

# TRANSMITTAL



Ardaman & Associates, Inc.

**To:** ERM  
840 W. Sam Houston Pkwy. Suite 600  
Houston, TX 77024  
**Phone:** (832) 786-5006  
**Attention:** Shawn Wiggins

**Date:** December 2, 2021

**Job No.:** 21-83-3884  
**Project:** Henning Mgmt

**From:** Chandler M. Willis

COPIES	DESCRIPTION
1	Laboratory Test Results (1)
1	Grain Size Curve (4)
1	Chain of Custody (1)

### THESE ARE TRANSMITTED:

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Reviewed By:

Chandler M. Willis

Laboratory Manager

Approved By:

Robb Jewel, P.E.

Branch Manager

The test sample(s) were reported to be from the client-specified designation(s) herein. The test results are indicative of only the specimens that were actually tested. The test results presented are based upon accepted industry practice as well as the test methods(s) listed. Ardaman and Associates, Inc. neither accepts responsibility for, nor makes claims to the final use and purpose of the test results.

These results shall not be reproduced in full (or in part) without the written approval of the client.

AASHTO Accredited Laboratory  
LELAP Certificate No. 02052

316 HIGHLANDIA DRIVE  
BATON ROUGE, LA 70810  
PHONE: (225) 752-4790  
FAX: (225) 752-4878

## Henning Mgmt LABORATORY TEST RESULTS TABLE 1

Date Tested	Sample ID	Depth (ft.)	ASTM D2216 Moisture Content (%)	Dry Density (lbs./cu.ft.)	Total Porosity (decimal)	ASTM D854 Specific Gravity	ASTM D5084 Permeability (cm/sec)	ASTM D4972 Soil pH	ASTM D2974 Organic Content (%)	ASTM D4318 Atterberg Limits			ASTM D422 Particle Size Analysis	ASTM D2487 Classification
										LL	PL	PI		
12/2/2021	H-12R	53-54	14.8									*	Gray SILTY SAND (SM)	
12/2/2021	H-12R	74-76	24.1	102.6			$3.2 \times 10^{-8}$					*	Gray and brown LEAN CLAY (CL) w/ trace sand	
12/2/2021	H-16R	38.5-39	26.7									*	Brown and gray LEAN CLAY (CL) w/ trace sand	
12/2/2021	H-16R	50.5-51	31.8	91.4			$1.1 \times 10^{-7}$					*	Brown and gray FAT CLAY (CH)	

NOTE:  
 (1) FOC = Organic Content divided by 174.  
 (2) \* See Particle Size Analysis Graph.  
 (3) NP = Non Plastic

Project: Henning Mgmt

Client: ERM



File No.: 21-83-3884  
 Date: 12/2/2021

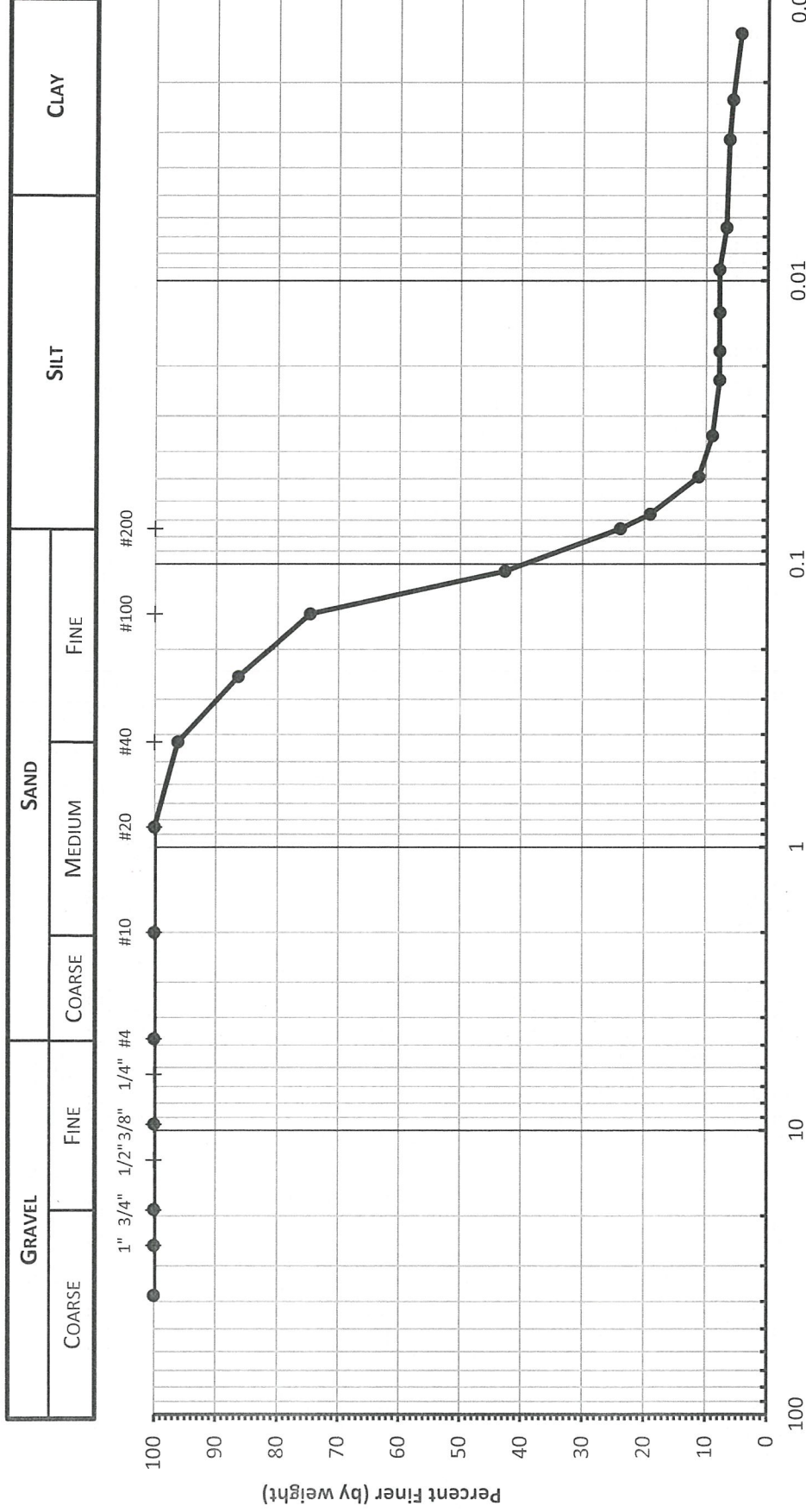
Client: ERM

Project: Henning Mgmt

AAI Project No.21-83-3884

## PARTICLE SIZE ANALYSIS

(ASTM D422)



SAMPLE IDENTIFICATION		VISUAL IDENTIFICATION			
BORING	H-12R	Gray SILTY SAND (SM)			
	DEPTH (FT)	53-54			
		% GRAVEL	% SAND	% SILT	% CLAY
		0.0	76.1	17.1	6.8

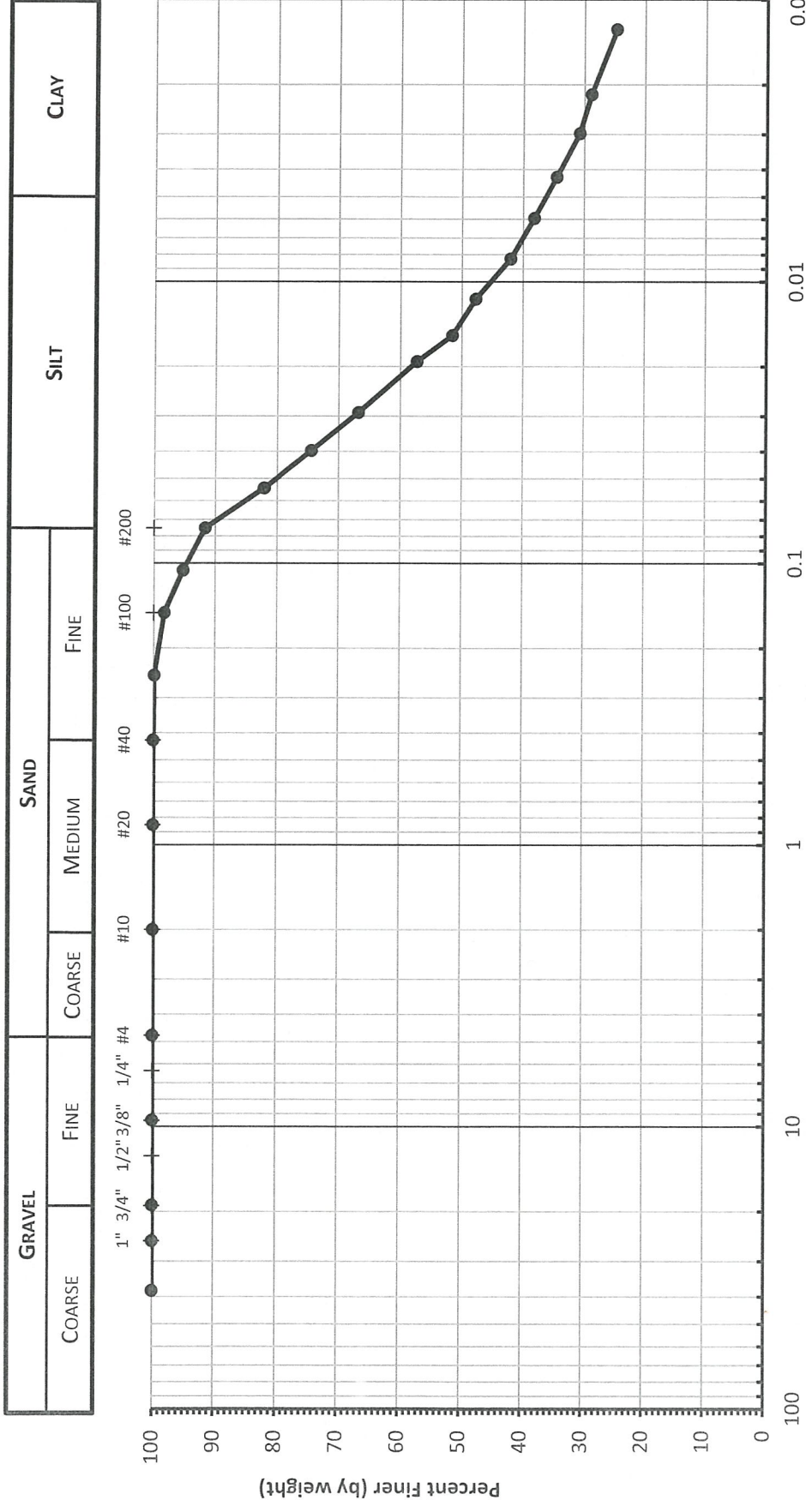


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# PARTICLE SIZE ANALYSIS (ASTM D422)

Client: ERM  
 Project: Henning Mgmt  
 AAI Project No.21-83-3884



SAMPLE IDENTIFICATION		VISUAL IDENTIFICATION			
BORING	H-12R	Gray and brown LEAN CLAY (CL) w/ trace sand			
	DEPTH (FT) 74-76				
		% GRAVEL	% SAND	% SILT	% CLAY
		0.0	8.4	55.5	36.1

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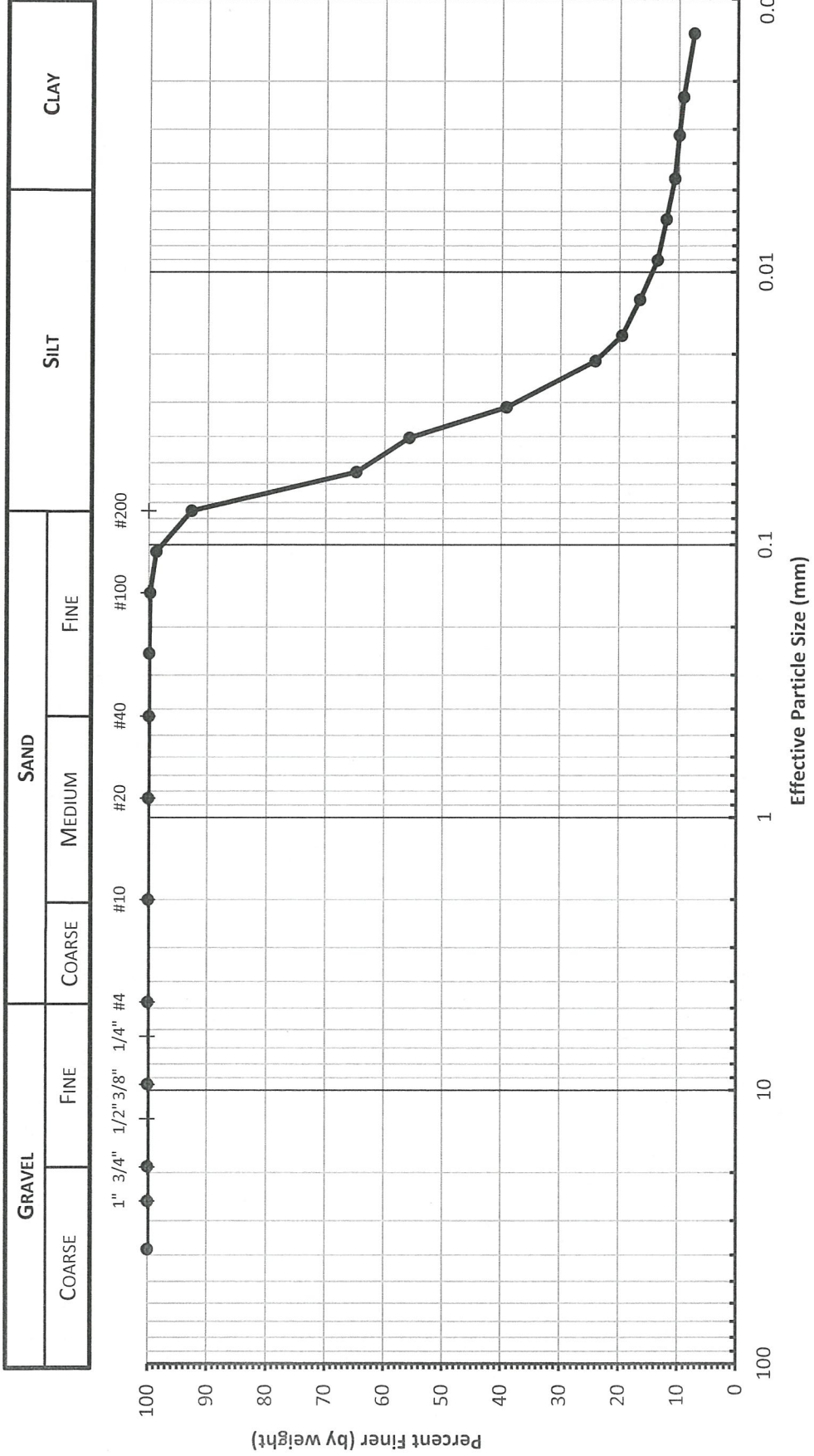
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# PARTICLE SIZE ANALYSIS (ASTM D422)

Client: ERM  
 Project: Henning Mgmt  
 AAI Project No.21-83-3884



SAMPLE IDENTIFICATION		VISUAL IDENTIFICATION			
BORING	H-16R	Brown and gray LEAN CLAY (CL) w/ trace sand			
	DEPTH (FT)	38.5-39			
		% GRAVEL	% SAND	% SILT	% CLAY
		0.0	7.3	81.7	11.0

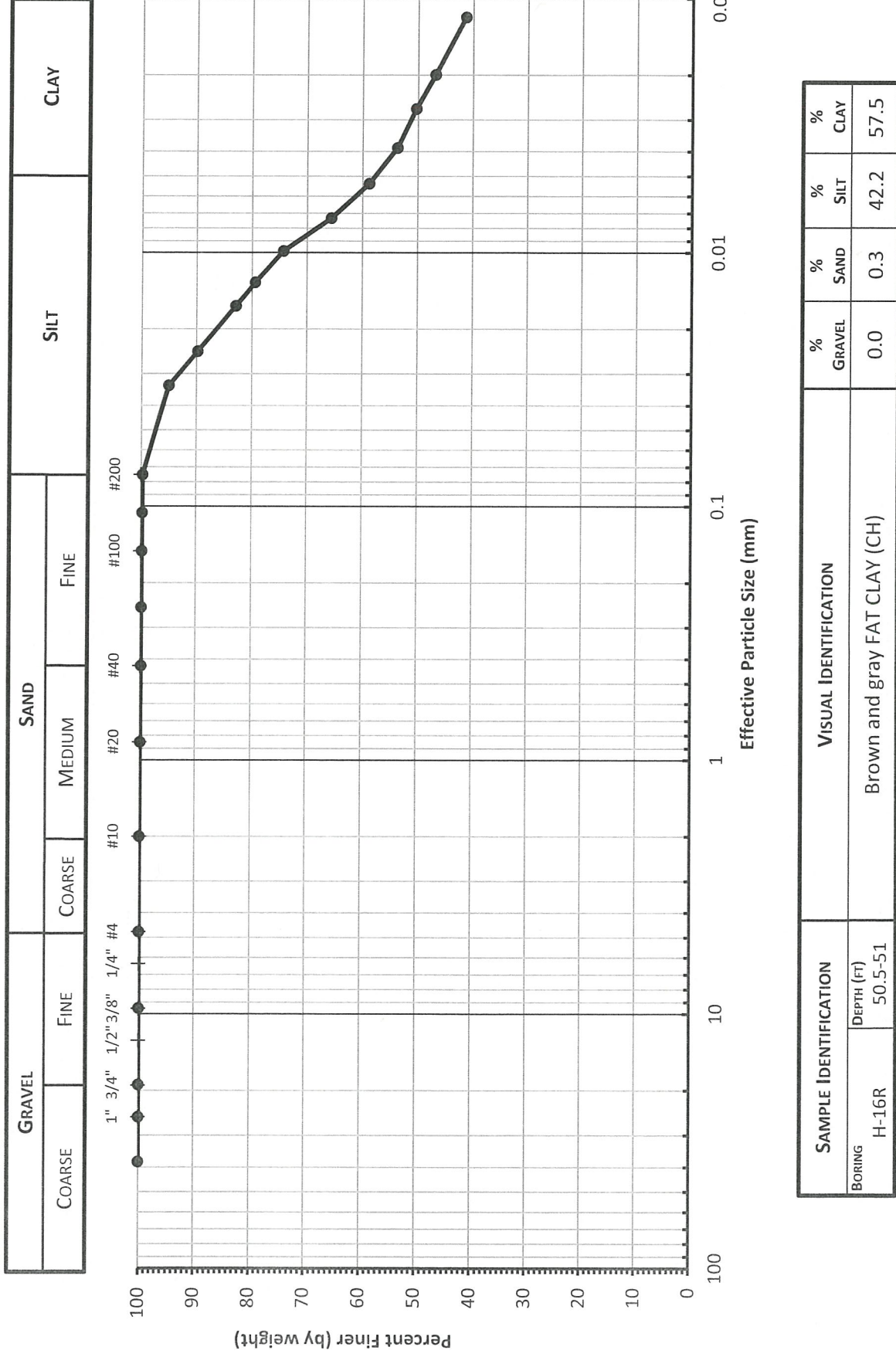
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 Baton Rouge, LA 70810  
 225-752-4790 (phone)  
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# PARTICLE SIZE ANALYSIS (ASTM D422)

Client: ERM  
 Project: Henning Mgmt  
 AAI Project No.21-83-3884



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Ardaman & Associates, Inc.

**To:** ERM  
840 W. Sam Houston Pkwy. Suite 600  
Houston, TX 77024  
**Phone:** (832) 786-5006  
**Attention:** Shawn Wiggins

**Date:** January 11, 2022

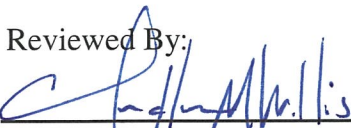
**Job No.:** 21-83-3884  
**Project:** Henning Mgmt

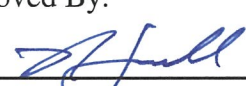
**From:** Chandler M. Willis

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1	Grain Size Curve (1)
1	Chain of Custody (1)

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Laboratory Manager

Approved By:  
  
Robb Jewell, P.E.  
Branch Manager

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PHONE: (225) 752-4790  
FAX: (225) 752-4878



# Henning Mgmt LABORATORY TEST RESULTS TABLE 1

Date Tested	Sample ID	Depth (ft.)	ASTM D2216	ASTM D5084	ASTM D4972	ASTM D2974	ASTM D4318			ASTM D422	ASTM D2487	
			Moisture Content (%)	Permeability (cm/sec)	Soil pH	Organic Content (%)	Atterberg Limits			Particle Size Analysis	Classification	
			Dry Density (lbs./cu.ft.)	Total Porosity (decimal)	Specific Gravity			LL	PL	PI		
1/11/2022	MW-8	50-52	97.8								*	Gray and tan FAT CLAY (CH)

NOTE:  
 (1) FOC = Organic Content divided by 174.  
 (2) \* See Particle Size Analysis Graph.  
 (3) NP = Non Plastic



Project: Henning Mgmt

Client: ERM

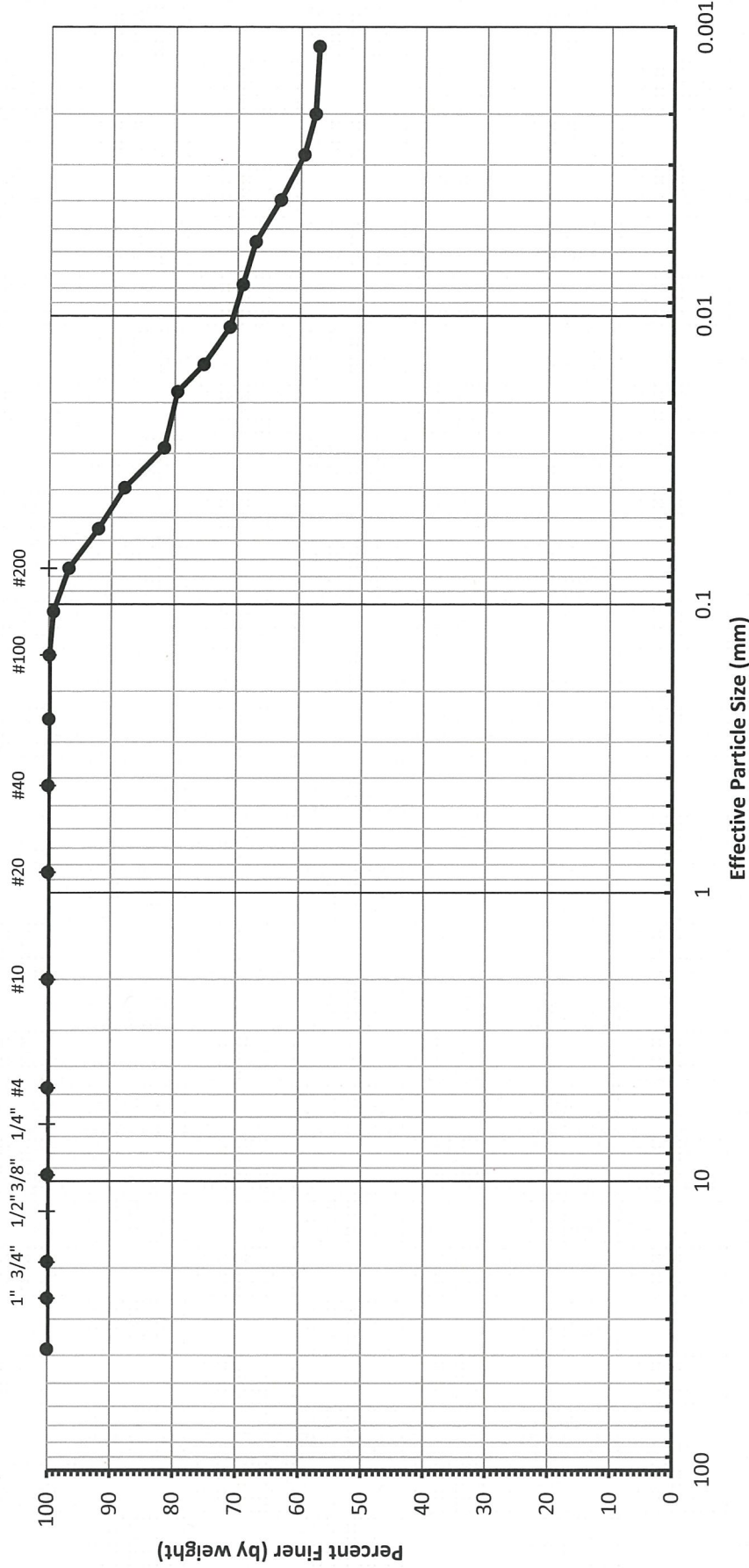
File No.: 21-83-3884

Date: 1/11/2022

Client: ERM  
 Project: Henning Management  
 AAI Project No.21-83-3884

# PARTICLE SIZE ANALYSIS (ASTM D422)

GRAVEL		SAND			SILT		CLAY
		COARSE	MEDIUM	FINE			



SAMPLE IDENTIFICATION		VISUAL IDENTIFICATION			
BORING	MW-8	Gray and tan FAT CLAY (CH)			
DEPTH (FT)	50-52				
% GRAVEL	0.0	% SAND	3.2	% SILT	31.0
% CLAY	65.8				

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ADAMANT & ASSOCIATES  
 21-83-3884  
 Chain of Custody



**Client Information:**  
 Company Name: ERM  
 Contact Name: Shawn Wilgins  
 Address: POUSCON, TX  
 City, State Zip: POUSCON, TX  
 Phone Number: 971-203-2385 Ext:           
 Fax Number:           
 E-mail Address: Shawn.wilgins@ERM.com

**Billing Information:**  
 PO Number:           
 Quote Number:           
 Required QC Level:           
 Bill Monthly:  Yes  No

**Project Name/Number:** Hennings Management  
0526033  
 Sampler's Signature: [Signature]  
 Shipping Method: UPS / FedEx / NOW  
DHL / Element / Hand / Mail

**Matrix Code**  
 DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Which Regulations Apply:			Turn Time	Rush turn times will incur a surcharge and must be pre-approved by (lab.)	Container	Pres.	Requested Tests	Comments
	<input type="checkbox"/> RCRA	<input type="checkbox"/> POTW	<input type="checkbox"/> NPDES						
MMW-8 50-52'	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> Distribution	<input type="checkbox"/> Special	<input type="checkbox"/> State	<input type="checkbox"/> Other	Quantity	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Soil Classification Moisture Particle Size Permeability	
						Type P=Plastic, V=Vial	MONS		

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
<u>[Signature]</u>	<u>12/16/21 13:30</u>	<u>[Signature]</u>	<u>12/16/21 13:30</u>	
<u>[Signature]</u>	<u>12/21/21 13:05</u>	<u>[Signature]</u>	<u>12/21/21 13:05</u>	Received at lab on ice? <input type="checkbox"/> Yes <input type="checkbox"/> No Temp: <u>        </u>

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

8800 North US 31  
 Columbus, IN  
 47201 USA  
 P 812-375-0531  
 F 812-375-0731

328 Ley Road, Suite 100  
 Fort Wayne, IN  
 46825 USA  
 P 260-471-7000  
 F 260-471-7777

909 Executive Dr  
 Warsaw, IN  
 46580 USA  
 P 574-267-3305  
 F 574-269-6569

3371 Cleveland Road, Suite 100A  
 South Bend, IN  
 46628 USA  
 P 574-277-0707  
 F 574-273-5699

2417 W. Pinhook Rd  
 Lafayette, LA  
 70508 USA  
 P 337-235-0463  
 F 337-233-6540



Environmental Resource Management  
 840 Sam Houston PKWY North, Suite 600  
 Houston, Texas 77024  
 Project: Henning Management 0526033



**Core Mineralogy, Inc.**  
 Analytical Consulting Services

**Semi Quantitative X-Ray Diffraction (XRD) &  
 Energy Dispersive X-Ray Spectrometry (EDX)**

[www.coremineral.com](http://www.coremineral.com)  
 100 Jared Drive  
 Broussard, LA 70518  
 Phone: (337) 984-0500  
 e-mail: mansourr@coremineral.com  
 Analyst: Mansour Rahmatian (M.S.)  
 CMI # 21111202 EDXXRD  
 Date Reported: 11/18/2021

Sample Submitted to CMI Labs on: 11/12/2021 @ 2:05 PM  
 Attention: Shawn Wiggins

Sample ID				Semi Quantitative Weight Percent Elemental Composition by EDX Normalized to 100%																		Mineral Phases Identified by XRD														
Sample Information	Date Sampled	Time Sampled	CMI Sample #	Carbon (C)	Oxygen (O)	Sodium (Na)	Magnesium (Mg)	Aluminum (Al)	Silicon (Si)	Phosphorus (P)	Sulfur (S)	Chlorine (Cl)	Potassium (K)	Calcium (Ca)	Chromium (Cr)	Manganese (Mn)	Iron (Fe)	Zinc (Zn)	Strontium (Sr)	Barium (Ba)	Titanium (Ti)	Total	Quartz (SiO <sub>2</sub> )	K-Feldspars (KAlSi <sub>3</sub> O <sub>8</sub> )	Plagioclase (NaAlSi <sub>3</sub> O <sub>8</sub> )	Hematite (Fe <sub>2</sub> O <sub>3</sub> )	Calcite (CaCO <sub>3</sub> )	Barium Sulfide (BaS)	Barite (BaSO <sub>4</sub> )	Witherite (BaCO <sub>3</sub> )	Barium Chloride (BaCl <sub>2</sub> )	Baria (BaO)	Barium Peroxide (BaO <sub>2</sub> )	Total Clay	Total	
H-8R 0-2'	11/11/21	1100	16873	6.86	31.59	0.24	ND	7.63	43.40	ND	1.01	0.03	1.09	0.83	ND	ND	2.75	ND	ND	3.79	0.8	100	62.8	1.5	2.3	ND	0.8	ND	6.1	ND	ND	ND	ND	ND	26.5	100
H-28R 0-2'	11/11/21	1540	16874	6.42	31.90	0.21	ND	9.20	43.49	ND	0.68	0.03	1.11	0.76	ND	ND	3.11	ND	ND	2.48	0.6	100	56.7	1.4	2.1	ND	ND	ND	3.7	ND	ND	ND	ND	ND	36.1	100

**ND = None Detected**

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# CORE MINERALOGY Chain of Custody

Laboratory Number:

<b>Client Information:</b>	<b>Billing Information:</b>	PO Number:	Project Name/Number: <b>HENNING MANAGEMENT 0526033</b>	Page <input type="text"/> of <input type="text"/> <b>Matrix Code</b>
Company Name: <b>ERM</b>	<b>SAME</b>	Quote Number:	Sampler's Signature 	DW = Drinking Water WW = Waste Water GW = Ground Water AQ = Aqueous OT = Other SL = Sludge    SOL = Solid O = Oil        SO = Soil F = Food       SW = Swab NG = Natural Gas NGL = Natural Gas Liquid PW = Produced Water CF = Completion Fluid
Contact Name: <b>SHAWN WILGINS</b>		Required QC Level		
Address: <b>840 W SAM HOUSTON PKWY N. SUITE 600</b>		Bill Monthly <input type="checkbox"/> Yes <input type="checkbox"/> No		
City, State Zip: <b>HOUSTON, TX 77024</b>				
Phone Number: <b>971-303-2385</b> Ext: <input type="text"/>				
Fax Number: <input type="text"/>				
E-mail Address: <b>SHAWN.WILGINS@ERM.COM</b>				

Which Regulations Apply:	Turn Time	(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container	Pres.	Requested Tests	Comments
<input type="checkbox"/> RCRA <input type="checkbox"/> Drinking Water <input type="checkbox"/> POTW <input type="checkbox"/> Distribution <input type="checkbox"/> NPDES <input type="checkbox"/> Special <input type="checkbox"/> USDA/FDA <input type="checkbox"/> State <input type="checkbox"/> RECAP/RISC <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other		Quantity	Type P=Plastic, G=Glass, V=Vial	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	
<b>Sample ID/Description</b>	<b>Date</b>	<b>Time</b>	<b>Grab / Composite</b>	<b>Matrix</b>		
H-8R 0-2' 16873	11/11/21	1100	GRAB	SO		
H-28R 0-2' 16874	11/11/21	1540	GRAB	SO		

#	Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
1		11/12/21 1155		11/12/21 1155	
2		11/12/21 2:05pm		11/12/2021 2:05PM	Received at lab on ice?
3					<input type="checkbox"/> Yes <input type="checkbox"/> No Temp:

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**ERM**

**0526033 HENNING**

**STANDARD LEVEL IV  
REPORT OF ANALYSIS**

**WORK ORDER #21-12077-OR**

**January 19, 2022**

**EBERLINE ANALYTICAL/OAK RIDGE LABORATORY  
OAK RIDGE, TN**

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**Eberline Services – Oak Ridge Laboratory  
LABORATORY DATA SUPPORT CHECKLIST**

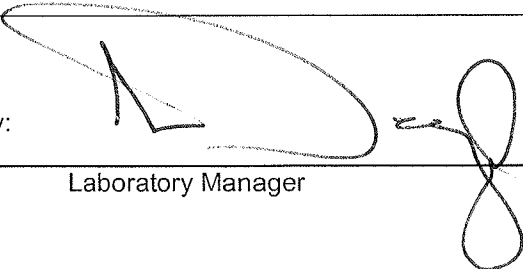
MP-001-3

Eberline Services Work Order # 21-12077

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		12/27/21	YSS	Sample Log-In
		1/13/22	YSS	Data Compilation
		1-14-22	MMT	First Technical Data Review
		1/14/22	MMT	Second Technical Data Review
		1/18/22	S	Data Entry/Electronic Deliverable
		1/18/22	S	Case Narrative
		1/19/22	YSS	Electronic Deliverable Proof
		1/19/22	MMT	Samples Analyzed within Holding Time Yes? <input checked="" type="checkbox"/> No? <input type="checkbox"/>
		1/19/22	MMT	QA/QC Review
				Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by:  \_\_\_\_\_

Laboratory Manager

1/19/22  
Date

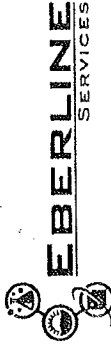


**SECTION I**  
**CHAIN OF CUSTODY**  
**& pH CHECK**

# Chain of Custody Record

No.

Eberline Services  
 601 Scarboro Road  
 Oak Ridge, TN 37830  
 (865) 481-0683 Phone • (865) 483-4621 Fax



Project Name: Hennings Management Project Number: 0520033  
 Send Report To: ERM - Sharon Wilgus Sampler (Print Name): Sharon Wilgus  
 Address: Hovscom, TX Shipper (Print Name):  
Sharon.wilgus@erm.com Shipment Method: Fedex  
 Airbill Number:  
 Laboratory Receiving:  
 Phone: 971-303-2385

REC'D DEC 27 2021  
 Analysis Requested  
Estum 226 & 228  
 Page 1 of 1  
3 coolers  
 Purchase Order # 21-12077

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
MW-11	12/15	0800	water	1		
MW-1		1345				
MW-8		1630				
MW-7	12/10	0750				
MW-9		0820				
MW-9D		0840				
SW-80 13'		1335				
SW-80 2'		1230				
MW-6	12/17	0830				
MW-10	12/20	1045				
MW-5		1330				
MW-4		1505				
MW-3		1630				
MW-2	12/21	0955				

Relinquished by: (Signature) [Signature] Date: 12/21/21 Time: 0800  
 Received by: (Signature) Fedex Date: 12/27/21 Time: 0957  
 Relinquished by: (Signature) Fedex Date: 12/27/21 Time: 0957  
 Received by: (Signature) [Signature] Date: 12/27/21 Time: 0957

Sample Custodian Remarks (Completed By Laboratory):  
 Turnaround:  Routine  24 Hour  1 Week  Other  
 Total # Containers Received?   
 COC Seals Present?   
 COC Seals Intact?   
 Received Containers Intact?   
 Temperature?



**EBERLINE**  
SERVICES  
Oak Ridge Laboratory

# Internal Chain of Custody

Work Order #

**21-12077**

Lab Deadline

**1/10/2022**

Analysis

**Ra226 - Level 4**

Sample Matrix

**Water**

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	30	V1.5
	05	20	V1.5
	06	30	V1.5
	07	30	V1.5
	08	50	V1.5
	09	20	V1.5
	10	40	V1.5
	11	20	V1.5
	12	20	V1.5
	13	40	V1.5
	14	60	V1.5
	15	40	V1.5
	16	40	V1.5
	17	20	V1.5

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JH	1/4/22 0930
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JH	1/5/22 0815
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	MB	1/5/22 0815
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	MB	1/10/22 0953
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KP	1/10/22 0954
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KBS	1/10/22 1738
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		



**EBERLINE**  
SERVICES  
Oak Ridge Laboratory

# Internal Chain of Custody

Work Order #

**21-12077**

Lab Deadline

**1/10/2022**

Analysis

**Ra228 - Level 4**

Sample Matrix

**Water**

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	30	V1.5
	05	20	V1.5
	06	30	V1.5
	07	30	V1.5
	08	50	V1.5
	09	20	V1.5
	10	40	V1.5
	11	20	V1.5
	12	20	V1.5
	13	40	V1.5
	14	60	V1.5
	15	40	V1.5
	16	40	V1.5
	17	20	V1.5

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		





**EBERLINE**  
SERVICES  
Oak Ridge Laboratory

# Internal Chain of Custody

Work Order #

**21-12077**

Lab Deadline

**1/4/2022**

Analysis


**TDS - Level 4**

Sample Matrix

**Water**

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	30	V1.5
	05	20	V1.5
	06	30	V1.5
	07	30	V1.5
	08	50	V1.5
	09	20	V1.5
	10	40	V1.5
	11	20	V1.5
	12	20	V1.5
	13	40	V1.5
	14	60	V1.5
	15	40	V1.5
	16	40	V1.5
	17	20	V1.5

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	<i>J. Achelle</i>	1-3-22
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	<i>My</i>	4 JAN 22 0345
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

	<b>Sample Receiving Report</b> (Volumes, pH, & CPM)	<b>Internal Work Order</b>
		<b>21-12077</b>
		Received By <b>RSPENCER</b>


FR	ClientID	# Btls	Comments	Matrix	Storage	Rec Vol Ttl	CPM Max
01	LCS	0		WA	V1.5		
02	BLANK	0		WA	V1.5		
03	DUP	0		WA	V1.5		
04	MW-11	1		WA	V1.5	3.76	30
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	30
05	MW-1	1		WA	V1.5	3.76	20
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	20
06	MW-8	1		WA	V1.5	3.76	30
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	30
07	MW-7	1		WA	V1.5	3.76	30
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	30
08	MW-9	1		WA	V1.5	3.76	50
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	50
09	MW-9D	1		WA	V1.5	3.76	20
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	20
10	SW-BO 13	1		WA	V1.5	3.76	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	40
11	SW-BO 2	1		WA	V1.5	3.76	20
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	20
12	MW-6	1		WA	V1.5	3.76	20
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	20
13	MW-10	1		WA	V1.5	3.76	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	40
14	MW-5	1		WA	V1.5	3.76	60
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	60
15	MW-4	1		WA	V1.5	3.76	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	40
16	MW-3	1		WA	V1.5	3.76	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	40
17	MW-2	1		WA	V1.5	3.76	20
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	3.7600	20

Received by: *Randolph Spencer*

Date: 12-27-21

**SECTION II**  
**SAMPLE ACKNOWLEDGEMENT**

Client Name		Contract/PO		Project Type		Date Received		Required Turnaround Days		Eberline Services Work Order								
ERM		0526033		Environmental		12/28/2021		21		21-12077								
Project Name		Client WO		Sample Disp		Lab Deadline		Internal Deadline		Client Deadline								
526033		HENNING		W		01/10/2022		01/18/2022		01/19/2022								
Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	TDS											
01	LCS	12/28/21	WA	V1.5	X	X	X					PL						
02	BLANK	12/28/21	WA	V1.5	X	X	X					3						
03	DUP	12/28/21	WA	V1.5	X	X	X					3						
04	MW-11	12/15/21 08:00	WA	V1.5	X	X	X					3						
05	MW-1	12/15/21 13:45	WA	V1.5	X	X	X					3						
06	MW-8	12/15/21 16:30	WA	V1.5	X	X	X					3						
07	MW-7	12/16/21 07:50	WA	V1.5	X	X	X					3						
08	MW-9	12/16/21 08:20	WA	V1.5	X	X	X					3						
09	MW-9D	12/16/21 08:40	WA	V1.5	X	X	X					3						
10	SW-BO 13	12/16/21 11:35	WA	V1.5	X	X	X					3						
11	SW-BO 2	12/16/21 12:30	WA	V1.5	X	X	X					3						
12	MW-6	12/17/21 08:30	WA	V1.5	X	X	X					3						
13	MW-10	12/20/21 10:45	WA	V1.5	X	X	X					3						
14	MW-5	12/20/21 13:30	WA	V1.5	X	X	X					3						
15	MW-4	12/20/21 15:05	WA	V1.5	X	X	X					3						
16	MW-3	12/20/21 16:30	WA	V1.5	X	X	X					3						
17	MW-2	12/21/21 09:55	WA	V1.5	X	X	X					3						
												0						
												0						
												0						
<b>Totals Per Analysis (non QA samples)</b>					14	14	14	0	0	0	0	0	0	0	0	0	0	0

 <b>EBERLINE</b> SERVICES  <b>Sample Log In Report</b>	<b>Oak Ridge Laboratory</b> 601 Scarboro Rd. Oak Ridge, TN 37830  <b>Voice: (865) 481-0683</b> <b>Fax: (865) 483-4621</b>	<b>Invoice</b> Accounts Payable ERM 840 W Sam Houston Pkwy N, Suite 600 Houston, TX 77024  Voice 281-242-5700 Fax 281-520-4625  <b>Contact</b> Voice Shawn Wiggins Fax 971-303-2385	<b>Report Data</b> Shawn Wiggins ERM 840 W Sam Houston Parkway N #600 Houston, TX 77024  Voice 971-303-2385 Fax
	0011		



Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST  
MP-001-2

WORK ORDER # 21-12077

SAMPLE MATRIX/MATRICES:

(CIRCLE ONE OR BOTH)

AQUEOUS NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	<input checked="" type="radio"/> Y	N	
If aqueous, properly preserved	<input checked="" type="radio"/> Y	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	<input checked="" type="radio"/> Y	N
Unbroken on outside of package?	<input checked="" type="radio"/> Y	N
Present on samples?	<input checked="" type="radio"/> Y	N
Unbroken on samples?	<input checked="" type="radio"/> Y	N
Was chain of custody present upon sample receipt?	<input checked="" type="radio"/> Y	N

IF THE RESPONSE TO ANY OF THE ABOVE IS NO, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SIGNATURE: *Kimberly Spencer* DATE: 12-27-21

**SECTION III**  
**CASE NARRATIVE**



EBERLINE ANALYTICAL CORPORATION  
601 SCARBORO ROAD  
OAK RIDGE, TENNESSEE 37830  
PHONE (865) 481-0683  
FAX (865) 483-4621

EBS-OR-49255

January 19, 2022

Shawn Wiggins  
ERM  
840 W Sam Houston Pkwy N #600  
Houston, TX 77478

CASE NARRATIVE  
Work Order # 21-12077-OR

SAMPLE RECEIPT

This work order contains fourteen water samples received 12/27/2021. Samples were analyzed for Radium-226/228 and Total Dissolved Solids.

<u>CLIENT ID</u>	<u>LAB ID</u>	<u>CLIENT ID</u>	<u>LAB ID</u>
MW-11	21-12077-04	SW-BO 2	21-12077-11
MW-1	21-12077-05	MW-6	21-12077-12
MW-8	21-12077-06	MW-10	21-12077-13
MW-7	21-12077-07	MW-5	21-12077-14
MW-9	21-12077-08	MW-4	21-12077-15
MW-9D	21-12077-09	MW-3	21-12077-16
SW-BO 13	21-12077-10	MW-2	21-12077-17

ANALYTICAL METHODS

Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0. Total Dissolved Solids were performed using Standard Methods 2540C.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 1-sigma value.

Minimum Detectable Activity (MDA) values for data represented in this report are sample-specific. MDA measurements are determined based on factors and conditions including instrument settings, aliquot size, and matrix type.

RADIUM-226

Samples were prepared by removing representative aliquots followed by mixed acid digestions as appropriate. This was followed by precipitations of Radium/Barium Sulfate. Precipitates were dissolved in alkaline EDTA. Radium was selectively precipitated and mounted on micro-porous filter media. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. The final result was corrected for inherent self-absorption from elemental Barium. Chemical recovery was calculated using a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.



ANALYTICAL RESULTS CONTINUED

RADIUM-226 CONTINUED

Samples demonstrated acceptable results for all Radium-226 analyses. Chemical recovery was acceptable for all analyses. The Radium-226 method blank demonstrated an acceptable result. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were counted on a gas proportional counter. Chemical recovery was determined using a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for all Radium-228 analyses. Chemical recovery was acceptable for all analyses. The Radium-228 method blank demonstrated an acceptable result. Results for the Radium-228 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

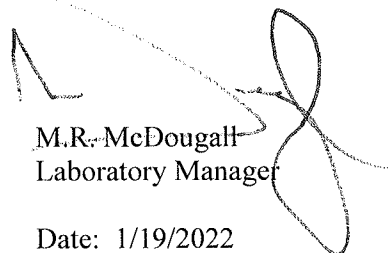
TOTAL DISSOLVED SOLIDS (TDS)

A volumetric aliquot of each sample was filtered through 0.45µm filter media into a tared 250 ml beaker. Samples were dried on a hot plate and allowed to cool. The TDS content was determined by reweighing tared beakers.

Samples demonstrated Total Dissolved Solids content that ranged from 38.0 to 6,620.0 mg/L.

CERTIFICATION OF ACCURACY

I certify that this data report complies with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.



M.R. McDougall  
Laboratory Manager

Date: 1/19/2022

Eberline Analytical wants and encourages your feedback regarding our performance providing radioanalytical services. Please visit <http://eberlineanalytical.com/> to provide us with feedback on our services.

**SECTION IV**  
**ANALYTICAL RESULTS SUMMARY**

# Eberline Analytical

## Final Report of Analysis

**Shawn Wiggins**  
ERM

840 W Sam Houston Parkway N #600  
Houston, TX 77024

SDG: **21-12077**  
Project: 0526033 Henning  
Analysis Category: ENVIRONMENTAL  
Sample Matrix: VVA

Report To:

Work Order Details:

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
21-12077-01	LCS	KNOWN	12/28/21 00:00	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	1.00E+01	4.61E-01			pCi/l
21-12077-01	LCS	SPIKE	12/28/21 00:00	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	1.03E+01	1.37E+00	2.57E+00	1.84E-01	pCi/l
21-12077-02	MBL	BLANK	12/28/21 00:00	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	5.65E-02	1.22E-01	1.23E-01	2.41E-01	pCi/l
21-12077-03	DUP	MW-1	12/15/21 13:45	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	2.32E-01	2.27E-01	2.33E-01	2.94E-01	pCi/l
21-12077-04	TRG	MW-11	12/15/21 08:00	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	4.49E-01	2.48E-01	2.65E-01	1.46E-01	pCi/l
21-12077-05	DO	MW-1	12/15/21 13:45	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	8.73E-02	1.48E-01	1.49E-01	2.62E-01	pCi/l
21-12077-06	TRG	MW-8	12/15/21 16:30	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	1.17E-01	1.40E-01	1.42E-01	1.98E-01	pCi/l
21-12077-07	TRG	MW-7	12/16/21 07:50	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	4.59E-01	3.14E-01	3.28E-01	3.00E-01	pCi/l
21-12077-08	TRG	MW-9	12/16/21 08:20	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	3.01E-01	2.21E-01	2.30E-01	2.25E-01	pCi/l
21-12077-09	TRG	MW-9D	12/16/21 08:40	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	5.43E-01	3.27E-01	3.47E-01	2.09E-01	pCi/l
21-12077-10	TRG	SW-BO 13	12/16/21 11:35	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	9.11E-02	9.99E-02	1.02E-01	1.37E-01	pCi/l
21-12077-11	TRG	SW-BO 2	12/17/21 08:30	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	-2.79E-02	1.12E-01	1.12E-01	2.87E-01	pCi/l
21-12077-12	TRG	MW-6	12/20/21 08:30	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	5.20E-01	3.30E-01	3.47E-01	3.17E-01	pCi/l
21-12077-13	TRG	MW-10	12/20/21 10:45	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	1.98E-01	1.69E-01	1.74E-01	1.67E-01	pCi/l
21-12077-14	TRG	MW-5	12/20/21 13:30	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	5.78E-01	3.76E-01	3.98E-01	3.47E-01	pCi/l
21-12077-15	TRG	MW-4	12/20/21 15:05	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	1.90E-01	2.37E-01	2.40E-01	3.73E-01	pCi/l
21-12077-16	TRG	MW-3	12/20/21 16:30	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	3.30E-01	2.30E-01	2.40E-01	2.04E-01	pCi/l
21-12077-17	TRG	MW-2	12/21/21 09:55	12/28/2021	1/10/2022	21-12077	Radium-226	EPA 903.0 Modified	4.79E-01	2.15E-01	2.38E-01	1.59E-01	pCi/l



# Eberline Analytical

## Final Report of Analysis

**Shawn Wiggins**  
ERM

840 W Sam Houston Parkway N #600  
Houston, TX 77024

SDG: **21-12077**  
Project: 0526033 Henning  
Analysis Category: ENVIRONMENTAL  
Sample Matrix: WA

Work Order Details:

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
21-12077-01	LCS	KNOWN	12/28/21 00:00	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	8.84E+00	4.51E-01			pCi/l
21-12077-01	LCS	SPIKE	12/28/21 00:00	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	9.61E+00	9.95E-01	2.39E+00	1.24E+00	pCi/l
21-12077-02	MBL	BLANK	12/28/21 00:00	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	1.92E-01	8.16E-01	8.17E-01	1.72E+00	pCi/l
21-12077-03	DUP	MW-1	12/15/21 13:45	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	1.16E+00	5.44E-01	6.05E-01	1.03E+00	pCi/l
21-12077-04	TRG	MW-11	12/15/21 08:00	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	6.08E-01	6.35E-01	6.49E-01	1.29E+00	pCi/l
21-12077-05	DO	MW-1	12/15/21 13:45	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	2.36E-01	5.61E-01	5.64E-01	1.17E+00	pCi/l
21-12077-06	TRG	MW-8	12/15/21 16:30	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	4.66E-01	5.88E-01	5.68E-01	1.14E+00	pCi/l
21-12077-07	TRG	MW-7	12/16/21 07:50	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	7.77E-01	6.57E-01	6.80E-01	1.32E+00	pCi/l
21-12077-08	TRG	MW-9	12/16/21 08:20	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	7.34E-01	5.33E-01	5.58E-01	1.05E+00	pCi/l
21-12077-09	TRG	MW-9D	12/16/21 08:40	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	7.86E-01	4.86E-01	5.17E-01	9.47E-01	pCi/l
21-12077-10	TRG	SW-BO 13	12/16/21 11:35	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	4.62E-01	4.92E-01	5.03E-01	1.00E+00	pCi/l
21-12077-11	TRG	SW-BO 2	12/16/21 12:30	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	1.40E-01	5.79E-01	5.79E-01	1.23E+00	pCi/l
21-12077-12	TRG	MW-6	12/17/21 08:30	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	1.71E+00	5.24E-01	6.51E-01	9.07E-01	pCi/l
21-12077-13	TRG	MW-10	12/20/21 10:45	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	3.70E-01	6.57E-01	6.63E-01	1.37E+00	pCi/l
21-12077-14	TRG	MW-5	12/20/21 13:30	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	2.10E+00	6.38E-01	7.95E-01	1.13E+00	pCi/l
21-12077-15	TRG	MW-4	12/20/21 15:05	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	7.19E-01	4.79E-01	5.06E-01	9.42E-01	pCi/l
21-12077-16	TRG	MW-3	12/20/21 16:30	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	5.68E-01	6.48E-01	6.61E-01	1.32E+00	pCi/l
21-12077-17	TRG	MW-2	12/21/21 09:55	12/28/2021	1/12/2022	21-12077	Radium-228	EPA 904.0	9.83E-01	6.22E-01	6.60E-01	1.21E+00	pCi/l
21-12077-04	TRG	MW-11	12/15/21 08:00	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	3.27E+03				mg/l
21-12077-05	TRG	MW-1	12/15/21 13:45	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.23E+03				mg/l
21-12077-06	TRG	MW-8	12/15/21 16:30	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.44E+03				mg/l
21-12077-07	TRG	MW-7	12/16/21 07:50	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	6.62E+03				mg/l
21-12077-08	TRG	MW-9	12/16/21 08:20	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.58E+03				mg/l
21-12077-09	TRG	MW-9D	12/16/21 08:40	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.73E+03				mg/l
21-12077-10	TRG	SW-BO 13	12/16/21 11:35	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	3.80E+01				mg/l
21-12077-11	TRG	SW-BO 2	12/16/21 12:30	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.00E+02				mg/l
21-12077-12	TRG	MW-6	12/17/21 08:30	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	4.08E+03				mg/l
21-12077-13	TRG	MW-10	12/20/21 10:45	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.98E+03				mg/l
21-12077-14	TRG	MW-5	12/20/21 13:30	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	3.41E+03				mg/l
21-12077-15	TRG	MW-4	12/20/21 15:05	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	2.72E+03				mg/l
21-12077-16	TRG	MW-3	12/20/21 16:30	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	2.15E+03				mg/l
21-12077-17	TRG	MW-2	12/21/21 09:55	12/28/2021	1/4/2022	21-12077	TDS	SM2540C	1.09E+03				mg/l

CU=Counting Uncertainty; CSU=Combined Standard Uncertainty (1-sigma); MDA=Minimal Detected Activity; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original



**EBERLINE**  
ANALYTICAL

EBERLINE ANALYTICAL CORPORATION

601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

**SECTION V**  
**ANALYTICAL STANDARD**



13a-b  
(f 6a)

# National Institute of Standards & Technology

## Certificate

### Standard Reference Material 4251C Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

#### Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]\*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

#### Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

#### Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

#### Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899  
October 1994

Thomas E. Gills, Chief  
Standard Reference Materials Program



QUALITY CONTROL PROGRAM  
QCP-009

Rev.8; 11/10/03  
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY  
RADIOACTIVE REFERENCE STANDARD SOLUTIONS

Solution Reference #		QCP-009-1-A NIST SRM4251C	Date	4/23/21
Solution #				Ba-6a
Principal Radionuclide	Half Life, Years		Half Life, Days	
<sup>133</sup> Ba	1.048E+01		3.828E+03	
Radionuclide of Interest			Reference Date	9/1/1993 0:00
Parent Solution Conc.	<sup>133</sup> Ba 1.48E+05 dpm/ml			
Chemical Composition of Standard Solution				
<sup>133</sup> BaCl <sub>2</sub> in 1M HCl				

Dilution Instructions: Dilution Solvent Used 1M HCl


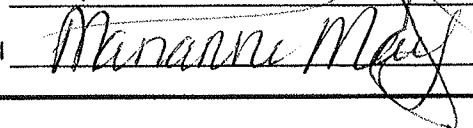
SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml  
Total Activity: 3.6950E+06 dpm  
Final Volume: 1000.00 ml  
Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 20, 2022

Verified & Approved By   
QC Approval 

Date: 4/23/21  
Date: 4/26/21



# CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<sup>Ra-5</sup>  
QA/QC REVIEWED  
Date 2/8/94 Initials *WR*

Radionuclide: Ra-226 Customer: TMA EBERLINE  
Half Life: 1600 ± 7 years P.O.No.: VH1888  
Catalog No.: 7226 Reference Date: February 1 1994 12:00 PST.  
Source No.: 453-26 Contained Radioactivity: (Ra-226) 1.001 μCi.  
Contained Radioactivity: (Ra-226) 37.0 kBq.

Description of Solution  
a. Mass of solution: 5.1864 g (in a 5 ml Flame Sealed Ampoule)  
b. Chemical form: Ra(NO<sub>3</sub>)<sub>2</sub> in 1 N HNO<sub>3</sub>  
c. Carrier content: None added  
d. Density: 1.0318 g/ml @ 20°C.

Radioimpurities: None detected (other than daughters)

Radioactive Daughters: Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration: (Ra-226) 0.1929 μCi/g.

## Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:

Energy peak(s) integrated under: 186 keV.

Branching ratio(s) used: 0.0351 gamma rays per decay.

## Uncertainty of Measurement

- a. Systematic uncertainty in instrument calibration: ±3.4%
- b. Random uncertainty in assay: ±3.1%
- c. Random uncertainty in weighing(s): ±0.2%
- d. Total uncertainty at the 99% confidence level: ±4.6%

## NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

## Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

## Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).



ISOTOPE PRODUCTS LABORATORIES  
1800 North Keystone Street  
Burbank, California 91504  
(818) 843 - 7000

*Anna U. Kuman*  
QUALITY CONTROL

*Feb. 3, 1994*  
Date Signed



**QUALITY CONTROL PROGRAM**  
MP 009

Rev.8; 11/01/03  
Title: Radioactive Reference Standards Solutions & Records

**EBERLINE SERVICES - OAK RIDGE LABORATORY**  
**RADIOACTIVE REFERENCE SOLUTIONS**  
*PRIMARY DILUTION RECERTIFICATION*  
**MP 009**

**SOLUTION REFERENCE #** IPL 453-26      **CURRENT DATE** 8/18/2021 0:00  
**SOLUTION #** Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
<sup>226</sup> Radium	1.600E+03	5.844E+05

<b>Radionuclide</b>	<sup>226</sup> Radium	<b>Reference Date</b>	2/1/1994 0:00
<b>Certified Activity</b>	1.001E+00 $\mu$ Ci		
<b>Certified Concentration</b>	$\mu$ Ci per gram		

<b>Ampoule /Solution Gross</b>		<b>Weight, Grams</b>
<b>Empty Ampoule</b>		<b>Weight, Grams</b>
<b>Solution Net</b>		<b>Weight, Grams</b>
<b>Total Activity in Ampoule</b>	1.0010 $\mu$ Ci	

**Chemical Composition of Standard Solution**  
<sup>226</sup>Ra(NO<sub>3</sub>)<sub>2</sub> in 1M HNO<sub>3</sub>

**Dilution Instructions:**      **Dilution Solvent Used** 1M HNO<sub>3</sub>

Dilute to a volume of 1000.00 milliliters

**Certified Total Activity of** 1.0010  $\mu$ Ci      **Which Equals** 2.222E+06 dpm at the date listed above

**And after dilution the activity of this solution is** 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

**Expiration Date:** August 18, 2022

Verified & Approved By 

Date: 8/18/2021

QC Approval 

Date: 8-30-21



QUALITY CONTROL PROGRAM  
MP 009

Rev.8; 11/01/03  
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY  
RADIOACTIVE REFERENCE STANDARD SOLUTIONS  
SECONDARY DILUTION RECERTIFICATION

Solution Reference #		MP 009 IPL-453-26	Date	8/18/2021 0:00
Solution #				Ra-5b
Principal Radionuclide	Half Life, Years	Half Life, Days		
<sup>226</sup> Radium	1.600E+03	5.844E+05		
Radionuclide of Interest	<sup>226</sup> Radium	Reference Date	2/1/1994 0:00	
Parent Solution Conc.	2.22E+03 dpm/ml			
Chemical Composition of Standard Solution				
<sup>226</sup> Ra(NO <sub>3</sub> ) <sub>2</sub> in 1M HNO <sub>3</sub>				

Dilution Instructions: Dilution Solvent Used 1M HNO<sub>3</sub>

SECONDARY VOLUMETRIC DILUTION


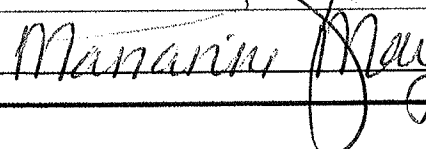
Vol. Parent Solution: 20.0000 ml  
Total Activity: 4.4440E+04 dpm  
Final Volume: 1000.00 ml

Final Activity Concentration: 4.4440E+01 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: 18-Aug-22

Verified & Approved By   
QC Approval 

Date: 8/18/2021 0:00

Date: 8-30-21

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

72325-207

Ra<sup>228</sup>

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	4.022 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	February 10, 2006 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	4.0%

Impurities:  $\gamma$ -impurities <0.1%

5.10721 grams 0.1M HCl solution with 50  $\mu$ g/g Ba carrier.

P O NUMBER 00003181, Item 1

SOURCE PREPARED BY:

M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED:

W.M. Ryz 2-13-06



# QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03

Title: Radioactive Reference Standards Solutions & Records

## EBERLINE SERVICES - OAK RIDGE LABORATORY RADIOACTIVE REFERENCE SOLUTIONS RECERTIFICATION MP 009

SOLUTION REFERENCE # Analytics 7235-207 CURRENT DATE 1/11/2021 0:00  
SOLUTION # Ra-12

Principal Radionuclide <sup>228</sup>Ra Half Life, Years 5.750E+00 Half Life, Days 2.100E+03

Radionuclide <sup>228</sup>Ra Reference Date 2/10/2006 0:00  
Certified Activity 1.087E-01  $\mu\text{Ci}$   
Certified Concentration                       $\mu\text{Ci per gram}$

Ampoule /Solution Gross 9.0741 Weight, Grams  
Empty Ampoule 3.9858 Weight, Grams  
Solution Net 5.0883 Weight, Grams  
Total Activity in Ampoule 0.1087  $\mu\text{Ci}$

### Chemical Composition of Standard Solution

<sup>228</sup>Ra(NO<sub>3</sub>)<sub>2</sub> in 0.5 M HCl

Dilution Instructions: Dilution Solvent Used 0.5 M HCl

Dilute to a volume of 991.00 Kg

Certified Total Activity of 0.1087  $\mu\text{Ci}$  Which Equals 2.413E+05 dpm at the date listed above

And after dilution the activity of this solution is 2.435E+02 dpm/ml This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: January 11, 2022

Recertified By 

Date: 1/11/21

QC Approval 

Date: 1/11/21

**SECTION VI**  
**QUALITY CONTROL SAMPLE RESULTS SUMMARY**



WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
<b>21-12077</b>	<b>Ra226</b>	<b>1</b>	<b>pCi</b>	<b>I</b>	<b>ERM</b>

**Laboratory Control Sample**

Analyte	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	102.70%	24.98%	100.00%	4.60%	1.00E+01	4.61E-01	1.03E+01	2.57E+00	Ra-5b	4.39E+01	4.60E+00	5.07E-01

**Matrix Spike**

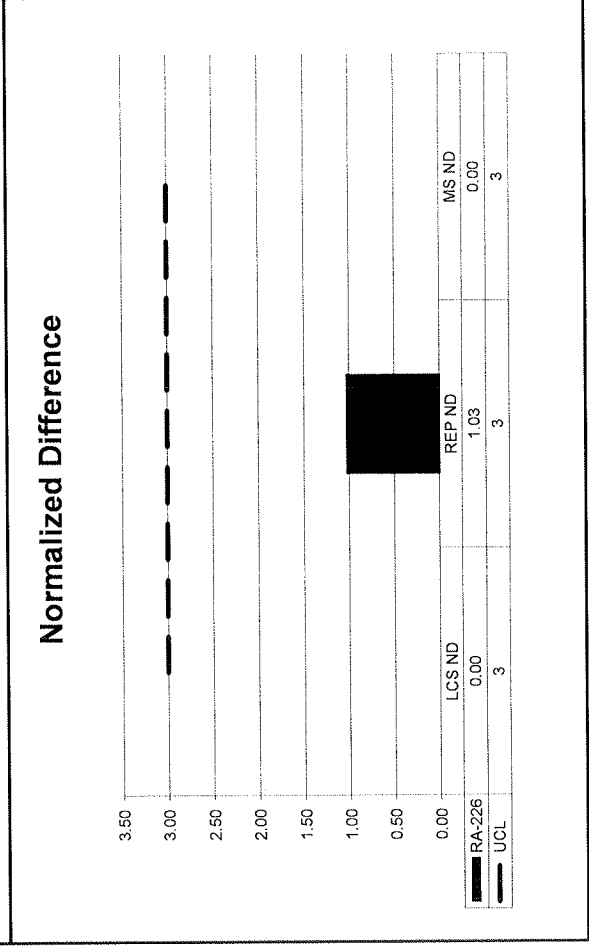
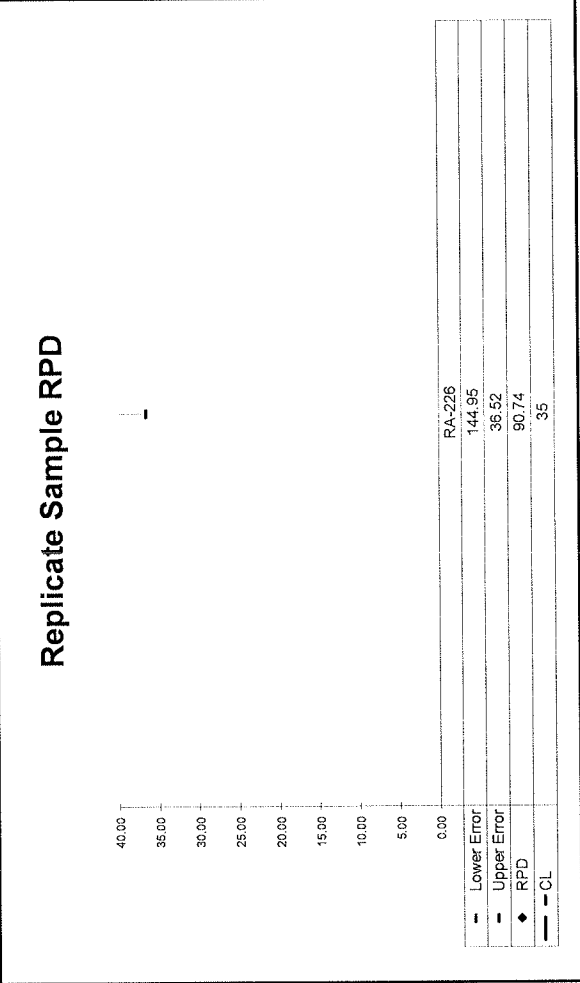
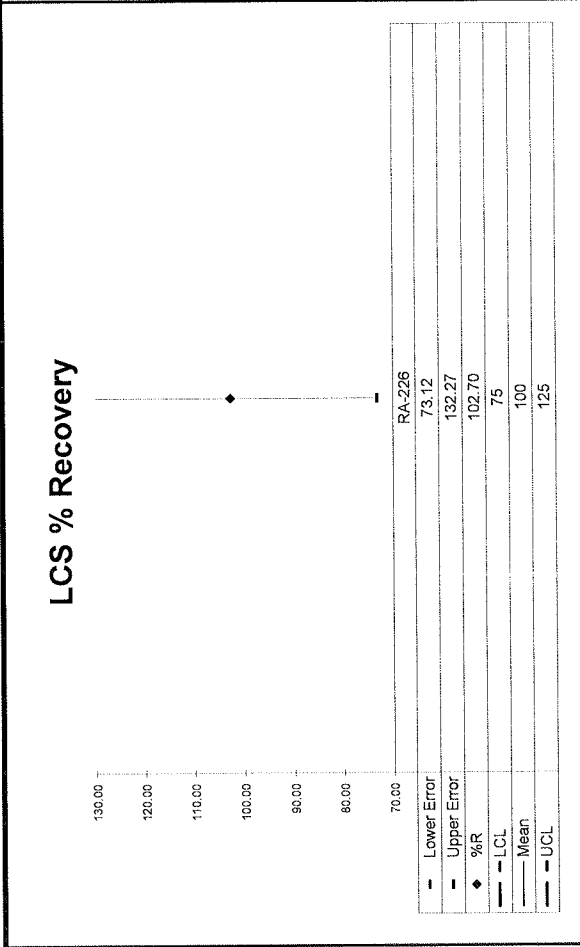
Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

**Replicate Sample**

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	MS % R	MS ND	Rep RPD	Rep ND
RA-226	1.03	90.74	8.73E-02	1.49E-01	2.32E-01	2.33E-01	1.03	OK			NA	OK

**QC Summary**

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
<b>21-12077</b>	<b>Ra226</b>	<b>1</b>	<b>pCi</b>	<b>I</b>	<b>ERM</b>



**No Matrix Spike**

WFO	Analysis	Run	Activity Units	Aliquot Units	Client Name
<b>21-12077</b>	<b>Ra228</b>	<b>1</b>	<b>pCi</b>	<b>I</b>	<b>ERM</b>

**Laboratory Control Sample**

Analyte	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	108.69%	24.90%	100.00%	5.10%	8.84E+00	4.51E-01	9.61E+00	2.39E+00	Ra-12	3.57E+01	5.10E+00	5.49E-01

**Matrix Spike**

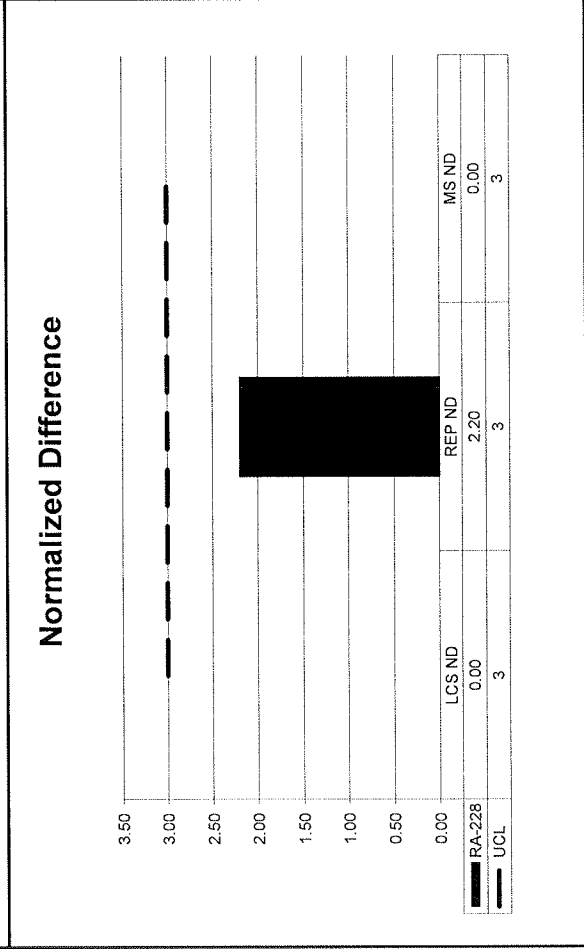
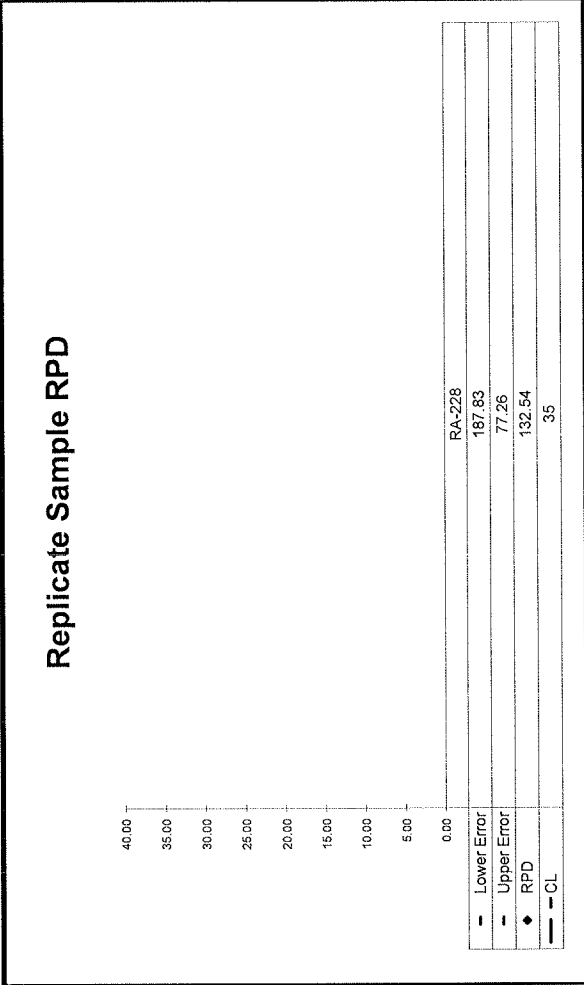
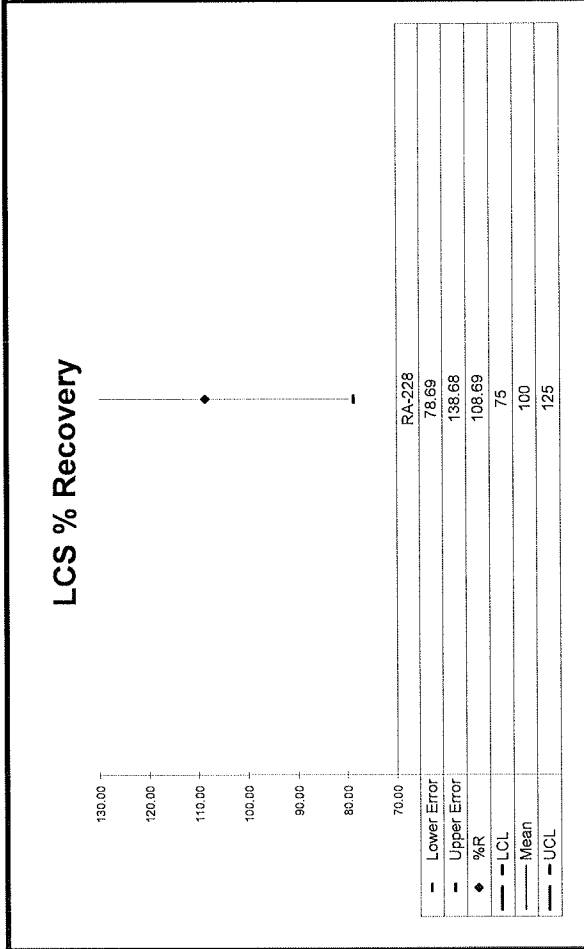
Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

**Replicate Sample**

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	MS % R	MS MD	Rep RPD	Rep ND
RA-228	2.20	132.54	2.36E-01	5.64E-01	1.16E+00	6.05E-01	1.09	OK			NA	OK

**QC Summary**

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
<b>21-12077</b>	<b>Ra228</b>	<b>1</b>	<b>pCi</b>	<b>I</b>	<b>ERM</b>




**No Matrix Spike**

**SECTION VII**  
**LABORATORY TECHNICIAN'S NOTES**




**RA-226 NOTES**

 <b>EBERLINE</b> <small>SERVICES</small> <b>Work Order Analysis Notes</b>	<b>Oak Ridge Laboratory</b> 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	21-12077
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	01/04/22 09:45	PREP	JHARVEY	ALIQOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	01/04/22 13:46	PREP	JHARVEY	FRACTIONS 10,13 AND 17 WERE FILTERED

*JL Harvey*  
1/4/22

 <b>EBERLINE</b> SERVICES <b>Work Order Analysis Notes</b>	<b>Oak Ridge Laboratory</b> 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	21-12077
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	01/04/22 09:45	PREP	JHARVEY	ALIUQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	01/04/22 13:46	PREP	JHARVEY	FRACTIONS 10,13 AND 17 WERE FILTERED
3	01/10/22 09:50	CHEM	MDAVIS	ADDED EDTA TO SAMPLES AND LET SIT. ADDED AMMONIUM SULFATE AND ACETIC ACID TO SAMPLES. FILTERED ONTO TARED FILTER PAPERS, LET DRY UNDER HEAT LAMP, REWEIGHED, AND SUBMITTED TO COUNT.

MD  
1/10/22



Reagents Used in an Analysis

Internal Work Order

**21-12077**

Analysis Code

Run

**Ra226**

**1**


Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
023319P	Ammonium Hydroxide	Reagent Grade	JHARVEY	1/4/2022
023495D05	Ammonium Sulfate	200 mg/ml	JHARVEY	1/4/2022
023160D04	Barium Carrier	1 mg/ml	JHARVEY	1/4/2022
022880D01	Lead Carrier	166 mg/ml	JHARVEY	1/4/2022
023824P	Nitric Acid	Reagent Grade	JHARVEY	1/4/2022
023196P	Acetic Acid	Reagent Grade	MDAVIS	1/10/2022
023495D01	Ammonium Sulfate	200 mg/ml	MDAVIS	1/10/2022
023837D01	EDTA	0.25M	MDAVIS	1/10/2022

Alpha Banks

53


Date	Sample #	Client	Load time	Count time	Analysis	Tech
1/10/22	2112073A(3-7)	PEC Structural	06:08	2hr 50min	Th	KP
1/10/22	220007A(3,4)	UCOR	0811	2hr 50min	UU	KP
1/10/22	2112091A(1-47)	UCOR	0811	2hr 50min	Pu	KP
1/10/22	2112091A(1-4)	UCOR	0812	2hr 50min	Pu242	KP
1/10/22	2112079A(1-6)	USA	0813	2hr 50min	UU	KP
1/10/22	Reagent 301A(1)	Lab	0815	1hr	UUNT	KP
1/10/22	2112091A(1,2)	UCOR	0908	2hr 50min	UU	KP
1/10/22	2112079A(7-14)	USA	0909	2hr 50min	UU	KP
1/10/22	2112091A(3,4)	UCOR	1108	2hr 50min	Th	KP
1/10/22	2112091A(1-4)	UCOR	1109	2hr 50min	Th229	KP
1/10/22	2201001A(1-4)	PEC Structural	1110	2hr 50min	Th	KP
1/10/22	2112057A(1-8)	Weston	1110	2hr 50min	Th	KP
1/10/22	2112057A(9-14)	Weston	1202	2hr 50min	Th	KP
1/10/22	2112079A(15-18)	USA	1203	2hr 50min	UU	KP
1/10/22	2112077A(1-7)	ERM	1408	2hr 50min	Pale	KB

**RA-228 NOTES**

 <b>EBERLINE</b> <small>SERVICES</small> <b>Work Order Analysis Notes</b>	<b>Oak Ridge Laboratory</b> 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	21-12077
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	01/04/22 09:45	PREP	JHARVEY	ALIQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	01/04/22 13:46	PREP	JHARVEY	FRACTIONS 10,13 AND 17 WERE FILTERED


*J Harvey*  
 1/4/22

 <b>EBERLINE</b> SERVICES <b>Work Order Analysis Notes</b>	<b>Oak Ridge Laboratory</b> 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	21-12077
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	01/04/22 09:45	PREP	JHARVEY	ALIUQUOTED AND ADDED SPIKE AND TRACER- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS
2	01/04/22 13:46	PREP	JHARVEY	FRACTIONS 10,13 AND 17 WERE FILTERED
3	01/12/22 11:10	CHEM	MDAVIS	ADDED FILTER PAPERS FROM COUNT ROOM TO LABELED C-TUBES, FILLED WITH EDTA SOLUTION AND LET SIT OVERNIGHT. REMOVED FILTER FROM EDTA-ADDED 2MLS YTTRIUM 9MG/ML CARRIER ADDED 18N NAOH TO SAMPLES AND RECORDED T1. HOT BATHED FOR 15 MIN, CENTRIFUGED AND DISCARDED SUPERNANT. ADDED 6N HNO3, DI WATER AND 10N NAOH. HOT BATHED FOR 15 MIN, CENTRIFUED AND DISCARDED SUPERNTANT. ADDED IN HNO3, DI WATER, AND AMMONIUM OXALATE. FILTERED ONTO TARED FILTER PAPERS. LET DRY UNDER HEAT LAMP, REWEIGHED AND SUBMITTED TO COUNT.

MB  
1/12/22



 <b>Reagents Used in an Analysis</b>		Internal Work Order		
		21-12077		
		Analysis Code		Run
		Ra228		1
Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
023319P	Ammonium Hydroxide	Reagent Grade	JHARVEY	1/4/2022
023495D05	Ammonium Sulfate	200 mg/ml	JHARVEY	1/4/2022
023160D04	Barium Carrier	1 mg/ml	JHARVEY	1/4/2022
022880D01	Lead Carrier	166 mg/ml	JHARVEY	1/4/2022
023824P	Nitric Acid	Reagent Grade	JHARVEY	1/4/2022
023118D01	Ammonium Oxalate	5%	MDAVIS	1/12/2022
023837D01	EDTA	0.25M	MDAVIS	1/12/2022
023055D12	Nitric Acid	1N	MDAVIS	1/12/2022
023055D11	Nitric Acid	6N	MDAVIS	1/12/2022
023120D02	Sodium Hydroxide	10M	MDAVIS	1/12/2022
023120D01	Sodium Hydroxide	18M	MDAVIS	1/12/2022
023128D01	Yttrium Carrier	9 mg/ml	MDAVIS	1/12/2022

Red LB41K


75

Date	Sample #	Client	Lead time	Count time	Analysis	Tech
1/11/22	Cross Talk	Lab	0728	5 min	αB	KP
1/12/22	21120915V (4.6)	UCOR	0824	2 hrs	Sr <sup>90</sup>	KP
1/12/22	Daily Bkgd/Qc	Lab	061/0520	1 hr/30 min	αB	KP
1/12/22	Cross Talk	Lab	0710	5 min	αB	KP
1/12/22	Cross Talk	Lab	0716	5 min	αB	KP
1/12/22	2112077Ra (15-17)	ERM	1141	2 hrs	Ra <sup>8</sup>	KP

Aqua LB4110

Date	Sample #	Client	Leadtime	Counttime	Analysis	Tech
1/7/22	2201007Sr(1-4c)	UCOR	0922	2hrs	Tot Sr	KP
1/7/22	2112054SV(2-4c)	UCOR	0923	2hrs	Sr <sup>90</sup>	KP
1/7/22	2112003SV(1)	Access	1030	30min	Sr <sup>90</sup>	KP
1/7/22	2112003Sr(1)	Access	1101	30min	Tot Sr	KP
1/7/22	2112003Sr(2-4)	Access	1125	2hrs	Tot Sr	KP
1/7/22	2201010AB(2-5)	Parsons	1125	8hrs	XB	KP
1/8/22	WKly Bkgd	Lab	1026	12hrs	XB	KP
1/10/22	Daily Bkgd/QC	Lab	0555/6704	1hr/30min	XB	KP
1/10/22	Cross Talk	Lab	0744	5min	XB	KP
1/10/22	Cross Talk	Lab	0820	5min	XB	KP
1/10/22	2112007CL(1-3.5)	UCOR	1450	30mins	CL <sup>36</sup>	KP
1/11/22	Daily Bkgd/QC	Lab	0558/6707	1hr/30min	XB	KP
1/11/22	Cross Talk	Lab	0745	5min	XB	KP
1/11/22	Cross Talk	Lab	0801	5min	XB	KP
1/11/22	2112091Np(1-4)	UCOR	0822	10min	Np	KP
1/11/22	2112067SV(1-4c)	UCOR	0823	2hrs	Sr <sup>90</sup>	KP
1/11/22	2112091SV(1-3)	UCOR	0824	2hrs	Sr <sup>90</sup>	KP
1/11/22	2201020AB(1-4)	UCOR	0833	1hr	XB	KP
1/11/22	2112067Pb(1-4)	UCOR	0936	2hrs	Pb	KP
1/11/22	2112091CL <sup>36</sup> (1-3.5)	UCOR	1419	30mins	CL <sup>36</sup>	KP
1/12/22	Daily Bkgd/QC	Lab	0529/6042	1hr/30min	XB	KP
1/12/22	Cross Talk	Lab	0717	5min	XB	KP
1/12/22	Cross Talk	Lab	0727	5min	XB	KP
1/12/22	2112091Pb(1-4)	UCOR	0735	2hrs	Pb	KP
1/12/22	2112077Ra(3-14)	ERM	1141	2hrs	Ra <sup>8</sup>	KP
1/12/22	2112077Ra(1+2)	ERM	1343	2hrs	Ra <sup>8</sup>	KP

**TDS NOTES**

 <b>EBERLINE</b> <small>SERVICES</small> <b>Work Order Analysis Notes</b>	<b>Oak Ridge Laboratory</b> 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	21-12077
		Analysis Code	TDS
		Run Number	1

#	Date	Dept	User	Notes
1	01/03/22 14:00	PREP	JPACHELLA	Samples were filtered, aliquoted into tared beakers, dried, and reweighed.

*1-3-22 JPachella*

**SECTION VIII**  
**ANALYTICAL DATA (RADIUM-226)**

<b>Work Order</b>	<b>21-12077</b>
<b>Analysis Code</b>	<b>Ra226</b>
<b>Run</b>	<b>1</b>
<b>Date Received</b>	<b>12/28/2021</b>
<b>Lab Deadline</b>	<b>1/10/2022</b>
<b>Client</b>	ERM
<b>Project</b>	526033
<b>Report Level</b>	4
<b>Activity Units</b>	pCi
<b>Aliquot Units</b>	l
<b>Matrix</b>	WA
<b>Method</b>	EPA 903.0 Modified
<b>Instrument Type</b>	Alpha Spectroscopy
<b>Radiometric Tracer</b>	Ba-133
<b>Radiometric Sol#</b>	Ba-6a
<b>Tracer Act (dpm/g)</b>	381.37
<b>Carrier</b>	
<b>Carrier Conc (mg/ml)</b>	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		12/28/21 00:00	1.0000E+00
02	MBL	BLANK		12/28/21 00:00	1.0000E+00
03	DUP	MW-1	20	12/15/21 13:45	1.0000E+00
04	TRG	MW-11	30	12/15/21 08:00	1.0000E+00
05	DO	MW-1	20	12/15/21 13:45	1.0000E+00
06	TRG	MW-8	30	12/15/21 16:30	1.0000E+00
07	TRG	MW-7	30	12/16/21 07:50	1.0000E+00
08	TRG	MW-9	50	12/16/21 08:20	1.0000E+00
09	TRG	MW-9D	20	12/16/21 08:40	1.0000E+00
10	TRG	SW-BO 13	40	12/16/21 11:35	1.0000E+00
11	TRG	SW-BO 2	20	12/16/21 12:30	1.0000E+00
12	TRG	MW-6	20	12/17/21 08:30	1.0000E+00
13	TRG	MW-10	40	12/20/21 10:45	1.0000E+00
14	TRG	MW-5	60	12/20/21 13:30	1.0000E+00
15	TRG	MW-4	40	12/20/21 15:05	1.0000E+00
16	TRG	MW-3	40	12/20/21 16:30	1.0000E+00
17	TRG	MW-2	20	12/21/21 09:55	1.0000E+00

\* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.  
\*\* Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	2.2142	844.4	399.0	104.90		0.0199	0.0267	0.0068		104.90	2.44	1.00
02	MBL	2.1944	836.9	344.0	91.25		0.0198	0.0263	0.0065		91.25	2.34	1.00
03	DUP	2.1947	837.0	380.0	100.79		0.0200	0.0285	0.0085		100.79	2.89	1.00
04	TRG	2.1917	835.8	350.0	92.96		0.0200	0.0254	0.0054		92.96	1.91	1.00
05	DO	2.1893	834.9	382.0	101.57		0.0199	0.0280	0.0081		101.57	2.79	1.00
06	TRG	2.1852	833.4	359.0	95.63		0.0200	0.0270	0.0070		95.63	2.50	1.00
07	TRG	2.1808	831.7	344.0	91.82		0.0200	0.0281	0.0081		91.82	2.79	1.00
08	TRG	2.1345	814.0	364.0	99.27		0.0199	0.0257	0.0058		99.27	2.08	1.00
09	TRG	2.0902	797.1	379.0	105.55		0.0201	0.0271	0.0070		105.55	2.50	1.00
10	TRG	2.1139	806.2	356.0	98.03		0.0197	0.0243	0.0046		98.03	1.49	1.00
11	TRG	2.5654	978.4	385.0	87.36		0.0201	0.0269	0.0068		87.36	2.44	1.00
12	TRG	2.1965	837.7	369.0	97.79		0.0198	0.0275	0.0077		97.79	2.69	1.00
13	TRG	2.1726	828.6	330.0	88.42		0.0200	0.0250	0.0050		88.42	1.71	1.00
14	TRG	2.1706	827.8	310.0	83.14		0.0201	0.0312	0.0111		83.14	3.00^	1.00
15	TRG	2.1742	829.2	401.0	107.36		0.0203	0.0276	0.0073		107.36	2.58	1.00
16	TRG	2.1695	827.4	350.0	93.91		0.0201	0.0270	0.0069		93.91	2.47	1.00
17	TRG	2.1716	828.2	304.0	81.49		0.0199	0.0241	0.0042		81.49	1.25	1.00

\* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.  
 \*\* Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.



Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
02	MBL			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
03	DUP			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
04	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
05	DO			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
06	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
07	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
08	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
09	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
10	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
11	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
12	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
13	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
14	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
15	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
16	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		
17	TRG			01/04/22 14:03	JHARVEY	01/10/22 08:08	MDAVIS		

\* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.  
\*\* Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/l	1.03E+01	1.37E+00	1.84E-01	1.00E+01	102.70	OK		OK	
02	RA-226	MBL	BLANK	pCi/l	5.65E-02	1.22E-01	2.41E-01					OK	OK
03	RA-226	DUP	MW-1	pCi/l	2.32E-01	2.27E-01	2.94E-01				NA	OK	
04	RA-226	TRG	MW-11	pCi/l	4.49E-01	2.48E-01	1.46E-01					OK	
05	RA-226	DO	MW-1	pCi/l	8.73E-02	1.48E-01	2.62E-01					OK	
06	RA-226	TRG	MW-8	pCi/l	1.17E-01	1.40E-01	1.98E-01					OK	
07	RA-226	TRG	MW-7	pCi/l	4.59E-01	3.14E-01	3.00E-01					OK	
08	RA-226	TRG	MW-9	pCi/l	3.01E-01	2.21E-01	2.25E-01					OK	
09	RA-226	TRG	MW-9D	pCi/l	5.43E-01	3.27E-01	2.09E-01					OK	
10	RA-226	TRG	SW-BO 13	pCi/l	9.11E-02	9.99E-02	1.37E-01					OK	
11	RA-226	TRG	SW-BO 2	pCi/l	-2.79E-02	1.12E-01	2.87E-01					OK	
12	RA-226	TRG	MW-6	pCi/l	5.20E-01	3.30E-01	3.17E-01					OK	
13	RA-226	TRG	MW-10	pCi/l	1.98E-01	1.69E-01	1.67E-01					OK	
14	RA-226	TRG	MW-5	pCi/l	5.78E-01	3.76E-01	3.47E-01					OK	
15	RA-226	TRG	MW-4	pCi/l	1.90E-01	2.37E-01	3.73E-01					OK	
16	RA-226	TRG	MW-3	pCi/l	3.30E-01	2.30E-01	2.04E-01					OK	
17	RA-226	TRG	MW-2	pCi/l	4.79E-01	2.15E-01	1.59E-01					OK	

	Run	1
	Analysis Code	Ra226
Eberline Services Work Order		21-12077
Client	ERM	

Preliminary Data Report & Analytical Calculations  
**Work Order: 21-12077-Ra226-1**

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep to Date/Time	Sep to Date/Time
01	RA-226	LCS	12/28/21 00:00	1.00E+00	100.00	0.00	104.90		1/10/2022 8:08	
02	RA-226	MBL	12/28/21 00:00	1.00E+00	91.25	0.00	91.25		1/10/2022 8:08	
03	RA-226	DUP	12/15/21 13:45	1.00E+00	100.00	0.00	100.79		1/10/2022 8:08	
04	RA-226	TRG	12/15/21 08:00	1.00E+00	92.96	0.00	92.96		1/10/2022 8:08	
05	RA-226	DO	12/15/21 13:45	1.00E+00	100.00	0.00	101.57		1/10/2022 8:08	
06	RA-226	TRG	12/15/21 16:30	1.00E+00	95.63	0.00	95.63		1/10/2022 8:08	
07	RA-226	TRG	12/16/21 07:50	1.00E+00	91.82	0.00	91.82		1/10/2022 8:08	
08	RA-226	TRG	12/16/21 08:20	1.00E+00	99.27	0.00	99.27		1/10/2022 8:08	
09	RA-226	TRG	12/16/21 08:40	1.00E+00	100.00	0.00	105.55		1/10/2022 8:08	
10	RA-226	TRG	12/16/21 11:35	1.00E+00	98.03	0.00	98.03		1/10/2022 8:08	
11	RA-226	TRG	12/16/21 12:30	1.00E+00	87.36	0.00	87.36		1/10/2022 8:08	
12	RA-226	TRG	12/17/21 08:30	1.00E+00	97.79	0.00	97.79		1/10/2022 8:08	
13	RA-226	TRG	12/20/21 10:45	1.00E+00	88.42	0.00	88.42		1/10/2022 8:08	
14	RA-226	TRG	12/20/21 13:30	1.00E+00	83.14	0.00	83.14		1/10/2022 8:08	
15	RA-226	TRG	12/20/21 15:05	1.00E+00	100.00	0.00	107.36		1/10/2022 8:08	
16	RA-226	TRG	12/20/21 16:30	1.00E+00	93.91	0.00	93.91		1/10/2022 8:08	
17	RA-226	TRG	12/21/21 09:55	1.00E+00	81.49	0.00	81.49		1/10/2022 8:08	

	Run	1
	Analysis Code	Ra226
Eberline Services Work Order	21-12077	
Client	ERM	

Preliminary Data Report & Analytical Calculations  
**Work Order: 21-12077-Ra226-1**

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	01/10/22 14:07		A_Spec	Alpha_043	170	2.34 E+02	1.00 E-03	14.7
02	RA-226	MBL	01/10/22 14:07		A_Spec	Alpha_044	170	1.32 E+00	4.00 E-03	15.9
03	RA-226	DUP	01/10/22 14:07		A_Spec	Alpha_045	170	4.98 E+00	6.00 E-03	16.4
04	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_046	170	1.28 E+01	1.00 E-03	15.6
05	RA-226	DO	01/10/22 14:07		A_Spec	Alpha_047	170	2.00 E+00	0.00 E+00	16.9
06	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_048	170	3.32 E+00	4.00 E-03	19.7
07	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_049	170	9.15 E+00	5.00 E-03	16.1
08	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_050	170	8.00 E+00	0.00 E+00	14.8
09	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_051	170	1.08 E+01	1.00 E-03	13.2
10	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_052	170	4.00 E+00	0.00 E+00	17.7
11	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_053	170	-5.10 E-01	3.00 E-03	13.5
12	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_054	170	1.08 E+01	7.00 E-03	15.2
13	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_055	170	5.66 E+00	2.00 E-03	14.7
14	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_056	170	1.00 E+01	0.00 E+00	16.5
15	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_057	170	3.96 E+00	1.20 E-02	14.3
16	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_058	170	8.49 E+00	3.00 E-03	17.9
17	RA-226	TRG	01/10/22 14:07		A_Spec	Alpha_059	170	2.06 E+01	8.00 E-03	17.5

	Run	1
	Analysis Code	Ra226
Eberline Services Work Order	21-12077	
Client	ERM	

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	12/28/21 00:00	1.0000	2.2142	844.4295	399.0000	104.90	2.44	1.00
02	MBL	BLANK	12/28/21 00:00	1.0000	2.1944	836.8783	344.0000	91.25	2.34	1.00
03	DUP	MW-1	12/15/21 13:45	1.0000	2.1947	836.9927	380.0000	100.79	2.89	1.00
04	TRG	MW-11	12/15/21 08:00	1.0000	2.1917	835.8486	350.0000	92.96	1.91	1.00
05	DO	MW-1	12/15/21 13:45	1.0000	2.1893	834.9333	382.0000	101.57	2.79	1.00
06	TRG	MW-8	12/15/21 16:30	1.0000	2.1852	833.3697	359.0000	95.63	2.50	1.00
07	TRG	MW-7	12/16/21 07:50	1.0000	2.1808	831.6917	344.0000	91.82	2.79	1.00
08	TRG	MW-9	12/16/21 08:20	1.0000	2.1345	814.0343	364.0000	99.27	2.08	1.00
09	TRG	MW-9D	12/16/21 08:40	1.0000	2.0902	797.1396	379.0000	105.55	2.50	1.00
10	TRG	SW-BO 13	12/16/21 11:35	1.0000	2.1139	806.1780	356.0000	98.03	1.49	1.00
11	TRG	SW-BO 2	12/16/21 12:30	1.0000	2.5654	978.3666	385.0000	87.36	2.44	1.00
12	TRG	MW-6	12/17/21 08:30	1.0000	2.1965	837.6792	369.0000	97.79	2.69	1.00
13	TRG	MW-10	12/20/21 10:45	1.0000	2.1726	828.5645	330.0000	88.42	1.71	1.00
14	TRG	MW-5	12/20/21 13:30	1.0000	2.1706	827.8017	310.0000	83.14	3.00^	1.00
15	TRG	MW-4	12/20/21 15:05	1.0000	2.1742	829.1747	401.0000	107.36	2.58	1.00
16	TRG	MW-3	12/20/21 16:30	1.0000	2.1695	827.3822	350.0000	93.91	2.47	1.00
17	TRG	MW-2	12/21/21 09:55	1.0000	2.1716	828.1831	304.0000	81.49	1.25	1.00



# Aliquot Worksheet

Work Order		Run	Analysis Code	Rpt Units	Lab Deadline	Technician	
<b>21-12077</b>		<b>1</b>	<b>Ra226</b>	<b>liters</b>	<b>1/10/2022</b>	<b>JHARVEY</b>	

Lab Fraction	ERM Client ID	Sample Type	Muffle Data		Dilution Data			Aliquot Data			MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq		
01	LCS	LCS							1.0000E+00	1.0000E+00				
02	BLANK	MBL							1.0000E+00	1.0000E+00				
03	MW-1	DUP							1.0000E+00	1.0000E+00				
04	MW-11	TRG							1.0000E+00	1.0000E+00				
05	MW-1	DO							1.0000E+00	1.0000E+00				
06	MW-8	TRG							1.0000E+00	1.0000E+00				
07	MW-7	TRG							1.0000E+00	1.0000E+00				
08	MW-9	TRG							1.0000E+00	1.0000E+00				
09	MW-9D	TRG							1.0000E+00	1.0000E+00				
10	SW-BO 13	TRG							1.0000E+00	1.0000E+00				
11	SW-BO 2	TRG							1.0000E+00	1.0000E+00				
12	MW-6	TRG							1.0000E+00	1.0000E+00				
13	MW-10	TRG							1.0000E+00	1.0000E+00				
14	MW-5	TRG							1.0000E+00	1.0000E+00				
15	MW-4	TRG							1.0000E+00	1.0000E+00				
16	MW-3	TRG							1.0000E+00	1.0000E+00				
17	MW-2	TRG							1.0000E+00	1.0000E+00				

Comments
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Technician: Jharvey Date: 1/4/22

# Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
<b>21-12077</b>	<b>1</b>	<b>Ra226</b>			<b>MDAVIS</b>

TRetek Fraction	ERM Client ID	Sample Type	Carrier Added (ml)	Filter Data			Gravimetric % Recovery
				Filter Tare (g)	Filter Final (g)	Filter Net (g)	
01	LCS	LCS		0.0199	0.0267	0.0068	
02	BLANK	MBL		0.0198	0.0263	0.0065	
03	DUP	DUP		0.0200	0.0285	0.0085	
04	MW-11	TRG		0.0200	0.0254	0.0054	
05	MW-1	DO		0.0199	0.0280	0.0081	
06	MW-8	TRG		0.0200	0.0270	0.0070	
07	MW-7	TRG		0.0200	0.0281	0.0081	
08	MW-9	TRG		0.0199	0.0257	0.0058	
09	MW-9D	TRG		0.0201	0.0271	0.0070	
10	SW-BO 13	TRG		0.0197	0.0243	0.0046	
11	SW-BO 2	TRG		0.0201	0.0269	0.0068	
12	MW-6	TRG		0.0198	0.0275	0.0077	
13	MW-10	TRG		0.0200	0.0250	0.0050	
14	MW-5	TRG		0.0201	0.0312	0.0111	
15	MW-4	TRG		0.0203	0.0276	0.0073	
16	MW-3	TRG		0.0201	0.0270	0.0069	
17	MW-2	TRG		0.0199	0.0241	0.0042	

Technician: Megan Davis Date: 1/10/22





KB  
1/10/22

Sample Description: SPIKE  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 01  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_043  
 Chamber Serial Number: 04026481A  
 Detector Serial Number: 91088  
 Env. Background: System Bkgd 311325  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 1/10/2022 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:10 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000  
 Counting Efficiency: 0.1469 +/- 0.0027 on 11/30/2021 2:02:38 PM  
 Effective Efficiency: 0.1469 +/- 0.0027

Control Certificate Name: Ra226\_Ra-5b  
 Chem. Recov. of Control: RA-226 0.420923 +/- 0.031233  
 Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.498	23.81	41.33	1.19	0.00E+000	3.0
RA-226	4.624	233.83	12.82	0.17	0.00E+000	3.5

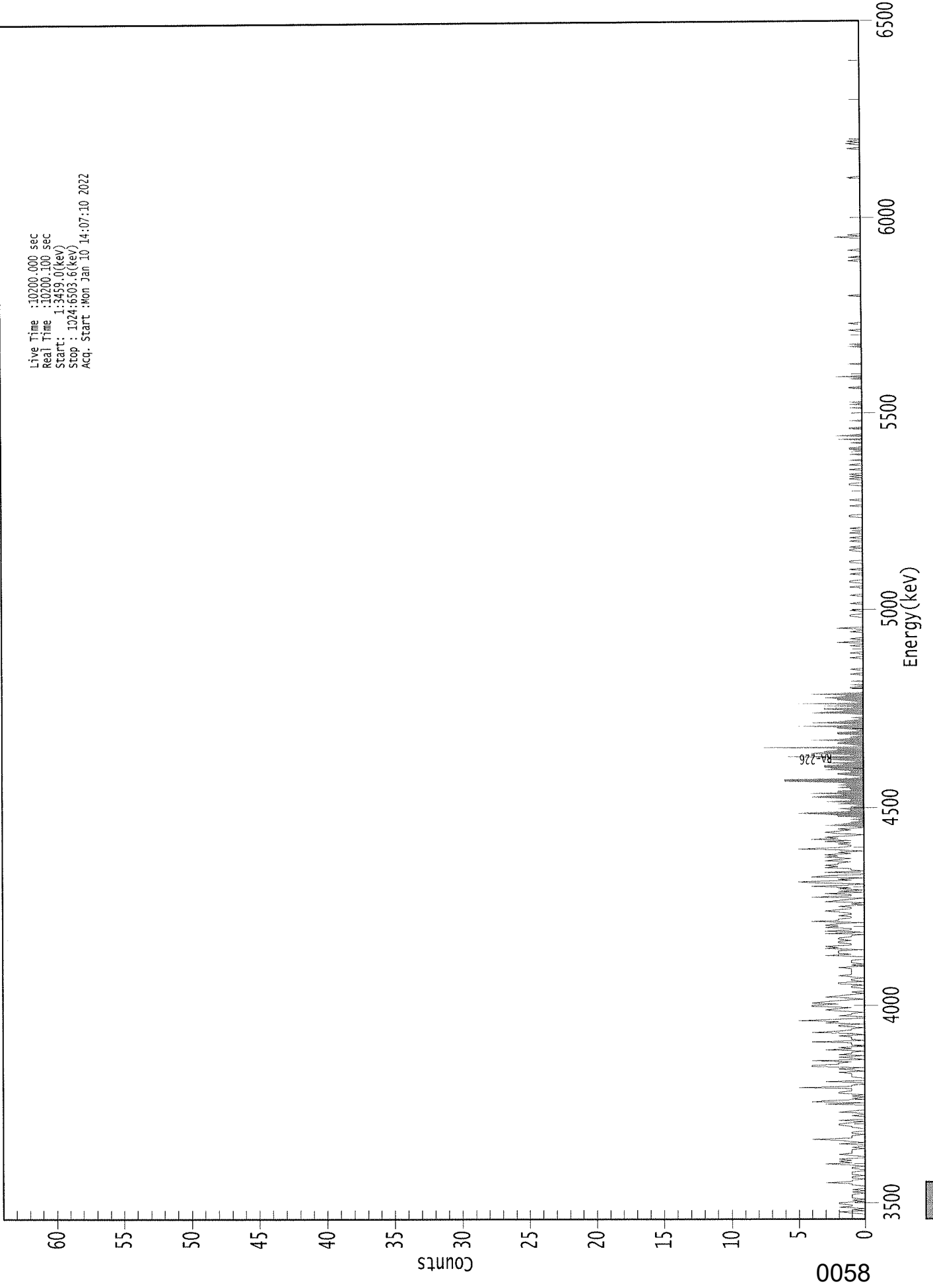
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.955	5685.50*	1.10E+000 +/- 4.57E-001	3.05E-001 +/- 1.08E-002
RA-226	0.967	4785.00*	1.03E+001 +/- 1.37E+000	1.84E-001 +/- 6.50E-003

AG  
1/11/22

0000304878.CNF

Live Time :10200.000 sec  
Real Time :10200.100 sec  
Start : 1:3459.0(Rev)  
Stop : 1024:6503.6(keV)  
Acq. Start :Mon Jan 10 14:07:10 2022



0058

ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 01

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	1	2	0
9:	1	0	2	1	1	1	2	2	0
17:	1	0	1	1	1	1	1	0	1
25:	0	1	0	0	0	0	1	1	3
33:	1	1	0	1	1	1	0	1	1
41:	1	0	0	1	1	1	0	1	3
49:	1	2	1	2	0	0	0	1	2
57:	1	1	1	1	0	0	1	0	0
65:	2	0	1	2	4	1	1	1	1
73:	0	1	1	0	0	0	0	1	1
81:	2	2	1	0	2	0	0	0	0
89:	1	0	0	2	1	0	0	0	0
97:	0	0	3	0	4	3	0	0	1
105:	0	1	0	2	2	1	1	1	1
113:	5	1	1	0	0	3	0	0	0
121:	0	1	1	1	1	2	0	0	1
129:	2	0	4	4	2	2	1	1	4
137:	0	1	2	0	2	1	1	1	0
145:	3	1	2	0	1	1	1	1	4
153:	0	1	1	1	2	0	1	1	4
161:	2	1	1	0	2	2	0	0	3
169:	2	5	2	0	0	2	1	1	1
177:	0	2	3	2	1	4	4	4	2
185:	4	3	2	0	1	3	2	2	1
193:	0	1	0	0	0	1	1	1	0
201:	2	2	0	1	1	0	1	1	2
209:	1	1	1	1	1	1	1	2	0
217:	1	0	1	1	1	0	0	0	0
225:	3	1	2	2	2	0	3	3	2
233:	3	1	1	2	2	1	2	2	2
241:	1	1	0	3	0	3	1	1	1
249:	3	2	3	2	0	4	2	2	2
257:	1	1	2	1	1	2	3	3	2
265:	1	1	2	0	1	0	3	3	2
273:	1	0	4	1	1	3	0	0	2
281:	0	2	1	4	1	0	4	4	5
289:	1	2	0	4	3	0	0	0	3
297:	0	1	1	3	2	3	2	2	2
305:	1	3	2	1	3	2	3	3	1
313:	2	0	2	5	2	1	1	1	2
321:	1	3	1	4	2	3	1	1	0
329:	2	3	2	1	2	0	1	1	3
337:	2	1	1	0	1	0	2	2	2
345:	3	5	4	1	1	2	1	1	1
353:	0	2	1	3	1	1	3	3	4
361:	3	1	4	2	2	1	1	1	2

369: 1 2 1 2 6 6 6 1

Sample Title: 01

Channel	1	2	1	2	6	6	6	1
377:	0	1	2	2	1	1	3	2
385:	3	3	3	1	3	0	2	3
393:	2	6	0	3	4	3	3	2
401:	2	8	0	1	2	2	1	4
409:	2	1	1	0	2	2	2	0
417:	1	2	2	5	0	2	4	2
425:	1	0	1	0	0	1	4	3
433:	1	3	3	0	3	0	5	0
441:	1	2	2	3	2	1	4	2
449:	0	0	0	1	1	0	1	0
457:	0	1	0	0	0	0	0	1
465:	0	0	0	1	0	0	0	0
473:	0	0	0	0	0	1	0	0
481:	0	1	0	0	0	0	0	1
489:	0	0	2	0	0	1	0	0
497:	0	0	0	1	0	0	2	0
505:	0	0	0	0	0	0	0	0
513:	1	1	0	0	0	1	0	0
521:	0	0	0	1	0	0	0	0
529:	0	0	1	0	0	0	0	0
537:	0	1	0	0	0	1	1	0
545:	0	0	0	0	1	0	0	0
553:	1	0	0	0	0	0	1	1
561:	0	0	0	0	0	0	0	0
569:	1	1	0	1	0	0	0	0
577:	1	0	0	1	0	0	0	1
585:	0	0	0	1	0	0	0	0
593:	0	0	0	0	0	1	1	0
601:	0	0	0	0	0	0	1	0
609:	0	0	0	1	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	1	1	0	0	0	1	0	1
633:	0	1	0	0	0	1	0	0
641:	0	1	0	0	0	1	0	0
649:	0	0	1	0	0	0	1	1
657:	1	0	0	0	1	0	0	2
665:	0	0	2	1	0	0	0	0
673:	1	1	0	0	0	0	0	1
681:	0	0	0	0	0	0	0	0
689:	0	0	1	0	0	1	0	1
697:	0	0	0	0	0	0	0	0
705:	0	0	0	1	1	0	0	0
713:	0	0	0	1	0	2	0	0
721:	0	0	0	0	0	0	0	0
729:	1	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	1
745:	0	1	0	0	0	0	0	0
753:	0	0	0	0	0	1	0	0
761:	0	0	0	1	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	1	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 01

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	1	0	0	1	0	0	0
825:	0	0	1	0	0	0	0	0
833:	0	0	0	0	0	2	0	1
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	1	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	1	0	0	0	1	0	1
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



KB  
1/10/22

Sample Description: BLANK  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 02  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_044  
 Chamber Serial Number: 04026481B  
 Detector Serial Number: 84168  
 Env. Background: System Bkgd 311326  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 1/10/2022 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:12 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9125 +/- 0.0000  
 Counting Efficiency: 0.1589 +/- 0.0028 on 11/30/2021 2:02:39 PM  
 Effective Efficiency: 0.1450 +/- 0.0026

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.443	0.30	988.46	1.70	0.00E+000	6.0
RA-226	4.637	1.32	215.97	0.68	0.00E+000	3.0

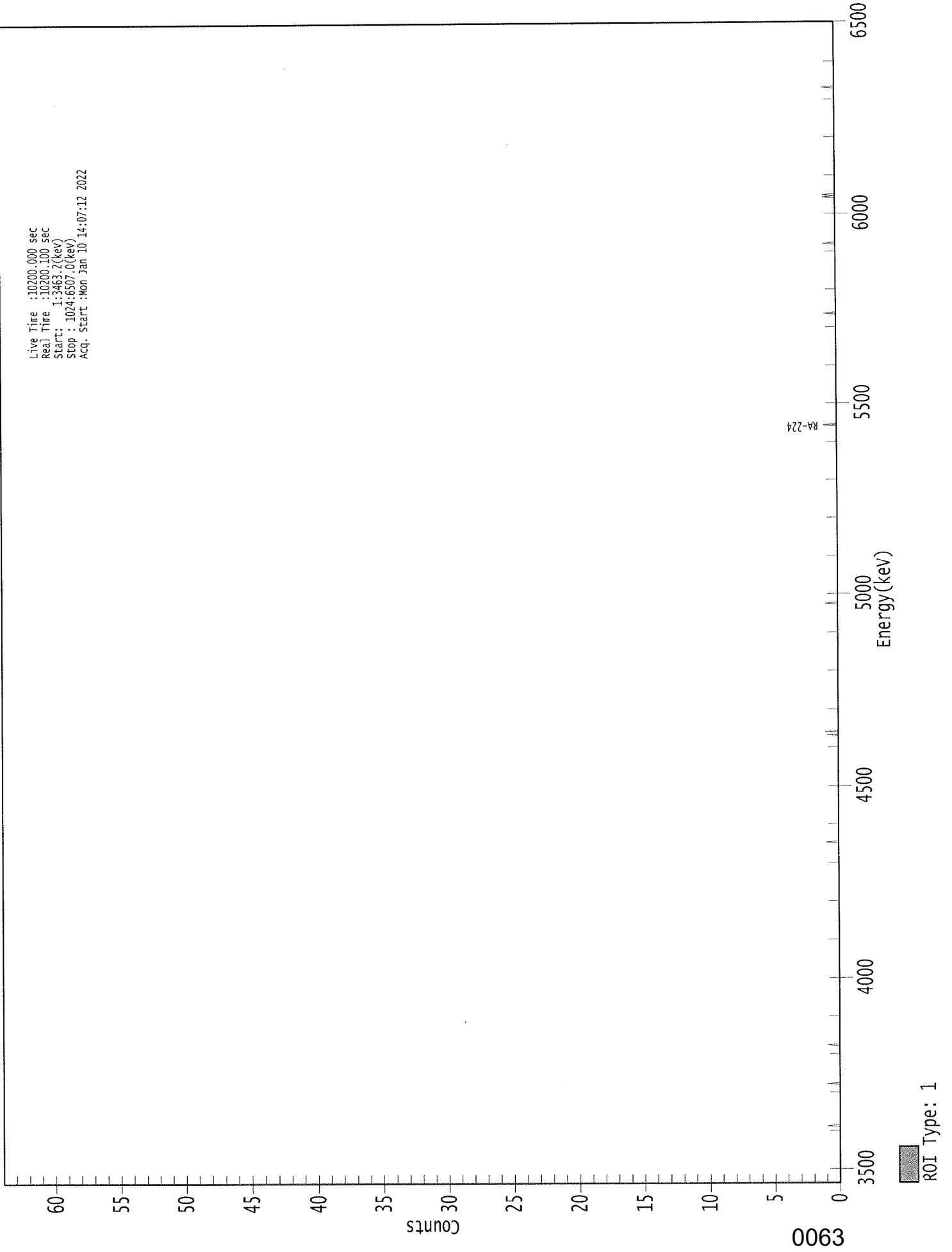
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.926	5685.50*	1.35E-002 +/- 1.33E-001	3.30E-001 +/- 1.16E-002
RA-226	0.972	4785.00*	5.65E-002 +/- 1.22E-001	2.41E-001 +/- 8.44E-003

AGP  
1/11/22

0000304862.CNF

Live Time :10200.000 sec  
Real Time :10200.100 sec  
Start : 1:3463.2(kev)  
Stop : 1024:6507.0(kev)  
Acq. Start :Mon Jan 10 14:07:12 2022



0063

ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
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Sample Title: 02

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	1	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	1
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	1	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	1	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0



369: 0 0 0 0 0 0 0 0 0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	1	0	0	1	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	1	1	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	1	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 02

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	1	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	1	0	1	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	1	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

CB  
1/10/22

Sample Description: MW-1 DUP  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 03  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_045  
 Chamber Serial Number: 04026482A  
 Detector Serial Number: 91131  
 Env. Background: System Bkgd 311327  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.890E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/15/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:14 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000  
 Counting Efficiency: 0.1642 +/- 0.0029 on 5/21/2021 9:18:20 AM  
 Effective Efficiency: 0.1642 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

-----  
 ----- PEAK AREA REPORT -----  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.505	2.15	161.66	0.85	0.00E+000	3.0
RA-226	4.609	4.98	97.79	1.02	0.00E+000	3.0

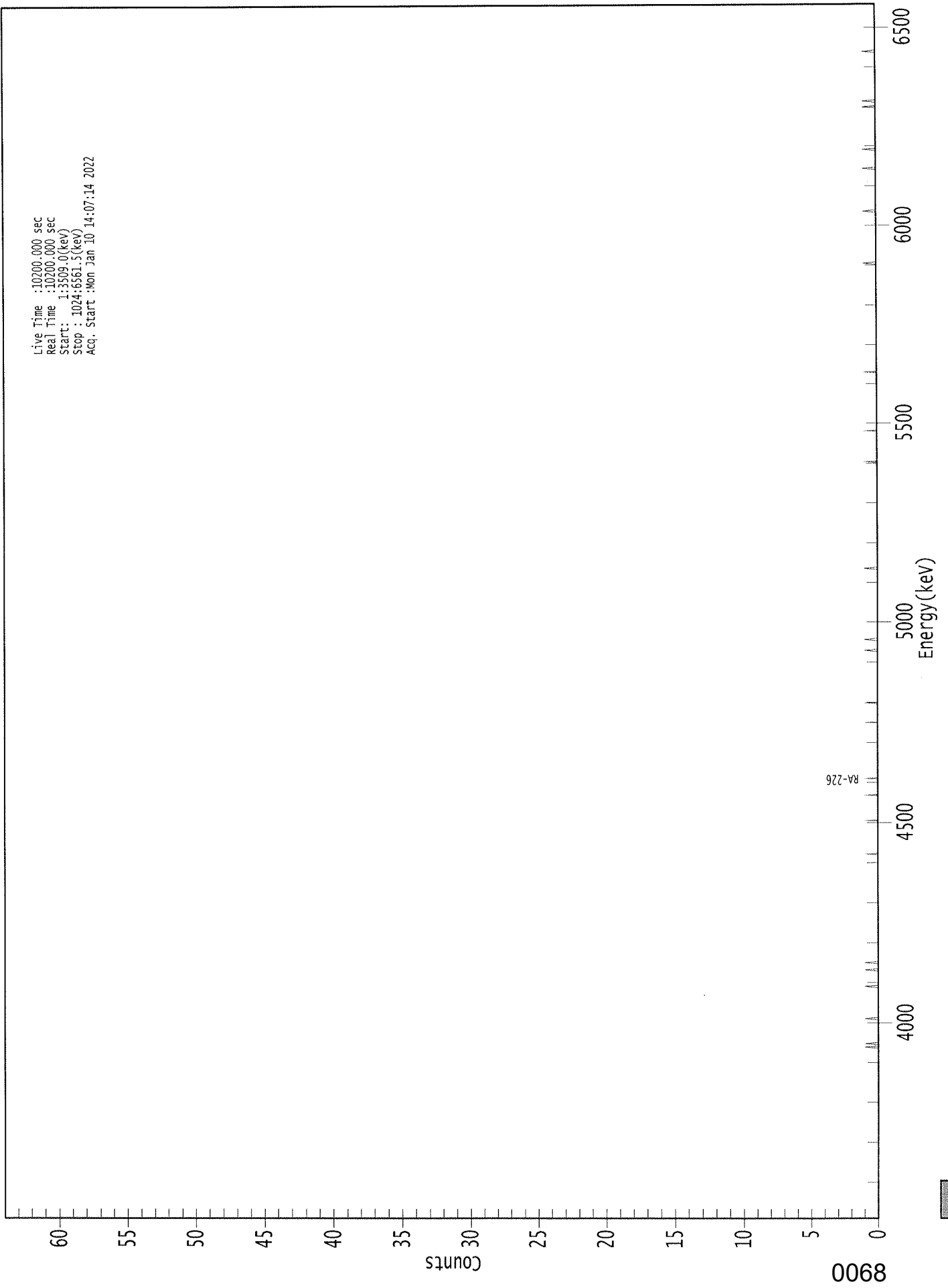
-----  
 ----- NUCLIDE ANALYSIS RESULTS -----  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.958	5685.50*	1.06E-001 +/- 1.72E-001	2.96E-001 +/- 1.04E-002
RA-226	0.960	4785.00*	2.32E-001 +/- 2.27E-001	2.94E-001 +/- 1.02E-002

AG  
1/11/22

0000304868.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start : 1:3509.0(keV)  
Stop : 1024:6561.5(keV)  
Acq. Start :Mon Jan 10 14:07:14 2022



ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 03

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	1	0	0	1	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	1	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	1	0	0	0	0	0	1
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	1	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	0	0	0
361:	0	0	0	0	0	0	0	0

369: 0 1 0 0 0 0 0 0 0

Sample Title: 03

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	1	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	1	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	0	0	0
481:	0	0	0	0	0	1	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	1	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	1	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 1 0 0 0 0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	1
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	1	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	1
937:	0	0	0	0	1	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	1	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB  
1/10/22

# Apex-Alpha™

Sample Description: MW-11  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 04  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_046  
 Chamber Serial Number: 04026482B  
 Detector Serial Number: 58762  
 Env. Background: System Bkgd 311328  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 1.910E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/15/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:16 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9296 +/- 0.0000  
 Counting Efficiency: 0.1557 +/- 0.0028 on 5/21/2021 9:18:19 AM  
 Effective Efficiency: 0.1447 +/- 0.0026

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.541	2.49	138.29	0.51	0.00E+000	3.0
RA-226	4.614	12.83	55.14	0.17	0.00E+000	3.0

-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

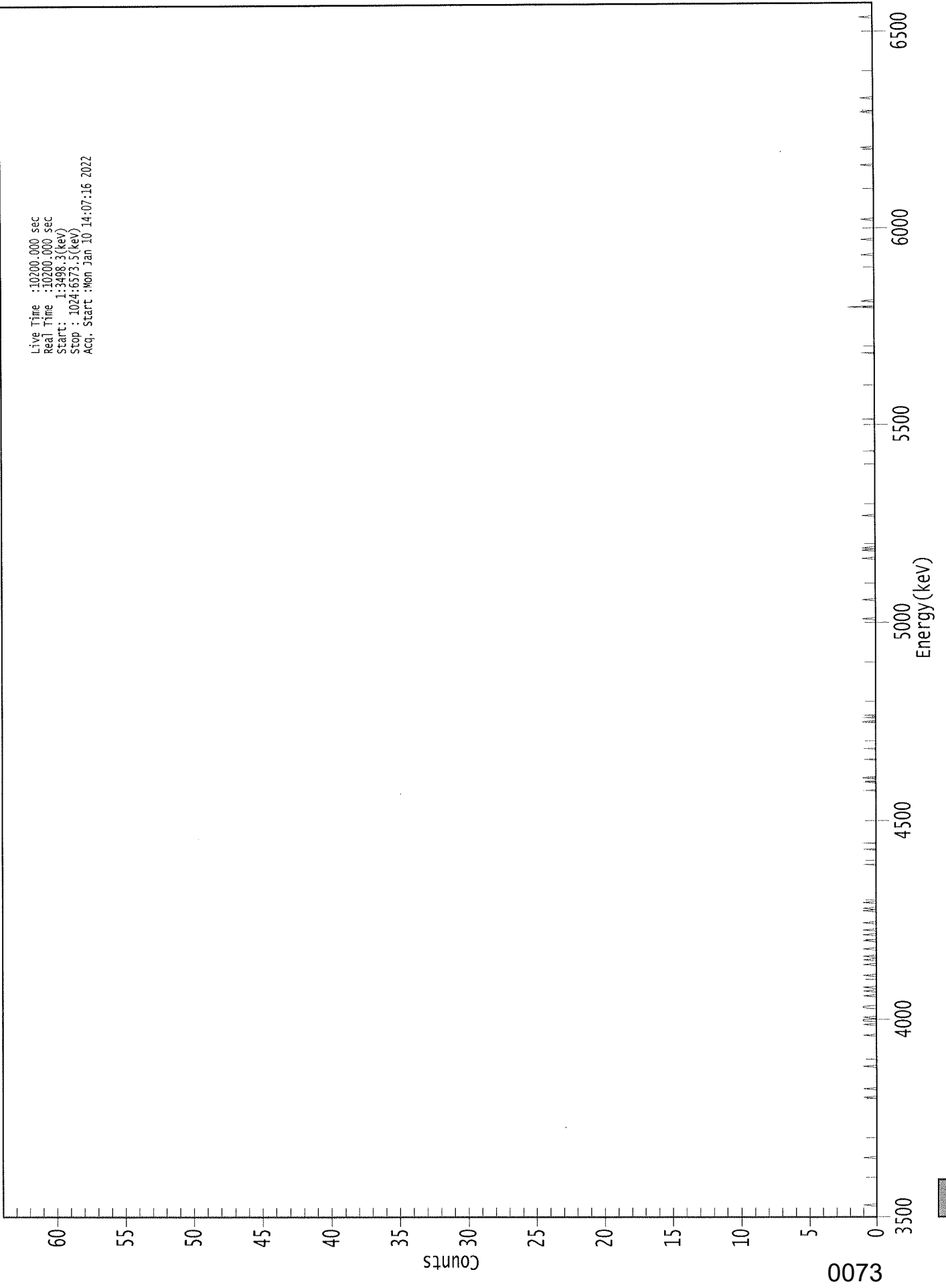
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.973	5685.50*	9.23E-002 +/- 1.28E-001	1.95E-001 +/- 6.85E-003
RA-226	0.963	4785.00*	4.49E-001 +/- 2.48E-001	1.46E-001 +/- 5.12E-003

AG  
1/11/22



0000304869.CNF

Live Time :10200.000 sec  
Real Time :10200.000 Sec  
Start: 1:3498.3(kev)  
Stop : 1024:6573.5(kev)  
Acq. Start :Mon Jan 10 14:07:16 2022



0073

ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 04

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	1	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	1	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	1	0	0	0
105:	0	0	0	0	1	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	1
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	0	1	0	0	0	0	0	0	0
161:	0	0	1	0	0	1	1	0	0
169:	1	0	0	0	0	0	0	0	0
177:	1	1	0	0	0	0	0	0	0
185:	0	0	1	0	0	0	1	0	0
193:	0	1	0	0	0	0	0	0	0
201:	0	0	0	1	0	0	0	0	0
209:	0	0	0	0	1	0	0	0	0
217:	1	0	0	1	0	0	0	0	0
225:	0	1	0	0	0	0	0	0	0
233:	1	0	0	0	0	1	0	0	0
241:	0	1	0	0	0	0	0	1	0
249:	0	0	0	0	0	0	0	0	0
257:	0	1	0	1	0	0	0	0	0
265:	1	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0	0
297:	1	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	1	0	0	0
313:	0	0	1	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	1	0	0
361:	0	0	0	0	0	1	0	0	0

369: 1 1 0 0 0 0 0 0

Sample Title: 04

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	0
393:	0	1	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	1
417:	1	0	0	1	0	1	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	1	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	1	0	0	0	0	0	0
561:	1	0	1	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	1	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	1	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	1	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	1	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	2	0	0
769:	0	0	1	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 04

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	1	0	0	0	0	0	0
817:	0	0	0	0	0	0	1	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	1
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	1	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	1	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	1	0	0	0	0	0
937:	0	0	0	0	0	0	1	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	1	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



11/10/22

Sample Description: MW-1  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 05  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_047  
 Chamber Serial Number: 10006125A  
 Detector Serial Number: 91086  
 Env. Background: System Bkgd 311329  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.790E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/15/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:18 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000  
 Counting Efficiency: 0.1694 +/- 0.0030 on 12/3/2021 12:28:26 PM  
 Effective Efficiency: 0.1694 +/- 0.0030

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.530	-0.34	592.90	0.34	0.00E+000	0.0
RA-226	4.629	2.00	169.74	0.00	0.00E+000	2.9

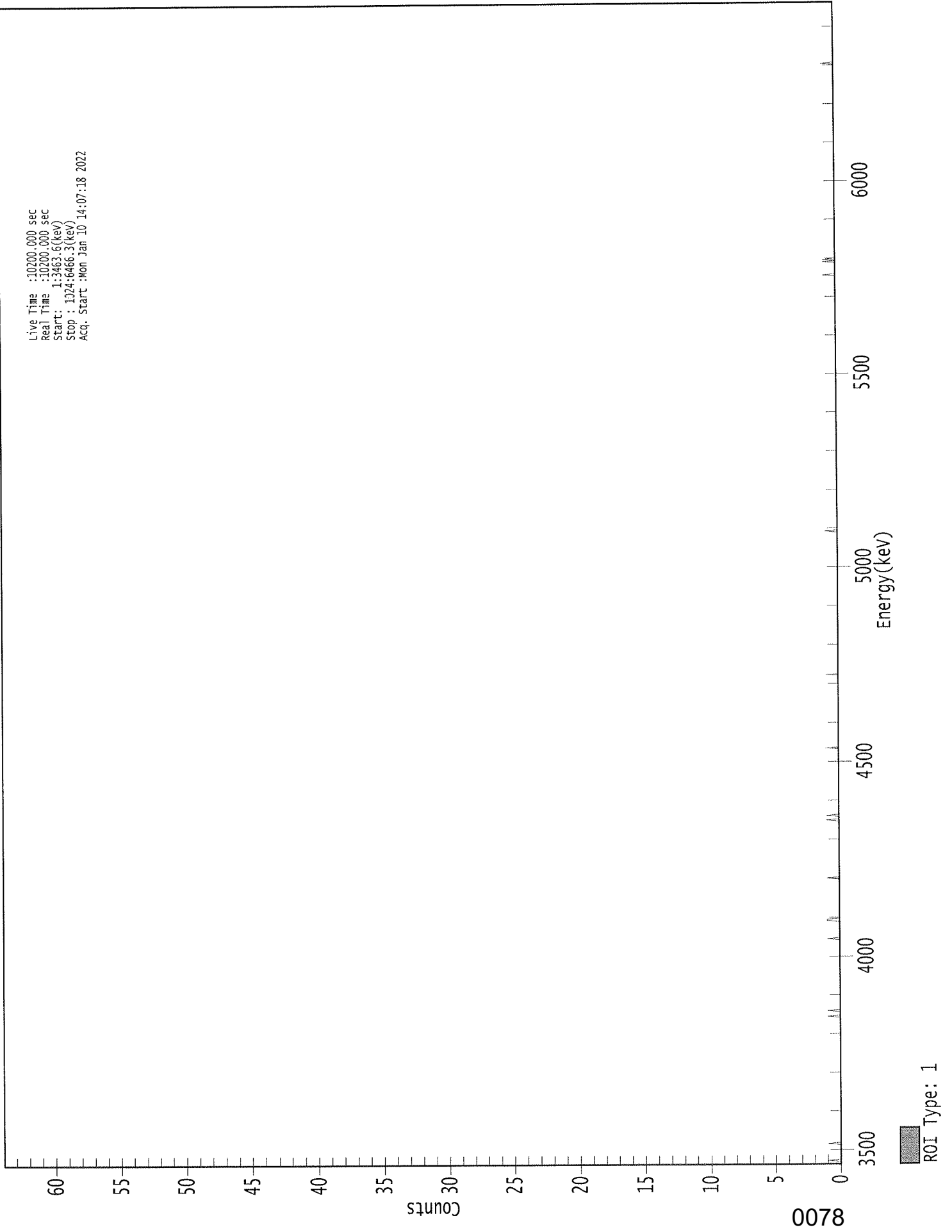
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.969	5685.50*	-1.57E-002 +/- 9.33E-002	2.21E-001 +/- 7.70E-003
RA-226	0.969	4785.00*	8.73E-002 +/- 1.48E-001	2.62E-001 +/- 9.08E-003

AG  
 1/11/22

0000304870.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start : 1:3463.6(keV)  
Stop : 1024:6466.3(keV)  
Acq. Start :Mon Jan 10 14:07:18 2022



0078

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 05

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	1	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	1	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	1
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	1	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	1	1
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	1	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	1	0
305:	0	0	1	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	1	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 05

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	1	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	1	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	1	0	0
785:	0	0	0	0	0	0	0	0
793:	0	1	0	1	0	0	0	0



801: 0 0 0 0 0 0 0 0

Sample Title: 05

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	1	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB  
1/10/22

# Apex-Alpha™

Sample Description: MW-8  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 06  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_048  
 Chamber Serial Number: 10006125B  
 Detector Serial Number: 83111  
 Env. Background: System Bkgd 311330  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.500E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/15/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:20 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9563 +/- 0.0000  
 Counting Efficiency: 0.1973 +/- 0.0034 on 12/3/2021 12:28:22 PM  
 Effective Efficiency: 0.1887 +/- 0.0033

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.493	4.66	94.59	0.34	0.00E+000	2.9
RA-226	4.520	3.32	119.77	0.68	0.00E+000	2.9

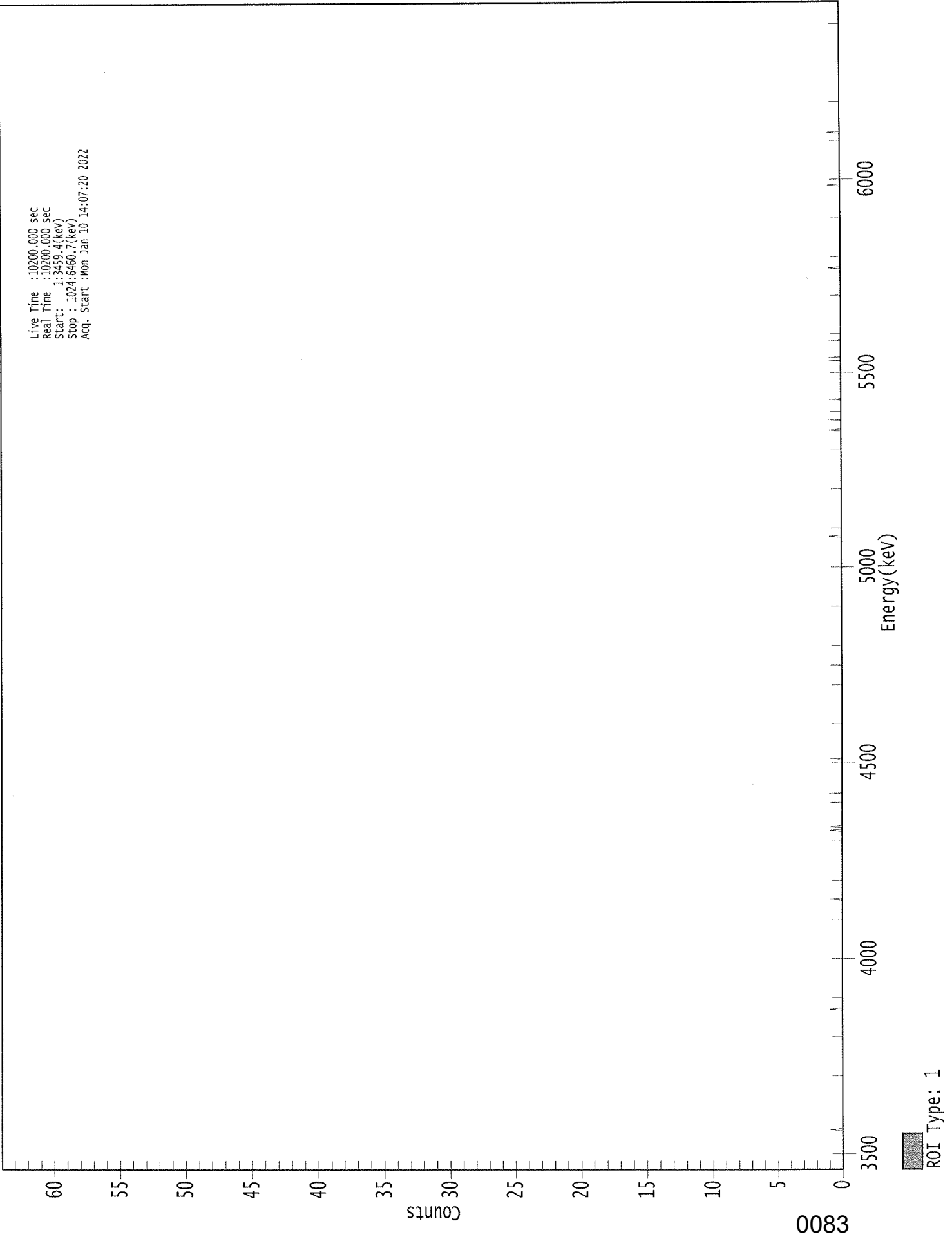
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.953	5685.50*	1.74E-001 +/- 1.64E-001	1.78E-001 +/- 6.07E-003
RA-226	0.912	4785.00*	1.17E-001 +/- 1.40E-001	1.98E-001 +/- 6.72E-003

AG  
 1/11/22

0000304867.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start : 1:34:59.4{(kev)  
Stop : :024:6460.7{(kev)  
Acq. Start :Mon Jan 10 14:07:20 2022



0083

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 06

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	1	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	1	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	1	0	0	1	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	1	0	0	0	0	0	0	0
329:	1	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	1	0
361:	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 06

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	1	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	1	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	1	0	0
649:	0	0	0	0	0	0	1	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	1	0	0	1	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	1	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	1	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 06

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	1	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	1	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



# Apex-Alpha™

CS  
1/10/22

Sample Description: MW-7  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 07  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_049  
 Chamber Serial Number: 10006121A  
 Detector Serial Number: 49  
 Env. Background: System Bkgd 311331  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.790E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/16/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:22 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9182 +/- 0.0000  
 Counting Efficiency: 0.1605 +/- 0.0029 on 5/21/2021 3:25:40 PM  
 Effective Efficiency: 0.1474 +/- 0.0026

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.528	2.32	149.12	0.68	0.00E+000	3.0
RA-226	4.590	9.15	68.23	0.85	0.00E+000	3.0

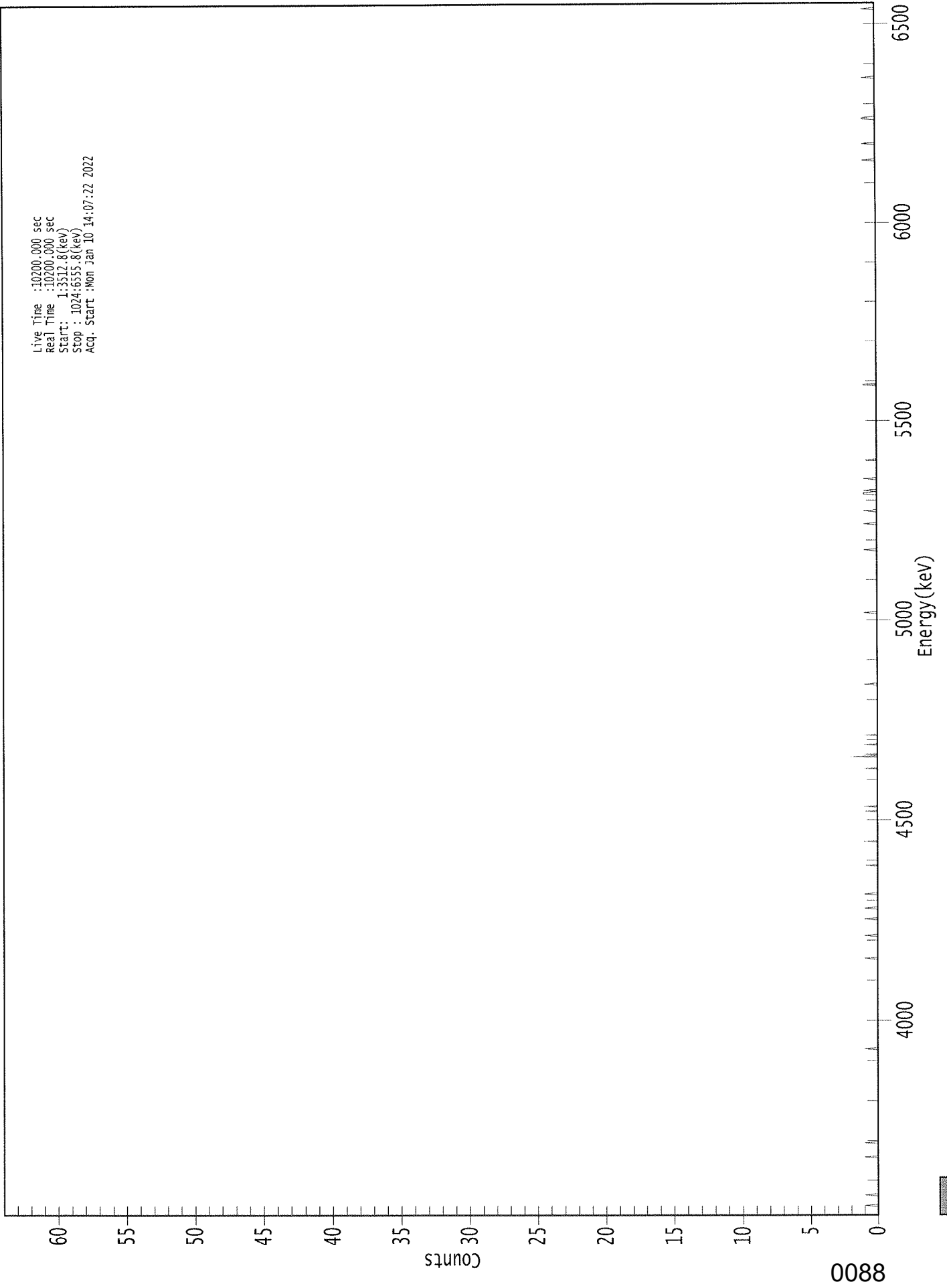
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.968	5685.50*	1.23E-001 +/- 1.84E-001	3.00E-001 +/- 1.06E-002
RA-226	0.951	4785.00*	4.59E-001 +/- 3.14E-001	3.00E-001 +/- 1.05E-002

AG  
1/11/22

0000304871.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start : 1:3512.8(kev)  
Stop : 1024:6555.8(kev)  
Acq. Start :Mon Jan 10 14:07:22 2022



ROI Type: 1

8800



\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 07

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	1	0	0	0	0	0	0	0	0
17:	0	1	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	1	0	0	0	0	0	0	0
57:	0	0	0	0	0	1	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	1	0	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0	0
217:	1	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	1	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	1	0	0	0	0	0	0	0
257:	0	0	1	0	0	0	0	0	0
265:	0	0	0	0	0	0	1	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0	0
313:	0	0	1	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0	0
337:	0	0	0	1	0	0	0	0	1
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 1

Sample Title: 07

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	2	0	1	0	0	0	0
393:	0	0	0	1	0	0	0	0
401:	0	0	0	1	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	1	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	1	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	1
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	1	0	0
585:	0	0	0	0	0	0	0	0
593:	1	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	1	1
609:	0	1	0	0	0	0	0	0
617:	0	0	0	1	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	1	1	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	1	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	1
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	1	1	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	1
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	1	0	0	0	0	0	0



# Apex-Alpha™

KB  
1/10/22

Sample Description: MW-9  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 08  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_050  
 Chamber Serial Number: 10006121B  
 Detector Serial Number: 50  
 Env. Background: System Bkgd 311332  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.080E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/16/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:24 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9927 +/- 0.0000  
 Counting Efficiency: 0.1477 +/- 0.0027 on 5/26/2021 3:37:09 PM  
 Effective Efficiency: 0.1466 +/- 0.0026

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.621	2.83	120.53	0.17	0.00E+000	3.0
RA-226	4.570	8.00	73.50	0.00	0.00E+000	3.0

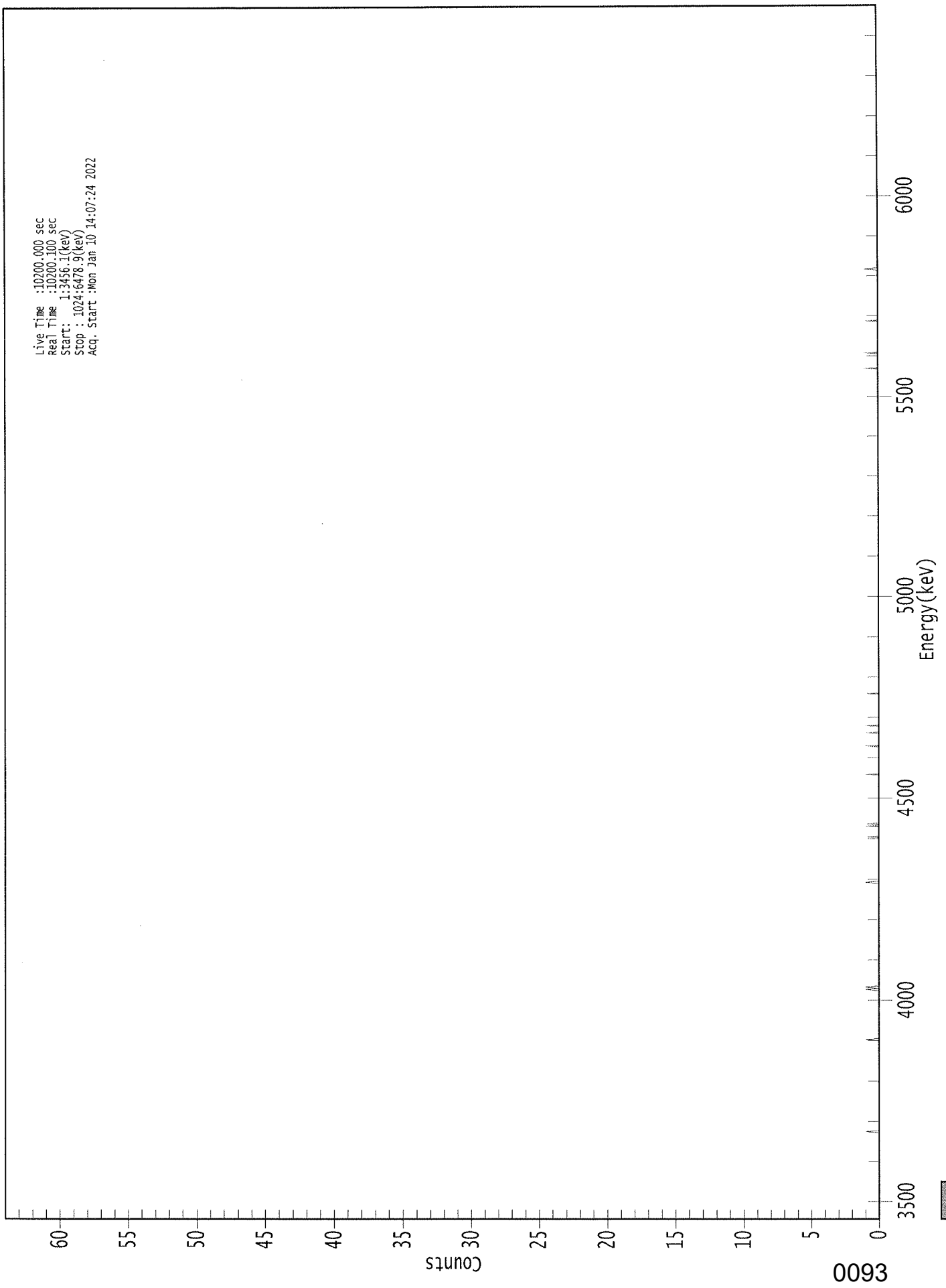
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.995	5685.50*	1.13E-001 +/- 1.36E-001	1.66E-001 +/- 5.88E-003
RA-226	0.941	4785.00*	3.01E-001 +/- 2.21E-001	2.25E-001 +/- 7.95E-003

AG  
1/11/22

0000304872.CNF

Live Time :10200.000 sec  
Real Time :10200.100 sec  
Start : 1:3456.1(kev)  
Stop : 1024:6478.9(kev)  
Acq. Start :Mon Jan 10 14:07:24 2022



ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 08

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	1	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0	1
153:	0	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	1	0	1	0	0	0	0	0
201:	0	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	1	0	0	0	0	0
289:	0	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0	0
321:	0	1	0	0	0	0	0	0	0
329:	0	0	1	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 1 0 0

Sample Title: 08

Channel									
377:	0	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	1	0	0	0
401:	0	0	0	0	0	0	0	0	0
409:	1	0	0	0	0	0	1	0	0
417:	0	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0	0
441:	0	1	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0	0
713:	0	0	0	1	0	0	0	0	0
721:	0	0	0	0	0	0	0	0	0
729:	1	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0	0
753:	0	0	0	1	0	0	0	0	0
761:	0	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0	1

801: 0 0 0 0 0 0 0 0 0

Sample Title: 08

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0





KB  
1/10/22

Sample Description: MW-9D  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 09  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_051  
 Chamber Serial Number: 10006123A  
 Detector Serial Number: 51  
 Env. Background: System Bkgd 311333  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.500E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/16/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:26 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000  
 Counting Efficiency: 0.1321 +/- 0.0024 on 5/21/2021 3:25:39 PM  
 Effective Efficiency: 0.1321 +/- 0.0024

Peak Match Tolerance: 0.350 MeV

-----  
 ----- PEAK AREA REPORT -----  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.663	0.83	239.53	0.17	0.00E+000	3.0
RA-226	4.582	10.83	60.10	0.17	0.00E+000	3.0

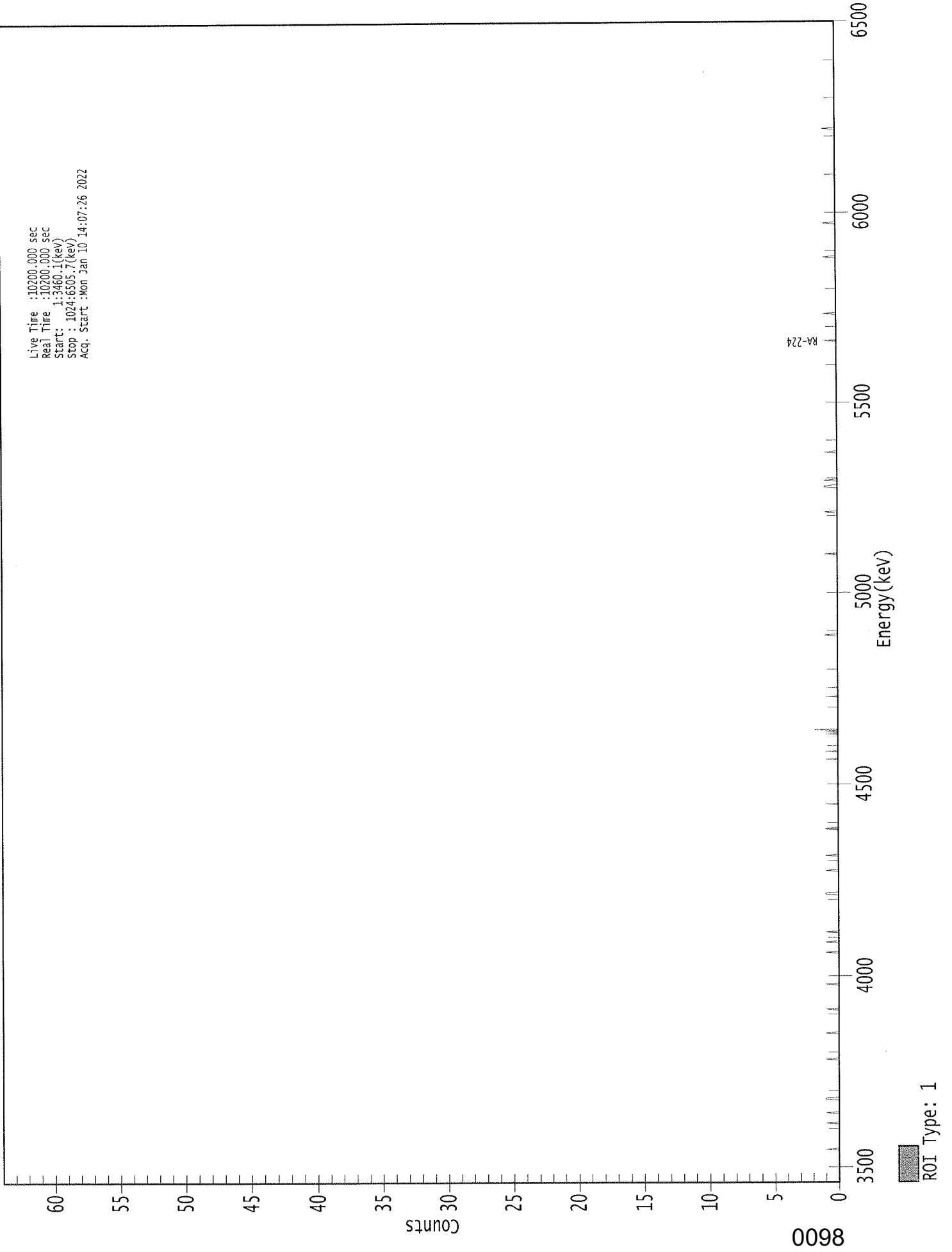
-----  
 ----- NUCLIDE ANALYSIS RESULTS -----  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.999	5685.50*	4.41E-002 +/- 1.06E-001	2.22E-001 +/- 8.00E-003
RA-226	0.947	4785.00*	5.43E-001 +/- 3.27E-001	2.09E-001 +/- 7.52E-003

AG  
1/11/22

0000304863.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start: 1:3460.1(kev)  
Stop : 1024:6505.7(kev)  
Acq. Start :Mon Jan 10 14:07:26 2022



8600

ROI Type: 1

\*\*\*\*\*  
\*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: 09

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	1	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	1	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	1	1	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	1	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	1	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	1	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	1	0	0
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	0	0	1	0	0	0	0	0	0
209:	0	0	0	1	0	0	0	0	0
217:	0	0	0	0	1	0	0	0	0
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	1	1	0	0
257:	0	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	0	1	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	1
289:	0	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	1	1	0
313:	0	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0	0
329:	0	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	0

369: 0 0 0 1 0 0 0 0

Sample Title: 09

Channel								
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	1	0	1	0	2	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	1	0	0	0	0	0
433:	0	0	1	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	1	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	1
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	1	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	1	1	0	0	0	0
617:	1	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	1	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	1	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 09

Channel								
809:	0	0	0	0	0	0	1	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	1	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB  
1/10/22

# Apex-Alpha™

Sample Description: SW-BO 13  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 10  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_052  
 Chamber Serial Number: 10006123B  
 Detector Serial Number: 52  
 Env. Background: System Bkgd 311334  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 1.490E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/16/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:28 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9803 +/- 0.0000  
 Counting Efficiency: 0.1768 +/- 0.0031 on 5/21/2021 3:25:37 PM  
 Effective Efficiency: 0.1733 +/- 0.0030

Peak Match Tolerance: 0.350 MeV

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 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.532	-0.34	592.90	0.34	0.00E+000	0.0
RA-226	4.651	4.00	109.57	0.00	0.00E+000	3.0

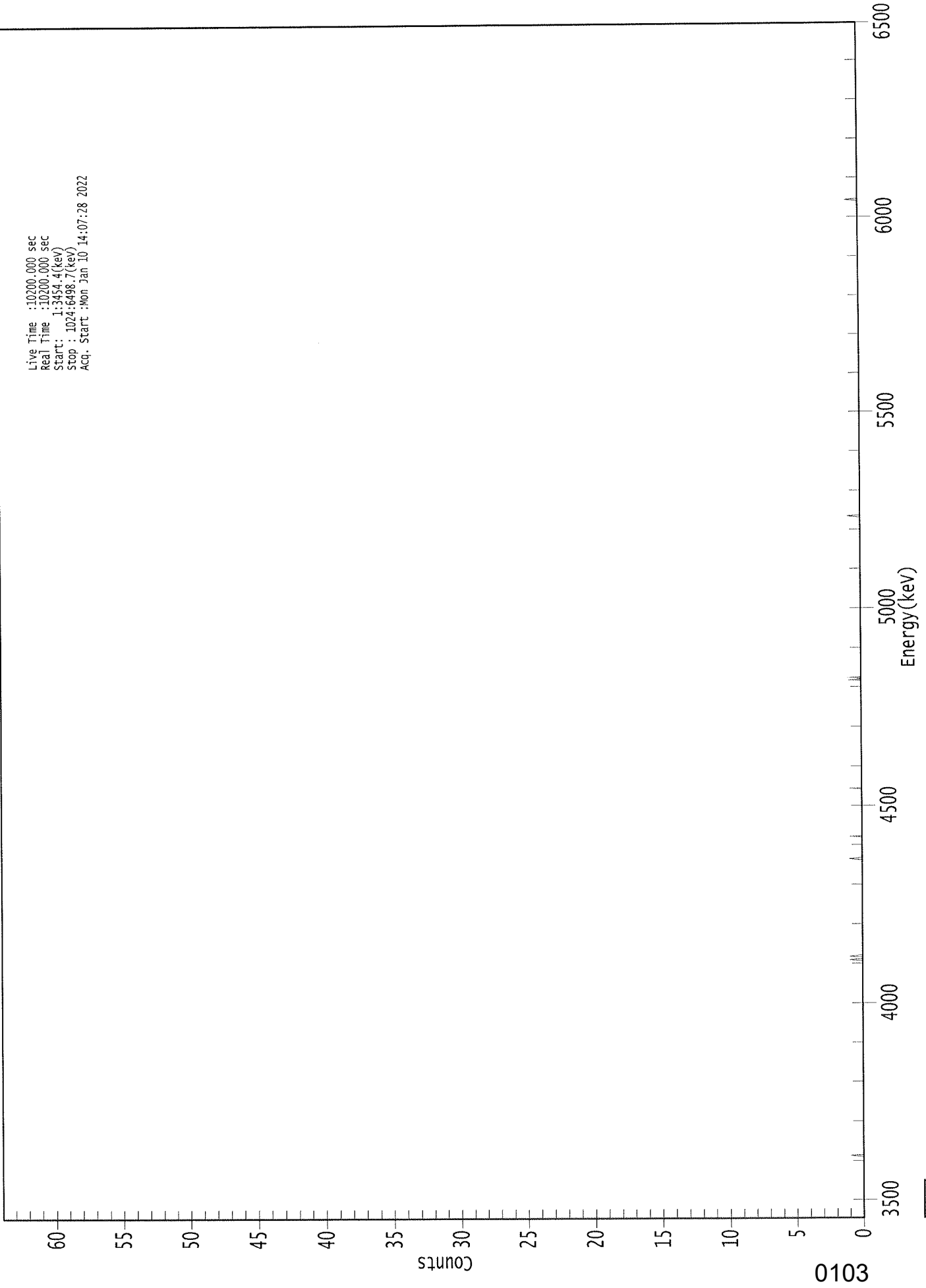
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.970	5685.50*	-8.21E-003 +/- 4.87E-002	1.15E-001 +/- 3.99E-003
RA-226	0.977	4785.00*	9.11E-002 +/- 9.99E-002	1.37E-001 +/- 4.70E-003

AG  
 1/11/22

0000304864.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start : 1:3454.4(keV)  
Stop : 1024:6498.7(keV)  
Acq. Start : Mon Jan 10 14:07:28 2022



0103

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 10

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	1	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	1	0	0	1
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	1	0	0
329:	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	1	0



369: 0 0 0 0 0 0 0 0 0

Sample Title: 10

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	1	0	1	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	1	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 10

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	1	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



KS  
1/10/22

Sample Description: SW-BO 2  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 11  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_053  
 Chamber Serial Number: 10006122A  
 Detector Serial Number: 53  
 Env. Background: System Bkgd 311335  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/16/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:30 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8736 +/- 0.0000  
 Counting Efficiency: 0.1353 +/- 0.0025 on 5/25/2021 4:02:23 PM  
 Effective Efficiency: 0.1182 +/- 0.0022

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.530	-0.34	592.90	0.34	0.00E+000	0.0
RA-226	4.626	-0.51	400.63	0.51	0.00E+000	0.0

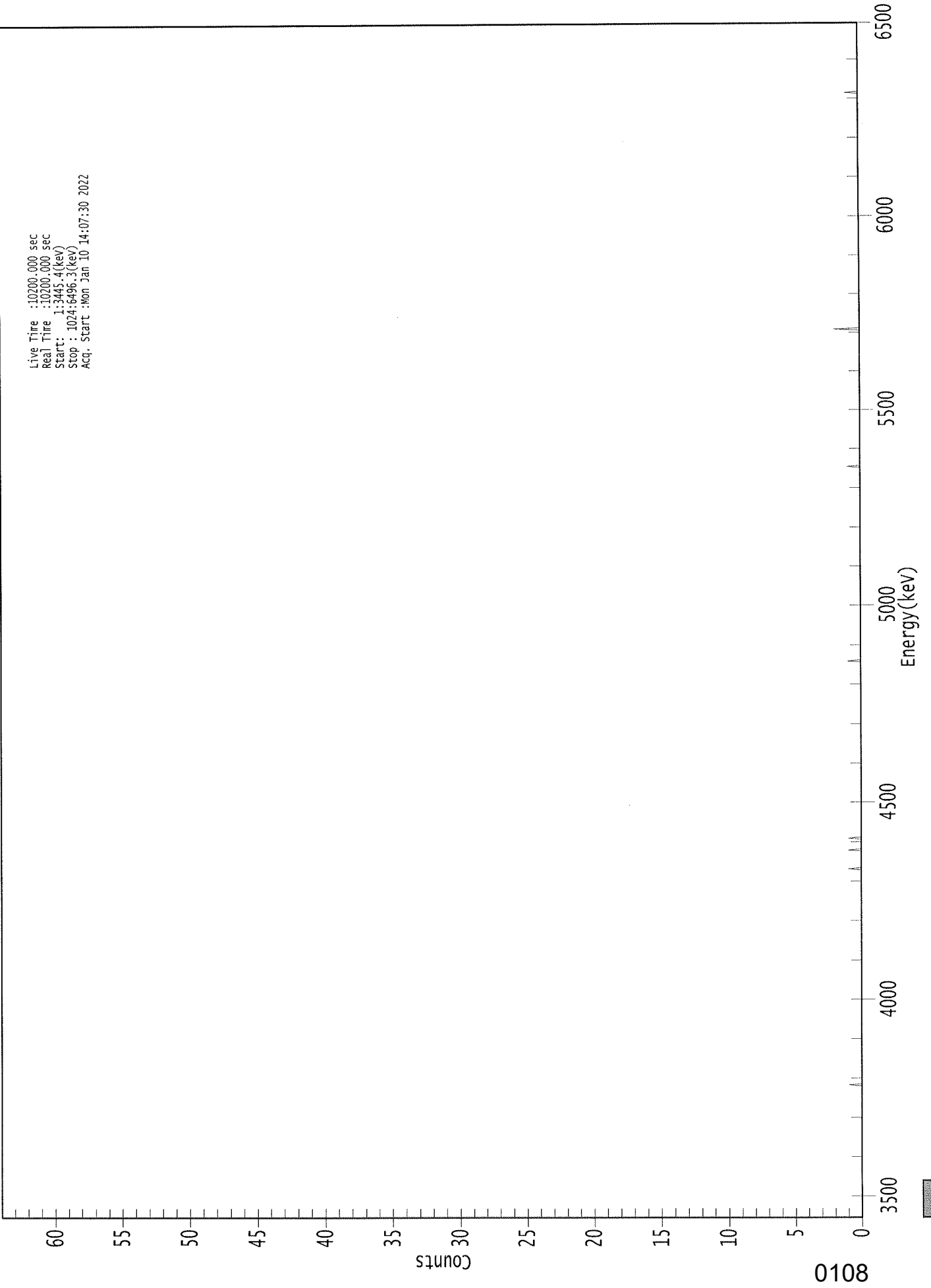
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.969	5685.50*	-1.97E-002 +/- 1.17E-001	2.77E-001 +/- 9.95E-003
RA-226	0.968	4785.00*	-2.79E-002 +/- 1.12E-001	2.87E-001 +/- 1.03E-002

AG  
1/11/22

0000304879.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start: 1:3445.4(kev)  
Stop : 1024:6496.3(kev)  
Acq. Start :Mon Jan 10 14:07:30 2022



0108

\*\*\*\*\*  
\*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: 11

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	1	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0	0
297:	0	1	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0	0
313:	0	1	0	0	0	0	0	0	0
321:	0	0	0	1	0	0	0	0	0
329:	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 11

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	1	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	1	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	2
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 11

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	1	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



# Apex-Alpha™

KB  
1/10/22

Sample Description: MW-6  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 12  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_054  
 Chamber Serial Number: 10006122B  
 Detector Serial Number: 54  
 Env. Background: System Bkgd 311336  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.690E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/17/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:32 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9779 +/- 0.0000  
 Counting Efficiency: 0.1516 +/- 0.0027 on 5/21/2021 3:25:35 PM  
 Effective Efficiency: 0.1483 +/- 0.0027

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.594	3.49	113.53	0.51	0.00E+000	3.0
RA-226	4.632	10.81	63.34	1.19	0.00E+000	3.0

-----  
 NUCLIDE ANALYSIS RESULTS  
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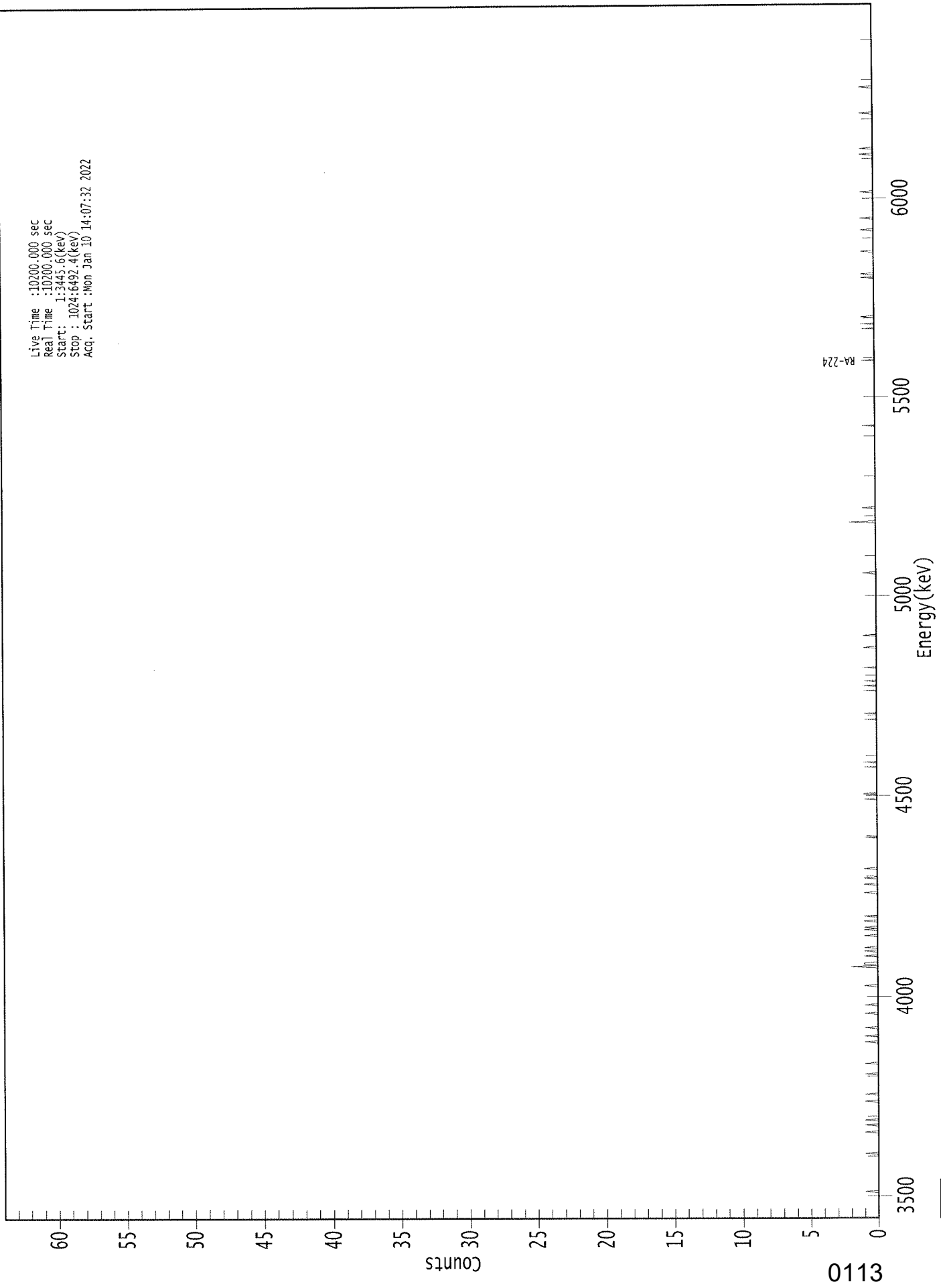
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.989	5685.50*	1.78E-001 +/- 2.02E-001	2.67E-001 +/- 9.40E-003
RA-226	0.970	4785.00*	5.20E-001 +/- 3.30E-001	3.17E-001 +/- 1.11E-002

AG  
1/11/22



0000304874.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start : 1:3445.6(Rev)  
Stop : 1024:6492.4(keV)  
Acq. Start :Mon Jan 10 14:07:32 2022



RA-224

0113

ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 12

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	1	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	1	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	1	0	0	0	0	0	1	0
81:	0	0	1	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	1	0	0	0	0	0
105:	1	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	1	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	1	0	0	0
153:	0	1	0	0	0	0	0	0
161:	1	0	0	0	0	0	0	0
169:	0	0	0	0	1	0	0	0
177:	0	0	0	1	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	2	0	1	1	0
217:	0	0	0	0	1	0	0	0
225:	1	0	0	1	0	0	0	0
233:	0	0	0	0	0	1	0	0
241:	0	0	1	0	1	0	0	0
249:	0	1	0	0	0	1	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	1	0	0	0	0	0	0
281:	1	0	0	0	0	1	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	1
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	1
353:	0	0	0	1	1	0	0	0
361:	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 12

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	1	0	0	0	1	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	1	0	0	0	0	1
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	1	0	0	0	1	0
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	1	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	0	0
489:	1	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	1	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	2	0	0	0	0	0	0	0
593:	0	0	0	0	1	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	1	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	1	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	1	0	0	0
753:	1	0	0	0	0	0	1	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	1
793:	0	0	1	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 12

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	1	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	1
833:	0	0	0	0	0	0	0	0
841:	0	1	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	1
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	1
897:	0	0	0	0	1	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	1	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	1	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

*KB  
1/10/22*

Sample Description: MW-10  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 13  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_055  
 Chamber Serial Number: 10006124A  
 Detector Serial Number: 55  
 Env. Background: System Bkgd 311337  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 1.710E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/20/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:34 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8842 +/- 0.0000  
 Counting Efficiency: 0.1467 +/- 0.0026 on 11/29/2021 5:27:30 PM  
 Effective Efficiency: 0.1298 +/- 0.0023

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.504	4.83	91.00	0.17	0.00E+000	3.0
RA-226	4.724	5.66	85.23	0.34	0.00E+000	3.0

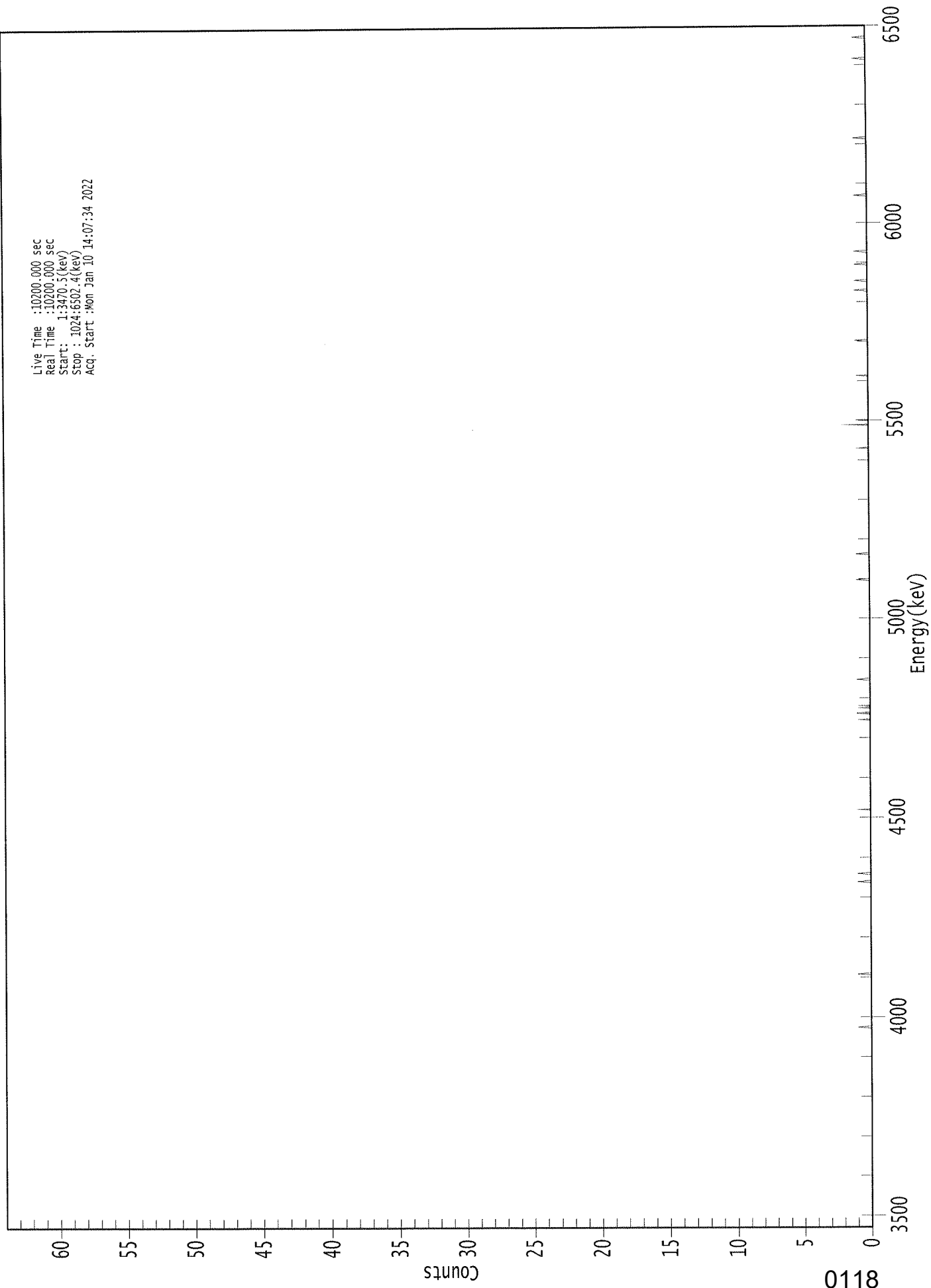
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.958	5685.50*	1.79E-001 +/- 1.63E-001	1.54E-001 +/- 5.46E-003
RA-226	0.995	4785.00*	1.98E-001 +/- 1.69E-001	1.67E-001 +/- 5.90E-003

*AG  
1/11/22*

0000304875.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start: 1:3470.5(kev)  
Stop : 1024:6502.4(kev)  
Acq. Start :Mon Jan 10 14:07:34 2022



0118

ROI Type: 1

\*\*\*\*\*  
\*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: 13

Elapsed Live time: 10200  
Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	1	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0	1
217:	0	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	1	0	0	0
297:	0	0	0	0	1	0	0	0	0
305:	0	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	1	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 13

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	1	0
433:	0	0	0	1	1	0	0	0
441:	1	0	1	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	1	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	1	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	1	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	1	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	2	0	0	0	1	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	1	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	1	0	0	0



801: 0 0 0 0 1 0 0 0

Sample Title: 13

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	1	0	0	0	0	0
825:	0	0	0	0	0	1	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	1	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	1	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	1	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	1	0	0	0
1017:	0	0	0	0	0	0	0	0

16  
1/10/22

Sample Description: MW-5  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 14  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_056  
 Chamber Serial Number: 10006124B  
 Detector Serial Number: 56  
 Env. Background: System Bkgd 311338  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 3.000E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/20/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:36 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8314 +/- 0.0000  
 Counting Efficiency: 0.1654 +/- 0.0029 on 11/29/2021 5:27:51 PM  
 Effective Efficiency: 0.1375 +/- 0.0024

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.473	3.00	130.67	0.00	0.00E+000	3.0
RA-226	4.561	10.00	65.01	0.00	0.00E+000	3.0

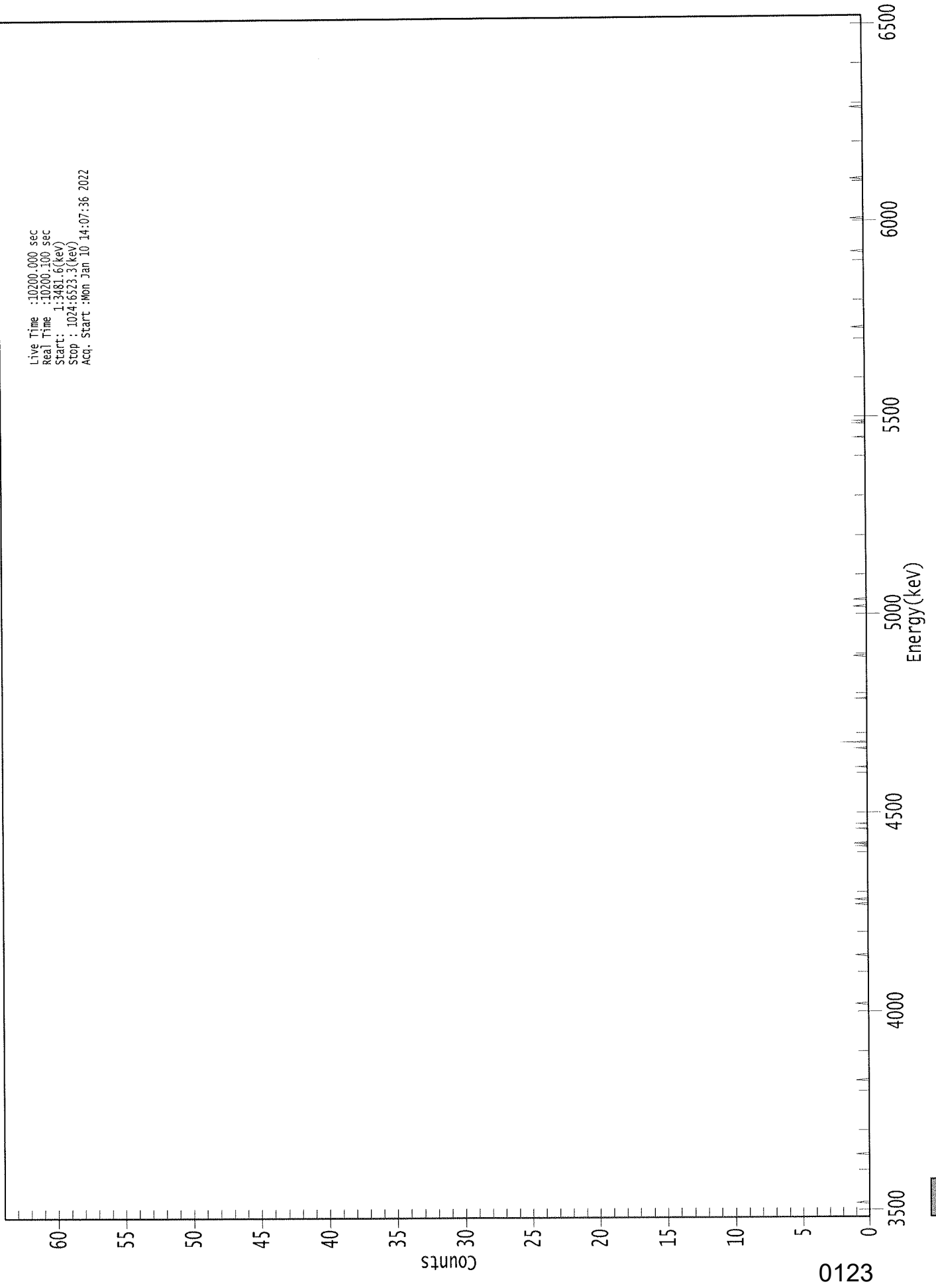
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.943	5685.50*	1.84E-001 +/- 2.40E-001	3.67E-001 +/- 1.27E-002
RA-226	0.937	4785.00*	5.78E-001 +/- 3.76E-001	3.47E-001 +/- 1.20E-002

AG  
1/11/22

0000304876.CNF

Live Time :10200.000 sec  
Real Time :10200.100 sec  
Start : 1:3481.6(keV)  
Stop : 1024:6523.3(keV)  
Acq. Start :Mon Jan 10 14:07:36 2022



0123

ROI Type: 1

\*\*\*\*\*  
\*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: 14

Elapsed Live time: 10200  
Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	1	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	1	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	1	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	1	0	0	0	1	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	1	0	1	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	1	0	0	0	1	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0


Sample Title: 14

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	1	0	0
401:	0	0	2	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	1
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	1	0	0
521:	0	0	0	1	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	1	0	0
665:	0	0	0	0	0	0	0	0
673:	0	1	0	1	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	1	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 14

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	1	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	1	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



# Apex-Alpha™

VB  
1/10/22

Sample Description: MW-4  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 15  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_057  
 Chamber Serial Number: 01017326A  
 Detector Serial Number: 57  
 Env. Background: System Bkgd 311339  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.580E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/20/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:38 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000  
 Counting Efficiency: 0.1426 +/- 0.0026 on 5/21/2021 3:25:34 PM  
 Effective Efficiency: 0.1426 +/- 0.0026

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.522	3.47	129.55	1.53	0.00E+000	3.0
RA-226	4.526	3.96	124.69	2.04	0.00E+000	3.0

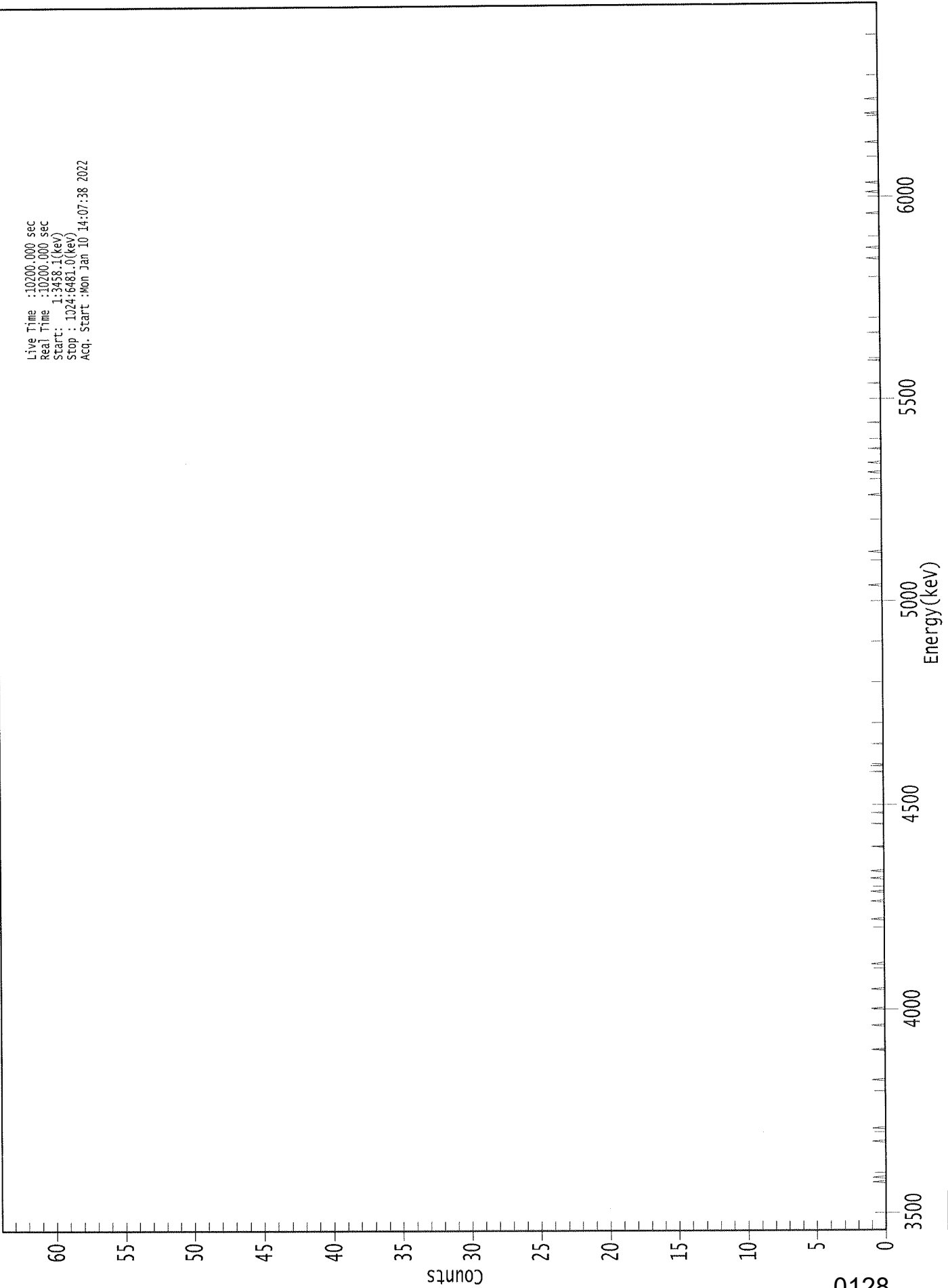
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.966	5685.50*	1.76E-001 +/- 2.28E-001	3.61E-001 +/- 1.28E-002
RA-226	0.916	4785.00*	1.90E-001 +/- 2.37E-001	3.73E-001 +/- 1.32E-002

AG  
1/11/22

0000304877.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start: 1:3458.1(kev)  
Stop : 1024:6481.0(kev)  
Acq. Start :Mon Jan 10 14:07:38 2022



0128



\*\*\*\*\*  
\*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
\*\*\*\*\*

Sample Title: 15

Elapsed Live time: 10200  
Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	1	0	0	0	1	0	0	0	0
49:	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	1	0	0	0	0	0	0
81:	0	0	0	0	0	1	0	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	1	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	1	0	0
153:	0	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	1	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0	0
185:	1	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	1	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	1	0	0	0
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0	0
257:	0	0	1	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	1	0	0	0	0	0	0	0
281:	0	1	0	0	0	0	0	0	0
289:	0	0	0	0	1	0	0	0	0
297:	0	0	1	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	1	0	0
321:	0	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0	0
337:	0	1	0	0	0	0	0	0	0
345:	0	0	1	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 15

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	1	0	0	0
385:	0	1	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	1	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	1
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	1	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	1	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	1	0	0
633:	0	0	0	0	0	1	0	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	1
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	1	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	1	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	1	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 15

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	1	0	0	0	0	0	0	0
817:	0	1	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	1	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	0	0	0
873:	1	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	1	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	1	0	0	0	0	0
937:	0	0	0	0	0	0	1	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KCS  
1/10/22

# Apex-Alpha™

Sample Description: MW-3  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 16  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_058  
 Chamber Serial Number: 01017326B  
 Detector Serial Number: 58  
 Env. Background: System Bkgd 311340  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 2.470E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/20/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:40 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9391 +/- 0.0000  
 Counting Efficiency: 0.1794 +/- 0.0031 on 5/21/2021 3:25:32 PM  
 Effective Efficiency: 0.1685 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.537	0.98	294.85	1.02	0.00E+000	3.0
RA-226	4.624	8.49	69.59	0.51	0.00E+000	3.0

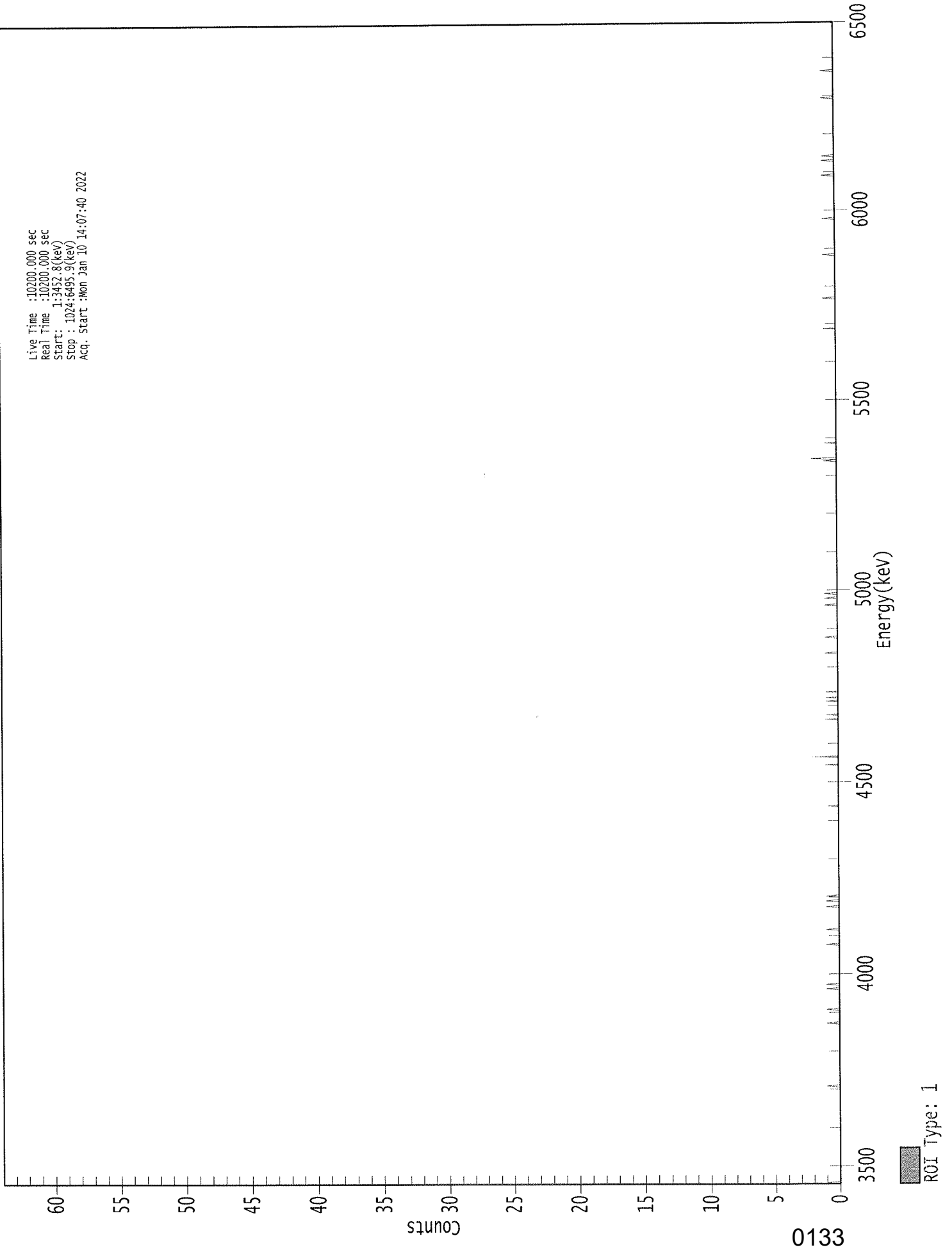
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter )	MDA (pCi/liter )
RA-224	0.971	5685.50*	4.03E-002 +/- 1.19E-001	2.59E-001 +/- 8.89E-003
RA-226	0.967	4785.00*	3.30E-001 +/- 2.30E-001	2.04E-001 +/- 6.97E-003

AG  
1/11/22

0000304865.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start: 1:3452.8(kev)  
Stop : 1024:6495.9(kev)  
Acq. Start :Mon Jan 10 14:07:40 2022



0133

ROI Type: 1

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 16

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	1	2	3	4	5	6	7	8	9
1:	0	1	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	1	0	0
89:	0	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	1	0	0	0
145:	0	0	0	0	0	0	0	0	0
153:	0	1	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0	0
169:	0	0	0	1	0	0	0	0	1
177:	0	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0	0
209:	0	0	1	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0	1
225:	0	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0	0
241:	0	0	0	1	0	0	0	0	0
249:	1	0	0	0	1	0	0	0	0
257:	0	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0	0
329:	0	0	0	1	0	0	0	0	0
337:	0	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0	1

369: 0 0 0 0 0 0 2 0

Sample Title: 16

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	1
409:	0	0	0	1	0	0	0	0
417:	0	0	0	0	0	0	0	1
425:	0	0	1	0	0	0	0	1
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	1
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	1	0	0	0	0
513:	0	1	0	0	0	1	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	1	0	2	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	1	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	1
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	1	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 16

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	1	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	1	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	1
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	1	0	0	0
905:	1	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	1	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



10B  
1/10/22

# Apex-Alpha™

Sample Description: MW-2  
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00003048  
 Batch Identification: 2112077A-RA  
 Sample Identification: 17  
 Sample Geometry: Shelf 2  
 Procedure Description: Ra

Detector Name: Alpha\_059  
 Chamber Serial Number: 02030596A  
 Detector Serial Number: 59  
 Env. Background: System Bkgd 311341  
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter  
 Generic Mult. Factor: 1.250E+000 Generic Div. Factor: 1.000E+000  
 Sample Date/Time: 12/21/2021 9:59:21 AM  
 Acquisition Date/Time: 1/10/2022 2:07:42 PM  
 Acquisition Live Time: 170.0 minutes  
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8149 +/- 0.0000  
 Counting Efficiency: 0.1752 +/- 0.0031 on 5/21/2021 3:25:31 PM  
 Effective Efficiency: 0.1428 +/- 0.0025

Peak Match Tolerance: 0.350 MeV

-----  
 PEAK AREA REPORT  
 -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.589	1.32	215.97	0.68	0.00E+000	3.0
RA-226	4.584	20.64	44.77	1.36	0.00E+000	3.0

