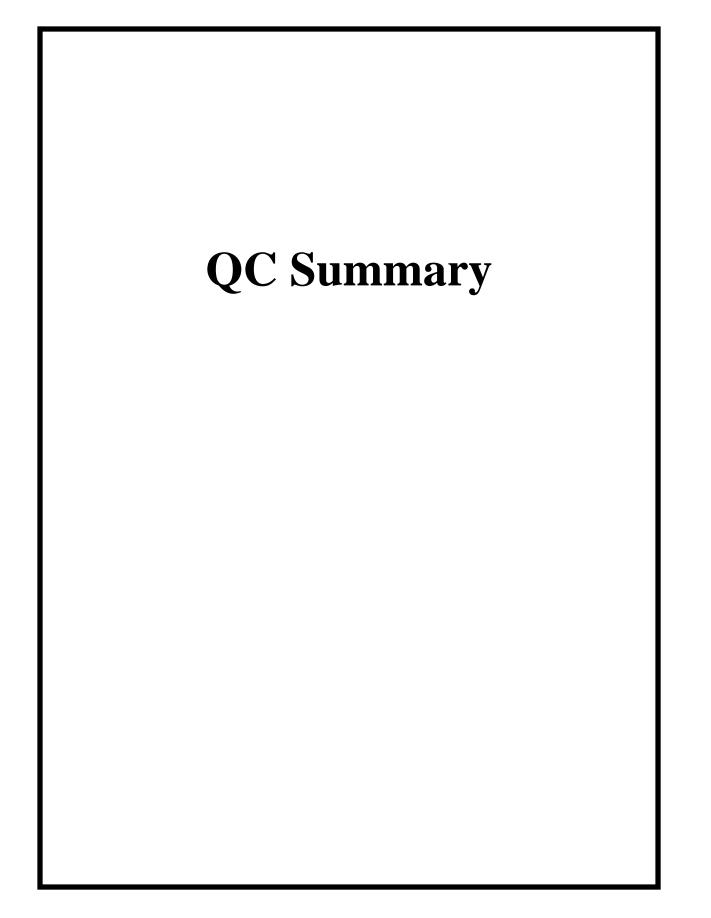
#### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit TPU: Total Propagated Uncertainty



## **GEL LABORATORIES LLC**

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## **QC Summary**

Report Date: June 13, 2019

Page 1 of 4

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

480030

Workorder:

**Contact:** 

Parmname NOM Sample Qual QC Units RPD% REC% Range Anlst Date Time **High Rad Testing** 1880186 Batch QC1204291755 480030001 DUP Н 0.000421 H 0.000384 Americium-241 uCi/g 9.18 (0%-20%) AXM6 06/06/19 08:21 Cesium-137 Η 0.00947 H 0.0098 uCi/g 3.47 (0% - 20%)QC1204291756 LCS 0.00181 99.9 06/06/19 08:13 Americium-241 0.0018 uCi/g (75% - 125%)0.000314 Cobalt-60 0.000303 96.5 uCi/g (75%-125%) 0.000569 0.000565 Cesium-137 uCi/g 99.4 (75% - 125%)QC1204291754 MB Americium-241 U 2.40E-06 uCi/g 06/06/19 08:10 Cesium-137 U -6.79E-08 uCi/g Batch 1880187 QC1204291758 480030001 DUP Uranium-232 HUh -9.52E-07 HU -7.15E-07 uCi/g N/A N/A JXB7 06/07/19 08:52 uCi/g Uranium-233/234 HUh 1.66E-06 HU 1.65E-07 N/A N/A Uranium-235/236 HUh 2.28E-06 HU 2.06E-06 N/A uCi/g N/A Uranium-238 HUh 3.20E-07 HU 2.94E-06 N/A uCi/g N/A QC1204291760 LCS Uranium-232 U -3.99E-06 uCi/g 06/07/19 08:52

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## **QC Summary**

				2		Jummai	<u>- y</u>						
Workorder:	480030											Page	2 of 4
Parmname		NON	м	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date T	Гіте
High Rad Testing	1880187												
Uranium-233/23	4					0.000384	uCi/g				JXB7	06/07/19	08:52
Uranium-235/23	6					2.63E-05	uCi/g						
Uranium-238		0.000425				0.000415	uCi/g		97.5	(75%-125%)			
QC120429175 Uranium-232	7 MB				U	7.18E-06	uCi/g					06/07/19	08:52
Uranium-233/23	4				U	2.68E-06	uCi/g						
Uranium-235/23	6				U	2.13E-06	uCi/g						
Uranium-238					U	2.68E-06	uCi/g						
QC120429175 Uranium-232	59 480030001		HUh	-9.52E-07	HU	3.82E-06	uCi/g					06/07/19	08:52
Uranium-233/23	4		HUh	1.66E-06	Н	0.000446	uCi/g						
Uranium-235/23	6		HUh	2.28E-06	Н	3.27E-05	uCi/g						
Uranium-238		0.000425	HUh	3.20E-07	Н	0.000436	uCi/g		102	(75%-125%)			
Batch 1	1880188												_
	52 480030001	DUP	Hh	8.46E-05	Н	7.45E-05	uCi/g	12.7		(0%-20%)	JXB7	06/10/19	09:08
Plutonium-239/2	:40		Hh	0.000186	Н	0.000199	uCi/g	6.72		(0%-20%)			
Plutonium-242			HUh	3.23E-06	Н	8.50E-06	uCi/g	38.9		(0% - 100%)			

## **GEL LABORATORIES LLC**

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## **QC Summary**

				<u>v</u>	Summa	<u>ry</u>						I
Workorder: 480030			_								Pag	e 3 of 4
Parmname	N	NOM	Sample	Qual	l QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1880188												
QC1204291764 LCS Plutonium-238					6.59E-06	uCi/g				JXB7	06/10/1	19 09:39
Plutonium-239/240	0.0003	13			0.000367	uCi/g		117	(75%-125%)	1		
Plutonium-242				U	6.12E-06	uCi/g						
QC1204291761 MB Plutonium-238				U	1.48E-06	uCi/g					06/12/1	19 10:49
Plutonium-239/240				U	1.40E-06	uCi/g						
Plutonium-242				U	-2.04E-06	uCi/g						
QC1204291763 480030001 Plutonium-238	MS	Hh	8.46E-05	Н	6.96E-05	uCi/g					06/12/3	19 10:49
Plutonium-239/240	0.0003	13 Hh	0.000186	Н	0.000563	uCi/g		121	(75%-125%)	l		
Plutonium-242		HUh	3.23E-06	HU	4.02E-06	uCi/g						
Batch 1880190												
QC1204291769 480030001 Strontium-90	DUP	Hh	0.000664	Н	0.000636	uCi/g	4.29		(0%-20%)	JXB7	06/06/1	19 16:43
QC1204291771 LCS Strontium-90	0.0036	54			0.00414	uCi/g		114	(75%-125%)	)	<b>06/06</b> /3	19 16:43
QC1204291768 MB Strontium-90				U	-1.07E-05	uCi/g					<b>06/06/</b> 1	19 16:43
QC1204291770 480030001 Strontium-90	MS 0.0037	72 Hh	0.000664	Н	0.00451	uCi/g		103	(75%-125%)	)	06/06/	19 16:43

## **GEL LABORATORIES LLC**

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## **QC Summary**

	•		-	X U D		<u></u>						
Workor	der: 480030										Pag	e 4 of 4
Parmnar	ne	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Notes:												
The Ou	alifiers in this repo	ort are defined as follows:										
**	Analyte is a Trac											
<	Result is less that	-										
>		than value reported										
BD	-	r below the MDC or tracer red	coverv is low									
FA	Failed analysis.		, <u>,</u>									
Н		ng time was exceeded										
J	Value is estimate	-										
К	Analyte present.	Reported value may be biase	d high. Actual	value is e	expected to	be lower.						
L	Analyte present.	Reported value may be biase	d low. Actual	value is ex	xpected to l	be higher.						
М	M if above MDC	and less than LLD			-	-						
М	REMP Result > I	MDC/CL and < RDL										
N/A	RPD or %Recove	ery limits do not apply.										
N1	See case narrativ	e										
ND	Analyte concentr	ration is not detected above th	e detection lin	nit								
NJ	Consult Case Nat	rrative, Data Summary packa	ge, or Project I	Manager	concerning	this qualifi	er					
Q	One or more qua	lity control criteria have not b	een met. Refe	r to the ap	oplicable na	urrative or I	DER.					
R	Sample results an	re rejected										
U	Analyte was anal	lyzed for, but not detected ab	ove the MDL,	MDA, M	DC or LOI	<b>)</b> .						
UI	Gamma Spectros	scopyUncertain identificatio	n									
UJ	Gamma Spectros	scopyUncertain identificatio	n									
UL	Not considered d	letected. The associated numb	er is the repor	ted conce	ntration, w	hich may b	e inaccurate	due to a low	bias.			
Х	Consult Case Nat	rrative, Data Summary packa	ge, or Project I	Manager	concerning	this qualifi	er					
Y	Other specific qu	alifiers were required to prop	erly define the	results. (	Consult cas	e narrative.						
^	RPD of sample a	nd duplicate evaluated using	+/-RL. Conce	ntrations	are <5X the	e RL. Qual	lifier Not Ap	plicable for	Radiochem	istry.		
h	Preparation or pr	reservation holding time was	exceeded									
^ The Re five time	elative Percent Di	ecovery limits do not apply w fference (RPD) obtained fron ct required detection limit (R DUP result.	n the sample du	uplicate (	DUP) is ev	aluated aga	ainst the acce	eptance criter	ia when th	e sample i	s greater	

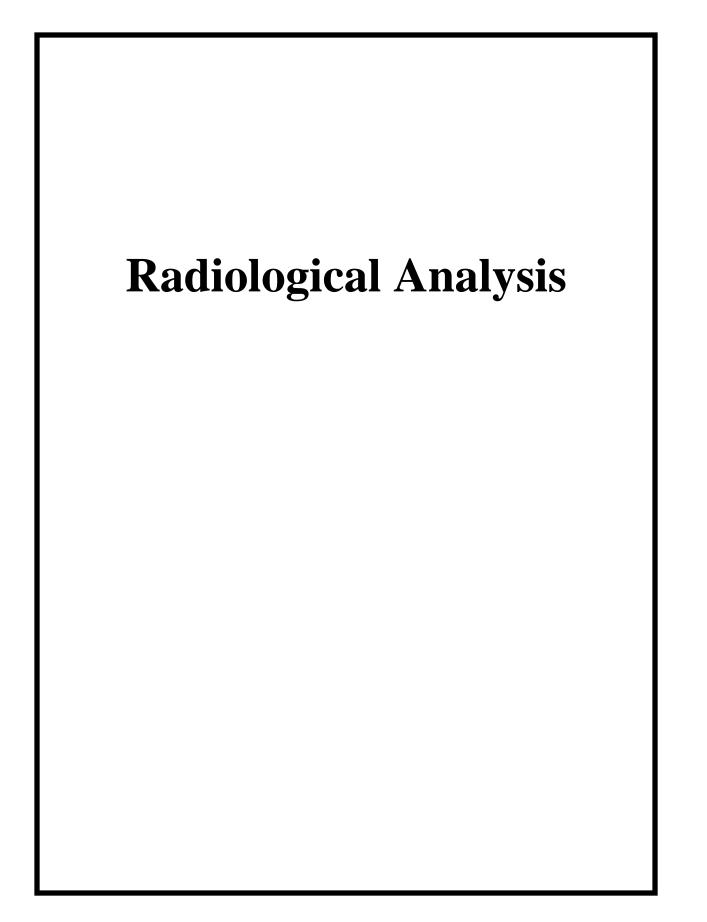
\* Indicates that a Quality Control parameter was not within specifications.

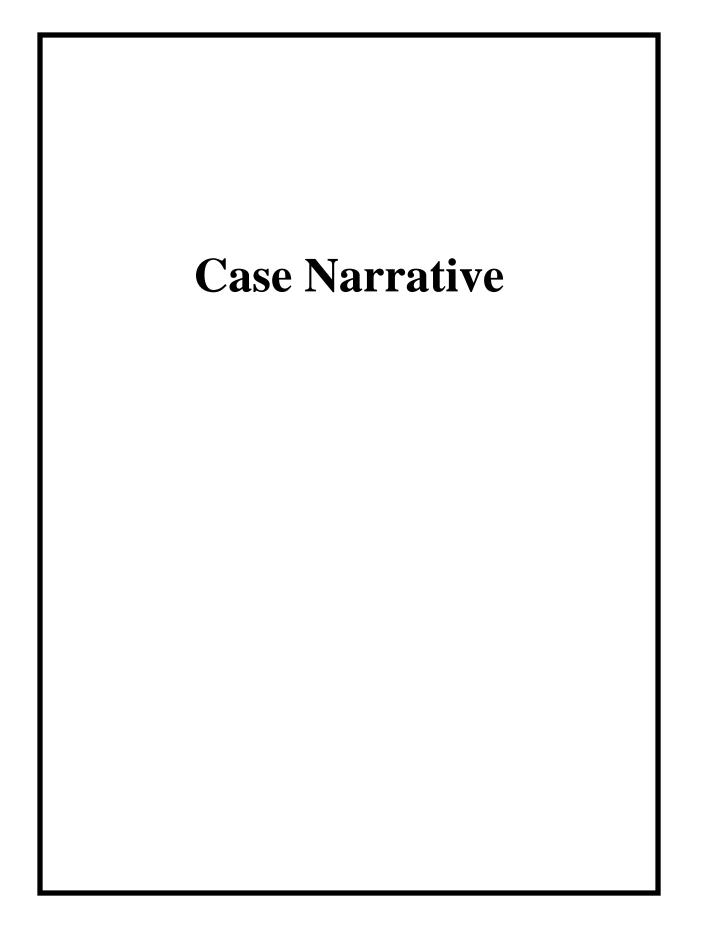
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17–018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maine	2019020
Maryland	270
Massachusetts	M–SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019–3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC002
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

#### List of current GEL Certifications as of 13 June 2019





#### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 443-003169 Work Order #: 480030

**Product:** Alphaspec U232, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, U-02-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1880187

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1880185

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
480030001	OGC Floor Stone
1204291757	Method Blank (MB)
1204291758	480030001(OGC Floor Stone) Sample Duplicate (DUP)
1204291759	480030001(OGC Floor Stone) Matrix Spike (MS)
1204291760	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### Quality Control (QC) Information

### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204291757 (MB)	Uranium-232	Result 0.00000718 < MDA 0.0000142 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.00000268 < MDA 0.00000589 > RDL 0.000001 uCi/g
	Uranium-235/236	Result 0.00000213 < MDA 0.0000032 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.00000268 < MDA 0.00000589 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample Analyte	Value
----------------	-------

Uranium-232	Result -0.000000715 < MDA 0.0000119 > RDL 0.000001 uCi/g		
Uranium-233/234	Result 0.000000165 < MDA 0.00000769 > RDL 0.000001 uCi/g		
Uranium-235/236	Result 0.00000206 < MDA 0.00000561 > RDL 0.000001 uCi/g		
Uranium-238	Result 0.00000294 < MDA 0.00000647 > RDL 0.000001 uCi/g		
	Uranium-233/234 Uranium-235/236		

Uranium-232

Uranium-233/234

Uranium-235/236

Uranium-238

Result -0.000000952 < MDA 0.00000836 > RDL

Result 0.00000166 < MDA 0.00000586 > RDL 0.000001

Result 0.00000228 < MDA 0.0000066 > RDL 0.000001

Result 0.00000032 < MDA 0.00000797 > RDL 0.000001

0.000001 uCi/g

uCi/g

uCi/g

uCi/g

#### **Technical Information**

480030001 (OGC Floor Stone)

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204291758 (OGC Floor StoneDUP)	Received 23-MAY-19, out of holding 23-DEC-18
1204291759 (OGC Floor StoneMS)	Received 23-MAY-19, out of holding 23-DEC-18
480030001 (OGC Floor Stone)	Received 23-MAY-19, out of holding 23-DEC-18

Product: Alphaspec Pu242, Solid High Rad Analytical Method: DOE EML HASL-300, Pu-11-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1880188

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1880185

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
480030001	OGC Floor Stone
1204291761	Method Blank (MB)
1204291762	480030001(OGC Floor Stone) Sample Duplicate (DUP)

WD:2020:0753 - Attachment B1204291763480030001(OGC Floor Stone) Matrix Spike (MS)1204291764Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Analyte Value				
1204291761 (MB)	Plutonium-238	Result 0.00000148 < MDA 0.0000237 > RDL 0.000001 uCi/g				
	Plutonium-239/240	Result 0.0000014 < MDA 0.0000123 > RDL 0.000001 uCi/g				
	Plutonium-242	Result -0.00000204 < MDA 0.0000147 > RDL 0.000001 uCi/g				

The following detection limit was not achieved due to high sample activity.

Sample	Analyte	Value
480030001 (OGC Floor Stone)	Plutonium-242	Result 0.00000323 < MDA 0.0000126 > RDL 0.000001 uCi/g

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204291762 (OGC Floor StoneDUP)	Received 23-MAY-19, out of holding 23-DEC-18
1204291763 (OGC Floor StoneMS)	Received 23-MAY-19, out of holding 23-DEC-18
480030001 (OGC Floor Stone)	Received 23-MAY-19, out of holding 23-DEC-18

#### Recounts

Sample 1204291763 (OGC Floor StoneMS) was recounted due to high recovery. The recount is reported. Sample 1204291761 (MB) was recounted due to a suspected false positive. The recount is reported.

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1880185

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>				
480030001	OGC Floor Stone				

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Technical Information**

Holding Time Samples were received and analyzed outside the hold time.

**Product:** Gammaspec, Cs137 Only, solid High Rad <u>Analytical Method:</u> DOE HASL 300, 4.5.2.3/Ga-01-R <u>Analytical Procedure:</u> GL-RAD-A-013 REV# 27 <u>Analytical Batch:</u> 1880186

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
480030001	OGC Floor Stone
1204291754	Method Blank (MB)
1204291755	480030001(OGC Floor Stone) Sample Duplicate (DUP)
1204291756	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Technical Information**

### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value		
1204291755 (OGC Floor StoneDUP)	Received 23-MAY-19, out of holding 23-DEC-18		
480030001 (OGC Floor Stone)	Received 23-MAY-19, out of holding 23-DEC-18		

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#### <u>Product:</u> GFPC, Sr90, solid High Rad <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1880190

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1880185

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
480030001	OGC Floor Stone
1204291768	Method Blank (MB)
1204291769	480030001(OGC Floor Stone) Sample Duplicate (DUP)
1204291770	480030001(OGC Floor Stone) Matrix Spike (MS)
1204291771	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204291769 (OGC Floor StoneDUP)	Received 23-MAY-19, out of holding 23-DEC-18
1204291770 (OGC Floor StoneMS)	Received 23-MAY-19, out of holding 23-DEC-18
480030001 (OGC Floor Stone)	Received 23-MAY-19, out of holding 23-DEC-18

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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

## Qualifier Definition Report for

## WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 443-003169 GEL Work Order: 480030

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

### **Review/Validation**

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

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

Lart Signature:

Name: Theresa Austin Title: Group Leader

Date: 18 JUN 2019

## **Digestion for Soil**

Batch ID:	1880185		D	ue Dates for Lab	: 16-JUN-2019	Hold: 23-DEC-2018	Package: 18-JUN-2019 SDG: 20-JUN		
Analyst:	Jon Burgess (JX)	B7)		<u>Ty</u>	pe Sample Id	Description		Serial Number	Spike Amount Spike Units
Method:	Client Requested Procedure								
Lab SOP:	GL-RAD-A-015 REV# 18								
Instrument:	R2-38110047								
# Sample ID	Prep Date	Min RDL	Initial	Final	Prep Factor				
		0	Weight (g)	Volume (mL)	(mL/g)				
1 480030001	30-MAY-201	9	0.6406	100	156.10365				
Reagent/Solven	t Lot ID	Description		Amount	Comments:				

Analytical Logbook version 1 11-04-2002

**GEL Laboratories LLC** 

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## RER – Ram Equipment Room

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a member of The GEL Group INC



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

gel.com

May 03, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 476212 SDG: 445-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 11, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

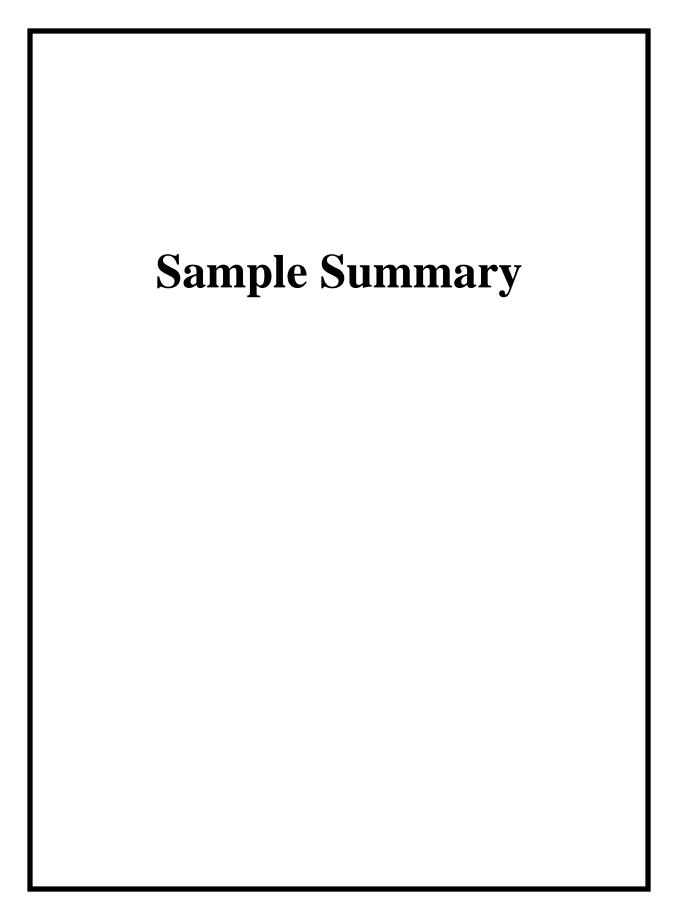
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





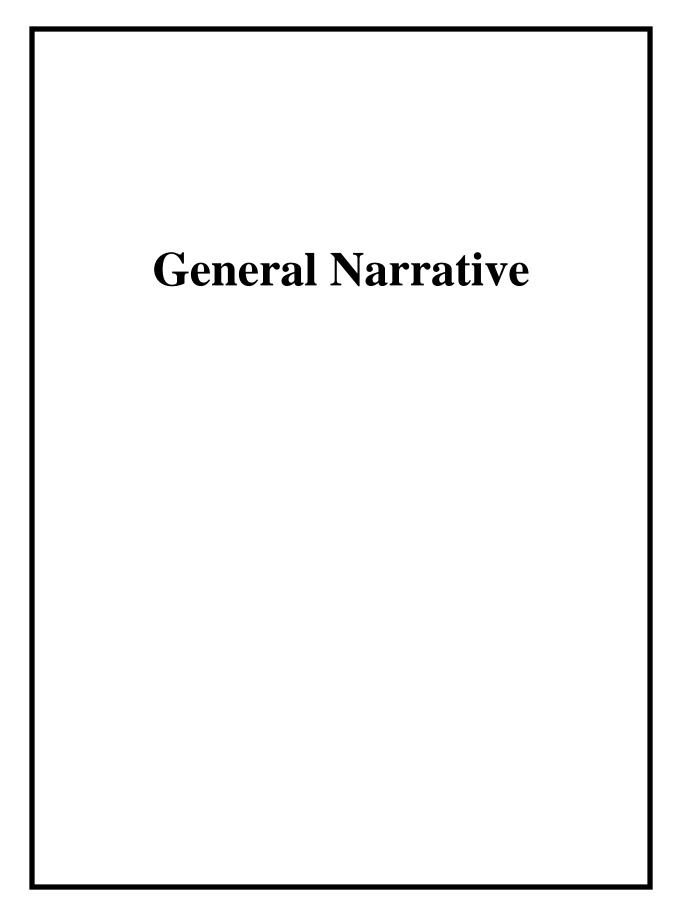
# **Sample Summary Sheet**

May 3, 2019

Release Number 445 Purchase Order Number

CH-003169

<u>Charge #</u> WV01.02.06.01.04.10.01 Description RER Floor



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 445-003169 Work Order: 476212

#### May 03, 2019

#### **Laboratory Identification:**

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

#### Release Number

445

#### Charge Number

WV01.02.06.01.04.10.01

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on April 11, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

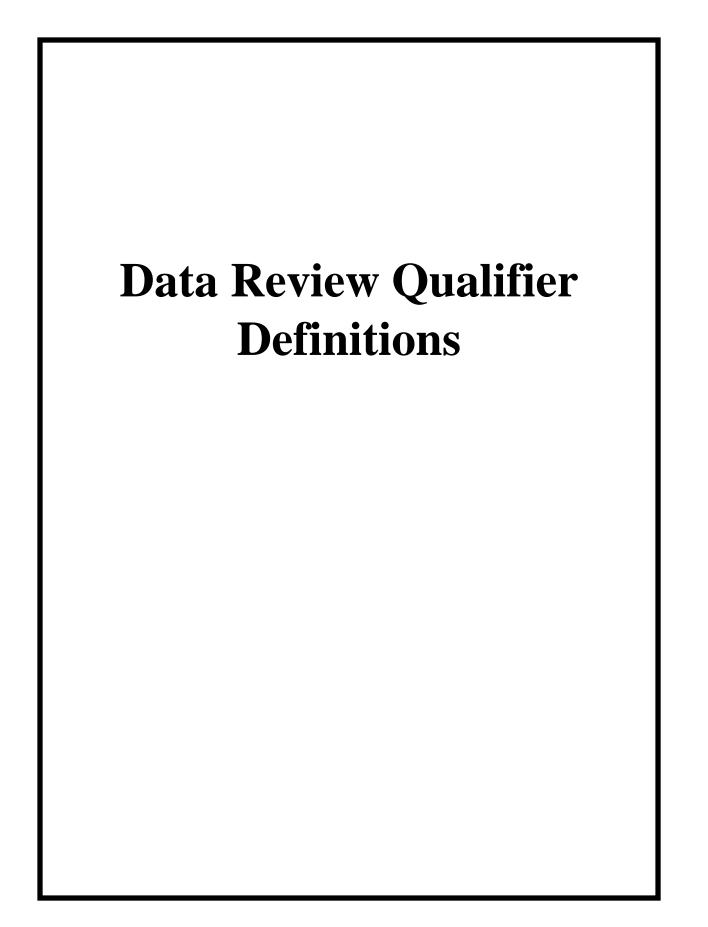
<u>Laboratory ID</u>	<u>Client ID</u>
476212001	RER Floor

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

(engo) Sho

Kerry OBarr for Katherine Cates Project Manager



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#### Data Review Qualifier Definitions