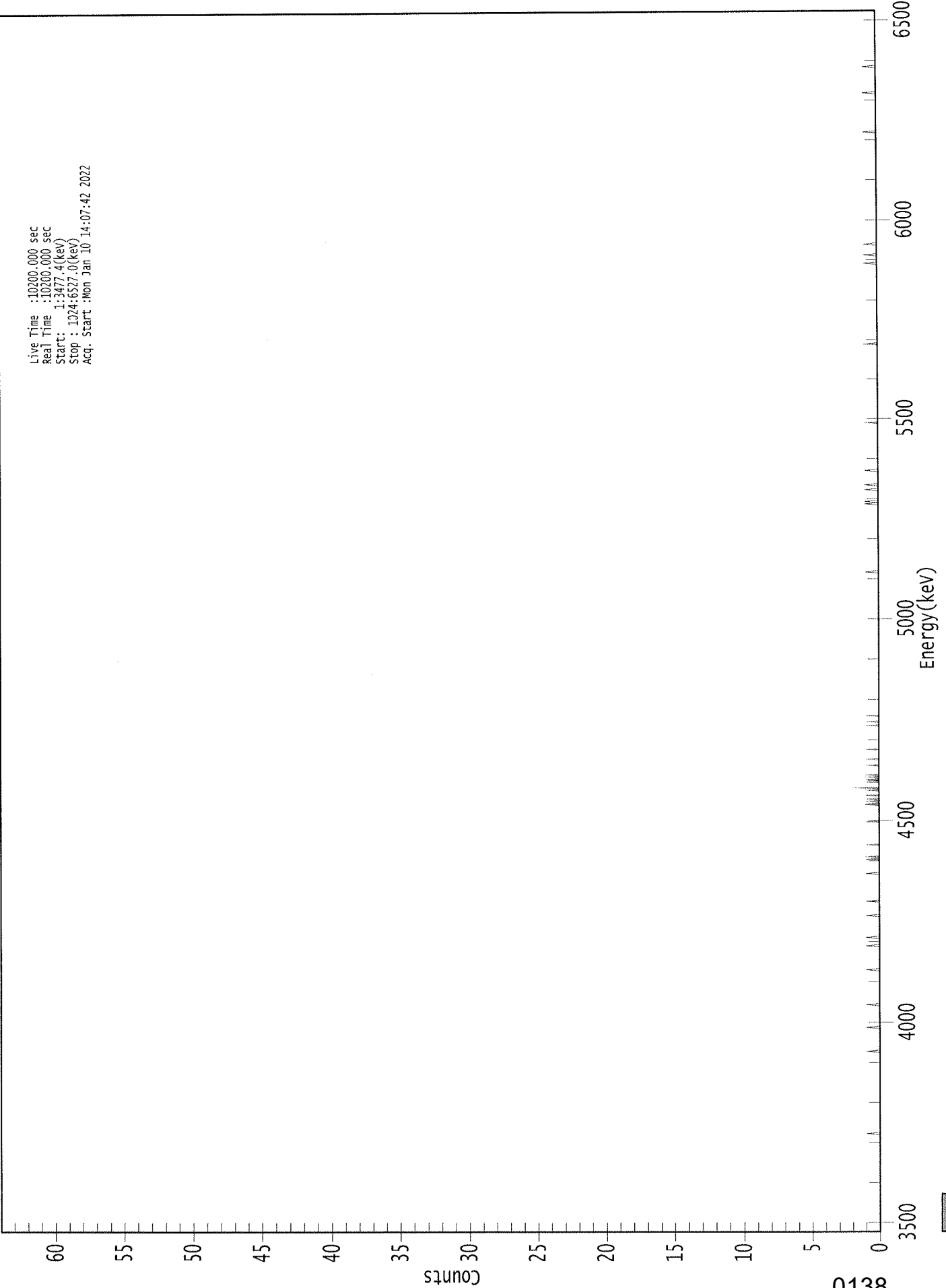
-----  
 NUCLIDE ANALYSIS RESULTS  
 -----

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.988	5685.50*	3.24E-002 +/- 7.00E-002	1.39E-001 +/- 4.79E-003
RA-226	0.949	4785.00*	4.79E-001 +/- 2.15E-001	1.59E-001 +/- 5.49E-003

AG  
 1/11/22

0000304866.CNF

Live Time :10200.000 sec  
Real Time :10200.000 sec  
Start: 1:3477.4(keV)  
Stop : 1024:6527.0(keV)  
Acq. Start :Mon Jan 10 14:07:42 2022



0138

\*\*\*\*\*  
 \*\*\*\*\* S P E C T R A L D A T A R E P O R T \*\*\*\*\*  
 \*\*\*\*\*

Sample Title: 17

Elapsed Live time: 10200  
 Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	1	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	1
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	1	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	1	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	1	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	1
241:	0	0	0	0	0	0	1	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	1	0	0	0	0	0	0	0
273:	0	0	0	0	1	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	1	0	0	0	0
305:	0	0	0	0	0	0	0	1
313:	0	1	0	0	0	0	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	1	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	1	1	0	1
361:	0	1	0	0	1	0	0	0

369: 1 0 2 0 0 0 0 1

Sample Title: 17

Channel	1	2	3	4	5	6	7	8
377:	0	1	0	1	0	1	0	0
385:	0	0	0	0	0	1	0	0
393:	0	0	1	0	0	0	0	0
401:	0	0	1	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	1	0
425:	0	1	0	0	0	0	1	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	1	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	1
609:	0	1	0	0	0	0	0	0
617:	0	0	0	1	0	0	0	1
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	1	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	1	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 17

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	1	0	0	0	0	0
817:	0	1	0	0	0	0	0	0
825:	0	0	1	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	1	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	1	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	1
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



## QA SUMMARY REPORT

### Review Of QA Results - Pulser Check

Date : 1/10/2022  
Time : 6:08:49 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 001	21f	ALL	Not Done	
Alpha 002	21f	ALL	Not Done	
Alpha 003	21f	ALL	Not Done	
Alpha 004	21f	ALL	Not Done	
Alpha 005	21f	ALL	Not Done	
Alpha 006	21f	ALL	Not Done	
Alpha 007	21f	ALL	Not Done	
Alpha 008	21f	ALL	Not Done	
Alpha 009	21f	ALL	Not Done	
Alpha 010	21f	ALL	Not Done	
Alpha 011	21f	ALL	Passed	1/10/2022 5:52:17 AM
Alpha 012	21f	ALL	Passed	1/10/2022 5:52:18 AM
Alpha 013	21f	ALL	Not Done	
Alpha 014	21f	ALL	Not Done	
Alpha 015	21f	ALL	Not Done	
Alpha 016	21f	ALL	Not Done	
Alpha 033	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:19 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:21 AM
Alpha 035	Alpha Analyst100DC	Peak Energy	Action	1/10/2022 5:52:22 AM
Alpha 036	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:24 AM
Alpha 037	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:26 AM
Alpha 038	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:29 AM
Alpha 039	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:31 AM
Alpha 040	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:34 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:36 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:38 AM
Alpha 043	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:41 AM
Alpha 044	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:44 AM
Alpha 045	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:46 AM
Alpha 046	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:49 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:51 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:54 AM
Alpha 049	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:52:57 AM
Alpha 050	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:00 AM
Alpha 051	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:02 AM
Alpha 052	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:05 AM
Alpha 053	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:08 AM
Alpha 054	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:11 AM
Alpha 055	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:14 AM
Alpha 056	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:17 AM
Alpha 057	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:19 AM
Alpha 058	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:23 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 059	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:26 AM
Alpha 060	Alpha Analyst100DC	ALL	Passed	1/10/2022 5:53:29 AM

APPROVED BY: ICP

APPROVAL DATE: 1/10/22

\*\*\*\*\*  
 \*\*\*\*\* LIBRARY LISTING REPORT \*\*\*\*\*  
 \*\*\*\*\*

Nuclide Library Title: Radium

Nuclide Library Description: Ra-226, Po-218, Rn-222

Nuclide Name	Half-Life (Seconds)	Energy (keV)	Energy Uncert. (keV)	Yield (%)	Yield Uncert. (Abs.+)
PO-218	5.049E+010	6003.000*	0.000	99.9800	0.0000
RN-222	5.049E+010	5490.000*	0.000	99.9200	0.0000
RA-226	5.049E+010	4785.000*	0.000	100.0000	0.0000

\* = key line

TOTALS: 3 Nuclides 3 Energy Lines



**SECTION IX**  
**ANALYTICAL DATA (RADIUM-228)**

Work Order	<b>21-12077</b>
Analysis Code	<b>Ra228</b>
Run	<b>1</b>
Date Received	<b>12/28/2021</b>
Lab Deadline	<b>1/10/2022</b>
Client	ERM
Project	526033
Report Level	<b>4</b>
Activity Units	pCi
Aliquot Units	I
Matrix	WA
Method	EPA 904.0
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	380.81
Carrier	Yttrium
Carrier Conc (mg/ml)	35.15

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		12/28/21 00:00	1.0000E+00
02	MBL	BLANK		12/28/21 00:00	1.0000E+00
03	DUP	MW-1	20	12/15/21 13:45	1.0000E+00
04	TRG	MW-11	30	12/15/21 08:00	1.0000E+00
05	DO	MW-1	20	12/15/21 13:45	1.0000E+00
06	TRG	MW-8	30	12/15/21 16:30	1.0000E+00
07	TRG	MW-7	30	12/16/21 07:50	1.0000E+00
08	TRG	MW-9	50	12/16/21 08:20	1.0000E+00
09	TRG	MW-9D	20	12/16/21 08:40	1.0000E+00
10	TRG	SW-BO 13	40	12/16/21 11:35	1.0000E+00
11	TRG	SW-BO 2	20	12/16/21 12:30	1.0000E+00
12	TRG	MW-6	20	12/17/21 08:30	1.0000E+00
13	TRG	MW-10	40	12/20/21 10:45	1.0000E+00
14	TRG	MW-5	60	12/20/21 13:30	1.0000E+00
15	TRG	MW-4	40	12/20/21 15:05	1.0000E+00
16	TRG	MW-3	40	12/20/21 16:30	1.0000E+00
17	TRG	MW-2	20	12/21/21 09:55	1.0000E+00

\* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.  
\*\* Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	2.2142	843.2	399.0	105.05	2.000	0.0883	0.1447	0.0564	80.23	84.28	1.00	1.00
02	MBL	2.1944	835.6	344.0	91.39	2.000	0.0888	0.1448	0.0560	79.66	72.80	1.00	1.00
03	DUP	2.1947	835.8	380.0	100.94	2.000	0.0886	0.1449	0.0563	80.09	80.84	1.00	1.00
04	TRG	2.1917	834.6	350.0	93.10	2.000	0.0883	0.1467	0.0584	83.07	77.34	1.00	1.00
05	DO	2.1893	833.7	382.0	101.72	2.000	0.0881	0.1450	0.0569	80.94	82.33	1.00	1.00
06	TRG	2.1852	832.1	359.0	95.77	2.000	0.0881	0.1428	0.0547	77.81	74.52	1.00	1.00
07	TRG	2.1808	830.5	344.0	91.96	2.000	0.0877	0.1419	0.0542	77.10	70.90	1.00	1.00
08	TRG	2.1345	812.8	364.0	99.41	2.000	0.0885	0.1448	0.0563	80.09	79.62	1.00	1.00
09	TRG	2.0902	796.0	379.0	105.71	2.000	0.0883	0.1454	0.0571	81.22	85.86	1.00	1.00
10	TRG	2.1139	805.0	356.0	98.18	2.000	0.0887	0.1458	0.0571	81.22	79.74	1.00	1.00
11	TRG	2.5654	976.9	385.0	87.49	2.000	0.0891	0.1440	0.0549	78.09	68.32	1.00	1.00
12	TRG	2.1965	836.4	369.0	97.94	2.000	0.0887	0.1434	0.0547	77.81	76.20	1.00	1.00
13	TRG	2.1726	827.3	330.0	88.55	2.000	0.0885	0.1345	0.0460	65.43	57.94	1.00	1.00
14	TRG	2.1706	826.6	310.0	83.26	2.000	0.0880	0.1511	0.0631	89.76	74.73	1.00	1.00
15	TRG	2.1742	828.0	401.0	107.52	2.000	0.0880	0.1456	0.0576	81.93	88.10	1.00	1.00
16	TRG	2.1695	826.2	350.0	94.05	2.000	0.0874	0.1460	0.0586	83.36	78.40	1.00	1.00
17	TRG	2.1716	827.0	304.0	81.61	2.000	0.0882	0.1457	0.0575	81.79	66.75	1.00	1.00

\* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.  
\*\* Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
02	MBL			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
03	DUP			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
04	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
05	DO			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
06	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
07	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
08	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
09	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
10	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
11	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
12	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
13	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
14	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
15	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
16	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS
17	TRG			01/12/22 08:58	M DAVIS	01/10/22 08:08	M DAVIS	01/12/22 09:09	M DAVIS

\* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ^ Indicates estimated SAF value.  
\*\* Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations  
**Work Order: 21-12077-Ra228-1**

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/l	9.61E+00	9.95E-01	1.24E+00	8.84E+00	103.69	OK		OK	
02	RA-228	MBL	BLANK	pCi/l	1.92E-01	8.16E-01	1.72E+00					OK	OK
03	RA-228	DUP	MW-1	pCi/l	1.16E+00	5.44E-01	1.03E+00				NA	OK	
04	RA-228	TRG	MW-11	pCi/l	6.08E-01	6.35E-01	1.29E+00					OK	
05	RA-228	DO	MW-1	pCi/l	2.36E-01	5.61E-01	1.17E+00					OK	
06	RA-228	TRG	MW-8	pCi/l	4.66E-01	5.58E-01	1.14E+00					OK	
07	RA-228	TRG	MW-7	pCi/l	7.77E-01	6.57E-01	1.32E+00					OK	
08	RA-228	TRG	MW-9	pCi/l	7.34E-01	5.33E-01	1.05E+00					OK	
09	RA-228	TRG	MW-9D	pCi/l	7.86E-01	4.86E-01	9.47E-01					OK	
10	RA-228	TRG	SW-BO 13	pCi/l	4.62E-01	4.92E-01	1.00E+00					OK	
11	RA-228	TRG	SW-BO 2	pCi/l	1.40E-01	5.79E-01	1.23E+00					OK	
12	RA-228	TRG	MW-6	pCi/l	1.71E+00	5.24E-01	9.07E-01					OK	
13	RA-228	TRG	MW-10	pCi/l	3.70E-01	6.57E-01	1.37E+00					OK	
14	RA-228	TRG	MW-5	pCi/l	2.10E+00	6.38E-01	1.13E+00					OK	
15	RA-228	TRG	MW-4	pCi/l	7.19E-01	4.79E-01	9.42E-01					OK	
16	RA-228	TRG	MW-3	pCi/l	5.68E-01	6.48E-01	1.32E+00					OK	
17	RA-228	TRG	MW-2	pCi/l	9.83E-01	6.22E-01	1.21E+00					OK	

	Run	1
	Analysis Code	Ra228
Eberline Services Work Order		21-12077
	Client	ERM
		0149

Preliminary Data Report & Analytical Calculations  
**Work Order: 21-12077-Ra228-1**

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep 10 Date/Time	Sep 11 Date/Time
01	RA-228	LCS	12/28/21 00:00	1.00E+00	105.05	80.23	84.28	1.00	1/10/2022 8:08	1/12/2022 9:09
02	RA-228	MBL	12/28/21 00:00	1.00E+00	91.39	79.66	72.80	1.00	1/10/2022 8:08	1/12/2022 9:09
03	RA-228	DUP	12/15/21 13:45	1.00E+00	100.94	80.09	80.84	1.00	1/10/2022 8:08	1/12/2022 9:09
04	RA-228	TRG	12/15/21 08:00	1.00E+00	93.10	83.07	77.34	1.00	1/10/2022 8:08	1/12/2022 9:09
05	RA-228	DO	12/15/21 13:45	1.00E+00	101.72	80.94	82.33	1.00	1/10/2022 8:08	1/12/2022 9:09
06	RA-228	TRG	12/15/21 16:30	1.00E+00	95.77	77.81	74.52	1.00	1/10/2022 8:08	1/12/2022 9:09
07	RA-228	TRG	12/16/21 07:50	1.00E+00	91.96	77.10	70.90	1.00	1/10/2022 8:08	1/12/2022 9:09
08	RA-228	TRG	12/16/21 08:20	1.00E+00	99.41	80.09	79.62	1.00	1/10/2022 8:08	1/12/2022 9:09
09	RA-228	TRG	12/16/21 08:40	1.00E+00	105.71	81.22	85.86	1.00	1/10/2022 8:08	1/12/2022 9:09
10	RA-228	TRG	12/16/21 11:35	1.00E+00	98.18	81.22	79.74	1.00	1/10/2022 8:08	1/12/2022 9:09
11	RA-228	TRG	12/16/21 12:30	1.00E+00	87.49	78.09	68.32	1.00	1/10/2022 8:08	1/12/2022 9:09
12	RA-228	TRG	12/17/21 08:30	1.00E+00	97.94	77.81	76.20	1.00	1/10/2022 8:08	1/12/2022 9:09
13	RA-228	TRG	12/20/21 10:45	1.00E+00	88.55	65.43	57.94	1.00	1/10/2022 8:08	1/12/2022 9:09
14	RA-228	TRG	12/20/21 13:30	1.00E+00	83.26	89.76	74.73	1.00	1/10/2022 8:08	1/12/2022 9:09
15	RA-228	TRG	12/20/21 15:05	1.00E+00	107.52	81.93	88.10	1.00	1/10/2022 8:08	1/12/2022 9:09
16	RA-228	TRG	12/20/21 16:30	1.00E+00	94.05	83.36	78.40	1.00	1/10/2022 8:08	1/12/2022 9:09
17	RA-228	TRG	12/21/21 09:55	1.00E+00	81.61	81.79	66.75	1.00	1/10/2022 8:08	1/12/2022 9:09

	Run	1
	Analysis Code	Ra228
Eberline Services Work Order	21-12077	
	Client	ERM
0150		

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	01/12/22 13:42		LB4110A	A3	120	679	1.15	0.4719
02	RA-228	MBL	01/12/22 13:42		LB4110A	A4	120	195	1.55	0.4548
03	RA-228	DUP	01/12/22 11:41		LB4110A	A3	120	217	1.15	0.4719
04	RA-228	TRG	01/12/22 11:41		LB4110A	A4	120	224	1.55	0.4548
05	RA-228	DO	01/12/22 11:41		LB4110A	B1	120	196	1.5	0.4626
06	RA-228	TRG	01/12/22 11:41		LB4110A	B2	120	171	1.183333333	0.4691
07	RA-228	TRG	01/12/22 11:41		LB4110A	B3	120	202	1.316666667	0.449
08	RA-228	TRG	01/12/22 11:41		LB4110A	B4	120	182	1.116666667	0.4619
09	RA-228	TRG	01/12/22 11:41		LB4110A	C1	120	184	1.066666667	0.4667
10	RA-228	TRG	01/12/22 11:41		LB4110A	C2	120	148	0.983333333	0.4578
11	RA-228	TRG	01/12/22 11:41		LB4110A	C3	120	146	1.15	0.4699
12	RA-228	TRG	01/12/22 11:41		LB4110A	D1	120	216	0.85	0.4924
13	RA-228	TRG	01/12/22 11:41		LB4110A	D3	120	142	1.033333333	0.4719
14	RA-228	TRG	01/12/22 11:41		LB4110A	D4	120	276	1.2	0.4741
15	RA-228	TRG	01/12/22 11:41		LB4110A	G1	120	189	1.133333333	0.4705
16	RA-228	TRG	01/12/22 11:41		LB4110A	G2	120	251	1.783333333	0.4676
17	RA-228	TRG	01/12/22 11:41		LB4110A	G4	120	185	1.083333333	0.4714

	1	Run
	Ra228	
Eberline Services Work Order	21-12077	
	ERM	
Client	0151	

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	12/28/21 00:00	1.0000	2.2142	843.1895	399.0000	105.05	1.00	1.00
02	MBL	BLANK	12/28/21 00:00	1.0000	2.1944	835.6495	344.0000	91.39	1.00	1.00
03	DUP	MW-1	12/15/21 13:45	1.0000	2.1947	835.7637	380.0000	100.94	1.00	1.00
04	TRG	MW-11	12/15/21 08:00	1.0000	2.1917	834.6213	350.0000	93.10	1.00	1.00
05	DO	MW-1	12/15/21 13:45	1.0000	2.1893	833.7073	382.0000	101.72	1.00	1.00
06	TRG	MW-8	12/15/21 16:30	1.0000	2.1852	832.1460	359.0000	95.77	1.00	1.00
07	TRG	MW-7	12/16/21 07:50	1.0000	2.1808	830.4704	344.0000	91.96	1.00	1.00
08	TRG	MW-9	12/16/21 08:20	1.0000	2.1345	812.8389	364.0000	99.41	1.00	1.00
09	TRG	MW-9D	12/16/21 08:40	1.0000	2.0902	795.9691	379.0000	105.71	1.00	1.00
10	TRG	SW-BO 13	12/16/21 11:35	1.0000	2.1139	804.9943	356.0000	98.18	1.00	1.00
11	TRG	SW-BO 2	12/16/21 12:30	1.0000	2.5654	976.9300	385.0000	87.49	1.00	1.00
12	TRG	MW-6	12/17/21 08:30	1.0000	2.1965	836.4492	369.0000	97.94	1.00	1.00
13	TRG	MW-10	12/20/21 10:45	1.0000	2.1726	827.3478	330.0000	88.55	1.00	1.00
14	TRG	MW-5	12/20/21 13:30	1.0000	2.1706	826.5862	310.0000	83.26	1.00	1.00
15	TRG	MW-4	12/20/21 15:05	1.0000	2.1742	827.9571	401.0000	107.52	1.00	1.00
16	TRG	MW-3	12/20/21 16:30	1.0000	2.1695	826.1673	350.0000	94.05	1.00	1.00
17	TRG	MW-2	12/21/21 09:55	1.0000	2.1716	826.9670	304.0000	81.61	1.00	1.00



# Spike and Tracer Worksheet

Internal Work Order		Run	Analysis Code		Date		Technician		Technician Initials		Witness Initials					
21-12077		1	Ra228		1/12/2022 8:57		MDAVIS		MDP							
LCS & Matrix Spikes																
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	LCS Volume Used (g)	MS Volume Used (g)	LCS Volume Used (g)	MSD Volume Used (g)	LCS Known pCi	Error Estimate	MS Added pCi	Error Estimate	LCS Known pCi	Error Estimate	MSD Added pCi	Error Estimate
Ra-228	Ra-12	35.730	1/12/2022	0.560	0.5493				8.84	0.451	0.00	0.000	0.00	0.000	0.00	0.000
Tracers																
fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition	Balance Printer Tapes									
01	Ba-133	Ba-6a	380.810	1/12/2022	2.2142	2.6600	Tracer									
02	Ba-133	Ba-6a	380.810	1/12/2022	2.1944	2.6600	LCS									
03	Ba-133	Ba-6a	380.810	1/12/2022	2.1947	2.6600	Matrix Spike									
04	Ba-133	Ba-6a	380.810	1/12/2022	2.1917	2.6600										
05	Ba-133	Ba-6a	380.810	1/12/2022	2.1893	2.6600										
06	Ba-133	Ba-6a	380.810	1/12/2022	2.1852	2.6600										
07	Ba-133	Ba-6a	380.810	1/12/2022	2.1808	2.6600										
08	Ba-133	Ba-6a	380.810	1/12/2022	2.1345	2.6600										
09	Ba-133	Ba-6a	380.810	1/12/2022	2.0902	2.6600										
10	Ba-133	Ba-6a	380.810	1/12/2022	2.1139	2.6600										
11	Ba-133	Ba-6a	380.810	1/12/2022	2.5654	2.6600										
12	Ba-133	Ba-6a	380.810	1/12/2022	2.1965	2.6600										
13	Ba-133	Ba-6a	380.810	1/12/2022	2.1726	2.6600										
14	Ba-133	Ba-6a	380.810	1/12/2022	2.1706	2.6600										
15	Ba-133	Ba-6a	380.810	1/12/2022	2.1742	2.6600										
16	Ba-133	Ba-6a	380.810	1/12/2022	2.1695	2.6600										
17	Ba-133	Ba-6a	380.810	1/12/2022	2.1716	2.6600										
0153																

# Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
<b>21-12077</b>	<b>1</b>	<b>Ra228</b>	<b>liters</b>	<b>1/10/2022</b>	<b>JHARVEY</b>

Lab Fraction	ERM Client ID	Sample Type	Muffle Data		Dilution Data			Aliquot Data			MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq		
01	LCS	LCS							1.0000E+00	1.0000E+00				
02	BLANK	MBL							1.0000E+00	1.0000E+00				
03	MW-1	DUP							1.0000E+00	1.0000E+00				
04	MW-11	TRG							1.0000E+00	1.0000E+00				
05	MW-1	DO							1.0000E+00	1.0000E+00				
06	MW-8	TRG							1.0000E+00	1.0000E+00				
07	MW-7	TRG							1.0000E+00	1.0000E+00				
08	MW-9	TRG							1.0000E+00	1.0000E+00				
09	MW-9D	TRG							1.0000E+00	1.0000E+00				
10	SW-BO 13	TRG							1.0000E+00	1.0000E+00				
11	SW-BO 2	TRG							1.0000E+00	1.0000E+00				
12	MW-6	TRG							1.0000E+00	1.0000E+00				
13	MW-10	TRG							1.0000E+00	1.0000E+00				
14	MW-5	TRG							1.0000E+00	1.0000E+00				
15	MW-4	TRG							1.0000E+00	1.0000E+00				
16	MW-3	TRG							1.0000E+00	1.0000E+00				
17	MW-2	TRG							1.0000E+00	1.0000E+00				

Comments
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Technician: J Harvey Date: 1-14-22

# Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
<b>21-12077</b>	<b>1</b>	<b>Ra228</b>	<b>Yttrium</b>	<b>35.1500</b>	<b>MDAVIS</b>

TRetec Fraction	ERM Client ID	Sample Type	Carrier Data Carrier Added (ml)	Filter Data			Gravimetric % Recovery
				Filter Tare (g)	Filter Final (g)	Filter Net (g)	
01	LCS	LCS	2.0000	0.0883	0.1447	0.0564	80.23
02	BLANK	MBL	2.0000	0.0888	0.1448	0.0560	79.66
03	DUP	DUP	2.0000	0.0886	0.1449	0.0563	80.09
04	MW-11	TRG	2.0000	0.0883	0.1467	0.0584	83.07
05	MW-1	DO	2.0000	0.0881	0.1450	0.0569	80.94
06	MW-8	TRG	2.0000	0.0881	0.1428	0.0547	77.81
07	MW-7	TRG	2.0000	0.0877	0.1419	0.0542	77.10
08	MW-9	TRG	2.0000	0.0885	0.1448	0.0563	80.09
09	MW-9D	TRG	2.0000	0.0883	0.1454	0.0571	81.22
10	SW-BO 13	TRG	2.0000	0.0887	0.1458	0.0571	81.22
11	SW-BO 2	TRG	2.0000	0.0891	0.1440	0.0549	78.09
12	MW-6	TRG	2.0000	0.0887	0.1434	0.0547	77.81
13	MW-10	TRG	2.0000	0.0885	0.1345	0.0460	65.43
14	MW-5	TRG	2.0000	0.0880	0.1511	0.0631	89.76
15	MW-4	TRG	2.0000	0.0880	0.1456	0.0576	81.93
16	MW-3	TRG	2.0000	0.0874	0.1460	0.0586	83.36
17	MW-2	TRG	2.0000	0.0882	0.1457	0.0575	81.79

Technician: Megan Owen Date: 1/12/22

1/12/2022

Detector ID	Sample ID	Alpha	Beta	Count	Time	Voltage	TOD
A3	2112077-01	55	679	120	1410	1/12/2022 1:42:57 PM	
A4	2112077-02	30	195	120	1410	1/12/2022 1:42:57 PM	
A3	2112077-03	23	217	120	1410	1/12/2022 11:41:22 AM	
A4	2112077-04	36	224	120	1410	1/12/2022 11:41:22 AM	
B1	2112077-05	15	196	120	1410	1/12/2022 11:41:23 AM	
B2	2112077-06	18	171	120	1410	1/12/2022 11:41:23 AM	
B3	2112077-07	18	202	120	1410	1/12/2022 11:41:23 AM	
B4	2112077-08	20	182	120	1410	1/12/2022 11:41:23 AM	
C1	2112077-09	23	184	120	1410	1/12/2022 11:41:23 AM	
C2	2112077-10	23	148	120	1410	1/12/2022 11:41:23 AM	
C3	2112077-11	15	146	120	1410	1/12/2022 11:41:23 AM	
D1	2112077-12	24	216	120	1410	1/12/2022 11:41:24 AM	
D3	2112077-13	22	142	120	1410	1/12/2022 11:41:24 AM	
D4	2112077-14	29	276	120	1410	1/12/2022 11:41:24 AM	
G1	2112077-15	14	189	120	1410	1/12/2022 11:41:24 AM	
G2	2112077-16	22	251	120	1410	1/12/2022 11:41:24 AM	
G4	2112077-17	26	185	120	1410	1/12/2022 11:41:24 AM	

GPC Detector Report  
(ALL Backgrounds)

UP  
1/12/22

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/2/2019	1/12/2022	2.83E-01	P	5.44E-03	1.64E-01	3.23E-01
LB4110A - A2	Alpha	11/2/2019	1/12/2022	2.50E-01	P	8.03E-03	1.47E-01	2.87E-01
LB4110A - A3	Alpha	11/2/2019	1/12/2022	1.83E-01	P	1.36E-02	1.60E-01	3.06E-01
LB4110A - A4	Alpha	11/2/2019	1/12/2022	1.67E-01	P	1.37E-02	1.62E-01	3.10E-01
LB4110A - B1	Alpha	11/2/2019	1/12/2022	1.33E-01	P	-2.63E-02	1.43E-01	3.13E-01
LB4110A - B2	Alpha	11/2/2019	1/12/2022	5.00E-02	P	1.94E-02	2.10E-01	4.01E-01
LB4110A - B3	Alpha	11/2/2019	1/12/2022	2.00E-01	P	1.52E-02	1.71E-01	3.27E-01
LB4110A - B4	Alpha	11/2/2019	1/12/2022	6.67E-02	P	-9.03E-03	1.17E-01	2.43E-01
LB4110A - C1	Alpha	11/2/2019	1/12/2022	8.33E-02	P	-1.63E-02	1.10E-01	2.37E-01
LB4110A - C2	Alpha	11/2/2019	1/12/2022	6.67E-02	P	-1.93E-02	1.08E-01	2.36E-01
LB4110A - C3	Alpha	11/2/2019	1/12/2022	1.33E-01	P	-2.35E-02	8.59E-02	1.95E-01
LB4110A - C4	Alpha	11/2/2019	1/12/2022	3.00E-01	P	3.02E-02	2.19E-01	4.08E-01
LB4110A - D1	Alpha	11/2/2019	1/12/2022	6.67E-02	P	-2.65E-02	7.23E-02	1.71E-01
LB4110A - D2	Alpha	11/2/2019	1/12/2022	5.00E-02	P	-1.03E-02	1.06E-01	2.22E-01
LB4110A - D3	Alpha	11/2/2019	1/12/2022	1.17E-01	P	-2.49E-03	1.25E-01	2.52E-01
LB4110A - D4	Alpha	11/2/2019	1/12/2022	1.50E-01	P	2.86E-02	1.67E-01	3.05E-01
LB4110A - E1	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - E2	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - E3	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - E4	Alpha	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.93E+02	2.53E+04
LB4110A - F1	Alpha	11/2/2019	1/10/2022	0.00E+00	P	-3.26E-02	1.31E-01	2.95E-01
LB4110A - F2	Alpha	11/2/2019	1/10/2022	0.00E+00	P	-3.95E-02	1.19E-01	2.77E-01
LB4110A - F3	Alpha	11/2/2019	1/10/2022	0.00E+00	P	-2.28E-02	1.05E-01	2.34E-01
LB4110A - F4	Alpha	11/2/2019	1/10/2022	0.00E+00	P	-4.44E-02	7.07E-02	1.86E-01
LB4110A - G1	Alpha	11/2/2019	1/12/2022	1.17E-01	P	-2.14E-02	8.74E-02	1.96E-01
LB4110A - G2	Alpha	11/2/2019	1/12/2022	8.33E-02	P	-2.07E-02	8.93E-02	1.99E-01
LB4110A - G3	Alpha	11/2/2019	1/12/2022	8.33E-02	P	-3.05E-02	1.52E-01	3.34E-01
LB4110A - G4	Alpha	11/2/2019	1/12/2022	1.83E-01	P	-2.35E-02	1.01E-01	2.26E-01

GPC Detector Report  
(ALL Backgrounds)

UP  
1/12/22

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/2/2019	1/12/2022	1.20E+00	P	-1.58E+00	1.37E+00	4.32E+00
LB4110A - A2	Beta	11/2/2019	1/12/2022	1.75E+00	P	-1.35E+00	1.66E+00	4.67E+00
LB4110A - A3	Beta	11/2/2019	1/12/2022	1.15E+00	P	-1.33E+00	1.46E+00	4.25E+00
LB4110A - A4	Beta	11/2/2019	1/12/2022	1.55E+00	P	-1.44E+00	1.50E+00	4.44E+00
LB4110A - B1	Beta	11/2/2019	1/12/2022	1.50E+00	P	1.02E+00	1.39E+00	1.77E+00
LB4110A - B2	Beta	11/2/2019	1/12/2022	1.18E+00	P	8.07E-01	1.39E+00	1.98E+00
LB4110A - B3	Beta	11/2/2019	1/12/2022	1.32E+00	P	9.17E-01	1.32E+00	1.72E+00
LB4110A - B4	Beta	11/2/2019	1/12/2022	1.12E+00	P	6.16E-01	1.55E+00	2.49E+00
LB4110A - C1	Beta	11/2/2019	1/12/2022	1.07E+00	P	7.90E-01	1.16E+00	1.54E+00
LB4110A - C2	Beta	11/2/2019	1/12/2022	9.83E-01	P	6.58E-01	1.01E+00	1.37E+00
LB4110A - C3	Beta	11/2/2019	1/12/2022	1.15E+00	P	7.54E-01	1.33E+00	1.90E+00
LB4110A - C4	Beta	11/2/2019	1/12/2022	1.22E+00	P	8.64E-01	1.29E+00	1.71E+00
LB4110A - D1	Beta	11/2/2019	1/12/2022	8.50E-01	P	6.69E-01	1.07E+00	1.47E+00
LB4110A - D2	Beta	11/2/2019	1/12/2022	1.62E+00	P	-1.34E+00	2.33E+00	6.00E+00
LB4110A - D3	Beta	11/2/2019	1/12/2022	1.03E+00	P	7.39E-01	1.12E+00	1.50E+00
LB4110A - D4	Beta	11/2/2019	1/12/2022	1.20E+00	P	1.04E+00	1.47E+00	1.90E+00
LB4110A - E1	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - E2	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - E3	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - E4	Beta	11/2/2017	5/19/2020	1.00E+05	F	-2.35E+04	8.94E+02	2.53E+04
LB4110A - F1	Beta	11/2/2019	1/10/2022	1.67E-02	P	2.10E-01	1.28E+00	2.35E+00
LB4110A - F2	Beta	11/2/2019	1/10/2022	0.00E+00	P	-5.04E-01	1.19E+00	2.88E+00
LB4110A - F3	Beta	11/2/2019	1/10/2022	0.00E+00	P	-2.58E-01	1.18E+00	2.62E+00
LB4110A - F4	Beta	11/2/2019	1/10/2022	0.00E+00	P	-1.30E+00	1.60E+00	4.50E+00
LB4110A - G1	Beta	11/2/2019	1/12/2022	1.13E+00	P	7.45E-01	1.18E+00	1.61E+00
LB4110A - G2	Beta	11/2/2019	1/12/2022	1.78E+00	P	1.12E+00	1.58E+00	2.04E+00
LB4110A - G3	Beta	11/2/2019	1/12/2022	1.13E+00	P	7.63E-01	1.17E+00	1.58E+00
LB4110A - G4	Beta	11/2/2019	1/12/2022	1.08E+00	P	7.39E-01	1.24E+00	1.75E+00

GPC Detector Report  
(ALL Efficiencies)

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/2/2019	1/12/2022	0.2347	P	0.2070	0.2331	0.2591
LB4110A - A2	Alpha	11/2/2019	1/12/2022	0.1983	P	0.1788	0.2019	0.2250
LB4110A - A3	Alpha	11/2/2019	1/12/2022	0.2008	P	0.1738	0.1967	0.2195
LB4110A - A4	Alpha	11/2/2019	1/12/2022	0.2241	P	0.1998	0.2259	0.2520
LB4110A - B1	Alpha	11/2/2019	1/12/2022	0.2142	P	0.1847	0.2112	0.2377
LB4110A - B2	Alpha	11/2/2019	1/12/2022	0.1864	P	0.1733	0.1981	0.2230
LB4110A - B3	Alpha	11/2/2019	1/12/2022	0.2106	W	0.2038	0.2338	0.2637
LB4110A - B4	Alpha	11/2/2019	1/12/2022	0.2158	P	0.1979	0.2275	0.2572
LB4110A - C1	Alpha	11/2/2019	1/12/2022	0.1979	P	0.1744	0.1982	0.2220
LB4110A - C2	Alpha	11/2/2019	1/12/2022	0.1891	P	0.1750	0.1999	0.2248
LB4110A - C3	Alpha	11/2/2019	1/12/2022	0.2080	P	0.1931	0.2244	0.2556
LB4110A - C4	Alpha	11/2/2019	1/12/2022	0.1954	P	0.1781	0.2093	0.2406
LB4110A - D1	Alpha	11/2/2019	1/12/2022	0.1925	P	0.1733	0.1973	0.2213
LB4110A - D2	Alpha	11/2/2019	1/12/2022	0.2316	P	0.2075	0.2351	0.2627
LB4110A - D3	Alpha	11/2/2019	1/12/2022	0.2354	P	0.2129	0.2410	0.2692
LB4110A - D4	Alpha	11/2/2019	1/12/2022	0.1819	P	0.1622	0.1844	0.2066
LB4110A - E1	Alpha	11/2/2017	5/19/2020	0.2075	P	0.1686	0.2257	0.2828
LB4110A - E2	Alpha	11/2/2017	5/19/2020	0.1778	P	0.1514	0.2049	0.2583
LB4110A - E3	Alpha	11/2/2017	5/19/2020	0.2234	P	0.1549	0.2076	0.2604
LB4110A - E4	Alpha	11/2/2017	5/19/2020	0.2155	P	0.1746	0.2353	0.2961
LB4110A - F1	Alpha	11/2/2019	1/10/2022	0.0000	F	0.1419	0.2082	0.2746
LB4110A - F2	Alpha	11/2/2019	1/10/2022	0.0000	F	0.1190	0.1738	0.2286
LB4110A - F3	Alpha	11/2/2019	1/10/2022	0.0000	F	0.1494	0.2173	0.2853
LB4110A - F4	Alpha	11/2/2019	1/10/2022	0.0000	F	0.1457	0.2123	0.2788
LB4110A - G1	Alpha	11/2/2019	1/12/2022	0.1924	P	0.1761	0.1869	0.1977
LB4110A - G2	Alpha	11/2/2019	1/12/2022	0.1764	P	0.1722	0.1833	0.1945
LB4110A - G3	Alpha	11/2/2019	1/12/2022	0.2125	P	0.2032	0.2150	0.2268
LB4110A - G4	Alpha	11/2/2019	1/12/2022	0.1809	P	0.1637	0.1832	0.2027

RP  
1/12/22

RP 1/12/22  
out of service

GPC Detector Report  
(ALL Efficiencies)

MP  
1/12/22

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/2/2019	1/12/2022	0.5734	P	0.5022	0.5658	0.6295
LB4110A - A2	Beta	11/2/2019	1/12/2022	0.4468	P	0.3923	0.4434	0.4944
LB4110A - A3	Beta	11/2/2019	1/12/2022	0.4889	P	0.4239	0.4796	0.5352
LB4110A - A4	Beta	11/2/2019	1/12/2022	0.5496	P	0.4912	0.5541	0.6171
LB4110A - B1	Beta	11/2/2019	1/12/2022	0.4876	P	0.4326	0.4953	0.5581
LB4110A - B2	Beta	11/2/2019	1/12/2022	0.4299	W	0.4211	0.4918	0.5625
LB4110A - B3	Beta	11/2/2019	1/12/2022	0.5258	P	0.5073	0.5839	0.6606
LB4110A - B4	Beta	11/2/2019	1/12/2022	0.5144	P	0.4840	0.5616	0.6392
LB4110A - C1	Beta	11/2/2019	1/12/2022	0.4885	P	0.4217	0.4772	0.5327
LB4110A - C2	Beta	11/2/2019	1/12/2022	0.4447	P	0.4213	0.4793	0.5373
LB4110A - C3	Beta	11/2/2019	1/12/2022	0.5407	P	0.4913	0.5681	0.6449
LB4110A - C4	Beta	11/2/2019	1/12/2022	0.4784	P	0.4400	0.5122	0.5844
LB4110A - D1	Beta	11/2/2019	1/12/2022	0.5640	P	0.5096	0.5779	0.6461
LB4110A - D2	Beta	11/2/2019	1/12/2022	0.5765	P	0.5252	0.5942	0.6631
LB4110A - D3	Beta	11/2/2019	1/12/2022	0.6001	P	0.5346	0.6035	0.6723
LB4110A - D4	Beta	11/2/2019	1/12/2022	0.4724	P	0.4277	0.4832	0.5388
LB4110A - E1	Beta	11/2/2017	5/19/2020	0.5360	P	0.4167	0.5408	0.6649
LB4110A - E2	Beta	11/2/2017	5/19/2020	0.4520	P	0.3728	0.4910	0.6092
LB4110A - E3	Beta	11/2/2017	5/19/2020	0.5775	P	0.3848	0.5001	0.6154
LB4110A - E4	Beta	11/2/2017	5/19/2020	0.5466	P	0.4532	0.5887	0.7241
LB4110A - F1	Beta	11/2/2019	1/10/2022	0.0044	F	0.3744	0.5247	0.6751
LB4110A - F2	Beta	11/2/2019	1/10/2022	0.0009	F	0.3099	0.4365	0.5632
LB4110A - F3	Beta	11/2/2019	1/10/2022	0.0002	F	0.4027	0.5661	0.7294
LB4110A - F4	Beta	11/2/2019	1/10/2022	0.0003	F	0.3883	0.5461	0.7040
LB4110A - G1	Beta	11/2/2019	1/12/2022	0.4667	W	0.4188	0.4439	0.4690
LB4110A - G2	Beta	11/2/2019	1/12/2022	0.4128	W	0.4065	0.4343	0.4620
LB4110A - G3	Beta	11/2/2019	1/12/2022	0.5111	P	0.4926	0.5186	0.5446
LB4110A - G4	Beta	11/2/2019	1/12/2022	0.4349	P	0.3950	0.4394	0.4837

out of service  
MP 1/12/22



**SECTION X**  
**BARIUM-133 ANALYTICAL TRACER DATA**

Analysis Report for 2112077-01  
SPIKE

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-01  
 Sample Description : SPIKE  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:56:03AM  
 Acquisition Started : 1/10/2022 9:56:11AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE5  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 1026.8 seconds  
  
 Dead Time : 12.35 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 2 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118873

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 10:13:20AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-01

SPIKE

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
1	5.74	43 -	55	49.47	2.53E+01	14.39	1.54E+01	0.76
2	20.96	195 -	209	202.96	6.80E+01	31.64	1.02E+02	0.71
3	25.23	232 -	260	245.90	3.16E+01	31.93	7.29E+01	2.64
4	30.76	287 -	315	301.69	2.35E+03	112.49	2.81E+02	0.76
M	5	329 -	360	343.97	6.10E+02	56.60	8.90E+01	0.78
m	6	329 -	360	352.14	9.75E+01	49.25	5.70E+01	0.71
7	53.00	514 -	537	525.81	5.63E+01	34.06	8.35E+01	0.54
M	8	597 -	622	608.00	1.16E+02	39.69	8.31E+01	0.78
m	9	597 -	622	614.15	1.44E+02	35.79	6.08E+01	0.70
M	10	641 -	669	651.00	4.40E+01	24.69	3.53E+01	0.79
m	11	641 -	669	654.95	4.33E+01	23.42	2.33E+01	0.57
m	12	641 -	669	664.41	3.23E+01	13.92	2.75E+00	0.71
M	13	785 -	818	793.11	5.89E+01	22.27	5.48E+01	0.71
m	14	785 -	818	807.14	9.48E+02	64.14	4.54E+01	0.62
15	92.71	915 -	938	926.10	2.56E+01	17.09	2.28E+01	1.61
16	111.68	1104 -	1126	1117.27	1.75E+02	36.48	8.37E+01	0.72
M	17	1137 -	1171	1155.00	3.68E+01	25.50	5.20E+01	0.87
m	18	1137 -	1171	1167.00	3.69E+01	12.88	2.00E+01	0.87
19	160.53	1597 -	1619	1609.68	3.82E+01	16.95	1.77E+01	0.90
20	276.18	2760 -	2784	2775.54	3.25E+01	19.16	3.10E+01	0.73
M	21	3029 -	3054	3037.00	1.14E+01	20.41	2.14E+00	1.07
m	22	3029 -	3054	3043.00	2.06E+02	25.42	9.46E+00	1.07
23	333.77	3341 -	3367	3356.10	4.51E+01	16.20	1.18E+01	0.59
24	355.90	3563 -	3592	3579.27	4.03E+02	41.86	1.64E+01	0.93
M	25	3842 -	3870	3858.00	1.06E+02	20.45	9.17E+00	1.13
m	26	3842 -	3870	3866.00	1.21E+01	12.81	7.19E+00	1.13
M	27	3875 -	3900	3881.23	1.75E+01	11.29	8.91E+00	0.92
m	28	3875 -	3900	3890.15	1.08E+02	22.85	9.54E+00	1.24

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:13:20AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118843.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
1	5.74	2.53E+01		14.39		2.53E+01	1.44E+01

Analysis Report for 2112077-01

SPIKE

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.	
	2	20.96	6.80E+01	31.64	8.71E+00	6.63E-01	5.93E+01	3.16E+01
	3	25.23	3.16E+01	31.93	1.87E+00	3.83E-01	2.97E+01	3.19E+01
	4	30.76	2.35E+03	112.49	6.35E+00	8.10E-01	2.34E+03	1.12E+02
M	5	34.96	6.10E+02	56.60	1.59E+00	6.48E-01	6.09E+02	5.66E+01
m	6	35.77	9.75E+01	49.25	1.59E+00	6.48E-01	9.59E+01	4.93E+01
	7	53.00	5.63E+01	34.06			5.63E+01	3.41E+01
M	8	61.15	1.16E+02	39.69	3.32E+00	6.94E-01	1.13E+02	3.97E+01
m	9	61.76	1.44E+02	35.79	3.32E+00	6.94E-01	1.41E+02	3.58E+01
M	10	65.42	4.40E+01	24.69			4.40E+01	2.47E+01
m	11	65.81	4.33E+01	23.42			4.33E+01	2.34E+01
m	12	66.75	3.23E+01	13.92			3.23E+01	1.39E+01
M	13	79.52	5.89E+01	22.27			5.89E+01	2.23E+01
m	14	80.91	9.48E+02	64.14			9.48E+02	6.41E+01
	15	92.71	2.56E+01	17.09			2.56E+01	1.71E+01
	16	111.68	1.75E+02	36.48	7.94E-01	4.65E-01	1.74E+02	3.65E+01
M	17	115.42	3.68E+01	25.50			3.68E+01	2.55E+01
m	18	116.61	3.69E+01	12.88			3.69E+01	1.29E+01
	19	160.53	3.82E+01	16.95			3.82E+01	1.69E+01
	20	276.18	3.25E+01	19.16			3.25E+01	1.92E+01
M	21	302.12	1.14E+01	20.41			1.14E+01	2.04E+01
m	22	302.71	2.06E+02	25.42			2.06E+02	2.54E+01
	23	333.77	4.51E+01	16.20			4.51E+01	1.62E+01
	24	355.90	4.03E+02	41.86			4.03E+02	4.19E+01
M	25	383.55	1.06E+02	20.45			1.06E+02	2.04E+01
m	26	384.34	1.21E+01	12.81			1.21E+01	1.28E+01
M	27	385.85	1.75E+01	11.29			1.75E+01	1.13E+01
m	28	386.73	1.08E+02	22.85			1.08E+02	2.29E+01

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
FE-55	0.99	5.89	* 24.50	1.15E-04	6.51E-05
NI-59	0.96	6.92	* 29.80	9.42E-05	5.35E-05

0164

Analysis Report for 2112077-01

SPIKE

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
I-129	0.87	29.78 *		57.00	3.25E+01	1.57E+00
		33.60 *		13.20	5.88E+01	5.48E+00
		39.58		7.52		
BA-133	1.00	81.00 *		34.06	4.01E+02	3.12E+01
		302.84 *		18.33	6.25E+02	8.34E+01
		356.01 *		62.05	3.46E+02	3.88E+01
TH-231	0.89	25.64 *		14.70	7.23E-01	7.78E-01
		84.21		6.40		
TH-234	0.94	63.29 *		3.80	2.79E+02	7.13E+01
AM-241	0.93	59.54 *		35.90	2.32E+01	8.13E+00

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
?	FE-55	0.999	1.15E-04	6.51E-05	
?	NI-59	0.965	9.42E-05	5.35E-05	
	I-129	0.875	3.45E+01	1.51E+00	
	BA-133	1.000	3.99E+02	2.33E+01	
	TH-231	0.895	7.23E-01	7.78E-01	
	TH-234	0.942	2.79E+02	7.13E+01	
X	NP-237	0.730			
	AM-241	0.936	2.32E+01	8.13E+00	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-01

SPIKE

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:13:20AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
2	20.96	6.59093E-02	26.67	Tol.	PA-234M
m 6	35.77	1.06522E-01	25.69	Sum	
7	53.00	6.25095E-02	30.27		
M 10	65.42	4.88708E-02	28.07	Sum	
m 11	65.81	4.81122E-02	27.04	Sum	
m 12	66.75	3.59038E-02	21.54	Sum	
M 13	79.52	6.54690E-02	18.90	Tol.	BA-133
15	92.71	2.84685E-02	33.35	Sum	
16	111.68	1.93713E-01	10.46	Sum	
M 17	115.42	4.09333E-02	34.60	Sum	
m 18	116.61	4.10123E-02	17.45	Sum	
19	160.53	4.24054E-02	22.20	Sum	
20	276.18	3.61389E-02	29.45		
M 21	302.12	1.26723E-02	89.47	Tol.	BA-133
23	333.77	5.01046E-02	17.96	Sum	
M 25	383.55	1.17878E-01	9.64	Sum	
m 26	384.34	1.34704E-02	52.82	Sum	
M 27	385.85	1.94359E-02	32.28	Sum	
m 28	386.73	1.20164E-01	10.57	Sum	

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

0166

Analysis Report for 2112077-01

SPIKE

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	4.91E-07	4.91E-07	-3.47E-07	2.28E-07
	3.31	12.30	6.33E-06		-2.65E-06	2.93E-06
+ FE-55	5.89 *	24.50	8.88E-05	8.88E-05	1.15E-04	3.83E-05
CO-57	122.06	85.51	8.86E+00	8.86E+00	2.23E+00	3.95E+00
	136.48	10.60	9.79E+01		5.06E+01	4.44E+01
+ NI-59	6.92 *	29.80	7.30E-05	7.30E-05	9.42E-05	3.15E-05
MO-93	16.59	52.90	2.67E-02	2.67E-02	-1.55E-02	1.20E-02
	18.60	10.00	2.80E-01		-1.87E-01	1.27E-01
NB-93M	16.57	9.43	1.49E-01	1.49E-01	-8.62E-02	6.69E-02
CD-109	88.03	3.72	9.00E+01	9.00E+01	-2.86E+01	3.87E+01
SN-113	255.12	1.93	4.77E+02	2.25E+01	-1.44E+02	2.00E+02
	391.69	61.90	2.25E+01		2.08E+01	1.01E+01
SN-119M	23.87	16.10	6.16E-01	5.45E-01	-5.28E-02	2.84E-01
	25.10	22.70	5.45E-01		1.60E-01	2.52E-01
+ I-129	29.78 *	57.00	1.35E+00	1.35E+00	3.25E+01	6.57E-01
	33.60 *	13.20	6.29E+00		5.88E+01	3.01E+00
	39.58	7.52	5.89E+00		1.85E+00	2.59E+00
+ BA-133	81.00 *	34.06	2.10E+01	1.91E+01	4.01E+02	9.92E+00
	302.84 *	18.33	5.08E+01		6.25E+02	2.13E+01
	356.01 *	62.05	1.91E+01		3.46E+02	8.39E+00
CE-139	165.85	80.35	1.51E+01	1.51E+01	3.46E+00	6.80E+00
CE-144	133.54	10.80	8.67E+01	8.67E+01	0.00E+00	3.91E+01
HG-203	279.19	77.30	9.47E+00	9.47E+00	-2.07E+01	3.76E+00
PB-210	46.50	4.25	1.58E+01	1.58E+01	-1.58E+01	6.83E+00
+ TH-231	25.64 *	14.70	1.27E+00	1.27E+00	7.23E-01	6.01E-01
	84.21	6.40	7.41E+01		4.44E+01	3.37E+01
PA-234M	9.89	89.00	1.13E-03	1.13E-03	4.32E-04	5.13E-04
	21.72	64.90	1.49E-01		-8.32E-02	7.04E-02
	37.93	23.75	1.49E+00		-1.08E+00	6.46E-01
+ TH-234	63.29 *	3.80	1.07E+02	1.07E+02	2.79E+02	5.06E+01
NP-237	29.37 *	14.00	5.50E+00	5.50E+00	1.32E+02	2.67E+00
	86.50	12.60	2.56E+01		-4.65E+00	1.10E+01
U-237	97.08	16.30	3.06E+01	2.53E+01	9.55E-01	1.36E+01
	101.07	26.30	2.53E+01		2.09E+00	1.15E+01
	114.00	12.30	7.22E+01		-8.67E+01	3.31E+01
	208.01	22.00	4.85E+01		-1.52E+01	2.11E+01
+ AM-241	59.54 *	35.90	1.12E+01	1.12E+01	2.32E+01	5.34E+00
AM-243	74.67	66.00	4.47E+00	4.47E+00	1.58E-01	1.99E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-02  
BLANK

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 2112077-02  
 Sample Description : BLANK  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:56:29AM  
 Acquisition Started : 1/10/2022 10:14:12AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE5  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 1019.9 seconds  
  
 Dead Time : 11.75 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 2 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118874

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 1/10/2022 10:31:15AM

Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-02

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	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	5.13	35 -	50	43.33	1.31E+01	16.93	3.18E+01	1.17
	2	20.76	187 -	211	200.92	9.51E+01	34.01	7.58E+01	0.50
	3	30.75	288 -	314	301.55	2.12E+03	106.49	2.58E+02	0.74
M	4	34.83	331 -	358	342.69	4.11E+02	45.48	3.40E+01	0.57
m	5	35.67	331 -	358	351.12	1.02E+02	42.90	3.40E+01	0.64
	6	41.95	405 -	422	414.49	1.00E+01	11.66	1.20E+01	0.12
	7	43.12	422 -	432	426.28	7.80E+00	7.31	4.40E+00	0.43
	8	52.82	511 -	534	524.03	3.45E+01	30.59	7.89E+01	0.31
	9	59.23	579 -	596	588.61	2.00E+01	13.27	1.20E+01	0.41
	10	61.66	600 -	626	613.15	1.77E+02	31.67	2.67E+01	0.55
M	11	64.72	640 -	670	644.00	4.04E+01	10.33	1.82E+00	0.79
m	12	65.82	640 -	670	655.00	8.34E+01	30.20	4.73E+01	0.79
M	13	79.41	778 -	817	791.98	1.12E+02	38.88	4.00E+01	0.98
m	14	80.90	778 -	817	807.00	8.38E+02	58.96	1.90E+01	0.66
	15	101.51	1001 -	1024	1014.78	2.65E+01	12.33	5.00E+00	1.17
	16	111.78	1108 -	1128	1118.23	1.05E+02	32.50	8.39E+01	0.50
	17	160.36	1595 -	1617	1607.98	2.15E+01	18.82	3.50E+01	1.10
M	18	276.23	2760 -	2785	2776.00	8.69E+01	14.00	0.00E+00	1.04
m	19	277.01	2760 -	2785	2783.85	9.76E+00	6.00	0.00E+00	0.75
	20	302.80	3027 -	3055	3043.86	1.41E+02	24.69	6.72E+00	0.83
	21	355.91	3563 -	3593	3579.35	3.60E+02	39.25	1.17E+01	1.01
	22	383.71	3841 -	3870	3859.68	5.87E+01	19.39	1.65E+01	0.32
M	23	386.32	3876 -	3902	3886.00	1.21E+01	20.69	2.76E+01	1.14
m	24	387.02	3876 -	3902	3893.00	1.02E+02	21.54	2.23E+01	1.14

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:31:15AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118843.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	5.13	1.31E+01	16.93			1.31E+01	1.69E+01
	2	20.76	9.51E+01	34.01	8.71E+00	6.63E-01	8.64E+01	3.40E+01
	3	30.75	2.12E+03	106.49	6.35E+00	8.10E-01	2.11E+03	1.06E+02
M	4	34.83	4.11E+02	45.48	1.59E+00	6.48E-01	4.10E+02	4.55E+01
m	5	35.67	1.02E+02	42.90	1.59E+00	6.48E-01	1.00E+02	4.29E+01

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Analysis Report for 2112077-02

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Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
6	41.95	1.00E+01	11.66	9.37E-01	5.02E-01	9.06E+00	1.17E+01
7	43.12	7.80E+00	7.31			7.80E+00	7.31E+00
8	52.82	3.45E+01	30.59			3.45E+01	3.06E+01
9	59.23	2.00E+01	13.27	3.32E+00	6.94E-01	1.67E+01	1.33E+01
10	61.66	1.77E+02	31.67	3.32E+00	6.94E-01	1.73E+02	3.17E+01
M 11	64.72	4.04E+01	10.33			4.04E+01	1.03E+01
m 12	65.82	8.34E+01	30.20			8.34E+01	3.02E+01
M 13	79.41	1.12E+02	38.88			1.12E+02	3.89E+01
m 14	80.90	8.38E+02	58.96			8.38E+02	5.90E+01
15	101.51	2.65E+01	12.33			2.65E+01	1.23E+01
16	111.78	1.05E+02	32.50	7.94E-01	4.65E-01	1.04E+02	3.25E+01
17	160.36	2.15E+01	18.82			2.15E+01	1.88E+01
M 18	276.23	8.69E+01	14.00			8.69E+01	1.40E+01
m 19	277.01	9.76E+00	6.00			9.76E+00	6.00E+00
20	302.80	1.41E+02	24.69			1.41E+02	2.47E+01
21	355.91	3.60E+02	39.25			3.60E+02	3.93E+01
22	383.71	5.87E+01	19.39			5.87E+01	1.94E+01
M 23	386.32	1.21E+01	20.69			1.21E+01	2.07E+01
m 24	387.02	1.02E+02	21.54			1.02E+02	2.15E+01

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
FE-55	0.98	5.89 *	24.50	2.75E-05	3.56E-05
NI-59	0.92	6.92 *	29.80	2.26E-05	2.92E-05
I-129	0.96	29.78 *	57.00	2.93E+01	1.48E+00
		33.60 *	13.20	3.91E+01	4.34E+00
		39.58 *	7.52	2.89E+00	3.72E+00
BA-133	1.00	81.00 *	34.06	3.54E+02	2.84E+01
		302.84 *	18.33	4.27E+02	7.80E+01
		356.01 *	62.05	3.10E+02	3.61E+01
HG-203	0.88	279.19 *	77.30	7.05E+00	4.35E+00
TH-234	0.94	63.29 *	3.80	9.04E+01	2.32E+01

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Analysis Report for 2112077-02

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<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
NP-237	0.73	29.37 *	14.00	1.19E+02	6.02E+00
		86.50	12.60		
AM-241	0.99	59.54 *	35.90	3.13E+00	2.50E+00

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
? FE-55	0.985	2.75E-05	3.56E-05	
? NI-59	0.921	2.26E-05	2.92E-05	
I-129	0.963	1.82E+01	2.82E+00	
BA-133	1.000	3.44E+02	2.15E+01	
HG-203	0.885	7.05E+00	4.35E+00	
TH-234	0.949	9.04E+01	2.32E+01	
NP-237	0.731	4.53E+01	1.30E+01	
AM-241	0.998	3.13E+00	2.50E+00	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-02

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:31:15AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

<i>Peak No.</i>	<i>Energy (keV)</i>	<i>Peak Size (CPS)</i>	<i>Peak CPS (%) Uncertainty</i>	<i>Peak Type</i>	<i>Tolerance Nuclide</i>	
	2	20.76	9.59732E-02	19.69	Tol.	MO-93 PA-234M
m	5	35.67	1.11487E-01	21.38	Sum	
	7	43.12	8.66667E-03	46.86		
	8	52.82	3.83784E-02	44.29		
	10	61.66	1.92580E-01	9.14	Sum	
m	12	65.82	9.26405E-02	18.11	Sum	
M	13	79.41	1.24978E-01	17.29		
	15	101.51	2.94444E-02	23.26	Sum	
	16	111.78	1.15851E-01	15.59	Sum	
	17	160.36	2.39031E-02	43.75	Sum	
M	18	276.23	9.66045E-02	8.05		
	22	383.71	6.52736E-02	16.50	Sum	
M	23	386.32	1.34885E-02	85.21	Sum	
m	24	387.02	1.13136E-01	10.58	Sum	

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-02

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<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	4.87E-07	4.87E-07	-1.86E-06	2.26E-07
	3.31	12.30	5.88E-06		-4.51E-06	2.71E-06
+ FE-55	5.89 *	24.50	5.86E-05	5.86E-05	2.75E-05	2.64E-05
CO-57	122.06	85.51	6.90E+00	6.90E+00	6.51E-01	2.97E+00
	136.48	10.60	7.09E+01		-3.25E+01	3.09E+01
+ NI-59	6.92 *	29.80	4.81E-05	4.81E-05	2.26E-05	2.17E-05
MO-93	16.59	52.90	2.21E-02	2.21E-02	-1.19E-02	9.70E-03
	18.60	10.00	3.01E-01		-1.92E-02	1.38E-01
NB-93M	16.57	9.43	1.23E-01	1.23E-01	-6.62E-02	5.41E-02
CD-109	88.03	3.72	1.13E+02	1.13E+02	5.83E+01	5.04E+01
SN-113	255.12	1.93	5.20E+02	2.10E+01	4.87E+01	2.21E+02
	391.69	61.90	2.10E+01		1.98E+01	9.38E+00
SN-119M	23.87	16.10	5.19E-01	4.79E-01	-1.86E-01	2.35E-01
	25.10	22.70	4.79E-01		1.14E-01	2.19E-01
+ I-129	29.78 *	57.00	1.37E+00	1.37E+00	2.93E+01	6.67E-01
	33.60 *	13.20	4.09E+00		3.91E+01	1.92E+00
	39.58 *	7.52	6.10E+00		2.89E+00	2.62E+00
+ BA-133	81.00 *	34.06	1.57E+01	1.57E+01	3.54E+02	7.28E+00
	302.84 *	18.33	4.24E+01		4.27E+02	1.71E+01
	356.01 *	62.05	1.65E+01		3.10E+02	7.08E+00
CE-139	165.85	80.35	1.22E+01	1.22E+01	-7.24E-01	5.36E+00
CE-144	133.54	10.80	8.24E+01	8.24E+01	2.91E+01	3.69E+01
+ HG-203	279.19 *	77.30	1.95E+00	1.95E+00	7.05E+00	0.00E+00
PB-210	46.50	4.25	1.72E+01	1.72E+01	-1.49E+00	7.52E+00
TH-231	25.64	14.70	7.98E-01	7.98E-01	-3.20E-01	3.64E-01
	84.21	6.40	7.01E+01		4.91E+01	3.17E+01
PA-234M	9.89	89.00	1.00E-03	1.00E-03	-2.43E-04	4.49E-04
	21.72	64.90	1.36E-01		-2.56E-03	6.43E-02
	37.93	23.75	1.35E+00		-1.16E+00	5.78E-01
+ TH-234	63.29 *	3.80	9.96E+01	9.96E+01	9.04E+01	4.68E+01
+ NP-237	29.37 *	14.00	5.59E+00	5.59E+00	1.19E+02	2.72E+00
	86.50	12.60	2.65E+01		-1.45E+01	1.15E+01
U-237	97.08	16.30	2.72E+01	2.40E+01	-7.66E+00	1.19E+01
	101.07	26.30	2.40E+01		-2.83E-01	1.08E+01
	114.00	12.30	5.57E+01		-1.59E+02	2.48E+01
	208.01	22.00	5.74E+01		-4.01E+00	2.55E+01
+ AM-241	59.54 *	35.90	3.74E+00	3.74E+00	3.13E+00	1.62E+00
AM-243	74.67	66.00	4.90E+00	4.90E+00	2.04E+00	2.20E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

KP  
1/10/22

Analysis Report for 2112077-03  
MW-1

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-03  
 Sample Description : MW-1  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:56:37AM  
 Acquisition Started : 1/10/2022 10:20:00AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE1  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.2 seconds  
  
 Dead Time : 0.03 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 31 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/14/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118875

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 10:35:03AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-03

MW-1

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	61.99	57 -	73	61.68	2.59E+02	44.58	1.61E+02	2.36
m	2	66.22	57 -	73	65.91	1.20E+02	47.29	1.84E+02	2.70
m	3	70.48	57 -	73	70.17	4.20E+01	39.80	1.84E+02	2.71
	4	81.28	75 -	86	80.97	7.36E+02	73.76	3.11E+02	2.11
	5	91.83	87 -	95	91.51	6.62E+01	38.97	1.92E+02	4.19
M	6	102.35	98 -	121	102.03	3.36E+01	35.72	2.33E+02	2.52
m	7	112.24	98 -	121	111.92	1.78E+02	44.90	2.04E+02	2.53
	8	276.72	272 -	281	276.38	5.69E+01	27.48	7.62E+01	2.12
M	9	299.92	298 -	309	299.58	9.95E+00	12.33	2.48E+01	1.92
m	10	303.50	298 -	309	303.16	1.35E+02	28.63	5.24E+01	2.31
	11	312.57	310 -	315	312.23	2.16E+01	17.52	4.28E+01	3.17
M	12	334.12	330 -	342	333.77	6.28E+01	22.25	4.15E+01	2.45
m	13	338.12	330 -	342	337.77	2.69E+01	24.17	5.85E+01	2.51
	14	356.42	350 -	362	356.07	4.93E+02	55.99	1.39E+02	2.39
M	15	384.47	380 -	394	384.12	1.06E+02	35.10	3.54E+01	2.52
m	16	387.51	380 -	394	387.16	2.09E+02	37.45	3.62E+01	2.17
m	17	391.95	380 -	394	391.60	5.05E+01	26.12	4.08E+01	2.23
M	18	414.48	409 -	421	414.13	2.81E+01	20.55	4.20E+01	3.10
m	19	417.95	409 -	421	417.60	2.38E+01	21.31	3.86E+01	3.11
	20	437.48	431 -	442	437.12	8.91E+01	23.41	2.39E+01	2.11
	21	468.26	463 -	474	467.90	2.23E+01	15.36	1.95E+01	2.89
	22	519.39	517 -	521	519.03	7.06E+00	6.18	1.88E+00	2.61
	23	525.99	523 -	528	525.63	8.00E+00	5.66	0.00E+00	3.48

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:35:03AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118839.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	61.99	2.59E+02	44.58	2.33E+01	2.32E+00	2.36E+02	4.46E+01
m	2	66.22	1.20E+02	47.29			1.20E+02	4.73E+01
m	3	70.48	4.20E+01	39.80			4.20E+01	3.98E+01
	4	81.28	7.36E+02	73.76			7.36E+02	7.38E+01
	5	91.83	6.62E+01	38.97	3.30E+01	1.50E+00	3.32E+01	3.90E+01
M	6	102.35	3.36E+01	35.72			3.36E+01	3.57E+01

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Analysis Report for 2112077-03

MW-1

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	7	112.24	1.78E+02	44.90			1.78E+02	4.49E+01
	8	276.72	5.69E+01	27.48			5.69E+01	2.75E+01
M	9	299.92	9.95E+00	12.33			9.95E+00	1.23E+01
m	10	303.50	1.35E+02	28.63			1.35E+02	2.86E+01
	11	312.57	2.16E+01	17.52			2.16E+01	1.75E+01
M	12	334.12	6.28E+01	22.25			6.28E+01	2.23E+01
m	13	338.12	2.69E+01	24.17	1.69E+00	1.30E+00	2.52E+01	2.42E+01
	14	356.42	4.93E+02	55.99			4.93E+02	5.60E+01
M	15	384.47	1.06E+02	35.10			1.06E+02	3.51E+01
m	16	387.51	2.09E+02	37.45			2.09E+02	3.74E+01
m	17	391.95	5.05E+01	26.12			5.05E+01	2.61E+01
M	18	414.48	2.81E+01	20.55			2.81E+01	2.05E+01
m	19	417.95	2.38E+01	21.31			2.38E+01	2.13E+01
	20	437.48	8.91E+01	23.41			8.91E+01	2.34E+01
	21	468.26	2.23E+01	15.36	0.00E+00	0.00E+00	2.23E+01	1.54E+01
	22	519.39	7.06E+00	6.18			7.06E+00	6.18E+00
	23	525.99	8.00E+00	5.66			8.00E+00	5.66E+00

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.95	255.12	1.93		
		391.69	*	61.90	3.80E+01
BA-133	0.99	81.00	*	34.06	3.77E+02
		302.84	*	18.33	3.76E+02
		356.01	*	62.05	3.86E+02
HG-203	0.85	279.19	*	77.30	3.78E+01
TH-234	0.95	63.29	*	3.80	6.33E+02
AM-241	0.85	59.54	*	35.90	6.70E+01



Analysis Report for 2112077-03

MW-1

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 2.500 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 2.000sigma

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## INTERFERENCE CORRECTED REPORT

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<i>Nuclide Name</i>	<i>Nuclide Id Confidence</i>	<i>Wt mean Activity (pCi/units)</i>	<i>Wt mean Activity Uncertainty</i>	<i>Comments</i>
SN-113	0.952	3.80E+01	1.97E+01	
BA-133	0.995	3.80E+02	2.87E+01	
HG-203	0.856	<del>3.78E+01</del>	1.84E+01	
? TH-234	0.958	6.33E+02	1.21E+02	
? AM-241	0.857	6.70E+01	1.28E+01	

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

Errors quoted at 2.000sigma

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Analysis Report for 2112077-03

MW-1

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:35:03AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
m	2	66.22	1.33480E-01	19.68	
m	3	70.48	4.66307E-02	47.42	
	5	91.83	3.69021E-02	58.71	
M	6	102.35	3.73051E-02	53.20	Tol. U-237
m	7	112.24	1.97684E-01	12.62	Tol. U-237
M	9	299.92	1.10555E-02	61.95	
	11	312.57	2.40181E-02	40.53	
M	12	334.12	6.98139E-02	17.71	
m	13	338.12	2.80276E-02	47.97	Sum
M	15	384.47	1.17310E-01	16.62	Sum
m	16	387.51	2.31727E-01	8.98	
M	18	414.48	3.11985E-02	36.59	
m	19	417.95	2.64972E-02	44.69	Sum
	20	437.48	9.89549E-02	13.14	Sum
	21	468.26	2.47222E-02	34.52	
	22	519.39	7.84722E-03	43.79	
	23	525.99	8.88889E-03	35.36	

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-03

MW-1

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	5.44E-07	5.44E-07	0.00E+00	0.00E+00
	3.31	12.30	6.51E-06		0.00E+00	0.00E+00
FE-55	5.89	24.50	1.09E-04	1.09E-04	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.60E+01	1.60E+01	6.01E-01	7.52E+00
	136.48	10.60	1.50E+02		-4.36E+01	7.04E+01
NI-59	6.92	29.80	2.19E-04	2.19E-04	0.00E+00	0.00E+00
MO-93	16.59	52.90	8.08E-03	8.08E-03	0.00E+00	0.00E+00
	18.60	10.00	6.79E-02		0.00E+00	0.00E+00
NB-93M	16.57	9.43	4.51E-02	4.51E-02	0.00E+00	0.00E+00
CD-109	88.03	3.72	2.82E+02	2.82E+02	-4.32E+02	1.34E+02
+ SN-113	255.12	1.93	8.12E+02	3.34E+01	1.28E+02	3.70E+02
	391.69	*	61.90	3.34E+01	3.80E+01	1.57E+01
SN-119M	23.87	16.10	1.08E-01	9.18E-02	0.00E+00	0.00E+00
	25.10	22.70	9.18E-02		0.00E+00	0.00E+00
I-129	29.78	57.00	1.15E+00	1.15E+00	-7.20E-01	5.42E-01
	33.60	13.20	2.02E+01		7.35E+01	9.87E+00
	39.58	7.52	4.64E+01		5.73E+01	2.26E+01
+ BA-133	81.00	*	34.06	4.34E+01	3.77E+02	2.10E+01
	302.84	*	18.33	1.24E+02	3.76E+02	5.80E+01
	356.01	*	62.05	4.62E+01	3.86E+02	2.20E+01
CE-139	165.85	80.35	2.32E+01	2.32E+01	-1.56E+01	1.09E+01
CE-144	133.54	10.80	1.46E+02	1.46E+02	1.66E+01	6.84E+01
+ HG-203	279.19	*	77.30	2.69E+01	3.78E+01	1.25E+01
PB-210	46.50	4.25	6.19E+01	6.19E+01	1.09E+00	2.93E+01
TH-231	25.64	14.70	1.53E-01	1.53E-01	0.00E+00	0.00E+00
	84.21	6.40	3.42E+02		1.26E+03	1.67E+02
PA-234M	9.89	89.00	4.64E-04	4.64E-04	0.00E+00	0.00E+00
	21.72	64.90	1.90E-02		0.00E+00	0.00E+00
	37.93	23.75	1.58E+01		5.75E+01	7.72E+00
+ TH-234	63.29	*	3.80	2.77E+02	6.33E+02	1.35E+02
NP-237	29.37	14.00	4.47E+00	4.47E+00	-2.80E+00	2.11E+00
	86.50	12.60	8.53E+01		-8.78E+02	4.06E+01
U-237	97.08	16.30	6.45E+01	4.64E+01	2.59E+00	3.03E+01
	101.07	26.30	4.64E+01		1.78E+01	2.19E+01
	114.00	12.30	1.90E+02		3.83E+02	9.16E+01
	208.01	22.00	8.79E+01		-5.38E+01	4.09E+01
+ AM-241	59.54	*	35.90	2.93E+01	6.70E+01	1.43E+01
AM-243	74.67	66.00	1.17E+01	1.17E+01	-2.62E+01	5.56E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-04  
MW-11

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 2112077-04  
 Sample Description : MW-11  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:56:46AM  
 Acquisition Started : 1/10/2022 10:31:31AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE5  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 1016.7 seconds  
  
 Dead Time : 11.48 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 2 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118876

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 1/10/2022 10:48:30AM

Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-04

MW-11

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	20.79	193 -	212	201.23	5.43E+01	37.05	1.33E+02	0.50
	2	24.70	230 -	248	240.59	2.64E+01	16.26	1.93E+01	0.43
	3	30.73	284 -	319	301.42	2.10E+03	105.19	1.87E+02	0.72
M	4	34.86	330 -	358	343.01	4.51E+02	48.01	4.43E+01	0.64
m	5	35.68	330 -	358	351.23	1.05E+02	40.33	9.38E+00	0.72
	6	52.97	518 -	532	525.48	5.13E+01	20.35	2.94E+01	0.72
	7	61.59	598 -	626	612.43	2.35E+02	45.46	9.67E+01	0.87
M	8	65.61	641 -	664	652.92	1.15E+02	35.67	8.74E+01	0.94
m	9	66.19	641 -	664	658.79	2.28E+01	24.38	6.08E+01	0.84
	10	80.82	790 -	817	806.21	7.90E+02	67.60	1.66E+02	0.59
M	11	108.97	1074 -	1130	1089.99	5.69E+01	24.82	3.43E+01	1.26
m	12	110.17	1074 -	1130	1102.00	3.09E+01	25.80	3.03E+01	0.86
m	13	111.54	1074 -	1130	1115.87	2.70E+02	37.14	4.57E+01	0.95
	14	116.00	1147 -	1171	1160.83	4.29E+01	20.77	3.21E+01	0.76
	15	127.48	1268 -	1285	1276.56	1.89E+01	10.21	4.14E+00	0.24
	16	275.97	2759 -	2784	2773.35	4.60E+01	13.56	0.00E+00	0.21
	17	302.64	3024 -	3058	3042.25	1.43E+02	25.24	7.28E+00	0.40
M	18	306.68	3069 -	3094	3083.00	1.18E+01	14.18	1.40E+01	1.07
m	19	307.28	3069 -	3094	3089.08	2.84E+01	10.97	9.07E+00	0.96
	20	333.28	3336 -	3362	3351.21	4.52E+01	17.19	1.37E+01	0.65
	21	355.76	3559 -	3596	3577.86	4.15E+02	41.64	7.63E+00	0.71
	22	383.56	3841 -	3871	3858.18	9.96E+01	21.22	6.83E+00	0.70
M	23	385.76	3874 -	3902	3880.33	2.74E+01	14.11	6.17E+00	0.83
m	24	386.52	3874 -	3902	3888.00	1.14E+02	26.18	2.20E+01	1.14
	25	390.65	3915 -	3940	3929.66	4.38E+01	15.81	1.04E+01	0.51

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:48:30AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118843.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	20.79	5.43E+01	37.05	8.71E+00	6.63E-01	4.56E+01	3.71E+01
	2	24.70	2.64E+01	16.26	1.87E+00	3.83E-01	2.45E+01	1.63E+01
	3	30.73	2.10E+03	105.19	6.35E+00	8.10E-01	2.09E+03	1.05E+02
M	4	34.86	4.51E+02	48.01	1.59E+00	6.48E-01	4.49E+02	4.80E+01

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Analysis Report for 2112077-04

MW-11

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	5	35.68	1.05E+02	40.33	1.59E+00	6.48E-01	1.03E+02	4.03E+01
	6	52.97	5.13E+01	20.35			5.13E+01	2.03E+01
	7	61.59	2.35E+02	45.46	3.32E+00	6.94E-01	2.31E+02	4.55E+01
M	8	65.61	1.15E+02	35.67			1.15E+02	3.57E+01
m	9	66.19	2.28E+01	24.38			2.28E+01	2.44E+01
	10	80.82	7.90E+02	67.60			7.90E+02	6.76E+01
M	11	108.97	5.69E+01	24.82	7.94E-01	4.65E-01	5.61E+01	2.48E+01
m	12	110.17	3.09E+01	25.80	7.94E-01	4.65E-01	3.02E+01	2.58E+01
m	13	111.54	2.70E+02	37.14	7.94E-01	4.65E-01	2.69E+02	3.71E+01
	14	116.00	4.29E+01	20.77			4.29E+01	2.08E+01
	15	127.48	1.89E+01	10.21			1.89E+01	1.02E+01
	16	275.97	4.60E+01	13.56			4.60E+01	1.36E+01
	17	302.64	1.43E+02	25.24			1.43E+02	2.52E+01
M	18	306.68	1.18E+01	14.18			1.18E+01	1.42E+01
m	19	307.28	2.84E+01	10.97			2.84E+01	1.10E+01
	20	333.28	4.52E+01	17.19			4.52E+01	1.72E+01
	21	355.76	4.15E+02	41.64			4.15E+02	4.16E+01
	22	383.56	9.96E+01	21.22			9.96E+01	2.12E+01
M	23	385.76	2.74E+01	14.11			2.74E+01	1.41E+01
m	24	386.52	1.14E+02	26.18			1.14E+02	2.62E+01
	25	390.65	4.38E+01	15.81			4.38E+01	1.58E+01

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty	
SN-113	0.92	255.12	1.93			
		391.69	*	61.90	3.61E+01	1.31E+01
I-129	0.87	29.78	*	57.00	2.90E+01	1.46E+00
		33.60	*	13.20	4.30E+01	4.60E+00
		39.58		7.52		
BA-133	0.99	81.00	*	34.06	3.33E+02	3.12E+01
		302.84	*	18.33	4.35E+02	7.97E+01
		356.01	*	62.05	3.57E+02	3.88E+01

Analysis Report for 2112077-04

MW-11

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
TH-231	0.88	25.64 *	14.70	5.46E-01	3.63E-01
		84.21	6.40		
TH-234	0.92	63.29 *	3.80	4.56E+02	9.00E+01
AM-241	0.89	59.54 *	35.90	4.82E+01	9.53E+00

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
SN-113	0.927	3.61E+01	1.31E+01	
I-129	0.877	3.03E+01	1.39E+00	
BA-133	0.999	3.50E+02	2.33E+01	
TH-231	0.882	5.46E-01	3.63E-01	
? TH-234	0.929	4.56E+02	9.00E+01	
X NP-237	0.731			
? AM-241	0.898	4.82E+01	9.53E+00	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-04

MW-11

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:48:30AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
1	20.79	5.06961E-02	40.61	Tol.	MO-93
m 5	35.68	1.14612E-01	19.55		
6	52.97	5.69809E-02	19.84	Sum	
M 8	65.61	1.27918E-01	15.49	Sum	
m 9	66.19	2.53721E-02	53.39	Sum	
M 11	108.97	6.23353E-02	22.12		
m 12	110.17	3.35031E-02	42.78	Sum	
m 13	111.54	2.99144E-01	6.90	Sum	
14	116.00	4.77072E-02	24.18	Sum	
15	127.48	2.10317E-02	26.97		
16	275.97	5.11111E-02	14.74		
M 18	306.68	1.31624E-02	59.86		
m 19	307.28	3.15893E-02	19.29		
20	333.28	5.01752E-02	19.03	Sum	
22	383.56	1.10652E-01	10.66	Sum	
M 23	385.76	3.04141E-02	25.77	Sum	
m 24	386.52	1.26443E-01	11.50	Sum	

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

0184



Analysis Report for 2112077-04

MW-11

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	4.83E-07	4.83E-07	-3.44E-06	2.24E-07
	3.31	12.30	6.33E-06		-6.53E-06	2.93E-06
FE-55	5.89	24.50	1.64E-04	1.64E-04	9.02E-07	7.45E-05
CO-57	122.06	85.51	9.68E+00	9.68E+00	-3.05E+00	4.36E+00
	136.48	10.60	9.65E+01		1.30E+01	4.38E+01
NI-59	6.92	29.80	3.92E-04	3.92E-04	6.18E-05	1.78E-04
MO-93	16.59	52.90	2.53E-02	2.53E-02	-8.21E-03	1.13E-02
	18.60	10.00	2.73E-01		-5.77E-02	1.24E-01
NB-93M	16.57	9.43	1.41E-01	1.41E-01	-4.58E-02	6.29E-02
CD-109	88.03	3.72	1.11E+02	1.11E+02	-5.85E+00	4.92E+01
+ SN-113	255.12	1.93	5.94E+02	1.40E+01	-2.45E+01	2.58E+02
	391.69	*	61.90	1.40E+01	3.61E+01	5.87E+00
SN-119M	23.87	16.10	5.46E-01	5.08E-01	1.09E-01	2.49E-01
	25.10	22.70	5.08E-01		9.93E-03	2.33E-01
+ I-129	29.78	*	57.00	1.22E+00	2.90E+01	5.93E-01
	33.60	*	13.20	4.29E+00	4.30E+01	2.02E+00
	39.58		7.52	6.30E+00	-1.27E-01	2.80E+00
+ BA-133	81.00	*	34.06	2.72E+01	1.44E+01	3.33E+02
	302.84	*	18.33	4.80E+01		4.35E+02
	356.01	*	62.05	1.44E+01		3.57E+02
CE-139	165.85	80.35	1.25E+01	1.25E+01	-4.44E-01	5.50E+00
CE-144	133.54	10.80	8.09E+01	8.09E+01	-2.42E+01	3.62E+01
HG-203	279.19	77.30	1.20E+01	1.20E+01	-5.32E+00	5.04E+00
PB-210	46.50	4.25	2.00E+01	2.00E+01	-8.87E-01	8.94E+00
+ TH-231	25.64	*	14.70	5.34E-01	5.34E-01	5.46E-01
	84.21		6.40	7.31E+01		3.53E+01
PA-234M	9.89	89.00	1.00E-03	1.00E-03	-7.72E-04	4.49E-04
	21.72	64.90	1.33E-01		-9.07E-03	6.25E-02
	37.93	23.75	1.61E+00		-8.28E-01	7.08E-01
+ TH-234	63.29	*	3.80	1.15E+02	1.15E+02	4.56E+02
NP-237	29.37	*	14.00	4.98E+00	4.98E+00	1.18E+02
	86.50	12.60	3.09E+01		-4.60E-01	1.37E+01
U-237	97.08	16.30	3.76E+01	2.54E+01	2.25E+01	1.71E+01
	101.07	26.30	2.54E+01		1.02E+01	1.16E+01
	114.00	12.30	5.78E+01		-4.27E+01	2.59E+01
	208.01	22.00	6.41E+01		1.80E+01	2.89E+01
+ AM-241	59.54	*	35.90	1.22E+01	1.22E+01	4.82E+01
AM-243	74.67	66.00	4.74E+00	4.74E+00	-8.15E-01	2.12E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-05  
MW-1

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-05  
 Sample Description : MW-1  
 Sample Type : RA RECOVERY

Sample Size : 1.000E+00 units  
 Facility : Countroom

Sample Taken On : 1/10/2022 9:56:54AM  
 Acquisition Started : 1/10/2022 10:35:39AM

Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE1  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.4 seconds

Dead Time : 0.04 %

Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 32 - 4096  
 Identification Energy Tolerance : 2.500 keV

Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/14/2021  
 Efficiency Calibration Description :

Sample Number : 118877

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 10:50:42AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-05

MW-1

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	52.63	48 -	56	52.32	4.62E+01	44.63	2.76E+02	3.28
M	2	62.10	57 -	73	61.79	2.25E+02	47.58	2.09E+02	2.60
m	3	66.43	57 -	73	66.12	1.57E+02	48.46	1.92E+02	2.70
	4	81.51	76 -	85	81.20	7.37E+02	74.20	3.65E+02	2.32
M	5	112.15	107 -	123	111.83	1.74E+02	42.35	1.99E+02	2.18
m	6	116.19	107 -	123	115.87	4.63E+01	40.91	1.74E+02	2.31
	7	185.66	181 -	189	185.34	4.40E+01	32.86	1.38E+02	3.55
	8	239.55	233 -	245	239.21	4.87E+01	38.76	1.47E+02	9.29
	9	277.49	273 -	282	277.15	5.59E+01	28.58	8.42E+01	2.45
M	10	303.57	299 -	314	303.23	1.34E+02	30.02	8.27E+01	2.49
m	11	307.57	299 -	314	307.23	2.76E+01	29.07	5.31E+01	2.49
M	12	333.97	328 -	342	333.62	6.49E+01	22.24	3.50E+01	2.35
	13	356.46	350 -	361	356.12	4.93E+02	51.61	9.40E+01	2.33
	14	366.12	362 -	371	365.77	3.61E+01	21.38	4.39E+01	4.00
M	15	384.58	379 -	404	384.23	1.14E+02	33.70	3.82E+01	2.54
m	16	387.54	379 -	404	387.19	1.70E+02	35.53	3.10E+01	2.21
m	17	391.58	379 -	404	391.23	4.84E+01	30.85	3.33E+01	2.55
	18	416.55	410 -	421	416.20	3.00E+01	33.53	1.24E+02	1.81
	19	437.59	432 -	442	437.24	7.51E+01	22.52	2.78E+01	2.57
	20	468.70	465 -	472	468.34	2.58E+01	12.17	6.48E+00	2.23
	21	498.04	494 -	500	497.68	6.38E+00	6.65	3.25E+00	2.66
	22	538.26	534 -	540	537.90	8.75E+00	9.63	1.05E+01	2.60
	23	670.50	666 -	673	670.13	8.00E+00	5.66	0.00E+00	1.16
	24	693.87	689 -	695	693.50	6.00E+00	4.90	0.00E+00	1.16

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:50:42AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118839.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	52.63	4.62E+01	44.63			4.62E+01	4.46E+01
M	2	62.10	2.25E+02	47.58	2.33E+01	2.32E+00	2.02E+02	4.76E+01
m	3	66.43	1.57E+02	48.46			1.57E+02	4.85E+01
	4	81.51	7.37E+02	74.20			7.37E+02	7.42E+01
M	5	112.15	1.74E+02	42.35			1.74E+02	4.24E+01

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Analysis Report for 2112077-05

MW-1

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	6	116.19	4.63E+01	40.91			4.63E+01	4.09E+01
	7	185.66	4.40E+01	32.86	1.72E+01	2.03E+00	2.68E+01	3.29E+01
	8	239.55	4.87E+01	38.76	4.91E+00	1.64E+00	4.38E+01	3.88E+01
	9	277.49	5.59E+01	28.58			5.59E+01	2.86E+01
M	10	303.57	1.34E+02	30.02			1.34E+02	3.00E+01
m	11	307.57	2.76E+01	29.07			2.76E+01	2.91E+01
M	12	333.97	6.49E+01	22.24			6.49E+01	2.22E+01
	13	356.46	4.93E+02	51.61			4.93E+02	5.16E+01
	14	366.12	3.61E+01	21.38			3.61E+01	2.14E+01
M	15	384.58	1.14E+02	33.70			1.14E+02	3.37E+01
m	16	387.54	1.70E+02	35.53			1.70E+02	3.55E+01
m	17	391.58	4.84E+01	30.85			4.84E+01	3.09E+01
	18	416.55	3.00E+01	33.53			3.00E+01	3.35E+01
	19	437.59	7.51E+01	22.52			7.51E+01	2.25E+01
	20	468.70	2.58E+01	12.17	0.00E+00	0.00E+00	2.58E+01	1.22E+01
	21	498.04	6.38E+00	6.65			6.38E+00	6.65E+00
	22	538.26	8.75E+00	9.63			8.75E+00	9.63E+00
	23	670.50	8.00E+00	5.66			8.00E+00	5.66E+00
	24	693.87	6.00E+00	4.90			6.00E+00	4.90E+00

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.95	255.12	1.93		
		391.69	*	61.90	3.65E+01
BA-133	0.99	81.00	*	34.06	3.79E+02
		302.84	*	18.33	3.72E+02
		356.01	*	62.05	3.87E+02
HG-203	0.92	279.19	*	77.30	3.72E+01
TH-234	0.96	63.29	*	3.80	5.42E+02

Analysis Report for 2112077-05

MW-1

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 2.500 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 2.000sigma

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## INTERFERENCE CORRECTED REPORT

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<i><b>Nuclide Name</b></i>	<i><b>Nuclide Id Confidence</b></i>	<i><b>Wt mean Activity (pCi/units)</b></i>	<i><b>Wt mean Activity Uncertainty</b></i>	<i><b>Comments</b></i>
SN-113	0.953	3.65E+01	2.33E+01	
BA-133	0.993	3.82E+02	2.82E+01	
HG-203	0.929	3.72E+01	1.91E+01	
TH-234	0.965	5.42E+02	1.29E+02	

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

Errors quoted at 2.000sigma

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Analysis Report for 2112077-05

MW-1

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:50:42AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	1	52.63	5.13647E-02	48.27	
m	3	66.43	1.74396E-01	15.44	
M	5	112.15	1.93316E-01	12.17	Tol. U-237
m	6	116.19	5.14912E-02	44.14	Tol. U-237
	7	185.66	2.97636E-02	61.45	
	8	239.55	4.86701E-02	44.28	
m	11	307.57	3.06216E-02	52.74	
M	12	333.97	7.21141E-02	17.13	
	14	366.12	4.00670E-02	29.64	Sum
M	15	384.58	1.26634E-01	14.79	Sum
m	16	387.54	1.88424E-01	10.48	Sum
	18	416.55	3.32790E-02	55.97	Sum
	19	437.59	8.34332E-02	15.00	Sum
	20	468.70	2.86207E-02	23.61	
	21	498.04	7.08333E-03	52.17	
	22	538.26	9.72222E-03	55.03	
	23	670.50	8.88889E-03	35.36	Sum
	24	693.87	6.66667E-03	40.82	Sum

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-05

MW-1

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	5.44E-07	5.44E-07	0.00E+00	0.00E+00
	3.31	12.30	6.51E-06		0.00E+00	0.00E+00
FE-55	5.89	24.50	1.09E-04	1.09E-04	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.66E+01	1.66E+01	3.90E+00	7.81E+00
	136.48	10.60	1.54E+02		-7.68E+00	7.26E+01
NI-59	6.92	29.80	2.19E-04	2.19E-04	0.00E+00	0.00E+00
MO-93	16.59	52.90	8.08E-03	8.08E-03	0.00E+00	0.00E+00
	18.60	10.00	6.79E-02		0.00E+00	0.00E+00
NB-93M	16.57	9.43	4.51E-02	4.51E-02	0.00E+00	0.00E+00
CD-109	88.03	3.72	2.95E+02	2.95E+02	-4.39E+01	1.40E+02
+ SN-113	255.12	1.93	9.18E+02	5.14E+01	5.51E+02	4.23E+02
	391.69	* 61.90	5.14E+01		3.65E+01	2.47E+01
SN-119M	23.87	16.10	1.08E-01	9.18E-02	0.00E+00	0.00E+00
	25.10	22.70	9.18E-02		0.00E+00	0.00E+00
I-129	29.78	57.00	1.09E+00	1.09E+00	-1.56E+00	5.12E-01
	33.60	13.20	2.24E+01		6.08E+01	1.10E+01
	39.58	7.52	6.05E+01		1.64E+02	2.97E+01
+ BA-133	81.00	* 34.06	4.42E+01	4.42E+01	3.79E+02	2.14E+01
	302.84	* 18.33	1.81E+02		3.72E+02	8.68E+01
	356.01	* 62.05	4.98E+01		3.87E+02	2.38E+01
CE-139	165.85	80.35	2.40E+01	2.40E+01	-3.55E+00	1.13E+01
CE-144	133.54	10.80	1.46E+02	1.46E+02	-2.64E+01	6.84E+01
+ HG-203	279.19	* 77.30	2.84E+01	2.84E+01	3.72E+01	1.33E+01
PB-210	46.50	4.25	6.29E+01	6.29E+01	-7.72E+00	2.98E+01
TH-231	25.64	14.70	1.53E-01	1.53E-01	0.00E+00	0.00E+00
	84.21	6.40	3.63E+02		-8.92E+00	1.77E+02
PA-234M	9.89	89.00	4.64E-04	4.64E-04	0.00E+00	0.00E+00
	21.72	64.90	1.90E-02		0.00E+00	0.00E+00
	37.93	23.75	1.99E+01		1.06E+02	9.79E+00
+ TH-234	63.29	* 3.80	2.91E+02	2.91E+02	5.42E+02	1.42E+02
NP-237	29.37	14.00	4.24E+00	4.24E+00	-6.06E+00	1.99E+00
	86.50	12.60	1.03E+02		1.57E+01	4.93E+01
U-237	97.08	16.30	6.49E+01	4.67E+01	-6.65E+01	3.05E+01
	101.07	26.30	4.67E+01		5.72E+00	2.20E+01
	114.00	12.30	1.99E+02		4.15E+02	9.60E+01
	208.01	22.00	9.24E+01		0.00E+00	4.32E+01
AM-241	59.54	35.90	2.03E+01	2.03E+01	1.63E+01	9.78E+00
AM-243	74.67	66.00	1.22E+01	1.22E+01	1.13E+00	5.78E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-06  
MW-8

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-06  
 Sample Description : MW-8  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:57:04AM  
 Acquisition Started : 1/10/2022 10:42:50AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE2  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.2 seconds  
  
 Dead Time : 0.02 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 27 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118878