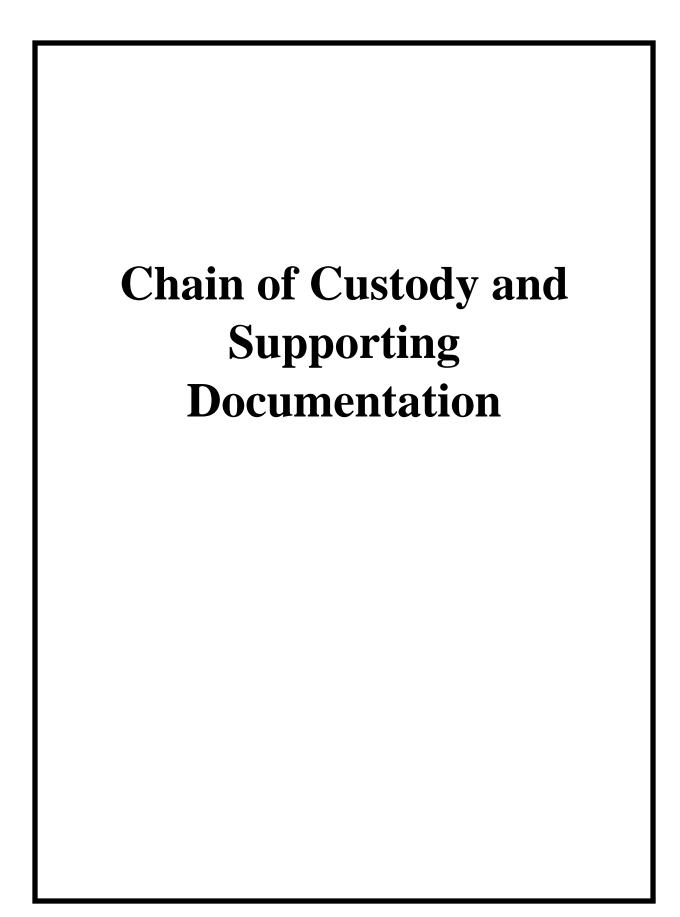
Qualifier Explanation

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



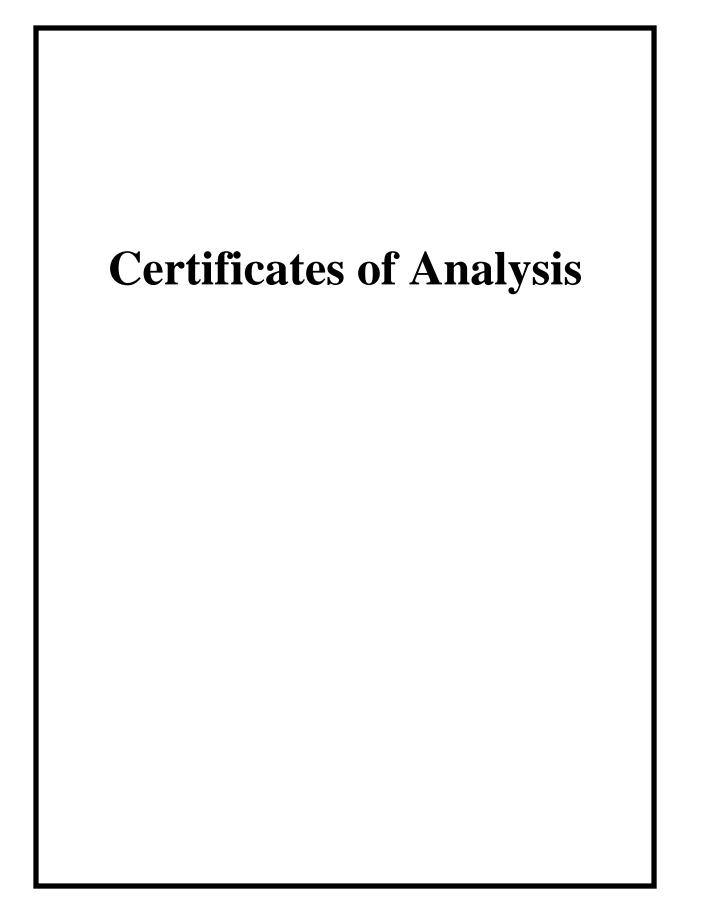
Erentt	D:2020:0753	4. Electronic Disk? Yes [ ] No [ x] <sup>A</sup>	7. Report Format Level: I [ x ] II [ B		1[] 2[] 3[]	11. Report Data To: W. Connors	Comments	** The five smears are to be composited by the lab to form a	composite sample and analyzed for <sup>241</sup> Am, <sup>137</sup> Cs, <sup>233</sup> U, <sup>233</sup> U, <sup>235</sup> U, <sup>236</sup> U, <sup>238</sup> U, <sup>238</sup> Pu, <sup>239</sup> Pu, <sup>240</sup> Pu, <sup>242</sup> Pu, <sup>90</sup> Sr, Report units in uCi per composite sample.		ulate Other Smear	Glass Poly	16. ZIO mCi Alpha NA[]	20. Sample Receipt:	Temperature 26 °C	Cooler Seals Intact? Yes [ V No [ ]	1 - -		
B JEST-FOR-ANALYSIS	4) lest Valley LLC ings Road 14171-9799	3. Analysis Requested		e(D- 10- 10- 10- 10- 10- 10- 10- 10- 10- 10	sedojc v 23 sobez	hosi e SS/23 SSi en	Gamm Am-24 U alph 232, -2 238, -2 238, -2 25, -20	× × × ×	****	l Sludge Other :	on Pipe Section Filter Particulate	Sample Bottle Type (Circle One): G			40. B. 28.18 13:10	4/11/12 855			
Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS	CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road West Valley, NY 14171-9799	Charge #: WV01 °C2 ° 06 °01 °04. P v01	6. Release #: 445	ou		13.	Date Time pH	3-28-18 10:30 na		14. Phase (Circle one ): (Solid) Liquid	Type (Circle one): Debris Coupon	15. Sample Bottle Size: /נאט אעך Si	ren li Hoole	Sample Custodian Signature/Date/Time	18/1310 Received by: Agan L	4.10.19 13 a Received by 2	Received by:	Received by:	
		1. Lab: GEL [2. Cha	5. PO #: CH-003/69 6. Reli	8. Cognizant Engineer/Project: MPPB Demo	10. DQO/SAP#: WVDP-584	12.	Sample ID# Type # Pres.	RER Floor Grab 1 na	nment B - Pag	18. Gross Wt (g) / <i>H2</i> . 3	Tare Wt (g) $l_{OS}$ , $\aleph$	Net Wt (g) 38, 5	17. Chain-of-Custody Reviewed by: $\int_{\Omega}$	19.6	Released by: (. Whaven 3-28-18	Released by: Janle A of Cont 1	Released by:	Released by:	WV-2865, Rev. 4 (SOP 300-08)

Page 9 of 29 SDG: 445-003169

CH-003169

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<b>CEEL</b> Laboratories LLC			
Client: 1. 1. 1. 1.			SAMPLE RECEIPT & REVIEW FORM
Received By: Creg And Stu			SDG/AR/COC/Work Order: 476212 476214
Carrier and Tracking Number			Date Received: 4/11/19 Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 810714709760
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?	1		Hazard Class Shipped: UN#: 2-710/ If UN2910, Is the Radioactive Shipment Survey Compliant? Yes_No
3) Did the client designate the samples are to be eccived as radioactive?	1	/	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as adioactive?	$\square$	,	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 3000 (PM)mR/Hr Classified as: Rad 1 (Rad 2) Rad 3
D) Did the client designate samples are hazardous?	, 	/	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		/	Af D or E is yes, select Hazards below. PCB's Flanunable Foreign Soil RCRA Asbestos Beryllium Other:
Sample Receipt Criteria	Kes	NA	2 Comments/Qualifiers (Required for Non-Conforming Items)
Shipping containers received intact and sealed?	1	1	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?			Circle Applicable: Client contacted and provided COC COC created upon receipt
<ul> <li>3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*</li> <li>4 Daily check performed and passed on IR</li> </ul>			Preservation Method: Wet Ice Ice Packs Dry ice None Other. *all temperatures are recorded in Celsius TEMP: 30 °C
temperature gun?	$  \checkmark$		Temperature Device Serial #: 283-79 Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
Samples requiring chemical preservation at proper pH?	L.		Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?			If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:
B Samples received within holding time?	7		ID's and tests affected:
Sample ID's on COC match ID's on bottles?	~		ID's and containers affected:
	-		Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
Number of containers received match number indicated on COC?	$\triangleleft$		Circle Applicable: No container count on COC Other (describe)
GEL provided?		-	
COC form is properly signed in relinquished/received sections?	$\checkmark$		Circle Applicable: Not relinquished Other (describe)
(Goo Commandin Polini II needed):			
PM (or PMA)	) reviev	v: In	nitials Date [2 Page of (
i i			GL-CHL-SR-001 Rev 6



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL LLC.	. BWXT W	est Valley									
	10282 Rock	Springs Ro	ad									
	West Valley,	, New York	14171-9799					Repo	rt Date:	May 3,	2019	
Contact:	Mr. William	Connors										
Project:	CH-003169	Haz Waste										
Client Sample	e ID: RER F	loor				Pro	oject:	WVNS	02501			_
Sample ID:	476212						ient ID:	WVNS				
Matrix:	Misc S											
Collect Date: Receive Date												
Collector:	: 11-AP Client	K-19										
Parameter	Qualifier	Result 1	Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Time	Batch	Mto
High Rad Testing			<b>`</b>									-
Alphaspec Pu242,	Solid High Rad	"As Receiv	ed"									
Plutonium-238	Hh	0.000117	+/-8.76E-05	9.30E-05	+/-8.95E-05	1.00E-06	uCi/g		JXB7 (	4/24/19 0835	1870155	1
Plutonium-239/240	Hh	0.000199	+/-0.000115	0.000121	+/-0.000119	1.00E-06	uCi/g					
Plutonium-242	HUh	2.73E-05	+/-6.05E-05	0.000106	+/-6.07E-05	1.00E-06	uCi/g					
Alphaspec U232, 1	Solid High Rad '	"As Receive	d''									
Uranium-232	HUh	-0.000124	+/-6.56E-05	0.000212	+/-6.57E-05		uCi/g		JXB7 (	04/18/19 1601	1864678	2
Uranium-233/234	HUh	2.92E-05	+/-4.85E-05	7.57E-05	+/-4.88E-05	1.00E-06	uCi/g					
Uranium-235/236	Hh		+/-5.64E-05	3.25E-05	+/-5.75E-05		uCi/g					
Uranium-238	HUh		+/-5.38E-05	8.37E-05	+/-5.42E-05	1.00E-06	uCi/g					
GFPC, Sr90, solid	-											
Strontium-90	Hh		+/-0.000179	5.71E-05	+/-0.000316	1.00E-04	uCi/g		JXB7 (	04/19/19 0727	1864681	3
Gammaspec, Cs13	37 Only, solid Hi	igh Rad "As	s Received"									
Americium-241	Н		+/-2.93E-05	2.76E-05	+/-3.49E-05		uCi/g		AXM6 (	04/22/19 1002	1866818	4
Cesium-137	Н		+/-5.17E-05	5.96E-06	+/-0.00382		uCi/g					
Cobalt-58	Н		+/-3.48E-05	3.03E-05	+/-3.63E-05	0.100	uCi/g					
Cobalt-60	Н		+/-9.01E-07	5.14E-07	+/-1.04E-06	0.050	uCi/g					
Niobium-95	Н	0.000181	+/-5.28E-05	4.83E-05	+/-5.56E-05	0.050	uCi/g					
The following Prep		performed	l			<b>D</b> (	<b>T'</b>		D. 4.1			
	Description	~ ~ ~ ~			Analyst	Date	Tin		ep Batch			
Client Requested Prc I	Dissolution Soil Pr	ep GL-RAD	-A-015		AXM6	04/12/19	141	5 180	56819			
The following Anal		were perfo	rmed									
Method I	Description											
1 I	OOE EML HASL-	300, Pu-11-F	RC Modified									
2 I	OOE EML HASL-	300, U-02-R	C Modified									
3 E	EPA 905.0 Modifie	ed/DOE RP5	01 Rev. 1 Mod	ified								
4 I	DOE HASL 300, 4	.5.2.3/Ga-01	-R									
Surrogate/Tracer l	Recovery	Test					E	Batch ID	Recovery	% Accepta	ble Lim	its
Plutonium-236 T	racer	Alphaspe	c Pu242, Soli	d High Rad "A	As Received"		1	1870155	76.8	(15%-	-125%)	
Uranium-232 Tra	cer			l High Rad "A			1	1864678	95		-125%)	
Uranium-235/236				l High Rad "A			1	1864678	72.8		-125%)	
Strontium Carrier				h Rad "As Red				1864681	104		-125%)	
Suchaum Curren		0110,01	, , , , , , , , , , , , , , , , , , ,						104	(2570-	/0)	

Batch ID Recovery% Acceptable Limits

### GEL LABORATORIES LLC

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### **Certificate of Analysis**

Address :LLC. 10282 Rock Springs RoadWest Valley, New York 14171-9799Report Date:May 3, 2019Contact:Mr. William ConnorsProject:CH-003169 Haz WasteClient Sample ID:RER Floor 476212001Project:WVNS02501 Client ID:Client ID:WVNS025	Parameter	<b>Oualifier</b> Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch	Mtd
10282 Rock Springs Road     West Valley, New York 14171-9799     Report Date:     May 3, 2019       Contact:     Mr. William Connors								
10282 Rock Springs RoadReport Date:May 3, 2019West Valley, New York 14171-9799Report Date:May 3, 2019	Project:	CH-003169 Haz Waste						
10282 Rock Springs Road	Contact:	Mr. William Connors						
Address .		West Valley, New York 14171-9799				Report Date:	May 3, 2019	
Company : CH2M HILL BWXT West Valley	1 2	LLC.						

Surrogate/Tracer Recovery Test

#### Notes:

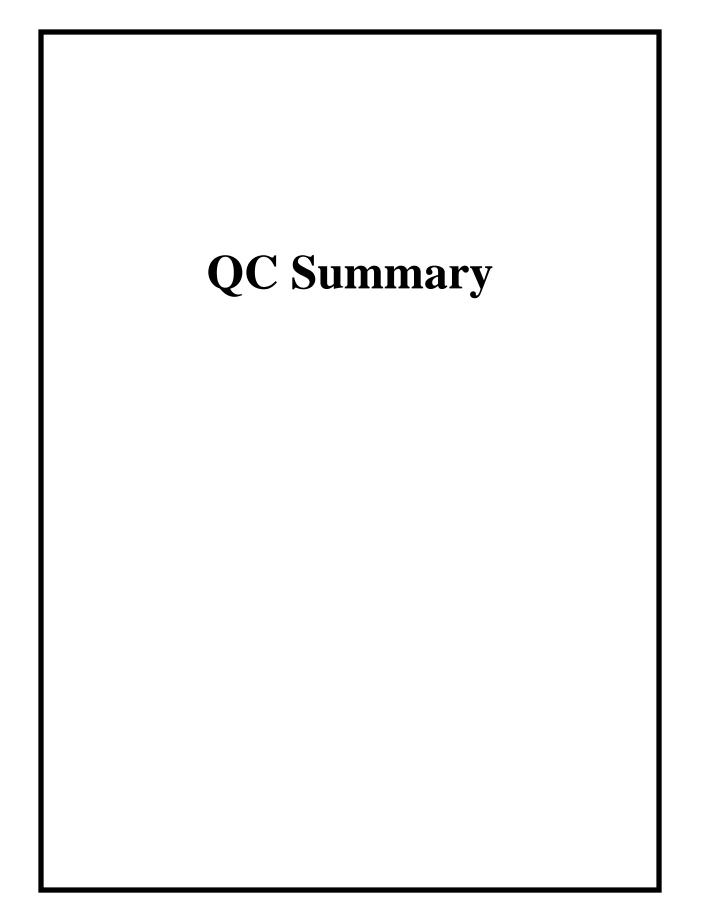
445

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration



### **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: May 3, 2019

Page 1 of 5

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 476212

**Contact:** 

Parmname			NOM	N	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 186	4678													
QC1204254055 Uranium-232	474903001	DUP		Hh	0.000279	Н	0.000412	uCi/g	38.5		(0% - 100%)	JXB7	04/23/1	9 22:19
Uranium-233/234				Hh	0.000573	Н	0.000834	uCi/g	37.1*		(0%-20%)			
Uranium-235/236				HUh	2.40E-05	Н	7.87E-05	uCi/g	74.6		(0% - 100%)			
Uranium-238				HUh	6.02E-05	HU	8.86E-05	uCi/g	N/A		N/A	A		
QC1204254057 Uranium-232	LCS					U	3.77E-05	uCi/g					04/18/1	19 23:20
Uranium-233/234							0.00329	uCi/g						
Uranium-235/236							0.000262	uCi/g						
Uranium-238			0.00359				0.00359	uCi/g		100	(75%-125%)			
QC1204254054 Uranium-232	MB					U	4.35E-05	uCi/g					04/18/1	19 16:01
Uranium-233/234						U	6.24E-07	uCi/g						
Uranium-235/236						U	4.96E-06	uCi/g						
Uranium-238						U	9.53E-06	uCi/g						
QC1204254056 Uranium-232	474903001	MS		Hh	0.000279	Н	0.000269	uCi/g					04/23/1	19 22:19

### **GEL LABORATORIES LLC**

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# **QC Summary**

				<u> </u>	$\frac{1}{2}$	Summar	<u>. y</u>					
Workorder: 476212				-								Page 2 of 5
Parmname		NON	M	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
High Rad Testing Batch 1864678												
Uranium-233/234			Hh	0.000573	Н	0.00391	uCi/g				JXB7	04/23/19 22:19
Uranium-235/236			HUh	2.40E-05	Н	0.000196	uCi/g					
Uranium-238		0.00359	HUh	6.02E-05	Н	0.00311	uCi/g		84.9	(75%-125%)		
Batch 1864681												
QC1204254061 4749030 Strontium-90	01 DUP		Hh	0.141	Н	0.124	uCi/g	12.7		(0%-20%)	JXB7	04/19/19 07:28
QC1204254063 LCS Strontium-90		0.00302				0.00258	uCi/g		85.4	(75%-125%)		04/19/19 07:28
QC1204254060 MB Strontium-90					U	3.13E-05	uCi/g					04/19/19 07:28
QC1204254062 4749030 Strontium-90	01 MS	0.00317	Hh	0.141	Н	0.129	uCi/g		N/A	(75%-125%)		04/19/19 07:28
Batch 1866818												
QC1204259093 4762120 Americium-241	01 DUP		Н	0.000167	Н	0.000153	uCi/g	8.51		(0%-20%)	AXM6	04/19/19 10:49
Cobalt-60			Н	5.31E-06	Н	5.51E-06	uCi/g	3.74		(0%-20%)		
Cesium-137			Н	0.042	Н	0.0474	uCi/g	12.1		(0%-20%)		
Cobalt-58			Н	0.000106	Н	0.000163	uCi/g	42.3		(0% - 100%)		
Niobium-95			Н	0.000181	HU	0.000144	uCi/g	9.78		(0% - 100%)		
QC1204259094 LCS Americium-241		0.00346				0.00367	uCi/g		106	(75%-125%)		04/19/19 10:50

### **GEL LABORATORIES LLC**

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# **QC Summary**

Workorder: 476212		-	<u> </u>		<b></b>					Pag	e 3 of 5
Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range A	Anlst		Time
High Rad Testing Batch 1866818											
Cobalt-60	0.00105			0.00118	uCi/g		112	(75%-125%)	AXM6	04/19/1	9 10:50
Cesium-137	0.00131			0.00148	uCi/g		113	(75%-125%)			
Cobalt-58			U	-1.06E-06	uCi/g						
Niobium-95			U	-1.06E-06	uCi/g						
QC1204259092 MB Americium-241			U	3.81E-07	uCi/g					04/19/]	19 08:14
Cobalt-60			U	4.04E-08	uCi/g						
Cesium-137			U	8.17E-09	uCi/g						
Cobalt-58			U	-3.85E-09	uCi/g						
Niobium-95			U	1.64E-07	uCi/g						
Batch 1870155 —											
Batch 1870155 QC1204266874 476212001 DUP Plutonium-238	Hh	0.000117	HU	8.83E-05	uCi/g	22.2		(0% - 100%)	JXB7	04/24/1	19 08:35
Plutonium-239/240	Hh	0.000199	Н	0.000136	uCi/g	37.7		(0% - 100%)			
Plutonium-242	HUh	2.73E-05	HU	2.25E-05	uCi/g	N/A		N/A			
QC1204266876 LCS Plutonium-238			U	3.53E-05	uCi/g					04/23/1	19 20:22
Plutonium-239/240	0.00352			0.00376	uCi/g		107	(75%-125%)			

### **GEL LABORATORIES LLC**

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### **QC Summary**

			-									
Workorder: 476212											Pag	ge 4 of 5
Parmname	NO	М	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1870155												
Plutonium-242				U	6.30E-05	uCi/g				JXB7	04/23/1	19 20:22
QC1204266873 MB Plutonium-238				U	2.82E-05	uCi/g					04/24/1	19 08:35
Plutonium-239/240				U	3.26E-05	uCi/g						
Plutonium-242				U	3.65E-05	uCi/g						
QC1204266875 476212001 MS												
Plutonium-238		Hh	0.000117	Н	0.000136	uCi/g					04/23/1	19 20:22
Plutonium-239/240	0.00352	Hh	0.000199	Н	0.00405	uCi/g		110	(75%-125%)	)		
Plutonium-242		HUh	2.73E-05	HU	5.31E-05	uCi/g						

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit

### **GEL LABORATORIES LLC**

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### **QC Summary**

			_	Q U DI	111111a	<u> </u>						
Workor	der: 476212										Pag	e 5 of 5
Parmna	me	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
NJ	Consult Case Narrative, Da	ata Summary package	e, or Project	Manager c	concerning	this qualifi	er					
Q	One or more quality control	ol criteria have not be	en met. Refe	r to the ap	plicable na	rrative or I	DER.					
R	Sample results are rejected											
U	Analyte was analyzed for,	but not detected abov	ve the MDL,	MDA, MI	DC or LOD							
UI	Gamma SpectroscopyUn	certain identification										
UJ	Gamma SpectroscopyUn	certain identification										
UL	Not considered detected. T	he associated numbe	r is the repor	ted concer	ntration, wh	ich may b	e inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Da	ata Summary package	e, or Project	Manager c	concerning	this qualifi	er					
Y	Other specific qualifiers we	ere required to prope	rly define the	e results. C	Consult case	narrative.						
^	RPD of sample and duplication	ate evaluated using +	-RL. Conce	entrations a	are <5X the	RL. Qual	lifier Not Ap	plicable for I	Radiochem	istry.		
h	Preparation or preservation	holding time was ex	ceeded									
^ The R five time	licates that spike recovery lin elative Percent Difference (I es (5X) the contract required sed to evaluate the DUP resu	RPD) obtained from the detection limit (RL)	the sample d	uplicate (1	DUP) is eva	aluated aga	ainst the acce	eptance criter	ia when the	e sample i	s greater	

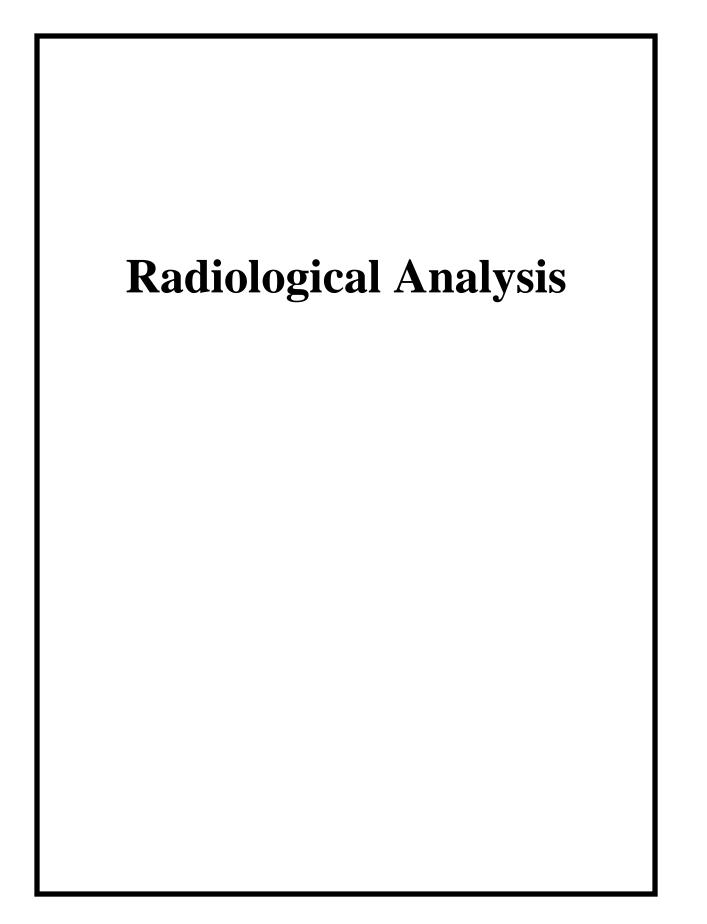
\* Indicates that a Quality Control parameter was not within specifications.

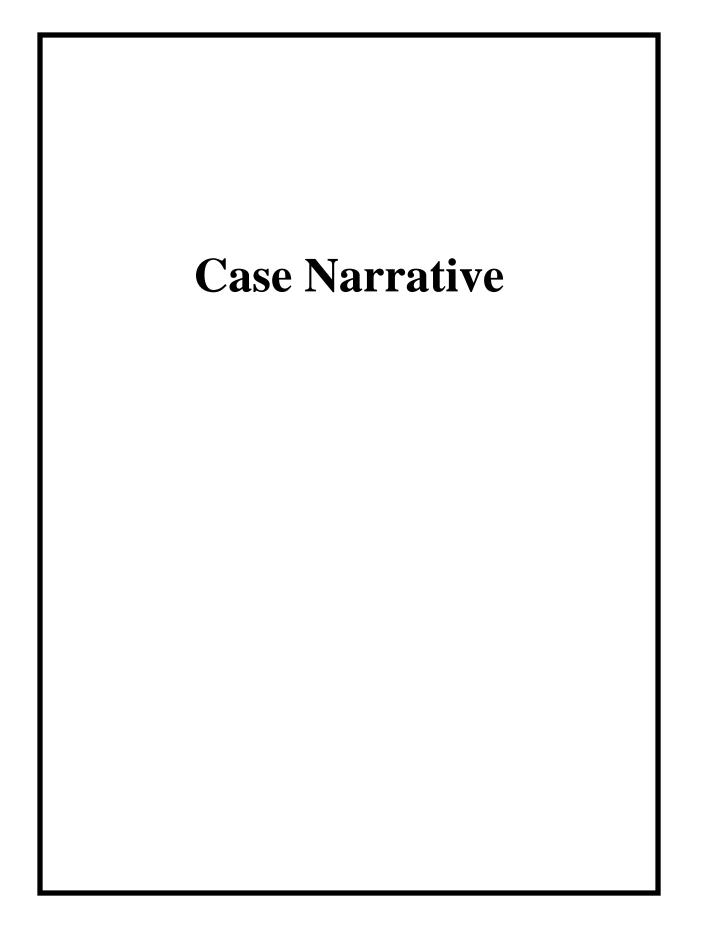
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

### List of current GEL Certifications as of 03 May 2019





#### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 445-003169 Work Order #: 476212

Product: Alphaspec U232, Solid High Rad Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1864678

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476212001	RER Floor
1204254054	Method Blank (MB)
1204254055	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254056	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254057	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-233/234	RPD 37.1* (0.00%-20.00%) RER 1.38 (0-3)

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204254054 (MB)	Uranium-232	Result 0.0000435 < MDA 0.000147 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.000000624 < MDA 0.0000713 > RDL 0.000001 uCi/g

		Result 0.00000496 < MDA 0.0000654 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.00000953 < MDA 0.0000713 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-238	Result 0.0000886 < MDA 0.000109 > RDL 0.000001 uCi/g
476212001 (RER Floor)	Uranium-232	Result -0.000124 < MDA 0.000212 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.0000292 < MDA 0.0000757 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.0000359 < MDA 0.0000837 > RDL 0.000001 uCi/g

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204254055 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254056 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### Negative > 3 sigma TPU

The result was more negative than the three sigma TPU. The background control chart was examined and the detector was determined to be fully functional.

Sample	Analyte	Value
476212001 (RER Floor)	Uranium-232	Negative Result > 3 sigma value

#### Recounts

The U-232 and U-236 traced portions of samples 1204254055 (XC-2 Floor DebrisDUP) and 1204254056 (XC-2 Floor DebrisMS) were given additional clean-up steps and recounted in order to remove suspected Plutonium interference. The recounts are being reported.

<u>Product:</u> Alphaspec Pu242, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 WD:2020:0753 - Attachment B Analytical Batch: 1870155

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
476212001	RER Floor
1204266873	Method Blank (MB)
1204266874	476212001(RER Floor) Sample Duplicate (DUP)
1204266875	476212001(RER Floor) Matrix Spike (MS)
1204266876	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Preparation Information**

#### **Aliquot Reduced**

Aliquots were reduced due to high activity based on Gamma data.

#### **Quality Control (QC) Information**

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204266873 (MB)	Plutonium-238	Result 0.0000282 < MDA 0.0000767 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result 0.0000326 < MDA 0.000105 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000365 < MDA 0.0000977 > RDL 0.000001 uCi/g
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g
476212001 (RER Floor)	Plutonium-242	Result 0.0000273 < MDA 0.000106 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g

	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g
476212001 (RER Floor)	Plutonium-242	Result 0.0000273 < MDA 0.000106 > RDL 0.000001 uCi/g

#### **Technical Information**

#### Holding Time

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204266874 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
1204266875 (RER FloorMS)	Received 11-APR-19, out of holding 24-SEP-18
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### Sample Re-prep/Re-analysis

Samples were reprepep due to high activity. The reanalysis is being reported.

#### Recounts

Samples 1204266873 (MB), 1204266874 (RER FloorDUP) and 476212001 (RER Floor) were recounted due to high MDCs. The recounts are reported.

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
476212001	RER Floor

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

Holding Time Samples were received and analyzed outside the hold time.

Product: Gammaspec, Cs137 Only, solid High Rad

WD:2020:0753 - Attachment B <u>Analytical Method:</u> DOE HASL 300, 4.5.2.3/Ga-01-R <u>Analytical Procedure:</u> GL-RAD-A-013 REV# 27 <u>Analytical Batch:</u> 1866818

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476212001	RER Floor
1204259092	Method Blank (MB)
1204259093	476212001(RER Floor) Sample Duplicate (DUP)
1204259094	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204259093 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### Recounts

Sample 476212001 (RER Floor) was recounted to verify sample results. Recount is reported.

#### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	<b>Client Sample</b>
Cobalt-58	476212001	RER Floor
Cobalt-60	476212001	RER Floor
Niobium-95	476212001	RER Floor

Product: GFPC, Sr90, solid High Rad <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1864681

Preparation Method: Client Requested Procedure

WD:2020:0753 - Attachment B <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476212001	RER Floor
1204254060	Method Blank (MB)
1204254061	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254062	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254063	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

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All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### Matrix Spike (MS) Recovery

The Matrix Spike (See Below) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

Sample	Analyte	Value
1204254062 (XC-2 Floor DebrisMS)	Strontium-90	-399* (75%-125%), but result > 5x nominal

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204254061 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254062 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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

### Qualifier Definition Report for

### WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 445-003169 GEL Work Order: 476212

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

### **Review/Validation**

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

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

Signature: Alout G. Mulary

Name: Heather McCarty Title: Analyst II

Date: 03 MAY 2019



a member of The GEL Group INC



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

gel.com

May 03, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 476212 SDG: 445-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 11, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

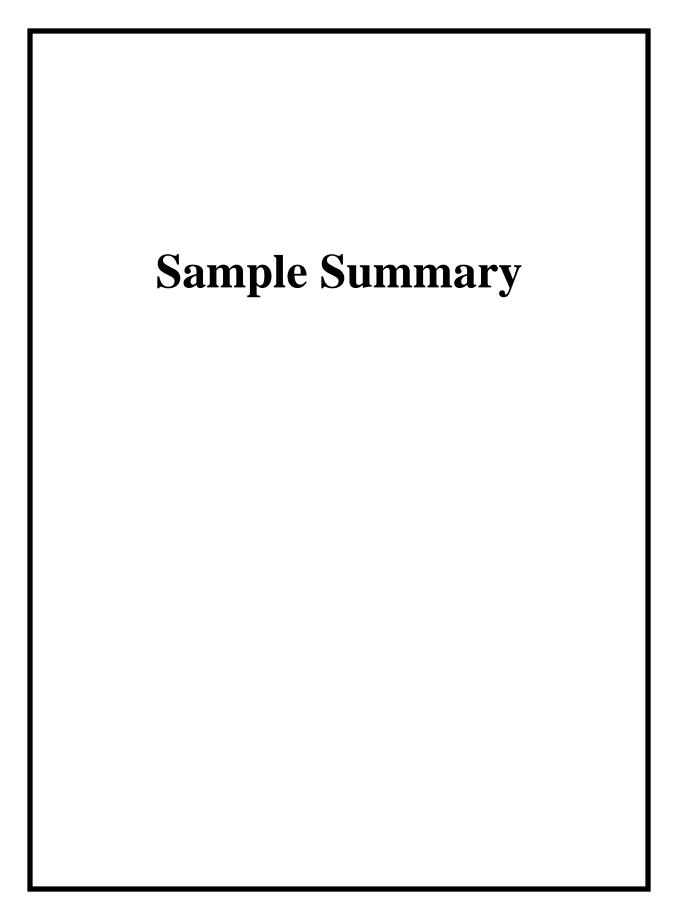
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

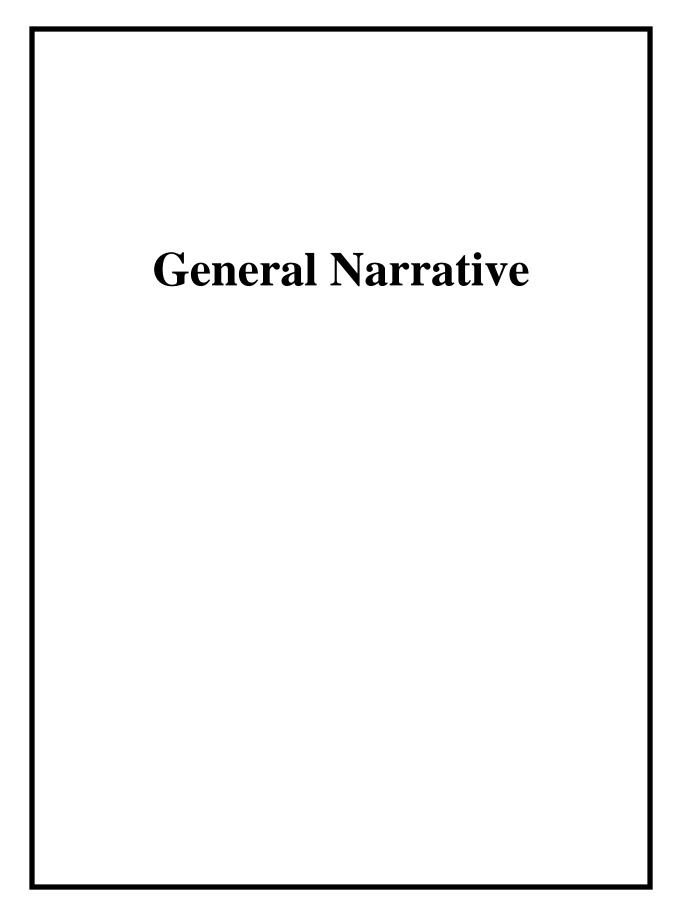
May 3, 2019

Release Number 445 Purchase Order Number

CH-003169

<u>Charge #</u> WV01.02.06.01.04.10.01

Description RER Floor



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 445-003169 Work Order: 476212

#### May 03, 2019

#### **Laboratory Identification:**

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

#### Release Number

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#### Charge Number

WV01.02.06.01.04.10.01

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on April 11, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

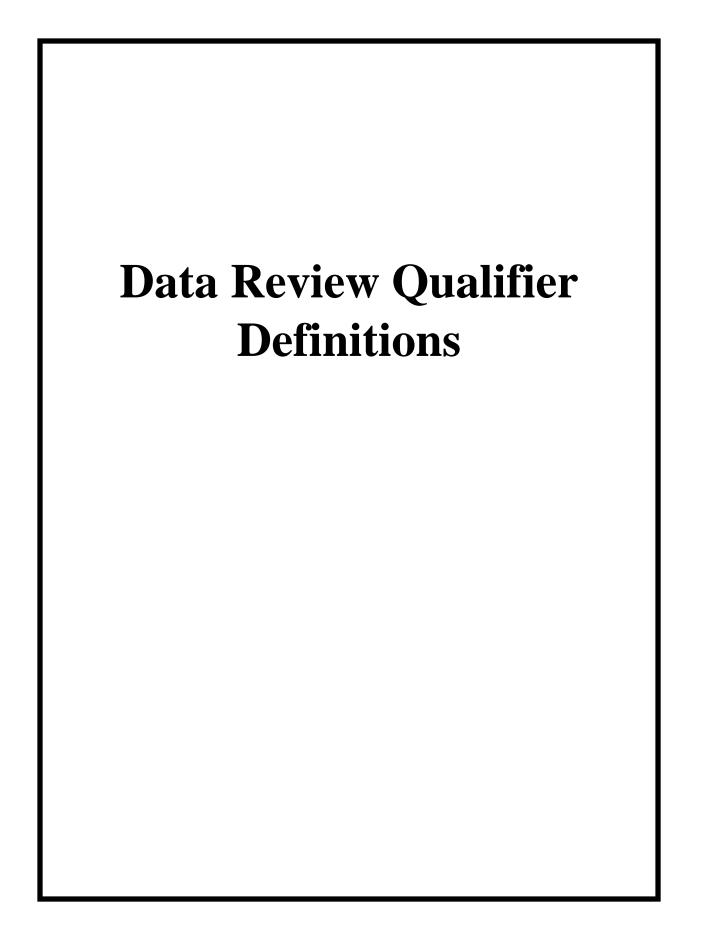
Laboratory ID	<u>Client ID</u>
476212001	RER Floor

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

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Kerry OBarr for Katherine Cates Project Manager



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#### Data Review Qualifier Definitions

Qualifier Explanation

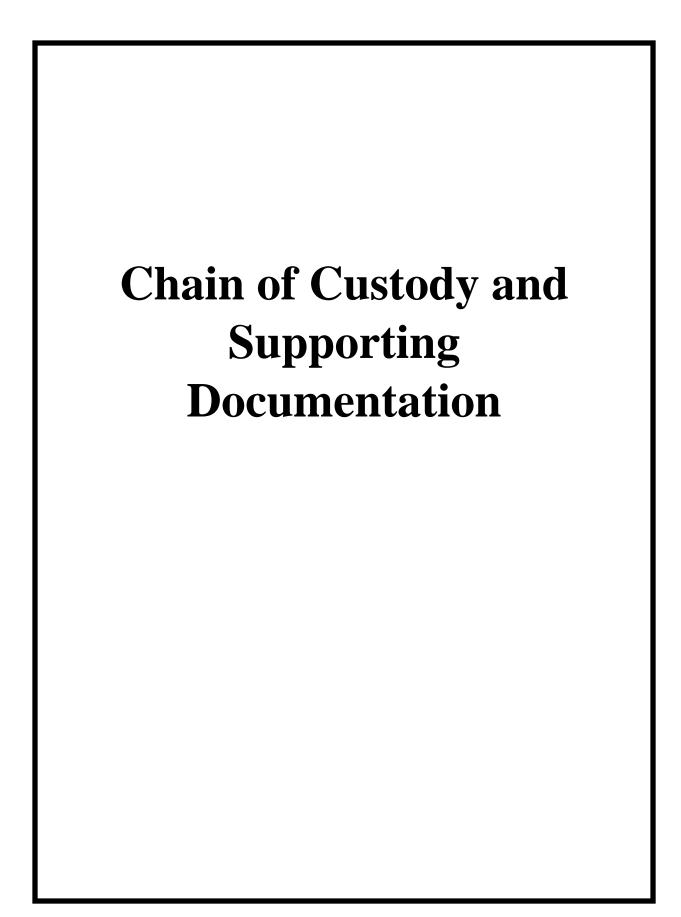
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- ${\tt C}$  ~ Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

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P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



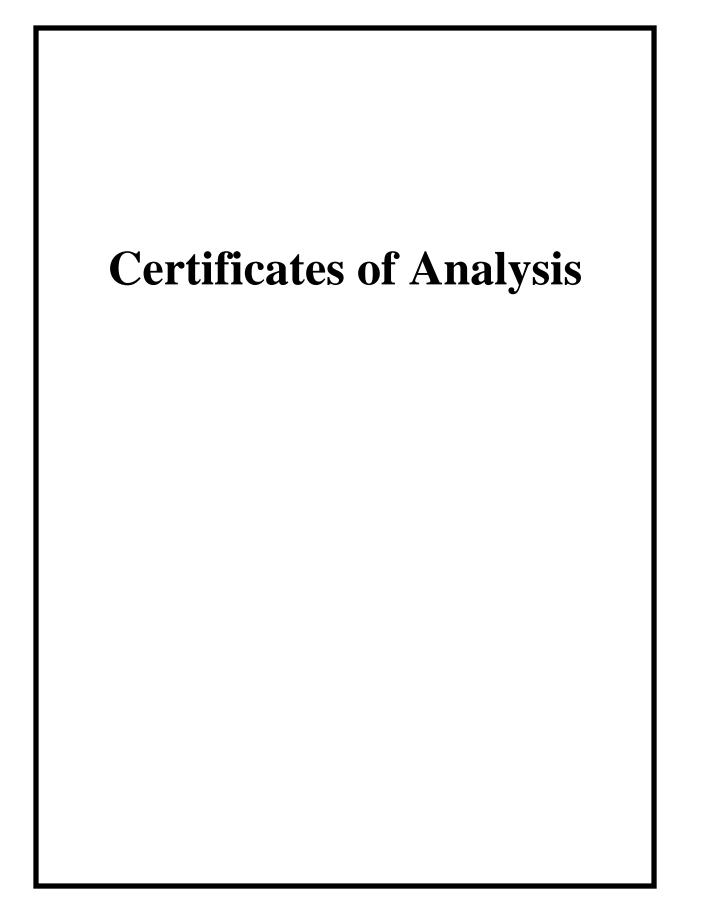
とこのした		4. Electronic Disk? Yes [ ]	7. Report Format Level: I[x] II [ a	9. Priority Code: Routine [x]	1[] 2[] 3[]	11. Report Data To: W. Connors	Comments	** The five smears are to be composited by the lab to form a	230 Desite sample and analyzed for 241 Am <sup>137</sup> Cs, <sup>232</sup> U, <sup>233</sup> U/ <sup>234</sup> U, <sup>235</sup> U / <sup>236</sup> U, <sup>238</sup> U, <sup>239</sup> Pu/ <sup>240</sup> Pu, <sup>242</sup> Pu, <sup>90</sup> Sr, Report units in uCi per composite sample.		Particulate Other Smear	ne): Glass Poly	16. 210 mCi Alpha NA[]	20. Sample Receipt:	3.//c Temperature 26 °C	Cooler Seals Intact? Yes [ V No [		
s EST-FOR-ANALYSIS	sst Valley LLC igs Road 4171-9799	3. Analysis Requested	ļ	e,236 5/236 5/236	sedojo v SS (4)	h isi si	Gamm Am-24 U alph 232, -2 238, -2 238, -2 238, -2	X X X X		Sludge Other :	n Pipe Section Filter	Sample Bottle Type (Circle One):			2. Ch. 3.28.18 1	4/11/19 855		
Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS (Page 1 of 2)	CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road West Valley, NY 14171-9799	1.cz. 06.01.04.10.01	45				Time	<i>i</i> ∂:% na		le one ): (Solid) Liquid	e one): Debris Coupon	1000 mL		Sample Custodian Signature/Date/Time	Received by: Rear L	, Received by:	Received by:	Received by:
Ċ		2. Charge #: WV0	9 6. Release #: 4	t: MPPB Demo		13.	# Pres. Date Cont.	na 3-28-18		3 Phase (Circle one ):	Type (Circle one):	5 Sample Bottle Size:	red by: For a lite	19. Sample Custo	0 3-28-18/1310	20-4-10.19 13.26	-	
		1. Lab: GEL	5. PO #: CH-003169	8. Cognizant Engineer/Project:	10. DQO/SAP#: WVDP-584	12.	· Sample ID# Type 4 Co	RER FLOON Grab	iment B - Pag	18. Gross Wt (g) / <i>f</i> /2. 3	Tare Wt (g)         Io3. %	Net Wt (g) 38, 5	17. Chain-of-Custody Reviewed by:		Released by: ("Attained	Released by: Dowl	Released by.	Released by:

Page 9 of 29 SDG: 445-003169

CH-003169

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Cliest:       WJUS       SAMPLE RECEIPT & REVIEW FORM         Breckvel By:       Create and Tracking Number       Control opticities         Currer and Tracking Number       Field:       Control opticities         Sample received B:       Sample Received:       HILD J 4700 97460         Sample received B:       Sample received:       UNN 279         Sample received:       Biological Control       UNN 279         Sample received:       Million       Biological Control       UNN 279         Sample received:       Control optical Control       Biological Control       UNN 279         Sample received:       Control optical Control       Biological Control       Control optical Control       Biological Control         Did to clical designed as DOT Simmological       Control optical Control       Control optical Control       Biological Control       Control optical Control <th>CEEL Laboratories LLC</th> <th></th> <th></th> <th></th>	CEEL Laboratories LLC			
Receives By: Grang Action Deceived Based Concerves on the: 9100 Action of the Control of the Control of Constant Control of Control	Client: 1.1.11 )<			
Currier and Tracking Number  Support a Store Currier Support on supple of audation dates Control UNE Field Services Courier Other  Support and DOT Houndoor?  (Currier and Tracking Number)  (Currier			·	
AShiped as a DOT Hazadoos?  Cor fortune of a supple are to be  Cor fortune of a supple are book  Cor fortune of a supple are book  Cor fortune of the supple are book  Co	7	<u> </u>		Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other
WSBigned is a DOT Hazadour?       Historic Class Stipped:       UNR: 2779         D) Did the folial designate the samples are to be conved an mildeoxive sticken on containers equal client designation.       OCC container of the samples are to be conved an mildeoxive sticken on containers equal client designation.         D) Did the Stoc classify the samples are interactive?       OCC container of the Convert Owegraft (Oberred Counts - Area Background County: Buttle Convert Counts - Area Background County: Buttle Counts - Background County: Buttle Counts - Area Background County: Buttle Counts - Area Background County: Buttle Counts - Area Background County: Buttle Counts - Background Counts - Background Counts - Background Counts - Background County	Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Center of and eacher?       Image: Center of and the angle of the ang	A)Shipped as a DOT Hazardous?	1		
abaseleve?       Clearmines intail (abig and containers open a lange deviation)         2) Did the client designate samples are boundow?       COC motion or handed labels on containers open a lange deviation.         2) Did the Client designate samples are boundow?       COC motion or handed labels on containers open a lange deviation.         2) Did the RSO identify possible houseds?       Z Z Z       CommentaQualifier (Required far Non-Conforming Hemo)         3) Shipping containers received inset and saled       Z Z Z Z       CommentaQualifier (Required far Non-Conforming Hemo)         4) Shipping containers received inset and saled?       Click Applicable: Seale broken       Damaded container         2) Chin for ussody documents included       Click Applicable: Client constered and provided COC       COC created upon receipi         3) Sample sequiring cold preservation       Preservation       Temperature Device Serial # Z Z Z       Clink Applicable:         3) Sample requiring chemical preservation       Preservation       Temperature Device Serial # Z Z Z       Clink Applicable:         3) Sample requiring chemical preservation       Temperature Device Serial # Z Z Z Z       Sample Dis and Containers Affected:         1) The preservation and preservation       Sample Dis and Containers Affected:       No.       NA (If yes, take to VOA Presearch)         1) Di any samples require Volatile       Do liquiv OVA visits fine of freatappeo? Yes No NA (If yes, take to VOA Presearc	3) Did the client designate the samples are to be eccived as radioactive?	1	/	COC notation or radioactive stickers on containers equal client designation.
2) Did the RSO identify possible hazakd?       If D or E is yes, solice Hazards below.         2) Did the RSO identify possible hazakd?       If D or E is yes, solice Hazards Delow.         3) Did the RSO identify possible hazakd?       If D or E is yes, solice Hazards Delow.         2) Did the RSO identify possible hazakd?       If D or E is yes, solice Hazards Delow.         2) Chin of catacody documents included       If D or E is yes, solice Hazards Delow.         2) Chin of catacody documents included       If D or E is yes, solice Hazards Delow.         2) Chin of catacody documents included       If D or E is yes, solice Hazards Delow.         3) Sample sequiring cold preservation       If Preservation Method: Wel too for Pads Dry ice.       Core Applicable: Seals broken Damaged container       Doll of (describe)         4) Dolly check performed and passed on IR       Somple Therein the Damaged container       Laking container       TEMP:	C) Did the RSO classify the samples as advactive?		,,	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 3000 (PM)mR/Hr Classified as: Rad 1 (Rad 2) Rad 3
2) Did the RSO identify possible heards?       Imanuable       Foreign Soil       RCAA       Addecise       Beryliam       Other:         Sample Receipt Citeria       \$       \$       \$       Comments/Qualifiera (Required for Non-Conforming Items)         1       Simple groatiners received intact and scaled?       Check Applicable: Scale broken       Damaged container       Leking container       Other (describe)         2       Check Applicable: Scale broken       Damaged container       Control (describe)       Other (describe)         3       Sample sequiring cold preservation within (0 ≤ 6 dag. C)?       Creck Applicable: Chen contacted and provided COC       COC created upon secelpt         5       Sample sequiring cold preservation miting the scale containers instance and scaled?       Temperature are accounted in Celaius       Temperature broke Script #: [TS J = C]         5       Sample containers instact and scaled?       Check Applicable: Scale broken       Damaged container       Laking container       Diff check provident Advecked:         4       taproper pH7       Temperature Broke Soil After the scale to taking the to VOA Freezer)       Do any samples requiring chemical preservation after celestable advected:       No	D) Did the client designate samples are hazardous?		/	[1] 그는 그는 그는 것은 사람이 있는 것은 것은 것은 것을 통해 있었다. 그는 것은 것은 그는 것은 것을 가지 않는 것을 가지 않는 것을 하는 것을 수 있다. 것을 하는 것을 수 있다. 것을 하는 것을 수 있는 것을 수 있다. 것을 하는 것을 수 있는 것을 하는 것을 수 있는 것을 수 있다. 것을 수 있는 것을 것을 수 있는 것을 것을 수 있는 것을
1       Shipping containers received infact and saled?       Circle Applicable: Seals broken Damaged container Leaking container Citer (describe)         2       Chain of custody documents included       Circle Applicable: Client contacted and provide COC       COC created upon receipt         3       Samples requiring cold preservation within (VS deg C)?       Circle Applicable: Client contacted and provide COC       COC created upon receipt         4       Daily cleack performed and passed on IR comperiture Device Serial #: 12K3192       Secondary Temperature Device Serial #: 12K3192         5       Sample containers intact and scaled?       Circle Applicable: Statis broken Damaged container Leaking container Other (describe)         6       Samples requires (Leaking containers Affected: Interperature Bevice Serial #: 12K3192         7       Do any samples requires Volatile Analysis?       Sample ID's and Containers Affected: Interperature Device Serial #: 12K3192         8       Sample DD's on COC match ID's on Unit the Applicable: If Yes, and Encoder of Soil Kits present for soil:de? Yes	E) Did the RSO identify possible hazards?		1	CB's Flowmohle Famin Cutton Content of the State
Shipping containers received intact and sealed?       Circk Applicable: Seals broken Damaged container Laking container Laking container (Laking container)         Chain of custody documents included with shipment?       Circk Applicable: Clent contacted and powided COC       COC created upon receipt         Samples requiring cold preservation within (0 ≤ doc QC)?       Preservation Method: We it for ice for Pecks Dry ice Control of the (discribe)       TEMP: 20°C         Daily cleck performed and passed on IR       Sconday Temperature Device Serial # (LApplicable);       Circk Applicable: Serial # (LApplicable);         Sample scontainers infact and sealed?       Circk Applicable: Serial # (LApplicable);       Circk Applicable: Serial # (LApplicable);         Sample containers infact and sealed?       Circk Applicable: Serial # (LApplicable);       Circk Applicable: Serial # (LApplicable);         Da any samples requiring Volatile Analysis?       Sample D's and Containers Affected:       No	· Sample Receipt Criteria	Kes	NA NA	2 Comments/Qualifiers (Required for Non-Cauforming Remot
with highment?       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V       V	sealed?			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
within (0 ≤ 6 deg. C)?*       **Il temperatures are recorded in Celsius       TEMP: 20.°C         bity cleck performed and passed on IR       Centerature Device Serial #: 24.32-72       Scondary: Centerature Device Serial #: 24.32-72         5       Sample containers intact and sealed?       Circle Applicable: Seals broken       Damaged container       Leaking container         5       Samples require Volatile Analysis?       Simple ID's and Containers Affected:       If Yes, are Bancros or Soil Kits preservation added, Low:       If Yes, are Bancros or Soil Kits preservation add preservation? Yes No NA (If yes, take to VOA Freezen)         Do any samples require Volatile Analysis?       Dirigid VOA vials centain add preservation? Yes No NA (If white vort, select No)         Acts liquid VOA vials free of headspace? Yes No NA (If white vort, select No)       Acts liquid VOA vials centain add preservation? Yes No NA	with shipment?	$\square$		
temperature gun?       Image: Conday Temperature Device Serial # (If Applicable):         Sample containers intact and sealed?       Circle Applicable: Seals broken Danaged container Ltaking container Other (describe)         Samples requiring chemical preservation at proper pH?       Sample ID's and Containers Affected:         If Yes, me Encores or Soil Kils present for solids? YesNoNA(If yes, take to VOA Freezer)       Do any samples require Volatile Analysis?         Sample preceived within holding time?       ID's and containers affected:       ID's and containers affected:         Sample ID's on COC match date & time on bottles?       Circle Applicable: No dates on containers. No times on containers COC missing info       Other (describe)         Number of containers received match and the property signed in relinquished //cecived sections?       Circle Applicable: No trelinquished Other (describe)         Are sample containers is properly signed in relinquished in sol properly signed in relinquished/received sections?       Circle Applicable: Not relinquished Other (describe)	within $(0 \le 6 \text{ deg. C})$ ?*		1	*all temperatures are recorded in Celsius TEMP: 20°C
Samples requiring chemical preservation at proper pH?       Sample DS and Containers Affected: If Preservation added_Lot#: If Yes, are Encores or Soil Kits present for solids? YesNoNA(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? YesNoNA(If unknown, select No) Are liquid VOA vials free of headspace? YesNoNA(If unknown, select No) Are liquid VOA vials free of headspace? YesNoNA(If unknown, select No)         Samples received within holding time?       ID's and tests affected:         Sample ID's on COC match late & time on bottles?       Circle Applicable: No dates on containers No times on containers COC missing info         Number of containers received match number of containers received match muber indicated on COC?       Circle Applicable: No container count on COC Other (describe)         Number of containers received in this bit indicates affected:       Circle Applicable: No trelinquished Other (describe)         Number of containers received match number indicated on COC?       Circle Applicable: No trelinquished Other (describe)         Number of containers infinible as GEL provided?       Circle Applicable: Not relinquished Other (describe)         COC form is properly signed in relinquished/Circle Applicable: Not relinquished Other (describe)         Numents (Use Continuation Form if needed):	temperature gun?	$  \land  $		Secondary Temperature Device Serial # (If Applicable):
at proper pH?       If Preservation added, Lott:         Do any samples require Volatile Analysis?       If Ves, are Encores or Soil Kits present for solids? YesNoNA(If yes, take to VOA Freezer)         Do liquid VOA vials contain acid preservation? YesNoNA(If unknown, select No)         Are liquid VOA vials free of headspace? YesNoNA(If unknown, select No)         Samples received within holding time?       ID's and tests affected:         Sample ID's on COC match ID's on bottles?       ID's and containers affected:         Date & time on COC match date & time on bottles?       Citcle Applicable: No dates on containers No times on containers COC missing info         Number of containers received match number indicated on COC?       Citcle Applicable: No container count on COC Other (describe)         Are sample containers identifiable as IEEL provided?       Citrele Applicable: Not relinquished Other (describe)         COC form is properly signed in relinquished/received sections?       Citrele Applicable: Not relinquished Other (describe)         numeuts (Use Continuation Form if needed):       Not relinquished Other (describe)				Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
Image: second	Samples requiring chemical preservation at proper pH?			
Samples received within holding time? Sample ID's on COC match ID's on bottles? Date & time on COC match date & time on bottles? Number of containers received match number indicated on COC? Are sample containers identifiable as GEL provided? COC form is properly signed in relinquished/received sections? numents (Use Continuation Form if needed): PM(acDM(4)) are in this of the form if needed):				If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA
bottles?       Image: Control of the second se	B Samples received within holding time?	フ		ID's and tests affected:
Image: Construction of containers received match number indicated on COC?       Circle Applicable: No container count on COC Other (describe)         Are sample containers identifiable as GEL provided?       Circle Applicable: Not relinquished Other (describe)         COC form is properly signed in relinquished/received sections?       Circle Applicable: Not relinquished Other (describe)         Imments (Use Continuation Form if needed):       Imments (Use Continuation Form if needed):		~		ID's and containers affected:
number indicated on COC?	on bottles?	4		
GEL provided?       Circle Applicable: Not relinquished Other (describe)         relinquished/received sections?       Circle Applicable: Not relinquished Other (describe)         numents (Use Continuation Form if needed):       .         .       .	number indicated on COC?			Circle Applicable: No container count on COC Other (describe)
Internation Form if needed):	GEL provided?		•	
	relinquished/received sections?	$\checkmark$		Circle Applicable: Not relinquished Other (describe)
PM (or PMA) review: Initials Date U Date Page of	•			
	PM (or PMA)	reviev	v: In	ialsDatePageof
GL-CHL-SR-001 Rev 6				



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL LLC.		-									
	10282 Rock \$	Springs Ro	ad									
	West Valley,	New York	14171-9799					Repo	ort Date:	May 3	, 2019	
Contact:	Mr. William	Connors						1				
Project:	CH-003169 I	Haz Waste										
						D	• .		202501			-
Client Sample Sample ID: Matrix:	476212 Misc So	001 olid					oject: ient ID:	WVN: WVN:	S02501 S025			
Collect Date:	28-MA											
Receive Date:	11-APE Client	<b>R</b> -19										
Collector: Parameter	Client Oualifier	Result I	Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Time	- Batch	Mtd
High Rad Testing	Quanner	Result	Sheertanity	DL	110	KL	Onits		r Analyst		Daten	IVILU
Alphaspec Pu242, S	Solid High Rad	"As Receiv	ed"									
Plutonium-238	Hh		+/-8.76E-05	9.30E-05	+/-8.95E-05	1.00E-06	uCi/g		JXB7	04/24/19 0835	1870155	1
Plutonium-239/240	Hh		+/-0.000115	0.000121	+/-0.000119		uCi/g					
Plutonium-242	HUh		+/-6.05E-05	0.000106	+/-6.07E-05	1.00E-06	uCi/g					
Alphaspec U232, Se	olid High Rad "	As Receive	d"									
Uranium-232			+/-6.56E-05	0.000212	+/-6.57E-05	1.00E-06	uCi/g		JXB7	04/18/19 1601	1864678	2
Uranium-233/234	HUh	2.92E-05	+/-4.85E-05	7.57E-05	+/-4.88E-05	1.00E-06	uCi/g					
Uranium-235/236	Hh	6.50E-05	+/-5.64E-05	3.25E-05	+/-5.75E-05	1.00E-06	uCi/g					
Uranium-238	HUh	3.59E-05	+/-5.38E-05	8.37E-05	+/-5.42E-05	1.00E-06	uCi/g					
GFPC, Sr90, solid	High Rad "As R	leceived"										
Strontium-90	Hh	0.00143	+/-0.000179	5.71E-05	+/-0.000316	1.00E-04	uCi/g		JXB7	04/19/19 0727	1864681	3
Gammaspec, Cs137	7 Only, solid Hi	gh Rad "As	Received"									
Americium-241	Н	0.000167	+/-2.93E-05	2.76E-05	+/-3.49E-05		uCi/g		AXM6	04/22/19 1002	1866818	4
Cesium-137	Н	0.042	+/-5.17E-05	5.96E-06	+/-0.00382	1.00E-05	uCi/g					
Cobalt-58	Н		+/-3.48E-05	3.03E-05	+/-3.63E-05	0.100	uCi/g					
Cobalt-60	Н		+/-9.01E-07	5.14E-07	+/-1.04E-06		uCi/g					
Niobium-95	Н	0.000181	+/-5.28E-05	4.83E-05	+/-5.56E-05	0.050	uCi/g					
The following Prep		performed	l									
	escription				Analyst	Date	Tir		ep Batch			
Client Requested Pro Di	issolution Soil Pre	ep GL-RAD	-A-015		AXM6	04/12/19	141	15 18	66819			
The following Analy		were perfo	rmed									
Method De	escription											
1 D0	DE EML HASL-3	00, Pu-11-R	C Modified								-	
2 D0	DE EML HASL-3	00, U-02-R	C Modified									
3 EF	PA 905.0 Modifie	d/DOE RP50	01 Rev. 1 Mod	ified								
4 D0	DE HASL 300, 4.	5.2.3/Ga-01-	-R									
Surrogate/Tracer R	ecovery	Гest					]	Batch ID	Recover	y% Accepta	able Limi	its
Plutonium-236 Tra	acer	Alphaspe	c Pu242. Soli	d High Rad "	As Received"			1870155	76.	-	-125%)	
Uranium-232 Trac				l High Rad "A				1864678	95		-125%)	
Uranium-235/236				l High Rad "A				1864678	72.		-125%)	
Strontium Carrier	114001	• •		h Rad "As Re				1864681	104			
Submuni Carrier		0110, 31	50, sonu riig	ii Nau As Kt				1004001	104	+ (23%)	-125%)	

Batch ID Recovery% Acceptable Limits

## GEL LABORATORIES LLC

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### **Certificate of Analysis**

Address :LLC. 10282 Rock Springs RoadWest Valley, New York 14171-9799Report Date:May 3, 2019Contact:Mr. William ConnorsProject:CH-003169 Haz WasteClient Sample ID:RER Floor 476212001Project:WVNS02501 Client ID:Client ID:WVNS025	Parameter	<b>Oualifier</b> Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch	Mtd
10282 Rock Springs Road     West Valley, New York 14171-9799     Report Date:     May 3, 2019       Contact:     Mr. William Connors								
10282 Rock Springs RoadReport Date:May 3, 2019West Valley, New York 14171-9799Report Date:May 3, 2019	Project:	CH-003169 Haz Waste						
10282 Rock Springs Road	Contact:	Mr. William Connors						
Address .		West Valley, New York 14171-9799				Report Date:	May 3, 2019	
Company : CH2M HILL BWXT West Valley	1 2	LLC.						