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 10:57:54AM

Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-06

MW-8

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	35.39	36 -	40	36.99	4.08E+02	54.83	2.06E+02	1.26
	2	53.20	52 -	58	54.77	5.65E+01	30.94	1.33E+02	1.25
M	3	61.81	59 -	70	63.36	1.86E+02	37.23	1.14E+02	1.96
m	4	66.24	59 -	70	67.77	9.77E+01	32.47	1.14E+02	1.98
	5	81.12	78 -	87	82.63	6.90E+02	65.04	2.09E+02	1.53
M	6	112.01	109 -	121	113.45	1.74E+02	34.59	1.07E+02	1.76
m	7	116.38	109 -	121	117.81	1.85E+01	23.93	1.09E+02	1.77
	8	266.55	264 -	270	267.69	1.83E+01	13.01	1.73E+01	3.31
	9	276.65	274 -	281	277.77	4.60E+01	20.88	3.80E+01	2.08
	10	285.68	282 -	293	286.78	3.32E+01	18.11	2.56E+01	6.87
m	11	302.84	294 -	306	303.91	1.41E+02	25.01	1.50E+01	1.68
	12	307.82	308 -	311	308.87	2.53E+01	15.49	3.33E+01	1.31
M	13	333.85	330 -	344	334.85	7.27E+01	18.85	1.32E+01	1.63
m	14	338.08	330 -	344	339.08	1.86E+01	11.97	1.07E+01	1.64
	15	356.09	352 -	361	357.06	4.82E+02	45.11	1.50E+01	1.43
	16	364.77	364 -	368	365.72	1.00E+01	10.94	1.79E+01	1.95
M	17	384.13	383 -	390	385.04	8.24E+01	18.06	1.98E+01	1.77
m	18	386.98	383 -	390	387.88	1.61E+02	29.57	4.85E+01	1.52
	19	391.40	391 -	395	392.29	4.74E+01	18.10	2.53E+01	1.29
M	20	414.66	413 -	426	415.51	2.22E+01	10.39	4.00E+00	2.07
m	21	418.38	413 -	426	419.22	2.36E+01	14.07	6.00E+00	2.08
m	22	422.00	413 -	426	422.84	1.05E+01	11.05	6.00E+00	2.08
	23	437.00	433 -	441	437.81	1.01E+02	22.83	1.84E+01	1.53
	24	467.36	464 -	471	468.11	1.30E+01	10.00	8.00E+00	2.49
	25	499.34	497 -	503	500.03	6.50E+00	6.65	3.00E+00	2.06
	26	608.39	606 -	612	608.87	9.00E+00	7.50	4.00E+00	1.59
	27	882.45	879 -	885	882.43	7.00E+00	5.29	0.00E+00	2.75
	28	1141.07	1137 -	1143	1140.60	5.00E+00	4.47	0.00E+00	1.24

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:57:54AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118840.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
1	35.39	4.08E+02		54.83		4.08E+02	5.48E+01

0193

Analysis Report for 2112077-06

MW-8

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	2	53.20	5.65E+01	30.94	2.30E-01	1.75E+00	5.63E+01	3.10E+01
M	3	61.81	1.86E+02	37.23	1.58E+00	1.58E+00	1.85E+02	3.73E+01
m	4	66.24	9.77E+01	32.47	1.35E+00	1.47E+00	9.63E+01	3.25E+01
	5	81.12	6.90E+02	65.04			6.90E+02	6.50E+01
M	6	112.01	1.74E+02	34.59			1.74E+02	3.46E+01
m	7	116.38	1.85E+01	23.93			1.85E+01	2.39E+01
	8	266.55	1.83E+01	13.01			1.83E+01	1.30E+01
	9	276.65	4.60E+01	20.88			4.60E+01	2.09E+01
	10	285.68	3.32E+01	18.11			3.32E+01	1.81E+01
m	11	302.84	1.41E+02	25.01			1.41E+02	2.50E+01
	12	307.82	2.53E+01	15.49			2.53E+01	1.55E+01
M	13	333.85	7.27E+01	18.85			7.27E+01	1.88E+01
m	14	338.08	1.86E+01	11.97			1.86E+01	1.20E+01
	15	356.09	4.82E+02	45.11			4.82E+02	4.51E+01
	16	364.77	1.00E+01	10.94			1.00E+01	1.09E+01
M	17	384.13	8.24E+01	18.06			8.24E+01	1.81E+01
m	18	386.98	1.61E+02	29.57			1.61E+02	2.96E+01
	19	391.40	4.74E+01	18.10			4.74E+01	1.81E+01
M	20	414.66	2.22E+01	10.39			2.22E+01	1.04E+01
m	21	418.38	2.36E+01	14.07			2.36E+01	1.41E+01
m	22	422.00	1.05E+01	11.05			1.05E+01	1.10E+01
	23	437.00	1.01E+02	22.83			1.01E+02	2.28E+01
	24	467.36	1.30E+01	10.00			1.30E+01	1.00E+01
	25	499.34	6.50E+00	6.65			6.50E+00	6.65E+00
	26	608.39	9.00E+00	7.50	3.38E+00	1.03E+00	5.62E+00	7.57E+00
	27	882.45	7.00E+00	5.29			7.00E+00	5.29E+00
	28	1141.07	5.00E+00	4.47			5.00E+00	4.47E+00

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.95	255.12	1.93		
		391.69 *	61.90	3.45E+01	1.33E+01

Analysis Report for 2112077-06

MW-8

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
BA-133	1.00	81.00 *		34.06	3.56E+02	3.66E+01
		302.84 *		18.33	3.64E+02	6.75E+01
		356.01 *		62.05	3.60E+02	3.68E+01
TH-234	0.94	63.29 *		3.80	5.36E+02	1.09E+02
AM-241	0.87	59.54 *		35.90	5.68E+01	1.15E+01

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
SN-113	0.950	3.45E+01	1.33E+01	
BA-133	1.000	3.59E+02	2.42E+01	
? TH-234	0.946	5.36E+02	1.09E+02	
? AM-241	0.876	5.68E+01	1.15E+01	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-06

MW-8

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:57:54AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
1	35.39	4.53249E-01	6.72	Tol.	I-129
2	53.20	6.25220E-02	27.54		
m 4	66.24	1.07026E-01	16.87		
M 6	112.01	1.93550E-01	9.93	Tol.	U-237
m 7	116.38	2.05721E-02	64.63	Tol.	U-237
8	266.55	2.03704E-02	35.48		
9	276.65	5.10855E-02	22.71		
10	285.68	3.68841E-02	27.28		
12	307.82	2.81658E-02	30.56		
M 13	333.85	8.07807E-02	12.96		
m 14	338.08	2.06764E-02	32.16		
16	364.77	1.11404E-02	54.57	Sum	
M 17	384.13	9.15951E-02	10.96	Sum	
m 18	386.98	1.79439E-01	9.15		
M 20	414.66	2.46312E-02	23.44		
m 21	418.38	2.61750E-02	29.87	Sum	
m 22	422.00	1.16738E-02	52.57		
23	437.00	1.11980E-01	11.32	Sum	
24	467.36	1.44444E-02	38.46		
25	499.34	7.22222E-03	51.17		
26	608.39	6.24249E-03	67.37		
27	882.45	7.77778E-03	37.80		
28	1141.07	5.55556E-03	44.72		

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

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Analysis Report for 2112077-06

MW-8

## NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)	
CA-41	3.00	77.00	5.55E-06	5.55E-06	0.00E+00	0.00E+00	
	3.31	12.30	5.93E-05		0.00E+00	0.00E+00	
FE-55	5.89	24.50	5.43E-04	5.43E-04	0.00E+00	0.00E+00	
CO-57	122.06	85.51	1.24E+01	1.24E+01	5.98E+00	5.74E+00	
	136.48	10.60	9.50E+01		-4.92E+01	4.32E+01	
NI-59	6.92	29.80	9.37E-04	9.37E-04	0.00E+00	0.00E+00	
MO-93	16.59	52.90	1.70E-02	1.70E-02	0.00E+00	0.00E+00	
	18.60	10.00	1.33E-01		0.00E+00	0.00E+00	
NB-93M	16.57	9.43	9.52E-02	9.52E-02	0.00E+00	0.00E+00	
CD-109	88.03	3.72	1.95E+02	1.95E+02	3.41E+01	9.02E+01	
+ SN-113	255.12	1.93	5.83E+02	1.61E+01	-2.20E+01	2.59E+02	
	391.69	*	61.90	1.61E+01	3.45E+01	7.04E+00	
SN-119M	23.87	16.10	1.81E-01	1.81E-01	0.00E+00	0.00E+00	
	25.10	22.70	1.44E+00		-1.97E-01	6.43E-01	
I-129	29.78	57.00	7.26E+00	7.26E+00	6.05E+01	3.58E+00	
	33.60	13.20	3.99E+01		1.56E+02	1.97E+01	
+ BA-133	39.58	7.52	1.75E+01		-3.39E+00	8.00E+00	
	81.00	*	34.06	3.39E+01	1.46E+01	3.56E+02	1.62E+01
	302.84	*	18.33	7.86E+01		3.64E+02	3.58E+01
	356.01	*	62.05	1.46E+01		3.60E+02	6.30E+00
CE-139	165.85	80.35	1.64E+01	1.64E+01	2.42E+00	7.57E+00	
CE-144	133.54	10.80	9.48E+01	9.48E+01	-2.13E+01	4.33E+01	
HG-203	279.19	77.30	1.78E+01	1.78E+01	1.53E+00	8.06E+00	
PB-210	46.50	4.25	5.66E+01	5.66E+01	2.75E+01	2.64E+01	
TH-231	25.64	14.70	3.11E+00	3.11E+00	-2.77E+00	1.43E+00	
	84.21	6.40	1.25E+02		-1.71E+03	5.84E+01	
PA-234M	9.89	89.00	1.45E-03	1.45E-03	0.00E+00	0.00E+00	
	21.72	64.90	3.37E-02		0.00E+00	0.00E+00	
+ TH-234	37.93	23.75	7.71E+00		-5.92E-01	3.64E+00	
	63.29	*	3.80	1.99E+02	1.99E+02	5.36E+02	9.56E+01
NP-237	29.37	14.00	2.84E+01	2.84E+01	2.37E+02	1.40E+01	
	86.50	12.60	5.75E+01		2.46E+01	2.67E+01	
U-237	97.08	16.30	5.20E+01	3.31E+01	-4.88E+00	2.41E+01	
	101.07	26.30	3.31E+01		-1.08E+01	1.53E+01	
	114.00	12.30	1.61E+02		1.83E+02	7.72E+01	
	208.01	22.00	6.24E+01		-5.36E+01	2.85E+01	
+ AM-241	59.54	*	35.90	2.11E+01	2.11E+01	5.68E+01	1.01E+01
	74.67		66.00	8.95E+00	8.95E+00	2.87E+00	4.16E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-06  
MW-8

16P  
1/10/22

Analysis Report for 2112077-07  
MW-7

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-07  
 Sample Description : MW-7  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:57:12AM  
 Acquisition Started : 1/10/2022 10:43:14AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE3  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 913.2 seconds  
  
 Dead Time : 1.44 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 8 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118879

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 10:58:29AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-07

MW-7

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>ROI start</b>	<b>ROI end</b>	<b>Peak Centroid</b>	<b>Net Peak Area</b>	<b>Net Area Uncertainty</b>	<b>Continuum Counts</b>	<b>FWHM (keV)</b>
M	1	20.62	18 -	40	21.27	8.03E+01	41.21	2.85E+02	3.62
m	2	31.29	18 -	40	31.93	2.53E+03	124.82	5.80E+02	5.38
M	3	61.51	53 -	70	62.13	2.17E+02	60.72	4.11E+02	3.06
m	4	65.84	53 -	70	66.45	1.04E+02	59.92	3.70E+02	3.09
	5	81.12	73 -	90	81.73	8.02E+02	99.03	5.87E+02	3.22
	6	112.58	106 -	122	113.17	3.39E+02	73.26	3.79E+02	3.54
	7	276.27	270 -	285	276.74	7.39E+01	37.68	1.14E+02	4.51
	8	302.81	296 -	310	303.27	1.17E+02	42.67	1.42E+02	2.78
	9	334.71	328 -	342	335.15	8.90E+01	29.22	5.20E+01	3.98
	10	356.29	347 -	362	356.71	3.61E+02	52.23	1.31E+02	3.74
	11	386.91	380 -	398	387.31	3.03E+02	47.73	8.14E+01	7.23
	12	415.99	409 -	422	416.37	3.00E+01	32.60	1.04E+02	2.11
	13	436.91	431 -	446	437.28	9.12E+01	30.46	5.76E+01	4.13
	14	469.93	462 -	477	470.28	2.90E+01	10.77	0.00E+00	12.80
	15	701.46	698 -	706	701.67	6.39E+00	7.50	5.22E+00	0.95

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.00sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:58:29AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118841.CNF

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Original Area</b>	<b>Orig. Area Uncertainty</b>	<b>Ambient Background</b>	<b>Backgr. Uncert.</b>	<b>Subtracted Area</b>	<b>Subtracted Uncert.</b>
M	1	20.62	8.03E+01	41.21			8.03E+01	4.12E+01
m	2	31.29	2.53E+03	124.82	8.55E+01	2.11E-01	2.44E+03	1.25E+02
M	3	61.51	2.17E+02	60.72	5.73E+01	6.61E-01	1.60E+02	6.07E+01
m	4	65.84	1.04E+02	59.92			1.04E+02	5.99E+01
	5	81.12	8.02E+02	99.03			8.02E+02	9.90E+01
	6	112.58	3.39E+02	73.26			3.39E+02	7.33E+01
	7	276.27	7.39E+01	37.68			7.39E+01	3.77E+01
	8	302.81	1.17E+02	42.67			1.17E+02	4.27E+01
	9	334.71	8.90E+01	29.22			8.90E+01	2.92E+01
	10	356.29	3.61E+02	52.23			3.61E+02	5.22E+01
	11	386.91	3.03E+02	47.73			3.03E+02	4.77E+01
	12	415.99	3.00E+01	32.60			3.00E+01	3.26E+01
	13	436.91	9.12E+01	30.46			9.12E+01	3.05E+01
	14	469.93	2.90E+01	10.77			2.90E+01	1.08E+01

0200



Analysis Report for 2112077-07

MW-7

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
15	701.46	6.39E+00	7.50			6.39E+00	7.50E+00

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.60	29.78 *	57.00	8.10E+01	4.16E+00
		33.60	13.20		
		39.58	7.52		
BA-133	0.99	81.00 *	34.06	3.53E+02	4.55E+01
		302.84 *	18.33	3.53E+02	1.30E+02
		356.01 *	62.05	3.33E+02	5.01E+01
TH-234	0.92	63.29 *	3.80	3.80E+02	1.45E+02
NP-237	0.60	29.37 *	14.00	3.30E+02	1.69E+01
		86.50	12.60		
AM-241	0.90	59.54 *	35.90	4.02E+01	1.53E+01

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

0201

Analysis Report for 2112077-07

MW-7

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
?	I-129	0.600	8.10E+01	4.16E+00	
	BA-133	0.999	<del>3.44E+02</del>	<del>3.26E+01</del>	
?	TH-234	0.922	3.80E+02	1.45E+02	
?	NP-237	0.603	3.30E+02	1.69E+01	
?	AM-241	0.906	4.02E+01	1.53E+01	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-07

MW-7

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:58:29AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M 1	20.62	8.92325E-02	25.66	Tol.	PA-234M
m 4	65.84	1.15171E-01	28.91		
6	112.58	3.77132E-01	10.79	Sum	
7	276.27	8.20950E-02	25.50		
9	334.71	9.88647E-02	16.42	Sum	
11	386.91	3.37022E-01	7.87	Sum	
12	415.99	3.33469E-02	54.32	Sum	
13	436.91	1.01333E-01	16.70	Sum	
14	469.93	3.22222E-02	18.57		
15	701.46	7.09877E-03	58.70		

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	1.41E-04	1.41E-04	1.54E-04	6.70E-05
	3.31	12.30	1.45E-03		1.59E-03	6.89E-04
FE-55	5.89	24.50	1.53E-02	1.53E-02	3.03E-02	7.36E-03
CO-57	122.06	85.51	2.29E+01	2.29E+01	-3.74E+00	1.10E+01
	136.48	10.60	1.83E+02		9.43E+01	8.75E+01

0203

Analysis Report for 2112077-07  
MW-7

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
NI-59	6.92	29.80	2.70E-02	2.70E-02	6.04E-02	1.30E-02
MO-93	16.59	52.90	5.68E-01	5.68E-01	7.52E-01	2.77E-01
	18.60	10.00	4.09E+00		6.37E-01	1.99E+00
NB-93M	16.57	9.43	3.17E+00	3.17E+00	4.20E+00	1.55E+00
CD-109	88.03	3.72	5.75E+02	5.75E+02	2.10E+02	2.81E+02
SN-113	255.12	1.93	1.11E+03	6.95E+01	-3.23E+02	5.21E+02
	391.69	61.90	6.95E+01		1.37E+02	3.35E+01
SN-119M	23.87	16.10	1.14E+01	1.00E+01	5.17E+01	5.62E+00
	25.10	22.70	1.00E+01		6.34E+01	4.95E+00
+ I-129	29.78	* 57.00	5.86E+00	5.86E+00	8.10E+01	2.88E+00
	33.60	13.20	4.22E+01		4.17E+02	2.09E+01
	39.58	7.52	7.22E+01		-4.54E+01	3.55E+01
+ BA-133	81.00	* 34.06	6.00E+01	5.70E+01	3.53E+02	2.94E+01
	302.84	* 18.33	1.91E+02		3.53E+02	9.13E+01
	356.01	* 62.05	5.70E+01		3.33E+02	2.73E+01
CE-139	165.85	80.35	2.88E+01	2.88E+01	9.72E-01	1.38E+01
CE-144	133.54	10.80	1.67E+02	1.67E+02	-4.60E+01	7.98E+01
HG-203	279.19	77.30	3.68E+01	3.68E+01	2.98E+01	1.74E+01
PB-210	46.50	4.25	9.81E+01	9.81E+01	-2.07E+02	4.75E+01
TH-231	25.64	14.70	1.65E+01	1.65E+01	1.04E+02	8.13E+00
	84.21	6.40	3.78E+02		1.88E+00	1.86E+02
PA-234M	9.89	89.00	4.23E-02	4.23E-02	7.22E-02	2.05E-02
	21.72	64.90	1.17E+00		-2.08E-01	5.69E-01
	37.93	23.75	2.48E+01		-9.90E+00	1.22E+01
+ TH-234	63.29	* 3.80	3.66E+02	3.66E+02	3.80E+02	1.80E+02
+ NP-237	29.37	* 14.00	2.38E+01	2.38E+01	3.30E+02	1.17E+01
	86.50	12.60	1.97E+02		2.56E+01	9.67E+01
U-237	97.08	16.30	9.92E+01	6.38E+01	8.61E+01	4.80E+01
	101.07	26.30	6.38E+01		-3.76E+00	3.08E+01
	114.00	12.30	2.18E+02		6.29E+02	1.06E+02
	208.01	22.00	1.17E+02		1.84E+01	5.59E+01
+ AM-241	59.54	* 35.90	3.87E+01	3.87E+01	4.02E+01	1.90E+01
AM-243	74.67	66.00	2.80E+01	2.80E+01	-4.37E-02	1.37E+01

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

KP  
1/10/22

Analysis Report for 2112077-08  
MW-9

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-08  
 Sample Description : MW-9  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:57:20AM  
 Acquisition Started : 1/10/2022 10:43:57AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE4  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 920.4 seconds  
  
 Dead Time : 2.22 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 8 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/22/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118880

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 10:59:20AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-08

MW-9

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>ROI start</b>	<b>ROI end</b>	<b>Peak Centroid</b>	<b>Net Peak Area</b>	<b>Net Area Uncertainty</b>	<b>Continuum Counts</b>	<b>FWHM (keV)</b>
M	1	20.91	17 -	41	20.88	1.12E+02	41.86	2.46E+02	2.59
m	2	30.75	17 -	41	30.72	1.95E+03	97.65	2.20E+02	2.54
m	3	35.15	17 -	41	35.11	4.00E+02	64.82	1.72E+02	2.36
	4	53.11	49 -	56	53.06	5.24E+01	32.37	1.39E+02	2.23
M	5	61.69	57 -	71	61.63	2.14E+02	46.24	1.70E+02	2.86
m	6	66.24	57 -	71	66.18	1.08E+02	51.08	2.24E+02	3.30
m	7	81.01	75 -	87	80.94	7.68E+02	61.58	1.11E+02	2.29
M	8	111.55	108 -	120	111.46	1.78E+02	34.18	1.01E+02	2.66
m	9	116.26	108 -	120	116.17	4.65E+01	43.54	1.49E+02	3.36
	10	248.29	244 -	252	248.12	2.11E+01	19.46	4.59E+01	4.58
	11	275.52	271 -	280	275.33	3.45E+01	27.75	9.09E+01	1.85
	12	303.30	297 -	309	303.09	1.24E+02	30.63	5.26E+01	2.35
	13	333.99	329 -	339	333.76	4.93E+01	29.33	8.95E+01	1.88
	14	355.94	349 -	362	355.70	3.20E+02	45.12	8.40E+01	2.23
	15	386.56	380 -	394	386.30	2.27E+02	32.32	1.25E+01	4.32
M	16	414.30	410 -	425	414.02	1.56E+01	11.49	6.29E+00	3.91
m	17	418.80	410 -	425	418.53	3.29E+01	14.87	3.28E+00	3.23
	18	436.82	432 -	441	436.53	5.30E+01	14.56	0.00E+00	2.31
	19	466.70	461 -	470	466.39	1.54E+01	9.85	5.11E+00	1.37
	20	473.88	471 -	476	473.57	7.00E+00	5.29	0.00E+00	3.00
	21	509.37	502 -	515	509.04	2.66E+01	13.00	6.77E+00	4.71
	22	873.52	869 -	875	873.00	5.00E+00	4.47	0.00E+00	2.98

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 10:59:20AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118842.CNF

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Original Area</b>	<b>Orig. Area Uncertainty</b>	<b>Ambient Background</b>	<b>Backgr. Uncert.</b>	<b>Subtracted Area</b>	<b>Subtracted Uncert.</b>
M	1	20.91	1.12E+02	41.86			1.12E+02	4.19E+01
m	2	30.75	1.95E+03	97.65			1.95E+03	9.77E+01
m	3	35.15	4.00E+02	64.82			4.00E+02	6.48E+01
	4	53.11	5.24E+01	32.37			5.24E+01	3.24E+01
M	5	61.69	2.14E+02	46.24	1.20E+01	2.36E+00	2.02E+02	4.63E+01
m	6	66.24	1.08E+02	51.08			1.08E+02	5.11E+01
m	7	81.01	7.68E+02	61.58			7.68E+02	6.16E+01

0206

Analysis Report for 2112077-08

MW-9

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	8	111.55	1.78E+02	34.18			1.78E+02	3.42E+01
m	9	116.26	4.65E+01	43.54			4.65E+01	4.35E+01
	10	248.29	2.11E+01	19.46			2.11E+01	1.95E+01
	11	275.52	3.45E+01	27.75			3.45E+01	2.77E+01
	12	303.30	1.24E+02	30.63			1.24E+02	3.06E+01
	13	333.99	4.93E+01	29.33			4.93E+01	2.93E+01
	14	355.94	3.20E+02	45.12			3.20E+02	4.51E+01
	15	386.56	2.27E+02	32.32			2.27E+02	3.23E+01
M	16	414.30	1.56E+01	11.49			1.56E+01	1.15E+01
m	17	418.80	3.29E+01	14.87			3.29E+01	1.49E+01
	18	436.82	5.30E+01	14.56			5.30E+01	1.46E+01
	19	466.70	1.54E+01	9.85			1.54E+01	9.85E+00
	20	473.88	7.00E+00	5.29			7.00E+00	5.29E+00
	21	509.37	2.66E+01	13.00	1.28E+01	1.26E+00	1.38E+01	1.31E+01
	22	873.52	5.00E+00	4.47			5.00E+00	4.47E+00

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.86	29.78 *	57.00	3.95E+01	1.98E+00
		33.60 *	13.20	5.47E+01	8.88E+00
		39.58	7.52		
BA-133	0.99	81.00 *	34.06	3.70E+02	3.29E+01
		302.84 *	18.33	4.43E+02	1.12E+02
		356.01 *	62.05	3.36E+02	4.94E+01
TH-234	0.93	63.29 *	3.80	4.75E+02	1.09E+02
AM-241	0.88	59.54 *	35.90	5.02E+01	1.16E+01

Analysis Report for 2112077-08

MW-9

\* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity  
 Energy Tolerance : 2.500 keV  
 Nuclide confidence index threshold = 0.30  
 Errors quoted at 2.000sigma

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## INTERFERENCE CORRECTED REPORT

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<i>Nuclide Name</i>	<i>Nuclide Id Confidence</i>	<i>Wt mean Activity (pCi/units)</i>	<i>Wt mean Activity Uncertainty</i>	<i>Comments</i>
I-129	0.868	4.02E+01	1.93E+00	
BA-133	0.999	3.64E+02	2.66E+01	
? TH-234	0.936	4.75E+02	1.09E+02	
X NP-237	0.701			
? AM-241	0.888	5.02E+01	1.16E+01	

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

Errors quoted at 2.000sigma

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Analysis Report for 2112077-08

MW-9

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 10:59:20AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M 1	20.91	1.24500E-01	18.68	Tol.	PA-234M
	4	53.11	5.82286E-02		
m 6	66.24	1.20360E-01	23.58	Sum	
M 8	111.55	1.97969E-01	9.59	Sum	
m 9	116.26	5.16730E-02	46.81	Sum	
	10	248.29	2.34091E-02		
	11	275.52	3.83889E-02		
	13	333.99	5.47281E-02	Sum	
	15	386.56	2.51955E-01	Sum	
M 16	414.30	1.72944E-02	36.91		
m 17	418.80	3.65209E-02	22.61	Sum	
	18	436.82	5.88889E-02	Sum	
	19	466.70	1.71605E-02		
	20	473.88	7.77778E-03		
	21	509.37	1.53324E-02		
	22	873.52	5.55556E-03		

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 2.00sigma

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-08

MW-9

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	2.38E-07	2.38E-07	0.00E+00	0.00E+00
	3.31	12.30	2.92E-06		0.00E+00	0.00E+00
FE-55	5.89	24.50	6.35E-04	6.35E-04	2.28E-04	2.89E-04
CO-57	122.06	85.51	1.67E+01	1.67E+01	-7.44E-01	7.83E+00
	136.48	10.60	1.50E+02		-3.58E+01	6.99E+01
NI-59	6.92	29.80	1.58E-03	1.58E-03	4.85E-04	7.32E-04
MO-93	16.59	52.90	1.45E-01	1.45E-01	7.81E-03	6.96E-02
	18.60	10.00	1.24E+00		-9.48E-02	5.97E-01
NB-93M	16.57	9.43	8.06E-01	8.06E-01	4.36E-02	3.88E-01
CD-109	88.03	3.72	2.50E+02	2.50E+02	-2.52E+01	1.18E+02
SN-113	255.12	1.93	1.14E+03	5.02E+01	4.15E+01	5.24E+02
	391.69	61.90	5.02E+01		3.90E+01	2.37E+01
SN-119M	23.87	16.10	2.30E+00	2.30E+00	-5.67E+01	1.11E+00
	25.10	22.70	2.49E+00		-4.98E+01	1.21E+00
+ I-129	29.78	* 57.00	3.22E+00	3.22E+00	3.95E+01	1.58E+00
	33.60	* 13.20	2.17E+01		5.47E+01	1.06E+01
	39.58	7.52	2.53E+01		-6.90E-01	1.22E+01
+ BA-133	81.00	* 34.06	3.32E+01	3.32E+01	3.70E+02	1.59E+01
	302.84	* 18.33	1.34E+02		4.43E+02	6.20E+01
	356.01	* 62.05	5.03E+01		3.36E+02	2.37E+01
CE-139	165.85	80.35	2.81E+01	2.81E+01	6.94E+00	1.32E+01
CE-144	133.54	10.80	1.42E+02	1.42E+02	1.64E+01	6.62E+01
HG-203	279.19	77.30	3.35E+01	3.35E+01	-1.48E+00	1.56E+01
PB-210	46.50	4.25	4.78E+01	4.78E+01	1.75E+01	2.25E+01
TH-231	25.64	14.70	6.04E+00	6.04E+00	-2.17E+01	2.97E+00
	84.21	6.40	3.72E+02		1.81E+03	1.82E+02
PA-234M	9.89	89.00	5.25E-03	5.25E-03	6.23E-03	2.49E-03
	21.72	64.90	3.73E-01		1.33E-01	1.80E-01
	37.93	23.75	1.02E+01		5.05E+00	4.97E+00
+ TH-234	63.29	* 3.80	2.08E+02	2.08E+02	4.75E+02	1.01E+02
NP-237	29.37	* 14.00	1.31E+01	1.31E+01	1.61E+02	6.45E+00
	86.50	12.60	1.21E+02		8.80E-01	5.85E+01
U-237	97.08	16.30	7.52E+01	5.19E+01	-4.27E+00	3.57E+01
	101.07	26.30	5.19E+01		3.48E+01	2.47E+01
	114.00	12.30	2.02E+02		5.13E+02	9.76E+01
	208.01	22.00	1.15E+02		-5.26E+00	5.38E+01
+ AM-241	59.54	* 35.90	2.20E+01	2.20E+01	5.02E+01	1.07E+01
AM-243	74.67	66.00	1.33E+01	1.33E+01	-1.88E+00	6.35E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-09  
MW-9D

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-09  
 Sample Description : MW-9D  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:57:30AM  
 Acquisition Started : 1/10/2022 10:48:46AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE5  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 1018.0 seconds  
  
 Dead Time : 11.59 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 2 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118881

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:05:47AM

Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-09  
MW-9D

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)	
1	9.95	85 -	99	91.92	1.71E+01	16.67	2.98E+01	0.51	
2	20.85	192 -	209	201.81	7.44E+01	34.00	1.05E+02	0.64	
3	30.73	286 -	321	301.35	2.22E+03	110.53	2.22E+02	0.78	
M	4	34.89	327 -	360	343.33	4.83E+02	51.94	5.87E+01	0.72
m	5	35.95	327 -	360	354.00	1.35E+02	29.43	3.73E+01	0.72
6	52.79	511 -	537	523.67	5.50E+01	28.53	5.40E+01	0.53	
7	61.56	600 -	622	612.06	2.47E+02	42.46	8.45E+01	0.83	
8	65.88	640 -	669	655.63	1.12E+02	43.36	1.15E+02	0.44	
9	70.95	700 -	714	706.75	1.39E+01	15.00	2.22E+01	0.82	
M	10	79.47	779 -	821	792.63	4.73E+01	23.39	4.90E+01	0.68
m	11	80.88	779 -	821	806.84	8.83E+02	61.86	3.39E+01	0.65
m	12	81.98	779 -	821	817.92	1.62E+01	11.31	8.08E+00	0.80
13	87.92	867 -	886	877.81	1.45E+01	15.26	2.51E+01	0.32	
14	91.91	899 -	928	917.96	2.30E+01	25.81	6.20E+01	0.18	
15	100.45	995 -	1013	1004.09	1.40E+01	16.67	3.19E+01	1.23	
16	111.74	1108 -	1126	1117.84	1.84E+02	36.25	8.54E+01	0.72	
17	115.78	1143 -	1171	1158.59	7.33E+01	26.37	4.35E+01	0.94	
18	160.24	1590 -	1618	1606.70	4.30E+01	17.58	1.59E+01	0.19	
19	276.18	2761 -	2785	2775.53	5.53E+01	17.15	1.13E+01	0.75	
M	20	302.01	3027 -	3053	3035.92	1.31E+01	21.78	1.61E+00	1.09
m	21	302.63	3027 -	3053	3042.15	1.54E+02	24.15	4.68E+00	1.00
22	333.55	3339 -	3365	3353.94	6.42E+01	19.38	1.56E+01	1.23	
23	355.82	3562 -	3593	3578.45	4.25E+02	42.50	1.28E+01	1.03	
24	383.60	3840 -	3871	3858.50	8.97E+01	21.49	1.06E+01	0.57	
25	386.61	3873 -	3901	3888.86	1.63E+02	28.89	2.32E+01	0.76	
26	390.79	3916 -	3941	3931.02	2.38E+01	15.37	1.65E+01	0.69	

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:05:47AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118843.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
1	9.95	1.71E+01	16.67	2.26E+00	5.77E-01	1.49E+01	1.67E+01
2	20.85	7.44E+01	34.00	8.71E+00	6.63E-01	6.57E+01	3.40E+01
3	30.73	2.22E+03	110.53	6.35E+00	8.10E-01	2.22E+03	1.11E+02

Analysis Report for 2112077-09

MW-9D

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Original Area</b>	<b>Orig. Area Uncertainty</b>	<b>Ambient Background</b>	<b>Backgr. Uncert.</b>	<b>Subtracted Area</b>	<b>Subtracted Uncert.</b>
M	4	34.89	4.83E+02	51.94	1.59E+00	6.48E-01	4.81E+02	5.19E+01
m	5	35.95	1.35E+02	29.43	1.59E+00	6.48E-01	1.34E+02	2.94E+01
	6	52.79	5.50E+01	28.53			5.50E+01	2.85E+01
	7	61.56	2.47E+02	42.46	3.32E+00	6.94E-01	2.43E+02	4.25E+01
	8	65.88	1.12E+02	43.36			1.12E+02	4.34E+01
	9	70.95	1.39E+01	15.00			1.39E+01	1.50E+01
M	10	79.47	4.73E+01	23.39			4.73E+01	2.34E+01
m	11	80.88	8.83E+02	61.86			8.83E+02	6.19E+01
m	12	81.98	1.62E+01	11.31			1.62E+01	1.13E+01
	13	87.92	1.45E+01	15.26	8.71E-01	5.07E-01	1.36E+01	1.53E+01
	14	91.91	2.30E+01	25.81			2.30E+01	2.58E+01
	15	100.45	1.40E+01	16.67			1.40E+01	1.67E+01
	16	111.74	1.84E+02	36.25	7.94E-01	4.65E-01	1.84E+02	3.63E+01
	17	115.78	7.33E+01	26.37			7.33E+01	2.64E+01
	18	160.24	4.30E+01	17.58			4.30E+01	1.76E+01
	19	276.18	5.53E+01	17.15			5.53E+01	1.71E+01
M	20	302.01	1.31E+01	21.78			1.31E+01	2.18E+01
m	21	302.63	1.54E+02	24.15			1.54E+02	2.41E+01
	22	333.55	6.42E+01	19.38			6.42E+01	1.94E+01
	23	355.82	4.25E+02	42.50			4.25E+02	4.25E+01
	24	383.60	8.97E+01	21.49			8.97E+01	2.15E+01
	25	386.61	1.63E+02	28.89			1.63E+02	2.89E+01
	26	390.79	2.38E+01	15.37			2.38E+01	1.54E+01

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
CD-109	1.00	88.03	*	3.72	6.26E+01
SN-113	0.93	255.12		1.93	
		391.69	*	61.90	1.96E+01
I-129	0.87	29.78	*	57.00	3.07E+01
		33.60	*	13.20	4.62E+01
		39.58		7.52	

0213

Analysis Report for 2112077-09

MW-9D

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
BA-133	0.99	81.00 *		34.06	3.73E+02	2.98E+01
		302.84 *		18.33	4.67E+02	7.70E+01
		356.01 *		62.05	3.65E+02	3.96E+01
PA-234M	0.98	9.89 *		89.00	5.81E-04	6.52E-04
		21.72 *		64.90	1.58E-01	8.21E-02
		37.93 *		23.75	7.95E+00	1.75E+00
TH-234	0.92	63.29 *		3.80	4.79E+02	8.40E+01
AM-241	0.90	59.54 *		35.90	5.07E+01	8.90E+00

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
CD-109	1.000	6.26E+01	7.04E+01	
SN-113	0.933	1.96E+01	1.27E+01	
I-129	0.877	3.20E+01	1.46E+00	
BA-133	0.999	3.79E+02	2.27E+01	
PA-234M	0.980	5.92E-04	6.52E-04	
? TH-234	0.926	4.79E+02	8.40E+01	
X NP-237	0.952			
? AM-241	0.901	5.07E+01	8.90E+00	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-09  
MW-9D

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 1/10/2022 11:05:47AM  
Peak Locate From Channel : 1  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	6	52.79	6.11111E-02	25.94	Sum
	8	65.88	1.24749E-01	19.31	Sum
	9	70.95	1.54667E-02	53.88	Sum
M	10	79.47	5.25703E-02	24.72	
m	12	81.98	1.79760E-02	34.97	Sum
	14	91.91	2.55453E-02	56.12	Sum
	15	100.45	1.56019E-02	59.36	Sum
	16	111.74	2.03895E-01	9.88	Sum
	17	115.78	8.13889E-02	18.00	Sum
	18	160.24	4.78214E-02	20.43	Sum
	19	276.18	6.14973E-02	15.49	
M	20	302.01	1.45487E-02	83.18	
	22	333.55	7.13457E-02	15.09	Sum
	24	383.60	9.96702E-02	11.98	Sum
	25	386.61	1.81556E-01	8.84	Sum

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

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## NUCLIDE MDA REPORT

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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-09

MW-9D

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	6.63E-07	6.63E-07	-4.77E-06	3.14E-07
	3.31	12.30	7.64E-06		-2.15E-05	3.59E-06
FE-55	5.89	24.50	1.48E-04	1.48E-04	3.16E-05	6.66E-05
CO-57	122.06	85.51	9.68E+00	9.68E+00	1.07E+00	4.36E+00
	136.48	10.60	8.79E+01		-3.85E+00	3.94E+01
NI-59	6.92	29.80	3.55E-04	3.55E-04	2.81E-05	1.60E-04
MO-93	16.59	52.90	2.85E-02	2.85E-02	3.19E-03	1.29E-02
	18.60	10.00	2.87E-01		-2.03E-01	1.31E-01
NB-93M	16.57	9.43	1.59E-01	1.59E-01	1.78E-02	7.18E-02
+ CD-109	88.03	* 3.72	1.14E+02	1.14E+02	6.26E+01	5.07E+01
+ SN-113	255.12	1.93	5.39E+02	1.83E+01	-1.65E+02	2.31E+02
	391.69	* 61.90	1.83E+01		1.96E+01	8.06E+00
SN-119M	23.87	16.10	5.19E-01	4.61E-01	1.14E-01	2.35E-01
	25.10	22.70	4.61E-01		-1.61E-02	2.10E-01
+ I-129	29.78	* 57.00	1.36E+00	1.36E+00	3.07E+01	6.59E-01
	33.60	* 13.20	5.62E+00		4.62E+01	2.68E+00
	39.58	7.52	6.93E+00		-1.27E-01	3.11E+00
+ BA-133	81.00	* 34.06	2.17E+01	1.70E+01	3.73E+02	1.03E+01
	302.84	* 18.33	3.92E+01		4.67E+02	1.55E+01
	356.01	* 62.05	1.70E+01		3.65E+02	7.33E+00
CE-139	165.85	80.35	1.53E+01	1.53E+01	-3.62E-01	6.92E+00
CE-144	133.54	10.80	9.08E+01	9.08E+01	2.34E+01	4.11E+01
HG-203	279.19	77.30	1.26E+01	1.26E+01	-8.60E+00	5.31E+00
PB-210	46.50	4.25	2.04E+01	2.04E+01	3.42E+00	9.12E+00
TH-231	25.64	14.70	8.47E-01	8.47E-01	-4.91E-02	3.88E-01
	84.21	6.40	8.48E+01		7.37E+01	3.91E+01
+ PA-234M	9.89	* 89.00	1.06E-03	1.06E-03	5.81E-04	4.76E-04
	21.72	* 64.90	1.25E-01		1.58E-01	5.94E-02
	37.93	* 23.75	3.42E+00		7.95E+00	1.63E+00
+ TH-234	63.29	* 3.80	9.85E+01	9.85E+01	4.79E+02	4.66E+01
NP-237	29.37	* 14.00	5.52E+00	5.52E+00	1.25E+02	2.68E+00
	86.50	* 12.60	3.36E+01		1.85E+01	1.50E+01
U-237	97.08	16.30	3.26E+01	2.92E+01	-1.46E+01	1.46E+01
	101.07	26.30	2.92E+01		3.59E+00	1.35E+01
	114.00	12.30	6.83E+01		-1.52E+02	3.11E+01
	208.01	22.00	6.20E+01		2.46E+01	2.78E+01
+ AM-241	59.54	* 35.90	1.04E+01	1.04E+01	5.07E+01	4.93E+00
AM-243	74.67	66.00	5.22E+00	5.22E+00	-5.59E-01	2.36E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction



*KB*  
*1/10/22*

Analysis Report for 2112077-10  
SW-BO 13

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-10  
 Sample Description : SW-BO 13  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:57:41AM  
 Acquisition Started : 1/10/2022 10:51:14AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE1  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.2 seconds  
  
 Dead Time : 0.02 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 32 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/14/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118882

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:06:17AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-10

SW-BO 13

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	52.71	48 -	56	52.40	6.14E+01	40.64	2.17E+02	3.44
M	2	62.11	57 -	71	61.80	2.18E+02	45.01	1.87E+02	2.23
m	3	66.39	57 -	71	66.08	1.03E+02	41.15	1.93E+02	2.23
	4	81.51	75 -	86	81.19	7.11E+02	73.40	3.18E+02	1.98
	5	102.52	98 -	106	102.20	3.13E+01	35.01	1.65E+02	5.33
M	6	112.26	107 -	119	111.94	2.23E+02	39.90	1.17E+02	2.78
m	7	116.86	107 -	119	116.55	4.85E+01	31.86	9.89E+01	2.25
	8	277.03	272 -	280	276.69	5.42E+01	28.80	9.37E+01	1.87
M	9	303.50	298 -	311	303.16	1.19E+02	32.50	1.09E+02	2.50
m	10	307.82	298 -	311	307.48	2.06E+01	29.46	1.23E+02	2.58
M	11	334.21	327 -	342	333.87	7.50E+01	24.00	3.64E+01	2.51
m	12	338.10	327 -	342	337.76	2.48E+01	25.50	3.80E+01	2.93
	13	356.58	351 -	361	356.24	4.47E+02	51.45	1.12E+02	2.31
	14	366.37	362 -	372	366.02	3.04E+01	22.01	4.52E+01	2.70
M	15	386.86	379 -	395	386.51	2.03E+02	36.28	2.30E+01	2.80
m	16	391.86	379 -	395	391.51	4.34E+01	29.87	3.03E+01	2.80
	17	397.38	395 -	399	397.03	1.05E+01	8.65	7.00E+00	2.32
M	18	418.64	411 -	427	418.28	2.93E+01	20.73	3.18E+01	3.11
m	19	422.09	411 -	427	421.74	1.45E+01	19.84	3.38E+01	3.11
m	20	425.43	411 -	427	425.08	1.03E+01	12.29	2.36E+01	2.70
	21	437.29	431 -	441	436.94	8.28E+01	22.29	2.23E+01	2.35
	22	468.49	463 -	473	468.13	2.55E+01	11.93	5.04E+00	6.38
	23	555.39	551 -	557	555.02	7.11E+00	6.95	3.78E+00	1.90
	24	561.40	559 -	563	561.04	6.07E+00	5.85	1.86E+00	1.90
	25	843.72	840 -	846	843.33	4.25E+00	6.02	3.50E+00	1.09
	26	943.59	940 -	945	943.20	5.00E+00	4.47	0.00E+00	2.75
	27	1002.22	998 -	1004	1001.83	6.00E+00	4.90	0.00E+00	2.74

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:06:17AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118839.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	52.71	6.14E+01	40.64			6.14E+01	4.06E+01
M	2	62.11	2.18E+02	45.01	2.33E+01	2.32E+00	1.94E+02	4.51E+01

0218

Analysis Report for 2112077-10

SW-BO 13

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
m	3	66.39	1.03E+02	41.15			1.03E+02	4.12E+01
	4	81.51	7.11E+02	73.40			7.11E+02	7.34E+01
	5	102.52	3.13E+01	35.01			3.13E+01	3.50E+01
M	6	112.26	2.23E+02	39.90			2.23E+02	3.99E+01
m	7	116.86	4.85E+01	31.86			4.85E+01	3.19E+01
	8	277.03	5.42E+01	28.80			5.42E+01	2.88E+01
M	9	303.50	1.19E+02	32.50			1.19E+02	3.25E+01
m	10	307.82	2.06E+01	29.46			2.06E+01	2.95E+01
M	11	334.21	7.50E+01	24.00			7.50E+01	2.40E+01
m	12	338.10	2.48E+01	25.50	1.69E+00	1.30E+00	2.31E+01	2.55E+01
	13	356.58	4.47E+02	51.45			4.47E+02	5.15E+01
	14	366.37	3.04E+01	22.01			3.04E+01	2.20E+01
M	15	386.86	2.03E+02	36.28			2.03E+02	3.63E+01
m	16	391.86	4.34E+01	29.87			4.34E+01	2.99E+01
	17	397.38	1.05E+01	8.65			1.05E+01	8.65E+00
M	18	418.64	2.93E+01	20.73			2.93E+01	2.07E+01
m	19	422.09	1.45E+01	19.84			1.45E+01	1.98E+01
m	20	425.43	1.03E+01	12.29			1.03E+01	1.23E+01
	21	437.29	8.28E+01	22.29			8.28E+01	2.23E+01
	22	468.49	2.55E+01	11.93	0.00E+00	0.00E+00	2.55E+01	1.19E+01
	23	555.39	7.11E+00	6.95			7.11E+00	6.95E+00
	24	561.40	6.07E+00	5.85			6.07E+00	5.85E+00
	25	843.72	4.25E+00	6.02			4.25E+00	6.02E+00
	26	943.59	5.00E+00	4.47			5.00E+00	4.47E+00
	27	1002.22	6.00E+00	4.90	1.18E+00	7.15E-01	4.82E+00	4.95E+00

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.95	255.12	1.93		
		391.69	*	61.90	3.27E+01
BA-133	0.99	81.00	*	34.06	3.66E+02
		302.84	*	18.33	3.29E+02
					2.25E+01
					4.06E+01
					9.19E+01

0219

Analysis Report for 2112077-10  
SW-BO 13

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
BA-133	0.99	356.01	*	62.05	3.51E+02	4.28E+01
HG-203	0.88	279.19	*	77.30	3.60E+01	1.93E+01
TH-234	0.96	63.29	*	3.80	5.23E+02	1.22E+02

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
SN-113	0.953	3.27E+01	2.25E+01	
BA-133	0.992	3.56E+02	2.81E+01	
HG-203	0.887	3.60E+01	1.93E+01	
TH-234	0.965	5.23E+02	1.22E+02	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-10  
SW-BO 13

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 1/10/2022 11:06:17AM  
Peak Locate From Channel : 1  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	1	52.71	6.81699E-02	33.12	
m	3	66.39	1.14145E-01	20.03	
	5	102.52	3.47466E-02	55.97	Tol. U-237
M	6	112.26	2.47612E-01	8.95	Tol. U-237
m	7	116.86	5.39163E-02	32.83	
m	10	307.82	2.29268E-02	71.39	
M	11	334.21	8.33297E-02	16.00	
m	12	338.10	2.56377E-02	55.33	Sum
	14	366.37	3.37631E-02	36.21	Sum
M	15	386.86	2.25022E-01	8.96	Sum
	17	397.38	1.16667E-02	41.17	
M	18	418.64	3.25616E-02	35.37	Sum
m	19	422.09	1.60634E-02	68.63	
m	20	425.43	1.14511E-02	59.62	
	21	437.29	9.20449E-02	13.46	Sum
	22	468.49	2.83135E-02	23.40	
	23	555.39	7.90123E-03	48.84	Sum
	24	561.40	6.74603E-03	48.20	
	25	843.72	4.72222E-03	70.83	
	26	943.59	5.55556E-03	44.72	
	27	1002.22	5.35427E-03	51.37	

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

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## NUCLIDE MDA REPORT

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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

0221

Analysis Report for 2112077-10  
SW-BO 13

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	5.44E-07	5.44E-07	0.00E+00	0.00E+00
	3.31	12.30	6.51E-06		0.00E+00	0.00E+00
FE-55	5.89	24.50	1.09E-04	1.09E-04	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.56E+01	1.56E+01	1.13E+00	7.31E+00
	136.48	10.60	1.42E+02		4.47E+00	6.63E+01
NI-59	6.92	29.80	2.19E-04	2.19E-04	0.00E+00	0.00E+00
MO-93	16.59	52.90	8.08E-03	8.08E-03	0.00E+00	0.00E+00
	18.60	10.00	6.79E-02		0.00E+00	0.00E+00
NB-93M	16.57	9.43	4.51E-02	4.51E-02	0.00E+00	0.00E+00
CD-109	88.03	3.72	2.79E+02	2.79E+02	-7.81E+01	1.32E+02
+ SN-113	255.12	1.93	8.12E+02	2.96E+01	6.34E+01	3.70E+02
	391.69	* 61.90	2.96E+01		3.27E+01	1.38E+01
SN-119M	23.87	16.10	1.08E-01	9.18E-02	0.00E+00	0.00E+00
	25.10	22.70	9.18E-02		0.00E+00	0.00E+00
I-129	29.78	57.00	1.06E+00	1.06E+00	-1.57E+00	4.96E-01
	33.60	13.20	1.99E+01		7.79E+01	9.76E+00
	39.58	7.52	4.48E+01		3.67E+01	2.18E+01
+ BA-133	81.00	* 34.06	4.41E+01	3.99E+01	3.66E+02	2.13E+01
	302.84	* 18.33	1.90E+02		3.29E+02	9.11E+01
	356.01	* 62.05	3.99E+01		3.51E+02	1.89E+01
CE-139	165.85	80.35	2.33E+01	2.33E+01	-5.86E+00	1.09E+01
CE-144	133.54	10.80	1.29E+02	1.29E+02	-1.67E+01	6.03E+01
+ HG-203	279.19	* 77.30	2.89E+01	2.89E+01	3.60E+01	1.35E+01
PB-210	46.50	4.25	5.91E+01	5.91E+01	-9.58E-01	2.79E+01
TH-231	25.64	14.70	1.53E-01	1.53E-01	0.00E+00	0.00E+00
	84.21	6.40	3.47E+02		1.25E+03	1.70E+02
PA-234M	9.89	89.00	4.64E-04	4.64E-04	0.00E+00	0.00E+00
	21.72	64.90	1.90E-02		0.00E+00	0.00E+00
	37.93	23.75	1.50E+01		4.51E+01	7.36E+00
+ TH-234	63.29	* 3.80	2.69E+02	2.69E+02	5.23E+02	1.31E+02
NP-237	29.37	14.00	4.12E+00	4.12E+00	-6.11E+00	1.93E+00
	86.50	12.60	9.43E+01		7.23E+00	4.51E+01
U-237	97.08	16.30	6.61E+01	4.58E+01	-1.49E+01	3.11E+01
	101.07	26.30	4.58E+01		2.38E+01	2.16E+01
	114.00	12.30	1.95E+02		4.70E+02	9.42E+01
	208.01	22.00	9.37E+01		4.17E+01	4.39E+01
AM-241	59.54	35.90	2.08E+01	2.08E+01	1.86E+01	1.01E+01
AM-243	74.67	66.00	1.15E+01	1.15E+01	-3.25E-01	5.43E+00

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

Analysis Report for 2112077-11  
SW-BO 2

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-11  
 Sample Description : SW-BO 2  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:57:54AM  
 Acquisition Started : 1/10/2022 10:58:29AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE2  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.2 seconds  
  
 Dead Time : 0.02 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 27 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118883

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:13:32AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-11

SW-BO 2

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	35.61	37 -	41	37.21	3.04E+02	67.43	2.57E+02	1.65
	2	52.66	51 -	57	54.22	4.73E+01	31.66	1.49E+02	1.33
M	3	61.89	59 -	71	63.43	1.90E+02	36.84	1.29E+02	1.78
m	4	66.11	59 -	71	67.65	8.54E+01	31.13	1.33E+02	1.80
	5	81.13	78 -	87	82.64	7.65E+02	71.06	2.82E+02	1.48
M	6	111.94	108 -	131	113.38	1.72E+02	32.10	8.52E+01	1.84
m	7	116.71	108 -	131	118.15	3.05E+01	28.92	1.12E+02	2.36
	8	186.39	183 -	193	187.68	4.58E+01	38.29	1.72E+02	2.66
	9	219.35	218 -	223	220.58	2.20E+01	19.70	6.00E+01	2.59
	10	276.43	274 -	281	277.55	5.01E+01	25.22	7.37E+01	1.34
M	11	303.02	300 -	312	304.08	1.45E+02	26.86	3.06E+01	1.60
m	12	307.80	300 -	312	308.85	1.57E+01	15.27	5.30E+01	1.60
M	13	333.85	331 -	341	334.85	4.97E+01	19.80	4.00E+01	1.63
m	14	337.15	331 -	341	338.15	1.09E+01	15.87	4.00E+01	1.63
M	15	352.18	351 -	361	353.15	2.20E+01	12.23	1.03E+01	1.65
m	16	356.13	351 -	361	357.09	5.09E+02	45.97	1.59E+01	1.63
	17	364.31	363 -	368	365.26	1.22E+01	14.66	3.35E+01	1.12
	18	376.54	374 -	380	377.46	1.15E+01	12.71	2.10E+01	1.14
M	19	383.94	381 -	398	384.85	8.92E+01	21.71	1.42E+01	1.68
m	20	387.19	381 -	398	388.09	1.75E+02	28.41	1.17E+01	1.69
m	21	391.95	381 -	398	392.85	1.93E+01	13.24	1.03E+01	1.69
M	22	415.15	410 -	426	416.00	2.15E+01	13.99	2.06E+01	1.56
m	23	421.84	410 -	426	422.67	8.74E+00	12.77	8.82E+00	1.89
	24	437.16	434 -	440	437.96	7.82E+01	19.31	1.16E+01	1.39
	25	457.79	456 -	461	458.56	9.00E+00	6.00	0.00E+00	3.75
	26	468.05	465 -	471	468.80	1.95E+01	13.16	1.71E+01	1.30
	27	476.88	474 -	481	477.61	6.60E+00	8.49	6.80E+00	2.50
	28	512.22	509 -	519	512.89	3.51E+01	13.35	3.84E+00	3.13
	29	530.72	528 -	534	531.35	5.43E+00	6.34	3.14E+00	1.90

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:13:32AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118840.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
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0224



Analysis Report for 2112077-11

SW-BO 2

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	35.61	3.04E+02	67.43			3.04E+02	6.74E+01
	2	52.66	4.73E+01	31.66	2.30E-01	1.75E+00	4.71E+01	3.17E+01
M	3	61.89	1.90E+02	36.84	1.58E+00	1.58E+00	1.89E+02	3.69E+01
m	4	66.11	8.54E+01	31.13	1.35E+00	1.47E+00	8.40E+01	3.12E+01
	5	81.13	7.65E+02	71.06			7.65E+02	7.11E+01
M	6	111.94	1.72E+02	32.10			1.72E+02	3.21E+01
m	7	116.71	3.05E+01	28.92			3.05E+01	2.89E+01
	8	186.39	4.58E+01	38.29	1.06E+01	1.75E+00	3.53E+01	3.83E+01
	9	219.35	2.20E+01	19.70			2.20E+01	1.97E+01
	10	276.43	5.01E+01	25.22			5.01E+01	2.52E+01
M	11	303.02	1.45E+02	26.86			1.45E+02	2.69E+01
m	12	307.80	1.57E+01	15.27			1.57E+01	1.53E+01
M	13	333.85	4.97E+01	19.80			4.97E+01	1.98E+01
m	14	337.15	1.09E+01	15.87			1.09E+01	1.59E+01
M	15	352.18	2.20E+01	12.23	4.22E+00	1.28E+00	1.77E+01	1.23E+01
m	16	356.13	5.09E+02	45.97			5.09E+02	4.60E+01
	17	364.31	1.22E+01	14.66			1.22E+01	1.47E+01
	18	376.54	1.15E+01	12.71			1.15E+01	1.27E+01
M	19	383.94	8.92E+01	21.71			8.92E+01	2.17E+01
m	20	387.19	1.75E+02	28.41			1.75E+02	2.84E+01
m	21	391.95	1.93E+01	13.24			1.93E+01	1.32E+01
M	22	415.15	2.15E+01	13.99			2.15E+01	1.40E+01
m	23	421.84	8.74E+00	12.77			8.74E+00	1.28E+01
	24	437.16	7.82E+01	19.31			7.82E+01	1.93E+01
	25	457.79	9.00E+00	6.00			9.00E+00	6.00E+00
	26	468.05	1.95E+01	13.16			1.95E+01	1.32E+01
	27	476.88	6.60E+00	8.49			6.60E+00	8.49E+00
	28	512.22	3.51E+01	13.35	1.96E+01	1.28E+00	1.55E+01	1.34E+01
	29	530.72	5.43E+00	6.34			5.43E+00	6.34E+00

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
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0225

Analysis Report for 2112077-11  
SW-BO 2

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
SN-113	0.95	255.12	1.93		
		391.69 *	61.90	1.41E+01	9.66E+00
BA-133	1.00	81.00 *	34.06	3.94E+02	4.00E+01
		302.84 *	18.33	3.74E+02	7.22E+01
		356.01 *	62.05	3.80E+02	3.77E+01
PA-234M	0.98	9.89	89.00		
		21.72	64.90		
		37.93 *	23.75	4.19E+01	9.30E+00
TH-234	0.95	63.29 *	3.80	5.49E+02	1.08E+02
AM-241	0.86	59.54 *	35.90	5.81E+01	1.14E+01

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
SN-113	0.951	1.41E+01	9.66E+00	
BA-133	1.000	3.85E+02	2.57E+01	
PA-234M	0.982	4.19E+01	9.30E+00	
? TH-234	0.951	5.49E+02	1.08E+02	
? AM-241	0.868	5.81E+01	1.14E+01	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-11

SW-BO 2

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 11:13:32AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	2	52.66	5.23217E-02	33.67	
m	4	66.11	9.33819E-02	18.54	
M	6	111.94	1.91213E-01	9.33	Tol. U-237
m	7	116.71	3.38664E-02	47.44	Sum
	8	186.39	3.92105E-02	54.30	
	9	219.35	2.44444E-02	44.77	
	10	276.43	5.57088E-02	25.15	
m	12	307.80	1.74771E-02	48.55	
M	13	333.85	5.52216E-02	19.92	
m	14	337.15	1.21034E-02	72.87	Sum
M	15	352.18	1.97067E-02	34.66	
	17	364.31	1.36015E-02	59.89	Sum
	18	376.54	1.27778E-02	55.25	
M	19	383.94	9.91221E-02	12.17	Sum
m	20	387.19	1.94357E-01	8.12	
M	22	415.15	2.39336E-02	32.48	
m	23	421.84	9.70683E-03	73.07	
	24	437.16	8.68849E-02	12.35	Sum
	25	457.79	1.00000E-02	33.33	
	26	468.05	2.16270E-02	33.81	
	27	476.88	7.33333E-03	64.28	
	28	512.22	1.72352E-02	43.23	
	29	530.72	6.03175E-03	58.43	

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

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Analysis Report for 2112077-11

SW-BO 2

## NUCLIDE MDA REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	5.55E-06	5.55E-06	0.00E+00	0.00E+00
	3.31	12.30	5.93E-05		0.00E+00	0.00E+00
FE-55	5.89	24.50	5.43E-04	5.43E-04	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.29E+01	1.29E+01	-1.59E+00	5.96E+00
	136.48	10.60	1.22E+02		7.57E+01	5.66E+01
NI-59	6.92	29.80	9.37E-04	9.37E-04	0.00E+00	0.00E+00
MO-93	16.59	52.90	1.70E-02	1.70E-02	0.00E+00	0.00E+00
	18.60	10.00	1.33E-01		0.00E+00	0.00E+00
NB-93M	16.57	9.43	9.52E-02	9.52E-02	0.00E+00	0.00E+00
CD-109	88.03	3.72	1.90E+02	1.90E+02	-9.80E+00	8.76E+01
+ SN-113	255.12	1.93	5.45E+02	2.67E+01	2.70E+01	2.40E+02
	391.69	*	61.90	2.67E+01	1.41E+01	1.24E+01
SN-119M	23.87	16.10	1.81E-01	1.81E-01	0.00E+00	0.00E+00
	25.10	22.70	1.65E+00		4.45E-01	7.50E-01
I-129	29.78	57.00	7.49E+00	7.49E+00	6.39E+01	3.70E+00
	33.60	13.20	4.13E+01		-5.30E+00	2.04E+01
	39.58	7.52	2.24E+01		4.78E+00	1.04E+01
+ BA-133	81.00	*	34.06	2.00E+01	3.94E+02	1.89E+01
	302.84	*	18.33	1.12E+02	3.74E+02	5.25E+01
	356.01	*	62.05	2.00E+01	3.80E+02	8.97E+00
CE-139	165.85	80.35	1.86E+01	1.86E+01	4.53E+00	8.66E+00
CE-144	133.54	10.80	1.02E+02	1.02E+02	-6.38E+01	4.72E+01
HG-203	279.19	77.30	2.43E+01	2.43E+01	2.06E+01	1.13E+01
PB-210	46.50	4.25	5.58E+01	5.58E+01	1.45E+01	2.59E+01
TH-231	25.64	14.70	3.29E+00	3.29E+00	-2.16E+00	1.52E+00
	84.21	6.40	1.36E+02		-2.15E+03	6.40E+01
+ PA-234M	9.89	89.00	1.45E-03	1.45E-03	0.00E+00	0.00E+00
	21.72	64.90	3.37E-02		0.00E+00	0.00E+00
	37.93	*	23.75	1.35E+01	4.19E+01	6.55E+00
+ TH-234	63.29	*	3.80	2.45E+02	5.49E+02	1.19E+02
	NP-237	29.37	14.00	2.94E+01	2.94E+01	2.50E+02
U-237	86.50	12.60	6.12E+01		2.74E+01	2.85E+01
	97.08	16.30	5.07E+01	3.31E+01	5.44E+00	2.35E+01
	101.07	26.30	3.31E+01		-4.62E+00	1.53E+01
	114.00	12.30	1.57E+02		2.61E+02	7.55E+01
+ AM-241	208.01	22.00	6.62E+01		1.71E+01	3.04E+01
	59.54	*	35.90	2.60E+01	2.60E+01	5.81E+01
AM-243	74.67	66.00	9.63E+00	9.63E+00	-6.04E+00	4.50E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-11  
SW-BO 2

*KP*  
*1/10/22*

Analysis Report for 2112077-12  
MW-6

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-12  
 Sample Description : MW-6  
 Sample Type : RA RECOVERY

Sample Size : 1.000E+00 units  
 Facility : Countroom

Sample Taken On : 1/10/2022 9:58:02AM  
 Acquisition Started : 1/10/2022 10:58:49AM

Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE3  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 913.9 seconds

Dead Time : 1.53 %

Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 9 - 4096  
 Identification Energy Tolerance : 2.500 keV

Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :

Sample Number : 118884

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:14:06AM

Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-12

MW-6

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>ROI start</b>	<b>ROI end</b>	<b>Peak Centroid</b>	<b>Net Peak Area</b>	<b>Net Area Uncertainty</b>	<b>Continuum Counts</b>	<b>FWHM (keV)</b>
m	1	31.29	16 -	42	31.93	2.43E+03	124.18	5.66E+02	5.38
M	2	63.12	45 -	89	63.74	3.83E+02	94.30	7.19E+02	5.86
m	3	81.18	45 -	89	81.79	8.45E+02	78.68	3.44E+02	3.58
	4	113.08	106 -	122	113.67	2.60E+02	80.09	5.20E+02	4.05
	5	160.72	158 -	166	161.27	2.87E+01	35.41	1.75E+02	2.98
	6	275.65	272 -	280	276.12	2.66E+01	25.23	8.27E+01	2.03
	7	303.64	296 -	314	304.09	1.40E+02	45.69	1.33E+02	4.28
	8	335.03	324 -	343	335.46	1.02E+02	43.03	1.21E+02	3.90
	9	356.35	350 -	363	356.77	3.88E+02	49.91	1.02E+02	3.81
	10	387.27	379 -	398	387.67	2.82E+02	51.46	1.11E+02	5.19
M	11	415.03	410 -	428	415.42	5.34E+01	23.92	4.62E+01	4.59
m	12	421.04	410 -	428	421.42	1.97E+01	25.67	3.74E+01	4.59
	13	437.38	433 -	444	437.75	8.14E+01	27.57	5.51E+01	2.69
	14	468.20	461 -	479	468.55	4.65E+01	20.21	2.10E+01	1.58
	15	511.61	505 -	517	511.94	3.10E+01	11.14	0.00E+00	3.66
	16	554.01	548 -	560	554.31	1.18E+01	10.11	6.33E+00	5.11
	17	585.15	582 -	589	585.43	7.00E+00	5.29	0.00E+00	2.74

M = First peak in a multiplet region  
 m = Other peak in a multiplet region  
 F = Fitted singlet  
 Errors quoted at 2.00sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:14:06AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118841.CNF

	<b>Peak No.</b>	<b>Energy (keV)</b>	<b>Original Area</b>	<b>Orig. Area Uncertainty</b>	<b>Ambient Background</b>	<b>Backgr. Uncert.</b>	<b>Subtracted Area</b>	<b>Subtracted Uncert.</b>
m	1	31.29	2.43E+03	124.18	8.55E+01	2.11E-01	2.34E+03	1.24E+02
M	2	63.12	3.83E+02	94.30	5.73E+01	6.61E-01	3.26E+02	9.43E+01
m	3	81.18	8.45E+02	78.68			8.45E+02	7.87E+01
	4	113.08	2.60E+02	80.09			2.60E+02	8.01E+01
	5	160.72	2.87E+01	35.41			2.87E+01	3.54E+01
	6	275.65	2.66E+01	25.23			2.66E+01	2.52E+01
	7	303.64	1.40E+02	45.69	5.24E-01	4.63E-01	1.39E+02	4.57E+01
	8	335.03	1.02E+02	43.03			1.02E+02	4.30E+01
	9	356.35	3.88E+02	49.91			3.88E+02	4.99E+01
	10	387.27	2.82E+02	51.46			2.82E+02	5.15E+01
M	11	415.03	5.34E+01	23.92			5.34E+01	2.39E+01
m	12	421.04	1.97E+01	25.67			1.97E+01	2.57E+01

Analysis Report for 2112077-12

MW-6

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
13	437.38	8.14E+01	27.57			8.14E+01	2.76E+01
14	468.20	4.65E+01	20.21			4.65E+01	2.02E+01
15	511.61	3.10E+01	11.14	1.43E+01	1.43E+00	1.67E+01	1.12E+01
16	554.01	1.18E+01	10.11			1.18E+01	1.01E+01
17	585.15	7.00E+00	5.29	0.00E+00	0.00E+00	7.00E+00	5.29E+00

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.59	29.78 *	57.00	7.77E+01	4.14E+00
		33.60	13.20		
		39.58	7.52		
BA-133	0.99	81.00 *	34.06	3.72E+02	3.74E+01
		302.84 *	18.33		
		356.01 *	62.05		
TH-234	0.99	63.29 *	3.80	8.16E+02	2.37E+02
NP-237	0.60	29.37 *	14.00	3.16E+02	1.68E+01
		86.50	12.60		

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma



Analysis Report for 2112077-12

MW-6

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## INTERFERENCE CORRECTED REPORT

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	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
?	I-129	0.599	7.77E+01	4.14E+00	
	BA-133	0.996	3.69E+02	<del>2.89E+01</del>	
	TH-234	0.999	8.16E+02	2.37E+02	
?	NP-237	0.603	3.16E+02	1.68E+01	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

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Analysis Report for 2112077-12

MW-6

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 11:14:06AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	4	113.08	2.88764E-01	15.41	Sum
	5	160.72	3.18582E-02	61.75	Sum
	6	275.65	2.96078E-02	47.34	
	8	335.03	1.13708E-01	21.03	Sum
	10	387.27	3.13030E-01	9.13	Sum
M	11	415.03	5.92792E-02	22.41	
m	12	421.04	2.18608E-02	65.24	Sum
	13	437.38	9.04944E-02	16.92	Sum
	14	468.20	5.16569E-02	21.74	
	15	511.61	1.85125E-02	33.69	
	16	554.01	1.31481E-02	42.73	
	17	585.15	7.77778E-03	37.80	

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	1.29E-04	1.29E-04	1.36E-04	6.08E-05
	3.31	12.30	1.33E-03		1.40E-03	6.25E-04
FE-55	5.89	24.50	1.38E-02	1.38E-02	1.99E-02	6.62E-03
CO-57	122.06	85.51	2.50E+01	2.50E+01	6.65E+00	1.21E+01

0234

Analysis Report for 2112077-12

MW-6

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CO-57	136.48	10.60	1.82E+02	2.50E+01	-7.95E+01	8.70E+01
NI-59	6.92	29.80	2.43E-02	2.43E-02	3.77E-02	1.17E-02
MO-93	16.59	52.90	5.61E-01	5.61E-01	5.42E-01	2.73E-01
	18.60	10.00	4.19E+00		7.34E-01	2.04E+00
NB-93M	16.57	9.43	3.14E+00	3.14E+00	3.03E+00	1.53E+00
CD-109	88.03	3.72	5.74E+02	5.74E+02	4.11E+01	2.81E+02
SN-113	255.12	1.93	1.30E+03	7.02E+01	7.93E+02	6.14E+02
	391.69	61.90	7.02E+01		1.64E+02	3.38E+01
SN-119M	23.87	16.10	1.12E+01	9.98E+00	4.57E+01	5.53E+00
	25.10	22.70	9.98E+00		6.00E+01	4.93E+00
+ I-129	29.78	* 57.00	6.69E+00	6.69E+00	7.77E+01	3.30E+00
	33.60	13.20	4.19E+01		4.03E+02	2.07E+01
	39.58	7.52	7.43E+01		3.83E+00	3.66E+01
+ BA-133	81.00	* 34.06	1.41E+02	4.91E+01	3.72E+02	6.98E+01
	302.84	* 18.33	2.03E+02		4.20E+02	9.72E+01
	356.01	* 62.05	4.91E+01		3.58E+02	2.33E+01
CE-139	165.85	80.35	2.91E+01	2.91E+01	-1.18E+00	1.39E+01
CE-144	133.54	10.80	1.76E+02	1.76E+02	-9.35E+01	8.40E+01
HG-203	279.19	77.30	3.23E+01	3.23E+01	-1.58E+00	1.52E+01
PB-210	46.50	4.25	1.01E+02	1.01E+02	9.88E+00	4.87E+01
TH-231	25.64	14.70	1.64E+01	1.64E+01	9.85E+01	8.09E+00
	84.21	6.40	3.82E+02		6.42E+00	1.88E+02
PA-234M	9.89	89.00	3.99E-02	3.99E-02	5.36E-02	1.93E-02
	21.72	64.90	1.21E+00		-2.38E+01	5.90E-01
	37.93	23.75	2.51E+01		1.09E+00	1.24E+01
+ TH-234	63.29	* 3.80	8.11E+02	8.11E+02	8.16E+02	4.02E+02
+ NP-237	29.37	* 14.00	2.72E+01	2.72E+01	3.16E+02	1.34E+01
	86.50	12.60	2.00E+02		2.32E+01	9.80E+01
U-237	97.08	16.30	9.47E+01	6.28E+01	2.63E+01	4.57E+01
	101.07	26.30	6.28E+01		-1.69E+00	3.03E+01
	114.00	12.30	2.15E+02		4.94E+02	1.05E+02
	208.01	22.00	1.14E+02		-6.36E+01	5.40E+01
AM-241	59.54	35.90	2.94E+01	2.94E+01	7.24E+01	1.44E+01
AM-243	74.67	66.00	2.79E+01	2.79E+01	-3.87E+00	1.37E+01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

KP  
1/10/22

Analysis Report for 2112077-13  
MW-10

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-13  
 Sample Description : MW-10  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:58:10AM  
 Acquisition Started : 1/10/2022 10:59:37AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE4  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 920.3 seconds  
  
 Dead Time : 2.21 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 9 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/22/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118885

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:15:00AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-13

MW-10

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	20.90	15 -	24	20.87	6.55E+01	55.84	4.03E+02	2.11
M	2	30.71	25 -	40	30.68	1.67E+03	87.77	1.72E+02	2.46
m	3	34.98	25 -	40	34.94	4.40E+02	80.77	1.37E+02	2.51
	4	53.05	49 -	57	53.00	7.12E+01	34.46	1.38E+02	2.35
M	5	61.30	57 -	69	61.25	1.97E+02	42.76	1.61E+02	2.72
m	6	65.31	57 -	69	65.25	1.14E+02	46.39	1.98E+02	2.73
	7	80.81	74 -	85	80.74	6.69E+02	67.88	2.45E+02	2.25
	8	102.23	100 -	104	102.15	1.85E+01	20.54	7.69E+01	2.16
	9	112.18	106 -	118	112.09	1.91E+02	54.03	2.53E+02	2.20
	10	276.29	270 -	280	276.10	3.23E+01	24.18	6.13E+01	1.46
	11	303.11	298 -	308	302.90	1.00E+02	35.06	1.12E+02	1.96
	12	355.94	350 -	360	355.70	3.24E+02	38.77	2.76E+01	2.44
	13	364.64	361 -	369	364.40	2.58E+01	13.74	1.24E+01	3.90
	14	386.29	378 -	396	386.03	2.35E+02	35.48	2.35E+01	5.00
	15	415.65	408 -	419	415.38	2.23E+01	20.59	4.14E+01	4.91
	16	437.03	432 -	441	436.75	5.10E+01	14.28	0.00E+00	2.38
	17	467.08	462 -	469	466.78	1.07E+01	11.83	1.65E+01	2.48
	18	750.13	745 -	753	749.67	9.00E+00	6.00	0.00E+00	2.88
	19	804.63	800 -	807	804.14	7.00E+00	5.29	0.00E+00	1.16

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:15:00AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118842.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	20.90	6.55E+01	55.84			6.55E+01	5.58E+01
M	2	30.71	1.67E+03	87.77			1.67E+03	8.78E+01
m	3	34.98	4.40E+02	80.77			4.40E+02	8.08E+01
	4	53.05	7.12E+01	34.46			7.12E+01	3.45E+01
M	5	61.30	1.97E+02	42.76	1.20E+01	2.36E+00	1.85E+02	4.28E+01
m	6	65.31	1.14E+02	46.39	1.20E+01	2.36E+00	1.02E+02	4.64E+01
	7	80.81	6.69E+02	67.88			6.69E+02	6.79E+01
	8	102.23	1.85E+01	20.54			1.85E+01	2.05E+01
	9	112.18	1.91E+02	54.03			1.91E+02	5.40E+01
	10	276.29	3.23E+01	24.18			3.23E+01	2.42E+01

0237

Analysis Report for 2112077-13

MW-10

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
11	303.11	1.00E+02	35.06			1.00E+02	3.51E+01
12	355.94	3.24E+02	38.77			3.24E+02	3.88E+01
13	364.64	2.58E+01	13.74			2.58E+01	1.37E+01
14	386.29	2.35E+02	35.48			2.35E+02	3.55E+01
15	415.65	2.23E+01	20.59			2.23E+01	2.06E+01
16	437.03	5.10E+01	14.28			5.10E+01	1.43E+01
17	467.08	1.07E+01	11.83			1.07E+01	1.18E+01
18	750.13	9.00E+00	6.00			9.00E+00	6.00E+00
19	804.63	7.00E+00	5.29			7.00E+00	5.29E+00

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.87	29.78 *	57.00	3.37E+01	1.77E+00
		33.60 *	13.20	5.93E+01	1.09E+01
		39.58	7.52		
BA-133	0.99	81.00 *	34.06	3.21E+02	3.48E+01
		302.84 *	18.33	3.58E+02	1.27E+02
		356.01 *	62.05	3.40E+02	4.31E+01
TH-234	0.90	63.29 *	3.80	4.28E+02	9.97E+01
AM-241	0.92	59.54 *	35.90	4.53E+01	1.06E+01

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

Analysis Report for 2112077-13  
MW-10

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## INTERFERENCE CORRECTED REPORT

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<i>Nuclide Name</i>	<i>Nuclide Id Confidence</i>	<i>Wt mean Activity (pCi/units)</i>	<i>Wt mean Activity Uncertainty</i>	<i>Comments</i>
I-129	0.872	3.44E+01	1.75E+00	
BA-133	0.999	3.30E+02	2.65E+01	
? TH-234	0.904	4.28E+02	9.97E+01	
X NP-237	0.702			
? AM-241	0.924	4.53E+01	1.06E+01	

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

Errors quoted at 2.000sigma

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Analysis Report for 2112077-13  
MW-10

**UNIDENTIFIED PEAKS**

Peak Locate Performed on : 1/10/2022 11:15:00AM  
Peak Locate From Channel : 1  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
1	20.90	7.27591E-02	42.64	Tol.	PA-234M
m 4	53.05	7.90556E-02	24.22		
m 6	65.31	1.13125E-01	22.81	Sum	
8	102.23	2.05848E-02	55.43	Tol.	U-237
9	112.18	2.12753E-01	14.11	Sum	
10	276.29	3.59259E-02	37.39		
13	364.64	2.86458E-02	26.64	Sum	
14	386.29	2.61368E-01	7.54	Sum	
15	415.65	2.47804E-02	46.16	Sum	
16	437.03	5.66667E-02	14.00	Sum	
17	467.08	1.19298E-02	55.10		
18	750.13	1.00000E-02	33.33		
19	804.63	7.77778E-03	37.80		

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

**NUCLIDE MDA REPORT**

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	2.38E-07	2.38E-07	0.00E+00	0.00E+00
	3.31	12.30	2.92E-06		0.00E+00	0.00E+00

0240



Analysis Report for 2112077-13

MW-10

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
FE-55	5.89	24.50	5.57E-04	5.57E-04	5.99E-05	2.50E-04
CO-57	122.06	85.51	1.75E+01	1.75E+01	-1.02E+01	8.24E+00
	136.48	10.60	1.53E+02		-5.38E+01	7.14E+01
NI-59	6.92	29.80	1.51E-03	1.51E-03	4.03E-04	6.97E-04
MO-93	16.59	52.90	1.51E-01	1.51E-01	1.76E-02	7.28E-02
	18.60	10.00	1.29E+00		1.06E+00	6.24E-01
NB-93M	16.57	9.43	8.42E-01	8.42E-01	9.84E-02	4.06E-01
CD-109	88.03	3.72	2.38E+02	2.38E+02	-1.76E+01	1.12E+02
SN-113	255.12	1.93	1.03E+03	4.95E+01	1.05E+02	4.71E+02
	391.69	61.90	4.95E+01		4.56E+01	2.33E+01
SN-119M	23.87	16.10	2.29E+00	2.29E+00	-4.72E+01	1.11E+00
	25.10	22.70	2.39E+00		-4.48E+01	1.16E+00
+ I-129	29.78	* 57.00	1.96E+00	1.96E+00	3.37E+01	9.51E-01
	33.60	* 13.20	1.29E+01		5.93E+01	6.29E+00
	39.58	7.52	2.35E+01		-1.49E+00	1.13E+01
+ BA-133	81.00	* 34.06	3.59E+01	2.77E+01	3.21E+02	1.73E+01
	302.84	* 18.33	1.79E+02		3.58E+02	8.47E+01
	356.01	* 62.05	2.77E+01		3.40E+02	1.24E+01
CE-139	165.85	80.35	2.53E+01	2.53E+01	-1.03E+01	1.19E+01
CE-144	133.54	10.80	1.48E+02	1.48E+02	1.98E+01	6.91E+01
HG-203	279.19	77.30	3.04E+01	3.04E+01	-1.73E+00	1.41E+01
PB-210	46.50	4.25	4.53E+01	4.53E+01	7.65E+00	2.13E+01
TH-231	25.64	14.70	5.79E+00	5.79E+00	-1.74E+01	2.84E+00
	84.21	6.40	3.44E+02		1.71E+01	1.68E+02
PA-234M	9.89	89.00	5.40E-03	5.40E-03	5.42E-03	2.57E-03
	21.72	64.90	3.69E-01		-1.83E-01	1.78E-01
	37.93	23.75	1.02E+01		7.26E-01	4.96E+00
+ TH-234	63.29	* 3.80	1.88E+02	1.88E+02	4.28E+02	9.10E+01
NP-237	29.37	* 14.00	7.97E+00	7.97E+00	1.37E+02	3.87E+00
	86.50	12.60	1.07E+02		-1.97E+01	5.16E+01
U-237	97.08	16.30	7.15E+01	4.62E+01	3.43E+00	3.38E+01
	101.07	26.30	4.62E+01		-9.44E+00	2.18E+01
	114.00	12.30	1.95E+02		4.13E+02	9.41E+01
	208.01	22.00	1.07E+02		-1.57E-01	4.99E+01
+ AM-241	59.54	* 35.90	1.99E+01	1.99E+01	4.53E+01	9.64E+00
AM-243	74.67	66.00	1.36E+01	1.36E+01	-1.92E+00	6.51E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-14  
MW-5

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## GAMMA SPECTRUM ANALYSIS

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Sample Identification : 2112077-14  
 Sample Description : MW-5  
 Sample Type : RA RECOVERY  
  
 Sample Size : 1.000E+00 units  
 Facility : Countroom  
  
 Sample Taken On : 1/10/2022 9:58:20AM  
 Acquisition Started : 1/10/2022 11:06:25AM  
  
 Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE5  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 1019.6 seconds  
  
 Dead Time : 11.73 %  
  
 Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 2 - 4096  
 Identification Energy Tolerance : 2.500 keV  
  
 Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :  
  
 Sample Number : 118886

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## PEAK ANALYSIS REPORT

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Peak Analysis Performed on : 1/10/2022 11:23:27AM

Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-14

MW-5

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	16.64	153 -	164	159.35	1.11E+01	11.83	1.59E+01	0.49
	2	20.91	192 -	209	202.40	7.66E+01	33.47	1.01E+02	0.52
	3	30.74	288 -	317	301.49	2.07E+03	109.91	3.04E+02	0.65
M	4	34.84	330 -	363	342.83	4.57E+02	51.22	6.49E+01	0.65
m	5	35.78	330 -	363	352.27	1.13E+02	53.07	4.86E+01	0.80
	6	53.10	513 -	536	526.83	5.01E+01	27.57	5.58E+01	0.34
	7	61.52	598 -	621	611.70	2.52E+02	36.44	3.20E+01	0.70
	8	65.71	642 -	666	653.94	9.70E+01	43.04	1.42E+02	0.44
M	9	79.55	774 -	819	793.46	5.50E+01	67.22	9.75E+01	1.44
m	10	80.88	774 -	819	806.87	8.49E+02	60.25	5.00E+01	0.65
	11	111.79	1108 -	1129	1118.34	1.75E+02	37.12	8.23E+01	0.58
	12	115.89	1152 -	1169	1159.72	3.11E+01	24.98	7.78E+01	0.19
	13	276.31	2763 -	2787	2776.83	4.16E+01	15.30	8.78E+00	0.46
M	14	302.41	3027 -	3053	3040.00	1.41E+02	23.28	1.04E+01	1.07
m	15	303.19	3027 -	3053	3047.83	1.92E+01	17.42	4.80E+00	0.67
	16	307.12	3074 -	3096	3087.41	3.20E+01	11.31	0.00E+00	0.88
M	17	333.26	3339 -	3365	3351.00	6.21E+01	18.03	3.13E+00	1.09
m	18	333.98	3339 -	3365	3358.27	3.45E+01	16.03	4.37E+00	0.88
	19	355.89	3563 -	3590	3579.20	4.18E+02	42.82	1.87E+01	0.83
M	20	383.23	3843 -	3871	3854.86	1.56E+01	20.35	5.85E+00	1.25
m	21	383.94	3843 -	3871	3862.00	1.60E+02	20.20	9.61E+00	1.13
M	22	386.12	3875 -	3901	3884.00	1.21E+01	22.20	1.59E+01	1.14
m	23	386.74	3875 -	3901	3890.18	1.12E+02	27.41	2.41E+01	0.93
	24	390.87	3915 -	3943	3931.89	3.64E+01	18.07	2.32E+01	1.34

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:23:27AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118843.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	16.64	1.11E+01	11.83			1.11E+01	1.18E+01
	2	20.91	7.66E+01	33.47	8.71E+00	6.63E-01	6.79E+01	3.35E+01
	3	30.74	2.07E+03	109.91	6.35E+00	8.10E-01	2.06E+03	1.10E+02
M	4	34.84	4.57E+02	51.22	1.59E+00	6.48E-01	4.55E+02	5.12E+01
m	5	35.78	1.13E+02	53.07	1.59E+00	6.48E-01	1.11E+02	5.31E+01

0243

Analysis Report for 2112077-14

MW-5

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	6	53.10	5.01E+01	27.57			5.01E+01	2.76E+01
	7	61.52	2.52E+02	36.44	3.32E+00	6.94E-01	2.49E+02	3.64E+01
	8	65.71	9.70E+01	43.04			9.70E+01	4.30E+01
M	9	79.55	5.50E+01	67.22			5.50E+01	6.72E+01
m	10	80.88	8.49E+02	60.25			8.49E+02	6.02E+01
	11	111.79	1.75E+02	37.12	7.94E-01	4.65E-01	1.74E+02	3.71E+01
	12	115.89	3.11E+01	24.98			3.11E+01	2.50E+01
	13	276.31	4.16E+01	15.30			4.16E+01	1.53E+01
M	14	302.41	1.41E+02	23.28			1.41E+02	2.33E+01
m	15	303.19	1.92E+01	17.42			1.92E+01	1.74E+01
	16	307.12	3.20E+01	11.31			3.20E+01	1.13E+01
M	17	333.26	6.21E+01	18.03			6.21E+01	1.80E+01
m	18	333.98	3.45E+01	16.03			3.45E+01	1.60E+01
	19	355.89	4.18E+02	42.82			4.18E+02	4.28E+01
M	20	383.23	1.56E+01	20.35			1.56E+01	2.03E+01
m	21	383.94	1.60E+02	20.20			1.60E+02	2.02E+01
M	22	386.12	1.21E+01	22.20			1.21E+01	2.22E+01
m	23	386.74	1.12E+02	27.41			1.12E+02	2.74E+01
	24	390.87	3.64E+01	18.07			3.64E+01	1.81E+01

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
MO-93	0.79	16.59	*	52.90	1.13E-02	1.21E-02
		18.60		10.00		
NB-93M	1.00	16.57	*	9.43	6.37E-02	6.80E-02
SN-113	0.93	255.12		1.93		
		391.69	*	61.90	3.00E+01	1.49E+01
I-129	0.87	29.78	*	57.00	2.86E+01	1.53E+00
		33.60	*	13.20	4.35E+01	4.90E+00
		39.58		7.52		
BA-133	0.99	81.00	*	34.06	3.59E+02	2.89E+01
		302.84	*	18.33	5.82E+01	5.29E+01

0244

Analysis Report for 2112077-14  
MW-5

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>		<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
BA-133	0.99	356.01 *		62.05	3.59E+02	3.97E+01
TH-234	0.92	63.29 *		3.80	4.88E+02	7.22E+01
AM-241	0.90	59.54 *		35.90	5.17E+01	7.64E+00

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
?	MO-93	0.799	1.13E-02	1.21E-02	
?	NB-93M	1.000	6.37E-02	6.80E-02	
	SN-113	0.937	3.00E+01	1.49E+01	
	I-129	0.877	2.99E+01	1.46E+00	
	BA-133	0.999	3.10E+02	2.14E+01	
?	TH-234	0.923	4.88E+02	7.22E+01	
X	NP-237	0.731			
?	AM-241	0.904	5.17E+01	7.64E+00	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-14  
MW-5

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 1/10/2022 11:23:27AM  
Peak Locate From Channel : 1  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide	
	2	20.91	7.54147E-02	24.66	Tol.	MO-93 PA-234M
m	5	35.78	1.23633E-01	23.85	Tol.	PA-234M
	6	53.10	5.56553E-02	27.52	Sum	
	8	65.71	1.07751E-01	22.19	Sum	
M	9	79.55	6.11657E-02	61.06	Sum	
	11	111.79	1.93404E-01	10.66	Sum	
	12	115.89	3.45635E-02	40.16	Sum	
	13	276.31	4.62319E-02	18.38		
M	14	302.41	1.56403E-01	8.27	Tol.	BA-133
	16	307.12	3.55556E-02	17.68		
M	17	333.26	6.90188E-02	14.51	Sum	
m	18	333.98	3.83246E-02	23.24	Sum	
M	20	383.23	1.73294E-02	65.24	Sum	
m	21	383.94	1.78112E-01	6.30	Sum	
M	22	386.12	1.34867E-02	91.44	Sum	
m	23	386.74	1.24421E-01	12.24	Sum	

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

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## NUCLIDE MDA REPORT

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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-14

MW-5

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	1.25E-06	1.25E-06	-1.07E-05	6.06E-07
	3.31	12.30	1.13E-05		-6.30E-05	5.40E-06
FE-55	5.89	24.50	1.64E-04	1.64E-04	1.52E-05	7.45E-05
CO-57	122.06	85.51	9.36E+00	9.36E+00	6.02E+00	4.20E+00
	136.48	10.60	9.65E+01		2.64E+01	4.38E+01
NI-59	6.92	29.80	3.32E-04	3.32E-04	-2.28E-04	1.49E-04
+ MO-93	16.59	* 52.90	1.93E-02	1.93E-02	1.13E-02	8.25E-03
	18.60	10.00	2.84E-01		-1.16E-01	1.29E-01
+ NB-93M	16.57	* 9.43	1.08E-01	1.08E-01	6.37E-02	4.63E-02
CD-109	88.03	3.72	1.38E+02	1.38E+02	2.16E+01	6.26E+01
+ SN-113	255.12	1.93	5.58E+02	2.05E+01	5.64E+01	2.40E+02
	391.69	* 61.90	2.05E+01		3.00E+01	9.12E+00
SN-119M	23.87	16.10	4.89E-01	4.49E-01	-2.62E-02	2.21E-01
	25.10	22.70	4.49E-01		1.22E-02	2.03E-01
+ I-129	29.78	* 57.00	1.45E+00	1.45E+00	2.86E+01	7.06E-01
	33.60	* 13.20	5.91E+00		4.35E+01	2.82E+00
	39.58	7.52	6.56E+00		4.55E+00	2.93E+00
+ BA-133	81.00	* 34.06	2.74E+01	2.04E+01	3.59E+02	1.31E+01
	302.84	* 18.33	4.93E+01		5.82E+01	2.06E+01
	356.01	* 62.05	2.04E+01		3.59E+02	9.03E+00
CE-139	165.85	80.35	1.38E+01	1.38E+01	-1.51E+00	6.19E+00
CE-144	133.54	10.80	7.46E+01	7.46E+01	-2.68E+01	3.30E+01
HG-203	279.19	77.30	1.58E+01	1.58E+01	-1.30E+01	6.93E+00
PB-210	46.50	4.25	1.67E+01	1.67E+01	-6.66E+00	7.30E+00
TH-231	25.64	14.70	7.57E-01	7.57E-01	-5.55E-01	3.43E-01
	84.21	6.40	7.21E+01		1.59E+01	3.27E+01
PA-234M	9.89	89.00	1.17E-03	1.17E-03	8.70E-04	5.35E-04
	21.72	64.90	1.38E-01		-6.32E-02	6.50E-02
	37.93	23.75	1.76E+00		-1.52E-01	7.83E-01
+ TH-234	63.29	* 3.80	6.43E+01	6.43E+01	4.88E+02	2.95E+01
NP-237	29.37	* 14.00	5.91E+00	5.91E+00	1.16E+02	2.88E+00
	86.50	12.60	3.42E+01		-4.14E+00	1.53E+01
U-237	97.08	16.30	4.02E+01	2.48E+01	1.67E+01	1.84E+01
	101.07	26.30	2.48E+01		1.24E+00	1.12E+01
	114.00	12.30	6.84E+01		-1.69E+02	3.12E+01
	208.01	22.00	5.53E+01		-4.79E+00	2.44E+01
+ AM-241	59.54	* 35.90	6.81E+00	6.81E+00	5.17E+01	3.12E+00
AM-243	74.67	66.00	5.44E+00	5.44E+00	-3.58E-01	2.47E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

LP  
1/10/22

Analysis Report for 2112077-15  
MW-4

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-15  
 Sample Description : MW-4  
 Sample Type : RA RECOVERY

Sample Size : 1.000E+00 units  
 Facility : Countroom

Sample Taken On : 1/10/2022 9:58:29AM  
 Acquisition Started : 1/10/2022 11:06:35AM

Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE1  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.2 seconds

Dead Time : 0.02 %

Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 32 - 4096  
 Identification Energy Tolerance : 2.500 keV

Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/14/2021  
 Efficiency Calibration Description :

Sample Number : 118887

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:21:38AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	52.93	48 -	73	52.62	5.64E+01	39.95	1.84E+02	2.68
m	2	61.93	48 -	73	61.62	2.58E+02	50.60	2.31E+02	2.70
m	3	66.75	48 -	73	66.44	8.42E+01	49.40	2.64E+02	2.71
	4	81.39	76 -	86	81.07	7.80E+02	75.34	3.41E+02	1.89
M	5	112.35	107 -	120	112.03	2.25E+02	45.49	1.69E+02	3.06
m	6	116.76	107 -	120	116.44	3.47E+01	36.77	1.58E+02	2.54
	7	133.60	129 -	138	133.28	3.52E+01	34.01	1.46E+02	5.74
	8	160.43	155 -	164	160.11	3.78E+01	39.29	1.96E+02	4.39
	9	227.85	222 -	233	227.52	3.84E+01	36.00	1.39E+02	5.62
	10	240.19	234 -	246	239.86	4.28E+01	32.43	1.02E+02	3.93
M	11	265.56	264 -	281	265.22	1.07E+01	8.43	2.06E+01	2.45
m	12	271.11	264 -	281	270.78	1.84E+01	17.41	4.53E+01	2.46
m	13	276.56	264 -	281	276.22	7.53E+01	21.33	3.95E+01	2.46
	14	303.68	296 -	310	303.34	1.73E+02	38.40	8.28E+01	2.65
	15	325.92	323 -	328	325.58	1.43E+01	11.53	1.54E+01	3.59
M	16	332.10	329 -	360	331.75	3.61E+01	17.12	1.59E+01	3.03
m	17	356.56	329 -	360	356.21	4.99E+02	47.62	5.37E+01	2.22
M	18	384.31	380 -	398	383.96	1.26E+02	29.83	3.12E+01	2.48
m	19	387.40	380 -	398	387.06	2.15E+02	38.23	2.42E+01	2.41
m	20	391.81	380 -	398	391.46	3.77E+01	23.62	1.57E+01	2.30
	21	418.22	410 -	426	417.87	9.18E+01	26.85	3.24E+01	8.82
	22	437.34	432 -	440	436.99	1.07E+02	23.35	1.87E+01	2.17
M	23	468.59	464 -	479	468.24	1.77E+01	12.17	1.62E+01	2.60
m	24	472.59	464 -	479	472.24	1.14E+01	12.49	7.90E+00	2.60
	25	1024.19	1020 -	1025	1023.80	5.00E+00	4.47	0.00E+00	1.16
	26	1076.53	1072 -	1079	1076.14	7.11E+00	7.21	3.78E+00	2.86

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:21:38AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118839.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	52.93	5.64E+01	39.95			5.64E+01	3.99E+01
m	2	61.93	2.58E+02	50.60	2.33E+01	2.32E+00	2.35E+02	5.06E+01
m	3	66.75	8.42E+01	49.40			8.42E+01	4.94E+01

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	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	4	81.39	7.80E+02	75.34			7.80E+02	7.53E+01
M	5	112.35	2.25E+02	45.49			2.25E+02	4.55E+01
m	6	116.76	3.47E+01	36.77			3.47E+01	3.68E+01
	7	133.60	3.52E+01	34.01			3.52E+01	3.40E+01
	8	160.43	3.78E+01	39.29			3.78E+01	3.93E+01
	9	227.85	3.84E+01	36.00			3.84E+01	3.60E+01
	10	240.19	4.28E+01	32.43	4.91E+00	1.64E+00	3.79E+01	3.25E+01
M	11	265.56	1.07E+01	8.43			1.07E+01	8.43E+00
m	12	271.11	1.84E+01	17.41			1.84E+01	1.74E+01
m	13	276.56	7.53E+01	21.33			7.53E+01	2.13E+01
	14	303.68	1.73E+02	38.40			1.73E+02	3.84E+01
	15	325.92	1.43E+01	11.53			1.43E+01	1.15E+01
M	16	332.10	3.61E+01	17.12			3.61E+01	1.71E+01
m	17	356.56	4.99E+02	47.62			4.99E+02	4.76E+01
M	18	384.31	1.26E+02	29.83			1.26E+02	2.98E+01
m	19	387.40	2.15E+02	38.23			2.15E+02	3.82E+01
m	20	391.81	3.77E+01	23.62			3.77E+01	2.36E+01
	21	418.22	9.18E+01	26.85			9.18E+01	2.69E+01
	22	437.34	1.07E+02	23.35			1.07E+02	2.33E+01
M	23	468.59	1.77E+01	12.17	0.00E+00	0.00E+00	1.77E+01	1.22E+01
m	24	472.59	1.14E+01	12.49			1.14E+01	1.25E+01
	25	1024.19	5.00E+00	4.47			5.00E+00	4.47E+00
	26	1076.53	7.11E+00	7.21			7.11E+00	7.21E+00

M = First peak in a multiplet region  
m = Other peak in a multiplet region  
F = Fitted singlet  
Errors quoted at 2.00sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.95	255.12	1.93		
		391.69	*	2.84E+01	1.78E+01
BA-133	0.99	81.00	*	4.00E+02	4.19E+01
		302.84	*	4.79E+02	1.10E+02
		356.01	*	3.91E+02	4.06E+01
CE-144	1.00	133.54	*	1.15E+02	1.11E+02

0250

Analysis Report for 2112077-15

MW-4

<b>Nuclide Name</b>	<b>Id Confidence</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Activity (pCi/units)</b>	<b>Activity Uncertainty</b>
TH-234	0.95	63.29 *	3.80	6.28E+02	1.36E+02
AM-241	0.86	59.54 *	35.90	6.65E+01	1.44E+01

\* = Energy line found in the spectrum.