Surrogate/Tracer Recovery Test

Notes:

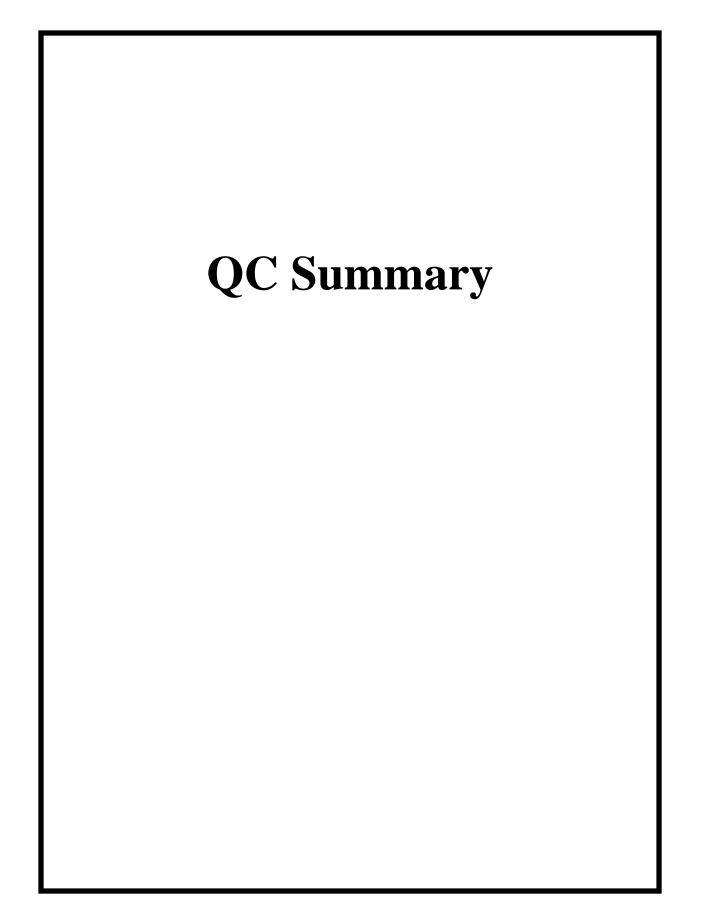
445

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration



### **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: May 3, 2019

Page 1 of 5

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 476212

**Contact:** 

Parmname			NON	N	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 186	4678													
QC1204254055 Uranium-232	474903001	DUP		Hh	0.000279	Н	0.000412	uCi/g	38.5		(0% - 100%)	JXB7	04/23/1	9 22:19
Uranium-233/234				Hh	0.000573	Н	0.000834	uCi/g	37.1*		(0%-20%)			
Uranium-235/236				HUh	2.40E-05	Н	7.87E-05	uCi/g	74.6		(0% - 100%)			
Uranium-238				HUh	6.02E-05	HU	8.86E-05	uCi/g	N/A		N/A	A		
QC1204254057 Uranium-232	LCS					U	3.77E-05	uCi/g					04/18/1	19 23:20
Uranium-233/234							0.00329	uCi/g						
Uranium-235/236							0.000262	uCi/g						
Uranium-238			0.00359				0.00359	uCi/g		100	(75%-125%)			
QC1204254054 Uranium-232	MB					U	4.35E-05	uCi/g					04/18/1	19 16:01
Uranium-233/234						U	6.24E-07	uCi/g						
Uranium-235/236						U	4.96E-06	uCi/g						
Uranium-238						U	9.53E-06	uCi/g						
QC1204254056 Uranium-232	474903001	MS		Hh	0.000279	Н	0.000269	uCi/g					04/23/1	19 22:19

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# **QC Summary**

		$\underline{\mathbf{v}}$	Summar	<u>. y</u>				
Workorder: 476212				_				Page 2 of 5
Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 1864678								
Uranium-233/234	Hh	0.000573 H	0.00391	uCi/g			JXB7	04/23/19 22:19
Uranium-235/236	HUh	2.40E-05 H	0.000196	uCi/g				
Uranium-238	0.00359 HUh	6.02E-05 H	0.00311	uCi/g		84.9	(75%-125%)	
Batch 1864681 —								
QC1204254061 474903001 DUP Strontium-90	Hh	0.141 H	0.124	uCi/g	12.7		(0%-20%) JXB7	04/19/19 07:28
QC1204254063 LCS Strontium-90	0.00302		0.00258	uCi/g		85.4	(75%-125%)	04/19/19 07:28
QC1204254060 MB Strontium-90		U	3.13E-05	uCi/g				04/19/19 07:28
QC1204254062 474903001 MS Strontium-90	0.00317 Hh	0.141 H	0.129	uCi/g		N/A	(75%-125%)	04/19/19 07:28
Batch 1866818 —								
QC1204259093 476212001 DUP Americium-241	Н	0.000167 H	0.000153	uCi/g	8.51		(0%-20%) AXM6	04/19/19 10:49
Cobalt-60	Н	5.31E-06 H	5.51E-06	uCi/g	3.74		(0%-20%)	
Cesium-137	Н	0.042 H	0.0474	uCi/g	12.1		(0%-20%)	
Cobalt-58	Н	0.000106 H	0.000163	uCi/g	42.3		(0% - 100%)	
Niobium-95	Н	0.000181 HU	0.000144	uCi/g	9.78		(0% - 100%)	
QC1204259094 LCS Americium-241	0.00346		0.00367	uCi/g		106	(75%-125%)	04/19/19 10:50

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# **QC Summary**

			Summar	<u>. y</u>						
Workorder: 476212									Pag	e 3 of 5
Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range A	Anlst	Date	Time
High Rad Testing Batch 1866818										
Cobalt-60	0.00105		0.00118	uCi/g		112	(75%-125%)	AXM6	04/19/1	19 10:50
Cesium-137	0.00131		0.00148	uCi/g		113	(75%-125%)			
Cobalt-58		U	-1.06E-06	uCi/g						
Niobium-95		U	-1.06E-06	uCi/g						
QC1204259092 MB Americium-241		U	3.81E-07	uCi/g					04/19/1	19 08:14
Cobalt-60		U	4.04E-08	uCi/g						
Cesium-137		U	8.17E-09	uCi/g						
Cobalt-58		U	-3.85E-09	uCi/g						
Niobium-95		U	1.64E-07	uCi/g						
Batch 1870155 —										
QC1204266874 476212001 DUP Plutonium-238	Hh	0.000117 HU	8.83E-05	uCi/g	22.2		(0% - 100%)	JXB7	04/24/1	19 08:35
Plutonium-239/240	Hh	0.000199 H	0.000136	uCi/g	37.7		(0% - 100%)			
Plutonium-242	HUh	2.73E-05 HU	2.25E-05	uCi/g	N/A		N/A			
QC1204266876 LCS Plutonium-238		U	3.53E-05	uCi/g					04/23/1	19 20:22
Plutonium-239/240	0.00352		0.00376	uCi/g		107	(75%-125%)			

### **GEL LABORATORIES LLC**

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### **QC Summary**

			-									
Workorder: 476212											Pag	ge 4 of 5
Parmname	NO	М	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1870155												
Plutonium-242				U	6.30E-05	uCi/g				JXB7	04/23/1	19 20:22
QC1204266873 MB Plutonium-238				U	2.82E-05	uCi/g					04/24/1	19 08:35
Plutonium-239/240				U	3.26E-05	uCi/g						
Plutonium-242				U	3.65E-05	uCi/g						
QC1204266875 476212001 MS												
Plutonium-238		Hh	0.000117	Н	0.000136	uCi/g					04/23/1	19 20:22
Plutonium-239/240	0.00352	Hh	0.000199	Н	0.00405	uCi/g		110	(75%-125%)	)		
Plutonium-242		HUh	2.73E-05	HU	5.31E-05	uCi/g						

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit

### **GEL LABORATORIES LLC**

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### **QC Summary**

			_	<b>V</b> C DI	111111a	. <u>.</u> .						
Workor	der: 476212										Pag	e 5 of 5
Parmna	me	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
NJ	Consult Case Narrative, Da	ata Summary package	e, or Project	Manager c	concerning	this qualifi	er					
Q	One or more quality control	ol criteria have not be	en met. Refe	r to the ap	plicable na	rrative or I	DER.					
R	Sample results are rejected											
U	Analyte was analyzed for,	but not detected abov	ve the MDL,	MDA, MI	DC or LOD							
UI	Gamma SpectroscopyUn	certain identification										
UJ	Gamma SpectroscopyUn	certain identification										
UL	Not considered detected. T	he associated numbe	r is the repor	ted concer	ntration, wh	ich may b	e inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Da	ata Summary package	e, or Project	Manager c	concerning	this qualifi	er					
Y	Other specific qualifiers we	ere required to prope	rly define the	e results. C	Consult case	narrative.						
^	RPD of sample and duplication	ate evaluated using +	-RL. Conce	entrations a	are <5X the	RL. Qual	lifier Not Ap	plicable for I	Radiochem	istry.		
h	Preparation or preservation	holding time was ex	ceeded									
^ The R five time	licates that spike recovery lin elative Percent Difference (I es (5X) the contract required sed to evaluate the DUP resu	RPD) obtained from the left of	the sample d	uplicate (1	DUP) is eva	aluated aga	ainst the acce	eptance criter	ia when the	e sample i	s greater	

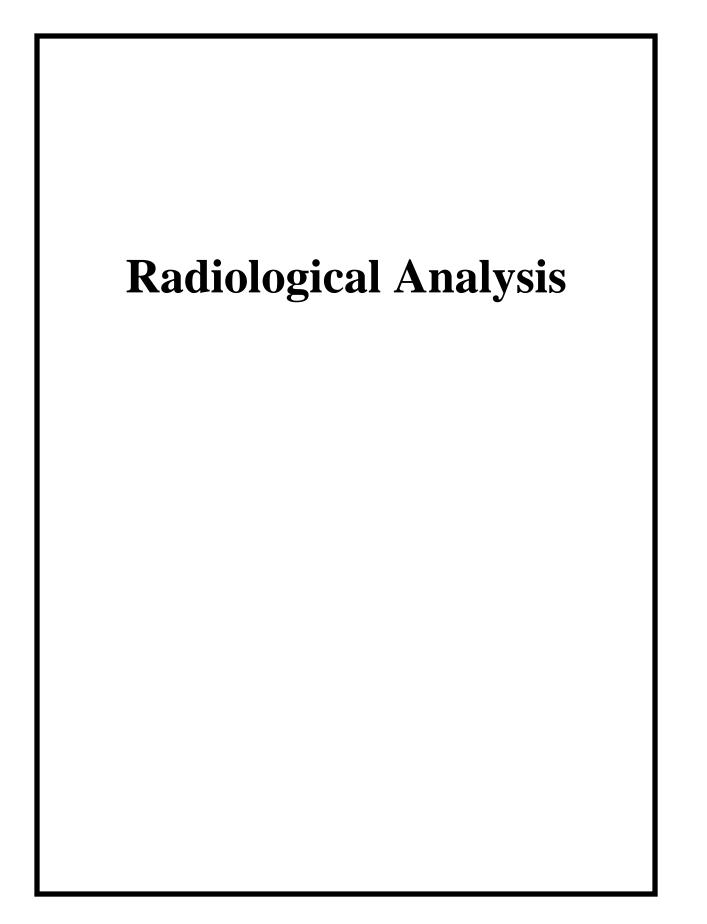
\* Indicates that a Quality Control parameter was not within specifications.

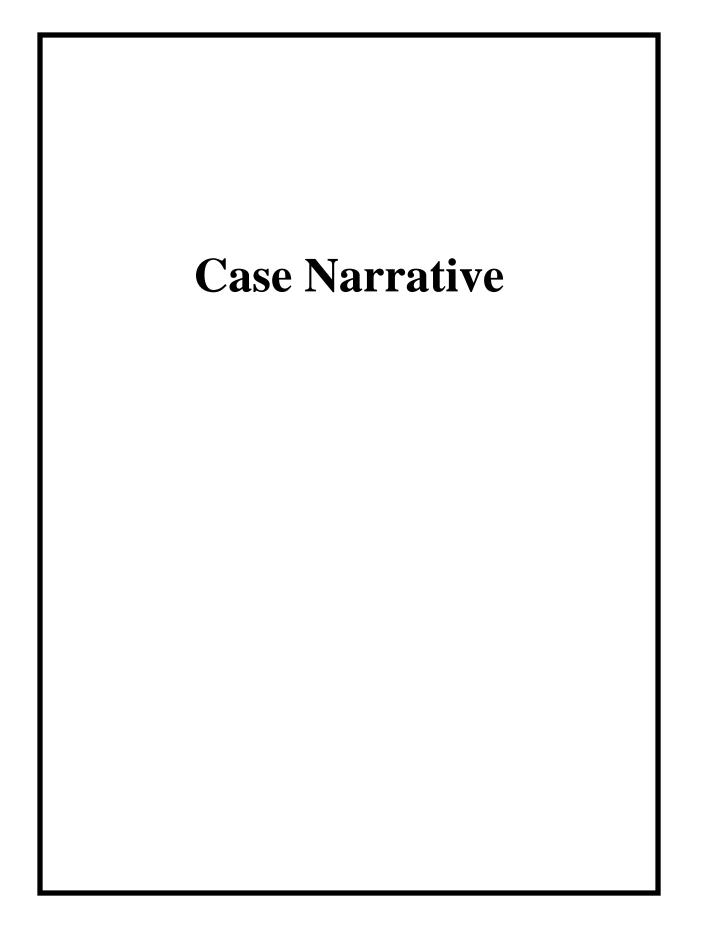
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

### List of current GEL Certifications as of 03 May 2019





#### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC SDG #: 445-003169 Work Order #: 476212

Product: Alphaspec U232, Solid High Rad Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1864678

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476212001	RER Floor
1204254054	Method Blank (MB)
1204254055	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254056	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254057	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-233/234	RPD 37.1* (0.00%-20.00%) RER 1.38 (0-3)

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204254054 (MB)	Uranium-232	Result 0.0000435 < MDA 0.000147 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.000000624 < MDA 0.0000713 > RDL 0.000001 uCi/g

		Result 0.00000496 < MDA 0.0000654 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.00000953 < MDA 0.0000713 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-238	Result 0.0000886 < MDA 0.000109 > RDL 0.000001 uCi/g
476212001 (RER Floor)	Uranium-232	Result -0.000124 < MDA 0.000212 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.0000292 < MDA 0.0000757 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.0000359 < MDA 0.0000837 > RDL 0.000001 uCi/g

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204254055 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254056 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### Negative > 3 sigma TPU

The result was more negative than the three sigma TPU. The background control chart was examined and the detector was determined to be fully functional.

Sample	Analyte	Value
476212001 (RER Floor)	Uranium-232	Negative Result > 3 sigma value

#### Recounts

The U-232 and U-236 traced portions of samples 1204254055 (XC-2 Floor DebrisDUP) and 1204254056 (XC-2 Floor DebrisMS) were given additional clean-up steps and recounted in order to remove suspected Plutonium interference. The recounts are being reported.

<u>Product:</u> Alphaspec Pu242, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 WD:2020:0753 - Attachment B Analytical Batch: 1870155

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
476212001	RER Floor
1204266873	Method Blank (MB)
1204266874	476212001(RER Floor) Sample Duplicate (DUP)
1204266875	476212001(RER Floor) Matrix Spike (MS)
1204266876	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Preparation Information**

#### **Aliquot Reduced**

Aliquots were reduced due to high activity based on Gamma data.

#### **Quality Control (QC) Information**

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204266873 (MB)	Plutonium-238	Result 0.0000282 < MDA 0.0000767 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result 0.0000326 < MDA 0.000105 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000365 < MDA 0.0000977 > RDL 0.000001 uCi/g
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g
476212001 (RER Floor)	Plutonium-242	Result 0.0000273 < MDA 0.000106 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g

	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g
476212001 (RER Floor)	Plutonium-242	Result 0.0000273 < MDA 0.000106 > RDL 0.000001 uCi/g

#### **Technical Information**

#### Holding Time

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204266874 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
1204266875 (RER FloorMS)	Received 11-APR-19, out of holding 24-SEP-18
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### Sample Re-prep/Re-analysis

Samples were reprepep due to high activity. The reanalysis is being reported.

#### Recounts

Samples 1204266873 (MB), 1204266874 (RER FloorDUP) and 476212001 (RER Floor) were recounted due to high MDCs. The recounts are reported.

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
476212001	RER Floor

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

Holding Time Samples were received and analyzed outside the hold time.

Product: Gammaspec, Cs137 Only, solid High Rad

WD:2020:0753 - Attachment B <u>Analytical Method:</u> DOE HASL 300, 4.5.2.3/Ga-01-R <u>Analytical Procedure:</u> GL-RAD-A-013 REV# 27 <u>Analytical Batch:</u> 1866818

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476212001	RER Floor
1204259092	Method Blank (MB)
1204259093	476212001(RER Floor) Sample Duplicate (DUP)
1204259094	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204259093 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### Recounts

Sample 476212001 (RER Floor) was recounted to verify sample results. Recount is reported.

#### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	<b>Client Sample</b>
Cobalt-58	476212001	RER Floor
Cobalt-60	476212001	RER Floor
Niobium-95	476212001	RER Floor

Product: GFPC, Sr90, solid High Rad <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1864681

Preparation Method: Client Requested Procedure

WD:2020:0753 - Attachment B <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1866819

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
476212001	RER Floor
1204254060	Method Blank (MB)
1204254061	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254062	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254063	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### Matrix Spike (MS) Recovery

The Matrix Spike (See Below) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

Sample	Analyte	Value
1204254062 (XC-2 Floor DebrisMS)	Strontium-90	-399* (75%-125%), but result > 5x nominal

#### **Technical Information**

#### **Holding Time**

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204254061 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254062 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
476212001 (RER Floor)	Received 11-APR-19, out of holding 24-SEP-18

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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

### Qualifier Definition Report for

### WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 445-003169 GEL Work Order: 476212

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

### **Review/Validation**

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

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

Signature: Alout G. Mulary

Name: Heather McCarty Title: Analyst II

Date: 03 MAY 2019

Attachment B - Page 342

#### XC-2 – Extraction Cell-2

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a member of The GEL Group INC



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

gel.com

April 22, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 474894 SDG: 428-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 29, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

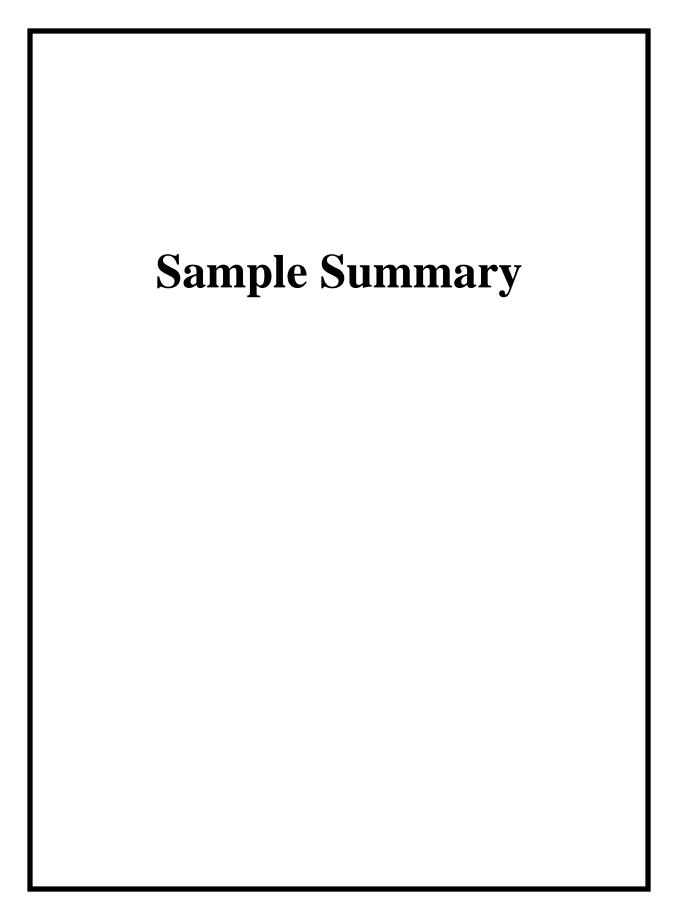
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





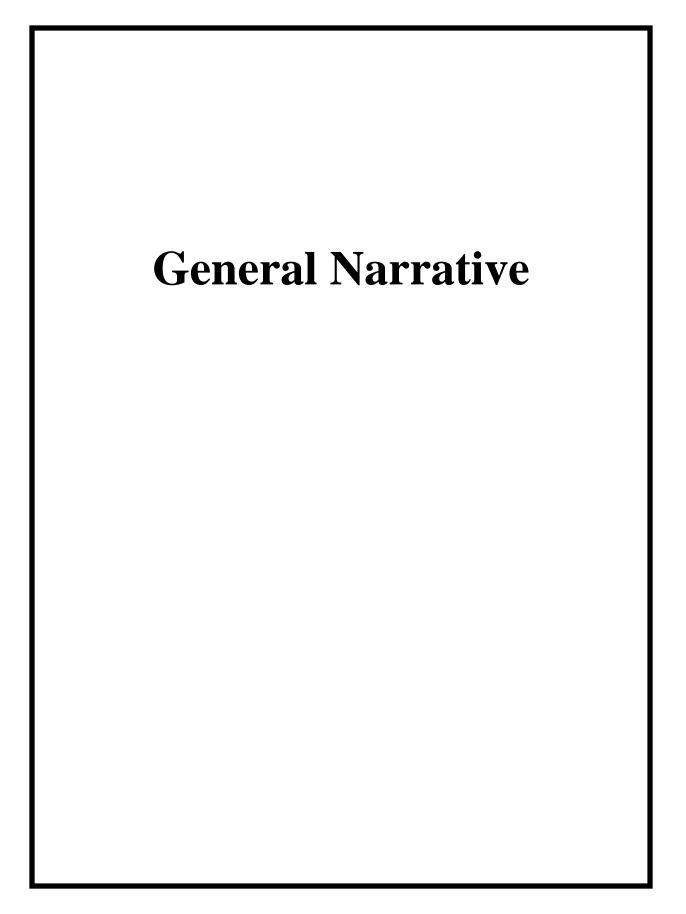
# **Sample Summary Sheet**

April 22, 2019

**Release Number** 428

**Purchase Order Number** CH-003169

Charge # WV01.C2.06.01.04.10.01 **Description** XC-2 Floor



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 428-003169 Work Order: 474894

#### April 22, 2019

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

#### Release Number

428

#### Charge Number

WV01.C2.06.01.04.10.01

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on March 29, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

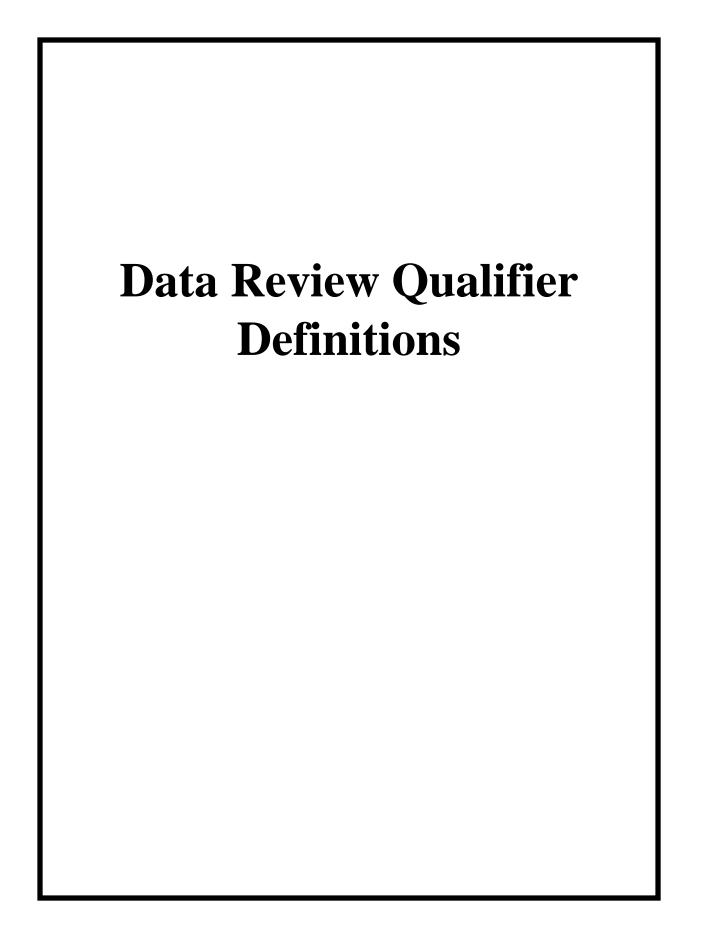
<u>Laboratory ID</u>	<u>Client ID</u>
474894001	XC-2 Floor

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

ingo m

Kerry OBarr for Katherine Cates Project Manager



428

#### Data Review Qualifier Definitions

Qualifier Explanation

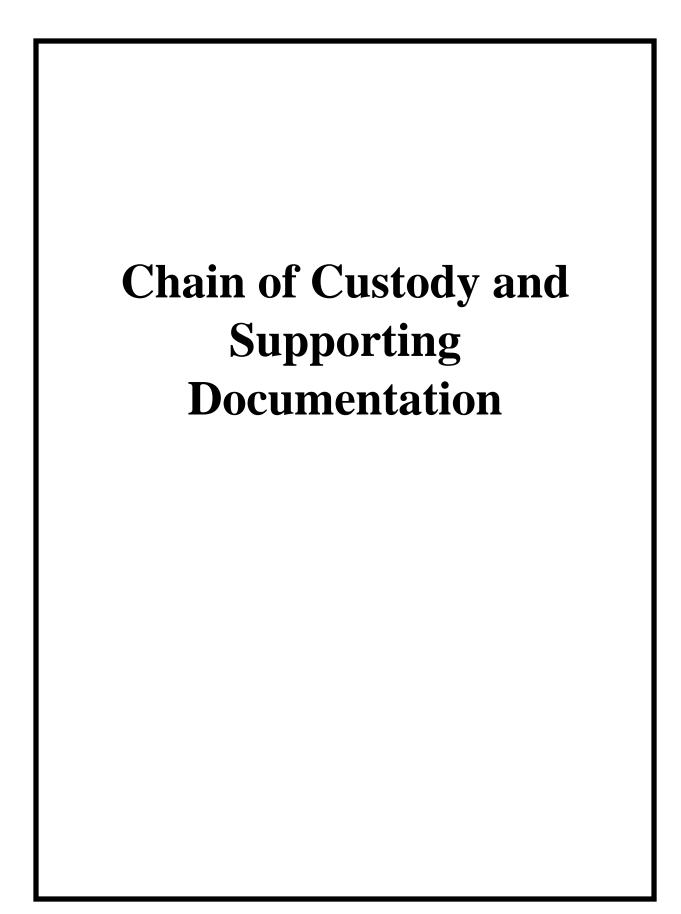
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- ${\tt C}$  ~ Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

428

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



								3	HOBALA JEOST	
		СНАІ	Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS (Page 1 of o)	Appendix B DY / REQUE	B EST-FO	R-ANALY	SIS	<b>*</b>	WD:	WD:
			CH2M HILL BWXT, West Valley LLC 10282 Rock Springs Road	M HILL BWXT, West Valley 10282 Rock Springs Road	est Valle ngs Roa				2020:0753	2020:0753
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Sample ID# T	Type # Pr Cont.	Pres. Date	Time	Hd	amma 142-m	si anpha is 12, -233/ 18)	-60	<i>L</i>	11. Report Data To: W. Connors Comments	<u> </u>
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SALACS			 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>					ı	composited by the lab to form a	
swears/	900 000 000 000 000 000 000 000 000 000								<sup></sup> Am, <sup></sup> Cs, <sup>233</sup> U, <sup>234</sup> U, <sup>235</sup> U, <sup>236</sup> U, <sup>238</sup> U, <sup>238</sup> U, <sup>238</sup> U, <sup>239</sup> Pu, <sup>242</sup> Pu, <sup>242</sup> Pu, <sup>90</sup> Sr	
Toto Page 3									Report units in uCi per composite sample.	
54										Т
18. Gross Wt (g)	86.84	14. Phase (Circle one ):	le ): Solid	linuid	0000					<u> </u>
Tare Wt (g)	76.85	Type (Circle one):								
Net Wt (g)	9.99	15. Sample Bottle Size	FW.						ণ	r
17. Chain-of-Custody Reviewed by:	y Reviewed by:		1-1-5 81		hie bolli	e I ype (C	Jainple Bottle Type (Circle One):	Glas	Poly	r
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Released by:	Cont Yes Dan 3.37.	19 13.71 Rec	$\int $	5	212		2 - 2	Sa	Temperature ZUANT.C	
Released by: <sup>U</sup>			Received by:		2101	50:4 11	S	T	Cooler Seals Intact? Yes [UTNo [ ]	
Released by:		Rec	Received by:							
WV-2865, Rev. 4 (SOP 300-08)	P 300-08)			, ,						,

	GEL Laboratories LLC SAMPLE RECEIPT & REVIEW FORM								
Client: WVVVS					G/AR/COC/Work Order: 47500547403 474894				
TKINIPAG					2/24/.0				
Received By: ZNVV/250					te Received: 0/29/19 Circle Applicable:				
Carrier and Tracking Number					Fortex Express FedEx Ground UPS Field Services Courier Other 8/07 1470 9770				
Sus	pected Hazard Information	Yes	°N	*If	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.				
A)S	hipped as a DOT Hazardous?	レ		Haz If U	ard Class Shipped: UN#: 2910 N2910, Is the Radioactive Shipment Survey Compliant? Yes Lato				
	Did the client designate the samples are to be ived as radioactive?	V			notation or radioactive stickers on containers equal client designation.				
	Did the RSO classify the samples as oactive?	2		Max Cla	timum Net Counts Observed Counts - Area Background Counts): sified as: Rad 1 Rad Add Add Add Add Add Add Add Add Add A				
	Did the client designate samples are rdous?		~		notation or hazard labels on containers equal client designation.				
E) [	oid the RSO identify possible hazards?		<u> </u>	PCE					
	Sample Receipt Criteria	Yes	NN NN	ź	Comments/Qualifiers (Required for Non-Conforming Items)				
1	Shipping containers received intact and sealed?	~			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)				
2	Chain of custody documents included with shipment?	~			Circle Applicable: Client contacted and provided COC COC created upon receipt				
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*		~	Ł	Preservation Method: Wet Ice Ice Packs Dry ice One Other: *all temperatures are recorded in Celsius TEMP: 20'C				
4	Daily check performed and passed on IR temperature gun?	/			Temperature Device Serial #:       IR3-18         Secondary Temperature Device Serial # (If Applicable):				
5	Sample containers intact and sealed?	_			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)				
6	Samples requiring chemical preservation at proper pH?		-	ł	Sample ID's and Containers Affected: If Preservation added, Lot#:				
7	Do any samples require Volatile Analysis?			-	If Yes, are Encores or Soil Kits present for solids? YesNoNA(If yes, take to VOA Freezer)         Do liquid VOA vials contain acid preservation? YesNoNA(If unknown, select No)         Are liquid VOA vials free of headspace? YesNoNA         Sample ID's and containers affected:				
8	Samples received within holding time?	>			ID's and tests affected:				
9	Sample ID's on COC match ID's on bottles?	/			ID's and containers affected:				
10	Date & time on COC match date & time on bottles?				Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)				
11	Number of containers received match number indicated on COC?	1			Circle Applicable: No container count on COC Other (describe)				
12	Are sample containers identifiable as								
12       GEL provided?         13       COC form is properly signed in relinquished/received sections?					Circle Applicable: Not relinquished Other (describe)				
Con	uments (Use Continuation Form if needed):								

PM (or PMA) review: Initials

Attachment B - Page 355

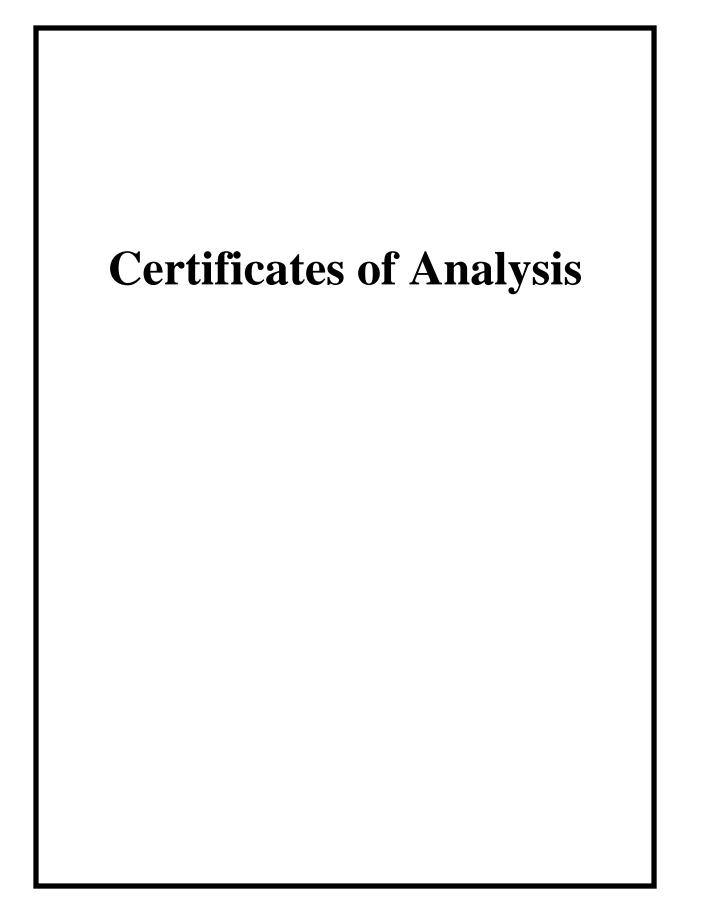
Date

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Page\_

of



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILI LLC.	L BWXT W	est Valley										
	10282 Rock	Springs Ro	ad										
	West Vallev	. New York	x 14171-9799					Re	port Date:	An	ril 22,	2019	
Contact:	Mr. William							100	poir Dute.	1 <b>.</b> p		2017	
Project:	CH-003169												
Client Sample Sample ID: Matrix: Collect Date: Receive Date:	474894 Swipe 17-MA 29-MA	4001 AY-17					oject: ient ID:		NS02501 NS025				
Collector:	Client	<b>D</b> 1/1		DI			<b>T</b> T <b>1</b> /				<b>T</b>	<b>D</b> ( 1	
Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	PF	DF Analyst	t Date	Time	Batch	Mtd.
High Rad Testing	220 240 242		"A - D	111									
Alphaspec Pu 238, Plutonium-238		0.0106	+/-0.000488		+/-0.00397	2.00E.06	uCi/somplo		A VM6	04/17/19	1412	1964692	1
Plutonium-239/240	Hh Hh		+/-0.000488	2.85E-05 2.91E-05			uCi/sample		AAMO	04/17/19	1415	1004003	1
Plutonium-242	Hh		+/-5.31E-05	2.91E 05 2.80E-05	+/-6.93E-05		uCi/sample						
Alphaspec U232, 2				ived"		0.0002							
Uranium-232	Hh		+/-7.15E-06	8.58E-06	+/-7.47E-06	2.00E-06	uCi/sample		AXM6	04/17/19	0815	1864684	2
Uranium-233/234	Hh	9.59E-06	+/-6.32E-06	7.25E-06	+/-6.51E-06		-		111110	0.01010	0010	100.001	-
Uranium-235/236	Hh	2.37E-06	+/-3.11E-06	2.37E-06	+/-3.14E-06		1						
Uranium-238	HUh	2.64E-06	+/-4.27E-06	7.04E-06	+/-4.29E-06		-						
GFPC, Sr90, filter	· HIGH RAD "A	s Received'	,										
Strontium-90	Hh		+/-0.000277	1.13E-05	+/-0.0148	2.00E-06	uCi/sample		AXM6	04/16/19	1458	1864685	3
Gammaspec, Gam	ma. Cs137. Filt	er HIGH R	AD "As Recei	ved"									
Americium-241	Hh		+/-0.000533	0.000267	+/-0.00284		uCi/sample		AXM6	04/02/19	1309	1863141	4
Cesium-137	Hh	0.031	+/-0.00048	9.31E-05	+/-0.00268	2.00E-07	uCi/sample						
Cobalt-60	Hh	0.000349	+/-7.39E-05	3.90E-05	+/-8.03E-05		uCi/sample						
Laboratory Compo	osite- Filters RA	D III "As R	Received"										
The following Prep	Methods were	performed	1										
	Description	<u>r</u>	-		Analyst	Date	Tim	e ]	Prep Batch				
Filter Prep F	Filter Prep				AXM6	04/04/19	1030	)	1862649				
The following AnalyMethodD	/	were perfo	ormed										
	OOE EML HASL-												
2 D	OE EML HASL-	300, U-02-R	C Modified										
3 E	PA 905.0 Modifie	ed/DOE RP5	01 Rev. 1 Mod	ified									
4 D	OE HASL 300, 4	.5.2.3/Ga-01	-R										
5 G	L-RAD-A-026												
Surrogate/Tracer F	Recovery	Test					В	atch I	D Recover	у% A(	ccepta	ble Limi	its
Plutonium-236 Tr	racer	Alphaspe	c Pu 238, 239	9, 240, 242 HI	GH RAD "As Recei	ved"	1	86468	3 58.	.8	(15%-	125%)	
Uranium-232 Tra					HIGH RAD "As Re			86468				125%)	
Uranium-235/236					HIGH RAD "As Re			86468				125%)	
Strontium Carrier						corveu							
Suonnum Carrier		GFPC, SI	50, mer HIC	GH RAD "As ]	Received		1	86468	5 10	2	(23%-	125%)	

Batch ID Recovery% Acceptable Limits

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## **Certificate of Analysis**

Par	ameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.
	Client Sample Sample ID:	ID: XC-2 Floor 474894001			Project: Client ID:	WVNS02501 WVNS025	
	Project:	CH-003169 Haz Waste					
	Contact:	Mr. William Connors					
		West Valley, New York 14171-9799				Report Date:	April 22, 2019
	Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road					

Surrogate/Tracer Recovery Test

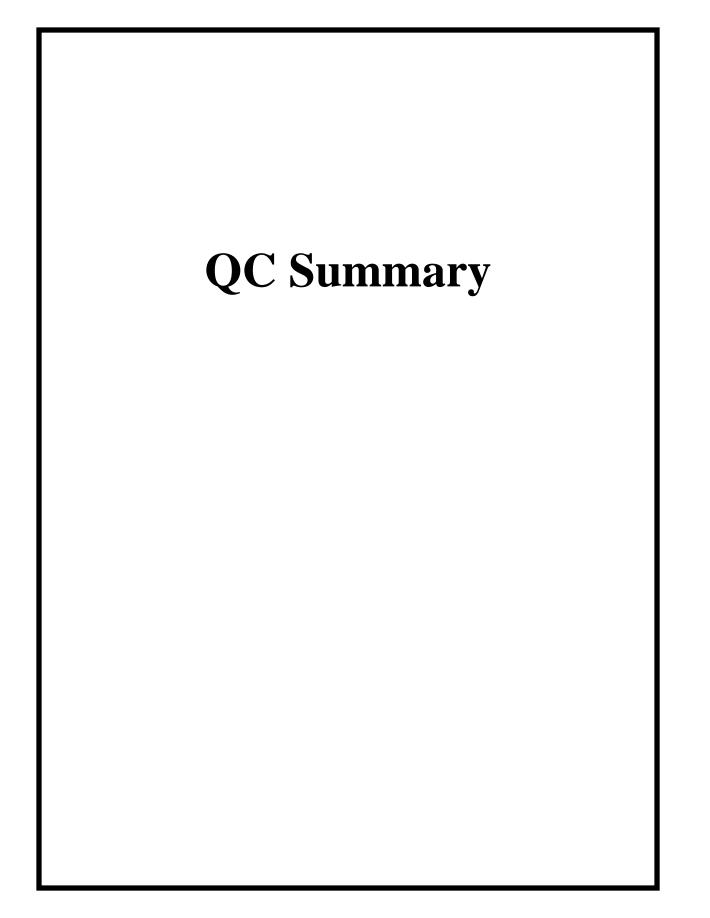
#### Notes:

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration



## **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: April 22, 2019

Page 1 of 4

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 474894

**Contact:** 

Parmname	NOM	Sample Qu	ual QC	Units	RPD%	REC%	Range	Anlst	Date Time
High Rad Testing Batch 1863141									
QC1204250642 LCS Cobalt-60	0.00538		0.00546	uCi/sample		102	(75%-125%)	AXM6	04/03/19 06:08
Americium-241	0.0303		0.032	uCi/sample		105	(75%-125%)		
Cesium-137	0.00959		0.00961	uCi/sample		100	(75%-125%)		
QC1204250643 LCSD Cobalt-60	0.00538		0.00545	uCi/sample	0.312	101	(0%-20%)		04/03/19 07:19
Americium-241	0.0303		0.0294	uCi/sample	8.5	96.8	(0%-20%)		
Cesium-137	0.00959		0.0104	uCi/sample	7.72	108	(0%-20%)		
QC1204250641 MB Cobalt-60		U	-1.41E-05	uCi/sample					04/03/19 06:23
Americium-241		U	-0.000141	uCi/sample					
Cesium-137		U	I 0.00	uCi/sample					
Batch 1864683									
QC1204254071 LCS Plutonium-238			2.28E-05	uCi/sample				AXM6	04/16/19 19:03
Plutonium-239/240	0.0002		0.000211	uCi/sample		105	(75%-125%)		
Plutonium-242		U	1.54E-05	uCi/sample			(75%-125%)		

### **GEL LABORATORIES LLC**

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# **QC Summary**

Workorder:	474894				<u> </u>					Раде	e 2 of 4
Parmname		NOM	Sample Qua	al QC	Units	RPD%	REC%	Range A	Anlst	Date	
High Rad Testing	864683		· ·								
QC1204254072 Plutonium-238	2 LCSD		U	4.50E-06	uCi/sample	0.718			AXM6	04/16/19	9 19:03
Plutonium-239/24	40	0.0002		0.000211	uCi/sample	0.236	105	(0%-20%)			
Plutonium-242			U	1.40E-05	uCi/sample	0					
QC1204254070 Plutonium-238	) MB		U	7.50E-06	uCi/sample					04/16/19	9 19:03
Plutonium-239/24	40		U	6.87E-07	uCi/sample						
Plutonium-242			U	4.93E-06	uCi/sample						
Batch 18	864684										
QC1204254078 Uranium-232			U	-1.88E-06	uCi/sample			(75%-125%)	AXM6	04/17/1	9 08:15
Uranium-233/234	4			0.000229	uCi/sample						
Uranium-235/236	5			2.03E-05	uCi/sample						
Uranium-238		0.000273		0.000244	uCi/sample		89.5	(75%-125%)			
QC1204254079 Uranium-232	) LCSD		U	3.93E-07	uCi/sample	0		(0%-20%)		04/17/19	9 08:15
Uranium-233/234	4			0.000231	uCi/sample	0.979					
Uranium-235/236	5			1.27E-05	uCi/sample	46.1					
Uranium-238		0.000273		0.000238	uCi/sample	2.4	87.3	(0%-20%)			

# **GEL LABORATORIES LLC**

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# **QC Summary**

Workord	der:	474894		-	<u> </u>		<u> </u>					Pag	ge 3 of 4
Parmnan	ne		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst		Time
High Rad Batch		1864684											
QC120 Uranium-	0425407′ -232	77 MB			U	-1.41E-06	uCi/sample				AXM6	04/17/1	19 08:15
Uranium-	-233/23	4			U	-1.63E-06	uCi/sample						
Uranium-	-235/23	6			U	8.86E-07	uCi/sample						
Uranium-	-238				U	1.57E-06	uCi/sample						
Batch	1	1864685											
	0425408		0.0023			0.00235	6 uCi/sample		102	(75%-125%	) AXM6	04/16/2	19 14:58
QC120 Strontium	0425408 n-90	32 LCSD	0.0023			0.00232	2 uCi/sample	1.18	101	(0%-20%	')	04/16/2	19 14:58
QC120 Strontium	04254080 n-90	30 MB			U	6.25E-06	uCi/sample					04/16/2	19 14:57
Notes:													
The Qua	ulifiers i	in this repor	t are defined as follows:										
		te is a Tracer											
<	Result	is less than	value reported										
>	Result	is greater th	nan value reported										
BD	Results	s are either b	below the MDC or tracer recover	ery is low									
FA	Failed	analysis.											
Н	Analyti	ical holding	g time was exceeded										
J	Value i	is estimated	i										
K	Analyt	e present. R	Reported value may be biased hi	igh. Actual	value i	is expected to	) be lower.						
L	Analyte	e present. R	Reported value may be biased lo	ow. Actual	value is	s expected to	be higher.						
М	M if ab	ove MDC a	and less than LLD										

- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.

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### **QC Summary**

			-		11111141	J						
Workor	rder: 474894										Pag	e 4 of 4
Parmna	ame	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
N1	See case narrative											
ND	Analyte concentration is not dete	ected above the	e detection lin	nit								
NJ	Consult Case Narrative, Data Su	mmary packag	ge, or Project I	Manager c	oncerning	this qualifie	er					
Q	One or more quality control crite	eria have not be	een met. Refe	r to the ap	plicable na	rrative or D	DER.					
R	Sample results are rejected											
U	Analyte was analyzed for, but no	ot detected abo	ve the MDL,	MDA, MI	DC or LOD							
UI	Gamma SpectroscopyUncertai	n identificatior	ı									
UJ	Gamma SpectroscopyUncertai	n identificatior	ı									
UL	Not considered detected. The ass	sociated numbe	er is the repor	ted concer	ntration, wh	ich may be	inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Data Su	mmary packag	ge, or Project	Manager c	oncerning	this qualifie	er					
Y	Other specific qualifiers were re-	quired to prope	erly define the	results. C	onsult case	narrative.						
^	RPD of sample and duplicate evaluation	aluated using +	-/-RL. Conce	ntrations a	are <5X the	RL. Qual	ifier Not Ap	plicable for I	Radiochem	istry.		
h	Preparation or preservation hold	ing time was e	xceeded									
^ The R five tim RL is us	dicates that spike recovery limits d Relative Percent Difference (RPD) nes (5X) the contract required deter- used to evaluate the DUP result. ates that a Ouality Control paramet	obtained from ction limit (RL	the sample due to the sample d	uplicate (l nere either	DUP) is eva	aluated aga	inst the acce	ptance criter	ia when the	e sample is	greater	

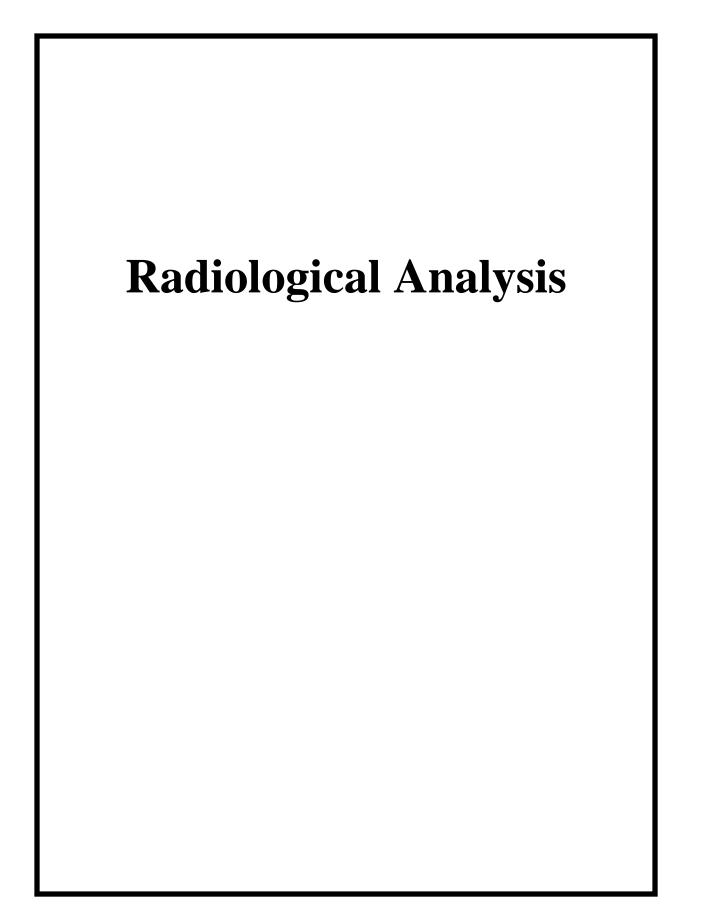
Indicates that a Quality Control parameter was not within specifications.

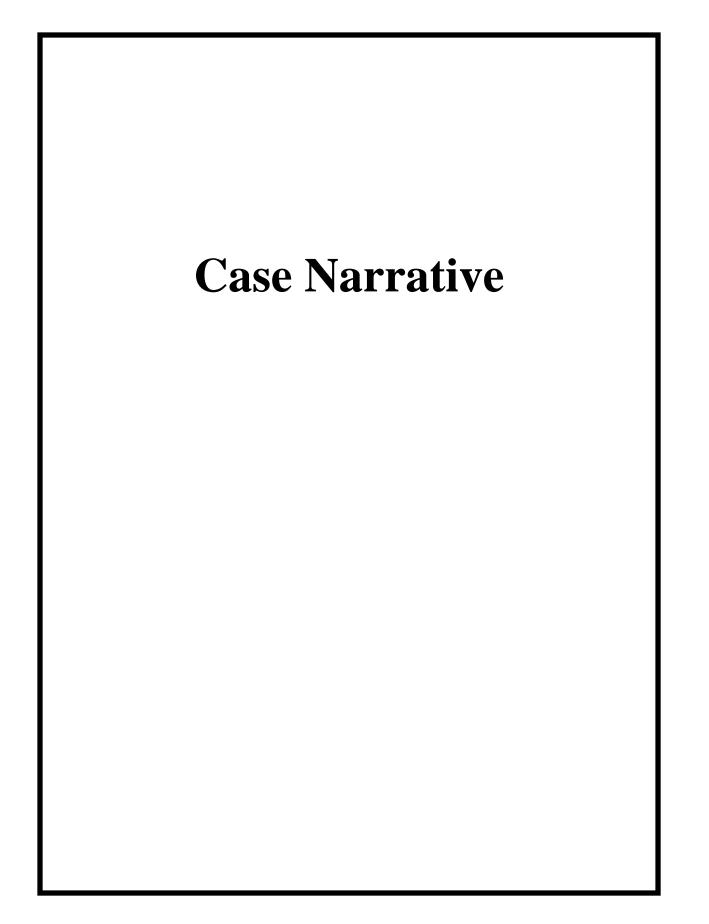
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17–018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

### List of current GEL Certifications as of 22 April 2019





### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC (WVNS) SDG #: 428-003169 Work Order #: 474894

**Product:** Alphaspec Pu 238, 239, 240, 242 HIGH RAD Analytical Method: DOE EML HASL-300, Pu-11-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1864683

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1862649

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
474894001	XC-2 Floor
1204254070	Method Blank (MB)
1204254071	Laboratory Control Sample (LCS)
1204254072	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204254070 (MB)	Plutonium-238	Result 0.0000075 < MDA 0.0000176 > RDL 0.000002 uCi/sample
	Plutonium-239/240	Result 0.000000687 < MDA 0.0000187 > RDL 0.000002 uCi/sample

### **Technical Information**

### Holding Time

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
474894001 (XC-2 Floor)	Received 29-MAR-19, out of holding 13-NOV-17

#### Recounts

Sample 474894001 (XC-2 Floor) was recounted for a shorter amount of time in order to reduce tailing. The recount is reported.

#### **Miscellaneous Information**

#### **Manual Integration**

Manual integration of alpha spectroscopy spectra 474894001 (XC-2 Floor) was performed to fully separate counts in Regions of Interest which would have been biased.