- = Manually added nuclide.

? = Manually edited nuclide.

@ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
SN-113	0.953	2.84E+01	1.78E+01	
BA-133	0.992	4.01E+02	2.82E+01	
CE-144	1.000	1.15E+02	1.11E+02	
? TH-234	0.954	6.28E+02	1.36E+02	
? AM-241	0.863	6.65E+01	1.44E+01	

? = nuclide is part of an undetermined solution

X = nuclide rejected by the interference analysis

@ = nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 2.000sigma

Analysis Report for 2112077-15

MW-4

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 11:21:38AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M	1	52.93	6.26893E-02	35.40	
m	3	66.75	9.35790E-02	29.33	
M	5	112.35	2.50467E-01	10.09	
m	6	116.76	3.85835E-02	52.94	
	8	160.43	4.19608E-02	52.02	Sum
	9	227.85	4.26852E-02	46.85	
	10	240.19	4.20621E-02	42.89	
M	11	265.56	1.19319E-02	39.23	Sum
m	12	271.11	2.04289E-02	47.34	
m	13	276.56	8.36333E-02	14.17	
	15	325.92	1.58838E-02	40.34	
M	16	332.10	4.01127E-02	23.72	
M	18	384.31	1.40531E-01	11.79	Sum
m	19	387.40	2.39118E-01	8.88	Sum
	21	418.22	1.02016E-01	14.62	Sum
	22	437.34	1.18496E-01	10.95	Sum
M	23	468.59	1.96167E-02	34.45	
m	24	472.59	1.26715E-02	54.76	Sum
	25	1024.19	5.55556E-03	44.72	
	26	1076.53	7.90123E-03	50.70	

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Analysis Report for 2112077-15

MW-4

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	5.44E-07	5.44E-07	0.00E+00	0.00E+00
	3.31	12.30	6.51E-06		0.00E+00	0.00E+00
FE-55	5.89	24.50	1.09E-04	1.09E-04	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.64E+01	1.64E+01	4.10E+00	7.71E+00
	136.48	10.60	1.48E+02		3.32E+01	6.95E+01
NI-59	6.92	29.80	2.19E-04	2.19E-04	0.00E+00	0.00E+00
MO-93	16.59	52.90	8.08E-03	8.08E-03	0.00E+00	0.00E+00
	18.60	10.00	6.79E-02		0.00E+00	0.00E+00
NB-93M	16.57	9.43	4.51E-02	4.51E-02	0.00E+00	0.00E+00
CD-109	88.03	3.72	2.78E+02	2.78E+02	-1.76E+02	1.32E+02
+ SN-113	255.12	1.93	7.92E+02	3.39E+01	-2.65E+01	3.60E+02
	391.69	* 61.90	3.39E+01		2.84E+01	1.59E+01
SN-119M	23.87	16.10	1.08E-01	9.19E-02	0.00E+00	0.00E+00
	25.10	22.70	9.19E-02		0.00E+00	0.00E+00
I-129	29.78	57.00	1.05E+00	1.05E+00	-8.82E-01	4.93E-01
	33.60	13.20	1.85E+01		6.85E+01	9.05E+00
	39.58	7.52	3.91E+01		1.66E+01	1.89E+01
+ BA-133	81.00	* 34.06	4.41E+01	4.41E+01	4.00E+02	2.13E+01
	302.84	* 18.33	1.35E+02		4.79E+02	6.40E+01
	356.01	* 62.05	7.78E+01		3.91E+02	3.78E+01
CE-139	165.85	80.35	2.43E+01	2.43E+01	3.97E+00	1.14E+01
+ CE-144	133.54	* 10.80	1.80E+02	1.80E+02	1.15E+02	8.57E+01
HG-203	279.19	77.30	2.79E+01	2.79E+01	3.10E+01	1.30E+01
PB-210	46.50	4.25	5.54E+01	5.54E+01	2.32E+00	2.61E+01
TH-231	25.64	14.70	1.53E-01	1.53E-01	0.00E+00	0.00E+00
	84.21	6.40	3.66E+02		1.58E+03	1.79E+02
PA-234M	9.89	89.00	4.64E-04	4.64E-04	0.00E+00	0.00E+00
	21.72	64.90	1.90E-02		0.00E+00	0.00E+00
	37.93	23.75	1.37E+01		3.86E+01	6.67E+00
+ TH-234	63.29	* 3.80	4.55E+02	4.55E+02	6.28E+02	2.24E+02
NP-237	29.37	14.00	4.09E+00	4.09E+00	-3.43E+00	1.92E+00
	86.50	12.60	9.32E+01		-3.12E+01	4.45E+01
U-237	97.08	16.30	6.83E+01	4.13E+01	-4.11E+01	3.22E+01
	101.07	26.30	4.13E+01		-1.87E+00	1.94E+01
	114.00	12.30	1.99E+02		4.22E+02	9.61E+01
	208.01	22.00	8.55E+01		-5.15E+01	3.97E+01
+ AM-241	59.54	* 35.90	4.81E+01	4.81E+01	6.65E+01	2.37E+01
AM-243	74.67	66.00	1.26E+01	1.26E+01	2.31E+00	6.01E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

KP  
1/10/22

Analysis Report for 2112077-16  
MW-3

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-16  
 Sample Description : MW-3  
 Sample Type : RA RECOVERY

Sample Size : 1.000E+00 units  
 Facility : Countroom

Sample Taken On : 1/10/2022 9:58:36AM  
 Acquisition Started : 1/10/2022 11:14:19AM

Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE2  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 900.2 seconds

Dead Time : 0.02 %

Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 27 - 4096  
 Identification Energy Tolerance : 2.500 keV

Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :

Sample Number : 118888

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:29:22AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-16

MW-3

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
	1	35.56	37 - 39	37.16	2.22E+02	47.81	2.66E+02	1.62
	2	52.62	50 - 57	54.18	5.47E+01	33.65	1.53E+02	1.15
M	3	62.08	61 - 70	63.62	1.59E+02	31.89	9.41E+01	1.78
m	4	66.23	61 - 70	67.77	9.78E+01	28.86	8.45E+01	1.77
	5	81.10	78 - 86	82.61	6.87E+02	61.42	1.57E+02	1.52
	6	111.58	108 - 116	113.03	7.97E+01	42.81	2.31E+02	1.75
	7	276.52	274 - 284	277.64	5.15E+01	28.20	8.30E+01	1.88
	8	285.83	284 - 291	286.93	2.10E+01	15.10	2.40E+01	3.16
	9	302.81	302 - 307	303.87	1.19E+02	29.55	8.51E+01	1.27
	10	333.54	330 - 338	334.55	3.11E+01	26.09	8.59E+01	1.47
	11	356.13	353 - 360	357.10	4.75E+02	47.79	6.41E+01	1.40
M	12	384.24	382 - 395	385.15	7.99E+01	23.45	2.22E+01	1.68
m	13	387.25	382 - 395	388.15	8.24E+01	23.71	1.80E+01	1.69
m	14	390.98	382 - 395	391.88	2.33E+01	15.81	1.57E+01	1.69
	15	414.94	413 - 420	415.79	1.79E+01	20.88	6.23E+01	1.34
	16	437.05	434 - 441	437.86	7.19E+01	20.20	2.02E+01	1.43
	17	451.16	450 - 454	451.94	5.50E+00	5.85	3.00E+00	2.38
	18	468.02	465 - 470	468.77	9.69E+00	10.00	1.26E+01	1.18
	19	481.99	480 - 485	482.71	7.00E+00	5.29	0.00E+00	3.32
	20	804.88	802 - 808	805.00	8.00E+00	5.66	0.00E+00	3.88
	21	857.77	855 - 860	857.80	5.00E+00	4.47	0.00E+00	2.76

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:29:22AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118840.CNF

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	1	2.22E+02	47.81			2.22E+02	4.78E+01
	2	5.47E+01	33.65	2.30E-01	1.75E+00	5.45E+01	3.37E+01
M	3	1.59E+02	31.89	1.58E+00	1.58E+00	1.57E+02	3.19E+01
m	4	9.78E+01	28.86	1.35E+00	1.47E+00	9.64E+01	2.89E+01
	5	6.87E+02	61.42			6.87E+02	6.14E+01
	6	7.97E+01	42.81			7.97E+01	4.28E+01
	7	5.15E+01	28.20			5.15E+01	2.82E+01
	8	2.10E+01	15.10			2.10E+01	1.51E+01

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Analysis Report for 2112077-16

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Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
	9	302.81	1.19E+02	29.55		1.19E+02	2.95E+01
	10	333.54	3.11E+01	26.09		3.11E+01	2.61E+01
	11	356.13	4.75E+02	47.79		4.75E+02	4.78E+01
M	12	384.24	7.99E+01	23.45		7.99E+01	2.35E+01
m	13	387.25	8.24E+01	23.71		8.24E+01	2.37E+01
m	14	390.98	2.33E+01	15.81		2.33E+01	1.58E+01
	15	414.94	1.79E+01	20.88		1.79E+01	2.09E+01
	16	437.05	7.19E+01	20.20		7.19E+01	2.02E+01
	17	451.16	5.50E+00	5.85		5.50E+00	5.85E+00
	18	468.02	9.69E+00	10.00		9.69E+00	1.00E+01
	19	481.99	7.00E+00	5.29		7.00E+00	5.29E+00
	20	804.88	8.00E+00	5.66	6.93E-01	5.82E-01	7.31E+00
	21	857.77	5.00E+00	4.47		5.00E+00	4.47E+00

M = First peak in a multiplet region

m = Other peak in a multiplet region

F = Fitted singlet

Errors quoted at 2.000sigma

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)	Yield(%)	Activity (pCi/units)	Activity Uncertainty
SN-113	0.94	255.12	1.93		
		391.69 *	61.90	1.70E+01	1.15E+01
BA-133	1.00	81.00 *	34.06	3.54E+02	3.48E+01
		302.84 *	18.33	3.09E+02	7.81E+01
		356.01 *	62.05	3.55E+02	3.86E+01
PA-234M	0.98	9.89	89.00		
		21.72	64.90		
		37.93 *	23.75	3.05E+01	6.57E+00
TH-234	0.96	63.29 *	3.80	4.60E+02	9.42E+01



Analysis Report for 2112077-16

MW-3

- \* = Energy line found in the spectrum.  
 - = Manually added nuclide.  
 ? = Manually edited nuclide.  
 @ = Energy line not used for Weighted Mean Activity

Energy Tolerance : 2.500 keV

Nuclide confidence index threshold = 0.30

Errors quoted at 2.000sigma

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## INTERFERENCE CORRECTED REPORT

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<i>Nuclide Name</i>	<i>Nuclide Id Confidence</i>	<i>Wt mean Activity (pCi/units)</i>	<i>Wt mean Activity Uncertainty</i>	<i>Comments</i>
SN-113	0.940	1.70E+01	1.15E+01	
BA-133	1.000	3.50E+02	2.45E+01	
PA-234M	0.981	3.05E+01	6.57E+00	
TH-234	0.963	4.60E+02	9.42E+01	

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

Errors quoted at 2.000sigma

Analysis Report for 2112077-16  
MW-3

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## UNIDENTIFIED PEAKS

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Peak Locate Performed on : 1/10/2022 11:29:22AM  
Peak Locate From Channel : 1  
Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
	2	52.62	6.05585E-02	30.91	
m	4	66.23	1.07155E-01	14.98	
	6	111.58	8.85385E-02	26.86	Tol. U-237
	7	276.52	5.72222E-02	27.38	
	8	285.83	2.33333E-02	35.95	
	10	333.54	3.45270E-02	41.98	
M	12	384.24	8.87725E-02	14.68	Sum
m	13	387.25	9.15144E-02	14.39	
	15	414.94	1.98413E-02	58.47	
	16	437.05	7.98916E-02	14.05	Sum
	17	451.16	6.11111E-03	53.20	Sum
	18	468.02	1.07639E-02	51.61	
	19	481.99	7.77778E-03	37.80	
	20	804.88	8.11893E-03	38.91	
	21	857.77	5.55556E-03	44.72	

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

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## NUCLIDE MDA REPORT

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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
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Analysis Report for 2112077-16

MW-3

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
CA-41	3.00	77.00	5.55E-06	5.55E-06	0.00E+00	0.00E+00
	3.31	12.30	5.93E-05		0.00E+00	0.00E+00
FE-55	5.89	24.50	5.43E-04	5.43E-04	0.00E+00	0.00E+00
CO-57	122.06	85.51	1.13E+01	1.13E+01	-4.03E+00	5.20E+00
	136.48	10.60	1.07E+02		9.22E+00	4.90E+01
NI-59	6.92	29.80	9.37E-04	9.37E-04	0.00E+00	0.00E+00
MO-93	16.59	52.90	1.70E-02	1.70E-02	0.00E+00	0.00E+00
	18.60	10.00	1.33E-01		0.00E+00	0.00E+00
NB-93M	16.57	9.43	9.52E-02	9.52E-02	0.00E+00	0.00E+00
CD-109	88.03	3.72	1.93E+02	1.93E+02	6.39E+01	8.94E+01
+ SN-113	255.12	1.93	5.45E+02	2.67E+01	2.68E+02	2.40E+02
	391.69	* 61.90	2.67E+01		1.70E+01	1.23E+01
SN-119M	23.87	16.10	1.81E-01	1.81E-01	0.00E+00	0.00E+00
	25.10	22.70	1.49E+00		-1.78E-01	6.68E-01
I-129	29.78	57.00	6.93E+00	6.93E+00	5.30E+01	3.41E+00
	33.60	13.20	3.90E+01		1.04E+01	1.92E+01
	39.58	7.52	1.90E+01		1.03E+00	8.72E+00
+ BA-133	81.00	* 34.06	2.85E+01	2.61E+01	3.54E+02	1.35E+01
	302.84	* 18.33	9.15E+01		3.09E+02	4.23E+01
	356.01	* 62.05	2.61E+01		3.55E+02	1.20E+01
CE-139	165.85	80.35	1.69E+01	1.69E+01	3.42E+00	7.81E+00
CE-144	133.54	10.80	1.11E+02	1.11E+02	1.67E+01	5.12E+01
HG-203	279.19	77.30	2.18E+01	2.18E+01	1.02E+01	1.01E+01
PB-210	46.50	4.25	4.55E+01	4.55E+01	-5.27E+00	2.08E+01
TH-231	25.64	14.70	3.26E+00	3.26E+00	-1.12E+00	1.51E+00
	84.21	6.40	1.10E+02		-1.38E-01	5.10E+01
+ PA-234M	9.89	89.00	1.45E-03	1.45E-03	0.00E+00	0.00E+00
	21.72	64.90	3.37E-02		0.00E+00	0.00E+00
	37.93	* 23.75	1.26E+01		3.05E+01	6.13E+00
+ TH-234	63.29	* 3.80	1.67E+02	1.67E+02	4.60E+02	7.97E+01
NP-237	29.37	14.00	2.71E+01	2.71E+01	2.08E+02	1.34E+01
	86.50	12.60	5.31E+01		2.99E+01	2.45E+01
U-237	97.08	16.30	4.70E+01	3.49E+01	-3.95E+01	2.16E+01
	101.07	26.30	3.49E+01		2.41E+01	1.62E+01
	114.00	12.30	1.39E+02		1.59E+02	6.66E+01
	208.01	22.00	6.10E+01		4.61E+00	2.78E+01
AM-241	59.54	35.90	1.50E+01	1.50E+01	4.50E-01	7.14E+00
AM-243	74.67	66.00	8.95E+00	8.95E+00	1.24E-01	4.16E+00

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

Analysis Report for 2112077-17  
MW-2

## GAMMA SPECTRUM ANALYSIS

Sample Identification : 2112077-17  
 Sample Description : MW-2  
 Sample Type : RA RECOVERY

Sample Size : 1.000E+00 units  
 Facility : Countroom

Sample Taken On : 1/10/2022 9:58:44AM  
 Acquisition Started : 1/10/2022 11:14:27AM

Procedure : BAFIL  
 Operator : Administrator  
 Detector Name : GE3  
 Geometry : BAFIL  
 Live Time : 900.0 seconds  
 Real Time : 913.5 seconds

Dead Time : 1.48 %

Peak Locate Threshold : 2.50  
 Peak Locate Range (in channels) : 1 - 4096  
 Peak Area Range (in channels) : 9 - 4096  
 Identification Energy Tolerance : 2.500 keV

Energy Calibration Used Done On : 11/20/2021  
 Efficiency Calibration Used Done On : 12/13/2021  
 Efficiency Calibration Description :

Sample Number : 118889

## PEAK ANALYSIS REPORT

Peak Analysis Performed on : 1/10/2022 11:29:43AM  
 Peak Analysis From Channel : 1  
 Peak Analysis To Channel : 4096

Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
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Analysis Report for 2112077-17

MW-2

	Peak No.	Energy (keV)	ROI start	ROI end	Peak Centroid	Net Peak Area	Net Area Uncertainty	Continuum Counts	FWHM (keV)
M	1	20.93	17 -	41	21.57	9.96E+01	44.15	2.92E+02	4.33
m	2	31.29	17 -	41	31.93	2.05E+03	112.59	4.18E+02	5.38
	3	63.62	55 -	72	64.24	2.68E+02	94.16	6.98E+02	4.91
	4	80.96	75 -	88	81.56	6.45E+02	76.12	3.58E+02	3.41
	5	112.88	104 -	125	113.46	1.25E+02	100.21	7.18E+02	2.38
	6	141.36	137 -	149	141.92	5.70E+01	44.68	2.08E+02	6.53
	7	276.61	269 -	284	277.08	3.40E+01	37.63	1.28E+02	3.36
	8	303.75	294 -	313	304.20	1.20E+02	46.48	1.40E+02	3.46
	9	335.70	330 -	341	336.13	4.10E+01	31.11	9.61E+01	7.38
	10	356.49	351 -	363	356.91	3.60E+02	45.22	7.09E+01	3.20
	11	386.90	378 -	400	387.30	2.65E+02	47.69	7.73E+01	5.08
M	12	417.22	410 -	444	417.60	3.13E+01	24.08	4.50E+01	6.72
m	13	437.71	410 -	444	438.08	7.41E+01	24.23	2.90E+01	4.29
	14	468.32	461 -	474	468.67	2.63E+01	13.00	7.37E+00	7.41
	15	508.52	502 -	514	508.84	1.75E+01	13.44	1.30E+01	5.33

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

## BACKGROUND SUBTRACT REPORT

Peak Analysis Performed on : 1/10/2022 11:29:43AM

Env. Background File : \\OR-GAMMA1\ApexRoot\Countroom\Data\0000118841.CNF

	Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
M	1	20.93	9.96E+01	44.15			9.96E+01	4.42E+01
m	2	31.29	2.05E+03	112.59	8.55E+01	2.11E-01	1.97E+03	1.13E+02
	3	63.62	2.68E+02	94.16	5.73E+01	6.61E-01	2.11E+02	9.42E+01
	4	80.96	6.45E+02	76.12			6.45E+02	7.61E+01
	5	112.88	1.25E+02	100.21			1.25E+02	1.00E+02
	6	141.36	5.70E+01	44.68	1.94E+00	1.62E+00	5.51E+01	4.47E+01
	7	276.61	3.40E+01	37.63			3.40E+01	3.76E+01
	8	303.75	1.20E+02	46.48	5.24E-01	4.63E-01	1.19E+02	4.65E+01
	9	335.70	4.10E+01	31.11			4.10E+01	3.11E+01
	10	356.49	3.60E+02	45.22			3.60E+02	4.52E+01
	11	386.90	2.65E+02	47.69			2.65E+02	4.77E+01
M	12	417.22	3.13E+01	24.08			3.13E+01	2.41E+01
m	13	437.71	7.41E+01	24.23			7.41E+01	2.42E+01
	14	468.32	2.63E+01	13.00			2.63E+01	1.30E+01

Analysis Report for 2112077-17

MW-2

Peak No.	Energy (keV)	Original Area	Orig. Area Uncertainty	Ambient Background	Backgr. Uncert.	Subtracted Area	Subtracted Uncert.
15	508.52	1.75E+01	13.44			1.75E+01	1.34E+01

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

## NUCLIDE IDENTIFICATION REPORT

Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

### IDENTIFIED NUCLIDES

Nuclide Name	Id Confidence	Energy (keV)		Yield(%)	Activity (pCi/units)	Activity Uncertainty
I-129	0.59	29.78	*	57.00	6.53E+01	3.75E+00
		33.60		13.20		
		39.58		7.52		
BA-133	0.99	81.00	*	34.06	2.83E+02	3.50E+01
		302.84	*	18.33	3.61E+02	1.42E+02
		356.01	*	62.05	3.32E+02	4.39E+01
TH-234	0.99	63.29	*	3.80	5.36E+02	2.40E+02
NP-237	0.60	29.37	*	14.00	2.66E+02	1.53E+01
		86.50		12.60		

\* = Energy line found in the spectrum.  
- = Manually added nuclide.  
? = Manually edited nuclide.  
@ = Energy line not used for Weighted Mean Activity  
Energy Tolerance : 2.500 keV  
Nuclide confidence index threshold = 0.30  
Errors quoted at 2.000sigma

## INTERFERENCE CORRECTED REPORT

Analysis Report for 2112077-17  
MW-2

	<b>Nuclide Name</b>	<b>Nuclide Id Confidence</b>	<b>Wt mean Activity (pCi/units)</b>	<b>Wt mean Activity Uncertainty</b>	<b>Comments</b>
?	I-129	0.599	6.53E+01	3.75E+00	
	BA-133	0.993	3.04E+02	2.69E+01	
	TH-234	0.997	5.36E+02	2.40E+02	
?	NP-237	0.603	2.66E+02	1.53E+01	

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

Errors quoted at 2.000sigma

Analysis Report for 2112077-17

MW-2

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**UNIDENTIFIED PEAKS**


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Peak Locate Performed on : 1/10/2022 11:29:43AM  
 Peak Locate From Channel : 1  
 Peak Locate To Channel : 4096

Peak No.	Energy (keV)	Peak Size (CPS)	Peak CPS (%) Uncertainty	Peak Type	Tolerance Nuclide
M 1	20.93	1.10674E-01	22.16	Tol.	MO-93 PA-234M
5	112.88	1.38991E-01	40.06	Sum	
6	141.36	6.11791E-02	40.60		
7	276.61	3.77778E-02	55.34		
9	335.70	4.55181E-02	37.97	Sum	
11	386.90	2.94857E-01	8.98	Sum	
M 12	417.22	3.47941E-02	38.45		
m 13	437.71	8.23763E-02	16.34	Sum	
14	468.32	2.92407E-02	24.70		
15	508.52	1.94444E-02	38.39		

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

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**NUCLIDE MDA REPORT**


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Nuclide Library Used : \\OR-GAMMA1\ApexRoot\Countroom\Library\WSRC.NLB

Nuclide Name	Energy (keV)	Yield(%)	Line MDA (pCi/units)	Nuclide MDA (pCi/units)	Activity (pCi/units)	Dec. Level (pCi/units)
CA-41	3.00	77.00	1.04E-04	1.04E-04	7.35E-05	4.84E-05
	3.31	12.30	1.07E-03		7.56E-04	4.98E-04
FE-55	5.89	24.50	1.14E-02	1.14E-02	1.36E-02	5.41E-03
CO-57	122.06	85.51	2.16E+01	2.16E+01	-4.51E-01	1.04E+01
	136.48	10.60	1.74E+02		-3.57E+01	8.28E+01

0264



Analysis Report for 2112077-17

MW-2

<b>Nuclide Name</b>	<b>Energy (keV)</b>	<b>Yield(%)</b>	<b>Line MDA (pCi/units)</b>	<b>Nuclide MDA (pCi/units)</b>	<b>Activity (pCi/units)</b>	<b>Dec. Level (pCi/units)</b>
NI-59	6.92	29.80	2.03E-02	2.03E-02	2.76E-02	9.66E-03
MO-93	16.59	52.90	4.82E-01	4.82E-01	3.55E-01	2.34E-01
	18.60	10.00	3.62E+00		3.11E-01	1.75E+00
NB-93M	16.57	9.43	2.70E+00	2.70E+00	1.98E+00	1.31E+00
CD-109	88.03	3.72	5.27E+02	5.27E+02	5.93E+00	2.57E+02
SN-113	255.12	1.93	1.13E+03	6.40E+01	1.05E+02	5.29E+02
	391.69	61.90	6.40E+01		1.16E+02	3.07E+01
SN-119M	23.87	16.10	1.05E+01	9.27E+00	4.73E+01	5.20E+00
	25.10	22.70	9.27E+00		5.54E+01	4.58E+00
+ I-129	29.78	* 57.00	5.40E+00	5.40E+00	6.53E+01	2.65E+00
	33.60	13.20	3.89E+01		3.54E+02	1.92E+01
	39.58	7.52	6.66E+01		-1.39E+01	3.27E+01
+ BA-133	81.00	* 34.06	4.21E+01	3.99E+01	2.83E+02	2.04E+01
	302.84	* 18.33	2.12E+02		3.61E+02	1.02E+02
	356.01	* 62.05	3.99E+01		3.32E+02	1.87E+01
CE-139	165.85	80.35	2.55E+01	2.55E+01	-8.94E+00	1.21E+01
CE-144	133.54	10.80	1.61E+02	1.61E+02	-6.52E+01	7.68E+01
HG-203	279.19	77.30	3.19E+01	3.19E+01	1.33E+00	1.50E+01
PB-210	46.50	4.25	9.14E+01	9.14E+01	-7.99E+01	4.41E+01
TH-231	25.64	14.70	1.52E+01	1.52E+01	9.10E+01	7.51E+00
	84.21	6.40	3.44E+02		-8.99E+00	1.69E+02
PA-234M	9.89	89.00	3.31E-02	3.31E-02	3.34E-02	1.59E-02
	21.72	64.90	1.12E+00		-5.18E-02	5.44E-01
	37.93	23.75	2.27E+01		-4.34E+00	1.12E+01
+ TH-234	63.29	* 3.80	3.82E+02	3.82E+02	5.36E+02	1.87E+02
+ NP-237	29.37	* 14.00	2.20E+01	2.20E+01	2.66E+02	1.08E+01
	86.50	12.60	1.79E+02		-7.55E+00	8.77E+01
U-237	97.08	16.30	9.39E+01	5.93E+01	5.72E+01	4.53E+01
	101.07	26.30	5.93E+01		1.48E+01	2.86E+01
	114.00	12.30	1.94E+02		4.33E+02	9.45E+01
	208.01	22.00	1.12E+02		1.16E+01	5.34E+01
AM-241	59.54	35.90	2.64E+01	2.64E+01	1.53E+00	1.29E+01
AM-243	74.67	66.00	2.49E+01	2.49E+01	-1.83E+00	1.22E+01

+ = Nuclide identified during the nuclide identification

\* = Energy line found in the spectrum

&gt; = MDA value not calculated

@ = Half-life too short to be able to perform the decay correction

**SECTION XI**  
**ANALYTICAL DATA (TOTAL DISSOLVED SOLIDS)**

# TDS / TSS Worksheet

Work Order	Run	Analysis Code	Technician
<b>21-12077</b>	<b>1</b>	<b>TDS</b>	<b>MHIGHTOWER</b>

TRetec Fraction	ERM Client ID	Aliquot ml	Filter Data			TDS/TSS (mg/L)	Maximum Aliq (mL)
			Filter Tare (g)	Filter Final (g)	Filter Net (g)		
04	MW-11	100.0000	78.9350	79.2617	0.3267	3267.0000	30.61
05	MW-1	100.0000	80.8204	80.9437	0.1233	1233.0000	81.10
06	MW-8	100.0000	79.0351	79.1794	0.1443	1443.0000	69.30
07	MW-7	100.0000	122.7568	123.4188	0.6620	6620.0000	15.11
08	MW-9	100.0000	82.7099	82.8681	0.1582	1582.0000	63.21
09	MW-9D	100.0000	78.7647	78.9380	0.1733	1733.0000	57.70
10	SW-BO 13	100.0000	122.7370	122.7408	0.0038	38.0000	2631.58
11	SW-BO 2	100.0000	80.5372	80.5472	0.0100	100.0000	1000.00
12	MW-6	100.0000	80.2330	80.6405	0.4075	4075.0000	24.54
13	MW-10	100.0000	83.5245	83.7224	0.1979	1979.0000	50.53
14	MW-5	100.0000	124.5341	124.8753	0.3412	3412.0000	29.31
15	MW-4	100.0000	81.6316	81.9034	0.2718	2718.0000	36.79
16	MW-3	100.0000	78.2393	78.4543	0.2150	2150.0000	46.51
17	MW-2	100.0000	79.0508	79.1593	0.1085	1085.0000	92.17

Technician: MG Date: 1/4/22

# Aliquot Worksheet

Work Order		Run		Analysis Code		Rpt Units		Lab Deadline		Technician	
<b>21-12077</b>		<b>1</b>		<b>TDS</b>		<b>liters</b>		<b>1/10/2022</b>		<b>JPACHELLA</b>	

Lab Fraction	ERM Client ID	Sample Type	Muffle Data		Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq	
01	LCS	LCS						1.0000E+00	1.0000E+00				
02	BLANK	MBL						1.0000E+00	1.0000E+00				
03	DUP	DUP						1.0000E-01	1.0000E-01				
04	MW-11	TRG						1.0000E-01	1.0000E-01				
05	MW-1	TRG						1.0000E-01	1.0000E-01				
06	MW-8	TRG						1.0000E-01	1.0000E-01				
07	MW-7	TRG						1.0000E-01	1.0000E-01				
08	MW-9	TRG						1.0000E-01	1.0000E-01				
09	MW-9D	TRG						1.0000E-01	1.0000E-01				
10	SW-BO 13	TRG						1.0000E-01	1.0000E-01				
11	SW-BO 2	TRG						1.0000E-01	1.0000E-01				
12	MW-6	TRG						1.0000E-01	1.0000E-01				
13	MW-10	TRG						1.0000E-01	1.0000E-01				
14	MW-5	TRG						1.0000E-01	1.0000E-01				
15	MW-4	TRG						1.0000E-01	1.0000E-01				
16	MW-3	TRG						1.0000E-01	1.0000E-01				
17	MW-2	TRG						1.0000E-01	1.0000E-01				

Comments
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0268

Technician: J. Pachella Date: 1/3/22



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

December 02, 2021

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 21110790

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 29 sample(s) on 11/12/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



Element Materials Technology Lafayette  
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## Case Narrative

WO#: 21110790  
Date: 12/2/2021

---

**CLIENT:** Environmental Resources Management  
**Project:** Henning Management 0526033

---

12/2/2021: This report is being re-issued and replaces the original report in its entirety. The COC and corresponding sample ID were changed for 21110790-024 to H-24R 0-2'. And the select list for the SPLP metals for 21110790-017 was changed to include Strontium. (rev01c)

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Please review the Sample Log-in Check List regarding the discrepancies between the chain of custody and the samples received and the documentation of client resolution.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 8:55:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-001 **Matrix:** SOIL  
**Client Sample ID** H22W 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	258	0.487		mg/Kg	1	11/16/2021 8:05:43 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	19.6	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 9:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-002 **Matrix:** SOIL  
**Client Sample ID** H-22R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	1.04	0.0100		mg/L	1	11/18/2021 3:33:08 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.3	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 9:15:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-003 **Matrix:** SOIL  
**Client Sample ID** H-22S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	2,150	0.518		mg/Kg	1	11/16/2021 8:08:01 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	12.7	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 9:25:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-004 **Matrix:** SOIL  
**Client Sample ID** H-22N 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	2,020	0.504		mg/Kg	1	11/16/2021 8:17:15 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	11.0	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 9:35:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-005 **Matrix:** SOIL  
**Client Sample ID** H-22E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	558	0.483		mg/Kg	1	11/16/2021 8:19:33 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	13.4	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 11:00:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-006 **Matrix:** SOIL  
**Client Sample ID** H-8R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>						Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	1.83	0.0100		mg/L	1	11/18/2021 3:35:26 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	11.1	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 11:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-007 **Matrix:** SOIL  
**Client Sample ID** H-8E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	344	0.495		mg/Kg	1	11/16/2021 8:21:50 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	18.1	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 11:35:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-008 **Matrix:** SOIL  
**Client Sample ID** H-8W 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	519	0.509		mg/Kg	1	11/19/2021 1:44:27 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	20.0	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 11:40:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-009 **Matrix:** SOIL  
**Client Sample ID** H-8S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	2,300	0.524		mg/Kg	1	11/19/2021 1:51:21 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	14.3	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 11:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-010 **Matrix:** SOIL  
**Client Sample ID** H-8N 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	1,640	0.505		mg/Kg	1	11/19/2021 1:53:39 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	13.3	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 1:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-011 **Matrix:** SOIL  
**Client Sample ID** H-16N 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	193	0.483		mg/Kg	1	11/19/2021 1:55:57 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.1	1.00		wt%	1	11/15/2021 11:30:00 AM

**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 1:25:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-012 **Matrix:** SOIL  
**Client Sample ID** H-16W 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	37.4	0.524		mg/Kg	1	11/19/2021 1:58:15 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.7	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 1:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-013 **Matrix:** SOIL  
**Client Sample ID** H-16E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	204	0.505		mg/Kg	1	11/19/2021 2:07:22 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	13.4	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 1:50:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-014 **Matrix:** SOIL  
**Client Sample ID** H-16S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	394	0.482		mg/Kg	1	11/19/2021 2:09:41 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	19.0	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 2:45:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-015 **Matrix:** SOIL  
**Client Sample ID** H-24S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	3,350	4.90		mg/Kg	10	11/19/2021 4:35:59 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	28.1	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 3:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-016 **Matrix:** SOIL  
**Client Sample ID** H-28W 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	138	0.511		mg/Kg	1	11/19/2021 2:14:18 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	23.7	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



Element Materials Technology Lafayette  
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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 3:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-017 **Matrix:** SOIL  
**Client Sample ID** H-28R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	11.0	0.0100		mg/L	1	11/18/2021 3:37:45 PM
Lead	0.180	0.0100		mg/L	1	11/18/2021 3:37:45 PM
Strontium	0.520	0.0100		mg/L	1	11/18/2021 3:37:45 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	24.5	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 4:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-018 **Matrix:** SOIL  
**Client Sample ID** H-28S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	993	0.499		mg/Kg	1	11/19/2021 2:16:36 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	22.4	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 4:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-019 **Matrix:** SOIL  
**Client Sample ID** H-28E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	1,340	0.520		mg/Kg	1	11/19/2021 2:18:54 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	32.4	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 7:55:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-020 **Matrix:** SOIL  
**Client Sample ID** H-28N 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	839	0.507		mg/Kg	1	11/19/2021 2:21:13 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	25.7	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 8:15:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-021 **Matrix:** SOIL  
**Client Sample ID** H-24N 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	2,510	0.511		mg/Kg	1	11/19/2021 2:23:30 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	22.4	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 8:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-022 **Matrix:** SOIL  
**Client Sample ID** H-24E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	1,630	0.518		mg/Kg	1	11/19/2021 2:25:49 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	14.4	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 9:00:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-023 **Matrix:** SOIL  
**Client Sample ID** H-24W 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	2,400	0.495		mg/Kg	1	11/19/2021 2:28:07 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	16.0	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 9:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-024 **Matrix:** SOIL  
**Client Sample ID** H-24R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>MERCURY, SPLP</b>				<b>SW7470A</b>	<b>SW 1312M</b>	Analyst: <b>BXB</b>
Mercury	< 0.000200	0.000200		mg/L	1	11/18/2021 8:02:25 AM
<b>SPLP BARIUM BY SW1312/6010 ICP METALS, SPLP LEACHED</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
Barium	1.65	0.0100		mg/L	1	11/18/2021 3:40:03 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.6	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 10:30:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-025 **Matrix:** SOIL  
**Client Sample ID** H-4R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>						Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	2.41	0.0100		mg/L	1	11/18/2021 3:42:21 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	18.1	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 10:40:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-026 **Matrix:** SOIL  
**Client Sample ID** H-4N 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	2,280	0.503		mg/Kg	1	11/19/2021 2:35:01 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	21.1	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 10:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-027 **Matrix:** SOIL  
**Client Sample ID** H-4E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	2,090	0.498		mg/Kg	1	11/19/2021 2:37:19 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	27.0	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 10:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-028 **Matrix:** SOIL  
**Client Sample ID** H-4S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	373	0.497		mg/Kg	1	11/19/2021 2:39:38 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	25.3	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21110790

Date Reported: 12/2/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/12/2021 11:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21110790-029 **Matrix:** SOIL  
**Client Sample ID** H-4W 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	1,070	0.479		mg/Kg	1	11/19/2021 2:41:57 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.3	1.00		wt%	1	11/15/2021 11:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41611

Sample ID	<b>MB-41611</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/12/2021</b>	RunNo:	<b>104358</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>41611</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>11/16/2021</b>	SeqNo:	<b>2551392</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-41611</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/12/2021</b>	RunNo:	<b>104358</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>41611</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>11/16/2021</b>	SeqNo:	<b>2551393</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.6		0.500	25.00	0		94.6	80	120				

Sample ID	<b>LCSD-41611</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/12/2021</b>	RunNo:	<b>104358</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41611</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>11/16/2021</b>	SeqNo:	<b>2551396</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		24.0		0.500	25.00	0		96.1	80	120	23.64	1.55	20	

Sample ID	<b>21110605-007AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/12/2021</b>	RunNo:	<b>104358</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41611</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>11/16/2021</b>	SeqNo:	<b>2551398</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		241		0.518	25.89	232.5		33.2	75	125				S

**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41611

Sample ID	<b>21110605-007AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/12/2021</b>	RunNo:	<b>104358</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41611</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>11/16/2021</b>	SeqNo:	<b>2551399</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		226		0.481		24.04		232.5		-26.2		75		125		241.1		6.38		20		S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41660

Sample ID	<b>MB-41660</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104439</b>			
Client ID:	<b>PBW</b>	Batch ID:	<b>41660</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>11/18/2021</b>	SeqNo:	<b>2553454</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.0100		0.0100										
Lead		< 0.0100		0.0100										
Strontium		< 0.0100		0.0100										

Sample ID	<b>LCS-41660</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104439</b>			
Client ID:	<b>LCSW</b>	Batch ID:	<b>41660</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>11/18/2021</b>	SeqNo:	<b>2553455</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.489		0.0100	0.5000	0		97.7	80	120				
Lead		0.479		0.0100	0.5000	0		95.7	80	120				
Strontium		0.481		0.0100	0.5000	0		96.3	80	120				

Sample ID	<b>LCSD-41660</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104439</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41660</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>11/18/2021</b>	SeqNo:	<b>2553456</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.486		0.0100	0.5000	0		97.2	80	120	0.4887	0.595	20	
Lead		0.473		0.0100	0.5000	0		94.7	80	120	0.4786	1.08	20	
Strontium		0.480		0.0100	0.5000	0		96.0	80	120	0.4815	0.325	20	

**Qualifiers:**

- |     |  |    |                      |    |  |
|-----|--|----|----------------------|----|--|
| H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  | ND | Not Detected at the Reporting Limit                |
| R   | RPD outside accepted recovery limits               | RL | Reporting Limit      | S  | Spike Recovery outside accepted recovery limits    |
| SDL | Sample detection limit                             | U  | Analyte not detected | W  | Sample container temperature is out of limit as sp |



Element Materials Technology Lafayette  
 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41660

Sample ID	<b>21110790-025AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104439</b>					
Client ID:	<b>H-4R 0-2'</b>	Batch ID:	<b>41660</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>11/18/2021</b>	SeqNo:	<b>2553466</b>					
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Barium	2.83	0.0100	0.5000	2.411	84.0	75	125									
Lead	0.469	0.0100	0.5000	0.005460	92.7	75	125									
Strontium	0.556	0.0100	0.5000	0.07910	95.3	75	125									

Sample ID	<b>21110790-025AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104439</b>					
Client ID:	<b>H-4R 0-2'</b>	Batch ID:	<b>41660</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>11/18/2021</b>	SeqNo:	<b>2553467</b>					
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Barium	3.17	0.0100	0.5000	2.411	151	75	125	2.831	11.2	20	S
Lead	0.485	0.0100	0.5000	0.005460	96.0	75	125	0.4692	3.40	20	
Strontium	0.582	0.0100	0.5000	0.07910	101	75	125	0.5558	4.65	20	

**NOTES:**

S - Analyte concentration in native sample was too high for accurate spike recovery(ies). The method is in control as indicated by the laboratory control sample (LCS).

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp





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# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41663

Sample ID	<b>MB-41663</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104465</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>41663</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>11/19/2021</b>	SeqNo:	<b>2554149</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-41663</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104465</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>41663</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>11/19/2021</b>	SeqNo:	<b>2554150</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.7		0.500	25.00	0		94.7	80	120				

Sample ID	<b>LCSD-41663</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104465</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41663</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>11/19/2021</b>	SeqNo:	<b>2554151</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		24.6		0.500	25.00	0		98.3	80	120	23.67	3.76	20	

Sample ID	<b>21110790-008AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104465</b>			
Client ID:	<b>H-8W 0-2'</b>	Batch ID:	<b>41663</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>11/19/2021</b>	SeqNo:	<b>2554153</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		1,160		0.492	24.59	519.0		2,620	75	125				S

**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41663

Sample ID	<b>21110790-008AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/17/2021</b>	RunNo:	<b>104465</b>											
Client ID:	<b>H-8W 0-2'</b>	Batch ID:	<b>41663</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>11/19/2021</b>	SeqNo:	<b>2554154</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		591		0.488		24.40		519.0		295		75		125		1,163		65.3		20		RS

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21110790  
 02-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R104338

Sample ID	<b>21110605-001Adup</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104338</b>
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R104338</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/12/2021</b>	SeqNo:	<b>2550798</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Percent Moisture		21.2		1.00						20.80	1.90 20

Sample ID	<b>21110790-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104338</b>
Client ID:	<b>H22W 0-2'</b>	Batch ID:	<b>R104338</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/15/2021</b>	SeqNo:	<b>2550814</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Percent Moisture		19.7		1.00						19.60	0.51 20

Sample ID	<b>21110790-021ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104338</b>
Client ID:	<b>H-24N 0-2'</b>	Batch ID:	<b>R104338</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/15/2021</b>	SeqNo:	<b>2550835</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Percent Moisture		22.5		1.00						22.40	0.45 20

**Qualifiers:**

- |     |  |    |                      |    |  |
|-----|--|----|----------------------|----|--|
| H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  | ND | Not Detected at the Reporting Limit                |
| R   | RPD outside accepted recovery limits               | RL | Reporting Limit      | S  | Spike Recovery outside accepted recovery limits    |
| SDL | Sample detection limit                             | U  | Analyte not detected | W  | Sample container temperature is out of limit as sp |






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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON**

Work Order Number: **21110790**

RcptNo: **1**

Logged by:	<b>Rhonda David</b>	<b>11/12/2021 1:45:00 PM</b>	
Completed By:	<b>Rhonda David</b>	<b>11/12/2021 2:59:10 PM</b>	
Reviewed By:	<b>Cristina Thibeaux</b>	<b>11/30/2021 7:25:47 AM</b>	

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text" value="Shawn A. Wiggins"/>	Date	<input type="text" value="11/12/2021"/>
By Whom:	<input type="text" value="Buffy Bryant"/>	Via:	<input checked="" type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="Confirm sample id's for COC Page 3 H-28E, H-28W, H-28R samples"/>		
Client Instructions:	<input type="text" value="Follow sample baqs for pg.3, H-4S 0-2' Collection time 1110."/>		

18. Additional remarks:

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------





Chain of Custody

Laboratory Number: 21110790

Client Information: **ERM**  
 Company Name: **Sittman Wilgus**  
 Address: **840 W Sam Houston Pkwy N, Suite 600, Houston, Texas 77024**  
 Phone Number: **971-303-2385**  
 City, State Zip: **Houston, Texas 77024**  
 Turn Time:  Standard  RUSH  
 Billing Information: **Same**  
 PO Number:  
 Quote Number:  
 Required QC Level:  
 Bill Monthly:  Yes  No  
 Shipping Method: **UPS / FedEx / Airborne**  
 Project Name/Number: **HEAVY METALS ANALYSIS**  
 Sampler's Signature: *[Signature]*  
 Matrix Code: **0526053**  
 DW = Drinking Water, WW = Waste Water, GW = Ground Water, AQ = Aqueous, OT = Other, SL = Sludge, O = Oil, F = Food, NG = Natural Gas, PW = Produced Water, CF = Completion Fluid

Sample ID/Description	Turn Time		Collection Information	Container	Pres.	Requested Tests	Comments
	Date	Time					
H-22W 0-2'	11/11/21	0855	GRAB	P	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	SPR Barium	X = ANALYSIS REQUESTED O = HOLD FOR POSSIBLE ANALYSIS FURNISHING RESULTS
H-22E 0-2'		0910					
H-22S 0-2'		0915					
H-22N 0-2'		0925					
H-22E 0-2'		0935					
H-8E 0-2'		1100					
H-8W 0-2'		1135					
H-8S 0-2'		1140					

Relinquished by: *[Signature]* Date/Time: 11/12/21 1155  
 Received by: *[Signature]* Date/Time: 11/12/21 1345  
 Field Notes: Received at lab on ice?  Yes  No Temp:

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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 629 Washington St, Suite 300, Columbus, IN 47201-6231 USA  
 2121 East Washington Boulevard, Fort Wayne, IN 46803-1328 USA  
 560 South Zimmer Road, Warsaw, IN 46680-2368 USA  
 3371 Cleveland Road, Suite 100A, South Bend, IN 46628-0780 USA  
 2417 W. Pinhook Rd, Lafayette, LA 70508-3344 USA





# Chain of Custody

Laboratory Number: **21110790**

Client Information: **ERM** PO Number: **0526033** Page 2 of 4  
 Billing Information: **Same** Matrix Code  
 Company Name: **SITARD WIGGINS** Quote Number:  
 Contact Name: **840 W SAM HOUSTON PKWY N** Required QC Level:  
 Address: **SUITE 600** Bill Monthly:  Yes  No  
 City, State Zip: **HOUSTON, TX 77024** Ext.:  
 Phone Number: **971-303-2305** Ext.:  
 Fax Number: **971-303-2305**  
 E-mail Address: **SITARD.WIGGINS@ERM.COM**

Which Regulations Apply: <input type="checkbox"/> RCRA <input type="checkbox"/> POTW <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input type="checkbox"/> RECAP/RI/SC	Turn Time <input checked="" type="checkbox"/> Standard <input type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	Collection Information		Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container Type P=Plastic, V=Vial	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> NaOH, Na <sub>2</sub> SO <sub>3</sub>	Requested Tests	Comments
		Date	Time					
		Matrix						
Sample ID/Description	Date	Time	Grab / Composite	Matrix	Quantity			
H-8N 0-2'	11/11/21	1150	Grab	SO	1		SRP LEAD	X - ANALYSIS REQUESTED O - HOLD FOR POSSIBLE ANALYSIS PENDING INITIAL RESULTS
H-16N 0-2'		1310					SRP LEAD	
H-16W 0-2'		1325					SRP LEAD	
H-16E 0-2'		1340					SRP LEAD	
H-16S 0-2'		1350					SRP LEAD	
H-24S 0-2'		1445					SRP LEAD	
H-28W 0-2'		1510					SRP LEAD	
H-28E 0-2'		1540					SRP LEAD	
H-28S 0-2'		1615					SRP LEAD	

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
<i>[Signature]</i>	11/12/21 1155	<i>[Signature]</i>	11/12/21 1155	Received at lab on ice?
<i>[Signature]</i>	11/12/21 1345	<i>[Signature]</i>	11/12/21 1345	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp:

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 P 574-267-3305 F 574-269-9599

3371 Cleveland Road, Suite 100A  
 South Bend, IN 46626-9760 USA  
 P 574-277-0707 F 574-273-6699

2417 W. Pinhook Rd  
 Lafayette, LA 70508-3344 USA  
 P 337-235-0483 F 337-233-6540





# Chain of Custody

Laboratory Number: **21110790**

Page **3** of **4**  
Matrix Code

Project Name/Number: **Hensley Management 0526033**

Sampler's Signature: *[Signature]*

Shipping Method: **UPS / FedEx / Airborne**  
**DHL / Element / Hand / Mail**

PO Number:

Quote Number:

Required QC Level

Bill Monthly  Yes  No

Ext:

Ext:

Billing Information: **Stand**

Client Information:

Company Name: **ERM**

Contact Name: **Shawn Wilgins**

Address: **9400 Sam Houston Blvd  
Suite 600  
Houston TX 77024**

City, State Zip: **Houston TX 77024**

Phone Number: **971-303-2385**

Fax Number: **Ext:**

E-mail Address: **Shawn.Wilgins@erm.com**

Which Regulations Apply:

RCRA  Drinking Water

POTW  Distribution

NPDES  Special

USDA/FDA  State

RECAP/RI/SC  Other

Sample ID/Description	Turn Time		(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container Type	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Requested Tests	Comments
	Date	Time					
H-28E 0-2'	11/11/21	1640	Grab	P	None	SRP Mercury	X = Analyze 0 = Hold
H-28N 0-2'	11/12/21	0755	Grab	P	None	SRP Mercury	BB 11/13/21
H-24N 0-2'	1	0815	Grab	P	None	SRP Mercury	H-24E
H-28E 0-2'	1	0850	Grab	P	None	SRP Mercury	H-24W
H-28W 0-2'	1	0900	Grab	P	None	SRP Mercury	H-24R (rev01c 12/11/21)
H-28R 0-2'	1	0910	Grab	P	None	SRP Mercury	
H-4R 0-2'	1	1030	Grab	P	None	SRP Mercury	
H-4N 0-2'	1	1040	Grab	P	None	SRP Mercury	
H-4E 0-2'	1	1050	Grab	P	None	SRP Mercury	

Relinquished by	Date/Time	Received by	Date/Time	Field Notes
<i>[Signature]</i>	11/12/21 1345	<i>[Signature]</i>	11/12/21 1345	

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629 Washington St, Suite 300 Columbus, IN 47201-6231 USA P 812-375-0531 F 812-375-0731

2121 East Washington Boulevard Fort Wayne, IN 46803-1328 USA P 260-471-7000 F 260-471-7777

560 South Zimmer Road Warsaw, IN 46580-2368 USA P 574-267-3305 F 574-269-6569

3371 Cleveland Road, Suite 100A South Bend, IN 46628-9780 USA P 574-277-0707 F 574-273-5699

2417 W. Pinhook Rd Lafayette, LA 70508-3344 USA P 337-235-0483 F 337-233-6540









Element Materials Technology Lafayette  
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Website: [www.element.com](http://www.element.com)

December 21, 2021

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 21111085

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 30 sample(s) on 11/19/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



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## Case Narrative

WO#: 21111085  
Date: 12/21/2021

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**CLIENT:** Environmental Resources Management  
**Project:** Henning Management 0526033

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Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/15/2021 4:55:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-001 **Matrix:** SOIL  
**Client Sample ID** H-16R 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>MERCURY, SPLP</b>						
				<b>SW7470A</b>	<b>SW 1312M</b>	Analyst: <b>BXB</b>
Mercury	< 0.000200	0.000200		mg/L	1	12/3/2021 6:34:11 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						
				<b>SW9056A</b>		Analyst: <b>SGP</b>
Chloride	242	5.34		mg/Kg-dry	20	12/10/2021 3:31:02 PM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>						
				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	60.4	0.487		mg/Kg	1	12/7/2021 6:11:38 PM
<b>SPLP BARIUM BY SW1312/6010</b>						
<b>ICP METALS, SPLP LEACHED</b>						
Barium	0.472	0.0100		mg/L	1	12/7/2021 10:17:12 PM
Lead	0.0147	0.0100		mg/L	1	12/7/2021 10:17:12 PM
<b>PERCENT MOISTURE</b>						
				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	15.1	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/15/2021 5:05:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-002 **Matrix:** SOIL  
**Client Sample ID** H-16R 14-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	9.82	0.10	*	mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	16.5	0.10	*	%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	42.8	0.10	*		1	12/10/2021
Soluble Calcium	9.20	0.02		meq/L	1	12/10/2021
Soluble Magnesium	3.13	0.05		meq/L	1	12/10/2021
Soluble Sodium	106	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	4,080	68.0		mg/Kg-dry	200	12/10/2021 3:44:50 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	19.5	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/15/2021 5:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-003 **Matrix:** SOIL  
**Client Sample ID** H-16R 50-50.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	3.01	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	8.01	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	5.45	0.10			1	12/10/2021
Soluble Calcium	8.77	0.02		meq/L	1	12/10/2021
Soluble Magnesium	6.68	0.05		meq/L	1	12/10/2021
Soluble Sodium	15.2	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	734	12.7		mg/Kg-dry	50	12/10/2021 3:58:38 PM
<b>CHLORIDES, SPLP LEACHED</b>						Analyst: <b>SGP</b>
Chlorides	35.5	10.0		mg/L	1	12/1/2021 3:56:00 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	22.2	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 7:40:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-004 **Matrix:** SOIL  
**Client Sample ID** H-12R 0-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>LA STATEWIDE ORDER 29-B TESTING- ESP EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	5.45	0.10		%	1	12/21/2021
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	6.14	0.10			1	12/10/2021
Soluble Calcium	1.29	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.39	0.05		meq/L	1	12/10/2021
Soluble Sodium	5.64	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						
					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	40.0	1.91		mg/Kg-dry	10	12/10/2021 4:12:26 PM
<b>PERCENT MOISTURE</b>						
					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	10.4	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 7:45:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-005 **Matrix:** SOIL  
**Client Sample ID** H-12R 1-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>LA STATEWIDE ORDER 29-B TESTING- ESP EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	12.6	0.10		%	1	12/21/2021
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	6.67	0.10			1	12/10/2021
Soluble Calcium	0.53	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.49	0.05		meq/L	1	12/10/2021
Soluble Sodium	4.76	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						
Chloride	73.5	2.44		mg/Kg-dry	10	12/10/2021 4:26:14 PM
<b>PERCENT MOISTURE</b>						
Percent Moisture	13.9	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 7:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-006 **Matrix:** SOIL  
**Client Sample ID** H-12R 2-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>LA STATEWIDE ORDER 29-B TESTING- ESP EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	17.4	0.10	*	%	1	12/21/2021
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	16.4	0.10	*		1	12/10/2021
Soluble Calcium	1.03	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.45	0.05		meq/L	1	12/10/2021
Soluble Sodium	14.1	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						
Chloride	220	4.64		mg/Kg-dry	20	12/10/2021 7:53:17 PM
<b>PERCENT MOISTURE</b>						
Percent Moisture	17.3	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 12:50:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-007 **Matrix:** SOIL  
**Client Sample ID** H-12R 76-78

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	3.81	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	4.69	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	7.70	0.10			1	12/10/2021
Soluble Calcium	9.28	0.02		meq/L	1	12/10/2021
Soluble Magnesium	6.35	0.05		meq/L	1	12/10/2021
Soluble Sodium	21.5	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	927	22.6		mg/Kg-dry	100	12/10/2021 8:34:41 PM
<b>CHLORIDES, SPLP LEACHED</b>					<b>SW9253</b>	Analyst: <b>SGP</b>
Chlorides	42.6	10.0		mg/L	1	12/1/2021 3:56:00 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.6	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 4:05:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-008 **Matrix:** SOIL  
**Client Sample ID** H-21R 0-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.64	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	4.05	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	3.79	0.10			1	12/10/2021
Soluble Calcium	1.98	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.70	0.05		meq/L	1	12/10/2021
Soluble Sodium	4.39	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	61.5	2.68		mg/Kg-dry	10	12/10/2021 9:16:07 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	16.1	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
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S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 4:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-009 **Matrix:** SOIL  
**Client Sample ID** H-21R 1-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.79	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	16.3	0.10	*	%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	7.45	0.10			1	12/10/2021
Soluble Calcium	0.84	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.57	0.05		meq/L	1	12/10/2021
Soluble Sodium	6.26	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	128	3.99		mg/Kg-dry	20	12/10/2021 9:29:55 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	16.0	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 4:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-010 **Matrix:** SOIL  
**Client Sample ID** H-21R 2-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	1.32	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	24.7	0.10	*	%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	11.5	0.10			1	12/10/2021
Soluble Calcium	1.03	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.76	0.05		meq/L	1	12/10/2021
Soluble Sodium	10.9	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	271	4.34		mg/Kg-dry	20	12/10/2021 9:43:43 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	16.7	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



Element Materials Technology Lafayette  
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 4:20:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-011 **Matrix:** SOIL  
**Client Sample ID** H-21R 10-12

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	3.03	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	20.0	0.10	*	%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	27.1	0.10	*		1	12/10/2021
Soluble Calcium	1.26	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.56	0.05		meq/L	1	12/10/2021
Soluble Sodium	25.9	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	1,090	15.3		mg/Kg-dry	50	12/10/2021 9:57:32 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	20.8	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/17/2021 5:00:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-012 **Matrix:** SOIL  
**Client Sample ID** H-21R 22-24

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.16	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	5.97	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	3.76	0.10			1	12/10/2021
Soluble Calcium	3.28	0.02		meq/L	1	12/10/2021
Soluble Magnesium	1.81	0.05		meq/L	1	12/10/2021
Soluble Sodium	6.00	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	248	5.18		mg/Kg-dry	20	12/10/2021 10:11:20 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.8	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 8:30:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-013 **Matrix:** SOIL  
**Client Sample ID** H-21W 8-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	3.73	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	4.67	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	5.97	0.10			1	12/10/2021
Soluble Calcium	13.0	0.02		meq/L	1	12/10/2021
Soluble Magnesium	6.42	0.05		meq/L	1	12/10/2021
Soluble Sodium	18.6	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	1,010	23.1		mg/Kg-dry	100	12/10/2021 10:25:07 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	19.3	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 8:35:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-014 **Matrix:** SOIL  
**Client Sample ID** H-21W 6-8

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	1.19	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	6.32	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	7.21	0.10			1	12/10/2021
Soluble Calcium	1.71	0.02		meq/L	1	12/10/2021
Soluble Magnesium	1.02	0.05		meq/L	1	12/10/2021
Soluble Sodium	8.41	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	276	4.82		mg/Kg-dry	20	12/10/2021 10:38:55 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	16.8	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 8:40:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-015 **Matrix:** SOIL  
**Client Sample ID** H-21W 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.68	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	4.63	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	4.72	0.10			1	12/10/2021
Soluble Calcium	1.38	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.69	0.05		meq/L	1	12/10/2021
Soluble Sodium	4.80	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	94.6	2.28		mg/Kg-dry	10	12/10/2021 10:52:43 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	18.1	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 9:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-016 **Matrix:** SOIL  
**Client Sample ID** MW-6 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	1.25	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	9.55	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	8.18	0.10			1	12/10/2021
Soluble Calcium	2.22	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.57	0.05		meq/L	1	12/10/2021
Soluble Sodium	9.65	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	203	4.32		mg/Kg-dry	20	12/10/2021 11:06:31 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	19.5	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 9:55:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-017 **Matrix:** SOIL  
**Client Sample ID** MW-6 4-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	2.08	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	8.90	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	13.4	0.10	*		1	12/10/2021
Soluble Calcium	2.17	0.02		meq/L	1	12/10/2021
Soluble Magnesium	0.79	0.05		meq/L	1	12/10/2021
Soluble Sodium	16.3	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	591	12.7		mg/Kg-dry	50	12/11/2021 12:29:20 AM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	17.1	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 10:00:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-018 **Matrix:** SOIL  
**Client Sample ID** MW-6 8-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	
Electrical Conductivity	3.23	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	
Exchangeable Sodium %	5.05	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	
Sodium Adsorption Ratio	7.89	0.10			1	12/10/2021
Soluble Calcium	9.84	0.02		meq/L	1	12/10/2021
Soluble Magnesium	3.73	0.05		meq/L	1	12/10/2021
Soluble Sodium	20.6	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
					<b>SW9056A</b>	
Chloride	813	10.8		mg/Kg-dry	50	12/11/2021 12:43:08 AM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
					<b>LDNR 29-B</b>	
Percent Moisture	19.0	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 11:25:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-019 **Matrix:** SOIL  
**Client Sample ID** MW-6 38-40

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.82	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	340	10.6		mg/Kg-dry	50	12/11/2021 12:56:57 AM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	22.2	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 11:30:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-020 **Matrix:** SOIL  
**Client Sample ID** MW-6 30-32

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.08	0.10		mmhos/cm	1	12/10/2021 11:30:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	3.15	0.10		%	1	12/21/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	3.25	0.10			1	12/10/2021
Soluble Calcium	3.35	0.02		meq/L	1	12/10/2021
Soluble Magnesium	1.77	0.05		meq/L	1	12/10/2021
Soluble Sodium	5.20	0.25		meq/L	1	12/10/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	189	4.52		mg/Kg-dry	20	12/11/2021 1:10:44 AM
<b>CHLORIDES, SPLP LEACHED</b>					<b>SW9253</b>	Analyst: <b>SGP</b>
Chlorides	10.6	10.0		mg/L	1	12/1/2021 3:56:00 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.4	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 11:35:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-021 **Matrix:** SOIL  
**Client Sample ID** MW-6 18-20

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	4.53	0.10	*	mmhos/cm	1	12/10/2021 11:05:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>				<b>SW9056A</b>		Analyst: <b>SGP</b>
Chloride	1,210	22.8		mg/Kg-dry	100	12/11/2021 1:24:32 AM
<b>CHLORIDES, SPLP LEACHED</b>				<b>SW9253</b>		Analyst: <b>SGP</b>
Chlorides	49.7	10.0		mg/L	1	12/1/2021 3:56:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	23.0	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





Element Materials Technology Lafayette  
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 Website: [www.element.com](http://www.element.com)

# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 3:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-022 **Matrix:** SOIL  
**Client Sample ID** H-15N 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	89.6	0.498		mg/Kg	1	12/7/2021 6:18:36 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.7	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 3:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-023 **Matrix:** SOIL  
**Client Sample ID** H-15W 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	636	0.523		mg/Kg	1	12/7/2021 6:20:54 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	15.5	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/18/2021 4:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-024 **Matrix:** SOIL  
**Client Sample ID** H-15R 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP MERCURY BY SW1312/7470</b>					<b>SW7470A</b>	<b>SW 1312M</b>
<b>MERCURY, SPLP</b>						Analyst: <b>BXB</b>
Mercury	< 0.000200	0.000200		mg/L	1	12/3/2021 6:44:25 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/19/2021 8:45:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-025 **Matrix:** SOIL  
**Client Sample ID** H-15E 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	34.0	0.481		mg/Kg	1	12/7/2021 6:23:11 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	22.2	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/19/2021 9:05:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-026 **Matrix:** SOIL  
**Client Sample ID** H-15S 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	64.7	0.482		mg/Kg	1	12/7/2021 6:25:30 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	19.9	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/19/2021 10:00:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-027 **Matrix:** SOIL  
**Client Sample ID** H-11S 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	59.1	0.505		mg/Kg	1	12/7/2021 6:27:49 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.2	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/19/2021 10:05:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-028 **Matrix:** SOIL  
**Client Sample ID** H-11E 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	758	0.495		mg/Kg	1	12/7/2021 6:30:07 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.3	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/19/2021 10:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-029 **Matrix:** SOIL  
**Client Sample ID** H-11R 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	0.206	0.0500		mg/L	1	12/7/2021 10:19:32 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.9	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 21111085

Date Reported: 12/21/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/19/2021 10:15:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21111085-030 **Matrix:** SOIL  
**Client Sample ID** H-11N 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	1,270	0.508		mg/Kg	1	12/7/2021 6:32:26 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.1	1.00		wt%	1	11/24/2021 1:30:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41805

Sample ID	<b>MB-41805</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/29/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>41805</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564839</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-41805</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/29/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>41805</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564840</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		25.1		0.500	25.00	0		101	80	120				

Sample ID	<b>LCSD-41805</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/29/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41805</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564841</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		25.1		0.500	25.00	0		100	80	120	25.14	0.189	20	

Sample ID	<b>21111084-014BMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/29/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41805</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564846</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		85.2		0.517	25.87	53.24		123	75	125				

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- SDL Sample detection limit
- M Matrix Interference
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41805

Sample ID	<b>21111084-014BMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>11/29/2021</b>	RunNo:	<b>104895</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41805</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564847</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		70.8		0.478		23.92		53.24		73.5		75		125		85.18		18.4		20		S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41887

Sample ID	<b>MB-41887</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>					
Client ID:	<b>PBW</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564754</b>					
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.0100		0.0100												
Lead		< 0.0100		0.0100												

Sample ID	<b>LCS-41887</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>					
Client ID:	<b>LCSW</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564755</b>					
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.452		0.0100		0.5000		0		90.3	80	120				
Lead		0.442		0.0100		0.5000		0		88.5	80	120				

Sample ID	<b>LCSD-41887</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>					
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564756</b>					
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.470		0.0100		0.5000		0		93.9	80	120	0.4515	3.90	20	
Lead		0.463		0.0100		0.5000		0		92.5	80	120	0.4424	4.47	20	

Sample ID	<b>21111085-029AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>					
Client ID:	<b>H-11R 0-2</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564759</b>					
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		2.53		0.0500		2.500		0.2061		93.0	75	125				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41887

Sample ID	<b>21111085-029AMS</b>	SampType: <b>MS</b>	TestCode: <b>6010_SPLP</b>	Units: <b>mg/L</b>	Prep Date: <b>12/7/2021</b>	RunNo: <b>104895</b>					
Client ID:	<b>H-11R 0-2</b>	Batch ID: <b>41887</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>12/7/2021</b>	SeqNo: <b>2564759</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	2.26	0.0500	2.500	0	90.4	75	125				

Sample ID	<b>21111085-029AMSD</b>	SampType: <b>MSD</b>	TestCode: <b>6010_SPLP</b>	Units: <b>mg/L</b>	Prep Date: <b>12/7/2021</b>	RunNo: <b>104895</b>					
Client ID:	<b>H-11R 0-2</b>	Batch ID: <b>41887</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>12/7/2021</b>	SeqNo: <b>2564760</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	2.49	0.0500	2.500	0.2061	91.4	75	125	2.532	1.63	20	
Lead	2.24	0.0500	2.500	0	89.6	75	125	2.260	0.918	20	

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |



Element Materials Technology Lafayette  
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 Website: [www.element.com](http://www.element.com)

# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41935

Sample ID	<b>21111085-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>SAR_S</b>	Units:		Prep Date:	<b>12/10/2021</b>	RunNo:	<b>105021</b>		
Client ID:	<b>H-16R 0-2</b>	Batch ID:	<b>41935</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2569481</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio		10.1		0.10						10.18	0.37	20	
Soluble Calcium		1.10		0.02						1.09	0.78	20	
Soluble Magnesium		0.49		0.05						0.49	0.37	20	
Soluble Sodium		9.03		0.25						9.04	0.04	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- SDL Sample detection limit
- M Matrix Interference
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42040

Sample ID	<b>21111085-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>ESP_S</b>	Units:	%	Prep Date:	<b>12/20/2021</b>	RunNo:	<b>105299</b>		
Client ID:	<b>H-16R 0-2</b>	Batch ID:	<b>42040</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577614</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Exchangeable Sodium %		4.54		0.10						5.24	14.3	20	

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42044

Sample ID	21111085-001ADUP	SampType:	DUP	TestCode:	CEC	Units:	meq/100g	Prep Date:	12/20/2021	RunNo:	105299		
Client ID:	H-16R 0-2	Batch ID:	42044	TestNo:	LDNR 29-B	LDNR 29-B		Analysis Date:	12/21/2021	SeqNo:	2577452		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cation Exchange Capacity		29.8		0.100						26.71	11.1	20	

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |





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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R104752

Sample ID	<b>MB-R104752</b>	SampType:	<b>MBLK</b>	TestCode:	<b>CL_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>104752</b>			
Client ID:	<b>PBW</b>	Batch ID:	<b>R104752</b>	TestNo:	<b>SW9253</b>			Analysis Date:	<b>12/1/2021</b>	SeqNo:	<b>2561812</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides		< 10.0		10.0										

Sample ID	<b>LCSD-R104752</b>	SampType:	<b>LCSD</b>	TestCode:	<b>CL_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>104752</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>R104752</b>	TestNo:	<b>SW9253</b>			Analysis Date:	<b>12/1/2021</b>	SeqNo:	<b>2561813</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides		117		10.0	100.0	0		117	80	120	103.0	12.9	20	

Sample ID	<b>LCS-R104752</b>	SampType:	<b>LCS</b>	TestCode:	<b>CL_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>104752</b>			
Client ID:	<b>LCSW</b>	Batch ID:	<b>R104752</b>	TestNo:	<b>SW9253</b>			Analysis Date:	<b>12/1/2021</b>	SeqNo:	<b>2561814</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides		103		10.0	100.0	0		103	80	120				

Sample ID	<b>21111085-007AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>CL_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>104752</b>			
Client ID:	<b>H-12R 76-78</b>	Batch ID:	<b>R104752</b>	TestNo:	<b>SW9253</b>			Analysis Date:	<b>12/1/2021</b>	SeqNo:	<b>2561817</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides		156		10.0	100.0	42.60		114	80	120				

**Qualifiers:**

- |   |  |                        |
|---|--|------------------------|
| * Value exceeds Maximum Contaminant Level.                              | H Holding times for preparation or analysis exceeded | M Matrix Interference  |
| ND Not Detected at the Reporting Limit                                  | R RPD outside accepted recovery limits               | RL Reporting Limit     |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                           | U Analyte not detected |
| W Sample container temperature is out of limit as specified at testcode |  |                        |



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R104752

Sample ID	<b>21111085-007AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>CL_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>104752</b>		
Client ID:	<b>H-12R 76-78</b>	Batch ID:	<b>R104752</b>	TestNo:	<b>SW9253</b>			Analysis Date:	<b>12/1/2021</b>	SeqNo:	<b>2561818</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides		149		10.0	100.0	42.60	106	80	120	156.2	4.65	20	

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R104838

Sample ID	<b>21111079-015ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104838</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R104838</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/24/2021</b>	SeqNo:	<b>2563608</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture		18.5		1.00						18.60	0.54	20	

Sample ID	<b>21111085-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104838</b>		
Client ID:	<b>H-16R 0-2</b>	Batch ID:	<b>R104838</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/24/2021</b>	SeqNo:	<b>2563627</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture		15.1		1.00						15.10	0	20	

Sample ID	<b>21111085-021ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104838</b>		
Client ID:	<b>MW-6 18-20</b>	Batch ID:	<b>R104838</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/24/2021</b>	SeqNo:	<b>2563648</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture		25.1		1.00						23.00	8.73	20	

Sample ID	<b>21111120-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>104838</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R104838</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>11/29/2021</b>	SeqNo:	<b>2563663</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture		92.9		1.00						92.90	0	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- SDL Sample detection limit
- M Matrix Interference
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R104838

Sample ID	21111120-021ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 104838
Client ID:	ZZZZZZ	Batch ID: R104838	TestNo: LDNR 29-B	Analysis Date: 11/29/2021	SeqNo: 2563684	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Percent Moisture	85.6	1.00				85.20 0.47 20

Sample ID	21111120-041ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 104838
Client ID:	ZZZZZZ	Batch ID: R104838	TestNo: LDNR 29-B	Analysis Date: 11/29/2021	SeqNo: 2563705	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Percent Moisture	81.0	1.00				81.30 0.37 20

Sample ID	21111120-061ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 104838
Client ID:	ZZZZZZ	Batch ID: R104838	TestNo: LDNR 29-B	Analysis Date: 11/29/2021	SeqNo: 2563726	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Percent Moisture	54.9	1.00				54.80 0.18 20

Sample ID	21111120-081ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 104838
Client ID:	ZZZZZZ	Batch ID: R104838	TestNo: LDNR 29-B	Analysis Date: 11/29/2021	SeqNo: 2563747	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Percent Moisture	73.2	1.00				64.70 12.3 20

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** R105004

Sample ID	<b>MB-R104948</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105004</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105004</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2567926</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	< 0.10	0.10									
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Sample ID	<b>LCS1-R104948</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105004</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105004</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2567928</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	0.52	0.10	0.50	0	102	90	110				
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Sample ID	<b>LCS2-R104948</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105004</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105004</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2567930</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	54.2	0.10	53.00	0	102	90	110				
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Sample ID	<b>21111079-015ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105004</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105004</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2567939</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	3.65	0.10								3.67	0.55	20
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**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105006

Sample ID	<b>MB-R105004</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105006</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105006</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568027</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		< 0.10		0.10							

Sample ID	<b>LCS1-R105004</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105006</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105006</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568028</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		0.52		0.10	0.50	0	103	90	110		

Sample ID	<b>LCS2-R105004</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105006</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105006</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568029</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		53.7		0.10	53.00	0	101	90	110		

Sample ID	<b>21111085-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105006</b>
Client ID:	<b>H-16R 0-2</b>	Batch ID:	<b>R105006</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568031</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		1.12		0.10						1.12	0.27 20

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level.  
 ND Not Detected at the Reporting Limit  
 S Spike Recovery outside accepted recovery limits  
 W Sample container temperature is out of limit as specified at testcode

H Holding times for preparation or analysis exceeded  
 R RPD outside accepted recovery limits  
 SDL Sample detection limit

M Matrix Interference  
 RL Reporting Limit  
 U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105038

Sample ID	<b>mblk</b>	SampType:	<b>MBLK</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105038</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568919</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Chloride		< 0.250		0.250							

Sample ID	<b>lcs</b>	SampType:	<b>LCS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>
Client ID:	<b>LCSS</b>	Batch ID:	<b>R105038</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568920</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Chloride		9.98		0.250	10.00	0	99.8	80	120		

Sample ID	<b>lcsd</b>	SampType:	<b>LCSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>
Client ID:	<b>LCSS02</b>	Batch ID:	<b>R105038</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568921</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Chloride		10.1		0.250	10.00	0	101	80	120	9.981	0.980 15

Sample ID	<b>21111079-016ams</b>	SampType:	<b>MS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R105038</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568932</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Chloride		420		10.4	208.8	216.4	97.5	80	120		

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



Element Materials Technology Lafayette  
 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105038

Sample ID	<b>21111079-016amsd</b>	SampType:	<b>MSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R105038</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568933</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		435		10.4	208.8	216.4	105	80	120	420.0	3.53	15	

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |





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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105038-2

Sample ID	<b>mblk</b>	SampType:	<b>MBLK</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>R105038-2</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568948</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		< 0.250		0.250										

Sample ID	<b>lcs</b>	SampType:	<b>LCS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>R105038-2</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568949</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		9.89		0.250	10.00	0		98.9	80	120				

Sample ID	<b>lcsd</b>	SampType:	<b>LCSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>R105038-2</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568950</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		10.2		0.250	10.00	0		102	80	120	9.887	3.40	15	

Sample ID	<b>21111085-007ams</b>	SampType:	<b>MS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>H-12R 76-78</b>	Batch ID:	<b>R105038-2</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568964</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,430		22.6	451.5	927.5		112	80	120				

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105038-2

Sample ID	<b>21111085-007amsd</b>	SampType:	<b>MSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>		
Client ID:	<b>H-12R 76-78</b>	Batch ID:	<b>R105038-2</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568965</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,410		22.6	451.5	927.5	108	80	120	1,431	1.17	15	

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105038-3

Sample ID	<b>mblk</b>	SampType:	<b>MBLK</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>R105038-3</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/10/2021</b>	SeqNo:	<b>2568977</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		< 0.250		0.250										

Sample ID	<b>lcs</b>	SampType:	<b>LCS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>R105038-3</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/11/2021</b>	SeqNo:	<b>2568978</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		9.94		0.250	10.00	0		99.4	80	120				

Sample ID	<b>lcsd</b>	SampType:	<b>LCSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>R105038-3</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/11/2021</b>	SeqNo:	<b>2568979</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		10.5		0.250	10.00	0		105	80	120	9.942	5.76	15	

Sample ID	<b>21111085-021ams</b>	SampType:	<b>MS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>			
Client ID:	<b>MW-6 18-20</b>	Batch ID:	<b>R105038-3</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/11/2021</b>	SeqNo:	<b>2568985</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,660		22.8	455.5	1,208		98.4	80	120				

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level.  
 ND Not Detected at the Reporting Limit  
 S Spike Recovery outside accepted recovery limits  
 W Sample container temperature is out of limit as specified at testcode

H Holding times for preparation or analysis exceeded  
 R RPD outside accepted recovery limits  
 SDL Sample detection limit

M Matrix Interference  
 RL Reporting Limit  
 U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21111085  
 21-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105038-3

Sample ID	<b>21111085-021amsd</b>	SampType:	<b>MSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105038</b>											
Client ID:	<b>MW-6 18-20</b>	Batch ID:	<b>R105038-3</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/11/2021</b>	SeqNo:	<b>2568986</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Chloride		1,660		22.8		455.5		1,208		98.7		80		120		1,657		0.0727		15		

**Qualifiers:**

- |    |   |     |  |    |                      |
|----|---|-----|--|----|----------------------|
| *  | Value exceeds Maximum Contaminant Level.                              | H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  |
| ND | Not Detected at the Reporting Limit                                   | R   | RPD outside accepted recovery limits               | RL | Reporting Limit      |
| S  | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit                             | U  | Analyte not detected |
| W  | Sample container temperature is out of limit as specified at testcode |     |  |    |                      |



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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON** Work Order Number: **21111085** RcptNo: **1**

Logged by:	<b>Tammy Thibodeaux</b>	<b>11/19/2021 1:45:00 PM</b>	<i>Tammy Thibodeaux</i>
Completed By:	<b>Tammy Thibodeaux</b>	<b>11/19/2021 3:13:40 PM</b>	<i>Tammy Thibodeaux</i>
Reviewed By:	<b>Cristina Thibeaux</b>	<b>11/19/2021 4:22:35 PM</b>	<i>Cristina Thibeaux</i>

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------







# Chain of Custody

Laboratory Number: 8111085

Client Information: **ERM** PO Number: **0526033** Project Name/Number: **Herring Management** Page 2 of 4

Contact Name: **Shawn Wiggins** Quote Number: **Matrix Code**

Address: **City, State Zip:** **Phone Number:** **Fax Number:** **E-mail Address:**

Turn Time:  Standard  RUSH  1 Day  2 Day  Other

Required QC Level:  Yes  No

Bill Monthly:  Yes  No

Shipping Method: **UPS / FedEx / NOW** **DHL / Element / Hand / Mail**

Sampler's Signature: *Coy*

Sample ID/Description	Turn Time		(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container	Pres.	Requested Tests	Comments
	Date	Time					
H-21R (2-3')	11/17/21	1615	G	P	N/A	X	
H-21R (10-12')	11/17/21	1620	G	P	N/A	X	
H-21R (22-24')	11/17/21	1700	G	P	N/A	X	
H-21W (8-10')	11/18/21	830	G	P	N/A	X	
H-21W (6-8')	11/18/21	835	G	P	N/A	X	
H-21W (6-2')	11/18/21	840	G	P	N/A	X	
MW-6 (0-2')	11/18/21	950	G	P	N/A	X	
MW-6 (4-6')	11/18/21	955	G	P	N/A	X	
MW-6 (8-10')	11/18/21	1000	G	P	N/A	X	

Relinquished by: *Coy* Date/Time: **11/19/21 1345** Received by: *Dubodanp* Date/Time: **11/19/21 1345**

Field Notes: **Received at lab on ice?**  Yes  No Temp: **11/19/21 78**

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

8800 North US 31  
Columbus, IN 47201 USA  
P 812-375-0531  
F 812-375-0731

328 Ley Road, Suite 100  
Fort Wayne, IN 46825 USA  
P 260-471-7000  
F 260-471-7777

909 Executive Dr  
Warsaw, IN 46580 USA  
P 574-267-3305  
F 574-269-6569

3371 Cleveland Road, Suite 100A  
South Bend, IN 46628 USA  
P 574-277-0707  
F 574-273-5699

2417 W. Pinhook Rd  
Lafayette, LA 70508 USA  
P 337-235-0483  
F 337-233-6540







# Chain of Custody

2111087

Laboratory Number: 2111087

Page 4 of 4

Client Information:  
 Company Name: **ERM**  
 Contact Name: **Shawn Wiggins**  
 Address:  
 City, State Zip:  
 Phone Number:  
 Fax Number:  
 E-mail Address:

Billing Information:  
 PO Number: **0526033**  
 Quote Number:  
 Required QC Level:  
 Bill Monthly:  
 Yes  
 No

Project Name/Number: **Henning Management**  
 Sampler's Signature: *Cory Yhr*  
 Shipping Method:  
 UPS / FedEx / NOW  
 DHL / Element / Hand / Mail

Matrix Code  
 DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Which Regulations Apply:		Turn Time <input checked="" type="checkbox"/> Standard <input checked="" type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container Type P=Plastic G=Glass, V=Vial	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	Requested Tests	Comments					
	Collection Information								Quantity	Barium	SPB Barium		
	Date	Time										Matrix	
H-115(0-2')	11/19/21	1000	G	SO	P	N/A	X	X					
H-11E(0-2')	11/19/21	1005	G	SO	P	N/A	X	X					
H-11R(0-2')	11/19/21	1010	G	SO	P	N/A	X	X					
H-11N(0-2')	11/19/21	1015	G	SO	P	N/A	X	X					H = HOLD

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
1 <i>Cory Yhr</i>	11/19/21 1345	<i>Shawn Wiggins</i>	11/19/21 1345	
2				Received at lab on ice? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp:
3				

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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 F 812-375-0731

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 F 260-471-7777

909 Executive Dr  
 Warsaw, IN  
 46580 USA  
 P 574-267-3305  
 F 574-269-6569

3371 Cleveland Road, Suite 100A  
 South Bend, IN  
 46628 USA  
 P 574-277-0707  
 F 574-273-6699

2417 W. Pinhook Rd  
 Lafayette, LA  
 70508 USA  
 P 337-235-0483  
 F 337-233-6540



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Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

December 10, 2021

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 21120047

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 1 sample(s) on 11/12/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

## Case Narrative

WO#: 21120047  
Date: 12/10/2021

---

**CLIENT:** Environmental Resources Management

**Project:** Henning Management 0526033

---

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).



Element Materials Technology Lafayette  
 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# Analytical Report

(consolidated)

WO#: 21120047

Date Reported: 12/10/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/11/2021 2:45:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120047-001 **Matrix:** SOIL  
**Client Sample ID** H-24S 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	9.48	0.0100		mg/L	1	12/7/2021 10:26:30 PM

**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 21120047  
 10-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41887

Sample ID	<b>MB-41887</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>PBW</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564754</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.0100		0.0100										

Sample ID	<b>LCS-41887</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>LCSW</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564755</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.452		0.0100	0.5000	0		90.3	80	120				

Sample ID	<b>LCSD-41887</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564756</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.470		0.0100	0.5000	0		93.9	80	120	0.4515	3.90	20	

Sample ID	<b>21111085-029AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564759</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		2.53		0.0500	2.500	0.2061		93.0	75	125				

**Qualifiers:** H Holding times for preparation or analysis exceeded M Matrix Interference ND Not Detected at the Reporting Limit  
 RL Reporting Limit S Spike Recovery outside accepted recovery limits SDL Sample detection limit  
 U Analyte not detected W Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 21120047  
 10-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41887

Sample ID	<b>21111085-029AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564760</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		2.49		0.0500		2.500		0.2061		91.4		75		125		2.532		1.63		20		

**Qualifiers:**


H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode		



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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON** Work Order Number: **21120047** RcptNo: **1**

Logged by:	<b>Cristina Thibeaux</b>	<b>11/12/2021 1:45:00 PM</b>	
Completed By:	<b>Cristina Thibeaux</b>	<b>12/1/2021 5:51:11 PM</b>	
Reviewed By:	<b>Caitlin Duplantis</b>	<b>12/10/2021 9:19:36 AM</b>	

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:  
 relog of 21110790

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
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# Chain of Custody

**Client Information:**  
 Company Name: ERM  
 Contact Name: Suzanne Wilgands  
 Address: 840 W Sam Houston Pkwy N  
Suite 600  
Houston, Texas 77024  
 City, State Zip: 77024  
 Phone Number: 713-303-1385 Ext: \_\_\_\_\_  
 Fax Number: \_\_\_\_\_  
 E-mail Address: Suzanne.Wilgands@ERM.com

**Billing Information:**  
 Billing Information: Same

**PO Number:** \_\_\_\_\_  
**Quote Number:** \_\_\_\_\_  
**Required QC Level:** \_\_\_\_\_  
**Bill Monthly:**  Yes  No

**Shipping Method:** UPS / FedEx / Airborne  
DHL / Element / Hand / Mail

**Project Name/Number:** Decontamination project  
**Project Name/Number:** 0526033  
**Sampler's Signature:** *[Signature]*  
**Shipping Method:** \_\_\_\_\_

**Matrix Code:**  
 DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

relog 2/12/2007  
 2110790  
 12/1/21

Sample ID/Description	Turn Time		Collection Information	Matrix	Container		Pres.	Requested Tests	Comments
	Date	Time			Grab / Composite	Type			
H-22W 0-2'	11/1/21	0855	Grabs	SO	P	1	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> SO <sub>3</sub>	X = Analytic Required O = Hold for Analysis M = Matrix Analysis	
H-22E 0-2'		0910							
H-22S 0-2'		0915							
H-22N 0-2'		0925							
H-22E 0-2'		0935							
H-8E 0-2'		1100							
H-8W 0-2'		1135							
H-8S 0-2'		1140							

Relinquished by	Date/Time	Received by	Date/Time	Field Notes

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

9301 Innovation Drive, Suite 115  
 Delaware, IN 47334-0569 USA  
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628 Washington St. Suite 300  
 Columbus, IN 47201-6231 USA  
 P 812-375-0631 F 812-375-0731

2121 East Washington Boulevard  
 Fort Wayne, IN 46803-1328 USA  
 P 260-471-7000 F 260-471-7777

560 South Zimmar Road  
 Warsaw, IN 46514-3348 USA  
 P 874-287-3305 F 874-289-4669

3371 Cleveland Road, Suite 100A  
 South Bend, IN 46626-5780 USA  
 P 574-277-3707 F 574-273-5669

2417 W. Pinhook Rd  
 Lafayette, LA 70508-3344 USA  
 P 337-235-0483 F 337-233-8640





Chain of Custody

2110047  
2110790

Laboratory Number

Client Information: **ERAM**  
 Billing Information: **Same**  
 PO Number:  
 Quote Number:  
 Required QC Level:  
 Bill Monthly:  Yes  No  
 Shipping Method: UPS / FedEx / Airborne  
 DHL / Element / Hand / Mail

Company Name: **ERAM**  
 Contact Name: **Sharon Williams**  
 Address: **840 W. Sam Houston Pkwy N**  
 City, State Zip: **Suite 6000 Houston, TX 77024**  
 Phone Number: **071-303-2385** Ext:  
 Fax Number:  
 E-mail Address: **Sharon.Williams@eram.com**

Project Name/Number: **Henning's Management 0520033**  
 Matrix Code: **2110790**  
 Sampler's Signature: *[Signature]*  
 Shipping Method: **UPS / FedEx / Airborne**

DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 SL = Sludge  
 SO = Soil  
 F = Food  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Turn Time	Which Regulations Apply: <input type="checkbox"/> RCRA <input type="checkbox"/> POTW <input type="checkbox"/> NPDES <input type="checkbox"/> USCA/FDA <input type="checkbox"/> RCRA/RI/RO	Collection Information		Matrix	Quantity	Container Type P=Plastic, V=Vial	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> NaOH, Na <sub>2</sub> SO <sub>3</sub>	Requested Tests	Comments
			Date	Time						
H-8N 0-2'	Standard		11/11/21	1150	SO	1	P	NONE	SRL Lead	X - Analyte's reference D - Hold for possible analyte's ground initial. demands
H-16N 0-2'	RUSH		11/11/21	1310	SO	1	P		SRL Lead	
H-16W 0-2'	1 Day		11/11/21	1325	SO	1	P		SRL Lead	
H-16E 0-2'	2 Day		11/11/21	1340	SO	1	P		SRL Lead	
H-16S 0-2'	Other		11/11/21	1350	SO	1	P		SRL Lead	
H-24S 0-2'			11/11/21	1445	SO	1	P		SRL Lead	
H-28W 0-2'			11/11/21	1510	SO	1	P		SRL Lead	
H-28R 0-2'			11/11/21	1540	SO	1	P		SRL Lead	
H-28S 0-2'			11/11/21	1615	SO	1	P		SRL Lead	

Relinquished by	Date/Time	Received by	Date/Time	Field Notes
<i>[Signature]</i>	11/12/21 1155	<i>[Signature]</i>	11/12/21 1155	Received at lab on ice?
<i>[Signature]</i>	11/11/21 1345	<i>[Signature]</i>	11/21 1345	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp.

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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 Daleville, IN 47334-0569 USA  
 P 765-376-4103  
 F 765-376-4109

629 Washington St. Suite 300  
 Columbus, IN 47201-8231 USA  
 P 812-376-0531  
 F 812-376-0731

2121 East Washington Boulevard  
 Fort Wayne, IN 46803-1328 USA  
 P 260-471-7000  
 F 260-471-7777

560 South Zimмер Road  
 Warsaw, IN 46580-2366 USA  
 P 674-281-3305  
 F 674-281-6569

3371 Cleveland Road, Suite 100A  
 South Bend, IN 46828-9700 USA  
 P 674-277-0707  
 F 674-273-9699

2417 W. Pinhook Rd  
 Lafayette, LA 70508-3344 USA  
 P 337-235-0483  
 F 337-233-6540





Chain of Custody

Chain of Custody

Laboratory Number: 21120047

Laboratory Number: 2110790

Client Information: **Blilling Information:** PO Number: **Project Name/Number:** **Matrix Code**  
 Company Name: **EPRI** **Standard**  
 Contact Name: **Sharon Williams**  
 Address: **8400 SAM Houston Blvd**  
**Suite 600**  
 City, State Zip: **Houston, TX 77024**  
 Phone Number: **971-303-2385** Ext: **77024**  
 Fax Number: **971-303-2385** Ext: **77024**  
 E-mail Address: **Sharon.williams@epri.com**

Required QC Level:  Yes  No  
 Bill Monthly:  Yes  No  
 Shipping Method:  UPS / FedEx / Airborne  Hand / Mail  
 DHL / Element / Hand / Mail

Project Name/Number: **Henry H. Management**  
 Quote Number: **0526053**  
 Sampler's Signature: **[Signature]**  
 Shipping Method: **UPS**

DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge SOL = Solid  
 O = Oil SO = Soil  
 F = Food SW = Swab  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Date	Time	Matrix	Quantity	Container Type	Pres.	Requested Tests	Comments
H-28E 0-2'	11/11/21	1040	SO	1	P	None	SOP Mercury	X = Analyze O = Hold
H-28N 0-2'	11/12/21	0755					SOP Bismuth	
H-24N 0-2'	11/12/21	0815					% Moisture	
H-28E 0-2'	11/12/21	0850						
H-28W 0-2'	11/12/21	0900						
H-28R 0-2'	11/12/21	0910						
H-4R 0-2'	11/12/21	1030						
H-4N 0-2'	11/12/21	1040						
H-4E 0-2'	11/12/21	1050						

Relinquished by	Date/Time	Received by	Date/Time	Field Notes
[Signature]	11/12/21 1155	David	11/12/21 1155	
[Signature]	11/12/21 1345		11/12/21 1345	Received at lab on ice? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp: <input type="checkbox"/>

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

3301 Innovation Drive Suite 116 Daleville, IN 47534-0669 USA P 785-378-4103 F 785-378-4109

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2121 East Washington Boulevard Fort Wayne, IN 46803-1328 USA P 260-471-7000 F 260-471-7777

560 South Zimmer Road Warsaw, IN 46840-2168 USA P 874-287-3306 F 574-269-6169

3371 Cleveland Road, Suite 100A South Bend, IN 46626-8780 USA P 574-277-0707 F 574-273-5889

2417 W. Pinhook Rd Lafayette, LA 70508-3344 USA P 337-235-0483 F 337-233-6640



Chain of Custody

211 2007  
2110790

Laboratory Number

Client Information: **ERW** PO Number: **0526093** Project Name/Number: **Heavy Duty Maintenance** Page 4 of 4  
 Billing Information: **Same** Quote Number: **0526093** Matrix Code  
 Company Name: **Stam Wiggins** Required QC Level:  Yes  No Bill Monthly:  Yes  No  
 Contact Name: **Eric W Sam thousand (kern)** Ext: **77024** Shipping Method: **UPS / FedEx / Airborne**  
 Address: **Suite 600** **Stam, Wiggins C erw.com** DHL / Element / Hand / Mail  
 City, State Zip: **Stam, Wiggins C erw.com**

Sample ID/Description	Which Regulations Apply: <input type="checkbox"/> RCRA <input type="checkbox"/> POTW <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input type="checkbox"/> BECA/PRSC	Turn Time <input checked="" type="checkbox"/> Standard <input type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	Collection Information		Container Type P=Plastic, G=Glass, V=Vial	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> SO <sub>4</sub>	Requested Tests	Comments
			Date	Time				
H-AS 0-2'			11/12/21	1050, GAS	P	none	X % Moisture X % Barium	X = Analyze O = Hold
H-AW 0-2'			11/12/21	1120	P	none	X % Moisture X % Barium	
			11/13/21	1110				

Relinquished by	Date/Time	Received by	Date/Time	Field Notes
	11/12/21 1335	<i>[Signature]</i>	11/22/21 1345	Received at lab on ice? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp: _____

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2417 W. Pinhook Rd  
 Lafayette, LA 70508-0344 USA  
 P 337-235-0443 F 337-233-8540



*Element Materials Technology Lafayette*  
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Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

December 27, 2021

Dave Angle  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 21120179

Dear Dave Angle:

Element Materials Technology Lafayette received 31 sample(s) on 12/3/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

## Case Narrative

WO#: 21120179  
Date: 12/27/2021

---

**CLIENT:** Environmental Resources Management

**Project:** Henning Management 0526033

---

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The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).