Product: Alphaspec U232, 233, 234, 235, 238 HIGH RAD Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1864684

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1862649

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
474894001	XC-2 Floor
1204254077	Method Blank (MB)
1204254078	Laboratory Control Sample (LCS)
1204254079	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204254077 (MB)	Uranium-232	Result -0.00000141 < MDA 0.00000935 > RDL 0.000002 uCi/sample
	Uranium-233/234	Result -0.00000163 < MDA 0.00000599 > RDL 0.000002 uCi/sample
	Uranium-235/236	Result 0.000000886 < MDA 0.00000423 > RDL 0.000002 uCi/sample
	Uranium-238	Result 0.00000157 < MDA 0.00000422 > RDL 0.000002 uCi/sample

Sample (See Below) did not meet the detection limit due to the small sample aliquot used. The aliquot was reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
474894001 (XC-2 Floor)	Uranium-238	Result 0.00000264 < MDA 0.00000704 > RDL 0.000002 uCi/sample

#### **Technical Information**

#### **Holding Time**

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
474894001 (XC-2 Floor)	Received 29-MAR-19, out of holding 13-NOV-17

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1862649

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
474894001	XC-2 Floor

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: Gammaspec, Gamma, Cs137, Filter HIGH RAD Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R **Analytical Procedure:** GL-RAD-A-013 REV# 27 **Analytical Batch:** 1863141

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1862649

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
474894001	XC-2 Floor
1204250641	Method Blank (MB)
1204250642	Laboratory Control Sample (LCS)
1204250643	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

428

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value				
1204250641 (MB)	Cesium-137	Result 0 < MDA 0.0000362 > RDL 0.0000002 uCi/sample				

#### **Technical Information**

#### Holding Time

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
474894001 (XC-2 Floor)	Received 29-MAR-19, out of holding 13-NOV-17

#### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	Client Sample		
Cobalt-60	474894001	XC-2 Floor		

#### **Qualifier Information**

Qualifier	Reason	Analyte	Sample	<b>Client Sample</b>
UI	Results are considered a false positive due to no valid peak.	Cesium-137	1204250641	MB for batch 1863141

### **Product: GFPC, Sr90, filter HIGH RAD** <u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 <u>Analytical Batch:</u> 1864685

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1862649

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
474894001	XC-2 Floor
1204254080	Method Blank (MB)
1204254081	Laboratory Control Sample (LCS)
1204254082	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### Quality Control (QC) Information

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value					
1204254080 (MB)	Strontium-90	Result 0.00000625 < MDA 0.0000123 > RDL 0.000002 uCi/sample					

### **Technical Information**

### Holding Time

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
474894001 (XC-2 Floor)	Received 29-MAR-19, out of holding 13-NOV-17

<u>Product:</u> Laboratory Composite- Filters RAD III <u>Composite Preparation Method:</u> GL-RAD-A-026 WD:2020:0753 - Attachment B <u>Composite Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Composite Preparation Batch:</u> 1863195

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
474894001	XC-2 Floor

The samples in this SDG were analyzed on an "as received" basis.

#### Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

#### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **GEL LABORATORIES LLC**

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

### Qualifier Definition Report for

### WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 428-003169 GEL Work Order: 474894

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- UI Gamma Spectroscopy--Uncertain identification
- h Preparation or preservation holding time was exceeded

### **Review/Validation**

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

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

2022 Signature:

Date: 22 APR 2019

Name: Theresa Austin Title: Group Leader

# Prep Logbook

## WD:2020:0753 - Attachment B The Preparation of Special Matrices for the Determination of Radionuclides

Batch ID: Analyst: Method: Lab SOP: Instrument:	<b>1862649</b> Andrew McKenz Filter Prep GL-RAD-A-026 R2-38110047	. ,		Due I Type	Dates for Lab: Sample Id	22-APR-2019 Description	9 Hold: 13-N	NOV-2017	Package: 24-APR-2 Serial Number	019 SDG: 26-AP Spike Amount Spike Units
# Sample ID	Prep Date	Min RDL ()	Number of Filters	Container Wt (g)	Weight of total filter with container (g)	Weight of filter Diluted with container (g)	Not Saved Final Volume of filter diluted to in Liters (mL)		Weight of Filter Diluted (g)	
1 474894001	04-APR-2019		1	0	3.307	3.307	100	3.307	3.307	
Reagent/Solvent	t Lot ID	Description		Amount	Comments:					

Analytical Logbook version 1 11-04-2002

GEL Laboratories LLC



a member of The GEL Group INC



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

gel.com

April 25, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 474903 SDG: 427-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 29, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

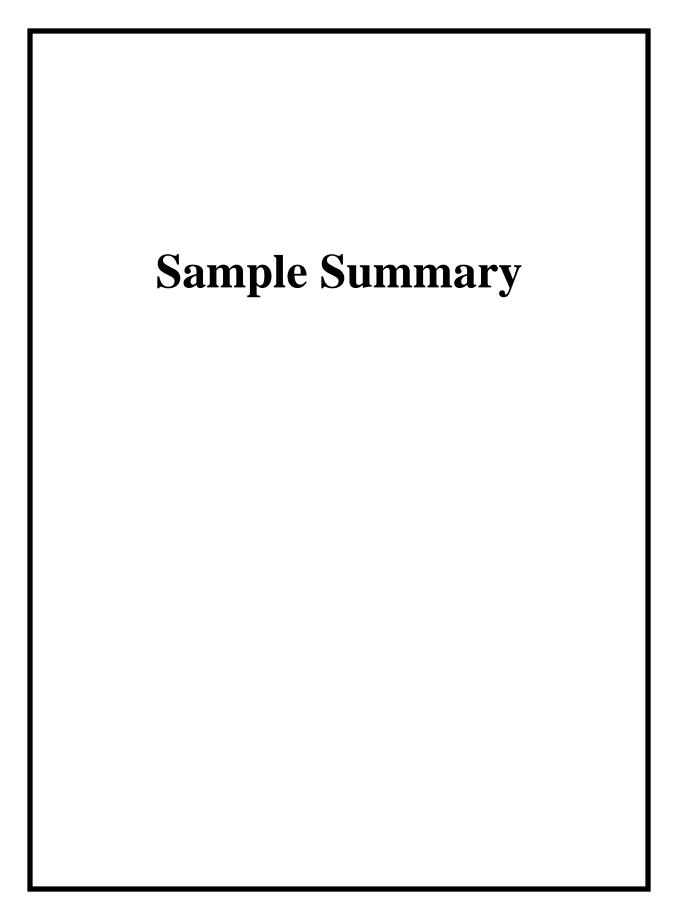
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures



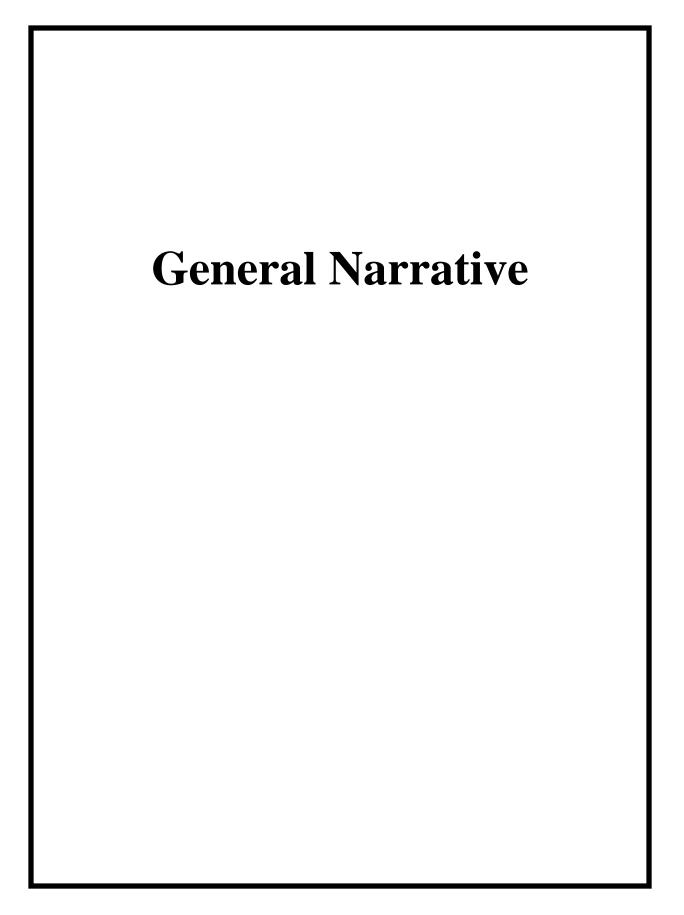


# **Sample Summary Sheet**

April 25, 2019

Release Number 427 Purchase Order Number CH-003169

<u>Charge #</u> WV01.C2.06.01.04.10.01 Description XC-2 Floor Debris



#### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 427-003169 Work Order: 474903

#### April 25, 2019

#### **Laboratory Identification:**

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

#### Release Number

427

#### Charge Number

WV01.C2.06.01.04.10.01

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on March 29, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

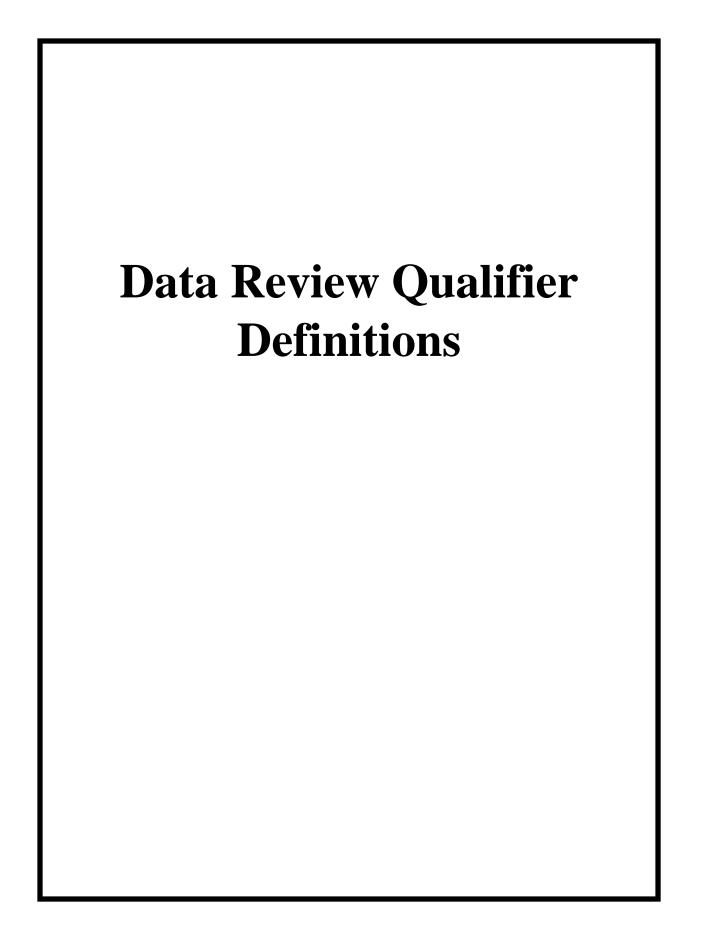
<u>Laboratory ID</u>	<u>Client ID</u>
474903001	XC-2 Floor Debris

#### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

ing o Sm

Kerry OBarr for Katherine Cates Project Manager



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#### Data Review Qualifier Definitions

Qualifier Explanation

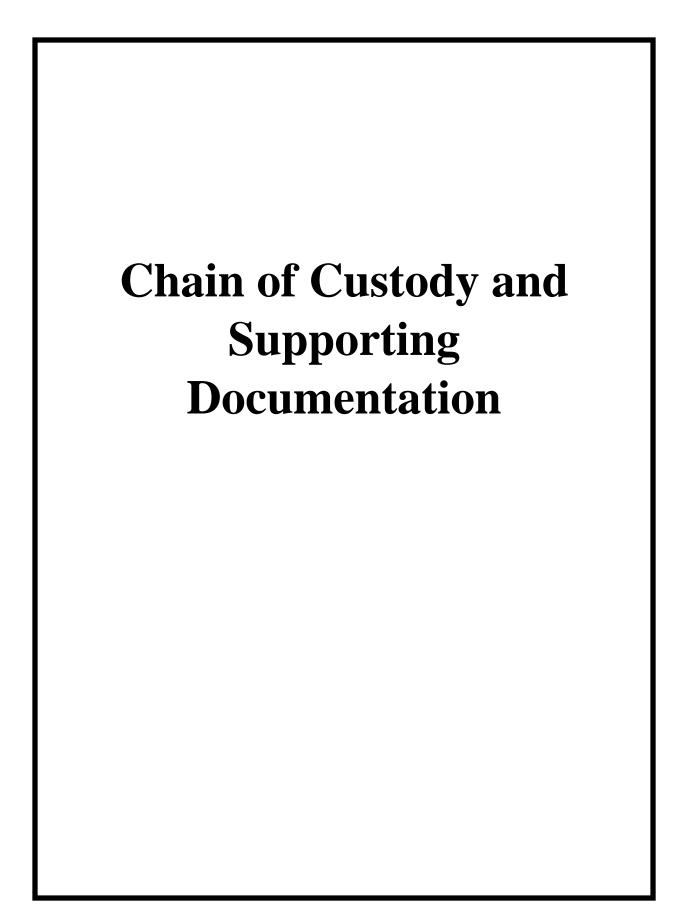
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by  $4 {\tt X}$  or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

427

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



composite sample and analyzed for <sup>241</sup> Am, <sup>137</sup>Cs, <sup>233</sup>U, <sup>233</sup>U, <sup>235</sup>U, <sup>235</sup>U, <sup>235</sup>U, <sup>235</sup>U, <sup>235</sup>U, <sup>305</sup>U, <sup></sup> Cooler Seals Intact? Yes [-TNo [ ] 11. Report Data To: W. Connors 2[] 3[ Report units in uCi per composite ] AN 9. Priority Code: Routine [ x ] composited by the lab to form a  $\mathcal{O}_{\mathcal{O}}$ 474903 \*\* The five smears are to be Comments mCi Alpha Temperature ZC 20. Sample Receipt: Other: Smear []] Poly sample. 16. Particulate Glass 1230 1505 3. Analysis Requested Sample Bottle Type (Circle One): 06-JS Filter 5/1-1/2 5/11/17  $\times$ 5.81 Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS Other : 238, -239/240, -242) -u9) səqotosi enqle u9  $\times$ Pipe Section CH2M HILL BWXT, West Valley LLC (852 U alpha isotopes (U-232, -233/234, 235/236, 29/62 Sludge West Valley, NY 14171-9799 10282 Rock Springs Road  $\times$ M 142-mA M Page 1 of 2) & TET-20 Tot smmsD  $\times$ Coupon Liquid 19. Sample Custodian Signature/Date/Time 500ml 5 Н Received by Kaur 2. Charge #: WV01.C2.06.01.04.10.01 na Ν Debris 8 Phase (Circle one ): Solid Received by: Received by: Received by: 01:0 Time Sample Bottle Size: Type (Circle one): 42 5-17-1 Date 15.71 6. Release #: 15112 ų. 15051 44. ų. Ø. Pres. 8. Cognizant Engineer/Project: J. Dudek 13:27. na 17. Chain-of-Custody Reviewed by: 143.06 76.85 ROLDS 18-SN # Cont. 10. DQO/SAP#: WVDP-584 Type Grab Rep Sample ID# DEBRIS Released by: Gross Wt (g) Released by: Released by: Released b**∛** FLOOR Tare Wt (g) Net Wt (g) x--2X 5. PO #: 1. Lab: <u>ci</u> ₩ 1 200 hmen

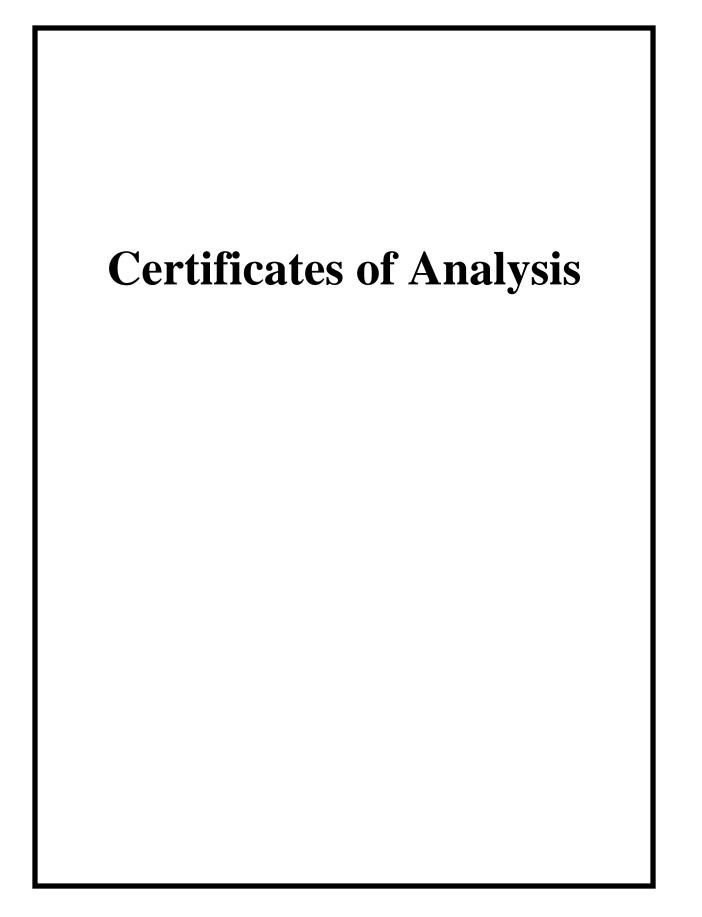
Page 9 of 29 SDG: 427-003169

CH-003169

WV-2865, Rev. 4 (SOP 300-08)

427

WVNS y: ZKW/RSC r and Tracking Number				SAMPLE RECEIPT & REVIEW FORM DG/AR/COC/Work Order: 47500547403 474894 Ite Received: 3/29/19 For Ex Express FedEx Ground UPS Field Services Courier Other									
r and Tracking Number				the Received: 3/29/19									
r and Tracking Number				Circle Applicable:									
exard Information				Circle Applicable:									
	Yes	ź	*If	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.									
	f	1-	1										
a DOT Hazardous?	1	$\vdash$		Inzard Class Shipped: UN2910, Is the Radioactive Shipment Survey Compliant? Yes_Letto									
ent designate the samples are to be dioactive?	V	F	co	C notation or radioactive stickers on containers equal client designation.									
O classify the samples as	~	-	Ma Cla	ximum Net Counts Observed: (Observed Counts - Area Background Counts): 8. OCPM / nR/Hr ssified as: Rad 1 (Rad) Rad 3									
ent designate samples are		L	3600.43	C notation or hazard labels on containers equal client designation.									
O identify possible hazards?		~		or E is yes, select Hazards below. 3's Flammable Foreign Soil RCRA Asbestos Beryllium Other:									
mple Receipt Criteria	Yes	NA	°Z	Comments/Qualifiers (Required for Non-Conforming Items)									
	~			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)									
	2			Circle Applicable: Client contacted and provided COC COC created upon receipt									
≤6 deg. C)?*		~	-	Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 20 'C									
	-			Temperature Device Serial #: IR3-18 Secondary Temperature Device Serial # (If Applicable):									
ontainers intact and sealed?	-			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)									
		1	-	Sample ID's and Containers Affected: If Preservation added, Lot#:									
ny samples require Volatile Analysis?			, /	If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer)         Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No)         Are liquid VOA vials free of headspace? Yes No NA         Sample ID's and containers affected:									
received within holding time?	7			ID's and tests affected:									
D's on COC match ID's on	フ			ID's and containers affected:									
	1			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)									
	-			Circle Applicable: No container count on COC Other (describe)									
			1										
n is properly signed in	7			Circle Applicable: Not relinquished Other (describe)									
	ent designate the samples are to be dioactive? O classify the samples as ent designate samples are O identify possible hazards? mple Receipt Criteria g containers received intact and Custody documents included oment? requiring cold preservation $0 \le 6$ deg. C)?* eck performed and passed on IR ure gun? containers intact and sealed? requiring chemical preservation pH? my samples require Volatile	ent designate the samples are to be       Image: Containers received intact and sealed?         O identify possible hazards?       Image: Containers received intact and sealed?         Image: Containers require volatile Analysis?       Image: Containers received intact and sealed?         Image: Containers require volatile Analysis?       Image: Containers received intact and sealed?         Image: Containers require volatile Analysis?       Image: Containers received intact and sealed?         Image: Containers require volatile Analysis?       Image: Containers received match analysis?         Image: Containers received match and passed on IR ure gun?       Image: Containers intact and sealed?         Image: Containers intact and sealed?       Image: Containers intact and sealed?         Image: Containers intact and sealed?       Image: Containers intact and sealed?         Image: Containers intact and sealed?       Image: Containers intact and sealed?         Image: Containers received match analysis?       Image: Containers intact and sealed?         Image: Containers received match analysis interes intact and sealed?       Image: Containers intact and sealed?         Image: Containers identifiable as vided?       Image: Containers identifiable as vided?	ent designate the samples are to be dioactive? O classify the samples as ent designate samples are O identify possible hazards? Imple Receipt Criteria g containers received intact and Custody documents included oment? requiring cold preservation $0 \le 6$ deg. C)?* eck performed and passed on IR ure gun? containers intact and sealed? requiring chemical preservation pH? In y samples require Volatile Analysis? received within holding time? D's on COC match ID's on me on COC match date & time $3^2$ of containers received match indicated on COC? ble containers identifiable as vided? n is properly signed in	ent designate the samples are to be dioactive?COCO classify the samples asMa Cla and the samples areMa Cla CoO classify the samples areCOO identify possible hazards?If DO identify possible hazards?PCFImple Receipt Criteria $\frac{2}{3}$ g containers received intact and $\frac{2}{3}$ requiring cold preservation $\frac{2}{3}$ $2 \le 6$ deg. C)?* $\frac{2}{3}$ exch performed and passed on IR ure gun? $\frac{2}{3}$ containers intact and sealed? $\frac{2}{3}$ requiring chemical preservation pH? $\frac{2}{3}$ iny samples require Volatile Analysis? $\frac{2}{3}$ no COC match ID's on me on COC match date & time s? $\frac{2}{3}$ of containers identifiable as vided? $\frac{2}{3}$ in is properly signed in $\frac{2}{3}$									



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company : Address :	CH2M HILI LLC. 10282 Rock		-								
			x 14171-9799					Dame	ant Datas	A mril 25	2010
Contact:	Mr. William		141/1-9/99					керс	ort Date:	April 25,	2019
Project:	CH-003169	Haz Waste									
Client Sample		Floor Debr	ris				oject:	WVNS			
Sample ID: Matrix:	474903 Solid	3001				Cl	ient ID:	WVNS	5025		
Collect Date:	17-MA	Y-17									
Receive Date:											
Collector:	Client										
Parameter	Qualifier	Result	Uncertainty	DL	TPU	RL	Units	PF D	F Analyst	Date Time	Batch M
High Rad Testing											
Alphaspec Pu242,	-										
Plutonium-238	Hh	2.73	+/-0.0946	0.00539		1.00E-06	uCi/g		JXB7 (	04/23/19 2022	1870155
Plutonium-239/240	Hh	2.40	+/-0.0881	0.00423		1.00E-06	uCi/g				
Plutonium-242	Hh	0.0248	+/-0.00917	0.00449	+/-0.0117	1.00E-06	uCi/g				
Alphaspec U232, S	0						~				
Uranium-232	Hh	0.000279		0.000161	+/-0.000147		uCi/g		JXB7 (	04/23/19 2219	1864678
Uranium-233/234	Hh	0.000573	+/-0.000168	0.0001	+/-0.000199		uCi/g				
Uranium-235/236 Uranium-238	HUh HUh	2.40E-05 6.02E-05	+/-4.10E-05 +/-6.32E-05	3.59E-05 7.87E-05	+/-4.13E-05 +/-6.41E-05		uCi/g uCi/g				
GFPC, Sr90, solid			T/-0.32E-03	7.87E-05	+/-0.412-05	1.00E-00	uci/g				
Strontium-90	High Kaa As I Hh	0.141	+/-0.0016	5.20E-05	+/-0.0261	1.00F.04	uCi/g		IVB7 (	04/19/19 0727	1864681
Gammaspec, Cs13				5.202-05		1.00L-04	uci/g		JAD7 (	H/1)/1) 0/2/	1004001
Americium-241	H	1.35	+/-0.00328	0.000993	+/-0.102		uCi/g		AXM6 (	04/12/19 0854	1863198
Cesium-137	Н		+/-0.000913	0.000126		1.00E-05	uCi/g		7171010 (		1005170
Cobalt-60	Н		+/-0.000106	4.10E-05	+/-0.00015	1.001 05	uCi/g				
Niobium-94	Н		+/-3.65E-05	3.70E-05	+/-3.69E-05	1.00E-06	uCi/g				
The following Prep	Methods were	performed	1								
	escription	1			Analyst	Date	Tin	ne Pr	ep Batch		
Client Requested Prc D	issolution Soil Pr	ep GL-RAD	-A-015		AXM6	04/04/19	103	0 18	63094		
The following Analy	tical Methods	were perfo	ormed								
	escription	<b>i</b>									
1 D	OE EML HASL-	300, Pu-11-F	RC Modified								
2 D	OE EML HASL-	300, U-02-R	C Modified								
	PA 905.0 Modifie			ified							
	OE HASL 300, 4										
Surrogate/Tracer R	lecoverv	Test					I	Batch ID	Recovery	% Accepta	ble Limits
Plutonium-236 Tra			c Pu242. Soli	d High Rad "A	s Received"			1870155	73.9	-	-125%)
Uranium-232 Trac				l High Rad "As				1864678	87.5		-125%)
Uranium-235/236		• •		l High Rad "As				1864678	70.5		-125%)
Strontium Carrier				0				1864681	99.4		-125%)
Strontium Carrier GFPC, Sr90, solid High Rad "As Received"								100-001	<i>,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(2570)	120701

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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

# **Certificate of Analysis**

Company : Address :	CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road					
Contact:	West Valley, New York 14171-9799 Mr. William Connors				Report Date:	April 25, 2019
Project:	CH-003169 Haz Waste					
Client Sample Sample ID:	D: XC-2 Floor Debris 474903001			Project: Client ID:	WVNS02501 WVNS025	
Parameter	Qualifier Result Uncertainty	DL	TPU	RL Units	PF DF Analyst	Date Time Batch Mtd.

Surrogate/Tracer Recovery Test

#### Notes:

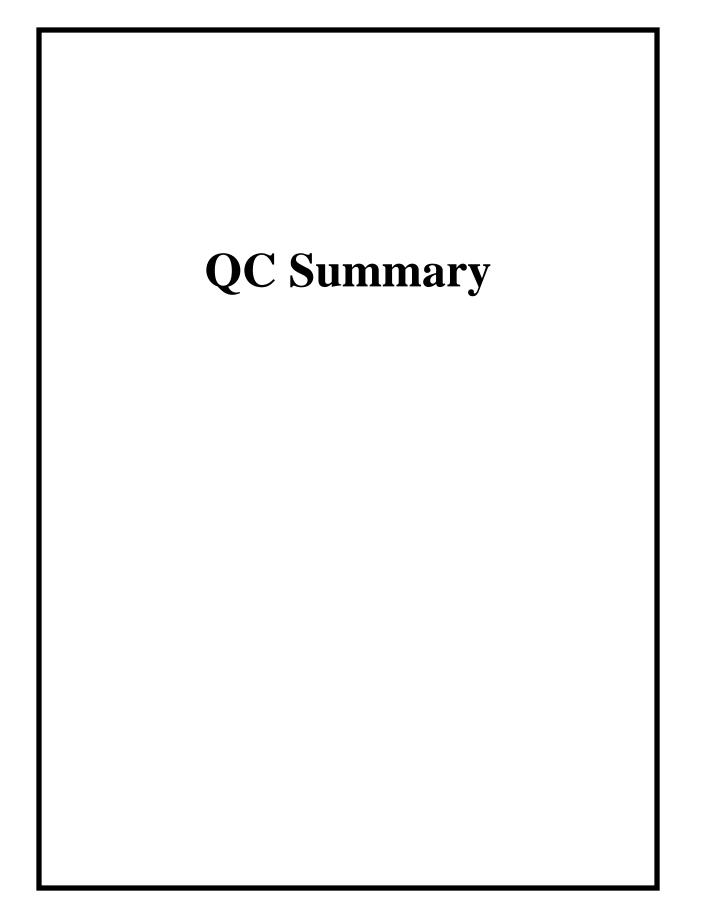
427

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration



## **GEL LABORATORIES LLC**

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

# **QC Summary**

Report Date: April 25, 2019

Page 1 of 5

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 474903

**Contact:** 

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range Anlst	Date Time
High Rad Testing Batch 1863198		•		<b>L</b>				8	
QC1204250756 474903001 DUP Americium-241	Н	1.35	Н	1.31	uCi/g	3.61		(0%-20%) AXM6	04/12/19 11:05
Cobalt-60	Н	0.00135	Н	0.00136	uCi/g	0.886		(0%-20%)	
Cesium-137	Н	0.196	Н	0.187	uCi/g	4.55		(0%-20%)	
Niobium-94	Н	6.31E-05	Н	0.000108	uCi/g	52.6		(0% - 100%)	
QC1204250757 LCS Americium-241	0.0726			0.0735	uCi/g		101	(75%-125%)	04/12/19 10:42
Cobalt-60	0.0193			0.0192	uCi/g		99.7	(75%-125%)	
Cesium-137	0.0251			0.0242	uCi/g		96.5	(75%-125%)	
Niobium-94			U	-2.81E-05	uCi/g				
QC1204250755 MB Americium-241			U	-5.42E-06	uCi/g				04/12/19 09:51
Cobalt-60			U	-6.49E-06	uCi/g				
Cesium-137			U	4.95E-06	uCi/g				
Niobium-94			U	1.68E-06	uCi/g				

### **GEL LABORATORIES LLC**

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# **QC Summary**

						$\frac{1}{2}$	Summar	<u>_y</u>						
Workorder: 47	74903				-			_					Pag	ge 2 of 5
Parmname			NON	М	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1864	4678													
QC1204254055 Uranium-232	474903001 I	DUP		Hh	0.000279	Н	0.000412	uCi/g	38.5		(0% - 100%)	) JXB7	04/23/1	19 22:19
Uranium-233/234				Hh	0.000573	Н	0.000834	uCi/g	37.1*		(0%-20%)	)		
Uranium-235/236				HUh	2.40E-05	Н	7.87E-05	uCi/g	74.6		(0% - 100%)	)		
Uranium-238				HUh	6.02E-05	HU	8.86E-05	uCi/g	N/A		N/A	A		
QC1204254057 Uranium-232	LCS					U	3.77E-05	uCi/g					04/18/1	19 23:20
Uranium-233/234							0.00329	uCi/g						
Uranium-235/236							0.000262	uCi/g						
Uranium-238			0.00359				0.00359	uCi/g		100	(75%-125%)	)		
QC1204254054 Uranium-232	MB					U	4.35E-05	uCi/g					04/18/1	19 16:01
Uranium-233/234						U	6.24E-07	uCi/g						
Uranium-235/236						U	4.96E-06	uCi/g						
Uranium-238						U	9.53E-06	uCi/g						
QC1204254056 Uranium-232	474903001 N	MS		Hh	0.000279	Н	0.000269	uCi/g					04/23/1	19 22:19
Uranium-233/234				Hh	0.000573	Н	0.00391	uCi/g						

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

# **QC Summary**

Workorder: 474903		-	<u> </u>							
	NOM	Comula			TI-sita					Page 3 of 5
Parmname High Rad Testing	NOM	Sample	Quai	QC	Units	RPD%	REC%	<b>Range</b> A	Anlst	Date Time
Batch 1864678										
Uranium-235/236	HUh	a 2.40E-05	Н	0.000196	uCi/g				JXB7	04/23/19 22:19
Uranium-238	0.00359 HUh	6.02E-05	Н	0.00311	uCi/g		84.9	(75%-125%)		
Batch 1864681 -										
QC1204254061 474903001 DU Strontium-90	JP Hh	n 0.141	Н	0.124	uCi/g	12.7		(0%-20%)	JXB7	04/19/19 07:28
QC1204254063 LCS Strontium-90	0.00302			0.00258	uCi/g		85.4	(75%-125%)		04/19/19 07:28
QC1204254060 MB Strontium-90			U	3.13E-05	uCi/g					04/19/19 07:28
QC1204254062 474903001 MS Strontium-90	S 0.00317 Hh	n 0.141	Н	0.129	uCi/g		N/A	(75%-125%)		04/19/19 07:28
Batch 1870155 -										
QC1204266874 476212001 DU Plutonium-238	JP Hh	n 0.000117	HU	8.83E-05	uCi/g	22.2		(0% - 100%)	JXB7	04/24/19 08:35
Plutonium-239/240	Hh	n 0.000199	Η	0.000136	uCi/g	37.7		(0% - 100%)		
Plutonium-242	HUh	a 2.73E-05	HU	2.25E-05	uCi/g	N/A		N/A		
QC1204266876 LCS Plutonium-238			U	3.53E-05	uCi/g					04/23/19 20:22
Plutonium-239/240	0.00352			0.00376	uCi/g		107	(75%-125%)		
Plutonium-242			U	6.30E-05	uCi/g					

48 4003

# **GEL LABORATORIES LLC**

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

# **QC Summary**

Workorder: 474903											Pag	e 4 of 5
Parmname	NO	М	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1870155												
QC1204266873 MB Plutonium-238				U	2.82E-05	uCi/g				JXB7	04/24/1	9 08:35
Plutonium-239/240				U	3.26E-05	uCi/g						
Plutonium-242				U	3.65E-05	uCi/g						
QC1204266875 476212001 MS Plutonium-238		Hh	0.000117	Н	0.000136	uCi/g					04/23/1	9 20:22
Plutonium-239/240	0.00352	Hh	0.000199	Н	0.00405	uCi/g		110	(75%-125%	)		
Plutonium-242		HUh	2.73E-05	HU	5.31E-05	uCi/g						

#### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- M M if above MDC and less than LLD
- $M \qquad REMP \ Result > MDC/CL \ and < RDL$
- $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected

Wardsondam

# **GEL LABORATORIES LLC**

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

# **QC Summary**

Workor	rder: 474903										Pag	e 5 of 5
Parmna	ime	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
U	Analyte was analyzed for, but not de	etected above t	he MDL, N	MDA, MDO	C or LOD.							
UI	Gamma SpectroscopyUncertain id	entification										
UJ	Gamma SpectroscopyUncertain identification											
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.											
Х	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier											
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.											
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.											
h	Preparation or preservation holding time was exceeded											
NI/A ind	diastas that spiles resources limits do no	ot opply when		acontration	awaaada am	ilea aoma	hy a factor o	f 1 on mono	or 0/ DDD m	ot opplies	hla	

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable. ^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

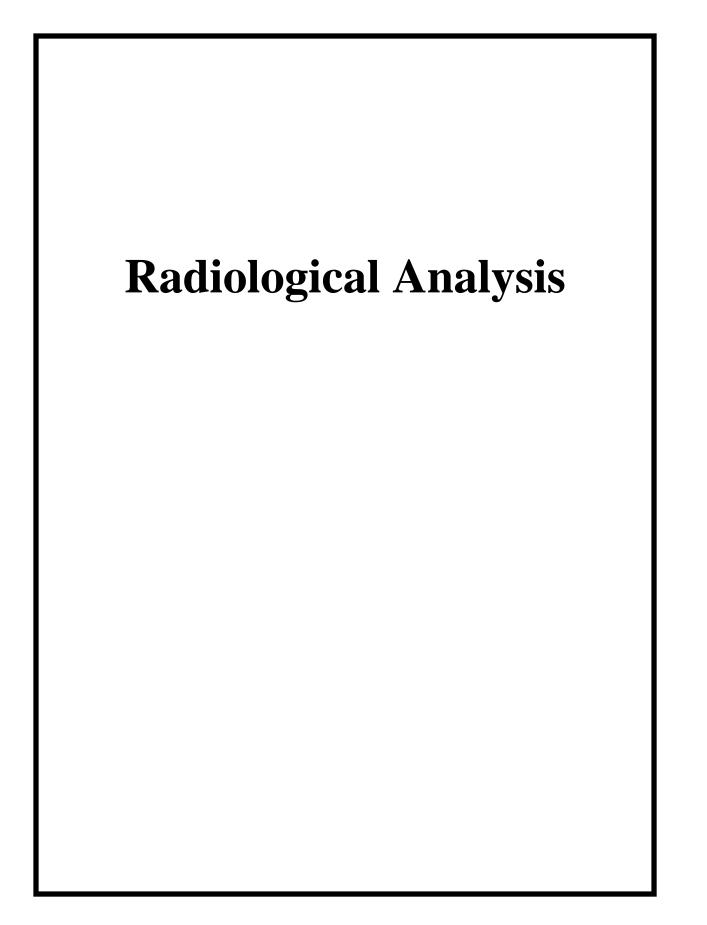
\* Indicates that a Quality Control parameter was not within specifications.

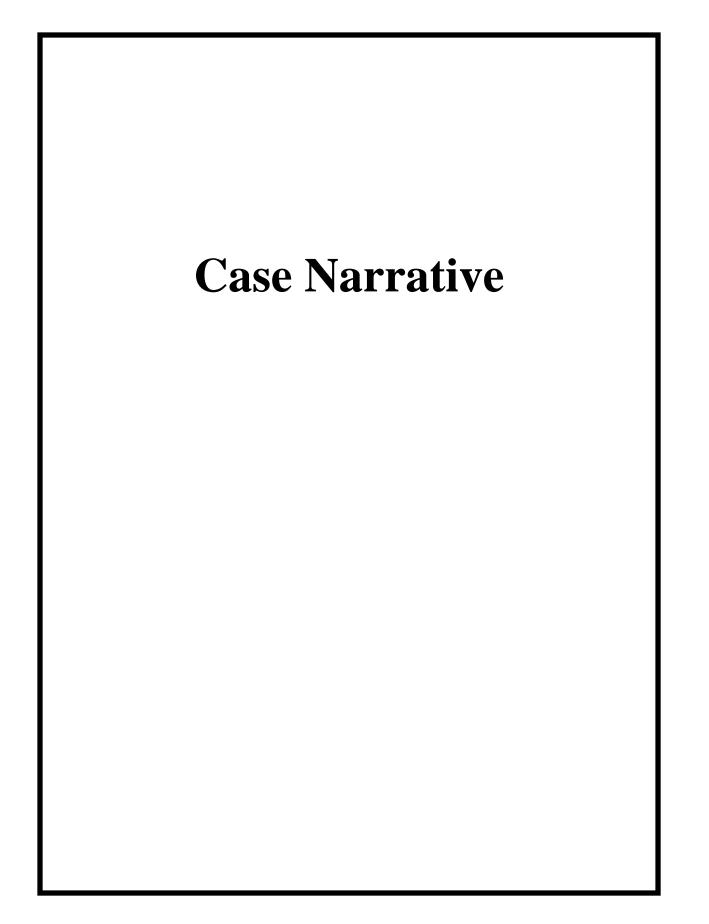
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122019-3
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

### List of current GEL Certifications as of 25 April 2019





### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC (WVNS) SDG #: 427-003169 Work Order #: 474903

**Product:** Alphaspec U232, Solid High Rad Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1864678

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1863094

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
474903001	XC-2 Floor Debris
1204254054	Method Blank (MB)
1204254055	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254056	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254057	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

### Duplication Criteria between QC Sample and Duplicate Sample

The Sample and the Duplicate, (See Below), did not meet the relative percent difference requirement; however, they do meet the relative error ratio requirement with the value listed below.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-233/234	RPD 37.1* (0.00%-20.00%) RER 1.38 (0-3)

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204254054 (MB)	Uranium-232	Result 0.0000435 < MDA 0.000147 > RDL 0.000001 uCi/g
	Uranium-233/234	Result 0.000000624 < MDA 0.0000713 > RDL 0.000001 uCi/g

		Result 0.00000496 < MDA 0.0000654 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.00000953 < MDA 0.0000713 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204254055 (XC-2 Floor DebrisDUP)	Uranium-238	Result 0.0000886 < MDA 0.000109 > RDL 0.000001 uCi/g
474903001 (XC-2 Floor Debris)	Uranium-235/236	Result 0.000024 < MDA 0.0000359 > RDL 0.000001 uCi/g
	Uranium-238	Result 0.0000602 < MDA 0.0000787 > RDL 0.000001 uCi/g

### **Technical Information**

### **Holding Time**

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204254055 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254056 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
474903001 (XC-2 Floor Debris)	Received 29-MAR-19, out of holding 13-NOV-17

### Recounts

The U-232 and U-236 traced portions of samples 1204254055 (XC-2 Floor DebrisDUP), 1204254056 (XC-2 Floor DebrisMS) and 474903001 (XC-2 Floor Debris) were given additional clean-up steps and recounted in order to remove suspected Plutonium interference. The recounts are being reported.

**Product:** Alphaspec Pu242, Solid High Rad <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1870155

**Preparation Method:** Client Requested Procedure **Preparation Procedure:** GL-RAD-A-015 REV# 18 **Preparation Batch:** 1863094

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
474903001	XC-2 Floor Debris
1204266873	Method Blank (MB)

WD:2020:0753 - Attachment B				
1204266874	476212001(RER Floor) Sample Duplicate (DUP)			
1204266875	476212001(RER Floor) Matrix Spike (MS)			
1204266876	Laboratory Control Sample (LCS)			

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Aliquot Reduced

Aliquots were reduced due to high activity based on Gamma data.

### **Quality Control (QC) Information**

### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204266873 (MB)	Plutonium-238	Result 0.0000282 < MDA 0.0000767 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result 0.0000326 < MDA 0.000105 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000365 < MDA 0.0000977 > RDL 0.000001 uCi/g
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g

Samples (See Below) did not meet the detection limits due to the small sample aliquots used. The aliquots were reduced due to the high activity of other isotopes and in attempt to minimize interference.

Sample	Analyte	Value
1204266873 (MB)	Plutonium-238	Result 0.0000282 < MDA 0.0000767 > RDL 0.000001 uCi/g
	Plutonium-239/240	Result 0.0000326 < MDA 0.000105 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000365 < MDA 0.0000977 > RDL 0.000001 uCi/g
1204266874 (RER FloorDUP)	Plutonium-238	Result 0.0000883 < MDA 0.0000934 > RDL 0.000001 uCi/g
	Plutonium-242	Result 0.0000225 < MDA 0.000113 > RDL 0.000001 uCi/g

### **Technical Information**

### WD:2020:0753 - Attachment B Holding Time

Samples (See Below) were logged in and analyzed outside the hold time.

Sample	Value
1204266874 (RER FloorDUP)	Received 11-APR-19, out of holding 24-SEP-18
1204266875 (RER FloorMS)	Received 11-APR-19, out of holding 24-SEP-18
474903001 (XC-2 Floor Debris)	Received 29-MAR-19, out of holding 13-NOV-17

### Sample Re-prep/Re-analysis

Samples were reprepep due to high activity. The reanalysis is being reported.

### Recounts

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Samples 1204266873 (MB) and 1204266874 (RER FloorDUP) were recounted due to high MDCs. The recounts are reported.

### **Miscellaneous Information**

### **Manual Integration**

Manual integration of alpha spectroscopy spectra 474903001 (XC-2 Floor Debris) was performed to fully separate counts in Regions of Interest which would have been biased.

**<u>Preparation Method:</u>** Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1863094

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
474903001	XC-2 Floor Debris

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product:** Gammaspec, Cs137 Only, solid High Rad Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R Analytical Procedure: GL-RAD-A-013 REV# 27 Analytical Batch: 1863198 WD:2020:0753 - Attachment B The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
474903001	XC-2 Floor Debris
1204250755	Method Blank (MB)
1204250756	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204250757	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

### **RDL** Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample Analyte Value		Value
1204250755 (MB)	Cesium-137	Result 0.00000495 < MDA 0.0000246 > RDL 0.00001 uCi/g

#### **Technical Information**

#### Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204250756 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
474903001 (XC-2 Floor Debris)	Received 29-MAR-19, out of holding 13-NOV-17

### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	Client Sample
Cobalt-60	474903001	XC-2 Floor Debris
Niobium-94	474903001	XC-2 Floor Debris

### Product: GFPC, Sr90, solid High Rad

<u>Analytical Method:</u> EPA 905.0 Modified/DOE RP501 Rev. 1 Modified <u>Analytical Procedure:</u> GL-RAD-A-004 REV# 21 WD:2020:0753 - Attachment B Analytical Batch: 1864681

<u>Preparation Method:</u> Client Requested Procedure <u>Preparation Procedure:</u> GL-RAD-A-015 REV# 18 <u>Preparation Batch:</u> 1863094

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	Client Sample Identification
474903001	XC-2 Floor Debris
1204254060	Method Blank (MB)
1204254061	474903001(XC-2 Floor Debris) Sample Duplicate (DUP)
1204254062	474903001(XC-2 Floor Debris) Matrix Spike (MS)
1204254063	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Quality Control (QC) Information**

#### Matrix Spike (MS) Recovery

The Matrix Spike (See Below) did not meet recovery requirements due to the sample activity being greater than five times the spiked nominal concentration.

Sample	Analyte	Value
1204254062 (XC-2 Floor DebrisMS)	Strontium-90	-399* (75%-125%), but result > 5x nominal

### **Technical Information**

### Holding Time

Samples (See Below) were received and analyzed outside the hold time.

Sample	Value
1204254061 (XC-2 Floor DebrisDUP)	Received 29-MAR-19, out of holding 13-NOV-17
1204254062 (XC-2 Floor DebrisMS)	Received 29-MAR-19, out of holding 13-NOV-17
474903001 (XC-2 Floor Debris)	Received 29-MAR-19, out of holding 13-NOV-17

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **GEL LABORATORIES LLC**

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

### Qualifier Definition Report for

### WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 427-003169 GEL Work Order: 474903

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

#### **Review/Validation**

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

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

Signature:	Houn Q	Millery
------------	--------	---------

Name: Heather McCarty Title: Analyst II

Date: 24 APR 2019

### XC-3 – Extraction Cell-3

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a member of The GEL Group INC



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

gel.com

March 20, 2019

Mr. William Connors CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York 14171-9799

Re: CH-003169 Haz Waste Work Order: 472051 SDG: 426-003169

Dear Mr. Connors:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 22, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

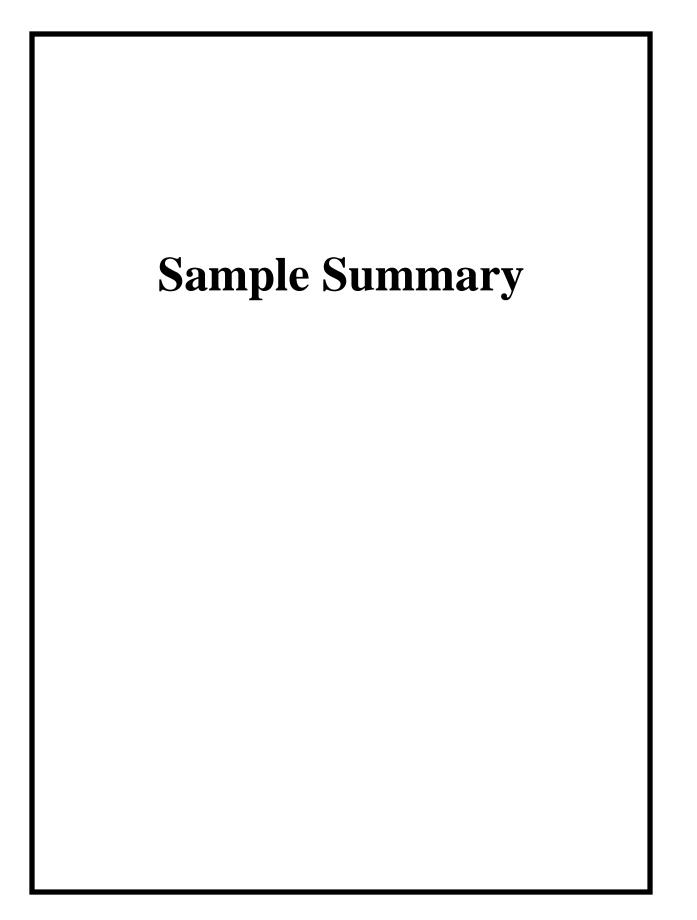
Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4705.

Sincerely,

Kerry OBarr for Katherine Cates Project Manager

Purchase Order: CH-003169 Enclosures





# **Sample Summary Sheet**

March 20, 2019

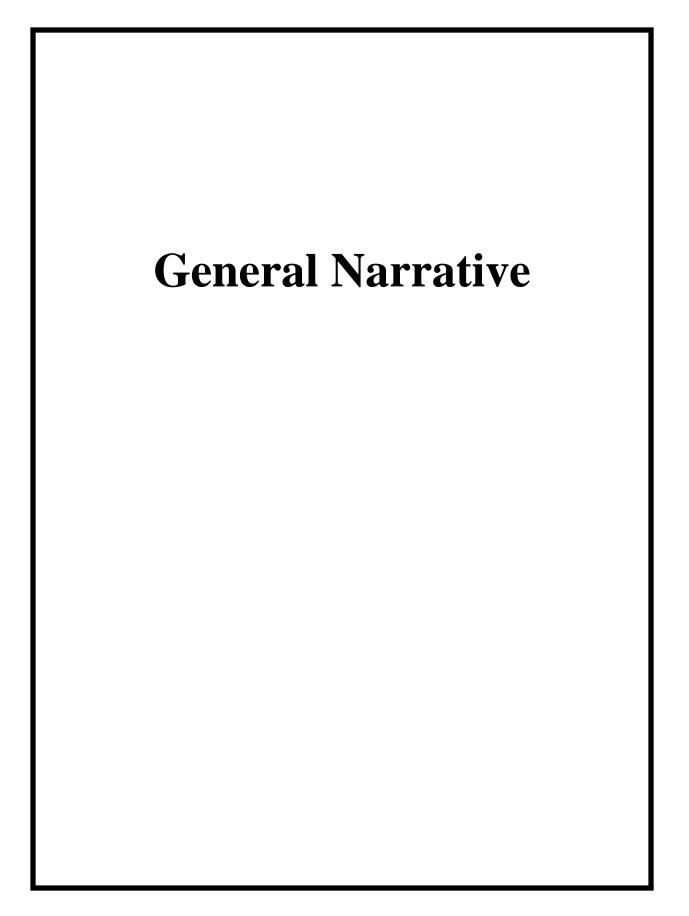
<u>Release Number</u>

Purchase Order Number CH-003169

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**D** 

<u>Charge #</u> WV01.C2.06.01.04.10.02 Description XC3 floor



### Case Narrative for CH2M HILL BWXT West Valley, LLC SDG: 426-003169 Work Order: 472051

March 20, 2019

#### Laboratory Identification:

GEL Laboratories LLC 2040 Savage Road Charleston, South Carolina 29407 (843) 556-8171

#### **Purchase Order**

CH-003169

### Release Number

426

### Charge Number

WV01.C2.06.01.04.10.02

#### **Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on February 22, 2019 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following sample:

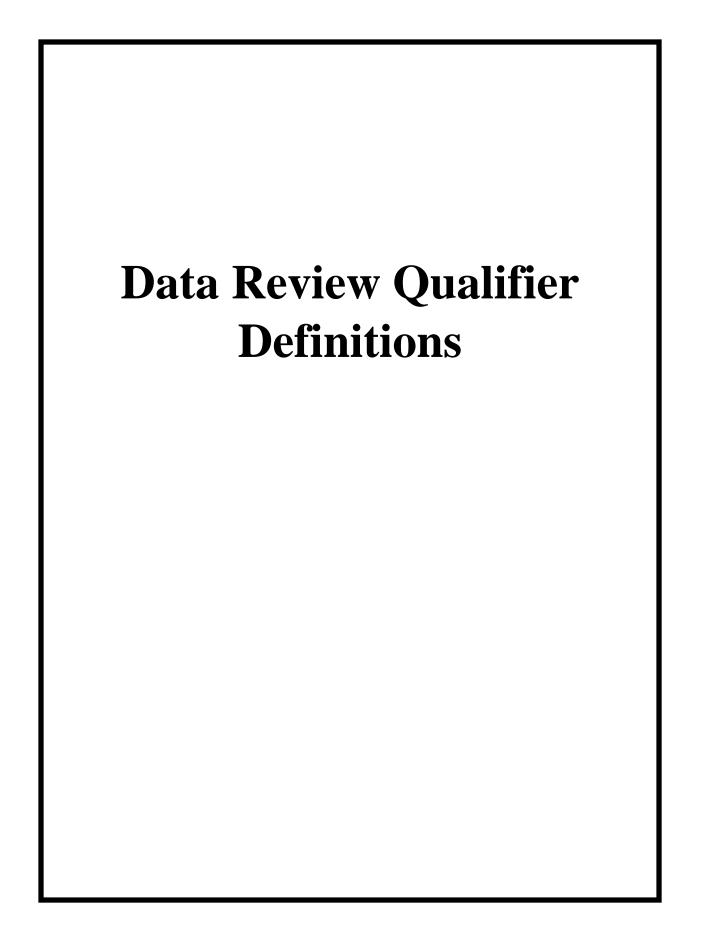
<u>Laboratory ID</u>	<u>Client ID</u>
472051001	XC3 floor

### Case Narrative

The laboratory case narrative included in the Radiochemistry data section of the deliverable outlines any NCRs or problems associated with the data for this Release. Sample analyses were conducted using methodology as outlined in GEL Standard Operating Procedures. Procedure references are also included in the laboratory case narrative. This data package, to the best of my knowledge is in compliance with technical and administrative requirements.

Kenzon

Kerry OBarr for Katherine Cates Project Manager



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#### Data Review Qualifier Definitions

Qualifier Explanation

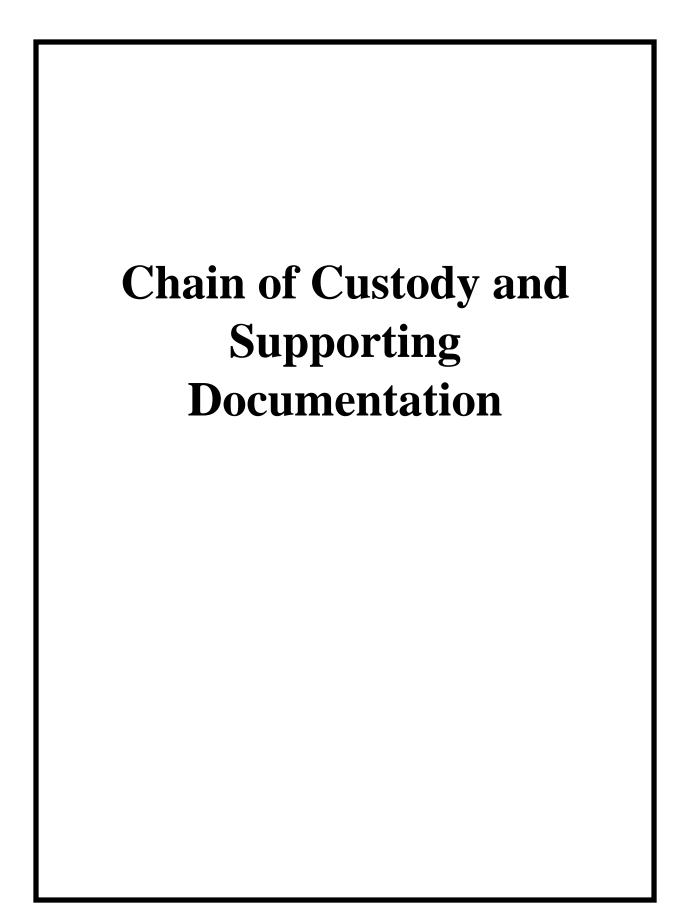
- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL</li>
- A The TIC is a suspected aldol-condensation product
- B Target analyte was detected in the associated blank
- B Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL</p>
- $\ensuremath{\mathtt{BD}}$   $\ensuremath{\,\mathtt{Results}}$  are either below the MDC or tracer recovery is low
- C  $% \left( {{\mathbb{C}}} \right)$  Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- d 5-day BOD-The 2:1 depletion requirement was not met for this sample
- E Organics-Concentration of the target analyte exceeds the instrument calibration range
- E Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H Analytical holding time was exceeded
- h Preparation or preservation holding time was exceeded
- J Value is estimated
- N Metals-The Matrix spike sample recovery is not within specified control limits
- N Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
- ND Analyte concentration is not detected above the reporting limit
- UI Gamma Spectroscopy-Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- Z Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

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P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.