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 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 12:55:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-001 **Matrix:** SOIL  
**Client Sample ID** MW-7 4-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	1.39	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	8.90	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	8.29	0.10			1	12/22/2021
Soluble Calcium	1.96	0.02		meq/L	1	12/22/2021
Soluble Magnesium	1.53	0.05		meq/L	1	12/22/2021
Soluble Sodium	10.9	0.25		meq/L	1	12/22/2021
<b>METALS IN SOIL OR SLUDGE BY ICP</b>						
Barium	9.30	0.482		mg/Kg	1	12/17/2021 5:22:50 PM
<b>PERCENT MOISTURE</b>						
Percent Moisture	15.5	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





Element Materials Technology Lafayette  
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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 1:00:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-002 **Matrix:** SOIL  
**Client Sample ID** MW-7 6-8

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.43	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	7.48	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	7.62	0.10			1	12/22/2021
Soluble Calcium	2.21	0.02		meq/L	1	12/22/2021
Soluble Magnesium	1.76	0.05		meq/L	1	12/22/2021
Soluble Sodium	10.7	0.25		meq/L	1	12/22/2021
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.4	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 1:05:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-003 **Matrix:** SOIL  
**Client Sample ID** MW-7 8-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.93	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	18.0	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 1:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-004 **Matrix:** SOIL  
**Client Sample ID** MW-7 12-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	2.63	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	19.5	1.00		wt%	1	12/7/2021 9:45:00 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 2:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-005 **Matrix:** SOIL  
**Client Sample ID** MW-7 38-40

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.06	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	134	5.99		mg/Kg-dry	20	12/21/2021 11:40:56 AM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	19.3	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

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H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 2:20:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-006 **Matrix:** SOIL  
**Client Sample ID** MW-7 32-34

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
<b>CATION EXCHANGE CAPACITY</b>						
Cation Exchange Capacity	36.9	0.100		meq/100g	1	12/22/2021
<b>29B SALTS</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	1.14	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	4.47	0.10		%	1	12/22/2021
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	4.85	0.10			1	12/22/2021
Soluble Calcium	2.58	0.02		meq/L	1	12/22/2021
Soluble Magnesium	1.92	0.05		meq/L	1	12/22/2021
Soluble Sodium	7.26	0.25		meq/L	1	12/22/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	112	5.42		mg/Kg-dry	20	12/21/2021 11:54:39 AM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	4.29	1.25		mg/L	5	12/9/2021 8:50:37 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.4	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

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ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 11/29/2021 2:25:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-007 **Matrix:** SOIL  
**Client Sample ID** MW-7 16-18

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	3.30	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	891	15.8		mg/Kg-dry	50	12/21/2021 12:08:26 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	20.9	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/1/2021 9:45:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-008 **Matrix:** SOIL  
**Client Sample ID** MW-1 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.02	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	3.14	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	8.02	0.10			1	12/22/2021
Soluble Calcium	1.36	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.45	0.05		meq/L	1	12/22/2021
Soluble Sodium	7.64	0.25		meq/L	1	12/22/2021
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	1,740	0.492		mg/Kg	1	12/17/2021 5:25:09 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	18.2	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/1/2021 9:50:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-009 **Matrix:** SOIL  
**Client Sample ID** MW-1 4-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
						Analyst: <b>JMI</b>
Electrical Conductivity	1.48	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>						
						Analyst: <b>BXB</b>
Exchangeable Sodium %	7.05	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>						
						Analyst: <b>STS</b>
Sodium Adsorption Ratio	8.53	0.10			1	12/22/2021
Soluble Calcium	2.24	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.88	0.05		meq/L	1	12/22/2021
Soluble Sodium	10.7	0.25		meq/L	1	12/22/2021
<b>METALS IN SOIL OR SLUDGE BY ICP</b>						
						Analyst: <b>STS</b>
Barium	81.9	0.490		mg/Kg	1	12/17/2021 5:27:28 PM
<b>PERCENT MOISTURE</b>						
						Analyst: <b>BXB</b>
Percent Moisture	16.8	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/1/2021 2:50:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-010 **Matrix:** SOIL  
**Client Sample ID** MW-1 58-60

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.67	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	121	16.0		mg/Kg-dry	50	12/21/2021 12:49:51 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	30.3	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/1/2021 2:55:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-011 **Matrix:** SOIL  
**Client Sample ID** MW-1 48-50

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.58	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	1.81	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	2.83	0.10			1	12/22/2021
Soluble Calcium	1.63	0.02		meq/L	1	12/22/2021
Soluble Magnesium	1.29	0.05		meq/L	1	12/22/2021
Soluble Sodium	3.41	0.25		meq/L	1	12/22/2021
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	28.4	2.60		mg/Kg-dry	10	12/21/2021 1:03:39 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	< 2.50	2.50		mg/L	10	12/9/2021 9:32:02 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.9	1.00		wt%	1	12/7/2021 9:45:00 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/1/2021 3:00:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-012 **Matrix:** SOIL  
**Client Sample ID** MW-1 8-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	2.07	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	14.2	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/1/2021 3:05:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-013 **Matrix:** SOIL  
**Client Sample ID** MW-1 20-22

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.52	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	54.3	2.66		mg/Kg-dry	10	12/21/2021 1:17:27 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	13.3	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 1:50:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-014 **Matrix:** SOIL  
**Client Sample ID** MW-9 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.77	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	7.30	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	7.15	0.10			1	12/22/2021
Soluble Calcium	0.91	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.62	0.05		meq/L	1	12/22/2021
Soluble Sodium	6.27	0.25		meq/L	1	12/22/2021
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	31.5	0.503		mg/Kg	1	12/17/2021 5:29:47 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	13.9	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 1:55:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-015 **Matrix:** SOIL  
**Client Sample ID** MW-9 4-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
<b>CATION EXCHANGE CAPACITY</b>						
Cation Exchange Capacity	33.2	0.100		meq/100g	1	12/22/2021
<b>29B SALTS</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.85	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	9.97	0.10		%	1	12/22/2021
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	8.52	0.10			1	12/22/2021
Soluble Calcium	0.75	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.51	0.05		meq/L	1	12/22/2021
Soluble Sodium	6.78	0.25		meq/L	1	12/22/2021
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	1,030	0.500		mg/Kg	1	12/17/2021 5:32:06 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	14.0	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

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H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 2:00:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-016 **Matrix:** SOIL  
**Client Sample ID** MW-9 8-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.68	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	15.8	1.00		wt%	1	12/7/2021 9:45:00 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 2:05:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-017 **Matrix:** SOIL  
**Client Sample ID** MW-9 12-14

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.13	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	19.8	1.00		wt%	1	12/7/2021 9:45:00 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 2:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-018 **Matrix:** SOIL  
**Client Sample ID** MW-9 14-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.89	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.8	1.00		wt%	1	12/7/2021 9:45:00 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 2:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-019 **Matrix:** SOIL  
**Client Sample ID** MW-9 20-22

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.62	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	14.4	1.00		wt%	1	12/7/2021 9:45:00 AM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 10:35:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-020 **Matrix:** SOIL  
**Client Sample ID** H-18 R 26-28

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	2.74	0.10		mmhos/cm	1	12/21/2021 11:20:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	779	13.5		mg/Kg-dry	50	12/21/2021 1:31:16 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	31.7	1.25		mg/L	5	12/9/2021 9:45:50 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.3	1.00		wt%	1	12/7/2021 9:45:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 10:40:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-021 **Matrix:** SOIL  
**Client Sample ID** H-18 R 18-20

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	5.56	0.10	*	mmhos/cm	1	12/21/2021 12:00:00 PM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	1,920	30.1		mg/Kg-dry	100	12/21/2021 2:12:40 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	118	2.50		mg/L	10	12/9/2021 9:59:38 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	19.3	1.00		wt%	1	12/7/2021 12:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 10:55:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-022 **Matrix:** SOIL  
**Client Sample ID** H-18 R 0-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	0.885	0.0100		mg/L	1	12/7/2021 10:28:49 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	21.4	1.00		wt%	1	12/7/2021 12:00:00 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 11:05:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-023 **Matrix:** SOIL  
**Client Sample ID** H-18 R 0-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.26	0.10		mmhos/cm	1	12/21/2021 12:00:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	12.0	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	10.7	0.10			1	12/22/2021
Soluble Calcium	1.17	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.66	0.05		meq/L	1	12/22/2021
Soluble Sodium	10.3	0.25		meq/L	1	12/22/2021
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.7	1.00		wt%	1	12/7/2021 12:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 11:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-024 **Matrix:** SOIL  
**Client Sample ID** H-18 R 1-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.37	0.10		mmhos/cm	1	12/21/2021 12:00:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	13.7	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	16.1	0.10	*		1	12/22/2021
Soluble Calcium	0.65	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.44	0.05		meq/L	1	12/22/2021
Soluble Sodium	11.9	0.25		meq/L	1	12/22/2021
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	19.5	1.00		wt%	1	12/7/2021 12:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 11:15:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-025 **Matrix:** SOIL  
**Client Sample ID** H-18 R 2-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.85	0.10		mmhos/cm	1	12/21/2021 12:00:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	14.3	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	13.5	0.10	*		1	12/22/2021
Soluble Calcium	0.35	0.02		meq/L	1	12/22/2021
Soluble Magnesium	0.28	0.05		meq/L	1	12/22/2021
Soluble Sodium	7.59	0.25		meq/L	1	12/22/2021
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	16.4	1.00		wt%	1	12/7/2021 12:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 12:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-026 **Matrix:** SOIL  
**Client Sample ID** H-18 NW 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	591	0.497		mg/Kg	1	12/21/2021 3:31:48 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	13.4	1.00		wt%	1	12/7/2021 12:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 12:20:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-027 **Matrix:** SOIL  
**Client Sample ID** H-18 NW 4-6

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	6.13	0.10	*	mmhos/cm	1	12/21/2021 12:00:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	14.4	0.10		%	1	12/22/2021
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	30.6	0.10	*		1	12/22/2021
Soluble Calcium	4.77	0.02		meq/L	1	12/22/2021
Soluble Magnesium	2.61	0.05		meq/L	1	12/22/2021
Soluble Sodium	58.8	0.25		meq/L	1	12/22/2021
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.6	1.00		wt%	1	12/7/2021 12:00:00 PM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 12:25:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-028 **Matrix:** SOIL  
**Client Sample ID** H-18 NW 8-10

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	6.46	0.10	*	mmhos/cm	1	12/21/2021 12:00:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	13.3	1.00		wt%	1	12/7/2021 12:00:00 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 12:30:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-029 **Matrix:** SOIL  
**Client Sample ID** H-18 NW 14-16

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	3.66	0.10		mmhos/cm	1	12/21/2021 12:00:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	20.0	1.00		wt%	1	12/7/2021 12:00:00 PM

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	H Holding times for preparation or analysis exceeded	M Matrix Interference
	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit
	U Analyte not detected	W Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 12:35:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-030 **Matrix:** SOIL  
**Client Sample ID** H-18 NW 16-18

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	7.41	0.10	*	mmhos/cm	1	12/21/2021 12:00:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	20.8	1.00		wt%	1	12/7/2021 12:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120179

Date Reported: 12/27/2021

**CLIENT:** Environmental Resources Management **Collection Date:** 12/3/2021 12:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120179-031 **Matrix:** SOIL  
**Client Sample ID** H-18 NW 22-24

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.18	0.10		mmhos/cm	1	12/21/2021 12:00:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	15.7	1.00		wt%	1	12/7/2021 12:00:00 PM

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41887

Sample ID	<b>MB-41887</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>PBW</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564754</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.0100		0.0100										

Sample ID	<b>LCS-41887</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>LCSW</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564755</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.452		0.0100	0.5000	0		90.3	80	120				

Sample ID	<b>LCSD-41887</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564756</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.470		0.0100	0.5000	0		93.9	80	120	0.4515	3.90	20	

Sample ID	<b>21111085-029AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564759</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		2.53		0.0500	2.500	0.2061		93.0	75	125				

**Qualifiers:**

- |   |   |  |
|---|---|--|
| * Value exceeds Maximum Contaminant Level.                              | B Analyte detected in the associated Method Blank | H Holding times for preparation or analysis exceeded |
| M Matrix Interference   | ND Not Detected at the Reporting Limit            | RL Reporting Limit                                   |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                        | U Analyte not detected                               |
| W Sample container temperature is out of limit as specified at testcode |   |  |



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41887

Sample ID	<b>21111085-029AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/7/2021</b>	RunNo:	<b>104895</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41887</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/7/2021</b>	SeqNo:	<b>2564760</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		2.49		0.0500		2.500		0.2061		91.4		75		125		2.532		1.63		20		

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected





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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41917

Sample ID	<b>MB-41917</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/9/2021</b>	RunNo:	<b>105222</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>41917</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/17/2021</b>	SeqNo:	<b>2574832</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-41917</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/9/2021</b>	RunNo:	<b>105222</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>41917</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/17/2021</b>	SeqNo:	<b>2574833</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		26.5		0.500	25.00	0		106	80	120				

Sample ID	<b>LCSD-41917</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/9/2021</b>	RunNo:	<b>105222</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>41917</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/17/2021</b>	SeqNo:	<b>2574834</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		26.5		0.500	25.00	0		106	80	120	26.53	0.157	20	

Sample ID	<b>21111262-003AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/9/2021</b>	RunNo:	<b>105222</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41917</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/17/2021</b>	SeqNo:	<b>2574838</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		58.7		0.499	24.94	54.51		16.7	75	125				S

**Qualifiers:**

- |   |   |  |
|---|---|--|
| * Value exceeds Maximum Contaminant Level.                              | B Analyte detected in the associated Method Blank | H Holding times for preparation or analysis exceeded |
| M Matrix Interference   | ND Not Detected at the Reporting Limit            | RL Reporting Limit                                   |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                        | U Analyte not detected                               |
| W Sample container temperature is out of limit as specified at testcode |   |  |



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 41917

Sample ID	<b>21111262-003AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/9/2021</b>	RunNo:	<b>105222</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>41917</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/17/2021</b>	SeqNo:	<b>2574839</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		58.2		0.492		24.60		54.51		15.0		75		125		58.66		0.820		20		S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

<b>Qualifiers:</b>	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	H	Holding times for preparation or analysis exceeded
	M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42001

Sample ID	<b>MB-42001</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/15/2021</b>	RunNo:	<b>105323</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42001</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578234</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-42001</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/15/2021</b>	RunNo:	<b>105323</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42001</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578235</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		24.7		0.500	25.00	0		98.9	80	120				

Sample ID	<b>LCSD-42001</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/15/2021</b>	RunNo:	<b>105323</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42001</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578236</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		24.8		0.500	25.00	0		99.4	80	120	24.73	0.436	20	

Sample ID	<b>21120179-026AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/15/2021</b>	RunNo:	<b>105323</b>			
Client ID:	<b>H-18 NW 0-2</b>	Batch ID:	<b>42001</b>	TestNo:	<b>SW6010B</b>	<b>SW3050B</b>		Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578238</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		244		0.486	24.29	591.4		-1,430	75	125				S

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** 42001

Sample ID	<b>21120179-026AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/15/2021</b>	RunNo:	<b>105323</b>											
Client ID:	<b>H-18 NW 0-2</b>	Batch ID:	<b>42001</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578239</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		259		0.515		25.73		591.4		-1,290		75		125		244.4		5.75		20		S

**NOTES:**

S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

**Qualifiers:**

- |   |   |  |
|---|---|--|
| * Value exceeds Maximum Contaminant Level.                              | B Analyte detected in the associated Method Blank | H Holding times for preparation or analysis exceeded |
| M Matrix Interference   | ND Not Detected at the Reporting Limit            | RL Reporting Limit                                   |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                        | U Analyte not detected                               |
| W Sample container temperature is out of limit as specified at testcode |   |  |



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42072

Sample ID	21120179-001ADUP	SampType:	DUP	TestCode:	ESP_S	Units:	%	Prep Date:	12/21/2021	RunNo:	105376		
Client ID:	MW-7 4-6	Batch ID:	42072	TestNo:	LDNR 29-B	LDNR 29-B		Analysis Date:	12/22/2021	SeqNo:	2580323		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Exchangeable Sodium %		9.14		0.10						8.90	2.66	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42073

Sample ID	<b>21120179-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>CEC</b>	Units:	<b>meq/100g</b>	Prep Date:	<b>12/21/2021</b>	RunNo:	<b>105376</b>
Client ID:	<b>MW-7 4-6</b>	Batch ID:	<b>42073</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>12/22/2021</b>	SeqNo:	<b>2580297</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Cation Exchange Capacity		32.3		0.100						32.96	2.12 20

Sample ID	<b>lcs-42073</b>	SampType:	<b>LCS</b>	TestCode:	<b>CEC</b>	Units:	<b>meq/100g</b>	Prep Date:	<b>12/21/2021</b>	RunNo:	<b>105376</b>
Client ID:	<b>LCSS</b>	Batch ID:	<b>42073</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>12/22/2021</b>	SeqNo:	<b>2580305</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Cation Exchange Capacity		20.5		0.100	25.00	0	82.1	76	124		

Sample ID	<b>lcsd-42073</b>	SampType:	<b>LCSD</b>	TestCode:	<b>CEC</b>	Units:	<b>meq/100g</b>	Prep Date:	<b>12/21/2021</b>	RunNo:	<b>105376</b>
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42073</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>12/22/2021</b>	SeqNo:	<b>2580306</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Cation Exchange Capacity		19.9		0.100	25.00	0	79.6	76	124	20.53	3.07 20

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42099

Sample ID	<b>21120179-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>SAR_S</b>	Units:		Prep Date:	<b>12/22/2021</b>	RunNo:	<b>105372</b>		
Client ID:	<b>MW-7 4-6</b>	Batch ID:	<b>42099</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>12/22/2021</b>	SeqNo:	<b>2580188</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio		8.42		0.10						8.29	1.65	20	
Soluble Calcium		1.95		0.02						1.96	0.37	20	
Soluble Magnesium		1.53		0.05						1.53	0.03	20	
Soluble Sodium		11.1		0.25						10.95	1.54	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
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- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R104999

Sample ID	<b>mblk</b>	SampType: <b>MBLK</b>	TestCode: <b>9056_SPLP</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>104999</b>
Client ID:	<b>PBS</b>	Batch ID: <b>R104999</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/9/2021</b>	SeqNo: <b>2567835</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	< 0.250	0.250				

Sample ID	<b>lcs</b>	SampType: <b>LCS</b>	TestCode: <b>9056_SPLP</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>104999</b>
Client ID:	<b>LCSS</b>	Batch ID: <b>R104999</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/9/2021</b>	SeqNo: <b>2567836</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	10.8	0.250	10.00	0	108	80 120

Sample ID	<b>lcsd</b>	SampType: <b>LCSD</b>	TestCode: <b>9056_SPLP</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>104999</b>
Client ID:	<b>LCSS02</b>	Batch ID: <b>R104999</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/9/2021</b>	SeqNo: <b>2567837</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	10.1	0.250	10.00	0	101	80 120 10.75 6.66 15

Sample ID	<b>21120377-005ams</b>	SampType: <b>MS</b>	TestCode: <b>9056_SPLP</b>	Units: <b>mg/L</b>	Prep Date:	RunNo: <b>104999</b>
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R104999</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/9/2021</b>	SeqNo: <b>2567842</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	8.66	0.250	5.000	3.211	109	80 120

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				





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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** R104999

Sample ID	<b>21120377-005amsd</b>	SampType:	<b>MSD</b>	TestCode:	<b>9056_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>104999</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R104999</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/9/2021</b>	SeqNo:	<b>2567843</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Chloride		8.77		0.250		5.000		3.211		111		80		120		8.655		1.27		15		

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
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- ND Not Detected at the Reporting Limit
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- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** R105061

Sample ID	<b>21120162-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/7/2021</b>	SeqNo: <b>2569604</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	62.3	1.00						64.50	3.47	20	

Sample ID	<b>21120162-021ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/7/2021</b>	SeqNo: <b>2569625</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	54.8	1.00						56.10	2.34	20	

Sample ID	<b>21120179-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>MW-7 4-6</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/7/2021</b>	SeqNo: <b>2569640</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	14.7	1.00						15.50	5.30	20	

Sample ID	<b>21120179-021ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>H-18 R 18-20</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/7/2021</b>	SeqNo: <b>2569661</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	21.2	1.00						19.30	9.38	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
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- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105061

Sample ID	<b>21120184-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/8/2021</b>	SeqNo: <b>2569673</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	15.3	1.00						16.10	5.10	20	

Sample ID	<b>21120186-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/8/2021</b>	SeqNo: <b>2569684</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	20.2	1.00						17.90	12.1	20	

Sample ID	<b>21120069-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105061</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105061</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/6/2021</b>	SeqNo: <b>2569700</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	47.9	1.00						49.40	3.08	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** R105298

Sample ID	<b>MB-R105296</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105298</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105298</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577373</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity < 0.10 0.10

Sample ID	<b>LCS1-R105296</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105298</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105298</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577374</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity 0.56 0.10 0.50 0 110 90 110

Sample ID	<b>LCS2-R105296</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105298</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105298</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577375</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity 57.9 0.10 53.00 0 109 90 110

Sample ID	<b>21120179-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105298</b>
Client ID:	<b>MW-7 4-6</b>	Batch ID:	<b>R105298</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577377</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity 1.39 0.10 1.39 0 20

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105305

Sample ID	<b>MB-R105298</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105305</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105305</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577792</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		< 0.10		0.10							

Sample ID	<b>LCS1-R105298</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105305</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105305</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577793</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		0.56		0.10	0.50	0	110	90	110		

Sample ID	<b>LCS2-R105298</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105305</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105305</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577794</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		57.7		0.10	53.00	0	109	90	110		

Sample ID	<b>21120179-021ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105305</b>
Client ID:	<b>H-18 R 18-20</b>	Batch ID:	<b>R105305</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2577796</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		5.55		0.10						5.56	0.18 20 *

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105338

Sample ID	<b>mblk</b>	SampType:	<b>MBLK</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105338</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>R105338</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578718</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		< 0.250		0.250										

Sample ID	<b>lcs</b>	SampType:	<b>LCS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105338</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>R105338</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578719</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		10.1		0.250	10.00	0		101	80	120				

Sample ID	<b>lcsd</b>	SampType:	<b>LCSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105338</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>R105338</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578720</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		10.2		0.250	10.00	0		102	80	120	10.10	1.30	15	

Sample ID	<b>21120179-020ams</b>	SampType:	<b>MS</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105338</b>			
Client ID:	<b>H-18 R 26-28</b>	Batch ID:	<b>R105338</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578737</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,000		13.5	270.2	779.4		83.4	80	120				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21120179  
 27-Dec-21

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105338

Sample ID	<b>21120179-020amsd</b>	SampType: <b>MSD</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105338</b>					
Client ID:	<b>H-18 R 26-28</b>	Batch ID: <b>R105338</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578738</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	1,030	13.5	270.2	779.4	93.9	80	120	1,005	2.76	15	

Sample ID	<b>21120187-003ams</b>	SampType: <b>MS</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105338</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105338</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578768</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	229	9.65	193.0	8.591	114	80	120				

Sample ID	<b>21120187-003amsd</b>	SampType: <b>MSD</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105338</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105338</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578769</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	244	9.65	193.0	8.591	122	80	120	228.9	6.42	15	S

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON** Work Order Number: **21120179** RcptNo: **1**

Logged by:	<b>Tammy Thibodeaux</b>	<b>12/3/2021 3:15:00 PM</b>	
Completed By:	<b>Tammy Thibodeaux</b>	<b>12/3/2021 4:58:41 PM</b>	
Reviewed By:	<b>Cristina Thibeaux</b>	<b>12/6/2021 4:28:13 PM</b>	

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text" value="Cristina Thibeaux"/>	Date	<input type="text" value="12/6/2021"/>
By Whom:	<input type="text" value="Shawn Wiggins"/>	Via:	<input checked="" type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="add testing as per email"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:  
 Improper error correction(s) made by client.

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------





# Chain of Custody

Laboratory Number: **01120179**

**Client Information:** Company Name: **ERM** Contact Name: **Shawn Wiggins** Address:   
**Billing Information:** PO Number: **0526033** Quote Number:   
 Required QC Level:   
 Bill Monthly:  Yes  No   
 Ext:   
 Shipping Method:  UPS / FedEx / NOW  DHL / Element  Hard Mail  Mail

**Matrix Code:** DW = Drinking Water, WW = Waste Water, GW = Ground Water, AQ = Aqueous, OT = Other, SL = Sludge, O = Oil, F = Food, NGL = Natural Gas, PW = Produced Water, CF = Completion Fluid

Project Name/Number: **Henri's Management** Page 1 of 4  
 Sampler's Signature: *low*

Sample ID/Description	Which Regulations Apply:		Turn Time <input type="checkbox"/> Standard <input type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	Collection Information		Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container Type Quantity	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> NaOH, Na <sub>2</sub> SO <sub>3</sub>	Requested Tests	Comments	
	RCRA <input type="checkbox"/> Drinking Water <input type="checkbox"/> Distribution <input type="checkbox"/> Special <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input type="checkbox"/> RECAP/RISC			Date	Time						Matrix
	RCRA <input type="checkbox"/> Drinking Water <input type="checkbox"/> Distribution <input type="checkbox"/> Special <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input type="checkbox"/> RECAP/RISC			Date	Time						Matrix
MW-7 (4-6')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1255	6	P		X Total Es X STK X ESP	<del>NA</del>	
MW-7 (6-8')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1300	6	P		X STK X ESP	<del>NA</del>	
MW-7 (8-10')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1305	6	P		X STK X ESP	<del>NA</del>	
MW-7 (12-14')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1310	6	P		X STK X ESP	<del>NA</del>	
MW-7 (38-40')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1415	6	P		X STK X ESP	<del>NA</del>	
MW-7 (32-34')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1420	6	P		X STK X ESP	<del>NA</del>	
MW-7 (16-18')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11/29/21	1425	6	P		X STK X ESP	<del>NA</del>	
MW-7 (0-2')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12/1/21	945	6	P		X STK X ESP	<del>NA</del>	
MW-7 (4-6')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12/1/21	950	6	P		X STK X ESP	<del>NA</del>	

Relinquished by	Date/Time	Received by	Date/Time	Field Notes
<i>[Signature]</i>	12/3/21 15:15	<i>[Signature]</i>	12/3/21 15:15	Received at lab on ice?
				<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp.

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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Lafayette, LA 70508 USA  
P 337-235-0483  
F 337-233-6640



# Chain of Custody

Laboratory Number: 2120179

**Client Information:**  
 Company Name: CRM  
 Contact Name: Shawn Wiggins  
 Address:  
 City, State Zip:  
 Phone Number:  
 Fax Number:  
 E-mail Address:

**Billing Information:**  
 PO Number: 6526033  
 Quote Number:  
 Required QC Level:  
 Bill Monthly:  Yes  No  
 Ext:

**Project Name/Number:** Henning Management  
**Matrix Code:**  
 DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NG = Natural Gas  
 PW = Produced Water  
 CF = Completion Fluid

**Shipping Method:** UPS / FedEx / NOW  
 DHL / Element / Hand / Mail

**Sampler's Signature:** [Signature]

Sample ID/Description	Which Regulations Apply:		Turn Time		(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container	Pres.	Requested Tests		Comments
	RCRA	POTW	INPDES	USDA/FDA				RECAP/RI/SC	Date	
MW-1 (58-60')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Quantity	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub>	ESR	X	
MW-1 (48-50')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Type	NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	SAR	X	
MW-1 (8-10')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P=Plastic, V=Vial		% Moisture	X	
MW-1 (20-22')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				X	
MW-9 (0-2')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				X	
MW-9 (4-6')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				X	
MW-9 (8-10')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				X	
MW-9 (12-14')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				X	
MW-9 (14-16')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				X	

**Relinquished by:** [Signature] **Date/Time:** 12/2/21 1355

**Received by:** [Signature] **Date/Time:** 12/3/21 1515

**Field Notes:** Received at lab on ice?  Yes  No Temp:

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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 F 574-289-8800

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 Lafayette, LA 70508 USA  
 P 337-235-0463  
 F 337-233-6640





# Chain of Custody

Laboratory Number: 2112019

Client Information: **ERM** PO Number: 0526023 Project Name/Number: Henning Management Page 3 of 4

Contact Name: Shawn Wiggins Quote Number: \_\_\_\_\_ Matrix Code: \_\_\_\_\_

Address: \_\_\_\_\_ Required QC Level: \_\_\_\_\_

City, State Zip: \_\_\_\_\_ Ext: \_\_\_\_\_ Bill Monthly:  Yes  No

Phone Number: \_\_\_\_\_ Ext: \_\_\_\_\_ Shipping Method: UPS / FedEx / NOW

Fax Number: \_\_\_\_\_ E-mail Address: \_\_\_\_\_ DHL / Element / Hand / Mail

Which Regulations Apply:  RCRA  Drinking Water  POTW  Distribution  NPDES  Special  USDA/FDA  RECAP/IRIS  Other

Turn Time:  Standard  RUSH  1 Day  2 Day  Other

(Rush turn times will incur a surcharge and must be pre-approved by lab.)

Container: \_\_\_\_\_ Quantity: \_\_\_\_\_ Type: \_\_\_\_\_

Pres.: \_\_\_\_\_ HCl, HNO<sub>3</sub>, H<sub>2</sub>SO<sub>4</sub>, NaOH, Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>

Requested Tests: \_\_\_\_\_

Comments: \_\_\_\_\_

Sample ID/Description	Collection Information		Matrix	Turn Time	Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container	Pres.	Requested Tests				Comments	
	Date	Time						Grab / Composite	ESR	SAR	SFP Chloride		SFP Formium
MW-9 (20-22')	12/2/21	14:15	G	50		P							HOLD all samples for SPLP
H-18R (26-28')	12/3/21	10:35	G	50		P				X			Chloride from
H-18R (18-20')	12/3/21	10:40	G	50		P				X			H-18NW
H-18R (0-4')	12/3/21	10:55	G	50		P				X			
H-18R (0-1')	12/3/21	11:05	G	50		P				X			
H-18R (1-2')	12/3/21	11:10	G	50		P				X			
H-18R (2-3')	12/3/21	11:15	G	50		P				X			
H-18 NW (0-2')	12/3/21	12:15	G	50		P						H X	H=HOLD
H-18 NW (4-6')	12/3/21	12:20	G	50		P							

Relinquished by: \_\_\_\_\_ Date/Time: 12/1/21 15:45

Received by: [Signature] Date/Time: 12/3/21 15:15

Field Notes: Received at lab on ice?  Yes  No Temp: \_\_\_\_\_

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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F 260-471-7777

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46580 USA  
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F 574-269-6565

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F 574-273-5899

2417 W. Pinhook Rd  
Lafayette, LA  
70506 USA  
P 337-235-0483  
F 337-233-6540



# Chain of Custody

Laboratory Number: 212019

**Client Information:** Company Name: ERM PO Number: 0526033 Project Name/Number: Hensley Management Page 4 of 4  
 Contact Name: Shawn Wiggins Quote Number: \_\_\_\_\_ Matrix Code: \_\_\_\_\_  
 Address: \_\_\_\_\_ Required QC Level: \_\_\_\_\_  
 City, State Zip: \_\_\_\_\_ Bill Monthly:  Yes  No  
 Phone Number: \_\_\_\_\_ Ext: \_\_\_\_\_ Shipping Method: UPS / FedEx / NOW  
 Fax Number: \_\_\_\_\_ E-mail: \_\_\_\_\_ DHL / Element / Hand / Mail  
 E-mail Address: \_\_\_\_\_

**Matrix Code**  
 DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 SO = Soil  
 F = Food  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Turn Time		Rush turn times will incur a surcharge and must be pre-approved by lab.	Container Type G=Glass, V=Vial P=Plastic	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Requested Tests	Comments		
	Collection Information							Quantity	% Moisture
	Date	Time							
H-18NW(8-10')	12/3/21	1225	G	50			HOLD all		
H-18NW(14-16')	12/3/21	1230	G	50			Samples for SPLP		
H-18NW(16-18')	12/3/21	1235	G	50			Chloride from		
H-18NW(22-24')	12/3/21	1240	G	50			H-18NW		

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
	12/3/21 1545		12/31 1515	Received at lab on ice
				<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp: _____

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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 P 574-277-0707  
 F 574-273-5699

2417 W. Pinhook Rd  
 Lafayette, LA  
 70508 USA  
 P 337-235-0483  
 F 337-233-6640

To: Buffy Bryant <buffy.bryant@element.com>  
Subject: Henning Management - Additional Sampling Parameters

**CAUTION:** This email originated from outside of Element Materials Technology. **DO NOT** click links or open attachments unless you recognize the sender and know the content is safe. Please contact IT Service Desk if you are in any doubt about this email.

Buffy,

Jake Roberson dropped off some samples for our Henning Management project last Friday. We need to update the requested analyses for these samples with the following additions:

- MW-7
  - 4-6': Add EC, ESP, and Ba
  - 6-8': Add EC and ESP
  - 16-18': Add soluble Cl
  - 32-34': Add soluble Cl
  - 38-40': Add soluble Cl
- MW-1
  - 0-2': Add EC, ESP, and Ba
  - 4-6': Add EC and Ba
  - 20-22': Add soluble Cl
  - 48-50': Add soluble Cl
  - 58-60': Add soluble Cl
- MW-9
  - 0-2': Add EC and Ba
  - 4-6': Add Ba
- H-18R
  - 18-20': Add soluble Cl
  - 26-28': Add soluble Cl

Please let me know if you have any questions, and thanks very much for your help.

Thank you,

Shawn A. Wiggins, PG  
Senior Geologist

**ERM**



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

January 17, 2022

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning 0526033

Order No.: 21120560

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 27 sample(s) on 12/10/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

## Case Narrative

WO#: 21120560  
Date: 1/17/2022

---

**CLIENT:** Environmental Resources Management  
**Project:** Henning 0526033

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Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).





Element Materials Technology Lafayette  
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 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 12:00:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-001 **Matrix:** SOIL  
**Client Sample ID** MW-11 (0-2')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	2.38	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	10.4	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	10.2	0.10			1	1/13/2022
Soluble Calcium	3.68	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.84	0.05		meq/L	1	1/13/2022
Soluble Sodium	16.9	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>						Analyst: <b>STS</b>
Barium	53.7	0.499		mg/Kg	1	12/21/2021 10:25:09 PM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	16.3	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 12:05:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-002 **Matrix:** SOIL  
**Client Sample ID** MW-11 (4-6')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.55	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	11.9	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	9.56	0.10			1	1/13/2022
Soluble Calcium	1.85	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.07	0.05		meq/L	1	1/13/2022
Soluble Sodium	11.5	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.0	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 12:10:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-003 **Matrix:** SOIL  
**Client Sample ID** MW-11 (8-10')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.26	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	8.74	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	7.48	0.10			1	1/13/2022
Soluble Calcium	1.77	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.07	0.05		meq/L	1	1/13/2022
Soluble Sodium	8.91	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	16.0	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 12:15:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-004 **Matrix:** SOIL  
**Client Sample ID** MW-11 (10-12')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.49	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	22.9	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 12:20:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-005 **Matrix:** SOIL  
**Client Sample ID** MW-11 (20-22')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.12	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.0	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 3:00:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-006 **Matrix:** SOIL  
**Client Sample ID** H-17 SW (4-6')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.15	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	6.89	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	6.67	0.10			1	1/13/2022
Soluble Calcium	2.06	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.03	0.05		meq/L	1	1/13/2022
Soluble Sodium	8.29	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	21.6	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 3:05:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-007 **Matrix:** SOIL  
**Client Sample ID** H-17 SW (8-10')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.80	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	6.03	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	5.09	0.10			1	1/13/2022
Soluble Calcium	5.20	0.02		meq/L	1	1/13/2022
Soluble Magnesium	2.23	0.05		meq/L	1	1/13/2022
Soluble Sodium	9.82	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	18.9	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/7/2021 3:10:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-008 **Matrix:** SOIL  
**Client Sample ID** H-17 SW (10-12')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.72	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	22.7	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 2:00:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-009 **Matrix:** SOIL  
**Client Sample ID** MW-4 (0-2')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS CATION EXCHANGE CAPACITY</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Cation Exchange Capacity	28.4	0.100		meq/100g	1	1/6/2022
<b>29B SALTS ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.30	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	1.74	0.10		%	1	1/6/2022
<b>29B SALTS SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	2.02	0.10			1	1/13/2022
Soluble Calcium	0.96	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.58	0.05		meq/L	1	1/13/2022
Soluble Sodium	1.77	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	235	0.508		mg/Kg	1	12/21/2021 10:27:29 PM
<b>TRUE TOTAL BARIUM</b>					<b>LDNR 29-B</b>	Analyst: <b>STS</b>
True Total Barium	1,090	49.4		mg/Kg-dry	1	12/30/2021 4:45:33 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	13.9	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 2:05:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-010 **Matrix:** SOIL  
**Client Sample ID** MW-4 (4-6')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
<b>CATION EXCHANGE CAPACITY</b>						
Cation Exchange Capacity	33.6	0.100		meq/100g	1	1/6/2022
<b>29B SALTS</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.84	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	7.78	0.10		%	1	1/6/2022
<b>29B SALTS</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	5.67	0.10			1	1/13/2022
Soluble Calcium	1.41	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.96	0.05		meq/L	1	1/13/2022
Soluble Sodium	6.18	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	187	0.491		mg/Kg	1	12/21/2021 10:29:49 PM
<b>TRUE TOTAL BARIUM</b>					<b>LDNR 29-B</b>	Analyst: <b>STS</b>
True Total Barium	363	46.6		mg/Kg-dry	1	12/30/2021 4:52:31 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.4	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 2:10:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-011 **Matrix:** SOIL  
**Client Sample ID** MW-4 (16-18')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	2.52	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	22.1	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 2:15:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-012 **Matrix:** SOIL  
**Client Sample ID** MW-4 (40-42')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.83	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	3.69	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	3.05	0.10			1	1/13/2022
Soluble Calcium	2.31	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.68	0.05		meq/L	1	1/13/2022
Soluble Sodium	4.31	0.25		meq/L	1	1/13/2022
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	141	6.34		mg/Kg-dry	20	1/11/2022 8:11:54 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	5.89	1.25		mg/L	5	12/14/2021 8:48:37 AM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.1	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 2:20:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-013 **Matrix:** SOIL  
**Client Sample ID** MW-4 (48-50')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	2.24	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	18.3	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 2:25:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-014 **Matrix:** SOIL  
**Client Sample ID** MW-4 (58-60')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.61	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>				<b>SW9056A</b>		Analyst: <b>SGP</b>
Chloride	38.3	3.12		mg/Kg-dry	10	1/11/2022 8:25:42 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>				<b>SW9056A</b>		Analyst: <b>SGP</b>
Chloride	2.97	1.25		mg/L	5	12/14/2021 9:02:25 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	18.2	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 5:10:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-015 **Matrix:** SOIL  
**Client Sample ID** MW-3 (0-2')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.54	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	2.30	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	3.62	0.10			1	1/13/2022
Soluble Calcium	1.65	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.65	0.05		meq/L	1	1/13/2022
Soluble Sodium	3.87	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	1,430	0.516		mg/Kg	1	12/21/2021 10:32:09 PM
<b>TRUE TOTAL BARIUM</b>					<b>LDNR 29-B</b>	Analyst: <b>STS</b>
True Total Barium	2,710	49.0		mg/Kg-dry	1	12/30/2021 4:54:50 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	16.1	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 5:15:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-016 **Matrix:** SOIL  
**Client Sample ID** MW-3 (4-6')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.44	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	15.8	0.10	*	%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	2.11	0.10			1	1/13/2022
Soluble Calcium	1.46	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.90	0.05		meq/L	1	1/13/2022
Soluble Sodium	2.29	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	20.7	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/8/2021 5:20:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-017 **Matrix:** SOIL  
**Client Sample ID** MW-3 (14-16')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.52	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	24.8	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 12:45:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-018 **Matrix:** SOIL  
**Client Sample ID** MW-3 (30-32')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.74	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	2.03	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	3.17	0.10			1	1/13/2022
Soluble Calcium	2.19	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.35	0.05		meq/L	1	1/13/2022
Soluble Sodium	4.21	0.25		meq/L	1	1/13/2022
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	27.8	4.84		mg/Kg-dry	20	1/11/2022 8:39:29 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>					<b>SW9056A</b>	Analyst: <b>SGP</b>
Chloride	< 1.25	1.25		mg/L	5	12/14/2021 9:16:11 AM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.8	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

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M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 12:50:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-019 **Matrix:** SOIL  
**Client Sample ID** MW-3 (48-50')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.10	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.5	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

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WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 12:55:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-020 **Matrix:** SOIL  
**Client Sample ID** MW-3 (58-60')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.09	0.10		mmhos/cm	1	1/11/2022 10:15:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	28.1	1.00		wt%	1	12/14/2021 11:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 4:20:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-021 **Matrix:** SOIL  
**Client Sample ID** MW-2 (0-2')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.92	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	3.84	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	5.12	0.10			1	1/13/2022
Soluble Calcium	2.50	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.74	0.05		meq/L	1	1/13/2022
Soluble Sodium	6.52	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	266	0.494		mg/Kg	1	12/21/2021 10:34:29 PM
<b>TRUE TOTAL BARIUM</b>					<b>LDNR 29-B</b>	Analyst: <b>STS</b>
True Total Barium	2,250	46.0		mg/Kg-dry	1	12/30/2021 4:57:11 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	15.7	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 4:25:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-022 **Matrix:** SOIL  
**Client Sample ID** MW-2 (4-6')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	3.47	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	9.11	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	9.31	0.10			1	1/13/2022
Soluble Calcium	10.1	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.88	0.05		meq/L	1	1/13/2022
Soluble Sodium	22.8	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.2	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 4:30:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-023 **Matrix:** SOIL  
**Client Sample ID** MW-2 (12-14')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.64	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	24.9	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/9/2021 4:35:00 PM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-024 **Matrix:** SOIL  
**Client Sample ID** MW-2 (32-34')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.52	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	18.5	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/10/2021 9:05:00 AM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-025 **Matrix:** SOIL  
**Client Sample ID** MW-2 (42-44')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>JMI</b>
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.49	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>BXB</b>
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	1.65	0.10		%	1	1/6/2022
<b>29B SALTS (EC, ESP, SAR)</b>						Analyst: <b>STS</b>
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	2.79	0.10			1	1/13/2022
Soluble Calcium	1.43	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.88	0.05		meq/L	1	1/13/2022
Soluble Sodium	3.00	0.25		meq/L	1	1/13/2022
<b>SOLUBLE INORGANIC ANIONS IN SOIL BY IC</b>						Analyst: <b>SGP</b>
Chloride	20.7	2.30		mg/Kg-dry	10	1/11/2022 8:53:16 PM
<b>INORGANIC ANIONS, SPLP LEACHED BY SW1312/9056A</b>						Analyst: <b>SGP</b>
Chloride	< 1.25	1.25		mg/L	5	12/14/2021 9:29:59 AM
<b>PERCENT MOISTURE</b>						Analyst: <b>BXB</b>
Percent Moisture	17.6	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/10/2021 9:10:00 AM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-026 **Matrix:** SOIL  
**Client Sample ID** MW-2 (48-50')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.72	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	18.8	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 21120560

Date Reported: 1/17/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/10/2021 9:15:00 AM  
**Project:** Henning 0526033  
**Lab ID:** 21120560-027 **Matrix:** SOIL  
**Client Sample ID** MW-2 (58-60')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.02	0.10		mmhos/cm	1	1/11/2022 10:40:00 AM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	33.3	1.00		wt%	1	12/14/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit
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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42064

Sample ID	<b>21120580-008AMS</b>	SampType: <b>MS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578174</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	88.4	0.508	25.38	112.5	-95.1	75	125				S

Sample ID	<b>21120580-008AMSD</b>	SampType: <b>MSD</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578175</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	88.6	0.521	26.03	112.5	-91.9	75	125	88.38	0.245	20	S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

Sample ID	<b>MB-42064</b>	SampType: <b>MBLK</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>PBS</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578388</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	< 0.500	0.500									

Sample ID	<b>LCS-42064</b>	SampType: <b>LCS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>LCSS</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578389</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	23.5	0.500	25.00	0	94.0	80	120				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42064

Sample ID	<b>LCSD-42064</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/21/2021</b>	RunNo:	<b>105323</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42064</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578392</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.5		0.500	25.00	0		93.8	80	120	23.50	0.143	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42129

Sample ID	<b>MB-42129</b>	SampType:	<b>MBLK</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105539</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42129</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/30/2021</b>	SeqNo:	<b>2585629</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium		< 50.0		50.0										

Sample ID	<b>LCS-42129</b>	SampType:	<b>LCS</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105539</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42129</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/30/2021</b>	SeqNo:	<b>2585630</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium		5,060		50.0	5,000	0		101	75	125				

Sample ID	<b>LCSD-42129</b>	SampType:	<b>LCSD</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105539</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42129</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/30/2021</b>	SeqNo:	<b>2585631</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium		5,040		50.0	5,000	0		101	75	125	5,060	0.305	20	

Sample ID	<b>21120545-003AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105539</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42129</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/30/2021</b>	SeqNo:	<b>2585636</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium		10,200		48.5	4,850	5,653		94.6	75	125				

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
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- S Spike Recovery outside accepted recovery limits
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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42129

Sample ID	<b>21120545-003AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105539</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42129</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/30/2021</b>	SeqNo:	<b>2585637</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium		9,820		49.9	4,985	5,653	83.6	75	125	10,240	4.19	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42199

Sample ID	<b>21120560-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>ESP_S</b>	Units:	%	Prep Date:	<b>1/5/2022</b>	RunNo:	<b>105947</b>		
Client ID:	<b>MW-11 (0-2')</b>	Batch ID:	<b>42199</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/6/2022</b>	SeqNo:	<b>2598505</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Exchangeable Sodium %		8.93		0.10						10.43	15.5	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42200

Sample ID	<b>21120560-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>CEC</b>	Units:	<b>meq/100g</b>	Prep Date:	<b>1/5/2022</b>	RunNo:	<b>105947</b>
Client ID:	<b>MW-11 (0-2')</b>	Batch ID:	<b>42200</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/6/2022</b>	SeqNo:	<b>2598431</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Cation Exchange Capacity		28.3		0.100						28.87	2.03 20

Sample ID	<b>lcs-42200</b>	SampType:	<b>LCS</b>	TestCode:	<b>CEC</b>	Units:	<b>meq/100g</b>	Prep Date:	<b>1/5/2022</b>	RunNo:	<b>105947</b>
Client ID:	<b>LCSS</b>	Batch ID:	<b>42200</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/6/2022</b>	SeqNo:	<b>2598442</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Cation Exchange Capacity		22.7		0.100	25.00	0	90.8	76	124		

Sample ID	<b>lcsd-42200</b>	SampType:	<b>LCSD</b>	TestCode:	<b>CEC</b>	Units:	<b>meq/100g</b>	Prep Date:	<b>1/5/2022</b>	RunNo:	<b>105947</b>
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42200</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/6/2022</b>	SeqNo:	<b>2598443</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Cation Exchange Capacity		22.3		0.100	25.00	0	89.0	76	124	22.69	1.91 20

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** 42300

Sample ID	<b>21120560-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>SAR_S</b>	Units:		Prep Date:	<b>1/13/2022</b>	RunNo:	<b>105920</b>		
Client ID:	<b>MW-11 (0-2')</b>	Batch ID:	<b>42300</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/13/2022</b>	SeqNo:	<b>2597966</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio		10.1		0.10						10.19	1.28	20	
Soluble Calcium		3.66		0.02						3.68	0.55	20	
Soluble Magnesium		1.82		0.05						1.84	0.68	20	
Soluble Sodium		16.7		0.25						16.92	1.58	20	

Sample ID	<b>21120580-006ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>SAR_S</b>	Units:		Prep Date:	<b>1/13/2022</b>	RunNo:	<b>105920</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42300</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/13/2022</b>	SeqNo:	<b>2598024</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio		6.86		0.10						6.77	1.30	20	
Soluble Calcium		3.01		0.02						2.99	0.60	20	
Soluble Magnesium		1.11		0.05						1.10	0.56	20	
Soluble Sodium		9.85		0.25						9.69	1.60	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** R105110

Sample ID	<b>mblk</b>	SampType:	<b>MBLK</b>	TestCode:	<b>9056_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>105110</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>R105110</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/14/2021</b>	SeqNo:	<b>2570879</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		< 0.250		0.250										

Sample ID	<b>lcs</b>	SampType:	<b>LCS</b>	TestCode:	<b>9056_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>105110</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>R105110</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/14/2021</b>	SeqNo:	<b>2570880</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		10.0		0.250	10.00	0		100	80	120				

Sample ID	<b>lcsd</b>	SampType:	<b>LCSD</b>	TestCode:	<b>9056_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>105110</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>R105110</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/14/2021</b>	SeqNo:	<b>2570881</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		10.0		0.250	10.00	0		100	80	120	10.04	0.153	15	

Sample ID	<b>21111260-001ams</b>	SampType:	<b>MS</b>	TestCode:	<b>9056_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:		RunNo:	<b>105110</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R105110</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>12/14/2021</b>	SeqNo:	<b>2570891</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,830		50.0	1,000	710.1		112	80	120				

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** R105110

Sample ID	21111260-001amsd	SampType:	MSD	TestCode:	9056_SPLP	Units:	mg/L	Prep Date:		RunNo:	105110		
Client ID:	ZZZZZZ	Batch ID:	R105110	TestNo:	SW9056A			Analysis Date:	12/14/2021	SeqNo:	2570892		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,740		50.0	1,000	710.1	103	80	120	1,832	4.94	15	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** R105301

Sample ID	<b>21120481-002ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105301</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105301</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/14/2021</b>	SeqNo: <b>2577664</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	20.9	1.00						20.80	0.48	20	

Sample ID	<b>21120559-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105301</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105301</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/14/2021</b>	SeqNo: <b>2577684</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	23.4	1.00						22.20	5.26	20	

Sample ID	<b>21120560-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105301</b>					
Client ID:	<b>MW-11 (0-2')</b>	Batch ID: <b>R105301</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/14/2021</b>	SeqNo: <b>2577812</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	16.2	1.00						16.30	0.62	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



Element Materials Technology Lafayette  
 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
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 Website: [www.element.com](http://www.element.com)

# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** R105791

Sample ID	<b>MB-R105790</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105791</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105791</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/11/2022</b>	SeqNo:	<b>2593805</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		< 0.10		0.10							

Sample ID	<b>LCS1-R105790</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105791</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105791</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/11/2022</b>	SeqNo:	<b>2593806</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		0.54		0.10	0.50	0	107	90	110		

Sample ID	<b>LCS2-R105790</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105791</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105791</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/11/2022</b>	SeqNo:	<b>2593807</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		53.2		0.10	53.00	0	100	90	110		

Sample ID	<b>21120560-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105791</b>
Client ID:	<b>MW-11 (0-2')</b>	Batch ID:	<b>R105791</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/11/2022</b>	SeqNo:	<b>2593809</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		2.39		0.10						2.38	0.29 20

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** R105793

Sample ID <b>MB-R105791</b>	SampType: <b>MBLK</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>105793</b>						
Client ID: <b>PBS</b>	Batch ID: <b>R105793</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2593841</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	< 0.10	0.10									

Sample ID <b>LCS1-R105791</b>	SampType: <b>LCS1</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>105793</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R105793</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2593842</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	0.54	0.10	0.50	0	106	90	110				

Sample ID <b>LCS2-R105791</b>	SampType: <b>LCS2</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>105793</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R105793</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2593843</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	52.6	0.10	53.00	0	99.2	90	110				

Sample ID <b>21120580-006ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>EC_S</b>	Units: <b>mmhos/cm</b>	Prep Date:	RunNo: <b>105793</b>						
Client ID: <b>ZZZZZ</b>	Batch ID: <b>R105793</b>	TestNo: <b>LDNR 29-B</b>		Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2593852</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Electrical Conductivity	1.36	0.10						1.36	0.44	20	

**Qualifiers:**

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SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning 0526033

**BatchID:** R105856-2

Sample ID	<b>mblk</b>	SampType: <b>MBLK</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105856</b>
Client ID:	<b>PBS</b>	Batch ID: <b>R105856-2</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2595493</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	< 0.250	0.250				

Sample ID	<b>lcs</b>	SampType: <b>LCS</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105856</b>
Client ID:	<b>LCSS</b>	Batch ID: <b>R105856-2</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2595494</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	10.2	0.250	10.00	0	102	80 120

Sample ID	<b>lcsd</b>	SampType: <b>LCSD</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105856</b>
Client ID:	<b>LCSS02</b>	Batch ID: <b>R105856-2</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2595495</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	10.6	0.250	10.00	0	106	80 120 10.23 3.33 15

Sample ID	<b>21120589-001ams</b>	SampType: <b>MS</b>	TestCode: <b>9056_S</b>	Units: <b>mg/Kg-dry</b>	Prep Date:	RunNo: <b>105856</b>
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105856-2</b>	TestNo: <b>SW9056A</b>	Analysis Date: <b>1/11/2022</b>	SeqNo: <b>2595501</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Chloride	1,950	32.6	652.5	1,289	101	80 120

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- ND Not Detected at the Reporting Limit
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- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp





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# QC SUMMARY REPORT

WO#: 21120560  
 17-Jan-22

**Client:** Environmental Resources Management

**Project:** Henning 0526033

**BatchID:** R105856-2

Sample ID	<b>21120589-001AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>9056_S</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:		RunNo:	<b>105856</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R105856-2</b>	TestNo:	<b>SW9056A</b>			Analysis Date:	<b>1/11/2022</b>	SeqNo:	<b>2595502</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride		1,950		32.6	652.5	1,289	102	80	120	1,947	0.245	15	

**Qualifiers:**

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- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as sp



# Sample Log-In Check List

Client Name: **ERM\_HOUSTON** Work Order Number: **21120560** RcptNo: **1**

Logged by:	<b>Rhonda David</b>	<b>12/10/2021 12:40:00 PM</b>	
Completed By:	<b>Rhonda David</b>	<b>12/10/2021 4:37:45 PM</b>	
Reviewed By:	<b>Caitlin Duplantis</b>	<b>12/17/2021 9:32:01 AM</b>	

**Chain of Custody**

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

**Log In**

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

**Special Handling (if applicable)**

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:  
 Improper error correction(s) made by client

**Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------



# Chain of Custody

Laboratory Number: **21170530**

Client Information: **ERM** Billing Information: **SAME** PO Number: **0526033** Project Name/Number: **HENNING** Page 1 of 3  
 Contact Name: **STAWN WILGINS** Quote Number: **0526033** Sampler's Signature: *[Signature]* Matrix Code: **DW = Drinking Water, WW = Waste Water, GW = Ground Water, AQ = Aqueous, OT = Other, SL = Sludge, SOL = Solid, O = Oil, SO = Soil, F = Food, SW = Swab, NG = Natural Gas, NGL = Natural Gas Liquid, PW = Produced Water, CF = Completion Fluid**  
 Address: **Houston, TX** Ext: **971-303-2385** Shipping Method: **UPS / FedEx / NOW**  
 City, State Zip: **Houston, TX** Ext: **971-303-2385** Bill Monthly:  Yes  No  
 E-mail: **stawn.wilgins@erm.com** Address: **ERM, COM** Required QC Level: **DHL / Element / Hand / Mail**

Sample ID/Description	Turn Time <input checked="" type="checkbox"/> Standard <input type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	Collection Information			Container Quantity	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> G-Glass, V-Vial	Requested Tests	Comments
		(Rush turn times will incur a surcharge and must be pre-approved by lab.)		Type				
		Date	Time					
MW-11 (0-2')	<input checked="" type="checkbox"/> Standard	12/7/21	1200	G	S	6010 Barium X*	X*	X* 12/21/21: testing added. CCT 12/21/21
MW-11 (4-6')	<input type="checkbox"/> RUSH	12/7/21	1205	G	S	6010 Barium X*	X*	
MW-11 (8-10')	<input type="checkbox"/> 1 Day	12/7/21	1210	G	S	6010 Barium X*	X*	
MW-11 (10-12')	<input type="checkbox"/> 2 Day	12/7/21	1215	G	S	6010 Barium X*	X*	
MW-11 (20-22')	<input type="checkbox"/> Other	12/7/21	1220	G	S	6010 Barium X*	X*	
H-17 Sw (A-6')	<input type="checkbox"/> Drinking Water	12/7/21	1500	G	S	6010 Barium X*	X*	
H-17 Sw (8-10')	<input type="checkbox"/> Distribution	12/7/21	1505	G	S	6010 Barium X*	X*	
H-17 Sw (10-12')	<input type="checkbox"/> Special	12/7/21	1510	G	S	6010 Barium X*	X*	
MW-A (0-2')	<input type="checkbox"/> USDA/FDA	12/8/21	1400	G	S	6010 Barium X*	X*	

Relinquished by: *[Signature]* Date/Time: **12/10/21 / 1015** Received by: *[Signature]* Date/Time: **12/10/21 1015**  
 Field Notes: **Received at lab on ice?  Yes  No Temp: **12/10/21 1300****

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

8900 North US 31  
Columbus, IN 47201 USA  
P 812-375-0531  
F 812-375-0731

328 Ley Road, Suite 100  
Fort Wayne, IN 46825 USA  
P 260-471-7000  
F 260-471-7777

909 Executive Dr  
Warsaw, IN 46580 USA  
P 574-267-3305  
F 574-269-6569

3371 Cleveland Road, Suite 100A  
South Bend, IN 46628 USA  
P 574-277-0707  
F 574-273-5899

2417 W. Pinhook Rd  
Lafayette, LA 70508 USA  
P 337-235-0483  
F 337-233-6540



# Chain of Custody

Laboratory Number: 21120560

Client Information: **Bill** Information: **PO** Number: **Project Name/Number:** **Matrix Code**

Company Name: **EVN** **GAMZ** **HENNING**

Contact Name: **SHAWN WIGGINS** Quote Number: **0526033**

Address: **HOUSTON, TX** Required QC Level: **Sample's Signature**

City, State Zip: **271-303-2385** Ext: **Bill Monthly**

Phone Number: **SHAWN.WIGGINS@ELM.COM** **Yes** **No**

Fax Number: **Shipping Method:** **UPS / FedEx / NOW**

E-mail Address: **DHL / Element / Hand / Mail**

Page 2 of 3

**Matrix Code**

DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Turn Time	Which Regulations Apply:	Collection Information	Container	Pres.	Requested Tests			Comments			
						Date	Time	Matrix		6010 Barium	CEC	Chloride
MW-4 (A-6')	12/18/21	1405	G	SO	None	X	X	X	X*	X*	X*	X*: 12/21/21: testing added. CCT 12/21/21
MW-4 (16-18')	1410					X	X	X	X*	X*	X*	
MW-4 (40-42')	1415					X	X	X	X*	X*	X*	
MW-4 (48-50')	1420					X	X	X	X*	X*	X*	
MW-4 (58-60')	1425					X	X	X	X*	X*	X*	
MW-3 (0-2')	1710					X	X	X	X*	X*	X*	
MW-3 (A-6')	1715					X	X	X	X*	X*	X*	
MW-3 (14-16')	1720					X	X	X	X*	X*	X*	
MW-3 (30-32')	12/19/21	1245				X	X	X	X*	X*	X*	

Relinquished by: **SHAWN WIGGINS** Date/Time: **12/10/21 1015**

Received by: **SHAWN WIGGINS** Date/Time: **12/10/21 1240**

Field Notes: **Received at lab on ice? Yes No Temp:**





# Chain of Custody

Laboratory Number: **2120560**

**Client Information:** Company Name: **ERM** PO Number: **526033**  
 Contact Name: **Stana Wilgins** Quote Number: **526033**  
 Address: **Houston, TX** Required QC Level: **None**  
 Phone Number: **971-332-385** Ext: **2913** Bill Monthly:  Yes  No  
 E-mail Address: **stana.wilgins@erm.com**

**Project Name/Number:** **Hamming** **Matrix Code:** DW = Drinking Water, WW = Waste Water, GW = Ground Water, AQ = Aqueous, OT = Other, SL = Sludge, SOL = Solid, O = Oil, SO = Soil, F = Food, SW = Swab, NG = Natural Gas, NGL = Natural Gas Liquid, PW = Produced Water, CF = Completion Fluid

**Sampler's Signature:** *[Signature]* **Shipping Method:** UPS / FedEx / NOW, DHL / Element / Hand / Mail

Sample ID/Description	Turn Time	Which Regulations Apply:	Collection Information	Container	Pres.	Requested Tests	Comments		
								Collection Information	
								Date	Time
MW-3 (48-50')	12/9/21 12:50	<input checked="" type="checkbox"/> Standard RUSH	Grab / Composite	Type: P	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	ESR, SFR, SFR CI	MW-2 (52-74') Hold		
MW-3 (58-60')	12/9/21 12:55	<input type="checkbox"/> 1 Day, <input type="checkbox"/> 2 Day, <input type="checkbox"/> Other	SO	Quantity: 1	None				
MW-2 (0-2')	12/9/21 16:20								
MW-2 (4-6')	12/9/21 16:25								
MW-2 (12-14')	12/9/21 16:30								
MW-2 (32-34')	12/9/21 16:35								
MW-2 (42-44')	12/10/21 09:05		12/10/21						
MW-2 (48-50')	12/10/21 09:10		12/10/21						
MW-2 (58-60')	12/10/21 09:15		12/10/21						

**Relinquished by:** *[Signature]* **Date/Time:** 12/10/21 10:15  
**Received by:** *[Signature]* **Date/Time:** 12/10/21 13:40

**Field Notes:** Received at lab on ice?  Yes  No Temp:  Yes  No

Page 3 of 3

8800 North US 31, Columbus, IN 47201 USA, P 812-375-0531, F 812-375-0731

328 Ley Road, Suite 100, Fort Wayne, IN 46825 USA, P 260-471-7000, F 260-471-7777

909 Executive Dr, Warsaw, IN 46580 USA, P 574-267-3305, F 574-269-6569

3371 Cleveland Road, Suite 100A, South Bend, IN 46628 USA, P 574-277-0707, F 574-273-5699

2417 W. Plinhook Rd, Lafayette, LA 70508 USA, P 337-235-0483, F 337-233-6540

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January 26, 2022

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 21120834

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 21 sample(s) on 12/16/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



Element Materials Technology Lafayette  
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## Case Narrative

WO#: 21120834  
Date: 1/26/2022

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**CLIENT:** Environmental Resources Management

**Project:** Henning Management 0526033

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Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).





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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 1:30:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-001 **Matrix:** SOIL  
**Client Sample ID** MW-10 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.80	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	2.21	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	4.22	0.10			1	1/13/2022
Soluble Calcium	2.09	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.03	0.05		meq/L	1	1/13/2022
Soluble Sodium	5.27	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>						
Barium	1,050	0.478		mg/Kg	1	12/21/2021 10:57:50 PM
<b>TRUE TOTAL BARIUM</b>						
True Total Barium	4,120	47.8		mg/Kg-dry	1	1/19/2022 7:48:49 PM
<b>PERCENT MOISTURE</b>						
Percent Moisture	12.9	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 1:35:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-002 **Matrix:** SOIL  
**Client Sample ID** MW-10 4-6'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.88	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	7.65	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	8.40	0.10			1	1/13/2022
Soluble Calcium	0.72	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.68	0.05		meq/L	1	1/13/2022
Soluble Sodium	7.01	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	16.9	0.510		mg/Kg	1	1/5/2022 4:38:02 PM
<b>TRUE TOTAL BARIUM</b>					<b>LDNR 29-B</b>	Analyst: <b>STS</b>
True Total Barium	1,140	46.6		mg/Kg-dry	1	1/19/2022 8:04:42 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	16.2	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 1:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-003 **Matrix:** SOIL  
**Client Sample ID** MW-10 8-10'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.15	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	7.34	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	6.93	0.10			1	1/13/2022
Soluble Calcium	1.77	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.08	0.05		meq/L	1	1/13/2022
Soluble Sodium	8.27	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.5	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 1:45:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-004 **Matrix:** SOIL  
**Client Sample ID** MW-10 10-12'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.40	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	21.5	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 1:50:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-005 **Matrix:** SOIL  
**Client Sample ID** MW-10 12-14'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.13	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	21.8	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 1:55:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-006 **Matrix:** SOIL  
**Client Sample ID** MW-10 16-18'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.39	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	20.7	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 3:30:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-007 **Matrix:** SOIL  
**Client Sample ID** H-1 SE 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>						
Electrical Conductivity	0.58	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>EXCHANGEABLE SODIUM PERCENTAGE</b>						
Exchangeable Sodium %	1.00	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR)</b>						
<b>SODIUM ADSORPTION RATIO</b>						
Sodium Adsorption Ratio	1.99	0.10			1	1/13/2022
Soluble Calcium	2.57	0.02		meq/L	1	1/13/2022
Soluble Magnesium	1.03	0.05		meq/L	1	1/13/2022
Soluble Sodium	2.68	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>						
Barium	394	0.501		mg/Kg	1	1/5/2022 4:44:58 PM
<b>PERCENT MOISTURE</b>						
Percent Moisture	10.4	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 3:35:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-008 **Matrix:** SOIL  
**Client Sample ID** H-1 SE 4-6'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.91	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	6.46	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	7.54	0.10			1	1/13/2022
Soluble Calcium	0.93	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.66	0.05		meq/L	1	1/13/2022
Soluble Sodium	6.73	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	82.3	0.482		mg/Kg	1	1/5/2022 4:47:19 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.3	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 3:40:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-009 **Matrix:** SOIL  
**Client Sample ID** H-1 SE 8-10'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.19	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	14.8	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 3:45:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-010 **Matrix:** SOIL  
**Client Sample ID** H-1 SE 14-16'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.96	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	24.0	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 4:20:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-011 **Matrix:** SOIL  
**Client Sample ID** H-1R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.94	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>SPLP BARIUM BY SW1312/6010 ICP METALS, SPLP LEACHED</b>					<b>SW6010B</b>	Analyst: <b>STS</b>
Barium	4.41	0.0100		mg/L	1	12/27/2021 3:20:21 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.0	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/13/2021 4:25:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-012 **Matrix:** SOIL  
**Client Sample ID** H-1E 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	263	0.525		mg/Kg	1	1/5/2022 4:49:39 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	19.9	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 11:25:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-013 **Matrix:** SOIL  
**Client Sample ID** MW-8 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.83	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	2.74	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	4.04	0.10			1	1/13/2022
Soluble Calcium	2.90	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.57	0.05		meq/L	1	1/13/2022
Soluble Sodium	5.33	0.25		meq/L	1	1/13/2022
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	1,390	0.516		mg/Kg	1	1/5/2022 4:51:59 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	12.9	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



Element Materials Technology Lafayette  
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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 11:30:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-014 **Matrix:** SOIL  
**Client Sample ID** MW-8 4-6'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>29B SALTS (EC, ESP, SAR) ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	0.66	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>29B SALTS (EC, ESP, SAR) EXCHANGEABLE SODIUM PERCENTAGE</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>BXB</b>
Exchangeable Sodium %	9.60	0.10		%	1	1/14/2022
<b>29B SALTS (EC, ESP, SAR) SODIUM ADSORPTION RATIO</b>					<b>LDNR 29-B</b>	<b>LDNR 29-B</b> Analyst: <b>STS</b>
Sodium Adsorption Ratio	7.25	0.10			1	1/13/2022
Soluble Calcium	0.63	0.02		meq/L	1	1/13/2022
Soluble Magnesium	0.38	0.05		meq/L	1	1/13/2022
Soluble Sodium	5.15	0.25		meq/L	1	1/13/2022
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	17.5	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 11:35:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-015 **Matrix:** SOIL  
**Client Sample ID** MW-8 8-10'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>					<b>LDNR 29-B</b>	Analyst: <b>JMI</b>
Electrical Conductivity	1.76	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>					<b>LDNR 29-B</b>	Analyst: <b>BXB</b>
Percent Moisture	19.6	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 11:40:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-016 **Matrix:** SOIL  
**Client Sample ID** MW-8 14-16'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.78	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	23.1	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode





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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 11:45:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-017 **Matrix:** SOIL  
**Client Sample ID** MW-8 20-22'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.02	0.10		mmhos/cm	1	1/12/2022 1:50:00 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.8	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 2:00:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-018 **Matrix:** SOIL  
**Client Sample ID** H-19 NE 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	2,070	0.496		mg/Kg	1	1/5/2022 4:54:19 PM
<b>SPLP BARIUM BY SW1312/6010 ICP METALS, SPLP LEACHED</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
Barium	12.4	0.0100		mg/L	1	1/25/2022 8:43:25 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	14.0	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 2:05:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-019 **Matrix:** SOIL  
**Client Sample ID** H-19R 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>		Analyst: <b>STS</b>
<b>ICP METALS, SPLP LEACHED</b>						
Barium	0.775	0.0100		mg/L	1	12/27/2021 3:27:17 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	15.4	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 2:10:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-020 **Matrix:** SOIL  
**Client Sample ID** H-19 SW 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	579	0.483		mg/Kg	1	1/5/2022 5:01:15 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.5	1.00		wt%	1	12/22/2021 2:00:00 PM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# Analytical Report

(consolidated)

WO#: 21120834

Date Reported: 1/26/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/14/2021 2:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 21120834-021 **Matrix:** SOIL  
**Client Sample ID** H-18 SW 0-2'

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B</b>	<b>SW3050B</b>	Analyst: <b>STS</b>
Barium	40.9	0.524		mg/Kg	1	1/10/2022 8:33:35 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	16.6	1.00		wt%	1	12/18/2021 10:00:00 AM

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42064

Sample ID	<b>21120580-008AMS</b>	SampType: <b>MS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578174</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	88.4	0.508	25.38	112.5	-95.1	75	125				S

Sample ID	<b>21120580-008AMSD</b>	SampType: <b>MSD</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578175</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	88.6	0.521	26.03	112.5	-91.9	75	125	88.38	0.245	20	S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

Sample ID	<b>MB-42064</b>	SampType: <b>MBLK</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>PBS</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578388</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	< 0.500	0.500									

Sample ID	<b>LCS-42064</b>	SampType: <b>LCS</b>	TestCode: <b>6010_S</b>	Units: <b>mg/Kg</b>	Prep Date: <b>12/21/2021</b>	RunNo: <b>105323</b>					
Client ID:	<b>LCSS</b>	Batch ID: <b>42064</b>	TestNo: <b>SW6010B</b>	<b>SW3050B</b>	Analysis Date: <b>12/21/2021</b>	SeqNo: <b>2578389</b>					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	23.5	0.500	25.00	0	94.0	80	120				

**Qualifiers:**

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	H	Holding times for preparation or analysis exceeded
M	Matrix Interference	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit	U	Analyte not detected
W	Sample container temperature is out of limit as specified at testcode				



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42064

Sample ID	<b>LCSD-42064</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/21/2021</b>	RunNo:	<b>105323</b>											
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42064</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>12/21/2021</b>	SeqNo:	<b>2578392</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		23.5		0.500		25.00		0		93.8		80		120		23.50		0.143		20		

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42091

Sample ID	<b>MB-42091</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/22/2021</b>	RunNo:	<b>105418</b>			
Client ID:	<b>PBW</b>	Batch ID:	<b>42091</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/27/2021</b>	SeqNo:	<b>2582601</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.0100		0.0100										

Sample ID	<b>LCS-42091</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/22/2021</b>	RunNo:	<b>105418</b>			
Client ID:	<b>LCSW</b>	Batch ID:	<b>42091</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/27/2021</b>	SeqNo:	<b>2582602</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.488		0.0100	0.5000	0		97.7	80	120				

Sample ID	<b>LCSD-42091</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/22/2021</b>	RunNo:	<b>105418</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42091</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/27/2021</b>	SeqNo:	<b>2582603</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.492		0.0100	0.5000	0		98.3	80	120	0.4884	0.649	20	

Sample ID	<b>21120834-011AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>12/22/2021</b>	RunNo:	<b>105418</b>			
Client ID:	<b>H-1R 0-2'</b>	Batch ID:	<b>42091</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>12/27/2021</b>	SeqNo:	<b>2582607</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		5.09		0.0100	0.5000	4.407		137	75	125				S

**Qualifiers:**

- |   |   |  |
|---|---|--|
| * Value exceeds Maximum Contaminant Level.                              | B Analyte detected in the associated Method Blank | H Holding times for preparation or analysis exceeded |
| M Matrix Interference   | ND Not Detected at the Reporting Limit            | RL Reporting Limit                                   |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                        | U Analyte not detected                               |
| W Sample container temperature is out of limit as specified at testcode |   |  |





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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42091

Sample ID	21120834-011AMSD	SampType:	MSD	TestCode:	6010_SPLP	Units:	mg/L	Prep Date:	12/22/2021	RunNo:	105418	
Client ID:	H-1R 0-2'	Batch ID:	42091	TestNo:	SW6010B			Analysis Date:	12/27/2021	SeqNo:	2582608	
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		5.54	0.0100	0.5000	4.407	226	75	125	5.091	8.37	20	S

**NOTES:**

S - Analyte concentration in native sample was too high for accurate spike recovery(ies). The method is in control as indicated by the laboratory control sample (LCS).

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42130

Sample ID	<b>MB-42130</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105656</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42130</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/5/2022</b>	SeqNo:	<b>2588479</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-42130</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105656</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42130</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/5/2022</b>	SeqNo:	<b>2588482</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		25.0		0.500	25.00	0		100	80	120				

Sample ID	<b>LCSD-42130</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105656</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42130</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/5/2022</b>	SeqNo:	<b>2588483</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		25.0		0.500	25.00	0		100	80	120	24.99	0.206	20	

Sample ID	<b>21120834-002AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105656</b>			
Client ID:	<b>MW-10 4-6'</b>	Batch ID:	<b>42130</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/5/2022</b>	SeqNo:	<b>2588485</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		37.2		0.506	25.32	16.92		80.0	75	125				

**Qualifiers:**

- |   |   |  |
|---|---|--|
| * Value exceeds Maximum Contaminant Level.                              | B Analyte detected in the associated Method Blank | H Holding times for preparation or analysis exceeded |
| M Matrix Interference   | ND Not Detected at the Reporting Limit            | RL Reporting Limit                                   |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                        | U Analyte not detected                               |
| W Sample container temperature is out of limit as specified at testcode |   |  |



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42130

Sample ID	<b>21120834-002AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>12/28/2021</b>	RunNo:	<b>105656</b>											
Client ID:	<b>MW-10 4-6'</b>	Batch ID:	<b>42130</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/5/2022</b>	SeqNo:	<b>2588486</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		35.8		0.484		24.19		16.92		78.2		75		125		37.18		3.69		20		

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42232

Sample ID	<b>MB-42232</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593294</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-42232</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593295</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.3		0.500	25.00	0		93.0	80	120				

Sample ID	<b>LCSD-42232</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593296</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.6		0.500	25.00	0		94.4	80	120	23.25	1.45	20	

Sample ID	<b>21120834-021AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>H-18 SW 0-2'</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593301</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		135		0.508	25.42	40.87		370	75	125				S

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42232

Sample ID	<b>21120834-021AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>											
Client ID:	<b>H-18 SW 0-2'</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593302</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		128		0.480		23.98		40.87		363		75		125		134.9		5.33		20		S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

<b>Qualifiers:</b>	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank	H Holding times for preparation or analysis exceeded
	M Matrix Interference	ND Not Detected at the Reporting Limit	RL Reporting Limit
	S Spike Recovery outside accepted recovery limits	SDL Sample detection limit	U Analyte not detected
	W Sample container temperature is out of limit as specified at testcode		



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42235

Sample ID	<b>MB-42235</b>	SampType:	<b>MBLK</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>106068</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>42235</b>	TestNo:	<b>LDNR 29-B</b>	Analysis Date:	<b>1/19/2022</b>	SeqNo:	<b>2602425</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
True Total Barium		< 50.0		50.0							

Sample ID	<b>LCS-42235</b>	SampType:	<b>LCS</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>106068</b>
Client ID:	<b>LCSS</b>	Batch ID:	<b>42235</b>	TestNo:	<b>LDNR 29-B</b>	Analysis Date:	<b>1/19/2022</b>	SeqNo:	<b>2602426</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
True Total Barium		4,260		50.0	5,000	0	85.3	75	125		

Sample ID	<b>LCSD-42235</b>	SampType:	<b>LCSD</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>106068</b>
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42235</b>	TestNo:	<b>LDNR 29-B</b>	Analysis Date:	<b>1/19/2022</b>	SeqNo:	<b>2602427</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
True Total Barium		4,310		50.0	5,000	0	86.3	75	125	4,264	1.18 20

Sample ID	<b>21120832-041AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>106068</b>
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42235</b>	TestNo:	<b>LDNR 29-B</b>	Analysis Date:	<b>1/19/2022</b>	SeqNo:	<b>2602429</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
True Total Barium		17,100		49.5	4,946	12,870	85.1	75	125		

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42235

Sample ID	<b>21120832-041AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>TTBA</b>	Units:	<b>mg/Kg-dry</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>106068</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42235</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/19/2022</b>	SeqNo:	<b>2602430</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
True Total Barium		18,000		48.0	4,803	12,870	107	75	125	17,080	5.23	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42280

Sample ID	<b>21120834-001Adup</b>	SampType:	<b>DUP</b>	TestCode:	<b>ESP_S</b>	Units:	%	Prep Date:	<b>1/12/2022</b>	RunNo:	<b>105947</b>		
Client ID:	<b>MW-10 0-2'</b>	Batch ID:	<b>42280</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/14/2022</b>	SeqNo:	<b>2598519</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Exchangeable Sodium %		2.09		0.10						2.21	5.58	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected





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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42301

Sample ID	<b>21120829-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>SAR_S</b>	Units:		Prep Date:	<b>1/13/2022</b>	RunNo:	<b>105920</b>		
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42301</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/13/2022</b>	SeqNo:	<b>2598039</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio		27.8		0.10						27.64	0.57	20	*
Soluble Calcium		1.49		0.02						1.49	0.18	20	
Soluble Magnesium		1.04		0.05						1.04	0.02	20	
Soluble Sodium		31.3		0.25						31.10	0.52	20	

Sample ID	<b>21120834-001Adup</b>	SampType:	<b>DUP</b>	TestCode:	<b>SAR_S</b>	Units:		Prep Date:	<b>1/13/2022</b>	RunNo:	<b>105920</b>		
Client ID:	<b>MW-10 0-2'</b>	Batch ID:	<b>42301</b>	TestNo:	<b>LDNR 29-B</b>	<b>LDNR 29-B</b>		Analysis Date:	<b>1/13/2022</b>	SeqNo:	<b>2598051</b>		
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium Adsorption Ratio		4.21		0.10						4.22	0.23	20	
Soluble Calcium		2.11		0.02						2.09	0.67	20	
Soluble Magnesium		1.04		0.05						1.03	0.61	20	
Soluble Sodium		5.27		0.25						5.27	0.09	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42397

Sample ID	<b>MB-42397</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>1/24/2022</b>	RunNo:	<b>106241</b>			
Client ID:	<b>PBW</b>	Batch ID:	<b>42397</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>1/25/2022</b>	SeqNo:	<b>2606636</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.0100		0.0100										

Sample ID	<b>LCS-42397</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>1/24/2022</b>	RunNo:	<b>106241</b>			
Client ID:	<b>LCSW</b>	Batch ID:	<b>42397</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>1/25/2022</b>	SeqNo:	<b>2606637</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.500		0.0100	0.5000	0		100	80	120				

Sample ID	<b>LCSD-42397</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>1/24/2022</b>	RunNo:	<b>106241</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42397</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>1/25/2022</b>	SeqNo:	<b>2606638</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		0.508		0.0100	0.5000	0		102	80	120	0.5004	1.56	20	

Sample ID	<b>22010362-021AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>1/24/2022</b>	RunNo:	<b>106241</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42397</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>1/25/2022</b>	SeqNo:	<b>2606642</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		5.12		0.0100	0.5000	4.706		81.9	75	125				

**Qualifiers:**

- |   |   |  |
|---|---|--|
| * Value exceeds Maximum Contaminant Level.                              | B Analyte detected in the associated Method Blank | H Holding times for preparation or analysis exceeded |
| M Matrix Interference   | ND Not Detected at the Reporting Limit            | RL Reporting Limit                                   |
| S Spike Recovery outside accepted recovery limits                       | SDL Sample detection limit                        | U Analyte not detected                               |
| W Sample container temperature is out of limit as specified at testcode |   |  |



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42397

Sample ID	<b>22010362-021AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_SPLP</b>	Units:	<b>mg/L</b>	Prep Date:	<b>1/24/2022</b>	RunNo:	<b>106241</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42397</b>	TestNo:	<b>SW6010B</b>			Analysis Date:	<b>1/25/2022</b>	SeqNo:	<b>2606643</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		5.32		0.0100		0.5000		4.706		123		75		125		5.115		3.90		20		

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



Element Materials Technology Lafayette  
 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105657

Sample ID	21120566-001ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 105657					
Client ID:	ZZZZZZ	Batch ID: R105657	TestNo: LDNR 29-B		Analysis Date: 12/17/2021	SeqNo: 2588621					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	60.8	1.00						54.90	10.2	20	

Sample ID	21120567-001ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 105657					
Client ID:	ZZZZZZ	Batch ID: R105657	TestNo: LDNR 29-B		Analysis Date: 12/17/2021	SeqNo: 2588643					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	61.1	1.00						62.90	2.90	20	

Sample ID	21120567-020ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 105657					
Client ID:	ZZZZZZ	Batch ID: R105657	TestNo: LDNR 29-B		Analysis Date: 12/17/2021	SeqNo: 2588663					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	41.8	1.00						42.00	0.48	20	

Sample ID	21120829-001ADUP	SampType: DUP	TestCode: PMOIST_29B	Units: wt%	Prep Date:	RunNo: 105657					
Client ID:	ZZZZZZ	Batch ID: R105657	TestNo: LDNR 29-B		Analysis Date: 12/18/2021	SeqNo: 2588684					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	18.9	1.00						18.70	1.06	20	

**Qualifiers:**  
 \* Value exceeds Maximum Contaminant Level.  
 M Matrix Interference  
 S Spike Recovery outside accepted recovery limits  
 W Sample container temperature is out of limit as specified at testcode

B Analyte detected in the associated Method Blank  
 ND Not Detected at the Reporting Limit  
 SDL Sample detection limit

H Holding times for preparation or analysis exceeded  
 RL Reporting Limit  
 U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105657

Sample ID	<b>21120580-006ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105657</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105657</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/15/2021</b>	SeqNo: <b>2588701</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	26.4	1.00						26.80	1.50	20	

Sample ID	<b>21120832-001ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105657</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105657</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/22/2021</b>	SeqNo: <b>2588717</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	24.2	1.00						25.10	3.65	20	

Sample ID	<b>21120832-021ADUP</b>	SampType: <b>DUP</b>	TestCode: <b>PMOIST_29B</b>	Units: <b>wt%</b>	Prep Date:	RunNo: <b>105657</b>					
Client ID:	<b>ZZZZZZ</b>	Batch ID: <b>R105657</b>	TestNo: <b>LDNR 29-B</b>	Analysis Date: <b>12/22/2021</b>	SeqNo: <b>2588738</b>						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	28.5	1.00						30.50	6.78	20	

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
- B Analyte detected in the associated Method Blank
- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** R105707

Sample ID	<b>21120834-001Adup</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>105707</b>
Client ID:	<b>MW-10 0-2'</b>	Batch ID:	<b>R105707</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>12/22/2021</b>	SeqNo:	<b>2591018</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Percent Moisture		13.3		1.00						12.90	3.05 20

Sample ID	<b>21120917-007Adup</b>	SampType:	<b>DUP</b>	TestCode:	<b>PMOIST_29B</b>	Units:	<b>wt%</b>	Prep Date:		RunNo:	<b>105707</b>
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>R105707</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/4/2022</b>	SeqNo:	<b>2591166</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Percent Moisture		22.6		1.00						23.00	1.75 20

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
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- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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# QC SUMMARY REPORT

WO#: 21120834  
 26-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** R105864

Sample ID	<b>MB-R105861</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105864</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R105864</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/12/2022</b>	SeqNo:	<b>2595586</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		< 0.10		0.10							

Sample ID	<b>LCS1-R105861</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105864</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105864</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/12/2022</b>	SeqNo:	<b>2595587</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		0.50		0.10	0.50	0	98.4	90	110		

Sample ID	<b>LCS2-R105861</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105864</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R105864</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/12/2022</b>	SeqNo:	<b>2595588</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		57.3		0.10	53.00	0	108	90	110		

Sample ID	<b>21120834-001ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>105864</b>
Client ID:	<b>MW-10 0-2'</b>	Batch ID:	<b>R105864</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/12/2022</b>	SeqNo:	<b>2595593</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Electrical Conductivity		0.83		0.10						0.80	2.82 20

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- M Matrix Interference
- S Spike Recovery outside accepted recovery limits
- W Sample container temperature is out of limit as specified at testcode
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- ND Not Detected at the Reporting Limit
- SDL Sample detection limit
- H Holding times for preparation or analysis exceeded
- RL Reporting Limit
- U Analyte not detected



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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON** Work Order Number: **21120834** RcptNo: **1**

Logged by:	<b>Rhonda David</b>	<b>12/16/2021 3:16:00 PM</b>	
Completed By:	<b>Rhonda David</b>	<b>12/16/2021 4:39:03 PM</b>	
Reviewed By:	<b>Cristina Thibeaux</b>	<b>12/20/2021 2:37:11 PM</b>	

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------





# Chain of Custody

Laboratory Number: 21120834

Client Information: **ERM** Billing Information: **SAMS** PO Number: **0526033** Project Name/Number: **HEAVENLY MANAGEMENT** Page 1 of 3

Company Name: **Sittman Wilgains** Quote Number: **0526033** Matrix Code: **DW = Drinking Water, WW = Waste Water, GW = Ground Water, AQ = Aqueous, OT = Other, SL = Sludge, SO = Soil, O = Oil, F = Food, SW = Swab, NG = Natural Gas, NGL = Natural Gas Liquid, PW = Produced Water, CF = Completion Fluid**

Contact Name: **Sittman Wilgains** Required QC Level: **Bill Monthly** Shipper's Signature: *[Signature]*

Address: **Houston, TX** Ext: **971-333-2345** Shipping Method: **UPS / FedEx / NOW**

City, State Zip: **Houston, TX** Ext: **971-333-2345** DHL / Element / Hand / Mail

E-mail Address: **Sittman.Wilgains@erm.com**

Sample ID/Description	Which Regulations Apply:		Turn Time	Collection Information		Rush turn times will incur a surcharge and must be pre-approved by lab.	Container	Pres.	Requested Tests				Comments	
	IRORA	POTW		INPDES	USDA/IFDA				RECAP/IRIS	Date	Time	Grab / Composite		Matrix
MW-10 0-2'	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Standard	12/13	1330	G	SO	None	X	X	X	X	X	H = HOLD
MW-10 4-6'	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> RUSH	12/13	1335	G	SO	None	X	X	X	X	X	X: testing added on 12/21/21
MW-10 8-10'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1 Day	12/13	1340	G	SO	None	X	X	X	X	X	off
MW-10 10-12'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 2 Day	12/13	1345	G	SO	None	X	X	X	X	X	
MW-10 12-14'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other	12/13	1350	G	SO	None	X	X	X	X	X	
MW-10 16-18'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12/13	1355	G	SO	None	X	X	X	X	X	
H-1 SE 0-2'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12/13	1530	G	SO	None	X	X	X	X	X	
H-1 SE 4-6'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12/13	1535	G	SO	None	X	X	X	X	X	
H-1 SE 8-10'	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12/13	1540	G	SO	None	X	X	X	X	X	

Relinquished by: *[Signature]* Date/Time: 12/16/21 1330

Received by: *[Signature]* Date/Time: 12/16/21 1510

Field Notes: Received at lab on ice?  Yes  No Temp: 15/16

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

8800 North US 31  
Columbus, IN 47201 USA  
P 812-375-0531 F 812-375-0731

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Fort Wayne, IN 46825 USA  
P 260-471-7000 F 260-471-7777

909 Executive Dr  
Warsaw, IN 46580 USA  
P 574-287-3305 F 574-289-6569

3371 Cleveland Road, Suite 100A  
South Bend, IN 46628 USA  
P 574-277-0707 F 574-273-6699

2417 W. Pinhook Rd  
Lafayette, LA 70508 USA  
P 337-235-0483 F 337-235-6540



# Chain of Custody

Laboratory Number: 21120834

Company Name: **ERM**  
 Contact Name: **Sharon Wilgorns**  
 Address: **Houston, TX**  
 City, State Zip: **971-203-2385**  
 Phone Number: **Ext:**  
 Fax Number: **Sharon.Wilgorns@ERM.com**  
 E-mail Address: **Ext:**

Billing Information: **Special**  
 PO Number:  
 Quote Number:  
 Required QC Level:  
 Bill Monthly:  Yes  No  
 Shipping Method: **UPS / FedEx / NOW**  
 DHL / Element / Hand / Mail

Project Name/Number: **Houston Management**  
 Matrix Code:  
 Sampler's Signature: **Sharon Wilgorns**  
 Shipping Method: **UPS / FedEx / NOW**  
 DHL / Element / Hand / Mail

DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge SOL = Solid  
 O = Oil SO = Soil  
 F = Food SW = Swab  
 NG = Natural Gas  
 NGL = Natural Gas Liquid  
 PW = Produced Water  
 CF = Completion Fluid

Sample ID/Description	Which Regulations Apply: <input type="checkbox"/> RCRA <input type="checkbox"/> POTW <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input checked="" type="checkbox"/> RECAP/RISC <input checked="" type="checkbox"/> Other TAB	Turn Time <input checked="" type="checkbox"/> Standard <input type="checkbox"/> RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	Collection Information			Rush turn times will incur a surcharge and must be pre-approved by (lab.)	Container Type P=Plastic, V=Val	Pres. HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Requested Tests	Comments
			Date	Time	Grab / Composite					
H-15E 14-16'			12/13	1545	G	80			H = HOLD	
H-16 0-2'				1620					X: testing added on 12/21/21	
H-1E 0-2'				1625					CSF	
MW-8 0-2'			12/14	1175						
MW-8 4-6'				1130						
MW-8 8-10'				1135						
MW-8 14-16'				1140						
MW-8 20-22'				1145						
H-19 NE 0-2'				1400						

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:	
				Received at lab on ice?	Temp:
1 <i>[Signature]</i>	12/16/21 1330	<i>[Signature]</i>	12/16/21 1330	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2 <i>[Signature]</i>	12/16/21 1310	<i>[Signature]</i>	12/16/21 1576		
3					

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 P 574-277-0707  
 F 574-273-6699

2417 W. Pinhook Rd  
 Lafayette, LA 70508 USA  
 P 337-235-0483  
 F 337-233-6540



# Chain of Custody

Laboratory Number: **21120834**

**Client Information:** **Billing Information:** **PO Number:** **Quote Number:** **Required QC Level:**

**Company Name:** **ERM** **same**

**Contact Name:** **Stewart Wilgins**

**Address:** **47201 USA**

**City, State Zip:** **Amesbury, TX**

**Phone Number:** **71-303-2295** **Ext:**

**Fax Number:**

**E-mail Address:** **Stewart.Wilgins@ERM.com**

**Project Name/Number:** **HENNING MANAGEMENT**

**Sampler's Signature:** *[Signature]*

**Shipping Method:** **UPS / FedEx / NOW**

**DHL / Element / Hand / Mail**

**Matrix Code:**

DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NGL = Natural Gas  
 PW = Produced Water  
 CF = Completion Fluid

SOL = Solid  
 SO = Sol  
 SW = Swab  
 NG = Natural Gas  
 NL = Natural Gas Liquid

Sample ID/Description	Turn Time	Which Regulations Apply:	Collection Information	Container	Pres.	Requested Tests	Comments
H-19R 0-2'	12/14/21	1405	G	SD	None	SP, P, CI, SRP, BARIUM	H = HOLD
H-19 SW 0-2'	12/14/21	1410	G	P	None	SP, P, CI, SRP, BARIUM	X: test items added on 12/21/21
H-18 SW 0-2'	12/14/21	1415	G	P	None	SP, P, CI, SRP, BARIUM	add on 12/21/21

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
<i>[Signature]</i>	12/16/21 1330	<i>[Signature]</i>	12/16/21 1330	Received at lab on ice?
<i>[Signature]</i>	12/16/21 1516	<i>[Signature]</i>	12/16/21 1516	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Temp:

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

12/16/21 *[Signature]*

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 46825 USA  
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 F 260-471-7777

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 Warsaw, IN  
 46580 USA  
 P 574-287-3305  
 F 574-289-6569

3371 Cleveland Road, Suite 100A  
 South Bend, IN  
 46628 USA  
 P 574-277-0707  
 F 574-273-5699

2417 W. Pinhook Rd  
 Lafayette, LA  
 70608 USA  
 P 337-235-0483  
 F 337-233-6540





Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

January 11, 2022

Dave Angle  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 22010133

Dear Dave Angle:

Element Materials Technology Lafayette received 1 sample(s) on 12/3/2021 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

## Case Narrative

WO#: 22010133  
Date: 1/11/2022

---

**CLIENT:** Environmental Resources Management  
**Project:** Henning Management 0526033

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This report contains additional analytical data for the sample(s) originally received on 12/3/21 and assigned to Order Number 21120179. Per client request, the samples were analyzed for additional parameter(s).

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).



Element Materials Technology Lafayette  
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 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: [www.element.com](http://www.element.com)

# Analytical Report

(consolidated)

WO#: 22010133

Date Reported: 1/11/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 12/2/2021 2:00:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010133-001 **Matrix:** SOIL  
**Client Sample ID** MW-9 (8-10')

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>METALS IN SOIL OR SLUDGE BY ICP</b>					<b>SW6010B</b>	<b>SW3050B</b> Analyst: <b>STS</b>
Barium	296	0.525		mg/Kg	1	1/10/2022 9:13:01 PM

**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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# QC SUMMARY REPORT

WO#: 22010133  
 11-Jan-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42232

Sample ID	<b>MB-42232</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593294</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-42232</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593295</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.3		0.500	25.00	0		93.0	80	120				

Sample ID	<b>LCSD-42232</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593296</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		23.6		0.500	25.00	0		94.4	80	120	23.25	1.45	20	

Sample ID	<b>21120834-021AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593301</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		135		0.508	25.42	40.87		370	75	125				S

**Qualifiers:** H Holding times for preparation or analysis exceeded M Matrix Interference ND Not Detected at the Reporting Limit  
 RL Reporting Limit S Spike Recovery outside accepted recovery limits SDL Sample detection limit  
 U Analyte not detected W Sample container temperature is out of limit as specified at testcode





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# QC SUMMARY REPORT

WO#: 22010133  
 11-Jan-22

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** 42232

Sample ID	<b>21120834-021AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/6/2022</b>	RunNo:	<b>105777</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42232</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/10/2022</b>	SeqNo:	<b>2593302</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		128		0.480		23.98		40.87		363		75		125		134.9		5.33		20		S

**NOTES:**

S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

**Qualifiers:**

- |    |  |   |   |     |                                     |
|----|--|---|---|-----|-------------------------------------|
| H  | Holding times for preparation or analysis exceeded | M | Matrix Interference   | ND  | Not Detected at the Reporting Limit |
| RL | Reporting Limit                                    | S | Spike Recovery outside accepted recovery limits                       | SDL | Sample detection limit              |
| U  | Analyte not detected                               | W | Sample container temperature is out of limit as specified at testcode |     |                                     |






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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON**

Work Order Number: **22010133**

RcptNo: **1**

Logged by:	<b>Buffy Bryant</b>	<b>12/3/2021 3:15:00 PM</b>	
Completed By:	<b>Buffy Bryant</b>	<b>1/5/2022 12:09:41 PM</b>	
Reviewed By:	<b>Cristina Thibeaux</b>	<b>1/5/2022 12:37:54 PM</b>	

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:  
 Improper error correction(s) made by client.  
 Relog of 21120179-016A for total Ba(Requested by Shawn).