For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



WD:2020:0753 - Attachment B 10-242 Saupt tresmears are to be composited b \* Am-241, G-44, Gm-243, Cm-244, Cs-137, 4-429, Np-237, Pu-238, Pu-239, Pu-240, <del>Pu-244</del>, Sr-90, <del>Te-99</del>, U-232, U-233, U-234, U-235/9-238, <sup>Sz-4/2</sup>/1<sup>9</sup> M-238 scorple. R. Poly 4. Electronic Disk? Yes [ ] No [ X ----Cooler Seals Intact? Yes [ ] No [ 11. Report Data To: W. Connors | AN 2[] 3[ 7. Report Format Level: 1[X] Snears Routine [X ç -XC-3, report in uCild 2 z/zul/ 7 The firesmears are to be com the lab to form a composite so units in action composite Glass mCi Alpha Comments 20. Sample Receipt: Sample Bottle Type (Circle One): 9. Priority Code: ~~~ ~~~ Temperature < 10 10 (Other:) <u>6</u>. Particulate 1430 3. Analysis Requested 9:10 06-29 Filter Appendix B CHAIN-OF-CUSTODY / REQUEST-FOR-ANALYSIS Other : 200 02-01-1682-522-15 ma Pipe Section CH2M HILL BWXT, West Valley LLC 982 1597 Sludge 2-11) West Valley, NY 14171-9799 it bellen 10282 Rock Springs Road 122-W Jost Smines 1360 rd (Page 1 of 2) kefé Coupon  $\times$ Liquid Sample Custodian Signature/Date/Time 2. Charge #:WVV01.C2.06.01.04.10.04.02 3-20-1 Received by Courter Hd LE OG n/a Debris Solid Received by: Received by: Received by: CR644 Time Phase (Circle one ): Sample Bottle Size: Type (Circle one): 426 10:61 Date Release #: ň 12 4. auer New Jacip oi Pres. none ö 17. Chain-of-Custody Reviewed by:X 8. Cognizant Engineer/Project: FDP 47205 Meel # Cont. 16.58 5418 376 Type Grab Released by: A a w 5. PO #: CH-003169 10. DQO/SAP#: n/a Released by: Released by: Sample ID# Gross Wf (g) Released by GEL Tare Wt (g) Net Wt (g) XC3 floor 1. Lab: 5 ģ

Attachment B - Page 416

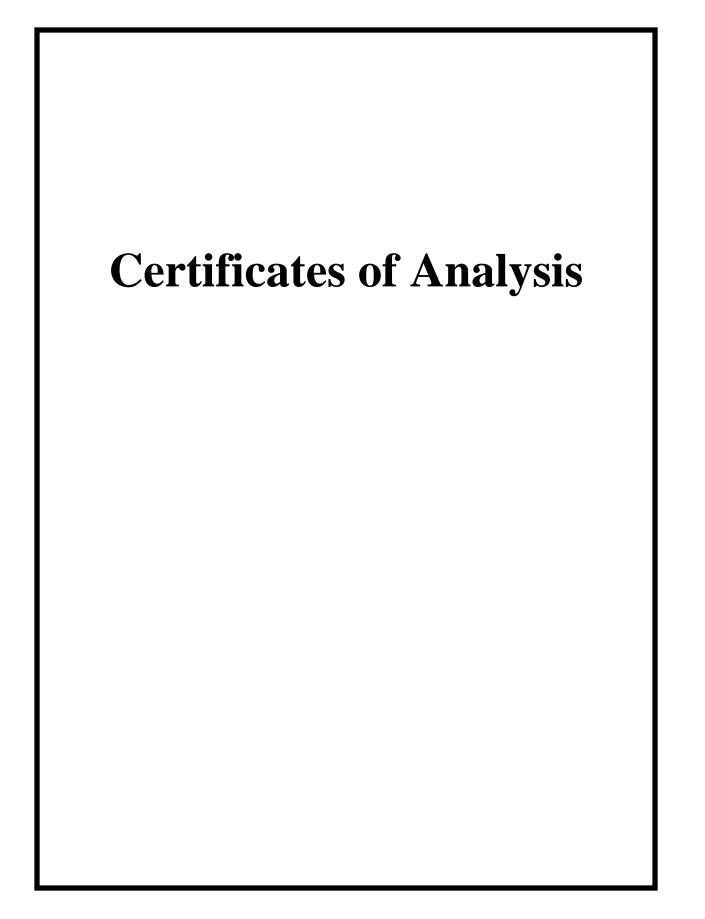
Page 9 of 28 SDG: 426-003169

WV-2865, Rev. 4 (SOP 300-08)

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	<b>GEL</b> Laboratories LLC				SAMPLE RECEIPT & REVIEW FORM
Client: W/VAS		Isr	G/AR/COC/Work Order: 47205 472050		
Received By: RSS					
	Carrier and Tracking Number				Circle Applicable: Circle
Sus	pected Hazard Information	Yes	Ž	*If	Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
<u>A)5</u>	shipped as a DOT Hazardous?	~	Ł	Ha: If t	zard Class Shipped: UN#: 2916 IN2910 Is the Radioactive Shipment Survey Compliant? Yes_No_
	Did the client designate the samples are to be eived as radioactive?	~	L	co	C notation or radioactive stickers on containers equal client designation.
	Did the RSO classify the samples as oactive?	~	Ł	Ma Cla	ximum Net Counts Observed* (Observed Counts - Area Background Counts): 1.5 CPM / RAH
	Did the client designate samples are ardous?		L	1	C notation or hazard labels on containers equal client designation or E is yes, select Hazards below.
E) [	Did the RSO identify possible hazards?		L	Per	
	Sample Receipt Criteria	Yes	N N	2°	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	L			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	2			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within $(0 \le 6 \text{ deg. C})$ ?*			1	Preservation Method: Wet lee lee Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 172
4	Daily check performed and passed on IR temperature gun?	2		Temperature Device Serial #:C Secondary Temperature Device Serial # (If Applicable):	
5	Sample containers intact and sealed?	2			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		2	ł	Sample ID's and Containers Affected: If Preservation added. Lot#:
7	Do any samples require Volatile Analysis?			~	If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:
8	Samples received within holding time?	J			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	L			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	v	-		Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
	Number of containers received match number indicated on COC?	7			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided? COC form is properly signed in			~	
13	relinquished/received sections? ments (Use Continuation Form if needed):				Circle Applicable: Not relinquished Other (describe)
	PM (or PMA) review: Initials AM Date 2/22/19 Page 1 of 1 GL-CHL-SR-001 Rev 6				
0	Attachment B - Page 417				

CH-003169



# **GEL LABORATORIES LLC**

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

# **Certificate of Analysis**

Company :		L BWXT We	est Valley										
Address :	LLC.	Springs Roa	đ										
	10262 ROCK	Springs Koa	lu										
	West Valley	, New York	14171-9799					R	eport Date:	Ma	rch 20,	2019	
Contact:	Mr. William	Connors							-				
Project:	CH-003169	Haz Waste											
Client Sample I							oject:		NS02501				
Sample ID: Matrix:	47205 Filter	1001				Cl	ient ID:	wv	NS025				
Collect Date:	17-MA	AR-17											
Receive Date:	22-FE	-											
Collector:	Client												
Parameter	Qualifier	Result U	ncertainty	DL	TPU	RL	Units	PF	DF Analys	st Date	Time	Batch	Mtd
High Rad Testing													
Alphaspec Pu 238, 2	239, 240, 242			d''									
Plutonium-238	Hh		+/-2.43E-05	8.75E-06	+/-3.66E-05		-		AXM6	03/09/19	9 1045	1852253	1
Plutonium-239/240	Hh	0.000254 -		1.19E-05	+/-4.64E-05		-						
Plutonium-242	HUh	2.65E-06		7.77E-06	+/-4.59E-06	0.0002	uCi/sample						
Alphaspec U232, 23	3, 234, 235, 2	38 HIGH RA	D "As Recei	ived"									
Uranium-232	Hh	2.58E-06 -	+/-2.09E-06	1.58E-06	+/-2.14E-06	2.00E-06	uCi/sample		AXM6	03/09/19	9 1013	1852254	2
Uranium-233/234	HUh		+/-1.00E-06	1.47E-06	+/-1.02E-06		-						
Uranium-235/236	HUh		+/-6.32E-07	7.85E-07	+/-6.39E-07		-						
Uranium-238	HUh	4.41E-07 -	+/-7.71E-07	1.30E-06	+/-7.76E-07	2.00E-06	uCi/sample						
GFPC, Sr90, filter H	HIGH RAD "A	s Received"											
Strontium-90	Hh	0.00236	+/-3.31E-05	3.85E-06	+/-0.000613	2.00E-06	uCi/sample		AXM6	03/08/19	9 1500	1852255	3
Gammaspec, Gamm	a, Cs137, Filt	er HIGH RA	D "As Recei	ved"									
Americium-241	Hh	0.000647	+/-0.00011	8.22E-05	+/-0.000141		uCi/sample		JXB7	02/26/19	9 1019	1852244	4
Cesium-137	Hh	0.000222 -	+/-6.50E-05	4.48E-05	+/-6.77E-05	2.00E-07	uCi/sample						
Cobalt-60	Hh	7.02E-05 -	+/-5.32E-05	4.78E-05	+/-5.35E-05		uCi/sample						
Laboratory Compos	ite- Filters RA	D III "As Re	eceived"										
The following Prep M	Aethods were	performed											
Method De	escription				Analyst	Date	Tim	ie	Prep Batch				
Filter Prep Filt	ter Prep				JXB7	02/28/19	100	7	1852242				
	·	e											
The following AnalytiMethodDes	scription	were perior	meu										
	-	200 D- 11 D(	C M. J.C. J										
20	E EML HASL-												
	E EML HASL-												
	A 905.0 Modifi			ified									
	DE HASL 300, 4	.5.2.3/Ga-01-F	R										
5 GL	-RAD-A-026												
Surrogate/Tracer Re	ecovery	Test					В	atch	ID Recove	ry% A	ccepta	ble Lim	its
Plutonium-236 Trad	cer	Alphaspec	Pu 238, 239	9, 240, 242 HI	GH RAD "As Recei	ved"	1	8522	53 89	9.4	(15%-	125%)	
Uranium-232 Trace	er				HIGH RAD "As Re			8522		1.9		125%)	
Uranium-235/236 T		1 1	, ,	, ,	HIGH RAD "As Re			8522		).3		125%)	
	IIdeel					CEIVEU							
Strontium Carrier		GFPC, Sr9	90, filter HIC	GH RAD "As ]	Received"		1	8522	55 92	2.7	(25%-	125%)	

Batch ID Recovery% Acceptable Limits

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# **Certificate of Analysis**

Parameter	Oualifier Result Uncertainty DI	TPI	RL Units	PF DF Analyst	Date Time Batch Mtd
Client Sample Sample ID:	EID: XC3 floor 472051001		Project: Client ID:	WVNS02501 WVNS025	
Project:	CH-003169 Haz Waste				
Contact:	Mr. William Connors				
	West Valley, New York 14171-9799			Report Date:	March 20, 2019
Address :	LLC. 10282 Rock Springs Road				
Company :	CH2M HILL BWXT West Valley				

Surrogate/Tracer Recovery Test

### Notes:

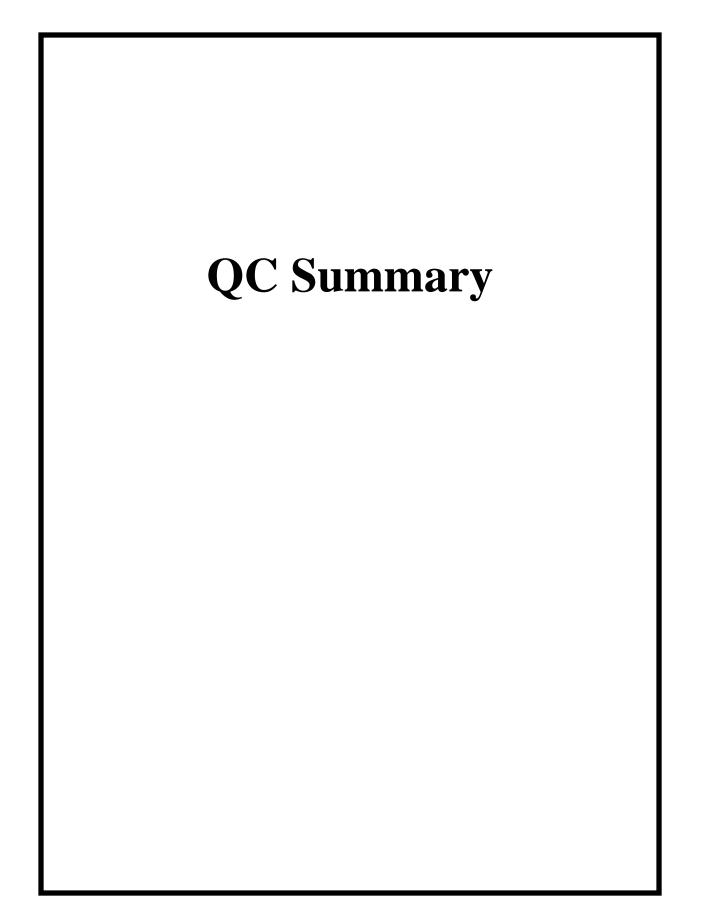
426

The MDC is a sample specific MDC.

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution FactorMtd.: MethodDL: Detection LimitPF: Prep FactorLc/LC: Critical LevelRL: Reporting LimitMDA: Minimum Detectable ActivityTPU: Total Propagated UncertaintyMDC: Minimum Detectable ConcentrationFinit Concentration



# **GEL LABORATORIES LLC**

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# **QC Summary**

Report Date: March 20, 2019

Page 1 of 4

CH2M HILL BWXT West Valley LLC. 10282 Rock Springs Road West Valley, New York

Mr. William Connors

Workorder: 472051

**Contact:** 

Parmname	NOM	Sample Qu	ual QC	Units	RPD%	REC%	Range	Anlst	Date	Time
High Rad Testing Batch 1852244										
QC1204226460 LCS Cobalt-60	0.00545		0.00567	uCi/sample		104	(75%-125%)	JXB7	02/26/1	9 15:56
Americium-241	0.0304		0.0314	uCi/sample		104	(75%-125%)	I		
Cesium-137	0.00961		0.0101	uCi/sample		105	(75%-125%)	I		
QC1204226461 LCSD Cobalt-60	0.00545		0.00534	uCi/sample	5.98	97.9	(0%-20%)	1	02/26/1	9 17:58
Americium-241	0.0304		0.0313	uCi/sample	0.447	103	(0%-20%)	I		
Cesium-137	0.00961		0.00923	uCi/sample	8.79	96	(0%-20%)	I		
QC1204226459 MB Cobalt-60		U	2.31E-06	uCi/sample					02/26/1	9 15:56
Americium-241		U	1.50E-05	uCi/sample						
Cesium-137		U	5.75E-08	uCi/sample						
Batch 1852253										
QC1204226478 LCS Plutonium-238		U	4.68E-06	uCi/sample				AXM6	03/09/1	9 10:45
Plutonium-239/240	0.0002		0.000222	uCi/sample		111	(75%-125%)	I		
Plutonium-242		U	2.35E-06	uCi/sample			(75%-125%)	I		

# **GEL LABORATORIES LLC**

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# **QC Summary**

Workorder: 47	2051		-	<b>L</b>							Page	e 2 of 4
Parmname		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst		Time
High Rad TestingBatch1852												
QC1204226479 Plutonium-238	LCSD			U	3.41E-06	uCi/sample	0			AXM6	03/09/1	19 10:45
Plutonium-239/240		0.0002			0.000222	uCi/sample	0.304	111	(0%-20%)			
Plutonium-242					8.26E-06	uCi/sample	47.2					
QC1204226477 Plutonium-238	MB			U	2.57E-06	uCi/sample					03/09/1	19 10:45
Plutonium-239/240				U	3.04E-06	uCi/sample						
Plutonium-242				U	2.36E-07	uCi/sample						
Batch 1852	- 254											
QC1204226484 Uranium-232	LCS			U	-9.32E-08	uCi/sample			(75%-125%)	AXM6	03/09/1	19 10:13
Uranium-233/234					4.71E-05	uCi/sample						
Uranium-235/236					3.59E-06	uCi/sample						
Uranium-238		5.45E-05			5.28E-05	uCi/sample		96.9	(75%-125%)			
QC1204226485 Uranium-232	LCSD			U	1.38E-07	uCi/sample	0		(0%-20%)		03/09/1	19 10:13
Uranium-233/234					5.84E-05	uCi/sample	21.4					
Uranium-235/236					3.52E-06	uCi/sample	1.89					
Uranium-238		5.45E-05			5.71E-05	uCi/sample	7.8	105	(0%-20%)			

# **GEL LABORATORIES LLC**

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# **QC Summary**

Workor	der: 47	72051		-	•		<b>•</b> /					Pag	e 3 of 4
Parmnar	ne		NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>High Rad</b> Batch		2254											
QC12 Uranium	04226483 -232	MB			U	-2.76E-07	uCi/sample				AXM6	03/09/1	19 10:13
Uranium	-233/234				U	-3.22E-07	uCi/sample						
Uranium	-235/236				U	9.47E-08	uCi/sample						
Uranium	-238				U	1.35E-07	uCi/sample						
Batch	1852	2255											
QC120 Strontiun	04226487 n-90	LCS	0.000154			0.000141	uCi/sample		91.8	(75%-125%	) AXM6	03/08/1	19 15:00
QC120 Strontiun	04226488 n-90	LCSD	0.000154			0.000155	uCi/sample	8.86	100	(0%-20%	)	03/08/1	19 15:00
QC12 Strontiun	04226486 n-90	MB			U	7.08E-08	uCi/sample					03/08/1	19 15:00
Notes:													
The Qua	alifiers in th	his report are	e defined as follows:										
**		s a Tracer co											
<	Result is l	less than valu	ue reported										
>	Result is g	greater than	value reported										
BD	Results ar	e either belo	w the MDC or tracer recov	very is low									
FA	Failed ana	alysis.											
Н	Analytica	l holding tin	ne was exceeded										
J	Value is e	estimated											
Κ	Analyte p	resent. Repo	orted value may be biased h	igh. Actual	value i	s expected to	be lower.						
L	Analyte p	resent. Repo	orted value may be biased le	ow. Actual	value is	s expected to	be higher.						
М	M if abov	e MDC and	less than LLD										
М	REMP Re	esult > MDC	/CL and < RDL										
NT/A		D 12											

 $N\!/\!A$   $\,$  RPD or %Recovery limits do not apply.

# **GEL LABORATORIES LLC**

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# **QC Summary**

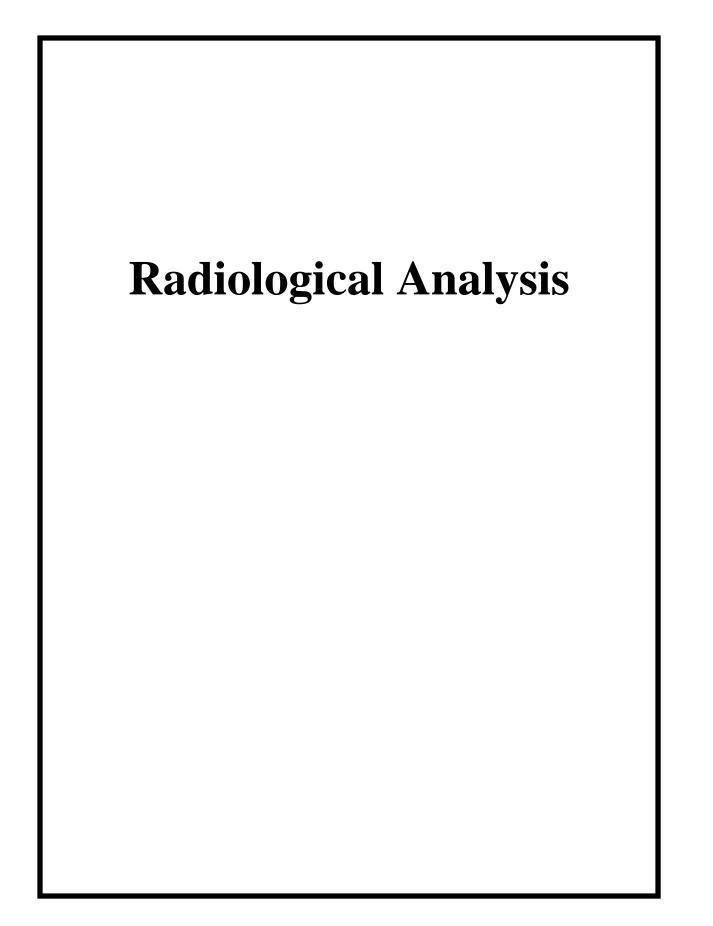
Workor	der: 472051									Pag	e 4 of 4
Parmnai	me	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
N1	See case narrative										
ND	Analyte concentration is not	detected above the	detection limit								
NJ	Consult Case Narrative, Data	a Summary packag	e, or Project Manager c	oncerning	this qualifi	er					
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UI	Gamma SpectroscopyUncertain identification										
UJ	Gamma SpectroscopyUncertain identification										
UL	Not considered detected. The	e associated numbe	r is the reported concen	tration, wh	ich may be	e inaccurate	due to a low	bias.			
Х	Consult Case Narrative, Data	a Summary packag	e, or Project Manager c	oncerning	this qualifi	er					
Y	Other specific qualifiers wer	e required to prope	rly define the results. C	onsult case	narrative.						
^	RPD of sample and duplicate	e evaluated using +	/-RL. Concentrations a	re <5X the	RL. Qual	ifier Not Ap	plicable for l	Radiochem	istry.		
h	Preparation or preservation h	nolding time was ex	ceeded								
^ The Ro five time RL is us	icates that spike recovery limited elative Percent Difference (RI es (5X) the contract required of the to evaluate the DUP result tes that a Quality Control para	PD) obtained from letection limit (RL).	the sample duplicate (I). In cases where either	OUP) is eva	aluated aga	inst the acce	ptance criter	ia when the	e sample is	s greater	

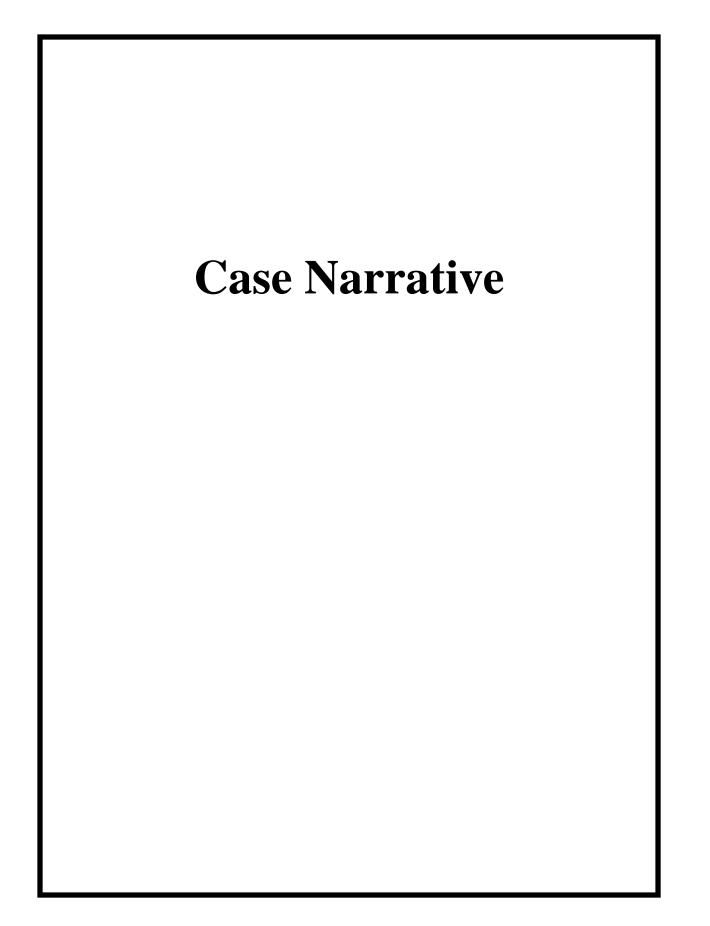
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA024
Maryland	270
Massachusetts	M–SC012
Michigan	9976
Mississippi	SC00012
Nississippi	NE-OS-26-13
Nevada	SC000122019-2
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC002 SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68–00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-14
Utah NELAP	SC000122018–27
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

### List of current GEL Certifications as of 20 March 2019





### Radiochemistry Technical Case Narrative CH2M HILL BWXT West Valley, LLC (WVNS) SDG #: 426-003169 Work Order #: 472051

<u>Product:</u> Alphaspec Pu 238, 239, 240, 242 HIGH RAD <u>Analytical Method:</u> DOE EML HASL-300, Pu-11-RC Modified <u>Analytical Procedure:</u> GL-RAD-A-011 REV# 27 <u>Analytical Batch:</u> 1852253

<u>Preparation Method:</u> Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
472051001	XC3 floor
1204226477	Method Blank (MB)
1204226478	Laboratory Control Sample (LCS)
1204226479	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

### Aliquot Reduced

Aliquots were reduced due to high activity based on Gamma data.

### **Quality Control (QC) Information**

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204226477 (MB)	Plutonium-238	Result 0.00000257 < MDA 0.00000557 > RDL 0.000002 uCi/sample
	Plutonium-239/240	Result 0.00000304 < MDA 0.00000733 > RDL 0.000002 uCi/sample

### **Technical Information**

### **Holding Time**

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
472051001 (XC3 floor)	Received 22-FEB-19, out of holding 13-SEP-17

Product: Alphaspec U232, 233, 234, 235, 238 HIGH RAD Analytical Method: DOE EML HASL-300, U-02-RC Modified Analytical Procedure: GL-RAD-A-011 REV# 27 Analytical Batch: 1852254

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
472051001	XC3 floor
1204226483	Method Blank (MB)
1204226484	Laboratory Control Sample (LCS)
1204226485	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Technical Information**

### Holding Time

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
472051001 (XC3 floor)	Received 22-FEB-19, out of holding 13-SEP-17

### Recounts

The U-232 traced portion of sample 472051001 (XC3 floor) was given additional clean-up steps and recounted in order to improve the resolution. The sample was recount(ed again to verify the result and the third count is reported.

Preparation Method: Filter Prep

WD:2020:0753 - Attachment B <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
472051001	XC3 floor

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

426

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

**Product: Gammaspec, Gamma, Cs137, Filter HIGH RAD Analytical Method:** DOE HASL 300, 4.5.2.3/Ga-01-R **Analytical Procedure:** GL-RAD-A-013 REV# 27 **Analytical Batch:** 1852244

**Preparation Method:** Filter Prep **Preparation Procedure:** GL-RAD-A-026 REV# 17 **Preparation Batch:** 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
472051001	XC3 floor
1204226459	Method Blank (MB)
1204226460	Laboratory Control Sample (LCS)
1204226461	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

#### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

#### **Quality Control (QC) Information**

#### **RDL Met**

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample	Analyte	Value
1204226459 (MB)	Cesium-137	Result 0.0000000575 < MDA 0.0000234 > RDL 0.0000002 uCi/sample

### **Technical Information**

### **Holding Time**

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value			
472051001 (XC3 floor)	Received 22-FEB-19, out of holding 13-SEP-17			

### **Additional Identified Radionuclides**

The following radionuclides were not requested but have been identified and reported.

Analyte	Sample	<b>Client Sample</b>		
Cobalt-60	472051001	XC3 floor		

Product: GFPC, Sr90, filter HIGH RAD Analytical Method: EPA 905.0 Modified/DOE RP501 Rev. 1 Modified Analytical Procedure: GL-RAD-A-004 REV# 21 Analytical Batch: 1852255

**<u>Preparation Method:</u>** Filter Prep <u>Preparation Procedure:</u> GL-RAD-A-026 REV# 17 <u>Preparation Batch:</u> 1852242

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	<b><u>Client Sample Identification</u></b>
472051001	XC3 floor
1204226486	Method Blank (MB)
1204226487	Laboratory Control Sample (LCS)
1204226488	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

### **Preparation Information**

**Preparation Information** Performed additional column separation to minimize interference.

### **Quality Control (QC) Information**

### RDL Met

The blank (See Below) did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots.

Sample Analyte		Value				
1204226486 (MB)	Strontium-90	Result 0.0000000708 < MDA 0.00000345 > RDL 0.000002 uCi/sample				

### **Technical Information**

### Holding Time

Sample (See Below) was received and analyzed outside the hold time.

Sample	Value
472051001 (XC3 floor)	Received 22-FEB-19, out of holding 13-SEP-17

**Product: Laboratory Composite- Filters RAD III Composite Preparation Method:** GL-RAD-A-026 **Composite Preparation Procedure:** GL-RAD-A-026 REV# 17 **Composite Preparation Batch:** 1852092

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<b><u>Client Sample Identification</u></b>
472051001	XC3 floor

The samples in this SDG were analyzed on an "as received" basis.

### **Data Summary:**

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

### **Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# **GEL LABORATORIES LLC**

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### Qualifier Definition Report for

### WVNS025 CH2M HILL BWXT West Valley, LLC

Client SDG: 426-003169 GEL Work Order: 472051

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- H Analytical holding time was exceeded
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

### **Review/Validation**

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

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

Signature: Alout G. Mulary

Name: Heather McCarty Title: Analyst II

Date: 20 MAR 2019

# Prep Logbook

# WD:2020:0753 - Attachment B The Preparation of Special Matrices for the Determination of Radionuclides

Batch ID: Analyst: Method: Lab SOP: Instrument:	<b>1852242</b> Jon Burgess (JXE Filter Prep GL-RAD-A-026 R2-38110047			Due I Type	Dates for Lab: Sample Id	18-MAR-2019 Description	9 Hold: 13-	SEP-2017	Package: 20-MAR- Serial Number	2019 SDG: 22-M Spike Amount Spike Units
# Sample ID	Prep Date	<b>Min RDL</b> ()	Number of Filters	Container Wt (g)	Weight of total filter with container (g)	Weight of filter Diluted with container (g)	Not Saved Final Volume of filter diluted to in Liters (mL)		Weight of Filter Diluted (g)	
<b>1</b> 472050001	28-FEB-2019		1	0	12.6414	12.6414	100	12.6414	12.6414	
<b>2</b> 472051001	28-FEB-2019		1	0	3.1628	3.1628	100	3.1628	3.1628	
Reagent/Solven	t Lot ID	Description		Amount	Comments:					

Analytical Logbook version 1 11-04-2002

GEL Laboratories LLC

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