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------



Chain of Custody

22010133 88  
212079 11/15/22

Laboratory Number: 22010133 88

Project Name/Number: Henning Management

Client Information: **ERM**  
 Contact Name: **Sharon Wiggins**  
 Address: \_\_\_\_\_  
 City, State Zip: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Fax Number: \_\_\_\_\_  
 E-mail Address: \_\_\_\_\_

Billing Information:  
 PO Number: **0526033**  
 Quote Number: \_\_\_\_\_  
 Required QC Level: \_\_\_\_\_  
 Bill Monthly:  Yes  No

Ext: \_\_\_\_\_

Shipping Method: **UPS / FedEx / NOW**  
 Hand  Mail

Matrix Code:  
 DW = Drinking Water  
 WW = Waste Water  
 GW = Ground Water  
 AQ = Aqueous  
 OT = Other  
 SL = Sludge  
 O = Oil  
 F = Food  
 NG = Natural Gas  
 PW = Produced Water  
 CF = Compressor Fluid

Sampler's Signature: *[Signature]*

Sample ID/Description	Turn Time		(Rush turn times will incur a surcharge and must be pre-approved by lab.)	Container		Pres.	Requested Tests		Comments
	Standard	RUSH		Type	Quantity		SAR	ESP	
MW-1 (58-60')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub>	X	SAR chloride	
MW-1 (48-50')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-1 (8-10')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-1 (20-22')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-9 (0-2')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-9 (4-6')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-9 (8-10')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-9 (12-14')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		
MW-9 (14-16')	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6	P	1		X		

Relinquished by: *[Signature]* Date/Time: 12/3/21 15:00

Received by: *[Signature]* Date/Time: 12/3/21 15:15

Field Notes: Received at lab on ice?  Yes  No Temp: \_\_\_\_\_

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

3000 North US 31  
 Columbus, IN 47281 USA  
 P 812-575-0521  
 F 812-575-0731

328 Lay Road, Suite 100  
 Fort Wayne, IN 46823 USA  
 P 260-471-7000  
 F 260-471-7777

300 Executive Dr  
 Warsaw, IN 46580 USA  
 P 574-267-3202  
 F 574-209-6000

3371 Cleveland Road, Suite 100A  
 South Bend, IN 46628 USA  
 P 574-277-0707  
 F 574-273-5889

2417 W. Pinhook Rd  
 Lafayette, LA 70506 USA  
 P 337-235-0483  
 F 337-233-8540



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February 08, 2022

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX

RE: Henning Management 0526033

Order No.: 22010535

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 10 sample(s) on 1/13/2022 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

A handwritten signature in blue ink, appearing to read 'Cristina Johnson'.

Cristina Thibeaux  
Customer Service Supervisor



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
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## Case Narrative

WO#: 22010535  
Date: 2/8/2022

---

**CLIENT:** Environmental Resources Management

**Project:** Henning Management 0526033

---

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).



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# Analytical Report

(consolidated)

WO#: **22010535**

Date Reported: **2/8/2022**

**CLIENT:** Environmental Resources Management **Collection Date:** 1/10/2022 2:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-001 **Matrix:** SOIL  
**Client Sample ID** H-4 E2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.58	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	3,920	5.04		mg/Kg	10	1/28/2022 4:08:42 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	20.3	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/10/2022 2:50:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-002 **Matrix:** SOIL  
**Client Sample ID** H-4 N2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.35	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	2,940	4.82		mg/Kg	10	1/28/2022 4:20:11 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	21.2	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		





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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/10/2022 3:20:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-003 **Matrix:** SOIL  
**Client Sample ID** H-4 W2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.62	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	504	0.488		mg/Kg	1	2/3/2022 9:59:47 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	24.6	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 10:05:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-004 **Matrix:** SOIL  
**Client Sample ID** H-8 N2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.11	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	2,040	0.485		mg/Kg	1	2/3/2022 10:02:05 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	19.2	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 10:10:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-005 **Matrix:** SOIL  
**Client Sample ID** H-8 S2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	1.27	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	1,900	50.8		mg/Kg	100	1/31/2022 4:58:49 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	15.0	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 10:15:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-006 **Matrix:** SOIL  
**Client Sample ID** H-22 S2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.67	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	232	0.505		mg/Kg	1	1/31/2022 5:24:12 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	14.7	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 11:05:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-007 **Matrix:** SOIL  
**Client Sample ID** H-24 NW 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.45	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	1,840	0.516		mg/Kg	1	2/3/2022 10:04:23 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	20.7	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 11:25:00 AM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-008 **Matrix:** SOIL  
**Client Sample ID** H-24 NE 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.40	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	3,310	4.77		mg/Kg	10	1/28/2022 4:22:30 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	17.0	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 12:20:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-009 **Matrix:** SOIL  
**Client Sample ID** H-28 SE 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.55	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	909	0.492		mg/Kg	1	1/31/2022 5:33:26 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	12.2	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		



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# Analytical Report

(consolidated)

WO#: 22010535

Date Reported: 2/8/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/11/2022 12:25:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22010535-010 **Matrix:** SOIL  
**Client Sample ID** H-24 SW 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>ELECTRICAL CONDUCTIVITY @ SATURATION</b>				<b>LDNR 29-B</b>		Analyst: <b>JMI</b>
Electrical Conductivity	0.32	0.10		mmhos/cm	1	1/27/2022 11:15:00 AM
<b>METALS IN SOIL OR SLUDGE BY ICP</b>				<b>SW6010B SW3050B</b>		Analyst: <b>STS</b>
Barium	875	0.523		mg/Kg	1	2/3/2022 10:13:02 PM
<b>PERCENT MOISTURE</b>				<b>LDNR 29-B</b>		Analyst: <b>BXB</b>
Percent Moisture	28.9	1.00		wt%	1	1/18/2022 5:30:00 AM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected
	W	Sample container temperature is out of limit as specified at testcode		





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# QC SUMMARY REPORT

WO#: 22010535  
 08-Feb-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42354

Sample ID	<b>MB-42354</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/19/2022</b>	RunNo:	<b>106376</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42354</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/29/2022</b>	SeqNo:	<b>2611084</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-42354</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/19/2022</b>	RunNo:	<b>106376</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42354</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/29/2022</b>	SeqNo:	<b>2611085</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		21.9		0.500	25.00	0		87.5	80	120				

Sample ID	<b>LCSD-42354</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/19/2022</b>	RunNo:	<b>106376</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42354</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/29/2022</b>	SeqNo:	<b>2611086</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		21.7		0.500	25.00	0		86.8	80	120	21.88	0.856	20	

Sample ID	<b>22010415-022AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/19/2022</b>	RunNo:	<b>106376</b>			
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42354</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/29/2022</b>	SeqNo:	<b>2611088</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		86.5		0.522	26.08	355.5		-1,030	75	125				S

**Qualifiers:**  
 H Holding times for preparation or analysis exceeded  
 R RPD outside accepted recovery limits  
 SDL Sample detection limit

M Matrix Interference  
 RL Reporting Limit  
 U Analyte not detected

ND Not Detected at the Reporting Limit  
 S Spike Recovery outside accepted recovery limits  
 W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 22010535  
 08-Feb-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42354

Sample ID	<b>22010415-022AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/19/2022</b>	RunNo:	<b>106376</b>											
Client ID:	<b>ZZZZZZ</b>	Batch ID:	<b>42354</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/29/2022</b>	SeqNo:	<b>2611091</b>											
Analyte		Result		PQL		SPK value		SPK Ref Val		%REC		LowLimit		HighLimit		RPD Ref Val		%RPD		RPDLimit		Qual
Barium		87.9		0.510		25.50		355.5		-1,050		75		125		86.51		1.59		20		S

**NOTES:**  
 S - Spike recovery indicates matrix interference. The method is in control as indicated by the Lab Control Sample.

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
	R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
	SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 22010535  
 08-Feb-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42382

Sample ID	<b>MB-42382</b>	SampType:	<b>MBLK</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/21/2022</b>	RunNo:	<b>106422</b>			
Client ID:	<b>PBS</b>	Batch ID:	<b>42382</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/31/2022</b>	SeqNo:	<b>2612346</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		< 0.500		0.500										

Sample ID	<b>LCS-42382</b>	SampType:	<b>LCS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/21/2022</b>	RunNo:	<b>106422</b>			
Client ID:	<b>LCSS</b>	Batch ID:	<b>42382</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/31/2022</b>	SeqNo:	<b>2612347</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		22.3		0.500	25.00	0		89.2	80	120				

Sample ID	<b>LCSD-42382</b>	SampType:	<b>LCSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/21/2022</b>	RunNo:	<b>106422</b>			
Client ID:	<b>LCSS02</b>	Batch ID:	<b>42382</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/31/2022</b>	SeqNo:	<b>2612348</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		24.2		0.500	25.00	0		96.9	80	120	22.29	8.33	20	

Sample ID	<b>22010535-005AMS</b>	SampType:	<b>MS</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/21/2022</b>	RunNo:	<b>106422</b>			
Client ID:	<b>H-8 S2 0-2</b>	Batch ID:	<b>42382</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/31/2022</b>	SeqNo:	<b>2612350</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		2,020		48.2	24.09	1,903		494	75	125				S

**Qualifiers:**  
 H Holding times for preparation or analysis exceeded  
 R RPD outside accepted recovery limits  
 SDL Sample detection limit

M Matrix Interference  
 RL Reporting Limit  
 U Analyte not detected

ND Not Detected at the Reporting Limit  
 S Spike Recovery outside accepted recovery limits  
 W Sample container temperature is out of limit as sp



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# QC SUMMARY REPORT

WO#: 22010535  
 08-Feb-22

**Client:** Environmental Resources Management  
**Project:** Henning Management 0526033

**BatchID:** 42382

Sample ID	<b>22010535-005AMSD</b>	SampType:	<b>MSD</b>	TestCode:	<b>6010_S</b>	Units:	<b>mg/Kg</b>	Prep Date:	<b>1/21/2022</b>	RunNo:	<b>106422</b>			
Client ID:	<b>H-8 S2 0-2</b>	Batch ID:	<b>42382</b>	TestNo:	<b>SW6010B</b>		<b>SW3050B</b>	Analysis Date:	<b>1/31/2022</b>	SeqNo:	<b>2612351</b>			
Analyte		Result		PQL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium		1,100		51.9	25.97	1,903		-3,080	75	125	2,022	58.9	20	RS

**NOTES:**

S - Analyte concentration in native sample was too high for accurate spike recovery(ies). The method is in control as indicated by the laboratory control sample (LCS).

**Qualifiers:**

- |     |  |    |                      |    |  |
|-----|--|----|----------------------|----|--|
| H   | Holding times for preparation or analysis exceeded | M  | Matrix Interference  | ND | Not Detected at the Reporting Limit                |
| R   | RPD outside accepted recovery limits               | RL | Reporting Limit      | S  | Spike Recovery outside accepted recovery limits    |
| SDL | Sample detection limit                             | U  | Analyte not detected | W  | Sample container temperature is out of limit as sp |



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# QC SUMMARY REPORT

WO#: 22010535  
 08-Feb-22

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** R106301

Sample ID	<b>MB-R106292</b>	SampType:	<b>MBLK</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>106301</b>
Client ID:	<b>PBS</b>	Batch ID:	<b>R106301</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/27/2022</b>	SeqNo:	<b>2608408</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	< 0.10	0.10									
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Sample ID	<b>LCS1-R106292</b>	SampType:	<b>LCS1</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>106301</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R106301</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/27/2022</b>	SeqNo:	<b>2608409</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	0.55	0.10	0.50	0	109	90	110				
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Sample ID	<b>LCS2-R106292</b>	SampType:	<b>LCS2</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>106301</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R106301</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/27/2022</b>	SeqNo:	<b>2608410</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	57.4	0.10	53.00	0	108	90	110				
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Sample ID	<b>22010550-022ADUP</b>	SampType:	<b>DUP</b>	TestCode:	<b>EC_S</b>	Units:	<b>mmhos/cm</b>	Prep Date:		RunNo:	<b>106301</b>
Client ID:	<b>ZZZZZ</b>	Batch ID:	<b>R106301</b>	TestNo:	<b>LDNR 29-B</b>			Analysis Date:	<b>1/27/2022</b>	SeqNo:	<b>2608427</b>
Analyte		Result		PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual

Electrical Conductivity	2.57	0.10								2.57	0.04	20
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**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits
SDL	Sample detection limit	U	Analyte not detected	W	Sample container temperature is out of limit as sp



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## Sample Log-In Check List

Client Name: **ERM\_HOUSTON**

Work Order Number: **22010535**

RcptNo: **1**

Logged by:	<b>Danielle Hollier</b>	<b>1/13/2022 2:30:00 PM</b>	
Completed By:	<b>Danielle Hollier</b>	<b>1/13/2022 4:05:01 PM</b>	
Reviewed By:	<b>Cristina Thibeaux</b>	<b>1/22/2022 2:49:56 PM</b>	

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present
2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA
4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present
- No. Seal Date: Signed By:
5. Was an attempt made to cool the samples? Yes  No  NA
6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA
- Not required**
7. Sample(s) in proper container(s)? Yes  No
8. Sufficient sample volume for indicated test(s)? Yes  No
9. Are samples (except VOA and ONG) properly preserved? Yes  No
10. Was preservative added to bottles? Yes  No  NA
11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials
12. Were any sample containers received broken? Yes  No
13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)
14. Are matrices correctly identified on Chain of Custody? Yes  No
15. Is it clear what analyses were requested? Yes  No
16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
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# Chain of Custody

Laboratory Number: **22010535**

<b>Client Information:</b>		<b>Billing Information:</b>		<b>PO Number:</b>		<b>Project Name/Number:</b>		<b>Page of</b>	
EKM		Same				Hennings Management		Matrix Code	
Sharon Wilgins		↓				0526033		DW = Drinking Water	
Houston, TX								WW = Waste Water	
								GW = Ground Water	
								AQ = Aqueous	
								OT = Other	
971-263-2365		Ext: ↓						SL = Sludge SOL = Solid	
								O = Oil SO = Soil	
Sharon.wilgins@ERM.com								F = Food SW = Swab	
								NG = Natural Gas	
								NGL = Natural Gas Liquid	
								PW = Produced Water	
								CF = Completion Fluid	

Sample ID/Description	Which Regulations Apply:		Turn Time	Rush turn times will incur a surcharge and must be pre-approved by (lab.)	Container	Pres.	Requested Tests	Comments			
	Collection Information								Quantity	Type	HCL, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> O <sub>3</sub>
	Date	Time									
H-4E2 0-2'	<input checked="" type="checkbox"/> RCRA	<input type="checkbox"/> Drinking Water	1/10/22	1415	GIRAS	SO					
H-4N2 0-2'	<input type="checkbox"/> POTW	<input type="checkbox"/> Distribution	↓	1450							
H-4W2 0-2'	<input type="checkbox"/> NPDES	<input type="checkbox"/> Special	1/11/22	1520							
H-8N2 0-2'	<input type="checkbox"/> USDA/FDA	<input checked="" type="checkbox"/> State (Federal lab.)	↓	1005							
H-8S2 0-2'	<input type="checkbox"/> RECAP/RISC	<input type="checkbox"/> Other	1/10/22	1010							
H-22S2 0-2'			↓	1015							
H-24NW 0-2'			1/10/22	1105							
H-24NE 0-2'			↓	1125							
H-28SE 0-2'			1/10/22	1220							

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
[Signature]	1/13/22 / 1300	[Signature]	1/13/22 / 1300	Received at lab on ice?
[Signature]	1/13/22 / 1430	[Signature]	1/13/22 / 1430	<input type="checkbox"/> Yes <input type="checkbox"/> No Temp:

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

8800 North US 31  
Columbus, IN 47201 USA  
P 812-375-0531  
F 812-375-0731

328 Ley Road, Suite 100  
Fort Wayne, IN 46825 USA  
P 260-471-7000  
F 260-471-7777

909 Executive Dr  
Warsaw, IN 46580 USA  
P 574-267-3305  
F 574-269-6669

3371 Cleveland Road, Suite 100A  
South Bend, IN 46628 USA  
P 574-277-0707  
F 574-273-5699

2417 W. Pinhook Rd  
Lafayette, LA 70508 USA  
P 337-235-0463  
F 337-233-6540





# Chain of Custody

Laboratory Number: **22010535**

<b>Client Information:</b> Company Name: <b>ERM</b> Contact Name: <b>Stuart Wilgand</b> Address: <b>Houston, TX</b> City, State Zip: Phone Number: <b>971-303-2385</b> Fax Number: E-mail Address: <b>stuart.wilgand@erm.com</b>		<b>Billing Information:</b> Same		<b>PO Number:</b> Quote Number: Required QC Level: Bill Monthly: <input type="checkbox"/> Yes <input type="checkbox"/> No Ext:		<b>Project Name/Number:</b> <b>HOUSING MANAGEMENT</b> 0526033 Sampler's Signature: <i>[Signature]</i> Shipping Method: <b>UPS / FedEx / NOW</b> <b>DHL / Element / Hand / Mail</b>		<b>Page of</b> <b>Matrix Code</b> DW = Drinking Water WW = Waste Water GW = Ground Water AQ = Aqueous OT = Other SL = Sludge O = Oil F = Food NG = Natural Gas NGL = Natural Gas Liquid PW = Produced Water CF = Completion Fluid SOL = Solid SO = Soil SW = Swab	
---	--	-------------------------------------	--	--	--	---	--	---	--

Sample ID/Description	Date	Time	Collection Information	Rush turn times will incur a surcharge and must be pre-approved by (lab.)	Container	Pres.	Requested Tests	Comments					
									Turn Time		Quantity	Type	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> O <sub>3</sub>
									Standard	RUSH			
H-ZASW 0-2'	11/22	12:25	GRAB	SO	1	P	X % Moisture X BATH X FC	Hand Fox SOP Box					

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
<i>[Signature]</i>	11/22 / 13:00	<i>[Signature]</i>	11/22 / 13:00	Received at lab on ice? <input type="checkbox"/> Yes <input type="checkbox"/> No Temp:
<i>[Signature]</i>	11/22 / 14:30	<i>[Signature]</i>	11/22 / 14:30	

All samples submitted to Element Materials Technology for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Element Materials Technology reserves the right to return unused sample portions.

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F 337-233-6540





*Element Materials Technology Lafayette*  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: [www.element.com](http://www.element.com)

February 23, 2022

Shawn Wiggins  
Environmental Resources Management  
CityCentre Four  
840 W. Sam Houston Pkwy North, Suite 600  
Houston, TX 77024  
TEL:  
FAX:

RE: Henning Management 0526033

Order No.: 22020358

Dear Shawn Wiggins:

Element Materials Technology Lafayette received 1 sample(s) on 1/13/2022 for the analyses presented in the following report.

In accordance with your instructions, Element Lafayette either conducted or subcontracted these analyses. Subcontracted analyses will be identified in the accompanying case narrative. All relevant sampling information can be found on the attached Chain-of-Custody form. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet the applicable requirements of TNI. Reported results relate only to the items tested.

Where applicable, all soil data, except for 29-B, are reported on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. TCEQ Certification No.: T104704261. LDHH Certification No.: LA023. ISDH Certification No.: C-LA-01. NDELCP Certification No.: R-226. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation. PA registration No.: 68-05967.

Estimated uncertainty is available upon request. This report shall not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

Cristina Thibeaux  
Customer Service Supervisor



Element Materials Technology Lafayette  
2417 W. Pinhook Road  
Lafayette, LA 70508-3344  
TEL: (337) 235-0483 FAX: (337) 233-6540  
Website: www.element.com

## Case Narrative

WO#: 22020358  
Date: 2/23/2022

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**CLIENT:** Environmental Resources Management

**Project:** Henning Management 0526033

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This report contains additional analytical data for the sample(s) originally received on 1/13/2022 and assigned to Order Number 22010535. Per client request, the samples were analyzed for additional parameter(s).

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

The results of the laboratory internal quality control data are provided in the QC Summary Report section of the report for your review. Laboratory-related QC exceptions that may impact the validity of data are discussed in the case narrative. Sample-related QC exceptions are flagged either in the results page(s) or in the QC report page(s). End users should consider QC exceptions when evaluating sample data against data quality objectives.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).



Element Materials Technology Lafayette  
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 Lafayette, LA 70508-3344  
 TEL: (337) 235-0483 FAX: (337) 233-6540  
 Website: www.element.com

# Analytical Report

(consolidated)

WO#: 22020358

Date Reported: 2/23/2022

**CLIENT:** Environmental Resources Management **Collection Date:** 1/10/2022 2:15:00 PM  
**Project:** Henning Management 0526033  
**Lab ID:** 22020358-001 **Matrix:** SOIL  
**Client Sample ID** H-4 E2 0-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>SPLP BARIUM BY SW1312/6010</b>				<b>SW6010B</b>	Analyst: <b>STS</b>	
<b>ICP METALS, SPLP LEACHED</b>						
Barium	0.708	0.100		mg/L	1	2/21/2022 8:56:13 PM

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode



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 Website: www.element.com

# QC SUMMARY REPORT

WO#: 22020358

23-Feb-22

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** 42764

Sample ID: <b>MB-42764</b>	SampType: <b>MBLK</b>	TestCode: <b>6010_SPLP</b>	Units: <b>mg/L</b>	Prep Date: <b>2/21/2022</b>	RunNo: <b>107141</b>
Client ID: <b>PBW</b>	Batch ID: <b>42764</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>2/21/2022</b>	SeqNo: <b>2633510</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Barium	< 0.0100	0.0100			

Sample ID: <b>LCS-42764</b>	SampType: <b>LCS</b>	TestCode: <b>6010_SPLP</b>	Units: <b>mg/L</b>	Prep Date: <b>2/21/2022</b>	RunNo: <b>107141</b>
Client ID: <b>LCSW</b>	Batch ID: <b>42764</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>2/21/2022</b>	SeqNo: <b>2633511</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Barium	0.456	0.0100	0.5000	0	91.2 80 120

Sample ID: <b>LCSD-42764</b>	SampType: <b>LCSD</b>	TestCode: <b>6010_SPLP</b>	Units: <b>mg/L</b>	Prep Date: <b>2/21/2022</b>	RunNo: <b>107141</b>
Client ID: <b>LCSS02</b>	Batch ID: <b>42764</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>2/21/2022</b>	SeqNo: <b>2633512</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Barium	0.498	0.0100	0.5000	0	99.6 80 120 0.4561 8.82 20

Sample ID: <b>22020358-001AMS</b>	SampType: <b>MS</b>	TestCode: <b>6010_SPLP</b>	Units: <b>mg/L</b>	Prep Date: <b>2/21/2022</b>	RunNo: <b>107141</b>
Client ID: <b>H-4 E2 0-2</b>	Batch ID: <b>42764</b>	TestNo: <b>SW6010B</b>	Analysis Date: <b>2/21/2022</b>	SeqNo: <b>2633516</b>	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Barium	5.35	0.100	5.000	0.7075	92.8 75 125

**Qualifiers:**

H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode		



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 2417 W. Pinhook Road  
 Lafayette, LA 70508-3344  
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 Website: www.element.com

# QC SUMMARY REPORT

WO#: 22020358  
 23-Feb-22

**Client:** Environmental Resources Management

**Project:** Henning Management 0526033

**BatchID:** 42764

Sample ID: 22020358-001AMSD	SampType: MSD	TestCode: 6010_SPLP	Units: mg/L	Prep Date: 2/21/2022	RunNo: 107141						
Client ID: H-4 E2 0-2	Batch ID: 42764	TestNo: SW6010B		Analysis Date: 2/21/2022	SeqNo: 2633517						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	5.74	0.100	5.000	0.7075	101	75	125	5.346	7.05	20	

<b>Qualifiers:</b>	H	Holding times for preparation or analysis exceeded	M	Matrix Interference	ND	Not Detected at the Reporting Limit
	RL	Reporting Limit	S	Spike Recovery outside accepted recovery limits	SDL	Sample detection limit
	U	Analyte not detected	W	Sample container temperature is out of limit as specified at testcode		



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## Sample Log-In Check List

Client Name: ERM\_HOUSTON

Work Order Number: 22020358

RcptNo: 1

Logged by: Cristina Thibeaux 1/13/2022 2:30:00 PM

Completed By: Kelli Foreman 2/8/2022 1:49:18 PM

Reviewed By: Kelli Foreman 2/8/2022 1:49:21 PM

*Cristina Thibeaux*  
*Kelli R Foreman*  
*Kelli R Foreman*

### Chain of Custody

1. Is Chain of Custody complete? Yes  No  Not Present   
 2. How was the sample delivered? Client

### Log In

3. Coolers are present? Yes  No  NA   
 4. Shipping container/cooler in good condition? Yes  No   
 Custody seals intact on shipping container/cooler? Yes  No  Not Present   
 No. Seal Date: Signed By:  
 5. Was an attempt made to cool the samples? Yes  No  NA   
Not required  
 6. Were all samples received at a temperature of >0° C to 6.0°C Yes  No  NA   
Not required  
 7. Sample(s) in proper container(s)? Yes  No   
 8. Sufficient sample volume for indicated test(s)? Yes  No   
 9. Are samples (except VOA and ONG) properly preserved? Yes  No   
 10. Was preservative added to bottles? Yes  No  NA   
 11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes  No  No VOA Vials   
 12. Were any sample containers received broken? Yes  No   
 13. Does paperwork match bottle labels? Yes  No   
 (Note discrepancies on chain of custody)  
 14. Are matrices correctly identified on Chain of Custody? Yes  No   
 15. Is it clear what analyses were requested? Yes  No   
 16. Were all holding times able to be met? Yes  No   
 (If no, notify customer for authorization.)

### Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes  No  NA

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

18. Additional remarks:  
 relog of 22010535

### Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------




element™

# Chain of Custody

relog: 22020350

Laboratory Number: 22010535 *ccr 2/10/22*

Company Name: Contact Name: Address: City, State Zip: Phone Number: Fax Number: E-mail Address:	<b>Client Information:</b> ERM Sitawnd Wilgins Houston, TX 971 302 2385 Sitawnd.wilgins@ERM.com	<b>Billing Information:</b> SAME	PO Number: Quote Number: Required QC Level: Bill Monthly: <input type="checkbox"/> Yes <input type="checkbox"/> No	Project Name/Number: Training Management 0526033 Sampler's Signature:  Shipping Method: UPS / FedEx / NOW DHL / Element / Hand / Mail	Page 1 of 1 <b>Matrix Code</b> DW = Drinking Water WW = Waste Water GW = Ground Water AQ = Aqueous OT = Other SL = Sludge SOL = Solid O = Oil SO = Soil F = Food SW = Swab NG = Natural Gas NGL = Natural Gas Liquid PW = Produced Water CF = Completion Fluid
---	--	-------------------------------------	---	---	---

Which Regulations Apply:	Turn Time	Collection Information	Container	Pres.	Requested Tests			Comments
					Quantity	Type	EC	
<input type="checkbox"/> RCRA <input type="checkbox"/> POTW <input type="checkbox"/> NPDES <input type="checkbox"/> USDA/FDA <input type="checkbox"/> RECAP/RISC <input type="checkbox"/> Drinking Water <input type="checkbox"/> Distribution <input type="checkbox"/> Special <input checked="" type="checkbox"/> State Regs/ <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Standard RUSH <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> Other	Date: 1/10/22 Time: 1415 Grab / Composite: GRAB Matrix: SO	Type: P=Plastic, G=Glass, V=Vial HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	HCl, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	<input checked="" type="checkbox"/> Moisture <input checked="" type="checkbox"/> Barium <input checked="" type="checkbox"/> EC	<input checked="" type="checkbox"/> SLP Ba <i>ccr 2/10/22</i>	Hold ALL SAMPLES FOR SLP Ba	
H-4E2 0-2' H-4N2 0-2' H-4W2 0-2' H-8N2 0-2' H-8S2 0-2' H-22S2 0-2' H-24NW 0-2' H-24NE 0-2' H-28SE 0-2'	1/10/22 1/11/22	1415 1520 1005 1010 1015 1105 1125 1220	GRAB SO	P NONE	X X X X X X X X X	X X X X X X X X	Hold ALL SAMPLES FOR SLP Ba	

Relinquished by	Date/Time	Received by	Date/Time	Field Notes:
<i>Emily Mat</i>	1/13/22 / 1300	<i>Emily Mat</i>	1/13/22 / 1300	Received at lab on ice? <input type="checkbox"/> Yes <input type="checkbox"/> No Temp:
<i>Emily Mat</i>	1/13/22 / 1430	<i>Emily Mat</i>	1/13/22 / 1430	

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12/29/2021

ERM  
Mr. Shawn Wiggins  
804 Main Street  
Baton Rouge, LA, 70802

Ref: Report Number: 21-348-0017  
Project Description: Project: Henning Management, Hayes, LA  
Project No: 0526033

Dear Mr. Shawn Wiggins:

Waypoint Analytical Louisiana, Inc. received sample(s) on 12/14/2021 for the analyses presented in the following report. The above referenced project has been analyzed per your instructions. Unless otherwise noted, the analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance. Analyses reported which indicate "Field" for these parameters were analyzed by the client in the field. Results for solid samples are reported on an as received or "wet weight" basis unless otherwise specified.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

All quality control measures undertaken in accordance with Waypoint Analytical Louisiana, Inc. CompQAP990807A and revisions under the terms of the Louisiana Environmental Laboratory Accreditation Program (Certificate #02041) are within acceptance ranges established in that document with the exception of the items indicated and/or discussed in a Case Narrative.

The results are shown on the attached analysis sheet(s). Be aware that the time analyzed for certain samples (e.g. - BOD, CBOD, etc.) refer to the time the sample batch was begun and not necessarily to the time an individual sample was begun. Thank you for allowing Waypoint Analytical Louisiana, Inc. to serve you. Should I be of further assistance, if you have any questions or need additional information please contact me or client services.

Sincerely,

Anthony J. Albert  
Laboratory Director

*Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis. This report may be reproduced in full only with the written permission of the laboratory and/or the entity to which it is addressed. Results contained herein relate only to the sample(s) submitted to the laboratory.*



## Certification Summary

**Laboratory ID: WP MLA: Waypoint Analytical Louisiana, Inc., Marrero, LA**

State	Program	Lab ID	Expiration Date
Georgia	State Program	02041	06/30/2022
Louisiana	State Program - NELAP	02041	06/30/2022

**Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN**

State	Program	Lab ID	Expiration Date
Alabama	State Program	40750	02/28/2022
Arkansas	State Program	88-0650	02/07/2022
California	State Program	2904	06/30/2022
Florida	State Program - NELAP	E871157	06/30/2022
Georgia	State Program	C044	02/18/2023
Georgia	State Program	04015	06/30/2022
Illinois	State Program - NELAP	200078	10/10/2022
Kentucky	State Program	80215	06/30/2022
Kentucky	State Program	KY90047	12/31/2021
Louisiana	State Program - NELAP	LA037	12/31/2021
Louisiana	State Program - NELAP	04015	06/30/2022
Mississippi	State Program	MS	02/11/2023
North Carolina	State Program	415	12/31/2021
Pennsylvania	State Program - NELAP	68-03195	05/31/2022
South Carolina	State Program	84002	06/30/2022
South Carolina	State Program	84002	06/30/2022
Tennessee	State Program	02027	02/11/2023
Texas	State Program - NELAP	T104704180	09/30/2022
Virginia	State Program	00106	06/30/2022
Virginia	State Program - NELAP	460181	09/14/2022

**Sample Summary Table**

**Report Number:** 21-348-0017  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
60574	H-1SE 0-2'	Soil	12/13/2021 15:30	12/14/2021	MAEPH LA	WP MTN
60574	H-1SE 0-2'	Soil	12/13/2021 15:30	12/14/2021	8270D	WP MTN
60574	H-1SE 0-2'	Soil	12/13/2021 15:30	12/14/2021	MAVPH LA	WP MTN
60575	H-1R 0-2'	Soil	12/13/2021 16:20	12/14/2021	8270D	WP MTN
60575	H-1R 0-2'	Soil	12/13/2021 16:20	12/14/2021	MAVPH LA	WP MTN
60575	H-1R 0-2'	Soil	12/13/2021 16:20	12/14/2021	MAEPH LA	WP MTN
60576	H-1E 0-2'	Soil	12/13/2021 16:25	12/14/2021	MAEPH LA	WP MTN
60576	H-1E 0-2'	Soil	12/13/2021 16:25	12/14/2021	8270D	WP MTN
60576	H-1E 0-2'	Soil	12/13/2021 16:25	12/14/2021	MAVPH LA	WP MTN

<b>Summary of Detected Analytes</b>
-------------------------------------

**Project:** Project: Henning Management, Hayes, LA

**Report Number:** 21-348-0017

Client Sample ID	Lab Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>H-1SE 0-2'</b>	<b>A 60574</b>					
MAVPH LA	Aliphatic >C6-C8	2.68	mg/Kg	2.61	12/19/2021 15:33	
<b>H-1E 0-2'</b>	<b>A 60576</b>					
MAVPH LA	Aliphatic >C6-C8	3.48	mg/Kg	2.47	12/19/2021 16:55	

---

Client: ERM **CASE NARRATIVE**  
Project: Project: Henning Management, Hayes, LA  
Lab Report Number: 21-348-0017  
Date: 12/29/2021

---

## Results

- Samples for VPH and EPH are reported as received

### **MA-DEP EPH (LA) Method MAEPH LA**

Sample 60574 (H-1SE 0-2')

QC Batch No: L591378

Surrogate(s) was flagged for recovery outside QC limits in this project sample. This sample was re-analyzed for verification, and/or dilution of target analytes. Batch QC samples (method blank and laboratory control samples) all showed surrogates within QC limits.

01308  
ERM  
Mr. Shawn Wiggins  
804 Main Street  
Baton Rouge , LA 70802

Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 12/29/2021  
Received : 12/14/2021

Report Number : **21-348-0017**

**REPORT OF ANALYSIS**

Lab No : **60574**

Matrix: **Soil**

Sample ID : **H-1SE 0-2'**

Sampled: **12/13/2021 15:30**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L590508** 12/16/21 13:07

**Prep Method:** MAEPH LA (Soil)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/22/21 06:42	NFP	L591378
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/22/21 05:29	NFP	L591378
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/22/21 06:42	NFP	L591378
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/22/21 05:29	NFP	L591378
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/22/21 05:29	NFP	L591378
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/22/21 06:42	NFP	L591378
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/22/21 05:29	NFP	L591378
Surrogate: Chlorooctadecane	50.1		Limits: 40-140%	1	12/22/21 06:42	NFP	MAEPH LA
Surrogate: OTP Surrogate	<b>38.1 *</b>		Limits: 40-140%	1	12/22/21 05:29	NFP	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **L591039** 12/19/21 12:49

**Prep Method:** MAVPH LA (Soil)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	2.68	mg/Kg	2.61	100	12/19/21 15:33	HRS	L591040
Aliphatic >C8-C10	<5.22	mg/Kg	5.22	100	12/19/21 15:33	HRS	L591040
Aromatic >C8-C10	<3.48	mg/Kg	3.48	100	12/19/21 15:33	HRS	L591040
Surrogate: 2,5-Dibromotoluene	75.9		Limits: 50-150%	100	12/19/21 15:33	HRS	MAVPH LA

Qualifiers/Definitions	*	Outside QC Limit	DF	Dilution Factor
	MQL	Method Quantitation Limit		

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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 12/29/2021  
Received : 12/14/2021

Report Number : **21-348-0017**

**REPORT OF ANALYSIS**

Lab No : **60575**

Matrix: **Soil**

Sample ID : **H-1R 0-2'**

Sampled: **12/13/2021 16:20**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L590508** 12/16/21 13:07

**Prep Method:** MAEPH LA (Soil)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/22/21 12:35	NFP	L591378
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/22/21 12:35	NFP	L591378
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/22/21 12:35	NFP	L591378
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/22/21 12:35	NFP	L591378
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/22/21 12:35	NFP	L591378
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/22/21 12:35	NFP	L591378
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/22/21 12:35	NFP	L591378
Surrogate: Chlorooctadecane	53.4		Limits: 40-140%	1	12/22/21 12:35	NFP	MAEPH LA
Surrogate: OTP Surrogate	46.0		Limits: 40-140%	1	12/22/21 12:35	NFP	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **L591039** 12/19/21 12:49

**Prep Method:** MAVPH LA (Soil)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<2.40	mg/Kg	2.40	100	12/19/21 16:14	HRS	L591040
Aliphatic >C8-C10	<4.81	mg/Kg	4.81	100	12/19/21 16:14	HRS	L591040
Aromatic >C8-C10	<3.21	mg/Kg	3.21	100	12/19/21 16:14	HRS	L591040
Surrogate: 2,5-Dibromotoluene	75.6		Limits: 50-150%	100	12/19/21 16:14	HRS	MAVPH LA

**Qualifiers/Definitions** \* Outside QC Limit DF Dilution Factor  
MQL Method Quantitation Limit

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804 Main Street  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 12/29/2021  
Received : 12/14/2021

Report Number : **21-348-0017**

**REPORT OF ANALYSIS**

Lab No : **60576**

Matrix: **Soil**

Sample ID : **H-1E 0-2'**

Sampled: **12/13/2021 16:25**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591154** 12/21/21 08:44

**Prep Method:** MAEPH LA (Soil)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/27/21 21:19	NFP	L591836
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/27/21 21:19	NFP	L591836
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/27/21 21:19	NFP	L591836
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/27/21 21:19	NFP	L591836
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/27/21 21:19	NFP	L591836
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/27/21 21:19	NFP	L591836
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/27/21 21:19	NFP	L591836
Surrogate: Chlorooctadecane	51.2		Limits: 40-140%	1	12/27/21 21:19	NFP	MAEPH LA
Surrogate: OTP Surrogate	46.7		Limits: 40-140%	1	12/27/21 21:19	NFP	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **L591039** 12/19/21 12:49

**Prep Method:** MAVPH LA (Soil)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	3.48	mg/Kg	2.47	100	12/19/21 16:55	HRS	L591040
Aliphatic >C8-C10	<4.94	mg/Kg	4.94	100	12/19/21 16:55	HRS	L591040
Aromatic >C8-C10	<3.29	mg/Kg	3.29	100	12/19/21 16:55	HRS	L591040
Surrogate: 2,5-Dibromotoluene	74.5		Limits: 50-150%	100	12/19/21 16:55	HRS	MAVPH LA

**Qualifiers/Definitions** \* Outside QC Limit DF Dilution Factor  
MQL Method Quantitation Limit



### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L590649      **QC Analytical Batch(es):** L590902  
**QC Prep Batch Method:** 3546      **Analysis Method:** 8270D  
**Analysis Description:** Semivolatile Organic Compounds - GC/MS

**Lab Reagent Blank**      LRB-L590649      Matrix: SOL  
Associated Lab Samples: 60574, 60575, 60576

Parameter	Units	Blank Result	MQL	Analyzed
Acenaphthene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Acenaphthylene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Anthracene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Benzo(a)anthracene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Benzo(a)pyrene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Benzo(b)fluoranthene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Benzo(g,h,i)perylene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Benzo(k)fluoranthene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Chrysene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Dibenz(a,h)anthracene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Fluoranthene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Fluorene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Indeno(1,2,3-cd)pyrene	µg/Kg	< 66.7	66.7	12/17/21 17:15
2-Methylnaphthalene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Naphthalene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Phenanthrene	µg/Kg	< 66.7	66.7	12/17/21 17:15
Pyrene	µg/Kg	< 66.7	66.7	12/17/21 17:15

**Laboratory Control Sample**      LCS-L590649

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Acenaphthene	µg/Kg	1670	872	52.2	10-146
Acenaphthylene	µg/Kg	1670	765	45.8	10-146
Anthracene	µg/Kg	1670	990	59.2	10-146
Benzo(a)anthracene	µg/Kg	1670	978	58.5	10-146
Benzo(a)pyrene	µg/Kg	1670	939	56.2	10-146
Benzo(b)fluoranthene	µg/Kg	1670	1030	61.6	10-146

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L590649 **QC Analytical Batch(es):** L590902  
**QC Prep Batch Method:** 3546 **Analysis Method:** 8270D  
**Analysis Description:** Semivolatile Organic Compounds - GC/MS

**Laboratory Control Sample** LCS-L590649

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Benzo(g,h,i)perylene	µg/Kg	1670	783	46.8	10-146
Benzo(k)fluoranthene	µg/Kg	1670	1120	67.0	10-146
Chrysene	µg/Kg	1670	973	58.2	10-146
Dibenz(a,h)anthracene	µg/Kg	1670	769	46.0	10-146
Fluoranthene	µg/Kg	1670	1070	64.0	10-146
Fluorene	µg/Kg	1670	913	54.6	10-146
Indeno(1,2,3-cd)pyrene	µg/Kg	1670	758	45.3	10-146
2-Methylnaphthalene	µg/Kg	1670	832	49.8	10-146
Naphthalene	µg/Kg	1670	764	45.7	37-148
Phenanthrene	µg/Kg	1670	999	59.8	10-146
Pyrene	µg/Kg	1670	1030	61.6	10-146

**Matrix Spike & Matrix Spike Duplicate** L 99304-MS-L590649 L 99304-MSD-L590649

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Acenaphthene	µg/Kg	< 66.7	1670	1670	928	839	55.5	50.2	10-146	10.0	30.0
Acenaphthylene	µg/Kg	< 66.7	1670	1670	825	743	49.4	44.4	10-146	10.4	30.0
Anthracene	µg/Kg	< 66.7	1670	1670	1030	940	61.6	56.2	10-146	9.1	30.0
Benzo(a)anthracene	µg/Kg	< 66.7	1670	1670	1040	919	62.2	55.0	10-146	12.3	30.0
Benzo(a)pyrene	µg/Kg	< 66.7	1670	1670	1020	875	61.0	52.3	10-146	15.3	30.0
Benzo(b)fluoranthene	µg/Kg	< 66.7	1670	1670	1280	993	76.6	59.4	10-146	25.2	30.0
Benzo(g,h,i)perylene	µg/Kg	< 66.7	1670	1670	726	619	43.4	37.0	10-146	15.9	30.0
Benzo(k)fluoranthene	µg/Kg	< 66.7	1670	1670	1180	1080	70.6	64.6	10-146	8.8	30.0
Chrysene	µg/Kg	< 66.7	1670	1670	1040	926	62.2	55.4	10-146	11.5	30.0
Dibenz(a,h)anthracene	µg/Kg	< 66.7	1670	1670	814	699	48.7	41.8	10-146	15.2	30.0
Fluoranthene	µg/Kg	< 66.7	1670	1670	1130	1020	67.6	61.0	10-146	10.2	30.0

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L590649 **QC Analytical Batch(es):** L590902  
**QC Prep Batch Method:** 3546 **Analysis Method:** 8270D  
**Analysis Description:** Semivolatile Organic Compounds - GC/MS

**Matrix Spike & Matrix Spike Duplicate** L 99304-MS-L590649 L 99304-MSD-L590649

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Fluorene	µg/Kg	< 66.7	1670	1670	1010	915	60.4	54.7	10-146	9.8	30.0
Indeno(1,2,3-cd)pyrene	µg/Kg	< 66.7	1670	1670	770	643	46.1	38.5	10-146	17.9	30.0
2-Methylnaphthalene	µg/Kg	< 66.7	1670	1670	924	871	55.3	52.1	10-146	5.9	30.0
Naphthalene	µg/Kg	< 66.7	1670	1670	824	807	49.3	48.3	37-148	2.0	30.0
Phenanthrene	µg/Kg	< 66.7	1670	1670	1070	993	64.0	59.4	10-146	7.4	30.0
Pyrene	µg/Kg	< 66.7	1670	1670	1180	1020	70.6	61.0	10-146	14.5	30.0

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L590508      **QC Analytical Batch(es):** L591378  
**QC Prep Batch Method:** MAEPH LA (Soil)      **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Lab Reagent Blank**      LRB-L590508      Matrix: SOL  
Associated Lab Samples: 60574, 60575

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C10-C12	mg/Kg	<2.00	2.00	12/21/21 08:50		
Aliphatic >C12-C16	mg/Kg	<2.00	2.00	12/21/21 08:50		
Aliphatic >C16-C35	mg/Kg	<4.00	4.00	12/21/21 08:50		
Aromatic >C10-C12	mg/Kg	<1.00	1.00	12/21/21 08:50		
Aromatic >C12-C16	mg/Kg	<2.00	2.00	12/21/21 08:50		
Aromatic >C16-C21	mg/Kg	<2.00	2.00	12/21/21 08:50		
Aromatic >C21-C35	mg/Kg	<2.00	2.00	12/21/21 08:50		
Chlorooctadecane (S)				12/21/21 08:50	60.4	40-140
OTP Surrogate (S)				12/21/21 08:50	46.2	40-140

**Laboratory Control Sample**      LCS-L590508

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C12-C16	mg/Kg	3.33	2.38	71.4	40-140
Aliphatic >C16-C35	mg/Kg	10.0	10.5	105	40-140
Aromatic >C10-C12	mg/Kg	3.33	2.16	64.8	40-140
Aromatic >C12-C16	mg/Kg	6.67	3.22	48.2	40-140
Aromatic >C16-C21	mg/Kg	3.33	2.47	74.1	40-140
Chlorooctadecane (S)				55.8	40-140
OTP Surrogate (S)				53.3	40-140

**Matrix Spike & Matrix Spike Duplicate**      A 60574-MS-L590508      A 60574-MSD-L590508

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aliphatic >C12-C16	mg/Kg	<2.00	3.28	3.33	2.43	2.69	74.0	80.7	40-140	10.1	25
Aliphatic >C16-C35	mg/Kg	<4.00	9.84	10.0	5.39	4.85	54.7	48.5	40-140	10.5	25

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L590508 **QC Analytical Batch(es):** L591378  
**QC Prep Batch Method:** MAEPH LA (Soil) **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Matrix Spike & Matrix Spike Duplicate** A 60574-MS-L590508 A 60574-MSD-L590508

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aromatic >C10-C12	mg/Kg	<1.00	3.28	3.33	2.12	2.23	64.6	66.9	40-140	5.0	25
Aromatic >C12-C16	mg/Kg	<2.00	6.56	6.67	4.57	3.89	69.6	58.3	40-140	16.0	25
Aromatic >C16-C21	mg/Kg	<2.00	3.28	3.33	3.33	2.94	102	88.2	40-140	12.4	25
Chlorooctadecane (S)							49.1	49.5	40-140		
OTP Surrogate (S)							63.4	53.1	40-140		

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L591154      **QC Analytical Batch(es):** L591836  
**QC Prep Batch Method:** MAEPH LA (Soil)      **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Lab Reagent Blank** LRB-L591154      Matrix: SOL  
Associated Lab Samples: 60576

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C10-C12	mg/Kg	<2.00	2.00	12/26/21 16:05		
Aliphatic >C12-C16	mg/Kg	<2.00	2.00	12/26/21 16:05		
Aliphatic >C16-C35	mg/Kg	<4.00	4.00	12/26/21 16:05		
Aromatic >C10-C12	mg/Kg	<1.00	1.00	12/26/21 16:05		
Aromatic >C12-C16	mg/Kg	<2.00	2.00	12/26/21 16:05		
Aromatic >C16-C21	mg/Kg	<2.00	2.00	12/26/21 16:05		
Aromatic >C21-C35	mg/Kg	<2.00	2.00	12/26/21 16:05		
Chlorooctadecane (S)				12/26/21 16:05	61.0	40-140
OTP Surrogate (S)				12/26/21 16:05	54.5	40-140

**Laboratory Control Sample** LCS-L591154

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C12-C16	mg/Kg	3.33	2.74	82.2	40-140
Aliphatic >C16-C35	mg/Kg	10.0	6.13	61.3	40-140
Aromatic >C10-C12	mg/Kg	3.33	3.19	95.7	40-140
Aromatic >C12-C16	mg/Kg	6.67	6.57	98.5	40-140
Aromatic >C16-C21	mg/Kg	3.33	3.67	110	40-140
Chlorooctadecane (S)				48.1	40-140
OTP Surrogate (S)				104	40-140

**Matrix Spike & Matrix Spike Duplicate** A 60576-MS-L591154      A 60576-MSD-L591154

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aliphatic >C12-C16	mg/Kg	<2.00	3.26	3.32	2.21	1.00	67.7	0.0*	40-140	9.9	25
Aliphatic >C16-C35	mg/Kg	<4.00	9.77	9.97	6.02	5.81	61.6	58.2	40-140	3.5	25

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L591154      **QC Analytical Batch(es):** L591836  
**QC Prep Batch Method:** MAEPH LA (Soil)      **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Matrix Spike & Matrix Spike Duplicate**      A 60576-MS-L591154      A 60576-MSD-L591154

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aromatic >C10-C12	mg/Kg	<1.00	3.26	3.32	2.47	2.56	75.7	77.1	40-140	3.5	25
Aromatic >C12-C16	mg/Kg	<2.00	6.51	6.64	4.04	4.13	62.0	62.1	40-140	2.2	25
Aromatic >C16-C21	mg/Kg	<2.00	3.26	3.32	2.21	2.04	67.7	61.4	40-140	8.0	25
Chlorooctadecane (S)							50.4	48.4	40-140		
OTP Surrogate (S)							67.4	62.6	40-140		

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-348-0017

**QC Prep:** L591039      **QC Analytical Batch(es):** L591040  
**QC Prep Batch Method:** MAVPH LA (Soil)      **Analysis Method:** MAVPH LA  
**Analysis Description:** MADEP VPH Rev 1.1

**Lab Reagent Blank**      LRB-L591039      Matrix: SOL  
Associated Lab Samples: 60574, 60575, 60576

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C6-C8	mg/Kg	<3.00	3.00	12/19/21 14:52		
Aliphatic >C8-C10	mg/Kg	<6.00	6.00	12/19/21 14:52		
Aromatic >C8-C10	mg/Kg	<4.00	4.00	12/19/21 14:52		
2,5-Dibromotoluene (S)				12/19/21 14:52	106	50-150

**Laboratory Control Sample**      LCS-L591039

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C6-C8	mg/Kg	60.0	62.5	104	50-150
Aliphatic >C8-C10	mg/Kg	120	140	117	50-150
Aromatic >C8-C10	mg/Kg	80.0	79.7	99.6	50-150
2,5-Dibromotoluene (S)				128	50-150



**Shipment Receipt Form**

Customer Number: **01308**  
 Customer Name: **ERM**  
 Report Number: **21-348-0017**

**Shipping Method**

Fed Ex       US Postal       Lab       Other :   
 UPS       Client       Courier      Thermometer ID:

Shipping container/cooler uncompromised?       Yes       No

Number of coolers/boxes received     

Custody seals intact on shipping container/cooler?       Yes       No       Not Present

Custody seals intact on sample bottles?       Yes       No       Not Present

Chain of Custody (COC) present?       Yes       No

COC agrees with sample label(s)?       Yes       No

COC properly completed       Yes       No

Samples in proper containers?       Yes       No

Sample containers intact?       Yes       No

Sufficient sample volume for indicated test(s)?       Yes       No

All samples received within holding time?       Yes       No

Cooler temperature in compliance?       Yes       No

Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun.       Yes       No

Water - Sample containers properly preserved       Yes       No       N/A

Water - VOA vials free of headspace       Yes       No       N/A

Trip Blanks received with VOAs       Yes       No       N/A

Soil VOA method 5035 – compliance criteria met       Yes       No       N/A


High concentration container (48 hr)       Low concentration EnCore samplers (48 hr)  
 High concentration pre-weighed (methanol -14 d)       Low conc pre-weighed vials (Sod Bis -14 d)

Special precautions or instructions included?       Yes       No

Comments:

Signature:

Date & Time:

Client Name/Address		Client Project Manager/Contact		Billing Information		For Laboratory Use Only	
ERM Houston, TX		Shawn Wilgins		<input type="checkbox"/> RUSH - Additional charges apply <input type="checkbox"/> Special Detection Limit(s) <input type="checkbox"/> Date Results Needed		Method of Shipment <input type="checkbox"/> Fed Ex <input type="checkbox"/> Courier <input checked="" type="checkbox"/> Client Drop Off <input type="checkbox"/> UPS <input type="checkbox"/> Client Drop Off Other	
Project Description Henning Management		Project/Site Location (City/State) Hayes, LA		Project Manager Email SHAWN.WILGINS@ERM.COM		Matrix Key WW - Wastewater GW - Groundwater DW - Drinking Water S - Soil /Solid O - Oil P - Product M - Misc	
Project Number 0526033		Project Manager Phone # 971-303-2385		Project Manager Email SHAWN.WILGINS@ERM.COM		Site/Facility ID #	
 5041 Taravelle Road Marrero, LA 70072 (504) 371-8560		Number of Containers 5		Matrix (Refer to Key) SS		Comments/Notes Cool < 10C Na2S2O3 (Micro Only) A Cool <= 6C B H2SO4 pH<2 C None Required D NaOH pH>10 E HNO3 pH<2 F HCL pH<2 G H3PO4 pH<2 H Cool <= 6C NA2S2O3 I	
Date 12/13 1530 12/13 1620 12/13 1625		Sample Identification H-1SE 0-2' H-1R 0-2' H-1E 0-2'		(G)rab or (C)omposite X X X		Required Analysis / Preservative 60574 60575 60576	
Ice 0/N		Lab Comments Shawn Wilgins Relinquished by: (SIGNATURE) Relinquished by: (SIGNATURE) Relinquished by: (SIGNATURE)		Date 12/14/21 10:33 12/14 13:01 12-14-21 1401		Date 12/14/21 10:33 12-14-21 1301	
Custody Seals Y/N		Blank/Cooler Temp 2.3°C		Relinquished by: (SIGNATURE) Relinquished by: (SIGNATURE) Relinquished by: (SIGNATURE)		Received by: (SIGNATURE) Received by: (SIGNATURE) Received by: (SIGNATURE)	
For Laboratory Use Only		Client Remarks/Comments		Date 12/14/21 10:33		Date 12-14-21 1301	

ERM  
Protect: Henning Management, Hayes, LA

21-348-0017  
01308  
12-14-2021  
18:13:40



1/16/2022

ERM

Mr. Shawn Wiggins  
840 West Sam Houston Parkway North  
Suite 600  
Houston, TX, 77024-4613

Ref: Report Number: 21-352-0003  
Project Description: Project: Henning Management, Hayes, LA  
Project No: 0526033

Dear Mr. Shawn Wiggins:

Waypoint Analytical Louisiana, Inc. received sample(s) on 12/17/2021 for the analyses presented in the following report. The above referenced project has been analyzed per your instructions. Unless otherwise noted, the analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance. Analyses reported which indicate "Field" for these parameters were analyzed by the client in the field. Results for solid samples are reported on an as received or "wet weight" basis unless otherwise specified.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

All quality control measures undertaken in accordance with Waypoint Analytical Louisiana, Inc. CompQAP990807A and revisions under the terms of the Louisiana Environmental Laboratory Accreditation Program (Certificate #02041) are within acceptance ranges established in that document with the exception of the items indicated and/or discussed in a Case Narrative.

The results are shown on the attached analysis sheet(s). Be aware that the time analyzed for certain samples (e.g. - BOD, CBOD, etc.) refer to the time the sample batch was begun and not necessarily to the time an individual sample was begun. Thank you for allowing Waypoint Analytical Louisiana, Inc. to serve you. Should I be of further assistance, if you have any questions or need additional information please contact me or client services.

Sincerely,

Anthony J. Albert  
Laboratory Director

*Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis. This report may be reproduced in full only with the written permission of the laboratory and/or the entity to which it is addressed. Results contained herein relate only to the sample(s) submitted to the laboratory.*



## Certification Summary

**Laboratory ID: WP MLA: Waypoint Analytical Louisiana, Inc., Marrero, LA**

State	Program	Lab ID	Expiration Date
Georgia	State Program	02041	06/30/2022
Louisiana	State Program - NELAP	02041	06/30/2022

**Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN**

State	Program	Lab ID	Expiration Date
Alabama	State Program	40750	02/28/2022
Arkansas	State Program	88-0650	02/07/2022
California	State Program	2904	06/30/2022
Florida	State Program - NELAP	E871157	06/30/2022
Georgia	State Program	C044	02/18/2023
Georgia	State Program	04015	06/30/2022
Illinois	State Program - NELAP	200078	10/10/2022
Kentucky	State Program	80215	06/30/2022
Kentucky	State Program	KY90047	12/31/2022
Louisiana	State Program - NELAP	LA037	12/31/2022
Louisiana	State Program - NELAP	04015	06/30/2022
Mississippi	State Program	MS	02/11/2023
North Carolina	State Program	415	12/31/2022
Pennsylvania	State Program - NELAP	68-03195	05/31/2022
South Carolina	State Program	84002	06/30/2022
South Carolina	State Program	84002	06/30/2022
Tennessee	State Program	02027	02/11/2023
Texas	State Program - NELAP	T104704180	09/30/2022
Virginia	State Program	00106	06/30/2022
Virginia	State Program - NELAP	460181	09/14/2022

**Laboratory ID: WP RMS: Waypoint Analytical Mississippi, Inc., Ridgeland, MS**

State	Program	Lab ID	Expiration Date
Arkansas	State Program	88-1409	02/01/2022
Kentucky	State Program	KY98013	12/31/2021
Louisiana	State Program - NELAP	04023	06/30/2022
North Carolina	State Program	694	12/31/2021



**Sample Summary Table**

**Report Number:** 21-352-0003  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
60830	MW-11	Groundwater	12/15/2021 08:00	12/17/2021 20:25		
60830	MW-11	Groundwater	12/15/2021 08:00	12/17/2021 20:25	6020B	WP MTN
60830	MW-11	Groundwater	12/15/2021 08:00	12/17/2021 20:25	MAEPH LA	WP MTN
60830	MW-11	Groundwater	12/15/2021 08:00	12/17/2021 20:25	7470A	WP MTN
60830	MW-11	Groundwater	12/15/2021 08:00	12/17/2021 20:25	8260B	WP RMS
60830	MW-11	Groundwater	12/15/2021 08:00	12/17/2021 20:25	MAVPH LA	WP RMS
60831	MW-1	Groundwater	12/15/2021 13:45	12/17/2021 20:25		
60831	MW-1	Groundwater	12/15/2021 13:45	12/17/2021 20:25	MAEPH LA	WP MTN
60831	MW-1	Groundwater	12/15/2021 13:45	12/17/2021 20:25	7470A	WP MTN
60831	MW-1	Groundwater	12/15/2021 13:45	12/17/2021 20:25	6020B	WP MTN
60831	MW-1	Groundwater	12/15/2021 13:45	12/17/2021 20:25	8260B	WP RMS
60831	MW-1	Groundwater	12/15/2021 13:45	12/17/2021 20:25	MAVPH LA	WP RMS
60832	MW-8	Groundwater	12/15/2021 16:30	12/17/2021 20:25		
60832	MW-8	Groundwater	12/15/2021 16:30	12/17/2021 20:25	MAEPH LA	WP MTN
60832	MW-8	Groundwater	12/15/2021 16:30	12/17/2021 20:25	7470A	WP MTN
60832	MW-8	Groundwater	12/15/2021 16:30	12/17/2021 20:25	6020B	WP MTN
60832	MW-8	Groundwater	12/15/2021 16:30	12/17/2021 20:25	MAVPH LA	WP RMS
60832	MW-8	Groundwater	12/15/2021 16:30	12/17/2021 20:25	8260B	WP RMS
60833	MW-7	Groundwater	12/16/2021 07:50	12/17/2021 20:25		
60833	MW-7	Groundwater	12/16/2021 07:50	12/17/2021 20:25	7470A	WP MTN
60833	MW-7	Groundwater	12/16/2021 07:50	12/17/2021 20:25	6020B	WP MTN
60833	MW-7	Groundwater	12/16/2021 07:50	12/17/2021 20:25	MAEPH LA	WP MTN
60833	MW-7	Groundwater	12/16/2021 07:50	12/17/2021 20:25	8260B	WP RMS
60833	MW-7	Groundwater	12/16/2021 07:50	12/17/2021 20:25	MAVPH LA	WP RMS
60834	MW-9	Groundwater	12/16/2021 08:20	12/17/2021 20:25		
60834	MW-9	Groundwater	12/16/2021 08:20	12/17/2021 20:25	7470A	WP MTN

WP MTN - Memphis, TN: Waypoint Analytical - TN, Memphis, TN

WP RMS - Ridgeland, MS: Waypoint Analytical - Mississippi, Inc., Ridgeland, MS

**Sample Summary Table**

**Report Number:** 21-352-0003  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
60834	MW-9	Groundwater	12/16/2021 08:20	12/17/2021 20:25	6020B	WP MTN
60834	MW-9	Groundwater	12/16/2021 08:20	12/17/2021 20:25	MAEPH LA	WP MTN
60834	MW-9	Groundwater	12/16/2021 08:20	12/17/2021 20:25	8260B	WP RMS
60834	MW-9	Groundwater	12/16/2021 08:20	12/17/2021 20:25	MAVPH LA	WP RMS
60835	MW-9D	Groundwater	12/16/2021 08:40	12/17/2021 20:25		
60835	MW-9D	Groundwater	12/16/2021 08:40	12/17/2021 20:25	7470A	WP MTN
60835	MW-9D	Groundwater	12/16/2021 08:40	12/17/2021 20:25	6020B	WP MTN
60835	MW-9D	Groundwater	12/16/2021 08:40	12/17/2021 20:25	MAEPH LA	WP MTN
60835	MW-9D	Groundwater	12/16/2021 08:40	12/17/2021 20:25	8260B	WP RMS
60835	MW-9D	Groundwater	12/16/2021 08:40	12/17/2021 20:25	MAVPH LA	WP RMS
60836	SW-BO 13'	Groundwater	12/16/2021 11:35	12/17/2021 20:25		
60836	SW-BO 13'	Groundwater	12/16/2021 11:35	12/17/2021 20:25	7470A	WP MTN
60836	SW-BO 13'	Groundwater	12/16/2021 11:35	12/17/2021 20:25	6020B	WP MTN
60836	SW-BO 13'	Groundwater	12/16/2021 11:35	12/17/2021 20:25	MAEPH LA	WP MTN
60836	SW-BO 13'	Groundwater	12/16/2021 11:35	12/17/2021 20:25	8260B	WP RMS
60836	SW-BO 13'	Groundwater	12/16/2021 11:35	12/17/2021 20:25	MAVPH LA	WP RMS
60837	SW-BO 2'	Groundwater	12/16/2021 12:30	12/17/2021 20:25		
60837	SW-BO 2'	Groundwater	12/16/2021 12:30	12/17/2021 20:25	7470A	WP MTN
60837	SW-BO 2'	Groundwater	12/16/2021 12:30	12/17/2021 20:25	6020B	WP MTN
60837	SW-BO 2'	Groundwater	12/16/2021 12:30	12/17/2021 20:25	MAEPH LA	WP MTN
60837	SW-BO 2'	Groundwater	12/16/2021 12:30	12/17/2021 20:25	8260B	WP RMS
60837	SW-BO 2'	Groundwater	12/16/2021 12:30	12/17/2021 20:25	MAVPH LA	WP RMS
60838	MW-6	Groundwater	12/17/2021 08:30	12/17/2021 20:25		
60838	MW-6	Groundwater	12/17/2021 08:30	12/17/2021 20:25	7470A	WP MTN
60838	MW-6	Groundwater	12/17/2021 08:30	12/17/2021 20:25	6020B	WP MTN
60838	MW-6	Groundwater	12/17/2021 08:30	12/17/2021 20:25	MAEPH LA	WP MTN

WP MTN - Memphis, TN: Waypoint Analytical - TN, Memphis, TN

WP RMS - Ridgeland, MS: Waypoint Analytical - Mississippi, Inc., Ridgeland, MS

**Sample Summary Table**

**Report Number:** 21-352-0003  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
60838	MW-6	Groundwater	12/17/2021 08:30	12/17/2021 20:25	8260B	WP RMS
60838	MW-6	Groundwater	12/17/2021 08:30	12/17/2021 20:25	MAVPH LA	WP RMS



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Client: ERM

**CASE NARRATIVE**

Project: Project: Henning Management, Hayes, LA

Lab Report Number: 21-352-0003

Date: 1/7/2022

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**MA-DEP EPH (LA) Method MAEPH LA**

Sample 60836 (SW-BO 13')

QC Batch No: L592025

Surrogate(s) was flagged for recovery outside QC limits in this project sample. This sample was re-analyzed for verification, and/or dilution of target analytes. Batch QC samples (method blank and laboratory control samples) all showed surrogates within QC limits.

Sample 68317

QC Batch No: L592025/L591640

The matrix spike and/or the matrix spike duplicate was outside quality control acceptance ranges due to the level of target analyte present relative to the spike amount. MS/MSD should be evaluated as duplicates.

**Metals Analyses Method 6020B**

Sample 60785

Analyte: Sodium

QC Batch No: L592716/L591291

The matrix spike and/or the matrix spike duplicate was outside quality control acceptance ranges. A dilution test was performed and passed quality control acceptance ranges. No matrix interference is suspected.

Analyte: Sodium

QC Batch No: L593295/L591291

The matrix spike and/or the matrix spike duplicate was outside quality control acceptance ranges. A dilution test was performed and passed quality control acceptance ranges. No matrix interference is suspected.

Analyte: Strontium

QC Batch No: L593295/L591291

The matrix spike and/or the matrix spike duplicate was outside quality control acceptance ranges. A dilution test was performed and passed quality control acceptance ranges. No matrix interference is suspected.



10485

ERM

Mr. Shawn Wiggins

840 West Sam Houston Parkway North  
Suite 600

Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60830**

Sample ID : **MW-11**

Matrix: **Groundwater**

Sampled: **12/15/2021 8:00**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	380	mg/L	10	1	12/27/21 10:39	AJA	A71162
Carbonate	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162
Alkalinity (as CaCO3)	380	mg/L	10	1	12/27/21 10:39	AJA	A71162
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	4420	mg/L	100	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B      **Prep Batch(es):** **L591287** 12/21/21 13:20      **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	0.0016	mg/L	0.0010	1	12/22/21 23:24	JTR	L591816
Barium	0.163	mg/L	0.001	1	12/22/21 23:24	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 23:24	JTR	L591816
Calcium	350	mg/L	4.00	20	12/28/21 23:01	JTR	L591816
Chromium	0.001	mg/L	0.001	1	12/22/21 23:24	JTR	L591816
Iron	2.44	mg/L	0.100	1	12/22/21 23:24	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/22/21 23:24	JTR	L591816

**Qualifiers/** \*      Outside QC Limit  
**Definitions**      MQL      Method Quantitation Limit

DF      Dilution Factor

10485

ERM  
Mr. Shawn Wiggins  
840 West Sam Houston Parkway North  
Suite 600  
Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/16/2022  
Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60830**  
Sample ID : **MW-11**

Matrix: **Groundwater**  
Sampled: **12/15/2021 8:00**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L591287** 12/21/21 13:20    **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	155	mg/L	2.00	20	12/28/21 23:01	JTR	L591816
Manganese	2.01	mg/L	0.001	1	12/22/21 23:24	JTR	L591816
Potassium	5.34	mg/L	0.100	1	12/22/21 23:24	JTR	L591816
Sodium	476	mg/L	5.00	50	01/07/22 12:26	BKN	L591816
Strontium	1.79	mg/L	0.020	20	12/28/21 23:01	JTR	L591816
Zinc	<0.010	mg/L	0.010	1	12/22/21 23:24	JTR	L591816
Dissolved Arsenic	<0.0010	mg/L	0.0010	1	12/22/21 21:00	JTR	L591815
Dissolved Barium	0.156	mg/L	0.001	1	12/22/21 21:00	JTR	L591815
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 21:00	JTR	L591815
Dissolved Chromium	<0.001	mg/L	0.001	1	12/22/21 21:00	JTR	L591815
Dissolved Iron	1.52	mg/L	0.100	1	12/22/21 21:00	JTR	L591815
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/22/21 21:00	JTR	L591815
Dissolved Manganese	1.97	mg/L	0.001	1	12/22/21 21:00	JTR	L591815
Dissolved Strontium	1.78	mg/L	0.020	20	12/28/21 20:17	JTR	L591815
Dissolved Zinc	<0.010	mg/L	0.010	1	12/22/21 21:00	JTR	L591815

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592117** 12/29/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/29/21 14:11	JW2	L592337

**Qualifiers/** \*                      Outside QC Limit                      DF                      Dilution Factor  
**Definitions**                      MQL                      Method Quantitation Limit



10485

ERM  
Mr. Shawn Wiggins  
840 West Sam Houston Parkway North  
Suite 600  
Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022  
Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60830**

Matrix: **Groundwater**

Sample ID : **MW-11**

Sampled: **12/15/2021 8:00**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.130	mg/L	0.130	1	12/29/21 21:32	MMK	L592025
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	12/29/21 21:32	MMK	L592025
Aromatic >C21-C35	<0.152	mg/L	0.152	1	12/29/21 21:32	MMK	L592025
Surrogate: Chlorooctadecane	64.5		Limits: 40-140%	1	12/29/21 21:32	MMK	MAEPH LA
Surrogate: OTP Surrogate	40.1		Limits: 40-140%	1	12/29/21 21:32	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 12:07	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 12:07	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 12:07		G166627
Surrogate: Toluene-d8	83.8		Limits: 70-130%	1	12/28/21 12:07		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

10485

ERM

Mr. Shawn Wiggins

840 West Sam Houston Parkway North  
Suite 600

Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60831**

Sample ID : **MW-1**

Matrix: **Groundwater**

Sampled: **12/15/2021 13:45**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	530	mg/L	10	1	12/27/21 10:39	AJA	A71162
Carbonate	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162
Alkalinity (as CaCO3)	530	mg/L	10	1	12/27/21 10:39	AJA	A71162
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	1350	mg/L	20	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B

**Prep Method:** 3005A

**Prep Batch(es):** **L591287** 12/21/21 13:20 **L591291** 12/21/21 13:20

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/22/21 23:30	JTR	L591816
Barium	0.022	mg/L	0.001	1	12/22/21 23:30	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 23:30	JTR	L591816
Calcium	140	mg/L	2.00	10	12/28/21 23:06	JTR	L591816
Chromium	0.001	mg/L	0.001	1	12/22/21 23:30	JTR	L591816
Iron	0.888	mg/L	0.100	1	12/22/21 23:30	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/22/21 23:30	JTR	L591816

**Qualifiers/Definitions** \* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

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Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/16/2022  
 Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60831**  
 Sample ID : **MW-1**

Matrix: **Groundwater**  
 Sampled: **12/15/2021 13:45**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L591287** 12/21/21 13:20    **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	69.6	mg/L	1.00	10	12/28/21 23:06	JTR	L591816
Manganese	0.871	mg/L	0.001	1	12/22/21 23:30	JTR	L591816
Potassium	4.22	mg/L	0.100	1	12/22/21 23:30	JTR	L591816
Sodium	186	mg/L	1.00	10	12/28/21 23:06	JTR	L591816
Strontium	0.833	mg/L	0.010	10	12/28/21 23:06	JTR	L591816
Zinc	<0.010	mg/L	0.010	1	12/22/21 23:30	JTR	L591816
Dissolved Arsenic	<0.0200	mg/L	0.0200	20	12/28/21 20:21	JTR	L591815
Dissolved Barium	0.021	mg/L	0.001	1	12/22/21 21:06	JTR	L591815
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 21:06	JTR	L591815
Dissolved Chromium	<0.001	mg/L	0.001	1	12/22/21 21:06	JTR	L591815
Dissolved Iron	0.514	mg/L	0.100	1	12/22/21 21:06	JTR	L591815
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/22/21 21:06	JTR	L591815
Dissolved Manganese	0.920	mg/L	0.001	1	12/22/21 21:06	JTR	L591815
Dissolved Strontium	0.845	mg/L	0.020	20	12/28/21 20:21	JTR	L591815
Dissolved Zinc	<0.010	mg/L	0.010	1	12/22/21 21:06	JTR	L591815

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592117** 12/29/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/29/21 14:13	JW2	L592337

**Qualifiers/** \*            Outside QC Limit                      DF            Dilution Factor  
**Definitions**    MQL            Method Quantitation Limit

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Information : Project No: 0526033

Report Date : 01/16/2022  
Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60831**

Matrix: **Groundwater**

Sample ID : **MW-1**

Sampled: **12/15/2021 13:45**

**Analytical Method:** 8260B **Prep Batch(es):** **G166622** 12/28/21 09:00

**Prep Method:** 5030B

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/28/21 19:17	CCK	G166625
Toluene	<0.002	mg/L	0.002	1	12/28/21 19:17	CCK	G166625
Ethylbenzene	<0.001	mg/L	0.001	1	12/28/21 19:17	CCK	G166625
Xylene (Total)	<0.001	mg/L	0.001	1	12/28/21 19:17	KCC	G166625
o-Xylene	<0.001	mg/L	0.001	1	12/28/21 19:17	CCK	G166625
m,p-Xylene	<0.002	mg/L	0.002	1	12/28/21 19:17	CCK	G166625
Surrogate: Toluene-d8	86.0		Limits: 70-130%	1	12/28/21 19:17		8260B

**Analytical Method:** 9056 **Prep Batch(es):** **A71558** 12/21/21 15:30

**Prep Method:** SW-9056 (PREP)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	58.5	mg/L	1.60	1	12/21/21 17:05	MJM	A71559
Sulfate	493	mg/L	10.0	1	12/21/21 17:05	MJM	A71559

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	12/29/21 21:56	MMK	L592025
Aromatic >C10-C12	<0.130	mg/L	0.130	1	12/29/21 21:56	MMK	L592025
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	12/29/21 21:56	MMK	L592025
Aromatic >C12-C16	<0.130	mg/L	0.130	1	12/29/21 21:56	MMK	L592025

**Qualifiers/Definitions** \* Outside QC Limit DF Dilution Factor  
 \* MQL Method Quantitation Limit

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Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60831**

Sample ID : **MW-1**

Matrix: **Groundwater**

Sampled: **12/15/2021 13:45**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.130	mg/L	0.130	1	12/29/21 21:56	MMK	L592025
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	12/29/21 21:56	MMK	L592025
Aromatic >C21-C35	<0.152	mg/L	0.152	1	12/29/21 21:56	MMK	L592025
Surrogate: Chlorooctadecane	62.7		Limits: 40-140%	1	12/29/21 21:56	MMK	MAEPH LA
Surrogate: OTP Surrogate	79.7		Limits: 40-140%	1	12/29/21 21:56	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 19:17	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 19:17	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 19:17		G166627
Surrogate: Toluene-d8	86.0		Limits: 70-130%	1	12/28/21 19:17		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
DF Dilution Factor  
MQL Method Quantitation Limit



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Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60832**

Sample ID : **MW-8**

Matrix: **Groundwater**

Sampled: **12/15/2021 16:30**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	400	mg/L	10	1	12/27/21 10:39	AJA	A71162
Carbonate	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162
Alkalinity (as CaCO3)	400	mg/L	10	1	12/27/21 10:39	AJA	A71162
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	1580	mg/L	20	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B      **Prep Batch(es):** **L591287** 12/21/21 13:20      **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/22/21 23:37	JTR	L591816
Barium	0.040	mg/L	0.001	1	12/22/21 23:37	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 23:37	JTR	L591816
Calcium	151	mg/L	2.00	10	12/28/21 23:10	JTR	L591816
Chromium	0.001	mg/L	0.001	1	12/22/21 23:37	JTR	L591816
Iron	0.715	mg/L	0.100	1	12/22/21 23:37	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/22/21 23:37	JTR	L591816

**Qualifiers/** \* Outside QC Limit  
**Definitions** MQL Method Quantitation Limit

DF Dilution Factor

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Report Date : 01/16/2022

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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60832**

Sample ID : **MW-8**

Matrix: **Groundwater**

Sampled: **12/15/2021 16:30**

**Analytical Method:** 6020B **Prep Batch(es):** **L591287** 12/21/21 13:20 **L591291** 12/21/21 13:20

**Prep Method:** 3005A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	72.7	mg/L	1.00	10	12/28/21 23:10	JTR	L591816
Manganese	1.54	mg/L	0.001	1	12/22/21 23:37	JTR	L591816
Potassium	4.36	mg/L	0.100	1	12/22/21 23:37	JTR	L591816
Sodium	211	mg/L	2.00	20	01/07/22 12:30	BKN	L591816
Strontium	0.867	mg/L	0.010	10	12/28/21 23:10	JTR	L591816
Zinc	<0.010	mg/L	0.010	1	12/22/21 23:37	JTR	L591816
Dissolved Arsenic	<0.0010	mg/L	0.0010	1	12/22/21 21:12	JTR	L591815
Dissolved Barium	0.034	mg/L	0.001	1	12/22/21 21:12	JTR	L591815
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 21:12	JTR	L591815
Dissolved Chromium	<0.001	mg/L	0.001	1	12/22/21 21:12	JTR	L591815
Dissolved Iron	0.206	mg/L	0.100	1	12/22/21 21:12	JTR	L591815
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/22/21 21:12	JTR	L591815
Dissolved Manganese	1.53	mg/L	0.001	1	12/22/21 21:12	JTR	L591815
Dissolved Strontium	0.855	mg/L	0.020	20	12/28/21 20:25	JTR	L591815
Dissolved Zinc	<0.010	mg/L	0.010	1	12/22/21 21:12	JTR	L591815

**Analytical Method:** 7470A **Prep Batch(es):** **L592117** 12/29/21 08:30

**Prep Method:** 7470A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/29/21 14:15	JW2	L592337

**Qualifiers/** \* Outside QC Limit  
**Definitions** MQ Method Quantitation Limit

DF Dilution Factor

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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60832**

Matrix: **Groundwater**

Sample ID : **MW-8**

Sampled: **12/15/2021 16:30**

**Analytical Method:** 8260B      **Prep Batch(es):** **G166623** 12/28/21 09:00  
**Prep Method:** 5030B

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/28/21 20:03	CCK	G166626
Toluene	<0.002	mg/L	0.002	1	12/28/21 20:03	CCK	G166626
Ethylbenzene	<0.001	mg/L	0.001	1	12/28/21 20:03	CCK	G166626
Xylene (Total)	<0.001	mg/L	0.001	1	12/28/21 20:03	KCC	G166626
o-Xylene	<0.001	mg/L	0.001	1	12/28/21 20:03	CCK	G166626
m,p-Xylene	<0.002	mg/L	0.002	1	12/28/21 20:03	CCK	G166626
Surrogate: Toluene-d8	83.6		Limits: 70-130%	1	12/28/21 20:03		8260B

**Analytical Method:** 9056      **Prep Batch(es):** **A71558** 12/21/21 15:30  
**Prep Method:** SW-9056 (PREP)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	237	mg/L	1.60	1	12/21/21 17:18	MJM	A71559
Sulfate	501	mg/L	10.0	1	12/21/21 17:18	MJM	A71559

**Analytical Method:** MAEPH LA      **Prep Batch(es):** **L591640** 12/23/21 10:30  
**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.136	mg/L	0.136	1	12/29/21 22:21	MMK	L592025
Aromatic >C10-C12	<0.136	mg/L	0.136	1	12/29/21 22:21	MMK	L592025
Aliphatic >C12-C16	<0.136	mg/L	0.136	1	12/29/21 22:21	MMK	L592025
Aromatic >C12-C16	<0.136	mg/L	0.136	1	12/29/21 22:21	MMK	L592025

**Qualifiers/** \* Outside QC Limit      DF Dilution Factor  
**Definitions**      MQ Method Quantitation Limit

10485

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Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022

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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60832**

Sample ID : **MW-8**

Matrix: **Groundwater**

Sampled: **12/15/2021 16:30**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.136	mg/L	0.136	1	12/29/21 22:21	MMK	L592025
Aliphatic >C16-C35	<0.227	mg/L	0.227	1	12/29/21 22:21	MMK	L592025
Aromatic >C21-C35	<0.159	mg/L	0.159	1	12/29/21 22:21	MMK	L592025
Surrogate: Chlorooctadecane	73.1		Limits: 40-140%	1	12/29/21 22:21	MMK	MAEPH LA
Surrogate: OTP Surrogate	56.4		Limits: 40-140%	1	12/29/21 22:21	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 20:03	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 20:03	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 20:03		G166627
Surrogate: Toluene-d8	83.6		Limits: 70-130%	1	12/28/21 20:03		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

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Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60833**

Matrix: **Groundwater**

Sample ID : **MW-7**

Sampled: **12/16/2021 7:50**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	390	mg/L	10	1	12/27/21 10:39	AJA	A71162
Carbonate	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162
Alkalinity (as CaCO3)	390	mg/L	10	1	12/27/21 10:39	AJA	A71162
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	6990	mg/L	100	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B      **Prep Batch(es):** **L591287** 12/21/21 13:20      **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	0.0017	mg/L	0.0010	1	12/22/21 23:51	JTR	L591816
Barium	0.050	mg/L	0.001	1	12/22/21 23:51	JTR	L591816
Cadmium	0.0010	mg/L	0.0010	1	12/22/21 23:51	JTR	L591816
Calcium	679	mg/L	10.0	50	12/28/21 23:14	JTR	L591816
Chromium	<0.001	mg/L	0.001	1	12/22/21 23:51	JTR	L591816
Iron	<0.100	mg/L	0.100	1	12/22/21 23:51	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/22/21 23:51	JTR	L591816

**Qualifiers/** \*      Outside QC Limit  
**Definitions**      MQL      Method Quantitation Limit

DF      Dilution Factor





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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60833**

Matrix: **Groundwater**

Sample ID : **MW-7**

Sampled: **12/16/2021 7:50**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	MLL	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.136	mg/L	0.136	1	12/29/21 22:45	MMK	L592025
Aliphatic >C16-C35	<0.227	mg/L	0.227	1	12/29/21 22:45	MMK	L592025
Aromatic >C21-C35	<0.159	mg/L	0.159	1	12/29/21 22:45	MMK	L592025
Surrogate: Chlorooctadecane	67.8		Limits: 40-140%	1	12/29/21 22:45	MMK	MAEPH LA
Surrogate: OTP Surrogate	78.0		Limits: 40-140%	1	12/29/21 22:45	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	MLL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 12:52	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 12:52	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 12:52		G166627
Surrogate: Toluene-d8	85.2		Limits: 70-130%	1	12/28/21 12:52		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MLL Method Quantitation Limit

DF Dilution Factor



10485

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Information : Project No: 0526033

Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60834**

Sample ID : **MW-9**

Matrix: **Groundwater**

Sampled: **12/16/2021 8:20**

**Analytical Method:** 2320B-2011

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	420	mg/L	10	1	12/27/21 10:39	AJA	A71162
Carbonate	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162
Alkalinity (as CaCO3)	420	mg/L	10	1	12/27/21 10:39	AJA	A71162
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162

**Analytical Method:** 2540C-2011

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	1710	mg/L	20	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B

**Prep Method:** 3005A

**Prep Batch(es):** **L591287** 12/21/21 13:20 **L591291** 12/21/21 13:20

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	0.0013	mg/L	0.0010	1	12/22/21 23:57	JTR	L591816
Barium	0.029	mg/L	0.001	1	12/22/21 23:57	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 23:57	JTR	L591816
Calcium	131	mg/L	2.00	10	12/28/21 23:18	JTR	L591816
Chromium	<0.001	mg/L	0.001	1	12/22/21 23:57	JTR	L591816
Iron	0.165	mg/L	0.100	1	12/22/21 23:57	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/22/21 23:57	JTR	L591816

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor





10485

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Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60834**

Matrix: **Groundwater**

Sample ID : **MW-9**

Sampled: **12/16/2021 8:20**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.130	mg/L	0.130	1	12/29/21 23:10	MMK	L592025
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	12/29/21 23:10	MMK	L592025
Aromatic >C21-C35	<0.152	mg/L	0.152	1	12/29/21 23:10	MMK	L592025
Surrogate: Chlorooctadecane	62.7		Limits: 40-140%	1	12/29/21 23:10	MMK	MAEPH LA
Surrogate: OTP Surrogate	67.3		Limits: 40-140%	1	12/29/21 23:10	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 13:15	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 13:15	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 13:15		G166627
Surrogate: Toluene-d8	83.2		Limits: 70-130%	1	12/28/21 13:15		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
DF Dilution Factor  
MQL Method Quantitation Limit

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Report Date : 01/16/2022  
Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60835**  
Sample ID : **MW-9D**

Matrix: **Groundwater**  
Sampled: **12/16/2021 8:40**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	440	mg/L	10	1	12/27/21 10:39	AJA	A71162
Carbonate	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162
Alkalinity (as CaCO3)	440	mg/L	10	1	12/27/21 10:39	AJA	A71162
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 10:39	AJA	A71162

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	1860	mg/L	20	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B      **Prep Batch(es):** **L591287** 12/21/21 13:20      **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	0.0040	mg/L	0.0010	1	12/23/21 00:04	JTR	L591816
Barium	0.140	mg/L	0.001	1	12/23/21 00:04	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/23/21 00:04	JTR	L591816
Calcium	159	mg/L	2.00	10	12/28/21 23:32	JTR	L591816
Chromium	0.025	mg/L	0.001	1	12/23/21 00:04	JTR	L591816
Iron	11.4	mg/L	0.100	1	12/23/21 00:04	JTR	L591816
Lead	0.0062	mg/L	0.0010	1	12/23/21 00:04	JTR	L591816

**Qualifiers/Definitions**      \*      Outside QC Limit      DF      Dilution Factor  
    MQL      Method Quantitation Limit

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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60835**  
 Sample ID : **MW-9D**

Matrix: **Groundwater**  
 Sampled: **12/16/2021 8:40**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L591287** 12/21/21 13:20    **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	85.9	mg/L	1.00	10	12/28/21 23:32	JTR	L591816
Manganese	1.84	mg/L	0.001	1	12/23/21 00:04	JTR	L591816
Potassium	6.35	mg/L	0.100	1	12/23/21 00:04	JTR	L591816
Sodium	268	mg/L	2.00	20	01/07/22 12:38	BKN	L591816
Strontium	0.980	mg/L	0.010	10	12/28/21 23:32	JTR	L591816
Zinc	0.040	mg/L	0.010	1	12/23/21 00:04	JTR	L591816
Dissolved Arsenic	0.0015	mg/L	0.0010	1	12/28/21 20:54	JTR	L591815
Dissolved Barium	0.041	mg/L	0.001	1	12/22/21 21:38	JTR	L591815
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/22/21 21:38	JTR	L591815
Dissolved Chromium	<0.001	mg/L	0.001	1	12/22/21 21:38	JTR	L591815
Dissolved Iron	0.235	mg/L	0.100	1	12/22/21 21:38	JTR	L591815
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/22/21 21:38	JTR	L591815
Dissolved Manganese	1.74	mg/L	0.001	1	12/22/21 21:38	JTR	L591815
Dissolved Strontium	0.952	mg/L	0.010	10	12/28/21 21:00	JTR	L591815
Dissolved Zinc	<0.010	mg/L	0.010	1	12/22/21 21:38	JTR	L591815

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592117** 12/29/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/29/21 14:21	JW2	L592337

**Qualifiers/Definitions**    \*    Outside QC Limit                      DF    Dilution Factor  
 MQ    Method Quantitation Limit



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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60835**  
 Sample ID : **MW-9D**

Matrix: **Groundwater**  
 Sampled: **12/16/2021 8:40**

**Analytical Method:** MAEPH LA      **Prep Batch(es):** **L591640** 12/23/21 10:30  
**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.143	mg/L	0.143	1	12/29/21 23:34	MMK	L592025
Aliphatic >C16-C35	<0.238	mg/L	0.238	1	12/29/21 23:34	MMK	L592025
Aromatic >C21-C35	<0.167	mg/L	0.167	1	12/29/21 23:34	MMK	L592025
Surrogate: Chlorooctadecane	64.7		Limits: 40-140%	1	12/29/21 23:34	MMK	MAEPH LA
Surrogate: OTP Surrogate	45.0		Limits: 40-140%	1	12/29/21 23:34	MMK	MAEPH LA

**Analytical Method:** MAVPH LA      **Prep Batch(es):** **G166624** 12/28/21 09:00  
**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 13:38	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 13:38	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 13:38		G166627
Surrogate: Toluene-d8	82.8		Limits: 70-130%	1	12/28/21 13:38		MAVPH LA

**Qualifiers/Definitions**      \*      Outside QC Limit      DF      Dilution Factor  
 MQ      Method Quantitation Limit



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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60836**  
Sample ID : **SW-BO 13'**

Matrix: **Groundwater**  
Sampled: **12/16/2021 11:35**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	70	mg/L	10	1	12/27/21 11:17	AJA	A71163
Carbonate	<10	mg/L	10	1	12/27/21 11:17	AJA	A71163
Alkalinity (as CaCO3)	70	mg/L	10	1	12/27/21 11:17	AJA	A71163
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 11:17	AJA	A71163

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	142	mg/L	10	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B                      **Prep Batch(es):** **L591287** 12/21/21 13:20      **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/23/21 00:10	JTR	L591816
Barium	0.952	mg/L	0.001	1	12/23/21 00:10	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/23/21 00:10	JTR	L591816
Calcium	13.5	mg/L	0.200	1	12/23/21 00:10	JTR	L591816
Chromium	<0.001	mg/L	0.001	1	12/23/21 00:10	JTR	L591816
Iron	7.85	mg/L	0.100	1	12/23/21 00:10	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/23/21 00:10	JTR	L591816

**Qualifiers/** \*      Outside QC Limit                      DF      Dilution Factor  
**Definitions**      MQL      Method Quantitation Limit





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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60836**

Matrix: **Groundwater**

Sample ID : **SW-BO 13'**

Sampled: **12/16/2021 11:35**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.143	mg/L	0.143	1	12/29/21 23:59	MMK	L592025
Aliphatic >C16-C35	<0.238	mg/L	0.238	1	12/29/21 23:59	MMK	L592025
Aromatic >C21-C35	<0.167	mg/L	0.167	1	12/29/21 23:59	MMK	L592025
Surrogate: Chlorooctadecane	55.9		Limits: 40-140%	1	12/29/21 23:59	MMK	MAEPH LA
Surrogate: OTP Surrogate	<b>33.2 *</b>		Limits: 40-140%	1	12/29/21 23:59	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 14:00	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 14:00	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 14:00		G166627
Surrogate: Toluene-d8	82.4		Limits: 70-130%	1	12/28/21 14:00		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
ML Method Quantitation Limit

DF Dilution Factor

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Information : Project No: 0526033

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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60837**

Sample ID : **SW-BO 2'**

Matrix: **Groundwater**

Sampled: **12/16/2021 12:30**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	80	mg/L	10	1	12/27/21 11:17	AJA	A71163
Carbonate	<10	mg/L	10	1	12/27/21 11:17	AJA	A71163
Alkalinity (as CaCO3)	80	mg/L	10	1	12/27/21 11:17	AJA	A71163
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 11:17	AJA	A71163

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	145	mg/L	10	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B

**Prep Method:** 3005A

**Prep Batch(es):** **L591287** 12/21/21 13:20 **L591291** 12/21/21 13:20

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/23/21 00:15	JTR	L591816
Barium	0.860	mg/L	0.001	1	12/23/21 00:15	JTR	L591816
Cadmium	<0.0010	mg/L	0.0010	1	12/23/21 00:15	JTR	L591816
Calcium	13.4	mg/L	0.200	1	12/23/21 00:15	JTR	L591816
Chromium	<0.001	mg/L	0.001	1	12/23/21 00:15	JTR	L591816
Iron	0.565	mg/L	0.100	1	12/23/21 00:15	JTR	L591816
Lead	<0.0010	mg/L	0.0010	1	12/23/21 00:15	JTR	L591816

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor





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**REPORT OF ANALYSIS**

Lab No : **60837**

Matrix: **Groundwater**

Sample ID : **SW-BO 2'**

Sampled: **12/16/2021 12:30**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	MLL	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.136	mg/L	0.136	1	12/30/21 00:24	MMK	L592025
Aliphatic >C16-C35	<0.227	mg/L	0.227	1	12/30/21 00:24	MMK	L592025
Aromatic >C21-C35	<0.159	mg/L	0.159	1	12/30/21 00:24	MMK	L592025
Surrogate: Chlorooctadecane	63.0		Limits: 40-140%	1	12/30/21 00:24	MMK	MAEPH LA
Surrogate: OTP Surrogate	40.0		Limits: 40-140%	1	12/30/21 00:24	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	MLL	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 14:23	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 14:23	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 14:23		G166627
Surrogate: Toluene-d8	84.0		Limits: 70-130%	1	12/28/21 14:23		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MLL Method Quantitation Limit

DF Dilution Factor



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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60838**

Matrix: **Groundwater**

Sample ID : **MW-6**

Sampled: **12/17/2021 8:30**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	320	mg/L	10	1	12/27/21 11:17	AJA	A71163
Carbonate	<10	mg/L	10	1	12/27/21 11:17	AJA	A71163
Alkalinity (as CaCO3)	320	mg/L	10	1	12/27/21 11:17	AJA	A71163
Hydroxide Alkalinity (as CaCO3)	<10	mg/L	10	1	12/27/21 11:17	AJA	A71163

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	5830	mg/L	100	1	12/21/21 14:50	MJM	A71083

**Analytical Method:** 6020B      **Prep Batch(es):** **L591287** 12/21/21 13:20      **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	0.0042	mg/L	0.0010	1	12/23/21 00:20	JTR	L591816
Barium	0.121	mg/L	0.001	1	12/23/21 00:20	JTR	L591816
Cadmium	0.0016	mg/L	0.0010	1	12/23/21 00:20	JTR	L591816
Calcium	520	mg/L	10.0	50	01/07/22 12:51	BKN	L591816
Chromium	0.006	mg/L	0.001	1	12/23/21 00:20	JTR	L591816
Iron	4.60	mg/L	0.100	1	12/23/21 00:20	JTR	L591816
Lead	0.0036	mg/L	0.0010	1	12/23/21 00:20	JTR	L591816

**Qualifiers/** \*      Outside QC Limit  
**Definitions**      MQL      Method Quantitation Limit

DF      Dilution Factor

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Project Project: Henning Management, Hayes, LA  
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Report Date : 01/16/2022  
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Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60838**  
 Sample ID : **MW-6**

Matrix: **Groundwater**  
 Sampled: **12/17/2021 8:30**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L591287** 12/21/21 13:20    **L591291** 12/21/21 13:20  
**Prep Method:** 3005A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	186	mg/L	2.00	20	12/28/21 23:36	JTR	L591816
Manganese	4.27	mg/L	0.020	20	12/28/21 23:36	JTR	L591816
Potassium	9.89	mg/L	0.100	1	12/23/21 00:20	JTR	L591816
Sodium	517	mg/L	5.00	50	01/07/22 12:51	BKN	L591816
Strontium	2.88	mg/L	0.020	20	12/28/21 23:36	JTR	L591816
Zinc	0.022	mg/L	0.010	1	12/23/21 00:20	JTR	L591816
Dissolved Arsenic	0.0012	mg/L	0.0010	1	12/28/21 21:04	JTR	L591815
Dissolved Barium	0.062	mg/L	0.001	1	12/22/21 21:54	JTR	L591815
Dissolved Cadmium	0.0015	mg/L	0.0010	1	12/22/21 21:54	JTR	L591815
Dissolved Chromium	<0.001	mg/L	0.001	1	12/22/21 21:54	JTR	L591815
Dissolved Iron	0.182	mg/L	0.100	1	12/22/21 21:54	JTR	L591815
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/22/21 21:54	JTR	L591815
Dissolved Manganese	4.48	mg/L	0.020	20	12/28/21 21:10	JTR	L591815
Dissolved Strontium	2.77	mg/L	0.020	20	12/28/21 21:10	JTR	L591815
Dissolved Zinc	<0.010	mg/L	0.010	1	12/22/21 21:54	JTR	L591815

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592117** 12/29/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/29/21 14:27	JW2	L592337

**Qualifiers/** \*      Outside QC Limit                      DF      Dilution Factor  
**Definitions**      MQL      Method Quantitation Limit



10485  
 ERM  
 Mr. Shawn Wiggins  
 840 West Sam Houston Parkway North  
 Suite 600  
 Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/16/2022  
 Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60838**  
 Sample ID : **MW-6**

Matrix: **Groundwater**  
 Sampled: **12/17/2021 8:30**

**Analytical Method:** 8260B      **Prep Batch(es):** G166622 12/28/21 09:00  
**Prep Method:** 5030B

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/28/21 14:45	CCK	G166625
Toluene	<0.002	mg/L	0.002	1	12/28/21 14:45	CCK	G166625
Ethylbenzene	<0.001	mg/L	0.001	1	12/28/21 14:45	CCK	G166625
Xylene (Total)	<0.001	mg/L	0.001	1	12/28/21 14:45	KCC	G166625
o-Xylene	<0.001	mg/L	0.001	1	12/28/21 14:45	CCK	G166625
m,p-Xylene	<0.002	mg/L	0.002	1	12/28/21 14:45	CCK	G166625
Surrogate: Toluene-d8	85.0		Limits: 70-130%	1	12/28/21 14:45		8260B

**Analytical Method:** 9056      **Prep Batch(es):** A71558 12/21/21 15:30  
**Prep Method:** SW-9056 (PREP)

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	1940	mg/L	8.00	1	12/21/21 19:09	MJM	A71559
Sulfate	595	mg/L	50.0	1	12/21/21 19:09	MJM	A71559

**Analytical Method:** MAEPH LA      **Prep Batch(es):** L591640 12/23/21 10:30  
**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	12/30/21 00:48	MMK	L592025
Aromatic >C10-C12	<0.130	mg/L	0.130	1	12/30/21 00:48	MMK	L592025
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	12/30/21 00:48	MMK	L592025
Aromatic >C12-C16	<0.130	mg/L	0.130	1	12/30/21 00:48	MMK	L592025

**Qualifiers/Definitions** \* Outside QC Limit      DF Dilution Factor  
 \* MQL Method Quantitation Limit

10485

ERM

Mr. Shawn Wiggins

840 West Sam Houston Parkway North  
Suite 600

Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/16/2022

Received : 12/17/2021

Report Number : **21-352-0003**

**REPORT OF ANALYSIS**

Lab No : **60838**

Sample ID : **MW-6**

Matrix: **Groundwater**

Sampled: **12/17/2021 8:30**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L591640** 12/23/21 10:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C16-C21	<0.130	mg/L	0.130	1	12/30/21 00:48	MMK	L592025
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	12/30/21 00:48	MMK	L592025
Aromatic >C21-C35	<0.152	mg/L	0.152	1	12/30/21 00:48	MMK	L592025
Surrogate: Chlorooctadecane	62.2		Limits: 40-140%	1	12/30/21 00:48	MMK	MAEPH LA
Surrogate: OTP Surrogate	59.0		Limits: 40-140%	1	12/30/21 00:48	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **G166624** 12/28/21 09:00

**Prep Method:** MAVPH LA (GC/MS) (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.005	mg/L	0.005	1	12/28/21 14:45	CCK	G166627
Aliphatic >C8-C10	<0.013	mg/L	0.013	1	12/28/21 14:45	CCK	G166627
Aromatic >C8-C10	<0.005	mg/L	0.005	1	12/28/21 14:45		G166627
Surrogate: Toluene-d8	85.0		Limits: 70-130%	1	12/28/21 14:45		MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Analytical Batch:** A71162  
**Analysis Method:** 2320B-2011  
**Analysis Description:** Alkalinity

**Lab Reagent Blank** LRB Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835

Parameter	Units	Blank Result	MQL	Analyzed
Alkalinity (as CaCO3)	mg/L	< 10	10	12/27/21 10:39

**Duplicate** A 60776-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Alkalinity (as CaCO3)	mg/L	< 10	< 10	0.0	10	12/27/21 10:39

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Analytical Batch:** A71163  
**Analysis Method:** 2320B-2011  
**Analysis Description:** Alkalinity

**Lab Reagent Blank** LRB Matrix: AQU  
Associated Lab Samples: 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed
Alkalinity (as CaCO3)	mg/L	< 10	10	12/27/21 11:17

**Duplicate** A 60836-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Alkalinity (as CaCO3)	mg/L	70	70	0.0	10	12/27/21 11:17

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Analytical Batch:** A71083  
**Analysis Method:** 2540C-2011  
**Analysis Description:** Total Dissolved Solids (TDS)

**Lab Reagent Blank** LRB Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed
Total Dissolved Solids	mg/L	< 10	10	12/21/21 14:50

**Duplicate** A 60830-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Total Dissolved Solids	mg/L	4420	4670	5.5	10	12/21/21 14:50

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** L591287      **QC Analytical Batch(es):** L591815,L592159  
**QC Prep Batch Method:** 3005A      **Analysis Method:** 6020B  
**Analysis Description:** Metals Analyses

**Lab Reagent Blank** LRB-L591287      Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed
Dissolved Arsenic	mg/L	<0.0010	0.0010	12/22/21 20:41
Dissolved Barium	mg/L	<0.001	0.001	12/22/21 20:41
Dissolved Cadmium	mg/L	<0.0010	0.0010	12/22/21 20:41
Dissolved Chromium	mg/L	<0.001	0.001	12/22/21 20:41
Dissolved Iron	mg/L	<0.100	0.100	12/22/21 20:41
Dissolved Lead	mg/L	<0.0010	0.0010	12/22/21 20:41
Dissolved Manganese	mg/L	<0.001	0.001	12/22/21 20:41
Dissolved Strontium	mg/L	<0.001	0.001	12/22/21 20:41
Dissolved Zinc	mg/L	<0.010	0.010	12/22/21 20:41

**Laboratory Control Sample** LCS-L591287

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Dissolved Arsenic	mg/L	0.0500	0.0525	105	80-120
Dissolved Barium	mg/L	0.100	0.099	100	80-120
Dissolved Cadmium	mg/L	0.0100	0.0093	94.0	80-120
Dissolved Chromium	mg/L	0.100	0.090	90.0	80-120
Dissolved Iron	mg/L	10.0	9.71	97.0	80-120
Dissolved Lead	mg/L	0.0500	0.0484	97.0	80-120
Dissolved Manganese	mg/L	0.100	0.091	91.0	80-120
Dissolved Strontium	mg/L	0.100	0.094	94.0	80-120
Dissolved Zinc	mg/L	0.500	0.471	94.0	80-120



### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** L591291      **QC Analytical Batch(es):** L591816,L592670,L592762,L593295  
**QC Prep Batch Method:** 3005A      **Analysis Method:** 6020B  
**Analysis Description:** Metals Analyses

**Lab Reagent Blank**      LRB-L591291      Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed
Arsenic	mg/L	<0.0010	0.0010	12/22/21 23:09
Barium	mg/L	<0.001	0.001	12/22/21 23:09
Calcium	mg/L	<0.200	0.200	12/22/21 23:09
Cadmium	mg/L	<0.0010	0.0010	12/22/21 23:09
Chromium	mg/L	<0.001	0.001	12/22/21 23:09
Iron	mg/L	<0.100	0.100	12/22/21 23:09
Lead	mg/L	<0.0010	0.0010	12/22/21 23:09
Magnesium	mg/L	<0.100	0.100	12/22/21 23:09
Manganese	mg/L	<0.001	0.001	12/22/21 23:09
Potassium	mg/L	<0.100	0.100	12/22/21 23:09
Sodium	mg/L	<0.100	0.100	12/22/21 23:09
Strontium	mg/L	<0.001	0.001	12/22/21 23:09
Zinc	mg/L	<0.010	0.010	12/22/21 23:09

**Laboratory Control Sample**      LCS-L591291

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Arsenic	mg/L	0.0500	0.0464	93.0	80-120
Barium	mg/L	0.100	0.103	103	80-120
Calcium	mg/L	10.0	10.1	101	80-120
Cadmium	mg/L	0.0100	0.0094	94.0	80-120
Chromium	mg/L	0.100	0.086	87.0	80-120
Iron	mg/L	10.0	9.62	96.0	80-120
Lead	mg/L	0.0500	0.0487	97.0	80-120
Magnesium	mg/L	10.0	9.55	96.0	80-120
Manganese	mg/L	0.100	0.092	93.0	80-120
Potassium	mg/L	10.0	9.63	96.0	80-120

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** L591291 **QC Analytical Batch(es):** L591816,L592670,L592762,L593295  
**QC Prep Batch Method:** 3005A **Analysis Method:** 6020B  
**Analysis Description:** Metals Analyses

**Laboratory Control Sample** LCS-L591291

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Sodium	mg/L	10.0	9.08	91.0	80-120
Strontium	mg/L	0.100	0.091	91.0	80-120
Zinc	mg/L	0.500	0.448	90.0	80-120

**Matrix Spike & Matrix Spike Duplicate** A 60785-MS-L591291 A 60785-MSD-L591291

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Arsenic	mg/L	0.0048	0.0500	0.0500	0.0525	0.0505	95.0	91.0	75-125	3.8	20
Barium	mg/L	0.546	0.100	0.100	0.656	0.646	110	100	75-125	1.5	20
Calcium	mg/L	118	10.0	10.0	126	126	80.0	80.0	75-125	0.0	20
Cadmium	mg/L	<0.0010	0.0100	0.0100	0.0095	0.0094	96.0	95.0	75-125	1.2	20
Chromium	mg/L	<0.001	0.100	0.100	0.090	0.089	90.0	90.0	75-125	0.7	20
Iron	mg/L	3.05	10.0	10.0	12.7	12.6	97.0	96.0	75-125	0.7	20
Lead	mg/L	<0.0010	0.0500	0.0500	0.0503	0.0488	101	98.0	75-125	3.0	20
Magnesium	mg/L	46.5	10.0	10.0	56.1	54.7	96.0	82.0	75-125	2.5	20
Manganese	mg/L	0.360	0.100	0.100	0.438	0.458	78.0	98.0	75-125	4.4	20
Potassium	mg/L	2.60	10.0	10.0	12.7	12.8	101	102	75-125	0.7	20
Sodium	mg/L	89.3	10.0	10.0	96.6	95.3	73.0*	60.0*	75-125	1.3	20
Strontium	mg/L	0.899	0.100	0.100	1.01	1.07	111	171*	75-125	5.7	20
Zinc	mg/L	<0.010	0.500	0.500	0.433	0.431	87.0	86.0	75-125	0.4	20

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** L592117      **QC Analytical Batch(es):** L592337  
**QC Prep Batch Method:** 7470A      **Analysis Method:** 7470A  
**Analysis Description:** Total Aqueous Mercury Analysis - CVAA

**Lab Reagent Blank**      LRB-L592117      Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed
Mercury	mg/L	<0.0002	0.0002	12/29/21 13:59

**Laboratory Control Sample**      LCS-L592117

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Mercury	mg/L	0.0040	0.0038	96.0	80-120

**Matrix Spike & Matrix Spike Duplicate**      L 96252-MS-L592117      L 96252-MSD-L592117

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Mercury	mg/L	<0.0002	0.0040	0.0040	0.0034	0.0035	86.0	90.0	80-120	4.2	20

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** G166622      **QC Analytical Batch(es):** G166625  
**QC Prep Batch Method:** 5030B      **Analysis Method:** 8260B  
**Analysis Description:** Volatile Organic Compounds - GC/MS

**Lab Reagent Blank**      LRB-G166622      Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MLQ	Analyzed	% Recovery	% Rec Limits
Benzene	mg/L	<0.001	0.001	12/28/21 11:22		
Ethylbenzene	mg/L	<0.001	0.001	12/28/21 11:22		
Toluene	mg/L	<0.002	0.002	12/28/21 11:22		
o-Xylene	mg/L	<0.001	0.001	12/28/21 11:22		
m,p-Xylene	mg/L	<0.002	0.002	12/28/21 11:22		
Toluene-d8 (S)				12/28/21 11:22	84.0	70-130

**Laboratory Control Sample**      LCS-G166622

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Benzene	mg/L	0.100	0.108	108	80-120
Ethylbenzene	mg/L	0.100	0.101	101	80-120
Toluene	mg/L	0.100	0.105	105	80-120
o-Xylene	mg/L	0.100	0.101	101	70-130
m,p-Xylene	mg/L	0.200	0.209	105	75-125
Toluene-d8 (S)				87.2	70-130

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** G166623      **QC Analytical Batch(es):** G166626  
**QC Prep Batch Method:** 5030B      **Analysis Method:** 8260B  
**Analysis Description:** Volatile Organic Compounds - GC/MS

**Lab Reagent Blank**      LRB-G166623      Matrix: AQU  
Associated Lab Samples: 60832

Parameter	Units	Blank Result	MLQ	Analyzed	% Recovery	% Rec Limits
Benzene	mg/L	<0.001	0.001	12/28/21 11:22		
Ethylbenzene	mg/L	<0.001	0.001	12/28/21 11:22		
Toluene	mg/L	<0.002	0.002	12/28/21 11:22		
o-Xylene	mg/L	<0.001	0.001	12/28/21 11:22		
m,p-Xylene	mg/L	<0.002	0.002	12/28/21 11:22		
Toluene-d8 (S)				12/28/21 11:22	84.0	70-130

**Laboratory Control Sample**      LCS-G166623

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Benzene	mg/L	0.100	0.108	108	80-120
Ethylbenzene	mg/L	0.100	0.101	101	80-120
Toluene	mg/L	0.100	0.105	105	80-120
o-Xylene	mg/L	0.100	0.101	101	70-130
m,p-Xylene	mg/L	0.200	0.209	105	75-125
Toluene-d8 (S)				87.2	70-130

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** A71117      **QC Analytical Batch(es):** A71118  
**QC Prep Batch Method:** EPA-300.0 (PREP)      **Analysis Method:** EPA-300.0  
**Analysis Description:** Anions by Ion Chromatography

**Lab Reagent Blank**      LRB-A71117      Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed
Chloride	mg/L	< 0.400	0.400	12/21/21 16:04
Sulfate	mg/L	< 0.500	0.500	12/21/21 16:04

**Laboratory Control Sample**      LCS-A71117

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Chloride	mg/L	50.0	51.6	103	90-110
Sulfate	mg/L	62.5	63.5	102	90-110

**Matrix Spike & Matrix Spike Duplicate**      A 60830-MS-A71117      A 60830-MSD-A71117

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Chloride	mg/L	1570	2500	2500	4060	4050	99.6	99.2	80-120	0.2	20.0
Sulfate	mg/L	181	3130	3130	3270	3250	98.6	98.0	80-120	0.6	20.0

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** L591640 **QC Analytical Batch(es):** L592025  
**QC Prep Batch Method:** MAEPH LA (Aqueous) **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Lab Reagent Blank** LRB-L591640 Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C10-C12	mg/L	<0.120	0.120	12/29/21 17:30		
Aliphatic >C12-C16	mg/L	<0.120	0.120	12/29/21 17:30		
Aliphatic >C16-C35	mg/L	<0.200	0.200	12/29/21 17:30		
Aromatic >C10-C12	mg/L	<0.120	0.120	12/29/21 17:30		
Aromatic >C12-C16	mg/L	<0.120	0.120	12/29/21 17:30		
Aromatic >C16-C21	mg/L	<0.120	0.120	12/29/21 17:30		
Aromatic >C21-C35	mg/L	<0.140	0.140	12/29/21 17:30		
Chlorooctadecane (S)				12/29/21 17:30	69.0	40-140
OTP Surrogate (S)				12/29/21 17:30	52.5	40-140

**Laboratory Control Sample** LCS-L591640

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C12-C16	mg/L	0.400	0.403	101	40-140
Aliphatic >C16-C35	mg/L	1.20	0.991	82.5	40-140
Aromatic >C10-C12	mg/L	0.400	0.282	70.5	40-140
Aromatic >C12-C16	mg/L	0.800	0.637	79.6	40-140
Aromatic >C16-C21	mg/L	0.400	0.446	112	40-140
Chlorooctadecane (S)				92.0	40-140
OTP Surrogate (S)				82.5	40-140

**Matrix Spike & Matrix Spike Duplicate** G 68317-MS-L591640 G 68317-MSD-L591640

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aliphatic >C12-C16	mg/L	20.7	0.400	0.417	17.9	23.9	-700*	1030*	40-140	30.9*	25
Aliphatic >C12-C16	mg/L	19.6	0.400	0.417	17.5	23.9	-510*	1030*	40-140	30.9*	25

\* QC Fail

Date: 01/09/2022 10:32 AM

Page 11 of 13

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** L591640 **QC Analytical Batch(es):** L592025  
**QC Prep Batch Method:** MAEPH LA (Aqueous) **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Matrix Spike & Matrix Spike Duplicate** G 68317-MS-L591640 G 68317-MSD-L591640

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aliphatic >C16-C35	mg/L	23.9	1.20	1.25	21.7	26.9	-180*	240*	40-140	19.7	25
Aliphatic >C16-C35	mg/L	26.9	1.20	1.25	24.7	26.9	-180*	240*	40-140	19.7	25
Aromatic >C10-C12	mg/L	3.63	0.400	0.417	3.76	6.60	32.5*	712*	40-140	54.8*	25
Aromatic >C12-C16	mg/L	4.34	0.800	0.833	7.18	6.69	355*	282*	40-140	44.6*	25
Aromatic >C12-C16	mg/L	4.34	0.800	0.833	4.85	6.69	63.7	282*	40-140	44.6*	25
Aromatic >C16-C21	mg/L	0.662	0.400	0.417	0.760	1.04	24.5*	90.6	40-140	31.1*	25
Chlorooctadecane (S)							61.5	61.5	40-140		
Chlorooctadecane (S)							65.5	61.5	40-140		
OTP Surrogate (S)							53.5	55.2	40-140		
OTP Surrogate (S)							60.5	55.2	40-140		



### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-352-0003

**QC Prep:** G166624      **QC Analytical Batch(es):** G166627  
**QC Prep Batch Method:** MAVPH LA (GC/MS) (Aqueous)      **Analysis Method:** MAVPH LA  
**Analysis Description:** MADEP VPH Rev 1.1

**Lab Reagent Blank** LRB-G166624      Matrix: AQU  
Associated Lab Samples: 60830, 60831, 60832, 60833, 60834, 60835, 60836, 60837, 60838

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C6-C8	mg/L	<0.005	0.005	12/28/21 11:22		
Aliphatic >C8-C10	mg/L	<0.013	0.013	12/28/21 11:22		
Toluene-d8 (S)				12/28/21 11:22	84.0	70-130

**Laboratory Control Sample** LCS-G166624

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C6-C8	mg/L	0.500	0.551	110	70-130
Aliphatic >C8-C10	mg/L	1.30	1.37	105	70-130
Toluene-d8 (S)				87.2	70-130

**Shipment Receipt Form**

Customer Number: **01308**  
 Customer Name: **ERM**  
 Report Number: **21-352-0003**

**Shipping Method**

Fed Ex       US Postal       Lab       Other :   
 UPS       Client       Courier      Thermometer ID:

Shipping container/cooler uncompromised?       Yes       No

---

Number of coolers/boxes received     

---

Custody seals intact on shipping container/cooler?       Yes       No       Not Present

---

Custody seals intact on sample bottles?       Yes       No       Not Present

---

Chain of Custody (COC) present?       Yes       No

---

COC agrees with sample label(s)?       Yes       No

---

COC properly completed       Yes       No

---

Samples in proper containers?       Yes       No

---

Sample containers intact?       Yes       No

---

Sufficient sample volume for indicated test(s)?       Yes       No

---

All samples received within holding time?       Yes       No

---

Cooler temperature in compliance?       Yes       No

---

Cooler/Samples arrived at the laboratory on ice.  
 Samples were considered acceptable as cooling process had begun.       Yes       No

---

Water - Sample containers properly preserved       Yes       No       N/A

---

Water - VOA vials free of headspace       Yes       No       N/A

---

Trip Blanks received with VOAs       Yes       No       N/A

---

Soil VOA method 5035 – compliance criteria met       Yes       No       N/A

---

High concentration container (48 hr)       Low concentration EnCore samplers (48 hr)  
 High concentration pre-weighed (methanol -14 d)       Low conc pre-weighed vials (Sod Bis -14 d)

---

Special precautions or instructions included?       Yes       No

Comments:

Signature:

Date & Time:

21-352-0003  
01308  
12-18-2021  
12:28:56



ERM  
Protect: Hennina Management, Hayes, LA

Method of Si  
 Fed Ex  
 Courier  
 Client Drop Off  
 Other

RUSH - Additional charges apply  
 Special Detection Limit(s)  
 Date Results Needed

Method of Si  
 Fed Ex  
 Courier  
 Client Drop Off  
 Other

Billing Information

Client Project Manager/Contact

Client Name/Address

Shawn Wilgins

ERN / Houston, TX

Project/Site Location (City/State)

HAYES, LA

Project Description

Hennina Management

Project Manager Phone #

971-303-2385

Project Number

0526033

Project Manager Email

shawn.wilgins@erm.com

Site/Facility ID #



235 Highpoint Dr.  
 Ridgeland, MS 39157  
 (601) 957-2676

Required Analysis / Preservative

Method of Si  
 Fed Ex  
 Courier  
 Client Drop Off  
 Other

Site/Facility ID #

Cool < 10C NA2S2O3 (Micro Only)  
 Cool <= 6C  
 H2SO4 pH<2  
 None Required  
 NaOH pH>10  
 HNO3 pH<2  
 HCL pH<2  
 H3PO4 pH<2  
 Cool <= 6C NA2S2O3

Date	Time	Sample Identification	Number of Containers	Matrix (Refer to Key)	(g)rab or (c)omposite	Required Analysis / Preservative						Comments/Notes	
						TOTAL METALS	DISSOLVED METALS (FIELD FILTERED)	BTEX	TPH FRACTIONS (EPIA 821)	ALKALINITY	CHLORIDE		SULFATE
12/15	0800	MW-11	8	GW	9	X	X	X	X	X	X	X	60830
1	1345	MW-1				X	X	X	X	X	X	X	60831
1	1630	MW-8				X	X	X	X	X	X	X	60832
12/16	0750	MW-7				X	X	X	X	X	X	X	60833
1	0820	MW-9				X	X	X	X	X	X	X	60834
1	0840	MW-9D				X	X	X	X	X	X	X	60835
1	1135	SW-80 13'				X	X	X	X	X	X	X	60836
1	1230	SW-80 2'				X	X	X	X	X	X	X	60837
12/17	0830	MW-6				X	X	X	X	X	X	X	60838

Client Remarks/Comments: TOTAL METALS: As, Ba, Cd, Cu, Cr, Fe, Pb, Mn, Ni, K, Na, Sr, Zn Hg  
 DISSOLVED METALS: As, Ba, Cd, Cu, Fe, Pb, Mn, Sr, Zn

Sampled by (Name - Print)  
 Shawn Wilgins

Relinquished by: (SIGNATURE)  
 [Signature]

Relinquished by: (SIGNATURE)  
 [Signature]

Relinquished by: (SIGNATURE)  
 [Signature]

For Laboratory Use Only

Ice Y/N	Custody Seals Y/N	Lab Comments

Date Time 12/17/21 1435  
 Received by: (SIGNATURE) [Signature]  
 Date Time 12-17-21

Date Time 12/17/21 1435  
 Received by: (SIGNATURE) [Signature]  
 Date Time 12/17/21 1435



1/16/2022

ERM

Mr. Shawn Wiggins  
840 West Sam Houston Parkway North  
Suite 600  
Houston, TX, 77024-4613

Ref: Report Number: 21-356-0028  
Project Description: Project: Henning Management, Hayes, LA  
Project No: 0526033

Dear Mr. Shawn Wiggins:

Waypoint Analytical Louisiana, Inc. received sample(s) on 12/22/2021 for the analyses presented in the following report. The above referenced project has been analyzed per your instructions. Unless otherwise noted, the analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance. Analyses reported which indicate "Field" for these parameters were analyzed by the client in the field. Results for solid samples are reported on an as received or "wet weight" basis unless otherwise specified.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

All quality control measures undertaken in accordance with Waypoint Analytical Louisiana, Inc. CompQAP990807A and revisions under the terms of the Louisiana Environmental Laboratory Accreditation Program (Certificate #02041) are within acceptance ranges established in that document with the exception of the items indicated and/or discussed in a Case Narrative.

The results are shown on the attached analysis sheet(s). Be aware that the time analyzed for certain samples (e.g. - BOD, CBOD, etc.) refer to the time the sample batch was begun and not necessarily to the time an individual sample was begun. Thank you for allowing Waypoint Analytical Louisiana, Inc. to serve you. Should I be of further assistance, if you have any questions or need additional information please contact me or client services.

Sincerely,

Anthony J. Albert  
Laboratory Director

*Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis. This report may be reproduced in full only with the written permission of the laboratory and/or the entity to which it is addressed. Results contained herein relate only to the sample(s) submitted to the laboratory.*





## Certification Summary

**Laboratory ID: WP MLA: Waypoint Analytical Louisiana, Inc., Marrero, LA**

State	Program	Lab ID	Expiration Date
Georgia	State Program	02041	06/30/2022
Louisiana	State Program - NELAP	02041	06/30/2022

**Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN**

State	Program	Lab ID	Expiration Date
Alabama	State Program	40750	02/28/2022
Arkansas	State Program	88-0650	02/07/2022
California	State Program	2904	06/30/2022
Florida	State Program - NELAP	E871157	06/30/2022
Georgia	State Program	C044	02/18/2023
Georgia	State Program	04015	06/30/2022
Illinois	State Program - NELAP	200078	10/10/2022
Kentucky	State Program	80215	06/30/2022
Kentucky	State Program	KY90047	12/31/2022
Louisiana	State Program - NELAP	LA037	12/31/2022
Louisiana	State Program - NELAP	04015	06/30/2022
Mississippi	State Program	MS	02/11/2023
North Carolina	State Program	415	12/31/2022
Pennsylvania	State Program - NELAP	68-03195	05/31/2022
South Carolina	State Program	84002	06/30/2022
South Carolina	State Program	84002	06/30/2022
Tennessee	State Program	02027	02/11/2023
Texas	State Program - NELAP	T104704180	09/30/2022
Virginia	State Program	00106	06/30/2022
Virginia	State Program - NELAP	460181	09/14/2022

**Laboratory ID: WP RMS: Waypoint Analytical Mississippi, Inc., Ridgeland, MS**

State	Program	Lab ID	Expiration Date
Arkansas	State Program	88-1409	02/01/2022
Kentucky	State Program	KY98013	12/31/2021
Louisiana	State Program - NELAP	04023	06/30/2022
North Carolina	State Program	694	12/31/2021

**Sample Summary Table**

**Report Number:** 21-356-0028  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	6020B	WP MTN
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	MAVPH LA	WP MTN
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	7470A	WP MTN
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	9056A	WP MTN
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	8260B	WP MTN
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	MAEPH LA	WP MTN
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	2320B-2011	WP RMS
61137	MW-10	Groundwater	12/20/2021 10:45	12/22/2021	2540C-2011	WP RMS
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	7470A	WP MTN
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	6020B	WP MTN
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	MAVPH LA	WP MTN
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	MAEPH LA	WP MTN
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	9056A	WP MTN
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	8260B	WP MTN
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	2540C-2011	WP RMS
61138	MW-5	Groundwater	12/20/2021 13:30	12/22/2021	2320B-2011	WP RMS
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	9056A	WP MTN
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	7470A	WP MTN
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	6020B	WP MTN
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	MAVPH LA	WP MTN
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	MAEPH LA	WP MTN
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	8260B	WP MTN
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	2540C-2011	WP RMS
61139	MW-4	Groundwater	12/20/2021 15:05	12/22/2021	2320B-2011	WP RMS
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	7470A	WP MTN
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	6020B	WP MTN

WP MTN - Memphis, TN: Waypoint Analytical - TN, Memphis, TN

WP RMS - Ridgeland, MS: Waypoint Analytical - Mississippi, Inc., Ridgeland, MS

**Sample Summary Table**

**Report Number:** 21-356-0028  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	MAVPH LA	WP MTN
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	MAEPH LA	WP MTN
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	9056A	WP MTN
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	8260B	WP MTN
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	2540C-2011	WP RMS
61140	MW-3	Groundwater	12/20/2021 16:30	12/22/2021	2320B-2011	WP RMS
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	9056A	WP MTN
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	7470A	WP MTN
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	6020B	WP MTN
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	MAVPH LA	WP MTN
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	MAEPH LA	WP MTN
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	8260B	WP MTN
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	2540C-2011	WP RMS
61141	MW-2	Groundwater	12/21/2021 09:55	12/22/2021	2320B-2011	WP RMS

WP MTN - Memphis, TN: Waypoint Analytical - TN, Memphis, TN

WP RMS - Ridgeland, MS: Waypoint Analytical - Mississippi, Inc., Ridgeland, MS



---

Client: ERM

**CASE NARRATIVE**

Project: Project: Henning Management, Hayes, LA

Lab Report Number: 21-356-0028

Date: 1/7/2022

---

**MA-DEP EPH (LA) Method MAEPH LA**

Sample 61137 (MW-10)

QC Batch No: L592449

Surrogate(s) were flagged for recoveries in the associated project sample. During the extraction step, the extraction technician noted that a significant emulsion formed. Batch QC samples (Method Blank and Laboratory Control Samples) all showed surrogate recoveries within QC limits, indicating that the biased recoveries were due to the sample matrix.

**Metals Analysis Method 6020B**

Sample 98657

Analyte: Strontium

QC Batch No: L592848/L592015

The matrix spike and/or the matrix spike duplicate was outside quality control acceptance ranges due to the level of this analyte present in the parent sample relative to the spike level. A dilution test was performed and passed quality control acceptance ranges. No matrix interference is suspected.

**Mercury Analysis Method 7470A**

Sample 98123

Analyte: Mercury

QC Batch No: L592553/L592343

The matrix spike and/or the matrix spike duplicate was outside quality control acceptance ranges. A post digestion spike was performed and passed quality control acceptance ranges. No matrix interference is suspected.



10485

ERM

Mr. Shawn Wiggins

840 West Sam Houston Parkway North

Suite 600

Houston , TX 77024-4613

Project

Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/17/2022

Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61137**

Matrix: **Groundwater**

Sample ID : **MW-10**

Sampled: **12/20/2021 10:45**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	441	mg/L	2	1	12/30/21 15:00	KDC	G166687
Carbonate	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687
Alkalinity (as CaCO3)	441	mg/L	2	1	12/30/21 15:00	KDC	G166687
Hydroxide Alkalinity (as CaCO3)	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	1940	mg/L	20	1	12/27/21 15:47	RQE	G166572

**Analytical Method:** 6020B      **Prep Batch(es):** **L592015** 12/28/21 13:10      **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	0.0030	mg/L	0.0010	1	12/29/21 18:38	JTR	L592556
Barium	0.076	mg/L	0.001	1	12/29/21 18:38	JTR	L592556
Cadmium	<0.0010	mg/L	0.0010	1	01/03/22 12:10	BKN	L592556
Calcium	200	mg/L	4.00	20	01/03/22 12:16	BKN	L592556
Chromium	0.016	mg/L	0.001	1	12/29/21 18:38	JTR	L592556
Iron	12.0	mg/L	0.100	1	12/29/21 18:38	JTR	L592556
Lead	0.0087	mg/L	0.0010	1	12/29/21 18:38	JTR	L592556

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

10485  
 ERM  
 Mr. Shawn Wiggins  
 840 West Sam Houston Parkway North  
 Suite 600  
 Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/17/2022  
 Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61137**  
 Sample ID : **MW-10**

Matrix: **Groundwater**  
 Sampled: **12/20/2021 10:45**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L592015** 12/28/21 13:10      **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	92.7	mg/L	2.00	20	01/03/22 12:16	BKN	L592556
Manganese	1.81	mg/L	0.001	1	12/29/21 18:38	JTR	L592556
Potassium	6.38	mg/L	0.100	1	12/29/21 18:38	JTR	L592556
Sodium	296	mg/L	2.00	20	01/03/22 12:16	BKN	L592556
Strontium	1.10	mg/L	0.020	20	01/03/22 12:16	BKN	L592556
Zinc	0.040	mg/L	0.010	1	12/29/21 18:38	JTR	L592556
Dissolved Arsenic	0.0010	mg/L	0.0010	1	12/29/21 17:43	JTR	L592556
Dissolved Barium	0.033	mg/L	0.001	1	12/29/21 17:43	JTR	L592556
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 17:43	BKN	L592556
Dissolved Chromium	<0.001	mg/L	0.001	1	12/29/21 17:43	JTR	L592556
Dissolved Iron	0.390	mg/L	0.100	1	12/29/21 17:43	JTR	L592556
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/29/21 17:43	JTR	L592556
Dissolved Manganese	1.74	mg/L	0.001	1	12/29/21 17:43	JTR	L592556
Dissolved Strontium	1.10	mg/L	0.020	20	01/03/22 11:28	BKN	L592556
Dissolved Zinc	<0.010	mg/L	0.010	1	12/29/21 17:43	JTR	L592556

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592343** 12/30/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/30/21 14:36	JW2	L592553

**Qualifiers/** \* Outside QC Limit                      DF      Dilution Factor  
**Definitions**      MQL      Method Quantitation Limit

10485  
ERM  
Mr. Shawn Wiggins  
840 West Sam Houston Parkway North  
Suite 600  
Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61137**  
Sample ID : **MW-10**

Matrix: **Groundwater**  
Sampled: **12/20/2021 10:45**

**Analytical Method:** 8260B      **Prep Batch(es):** **L592180** 12/28/21 21:48      **L592382** 12/29/21 10:55  
**Prep Method:** 5030B

Test	Results	Units	MLL	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/29/21 14:48	ASH	L592434
Toluene	<0.002	mg/L	0.002	1	12/29/21 04:18	ASH	L592200
Ethylbenzene	<0.001	mg/L	0.001	1	12/29/21 04:18	ASH	L592200
Xylene (Total)	<0.001	mg/L	0.001	1	12/29/21 04:18	KCC	L592200
o-Xylene	<0.001	mg/L	0.001	1	12/29/21 04:18	ASH	L592200
m,p-Xylene	<0.002	mg/L	0.002	1	12/29/21 04:18	ASH	L592200
Surrogate: 1,2-Dichloroethane - d4	103		Limits: 63-136%	1	12/29/21 04:18	ASH	8260B
Surrogate: 4-Bromofluorobenzene	83.6		Limits: 71-137%	1	12/29/21 04:18	ASH	8260B
Surrogate: Dibromofluoromethane	121		Limits: 70-128%	1	12/29/21 04:18	ASH	8260B
Surrogate: Toluene-d8	87.8		Limits: 70-130%	1	12/29/21 04:18	ASH	8260B
Surrogate: 1,2-Dichloroethane - d4	87.8		Limits: 63-136%	1	12/29/21 14:48	ASH	8260B
Surrogate: 4-Bromofluorobenzene	93.6		Limits: 71-137%	1	12/29/21 14:48	ASH	8260B
Surrogate: Dibromofluoromethane	101		Limits: 70-128%	1	12/29/21 14:48	ASH	8260B
Surrogate: Toluene-d8	91.6		Limits: 70-130%	1	12/29/21 14:48	ASH	8260B

**Analytical Method:** 9056A      **Prep Batch(es):** **L594823** 01/03/22 09:17  
**Prep Method:** SW-9056A (PREP)

Test	Results	Units	MLL	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	219	mg/L	1.60	10	01/03/22 22:55	JCA	L594825
Sulfate	847	mg/L	4.00	10	01/03/22 22:55	JCA	L594825

**Qualifiers/** \* Outside QC Limit      DF Dilution Factor  
**Definitions** MQL Method Quantitation Limit

10485  
 ERM  
 Mr. Shawn Wiggins  
 840 West Sam Houston Parkway North  
 Suite 600  
 Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/17/2022  
 Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61137**

Matrix: **Groundwater**

Sample ID : **MW-10**

Sampled: **12/20/2021 10:45**

**Analytical Method:** MAEPH LA                      **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 01:28	MMK	L592449
Aromatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 01:28	MMK	L592449
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 01:28	MMK	L592449
Aromatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 01:28	MMK	L592449
Aromatic >C16-C21	<0.130	mg/L	0.130	1	01/07/22 01:28	MMK	L592449
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	01/07/22 01:28	MMK	L592449
Aromatic >C21-C35	<0.152	mg/L	0.152	1	01/07/22 01:28	MMK	L592449
Surrogate: Chlorooctadecane	<b>39.9 *</b>		Limits: 40-140%	1	01/07/22 01:28	MMK	MAEPH LA
Surrogate: OTP Surrogate	73.3		Limits: 40-140%	1	01/07/22 01:28	MMK	MAEPH LA

**Analytical Method:** MAVPH LA                      **Prep Batch(es):** **L592661** 12/30/21 13:03

**Prep Method:** MAVPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.015	mg/L	0.015	1	12/30/21 15:47	HRS	L592664
Aliphatic >C8-C10	<0.030	mg/L	0.030	1	12/30/21 15:47	HRS	L592664
Aromatic >C8-C10	<0.020	mg/L	0.020	1	12/30/21 15:47	HRS	L592664
Surrogate: 2,5-Dibromotoluene	120		Limits: 50-150%	1	12/30/21 15:47	HRS	MAVPH LA

**Qualifiers/** \* Outside QC Limit                      DF Dilution Factor  
**Definitions**                      MQL Method Quantitation Limit

10485  
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Mr. Shawn Wiggins  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61138**

Matrix: **Groundwater**

Sample ID : **MW-5**

Sampled: **12/20/2021 13:30**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	241	mg/L	2	1	12/30/21 15:00	KDC	G166687
Carbonate	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687
Alkalinity (as CaCO3)	241	mg/L	2	1	12/30/21 15:00	KDC	G166687
Hydroxide Alkalinity (as CaCO3)	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	3360	mg/L	20	1	12/27/21 15:47	RQE	G166572

**Analytical Method:** 6020B      **Prep Batch(es):** **L592015** 12/28/21 13:10      **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 18:44	JTR	L592556
Barium	0.025	mg/L	0.001	1	12/29/21 18:44	JTR	L592556
Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 18:44	BKN	L592556
Calcium	428	mg/L	10.0	50	01/03/22 12:25	BKN	L592556
Chromium	<0.001	mg/L	0.001	1	12/29/21 18:44	JTR	L592556
Iron	0.119	mg/L	0.100	1	12/29/21 18:44	JTR	L592556
Lead	<0.0010	mg/L	0.0010	1	12/29/21 18:44	JTR	L592556

**Qualifiers/** \* Outside QC Limit  
**Definitions** MQL Method Quantitation Limit      DF Dilution Factor

10485  
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Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/17/2022  
 Received : 12/22/2021

Report Number : **21-356-0028**

## REPORT OF ANALYSIS

Lab No : **61138**  
 Sample ID : **MW-5**

Matrix: **Groundwater**  
 Sampled: **12/20/2021 13:30**

**Analytical Method:** 6020B                                    **Prep Batch(es):** **L592015** 12/28/21 13:10    **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	181	mg/L	1.00	10	01/03/22 12:20	BKN	L592556
Manganese	1.62	mg/L	0.001	1	12/29/21 18:44	JTR	L592556
Potassium	5.30	mg/L	0.100	1	12/29/21 18:44	JTR	L592556
Sodium	272	mg/L	5.00	50	01/03/22 12:25	BKN	L592556
Strontium	2.07	mg/L	0.050	50	01/03/22 12:25	BKN	L592556
Zinc	<0.010	mg/L	0.010	1	12/29/21 18:44	JTR	L592556
Dissolved Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 17:50	JTR	L592556
Dissolved Barium	0.025	mg/L	0.001	1	12/29/21 17:50	JTR	L592556
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 17:50	BKN	L592556
Dissolved Chromium	<0.001	mg/L	0.001	1	12/29/21 17:50	JTR	L592556
Dissolved Iron	<0.100	mg/L	0.100	1	12/29/21 17:50	JTR	L592556
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/29/21 17:50	JTR	L592556
Dissolved Manganese	1.61	mg/L	0.001	1	12/29/21 17:50	JTR	L592556
Dissolved Strontium	2.20	mg/L	0.050	50	01/03/22 11:32	BKN	L592556
Dissolved Zinc	<0.010	mg/L	0.010	1	12/29/21 17:50	JTR	L592556

**Analytical Method:** 7470A                                    **Prep Batch(es):** **L592343** 12/30/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/30/21 14:38	JW2	L592553

**Qualifiers/Definitions**  
 \* Outside QC Limit                                    DF    Dilution Factor  
 MQL Method Quantitation Limit

10485  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61138**

Matrix: **Groundwater**

Sample ID : **MW-5**

Sampled: **12/20/2021 13:30**

**Analytical Method:** 8260B                      **Prep Batch(es):** **L592180** 12/28/21 21:48

**Prep Method:** 5030B

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/29/21 04:50	ASH	L592200
Toluene	<0.002	mg/L	0.002	1	12/29/21 04:50	ASH	L592200
Ethylbenzene	<0.001	mg/L	0.001	1	12/29/21 04:50	ASH	L592200
Xylene (Total)	<0.001	mg/L	0.001	1	12/29/21 04:50	KCC	L592200
o-Xylene	<0.001	mg/L	0.001	1	12/29/21 04:50	ASH	L592200
m,p-Xylene	<0.002	mg/L	0.002	1	12/29/21 04:50	ASH	L592200
Surrogate: 1,2-Dichloroethane - d4	103		Limits: 63-136%	1	12/29/21 04:50	ASH	8260B
Surrogate: 4-Bromofluorobenzene	81.6		Limits: 71-137%	1	12/29/21 04:50	ASH	8260B
Surrogate: Dibromofluoromethane	120		Limits: 70-128%	1	12/29/21 04:50	ASH	8260B
Surrogate: Toluene-d8	86.4		Limits: 70-130%	1	12/29/21 04:50	ASH	8260B

**Analytical Method:** 9056A                      **Prep Batch(es):** **L594823** 01/03/22 09:17

**Prep Method:** SW-9056A (PREP)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	1100	mg/L	16.0	100	01/04/22 12:26	JCA	L594825
Sulfate	628	mg/L	40.0	100	01/04/22 12:26	JCA	L594825

**Analytical Method:** MAEPH LA                      **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 01:51	MMK	L592449

**Qualifiers/** \*                      Outside QC Limit                      DF                      Dilution Factor  
**Definitions**                      MQL                      Method Quantitation Limit

10485

ERM Project Project: Henning Management, Hayes, LA Report Date : 01/17/2022  
Mr. Shawn Wiggins Information : Project No: 0526033 Received : 12/22/2021  
840 West Sam Houston Parkway North  
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Houston , TX 77024-4613

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61138**

Matrix: **Groundwater**

Sample ID : **MW-5**

Sampled: **12/20/2021 13:30**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 01:51	MMK	L592449
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 01:51	MMK	L592449
Aromatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 01:51	MMK	L592449
Aromatic >C16-C21	<0.130	mg/L	0.130	1	01/07/22 01:51	MMK	L592449
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	01/07/22 01:51	MMK	L592449
Aromatic >C21-C35	<0.152	mg/L	0.152	1	01/07/22 01:51	MMK	L592449
Surrogate: Chlorooctadecane	46.1		Limits: 40-140%	1	01/07/22 01:51	MMK	MAEPH LA
Surrogate: OTP Surrogate	72.4		Limits: 40-140%	1	01/07/22 01:51	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **L592661** 12/30/21 13:03

**Prep Method:** MAVPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.015	mg/L	0.015	1	12/30/21 16:28	HRS	L592664
Aliphatic >C8-C10	<0.030	mg/L	0.030	1	12/30/21 16:28	HRS	L592664
Aromatic >C8-C10	<0.020	mg/L	0.020	1	12/30/21 16:28	HRS	L592664
Surrogate: 2,5-Dibromotoluene	120		Limits: 50-150%	1	12/30/21 16:28	HRS	MAVPH LA

**Qualifiers/** \* Outside QC Limit DF Dilution Factor  
**Definitions** MQL Method Quantitation Limit



10485

ERM Project Project: Henning Management, Hayes, LA Report Date : 01/17/2022  
Mr. Shawn Wiggins Information : Project No: 0526033 Received : 12/22/2021  
840 West Sam Houston Parkway North  
Suite 600  
Houston , TX 77024-4613

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61139**

Matrix: **Groundwater**

Sample ID : **MW-4**

Sampled: **12/20/2021 15:05**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	367	mg/L	2	1	12/30/21 15:00	KDC	G166687
Carbonate	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687
Alkalinity (as CaCO3)	367	mg/L	2	1	12/30/21 15:00	KDC	G166687
Hydroxide Alkalinity (as CaCO3)	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	2860	mg/L	20	1	12/27/21 15:47	RQE	G166572

**Analytical Method:** 6020B **Prep Batch(es):** **L592015** 12/28/21 13:10 **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 18:51	JTR	L592556
Barium	0.031	mg/L	0.001	1	12/29/21 18:51	JTR	L592556
Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 18:51	BKN	L592556
Calcium	359	mg/L	4.00	20	01/03/22 12:29	BKN	L592556
Chromium	<0.001	mg/L	0.001	1	12/29/21 18:51	JTR	L592556
Iron	0.289	mg/L	0.100	1	12/29/21 18:51	JTR	L592556
Lead	<0.0010	mg/L	0.0010	1	12/29/21 18:51	JTR	L592556

**Qualifiers/Definitions** \* Outside QC Limit DF Dilution Factor  
MQL Method Quantitation Limit

10485  
ERM  
Mr. Shawn Wiggins  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61139**

Matrix: **Groundwater**

Sample ID : **MW-4**

Sampled: **12/20/2021 15:05**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L592015** 12/28/21 13:10    **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	173	mg/L	2.00	20	01/03/22 12:29	BKN	L592556
Manganese	4.25	mg/L	0.020	20	01/03/22 12:29	BKN	L592556
Potassium	5.81	mg/L	0.100	1	12/29/21 18:51	JTR	L592556
Sodium	360	mg/L	2.00	20	01/03/22 12:29	BKN	L592556
Strontium	2.12	mg/L	0.020	20	01/03/22 12:29	BKN	L592556
Zinc	<0.010	mg/L	0.010	1	12/29/21 18:51	JTR	L592556
Dissolved Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 17:57	JTR	L592556
Dissolved Barium	0.029	mg/L	0.001	1	12/29/21 17:57	JTR	L592556
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 17:57	BKN	L592556
Dissolved Chromium	<0.001	mg/L	0.001	1	12/29/21 17:57	JTR	L592556
Dissolved Iron	0.171	mg/L	0.100	1	12/29/21 17:57	JTR	L592556
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/29/21 17:57	JTR	L592556
Dissolved Manganese	4.06	mg/L	0.020	20	01/03/22 11:36	BKN	L592556
Dissolved Strontium	1.95	mg/L	0.020	20	01/03/22 11:36	BKN	L592556
Dissolved Zinc	<0.010	mg/L	0.010	1	12/29/21 17:57	JTR	L592556

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592343** 12/30/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/30/21 14:40	JW2	L592553

**Qualifiers/** \* Outside QC Limit                      DF Dilution Factor  
**Definitions**    MQL Method Quantitation Limit

10485  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61139**  
Sample ID : **MW-4**

Matrix: **Groundwater**  
Sampled: **12/20/2021 15:05**

**Analytical Method:** 8260B      **Prep Batch(es):** **L592180** 12/28/21 21:48  
**Prep Method:** 5030B

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/29/21 05:23	ASH	L592200
Toluene	<0.002	mg/L	0.002	1	12/29/21 05:23	ASH	L592200
Ethylbenzene	<0.001	mg/L	0.001	1	12/29/21 05:23	ASH	L592200
Xylene (Total)	<0.001	mg/L	0.001	1	12/29/21 05:23	KCC	L592200
o-Xylene	<0.001	mg/L	0.001	1	12/29/21 05:23	ASH	L592200
m,p-Xylene	<0.002	mg/L	0.002	1	12/29/21 05:23	ASH	L592200
Surrogate: 1,2-Dichloroethane - d4	103		Limits: 63-136%	1	12/29/21 05:23	ASH	8260B
Surrogate: 4-Bromofluorobenzene	81.8		Limits: 71-137%	1	12/29/21 05:23	ASH	8260B
Surrogate: Dibromofluoromethane	122		Limits: 70-128%	1	12/29/21 05:23	ASH	8260B
Surrogate: Toluene-d8	87.0		Limits: 70-130%	1	12/29/21 05:23	ASH	8260B

**Analytical Method:** 9056A      **Prep Batch(es):** **L594823** 01/03/22 09:17  
**Prep Method:** SW-9056A (PREP)

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	1010	mg/L	1.60	10	01/03/22 23:46	JCA	L594825
Sulfate	659	mg/L	4.00	10	01/03/22 23:46	JCA	L594825

**Analytical Method:** MAEPH LA      **Prep Batch(es):** **L592076** 12/28/21 14:30  
**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 02:15	MMK	L592449

**Qualifiers/Definitions** \* Outside QC Limit      DF Dilution Factor  
MLQ Method Quantitation Limit

10485

ERM Project Project: Henning Management, Hayes, LA Report Date : 01/17/2022  
Mr. Shawn Wiggins Information : Project No: 0526033 Received : 12/22/2021  
840 West Sam Houston Parkway North  
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Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61139**

Matrix: **Groundwater**

Sample ID : **MW-4**

Sampled: **12/20/2021 15:05**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 02:15	MMK	L592449
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 02:15	MMK	L592449
Aromatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 02:15	MMK	L592449
Aromatic >C16-C21	<0.130	mg/L	0.130	1	01/07/22 02:15	MMK	L592449
Aliphatic >C16-C35	0.254	mg/L	0.217	1	01/07/22 02:15	MMK	L592449
Aromatic >C21-C35	<0.152	mg/L	0.152	1	01/07/22 02:15	MMK	L592449
Surrogate: Chlorooctadecane	51.6		Limits: 40-140%	1	01/07/22 02:15	MMK	MAEPH LA
Surrogate: OTP Surrogate	75.1		Limits: 40-140%	1	01/07/22 02:15	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **L592661** 12/30/21 13:03

**Prep Method:** MAVPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.015	mg/L	0.015	1	12/30/21 17:09	HRS	L592664
Aliphatic >C8-C10	<0.030	mg/L	0.030	1	12/30/21 17:09	HRS	L592664
Aromatic >C8-C10	<0.020	mg/L	0.020	1	12/30/21 17:09	HRS	L592664
Surrogate: 2,5-Dibromotoluene	115		Limits: 50-150%	1	12/30/21 17:09	HRS	MAVPH LA

**Qualifiers/  
Definitions**

\* Outside QC Limit DF Dilution Factor  
MQL Method Quantitation Limit

10485

ERM

Mr. Shawn Wiggins

840 West Sam Houston Parkway North  
Suite 600

Houston , TX 77024-4613

Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/17/2022

Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61140**

Sample ID : **MW-3**

Matrix: **Groundwater**

Sampled: **12/20/2021 16:30**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	481	mg/L	2	1	12/30/21 15:00	KDC	G166687
Carbonate	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687
Alkalinity (as CaCO3)	481	mg/L	2	1	12/30/21 15:00	KDC	G166687
Hydroxide Alkalinity (as CaCO3)	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	2060	mg/L	20	1	12/27/21 15:47	RQE	G166572

**Analytical Method:** 6020B

**Prep Method:** 3005A

**Prep Batch(es):** **L592015** 12/28/21 13:10 **L592054** 12/28/21 14:01

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 18:58	JTR	L592556
Barium	0.015	mg/L	0.001	1	12/29/21 18:58	JTR	L592556
Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 18:58	BKN	L592556
Calcium	240	mg/L	4.00	20	01/03/22 12:33	BKN	L592556
Chromium	<0.001	mg/L	0.001	1	12/29/21 18:58	JTR	L592556
Iron	0.183	mg/L	0.100	1	12/29/21 18:58	JTR	L592556
Lead	<0.0010	mg/L	0.0010	1	12/29/21 18:58	JTR	L592556

**Qualifiers/** \* Outside QC Limit  
**Definitions** MQL Method Quantitation Limit

DF Dilution Factor

10485

ERM

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Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/17/2022

Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61140**

Matrix: **Groundwater**

Sample ID : **MW-3**

Sampled: **12/20/2021 16:30**

**Analytical Method:** 6020B **Prep Batch(es):** **L592015** 12/28/21 13:10 **L592054** 12/28/21 14:01

**Prep Method:** 3005A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	96.8	mg/L	2.00	20	01/03/22 12:33	BKN	L592556
Manganese	3.31	mg/L	0.020	20	01/03/22 12:33	BKN	L592556
Potassium	5.18	mg/L	0.100	1	12/29/21 18:58	JTR	L592556
Sodium	253	mg/L	2.00	20	01/03/22 12:33	BKN	L592556
Strontium	1.19	mg/L	0.020	20	01/03/22 12:33	BKN	L592556
Zinc	<0.010	mg/L	0.010	1	12/29/21 18:58	JTR	L592556
Dissolved Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 18:04	JTR	L592556
Dissolved Barium	0.014	mg/L	0.001	1	12/29/21 18:04	JTR	L592556
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 18:04	BKN	L592556
Dissolved Chromium	<0.001	mg/L	0.001	1	12/29/21 18:04	JTR	L592556
Dissolved Iron	0.183	mg/L	0.100	1	12/29/21 18:04	JTR	L592556
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/29/21 18:04	JTR	L592556
Dissolved Manganese	3.15	mg/L	0.020	20	01/03/22 11:40	BKN	L592556
Dissolved Strontium	1.14	mg/L	0.020	20	01/03/22 11:40	BKN	L592556
Dissolved Zinc	<0.010	mg/L	0.010	1	12/29/21 18:04	JTR	L592556

**Analytical Method:** 7470A **Prep Batch(es):** **L592343** 12/30/21 08:30

**Prep Method:** 7470A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/30/21 14:43	JW2	L592553

**Qualifiers/** \* Outside QC Limit  
**Definitions** MQ Method Quantitation Limit

DF Dilution Factor

10485  
ERM  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61140**  
Sample ID : **MW-3**

Matrix: **Groundwater**  
Sampled: **12/20/2021 16:30**

**Analytical Method:** 8260B      **Prep Batch(es):** **L592180** 12/28/21 21:48  
**Prep Method:** 5030B

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/29/21 05:55	ASH	L592200
Toluene	<0.002	mg/L	0.002	1	12/29/21 05:55	ASH	L592200
Ethylbenzene	<0.001	mg/L	0.001	1	12/29/21 05:55	ASH	L592200
Xylene (Total)	<0.001	mg/L	0.001	1	12/29/21 05:55	KCC	L592200
o-Xylene	<0.001	mg/L	0.001	1	12/29/21 05:55	ASH	L592200
m,p-Xylene	<0.002	mg/L	0.002	1	12/29/21 05:55	ASH	L592200
Surrogate: 1,2-Dichloroethane - d4	104		Limits: 63-136%	1	12/29/21 05:55	ASH	8260B
Surrogate: 4-Bromofluorobenzene	80.0		Limits: 71-137%	1	12/29/21 05:55	ASH	8260B
Surrogate: Dibromofluoromethane	121		Limits: 70-128%	1	12/29/21 05:55	ASH	8260B
Surrogate: Toluene-d8	84.4		Limits: 70-130%	1	12/29/21 05:55	ASH	8260B

**Analytical Method:** 9056A      **Prep Batch(es):** **L594823** 01/03/22 09:17  
**Prep Method:** SW-9056A (PREP)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	153	mg/L	1.60	10	01/04/22 00:12	JCA	L594825
Sulfate	919	mg/L	4.00	10	01/04/22 00:12	JCA	L594825

**Analytical Method:** MAEPH LA      **Prep Batch(es):** **L592076** 12/28/21 14:30  
**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 02:39	MMK	L592449

**Qualifiers/Definitions** \* Outside QC Limit      DF Dilution Factor  
 MQL Method Quantitation Limit

10485

ERM Project Project: Henning Management, Hayes, LA Report Date : 01/17/2022  
Mr. Shawn Wiggins Information : Project No: 0526033 Received : 12/22/2021  
840 West Sam Houston Parkway North  
Suite 600  
Houston , TX 77024-4613

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61140**

Matrix: **Groundwater**

Sample ID : **MW-3**

Sampled: **12/20/2021 16:30**

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 02:39	MMK	L592449
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 02:39	MMK	L592449
Aromatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 02:39	MMK	L592449
Aromatic >C16-C21	<0.130	mg/L	0.130	1	01/07/22 02:39	MMK	L592449
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	01/07/22 02:39	MMK	L592449
Aromatic >C21-C35	<0.152	mg/L	0.152	1	01/07/22 02:39	MMK	L592449
Surrogate: Chlorooctadecane	52.1		Limits: 40-140%	1	01/07/22 02:39	MMK	MAEPH LA
Surrogate: OTP Surrogate	75.1		Limits: 40-140%	1	01/07/22 02:39	MMK	MAEPH LA

**Analytical Method:** MAVPH LA **Prep Batch(es):** **L592661** 12/30/21 13:03

**Prep Method:** MAVPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.015	mg/L	0.015	1	12/30/21 17:50	HRS	L592664
Aliphatic >C8-C10	<0.030	mg/L	0.030	1	12/30/21 17:50	HRS	L592664
Aromatic >C8-C10	<0.020	mg/L	0.020	1	12/30/21 17:50	HRS	L592664
Surrogate: 2,5-Dibromotoluene	112		Limits: 50-150%	1	12/30/21 17:50	HRS	MAVPH LA

**Qualifiers/** \* Outside QC Limit DF Dilution Factor  
**Definitions** MQ Method Quantitation Limit



10485

ERM

Mr. Shawn Wiggins

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Project Project: Henning Management, Hayes, LA

Information : Project No: 0526033

Report Date : 01/17/2022

Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61141**

Sample ID : **MW-2**

Matrix: **Groundwater**

Sampled: **12/21/2021 9:55**

**Analytical Method:** 2320B-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Bicarbonate	478	mg/L	2	1	12/30/21 15:00	KDC	G166687
Carbonate	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687
Alkalinity (as CaCO3)	478	mg/L	2	1	12/30/21 15:00	KDC	G166687
Hydroxide Alkalinity (as CaCO3)	<2	mg/L	2	1	12/30/21 15:00	KDC	G166687

**Analytical Method:** 2540C-2011

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Dissolved Solids	1120	mg/L	20	1	12/27/21 15:47	RQE	G166572

**Analytical Method:** 6020B      **Prep Batch(es):** **L592015** 12/28/21 13:10      **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 19:05	JTR	L592556
Barium	0.053	mg/L	0.001	1	12/29/21 19:05	JTR	L592556
Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 19:05	BKN	L592556
Calcium	128	mg/L	4.00	20	01/03/22 12:37	BKN	L592556
Chromium	0.009	mg/L	0.001	1	12/29/21 19:05	JTR	L592556
Iron	4.63	mg/L	0.100	1	12/29/21 19:05	JTR	L592556
Lead	0.0033	mg/L	0.0010	1	12/29/21 19:05	JTR	L592556

**Qualifiers/** \*      Outside QC Limit  
**Definitions**      MQL      Method Quantitation Limit

DF      Dilution Factor

10485  
 ERM  
 Mr. Shawn Wiggins  
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Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/17/2022  
 Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61141**  
 Sample ID : **MW-2**

Matrix: **Groundwater**  
 Sampled: **12/21/2021 9:55**

**Analytical Method:** 6020B                      **Prep Batch(es):** **L592015** 12/28/21 13:10    **L592054** 12/28/21 14:01  
**Prep Method:** 3005A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Magnesium	53.2	mg/L	2.00	20	01/03/22 12:37	BKN	L592556
Manganese	0.996	mg/L	0.001	1	12/29/21 19:05	JTR	L592556
Potassium	4.69	mg/L	0.100	1	12/29/21 19:05	JTR	L592556
Sodium	176	mg/L	2.00	20	01/03/22 12:37	BKN	L592556
Strontium	0.659	mg/L	0.020	20	01/03/22 12:37	BKN	L592556
Zinc	0.016	mg/L	0.010	1	12/29/21 19:05	JTR	L592556
Dissolved Arsenic	<0.0010	mg/L	0.0010	1	12/29/21 18:11	JTR	L592556
Dissolved Barium	0.027	mg/L	0.001	1	12/29/21 18:11	JTR	L592556
Dissolved Cadmium	<0.0010	mg/L	0.0010	1	12/29/21 18:11	BKN	L592556
Dissolved Chromium	<0.001	mg/L	0.001	1	12/29/21 18:11	JTR	L592556
Dissolved Iron	1.34	mg/L	0.100	1	12/29/21 18:11	JTR	L592556
Dissolved Lead	<0.0010	mg/L	0.0010	1	12/29/21 18:11	JTR	L592556
Dissolved Manganese	0.982	mg/L	0.001	1	12/29/21 18:11	JTR	L592556
Dissolved Strontium	0.662	mg/L	0.020	20	01/03/22 11:45	BKN	L592556
Dissolved Zinc	<0.010	mg/L	0.010	1	12/29/21 18:11	JTR	L592556

**Analytical Method:** 7470A                      **Prep Batch(es):** **L592343** 12/30/21 08:30  
**Prep Method:** 7470A

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Mercury	<0.00020	mg/L	0.00020	1	12/30/21 14:45	JW2	L592553

**Qualifiers/Definitions**    \*    Outside QC Limit                      DF    Dilution Factor  
 MQ    Method Quantitation Limit

10485  
ERM  
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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 01/17/2022  
Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61141**

Matrix: **Groundwater**

Sample ID : **MW-2**

Sampled: **12/21/2021 9:55**

**Analytical Method:** 8260B **Prep Batch(es):** **L592180** 12/28/21 21:48

**Prep Method:** 5030B

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Benzene	<0.001	mg/L	0.001	1	12/29/21 06:27	ASH	L592200
Toluene	<0.002	mg/L	0.002	1	12/29/21 06:27	ASH	L592200
Ethylbenzene	<0.001	mg/L	0.001	1	12/29/21 06:27	ASH	L592200
Xylene (Total)	<0.001	mg/L	0.001	1	12/29/21 06:27	KCC	L592200
o-Xylene	<0.001	mg/L	0.001	1	12/29/21 06:27	ASH	L592200
m,p-Xylene	<0.002	mg/L	0.002	1	12/29/21 06:27	ASH	L592200
Surrogate: 1,2-Dichloroethane - d4	98.0		Limits: 63-136%	1	12/29/21 06:27	ASH	8260B
Surrogate: 4-Bromofluorobenzene	80.2		Limits: 71-137%	1	12/29/21 06:27	ASH	8260B
Surrogate: Dibromofluoromethane	118		Limits: 70-128%	1	12/29/21 06:27	ASH	8260B
Surrogate: Toluene-d8	85.8		Limits: 70-130%	1	12/29/21 06:27	ASH	8260B

**Analytical Method:** 9056A **Prep Batch(es):** **L594823** 01/03/22 09:17

**Prep Method:** SW-9056A (PREP)

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Chloride	62.6	mg/L	0.400	1	01/04/22 00:25	JCA	L594825
Sulfate	403	mg/L	4.00	10	01/04/22 00:38	JCA	L594825

**Analytical Method:** MAEPH LA **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	MLQ	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 03:03	MMK	L592449

**Qualifiers/Definitions** \* Outside QC Limit DF Dilution Factor  
 MQL Method Quantitation Limit

10485

ERM  
 Mr. Shawn Wiggins  
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Project Project: Henning Management, Hayes, LA  
 Information : Project No: 0526033

Report Date : 01/17/2022  
 Received : 12/22/2021

Report Number : **21-356-0028**

**REPORT OF ANALYSIS**

Lab No : **61141**

Matrix: **Groundwater**

Sample ID : **MW-2**

Sampled: **12/21/2021 9:55**

**Analytical Method:** MAEPH LA                      **Prep Batch(es):** **L592076** 12/28/21 14:30

**Prep Method:** MAEPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aromatic >C10-C12	<0.130	mg/L	0.130	1	01/07/22 03:03	MMK	L592449
Aliphatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 03:03	MMK	L592449
Aromatic >C12-C16	<0.130	mg/L	0.130	1	01/07/22 03:03	MMK	L592449
Aromatic >C16-C21	<0.130	mg/L	0.130	1	01/07/22 03:03	MMK	L592449
Aliphatic >C16-C35	<0.217	mg/L	0.217	1	01/07/22 03:03	MMK	L592449
Aromatic >C21-C35	<0.152	mg/L	0.152	1	01/07/22 03:03	MMK	L592449
Surrogate: Chlorooctadecane	43.6		Limits: 40-140%	1	01/07/22 03:03	MMK	MAEPH LA
Surrogate: OTP Surrogate	77.0		Limits: 40-140%	1	01/07/22 03:03	MMK	MAEPH LA

**Analytical Method:** MAVPH LA                      **Prep Batch(es):** **L592661** 12/30/21 13:03

**Prep Method:** MAVPH LA (Aqueous)

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Aliphatic >C6-C8	<0.015	mg/L	0.015	1	12/30/21 18:31	HRS	L592664
Aliphatic >C8-C10	<0.030	mg/L	0.030	1	12/30/21 18:31	HRS	L592664
Aromatic >C8-C10	<0.020	mg/L	0.020	1	12/30/21 18:31	HRS	L592664
Surrogate: 2,5-Dibromotoluene	117		Limits: 50-150%	1	12/30/21 18:31	HRS	MAVPH LA

**Qualifiers/** \* Outside QC Limit                      DF Dilution Factor  
**Definitions**      MQL Method Quantitation Limit

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Analytical Batch:** G166687  
**Analysis Method:** 2320B-2011  
**Analysis Description:** Alkalinity

**Lab Reagent Blank** LRB Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed
Alkalinity (as CaCO3)	mg/L	4	2	12/30/21 15:00
Bicarbonate	mg/L	4	2	12/30/21 15:00
Carbonate	mg/L	< 2	2	12/30/21 15:00

**Laboratory Control Sample** LCS

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Alkalinity (as CaCO3)	mg/L	472	462	98.0	80-120

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Analytical Batch:** G166572  
**Analysis Method:** 2540C-2011  
**Analysis Description:** Total Dissolved Solids (TDS)

**Lab Reagent Blank** LRB Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed
Total Dissolved Solids	mg/L	< 20	20	12/27/21 15:47

**Laboratory Control Sample** LCS

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Total Dissolved Solids	mg/L	2620	2600	99.0	90-110

**Duplicate** G 68435-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
Total Dissolved Solids	mg/L	1220	1220	0.0	10	12/27/21 15:47

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592015      **QC Analytical Batch(es):** L592556,L592848  
**QC Prep Batch Method:** 3005A      **Analysis Method:** 6020B  
**Analysis Description:** Metals Analyses

**Lab Reagent Blank**      LRB-L592015      Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed
Arsenic	mg/L	<0.0010	0.0010	12/29/21 18:28
Barium	mg/L	<0.001	0.001	12/29/21 18:28
Calcium	mg/L	<0.200	0.200	12/29/21 18:28
Cadmium	mg/L	<0.0010	0.0010	12/29/21 18:28
Chromium	mg/L	<0.001	0.001	12/29/21 18:28
Iron	mg/L	<0.100	0.100	12/29/21 18:28
Lead	mg/L	<0.0010	0.0010	12/29/21 18:28
Magnesium	mg/L	<0.100	0.100	12/29/21 18:28
Manganese	mg/L	<0.001	0.001	12/29/21 18:28
Potassium	mg/L	<0.100	0.100	12/29/21 18:28
Sodium	mg/L	<0.100	0.100	12/29/21 18:28
Strontium	mg/L	<0.001	0.001	12/29/21 18:28
Zinc	mg/L	<0.010	0.010	12/29/21 18:28

**Laboratory Control Sample**      LCS-L592015

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Arsenic	mg/L	0.0500	0.0527	105	80-120
Barium	mg/L	0.100	0.101	101	80-120
Calcium	mg/L	10.0	10.0	100	80-120
Cadmium	mg/L	0.0100	0.0097	98.0	80-120
Chromium	mg/L	0.100	0.095	96.0	80-120
Iron	mg/L	10.0	9.50	95.0	80-120
Lead	mg/L	0.0500	0.0496	99.0	80-120
Magnesium	mg/L	10.0	9.76	98.0	80-120
Manganese	mg/L	0.100	0.098	98.0	80-120
Potassium	mg/L	10.0	10.1	101	80-120

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592015 **QC Analytical Batch(es):** L592556,L592848  
**QC Prep Batch Method:** 3005A **Analysis Method:** 6020B  
**Analysis Description:** Metals Analyses

**Laboratory Control Sample** LCS-L592015

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Sodium	mg/L	10.0	9.74	97.0	80-120
Strontium	mg/L	0.100	0.101	101	80-120
Zinc	mg/L	0.500	0.504	101	80-120

**Matrix Spike & Matrix Spike Duplicate** Q 98657-MS-L592015 Q 98657-MSD-L592015

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Arsenic	mg/L	<0.0010	0.0500	0.0500	0.0504	0.0542	101	108	75-125	7.2	20
Barium	mg/L	0.041	0.100	0.100	0.138	0.146	96.0	104	75-125	5.6	20
Calcium	mg/L	35.5	10.0	10.0	45.7	47.3	102	118	75-125	3.4	20
Cadmium	mg/L	<0.0010	0.0100	0.0100	0.0092	0.0097	93.0	97.0	75-125	4.7	20
Chromium	mg/L	<0.001	0.100	0.100	0.093	0.095	93.0	96.0	75-125	2.7	20
Iron	mg/L	0.252	10.0	10.0	9.49	9.64	92.0	94.0	75-125	1.5	20
Lead	mg/L	<0.0010	0.0500	0.0500	0.0485	0.0504	97.0	101	75-125	3.8	20
Magnesium	mg/L	10.7	10.0	10.0	19.7	20.3	90.0	96.0	75-125	3.0	20
Manganese	mg/L	0.035	0.100	0.100	0.130	0.135	94.0	99.0	75-125	3.7	20
Potassium	mg/L	8.51	10.0	10.0	18.1	18.8	96.0	103	75-125	3.7	20
Sodium	mg/L	44.7	10.0	10.0	54.0	55.2	93.0	105	75-125	2.1	20
Strontium	mg/L	1.14	0.100	0.100	1.20	1.24	60.0*	100	75-125	3.2	20
Zinc	mg/L	<0.010	0.500	0.500	0.480	0.504	96.0	101	75-125	4.8	20



### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592054      **QC Analytical Batch(es):** L592556,L592848  
**QC Prep Batch Method:** 3005A      **Analysis Method:** 6020B  
**Analysis Description:** Metals Analyses

**Lab Reagent Blank** LRB-L592054      Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed
Dissolved Arsenic	mg/L	<0.0010	0.0010	12/29/21 17:29
Dissolved Barium	mg/L	<0.001	0.001	12/29/21 17:29
Dissolved Cadmium	mg/L	<0.0010	0.0010	12/29/21 17:29
Dissolved Chromium	mg/L	<0.001	0.001	12/29/21 17:29
Dissolved Iron	mg/L	<0.100	0.100	12/29/21 17:29
Dissolved Lead	mg/L	<0.0010	0.0010	12/29/21 17:29
Dissolved Manganese	mg/L	<0.001	0.001	12/29/21 17:29
Dissolved Strontium	mg/L	<0.001	0.001	12/29/21 17:29
Dissolved Zinc	mg/L	<0.010	0.010	12/29/21 17:29

**Laboratory Control Sample** LCS-L592054

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Dissolved Arsenic	mg/L	0.0500	0.0518	104	80-120
Dissolved Barium	mg/L	0.100	0.099	100	80-120
Dissolved Cadmium	mg/L	0.0100	0.0097	98.0	80-120
Dissolved Chromium	mg/L	0.100	0.095	95.0	80-120
Dissolved Iron	mg/L	10.0	9.45	95.0	80-120
Dissolved Lead	mg/L	0.0500	0.0486	97.0	80-120
Dissolved Manganese	mg/L	0.100	0.094	94.0	80-120
Dissolved Strontium	mg/L	0.100	0.098	99.0	80-120
Dissolved Zinc	mg/L	0.500	0.485	97.0	80-120

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592343      **QC Analytical Batch(es):** L592553  
**QC Prep Batch Method:** 7470A      **Analysis Method:** 7470A  
**Analysis Description:** Total Aqueous Mercury Analysis - CVAA

**Lab Reagent Blank** LRB-L592343      Matrix: AQU  
 Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed
Mercury	mg/L	<0.0002	0.0002	12/30/21 14:26

**Laboratory Control Sample** LCS-L592343

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Mercury	mg/L	0.0040	0.0041	103	80-120

**Matrix Spike & Matrix Spike Duplicate** L 98123-MS-L592343 L 98123-MSD-L592343

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Mercury	mg/L	<0.0002	0.0040	0.0040	0.0031	0.0029	79.0*	73.0*	80-120	7.2	20

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592180      **QC Analytical Batch(es):** L592200  
**QC Prep Batch Method:** 5030B      **Analysis Method:** 8260B  
**Analysis Description:** Volatile Organic Compounds - GC/MS

**Lab Reagent Blank** LRB-L592180      Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Benzene	mg/L	<0.001	0.001	12/28/21 23:58		
Ethylbenzene	mg/L	<0.001	0.001	12/28/21 23:58		
Toluene	mg/L	<0.002	0.002	12/28/21 23:58		
o-Xylene	mg/L	<0.001	0.001	12/28/21 23:58		
m,p-Xylene	mg/L	<0.002	0.002	12/28/21 23:58		
4-Bromofluorobenzene (S)				12/28/21 23:58	81.6	71-137
Dibromofluoromethane (S)				12/28/21 23:58	122	70-128
1,2-Dichloroethane - d4 (S)				12/28/21 23:58	103	63-136
Toluene-d8 (S)				12/28/21 23:58	85.0	70-130

**Laboratory Control Sample** LCS-L592180

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Benzene	mg/L	0.100	0.110	110	70-130
Ethylbenzene	mg/L	0.100	0.096	96.0	80-120
Toluene	mg/L	0.100	0.096	96.4	80-120
o-Xylene	mg/L	0.100	0.095	95.0	70-130
m,p-Xylene	mg/L	0.200	0.192	96.0	75-125
4-Bromofluorobenzene (S)				90.4	71-137
Dibromofluoromethane (S)				116	70-128
1,2-Dichloroethane - d4 (S)				97.2	63-136
Toluene-d8 (S)				88.6	70-130

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592180      **QC Analytical Batch(es):** L592200  
**QC Prep Batch Method:** 5030B      **Analysis Method:** 8260B  
**Analysis Description:** Volatile Organic Compounds - GC/MS

**Matrix Spike & Matrix Spike Duplicate**      L 86937-MS-L592180      L 86937-MSD-L592180

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Benzene	mg/L	0.016	0.100	0.100	0.129	0.128	113	112	58-143	0.7	30
Ethylbenzene	mg/L	0.004	0.100	0.100	0.110	0.106	106	102	65-141	3.7	30
Toluene	mg/L	<0.002	0.100	0.100	0.110	0.109	110	109	64-145	0.9	30
o-Xylene	mg/L	<0.001	0.100	0.100	0.109	0.106	109	106	65-142	2.7	30
m,p-Xylene	mg/L	0.004	0.200	0.200	0.217	0.209	106	102	61-149	3.7	30
4-Bromofluorobenzene (S)							93.4	90.4	71-137		
Dibromofluoromethane (S)							120	119	70-128		
1,2-Dichloroethane - d4 (S)							103	105	63-136		
Toluene-d8 (S)							90.0	89.0	70-130		

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592382      **QC Analytical Batch(es):** L592434  
**QC Prep Batch Method:** 5030B      **Analysis Method:** 8260B  
**Analysis Description:** Volatile Organic Compounds - GC/MS

**Lab Reagent Blank**      LRB-L592382      Matrix: AQU  
Associated Lab Samples: 61137

Parameter	Units	Blank Result	ML	Analyzed	% Recovery	% Rec Limits
Benzene	mg/L	<0.001	0.001	12/29/21 13:44		
4-Bromofluorobenzene (S)				12/29/21 13:44	98.4	71-137
Dibromofluoromethane (S)				12/29/21 13:44	95.0	70-128
1,2-Dichloroethane - d4 (S)				12/29/21 13:44	84.2	63-136
Toluene-d8 (S)				12/29/21 13:44	85.4	70-130

**Laboratory Control Sample**      LCS-L592382

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Benzene	mg/L	0.100	0.109	109	70-130
4-Bromofluorobenzene (S)				128	71-137
Dibromofluoromethane (S)				122	70-128
1,2-Dichloroethane - d4 (S)				106	63-136
Toluene-d8 (S)				123	70-130

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L594823      **QC Analytical Batch(es):** L594825  
**QC Prep Batch Method:** SW-9056A (PREP)      **Analysis Method:** 9056A  
**Analysis Description:** Anions by Ion Chromatography

**Lab Reagent Blank** LRB-L594823      Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed
Chloride	mg/L	< 0.400	0.400	01/03/22 22:16
Sulfate	mg/L	< 1.00	1.00	01/03/22 22:16

**Laboratory Control Sample** LCS-L594823

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Chloride	mg/L	50.0	51.7	103	80-120
Sulfate	mg/L	62.5	64.2	103	80-120

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592076      **QC Analytical Batch(es):** L592449  
**QC Prep Batch Method:** MAEPH LA (Aqueous)      **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Lab Reagent Blank** LRB-L592076      Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C10-C12	mg/L	<0.120	0.120	01/07/22 00:16		
Aliphatic >C12-C16	mg/L	<0.120	0.120	01/07/22 00:16		
Aliphatic >C16-C35	mg/L	<0.200	0.200	01/07/22 00:16		
Aromatic >C10-C12	mg/L	<0.120	0.120	01/07/22 00:16		
Aromatic >C12-C16	mg/L	<0.120	0.120	01/07/22 00:16		
Aromatic >C16-C21	mg/L	<0.120	0.120	01/07/22 00:16		
Aromatic >C21-C35	mg/L	<0.140	0.140	01/07/22 00:16		
Chlorooctadecane (S)				01/07/22 00:16	54.0	40-140
OTP Surrogate (S)				01/07/22 00:16	69.0	40-140

**Laboratory Control Sample** LCS-L592076

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C12-C16	mg/L	0.400	0.321	80.2	40-140
Aliphatic >C16-C35	mg/L	1.20	0.929	77.4	40-140
Aromatic >C10-C12	mg/L	0.400	0.377	94.2	40-140
Aromatic >C12-C16	mg/L	0.800	0.693	86.6	40-140
Aromatic >C16-C21	mg/L	0.400	0.401	100	40-140
Chlorooctadecane (S)				51.5	40-140
OTP Surrogate (S)				95.0	40-140

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-356-0028

**QC Prep:** L592661      **QC Analytical Batch(es):** L592664  
**QC Prep Batch Method:** MAVPH LA (Aqueous)      **Analysis Method:** MAVPH LA  
**Analysis Description:** MADEP VPH Rev 1.1

**Lab Reagent Blank** LRB-L592661      Matrix: AQU  
Associated Lab Samples: 61137, 61138, 61139, 61140, 61141

Parameter	Units	Blank Result	MLQ	Analyzed	% Recovery	% Rec Limits
2,5-Dibromotoluene (S)				12/30/21 15:06	114	50-150

**Laboratory Control Sample** LCS-L592661

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C6-C8	mg/L	0.300	0.352	117	70-130
Aliphatic >C8-C10	mg/L	0.600	0.705	118	70-130
Aromatic >C8-C10	mg/L	0.400	0.374	93.5	70-130
2,5-Dibromotoluene (S)				124	50-150



### Shipment Receipt Form

Customer Number: **01308**  
 Customer Name: **ERM**  
 Report Number: **21-356-0028**

#### Shipping Method

Fed Ex       US Postal       Lab       Other :   
 UPS       Client       Courier      Thermometer ID:

Shipping container/cooler uncompromised?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Number of coolers/boxes received	<input type="text" value="1"/>		
Custody seals intact on shipping container/cooler?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Present
Custody seals intact on sample bottles?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Present
Chain of Custody (COC) present?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
COC agrees with sample label(s)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
COC properly completed	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Samples in proper containers?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sample containers intact?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sufficient sample volume for indicated test(s)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
All samples received within holding time?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Cooler temperature in compliance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun.	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Water - Sample containers properly preserved	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Water - VOA vials free of headspace	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Trip Blanks received with VOAs	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Soil VOA method 5035 – compliance criteria met	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
<input type="checkbox"/> High concentration container (48 hr)		<input type="checkbox"/> Low concentration EnCore samplers (48 hr)	
<input type="checkbox"/> High concentration pre-weighed (methanol -14 d)		<input type="checkbox"/> Low conc pre-weighed vials (Sod Bis -14 d)	
Special precautions or instructions included?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	

Comments:

Signature:

Date & Time:

21-356-0028  
01308  
12-22-2021  
17:03:30



ERM  
Project: Henning Management, Hayes, LA

Method Key  
 Fed Ex  
 Courier  
 USPS  
 Client Drop Off  
 Other

Method  
 RUSH - Additional charges apply  
 Special Detection Limit(s)  
 Date Results Needed

Client Name/Address		Client Project Manager/Contact		Billing Information		Method		Purchase Order Number		Site/Facility ID #	
ERM/Houston, TX		Shawn Wilgins		RUSH - Additional charges apply Special Detection Limit(s) Date Results Needed		Fed Ex Courier		USPS Client Drop Off		Site/Facility ID #	
Project Description Henning Management		Project/Site Location (City/State) Hayes, LA		Project Manager Email Shawn.wilgins@ERM.com		Method Key Fed Ex Courier		Method RUSH - Additional charges apply Special Detection Limit(s) Date Results Needed		Purchase Order Number	
Project Number 0526033		Project Manager Phone # 971-303-2385		Project Manager Email Shawn.wilgins@ERM.com		Method Key Fed Ex Courier		Method RUSH - Additional charges apply Special Detection Limit(s) Date Results Needed		Purchase Order Number	
Waypoint ANALYTICAL 235 Highpoint Dr. Ridgeland, MS 39157 (601) 957-2676		Sample Identification Unless noted, all containers per Table II of 40 CFR Part 136.		Matrix (Refer to Key)		Required Analysis / Preservative		Comments/Notes		Cool < 10C Na2S2O3 (Micro Only) Cool <= 6C H2SO4 pH<2 None Required NaOH pH>10 HNO3 pH<2 HCL pH<2 H3PO4 pH<2 Cool <= 6C Na2S2O3	
Date	Time	Number of Containers	Matrix (Refer to Key)	Total Metals	Dissolved Metals (Rad Filter)	BTEX	PAH Fractions (EPA/PT)	Acidity	Chloride	Sulfate	TDS
12/20	1045	8	GW	X	X	X	X	X	X	X	X
	1330			X	X	X	X	X	X	X	X
	1505			X	X	X	X	X	X	X	X
	1630			X	X	X	X	X	X	X	X
12/21	0955			X	X	X	X	X	X	X	X
Client Remarks/Comments: TOTAL METALS: As, Ba, Cd, Cr, Cu, Fe, Pb, Mg, Mn, K, Na, Sr, Zn, Hg DISSOLVED METALS: As, Ba, Cd, Cr, Fe, Pb, Mn, Sr, Zn											
Ice		Custody Seals		Relinquished by: (SIGNATURE)		Date Time		Received by: (SIGNATURE)		Date Time	
O/N		Y/N		Shawn Wilgins		12/21 1420		[Signature]		12/21 1420	
Blank/Cooler Temp		3.6°C		Relinquished by: (SIGNATURE)		Date Time		Received by: (SIGNATURE)		Date Time	
				[Signature]		12/21 1522		[Signature]		12/21 15:22	
				Relinquished by: (SIGNATURE)		Date Time		Received by: (SIGNATURE)		Date Time	
				[Signature]		12/22 1020		[Signature]		12/22 1020	
				Relinquished by: (SIGNATURE)		Date Time		Received by: (SIGNATURE)		Date Time	
				[Signature]		12/22/21 1500		[Signature]		12/22/21 1500	



12/7/2021

ERM

Mr. Shawn Wiggins  
804 Main Street  
Baton Rouge, LA, 70802

Ref: Report Number: 21-326-0003  
Project Description: Project: Henning Management, Hayes, LA  
Project No: 0526033

Dear Mr. Shawn Wiggins:

Waypoint Analytical Louisiana, Inc. received sample(s) on 11/19/2021 for the analyses presented in the following report. The above referenced project has been analyzed per your instructions. Unless otherwise noted, the analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and /or 40 CFR part 136.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance. Analyses reported which indicate "Field" for these parameters were analyzed by the client in the field. Results for solid samples are reported on an as received or "wet weight" basis unless otherwise specified.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

All quality control measures undertaken in accordance with Waypoint Analytical Louisiana, Inc. CompQAP990807A and revisions under the terms of the Louisiana Environmental Laboratory Accreditation Program (Certificate #02041) are within acceptance ranges established in that document with the exception of the items indicated and/or discussed in a Case Narrative.

The results are shown on the attached analysis sheet(s). Be aware that the time analyzed for certain samples (e.g. - BOD, CBOD, etc.) refer to the time the sample batch was begun and not necessarily to the time an individual sample was begun. Thank you for allowing Waypoint Analytical Louisiana, Inc. to serve you. Should I be of further assistance, if you have any questions or need additional information please contact me or client services.

Sincerely,

Anthony J. Albert  
Laboratory Director

*Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis. This report may be reproduced in full only with the written permission of the laboratory and/or the entity to which it is addressed. Results contained herein relate only to the sample(s) submitted to the laboratory.*





## Certification Summary

### Laboratory ID: WP MLA: Waypoint Analytical Louisiana, Inc., Marrero, LA

State	Program	Lab ID	Expiration Date
Georgia	State Program	02041	06/30/2022
Louisiana	State Program - NELAP	02041	06/30/2022

### Laboratory ID: WP MTN: Waypoint Analytical, LLC., Memphis, TN

State	Program	Lab ID	Expiration Date
Alabama	State Program	40750	02/28/2022
Arkansas	State Program	88-0650	02/07/2022
California	State Program	2904	06/30/2022
Florida	State Program - NELAP	E871157	06/30/2022
Georgia	State Program	C044	02/18/2023
Georgia	State Program	04015	06/30/2022
Illinois	State Program - NELAP	200078	10/10/2022
Kentucky	State Program	80215	06/30/2022
Kentucky	State Program	KY90047	12/31/2021
Louisiana	State Program - NELAP	LA037	12/31/2021
Louisiana	State Program - NELAP	04015	06/30/2022
Mississippi	State Program	MS	02/11/2023
North Carolina	State Program	415	12/31/2021
Pennsylvania	State Program - NELAP	68-03195	05/31/2022
South Carolina	State Program	84002	06/30/2022
South Carolina	State Program	84002	06/30/2022
Tennessee	State Program	02027	02/11/2023
Texas	State Program - NELAP	T104704180	09/30/2022
Virginia	State Program	00106	06/30/2022
Virginia	State Program - NELAP	460181	09/14/2022

**Sample Summary Table**

**Report Number:** 21-326-0003  
**Client Project Description:** Project: Henning Management, Hayes, LA  
Project No: 0526033

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
59248	H-15N (6-8')	Soil	11/18/2021 15:20	11/19/2021 18:00		
59248	H-15N (6-8')	Soil	11/18/2021 15:20	11/19/2021 18:00	MAVPH LA	WP MTN
59248	H-15N (6-8')	Soil	11/18/2021 15:20	11/19/2021 18:00	8270D	WP MTN
59248	H-15N (6-8')	Soil	11/18/2021 15:20	11/19/2021 18:00	MAEPH LA	WP MTN
59249	H-15W (6-8')	Soil	11/18/2021 15:50	11/19/2021 18:00		
59249	H-15W (6-8')	Soil	11/18/2021 15:50	11/19/2021 18:00	MAEPH LA	WP MTN
59249	H-15W (6-8')	Soil	11/18/2021 15:50	11/19/2021 18:00	MAVPH LA	WP MTN
59249	H-15W (6-8')	Soil	11/18/2021 15:50	11/19/2021 18:00	8270D	WP MTN
59250	H-15R (6-8')	Soil	11/18/2021 16:25	11/19/2021 18:00	SW-DRYWT	WP MTN
59250	H-15R (6-8')	Soil	11/18/2021 16:25	11/19/2021 18:00	8270D	WP MTN
59251	H-15S (6-8')	Soil	11/19/2021 09:15	11/19/2021 18:00		
59251	H-15S (6-8')	Soil	11/19/2021 09:15	11/19/2021 18:00	8270D	WP MTN
59251	H-15S (6-8')	Soil	11/19/2021 09:15	11/19/2021 18:00	MAVPH LA	WP MTN
59251	H-15S (6-8')	Soil	11/19/2021 09:15	11/19/2021 18:00	MAEPH LA	WP MTN
59252	H-15E (6-8')	Soil	11/19/2021 08:50	11/19/2021 18:00		
59252	H-15E (6-8')	Soil	11/19/2021 08:50	11/19/2021 18:00	8270D	WP MTN
59252	H-15E (6-8')	Soil	11/19/2021 08:50	11/19/2021 18:00	MAVPH LA	WP MTN
59252	H-15E (6-8')	Soil	11/19/2021 08:50	11/19/2021 18:00	MAEPH LA	WP MTN

**Summary of Detected Analytes**

**Project:** Project: Henning Management, Hayes, LA

**Report Number:** 21-326-0003

Client Sample ID	Lab Sample ID					
Method	Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>H-15N (6-8')</b>	<b>A 59248</b>					
SW-DRYWT	% Moisture	22.5	%		12/02/2021 15:01	
<b>H-15W (6-8')</b>	<b>A 59249</b>					
MAVPH LA	Aliphatic >C6-C8	2.95	mg/Kg	2.73	11/30/2021 18:24	
SW-DRYWT	% Moisture	19.7	%		12/02/2021 15:01	
<b>H-15R (6-8')</b>	<b>A 59250</b>					
8270D	Acenaphthene	77.4	mg/Kg	66.7	11/30/2021 19:10	
8270D	2-Methylnaphthalene	92.7	mg/Kg	66.7	11/30/2021 19:10	
SW-DRYWT	% Moisture	20.1	%		12/04/2021 11:26	
<b>H-15S (6-8')</b>	<b>A 59251</b>					
SW-DRYWT	% Moisture	18.2	%		12/02/2021 15:01	
<b>H-15E (6-8')</b>	<b>A 59252</b>					
MAVPH LA	Aliphatic >C6-C8	3.28	mg/Kg	2.54	11/30/2021 19:46	
SW-DRYWT	% Moisture	14.2	%		12/02/2021 15:01	

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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 12/07/2021  
Received : 11/19/2021

Report Number : **21-326-0003**

**REPORT OF ANALYSIS**

Lab No : **59248**

Matrix: **Soil**

Sample ID : **H-15N (6-8')**

Sampled: **11/18/2021 15:20**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Aliphatic >C6-C8	<2.46	mg/Kg	2.46	100	11/30/21 17:43	HRS	MAVPH LA
Aliphatic >C8-C10	<4.93	mg/Kg	4.93	100	11/30/21 17:43	HRS	MAVPH LA
Aromatic >C8-C10	<3.28	mg/Kg	3.28	100	11/30/21 17:43	HRS	MAVPH LA
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/02/21 15:38	MMK	MAEPH LA
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 15:38	MMK	MAEPH LA
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/02/21 15:38	MMK	MAEPH LA
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/02/21 17:20	MMK	MAEPH LA
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 17:20	MMK	MAEPH LA
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/02/21 17:20	MMK	MAEPH LA
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/02/21 17:20	MMK	MAEPH LA
Surrogate: Chlorooctadecane	45.5		Limits: 40-140%	1	12/02/21 15:38	MMK	MAEPH LA
Surrogate: OTP Surrogate	69.3		Limits: 40-140%	1	12/02/21 17:20	MMK	MAEPH LA

**Analytical Method:** SW-DRYWY

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	22.5	%		1	12/02/21 15:01	BMB	A70617

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 12/07/2021  
Received : 11/19/2021

Report Number : **21-326-0003**

**REPORT OF ANALYSIS**

Lab No : **59249**

Matrix: **Soil**

Sample ID : **H-15W (6-8')**

Sampled: **11/18/2021 15:50**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Aliphatic >C6-C8	2.95	mg/Kg	2.73	100	11/30/21 18:24	HRS	MAVPH LA
Aliphatic >C8-C10	<5.45	mg/Kg	5.45	100	11/30/21 18:24	HRS	MAVPH LA
Aromatic >C8-C10	<3.64	mg/Kg	3.64	100	11/30/21 18:24	HRS	MAVPH LA
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/02/21 16:09	MMK	MAEPH LA
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 16:09	MMK	MAEPH LA
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/02/21 16:09	MMK	MAEPH LA
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/02/21 17:43	MMK	MAEPH LA
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 17:43	MMK	MAEPH LA
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/02/21 17:43	MMK	MAEPH LA
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/02/21 17:43	MMK	MAEPH LA
Surrogate: Chlorooctadecane	<b>34.8 *</b>		Limits: 40-140%	1	12/02/21 16:09	MMK	MAEPH LA
Surrogate: OTP Surrogate	45.9		Limits: 40-140%	1	12/02/21 17:43	MMK	MAEPH LA

**Analytical Method:** SW-DRYWT

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	19.7	%		1	12/02/21 15:01	BMB	A70617

**Qualifiers/  
Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor



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Report Number : **21-326-0003**

**REPORT OF ANALYSIS**

Lab No : **59250**

Matrix: **Soil**

Sample ID : **H-15R (6-8')**

Sampled: **11/18/2021 16:25**

**Analytical Method:** 8270D **Prep Batch(es):** **L587066** 11/29/21 16:45  
**Prep Method:** 3546

Test	Results	Units	ML	DF	Date / Time Analyzed	By	Analytical Batch
Acenaphthene	77.4	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Acenaphthylene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Anthracene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Benzo(a)anthracene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Benzo(a)pyrene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Benzo(b)fluoranthene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Benzo(g,h,i)perylene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Benzo(k)fluoranthene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Chrysene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Dibenz(a,h)anthracene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Fluoranthene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Fluorene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Indeno(1,2,3-cd)pyrene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
2-Methylnaphthalene	92.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Naphthalene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Phenanthrene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Pyrene	<66.7	µg/Kg	66.7	1	11/30/21 19:10	BGV	L587163
Surrogate: 2-Fluorobiphenyl	55.0		Limits: 20-120%	1	11/30/21 19:10	BGV	8270D
Surrogate: 4-Terphenyl-d14	60.8		Limits: 22-120%	1	11/30/21 19:10	BGV	8270D
Surrogate: Nitrobenzene-d5	73.9		Limits: 22-120%	1	11/30/21 19:10	BGV	8270D

**Qualifiers/Definitions** \* Outside QC Limit DF Dilution Factor  
MQL Method Quantitation Limit



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Report Date : 12/07/2021  
 Received : 11/19/2021

Report Number : **21-326-0003**

**REPORT OF ANALYSIS**

Lab No : **59250**  
 Sample ID : **H-15R (6-8')**

Matrix: **Soil**  
 Sampled: **11/18/2021 16:25**

**Analytical Method:** SW-DRYWT

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	20.1	%		1	12/04/21 11:26	FMM	L588092

Qualifiers/ Definitions	*	Outside QC Limit	DF	Dilution Factor
	MQL	Method Quantitation Limit		

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Project Project: Henning Management, Hayes, LA  
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Report Date : 12/07/2021  
Received : 11/19/2021

Report Number : **21-326-0003**

**REPORT OF ANALYSIS**

Lab No : **59251**

Matrix: **Soil**

Sample ID : **H-15S (6-8')**

Sampled: **11/19/2021 9:15**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Aliphatic >C6-C8	<2.37	mg/Kg	2.37	100	11/30/21 19:05	HRS	MAVPH LA
Aliphatic >C8-C10	<4.73	mg/Kg	4.73	100	11/30/21 19:05	HRS	MAVPH LA
Aromatic >C8-C10	<3.15	mg/Kg	3.15	100	11/30/21 19:05	HRS	MAVPH LA
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/02/21 16:32	MMK	MAEPH LA
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 16:32	MMK	MAEPH LA
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/02/21 16:32	MMK	MAEPH LA
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/02/21 18:07	MMK	MAEPH LA
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 18:07	MMK	MAEPH LA
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/02/21 18:07	MMK	MAEPH LA
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/02/21 18:07	MMK	MAEPH LA
Surrogate: Chlorooctadecane	71.3		Limits: 40-140%	1	12/02/21 16:32	MMK	MAEPH LA
Surrogate: OTP Surrogate	59.1		Limits: 40-140%	1	12/02/21 18:07	MMK	MAEPH LA

**Analytical Method:** SW-DRYW

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	18.2	%		1	12/02/21 15:01	BMB	A70617

**Qualifiers/**  
**Definitions**

\* Outside QC Limit  
MQL Method Quantitation Limit

DF Dilution Factor

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Project Project: Henning Management, Hayes, LA  
Information : Project No: 0526033

Report Date : 12/07/2021  
Received : 11/19/2021

Report Number : **21-326-0003**

**REPORT OF ANALYSIS**

Lab No : **59252**

Matrix: **Soil**

Sample ID : **H-15E (6-8')**

Sampled: **11/19/2021 8:50**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Aliphatic >C6-C8	3.28	mg/Kg	2.54	100	11/30/21 19:46	HRS	MAVPH LA
Aliphatic >C8-C10	<5.08	mg/Kg	5.08	100	11/30/21 19:46	HRS	MAVPH LA
Aromatic >C8-C10	<3.38	mg/Kg	3.38	100	11/30/21 19:46	HRS	MAVPH LA
Aliphatic >C10-C12	<2.00	mg/Kg	2.00	1	12/02/21 16:56	MMK	MAEPH LA
Aliphatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 16:56	MMK	MAEPH LA
Aliphatic >C16-C35	<4.00	mg/Kg	4.00	1	12/02/21 16:56	MMK	MAEPH LA
Aromatic >C10-C12	<1.00	mg/Kg	1.00	1	12/02/21 18:31	MMK	MAEPH LA
Aromatic >C12-C16	<2.00	mg/Kg	2.00	1	12/02/21 18:31	MMK	MAEPH LA
Aromatic >C16-C21	<2.00	mg/Kg	2.00	1	12/02/21 18:31	MMK	MAEPH LA
Aromatic >C21-C35	<2.00	mg/Kg	2.00	1	12/02/21 18:31	MMK	MAEPH LA
Surrogate: Chlorooctadecane	44.3		Limits: 40-140%	1	12/02/21 00:17	MMK	MAEPH LA
Surrogate: OTP Surrogate	47.0		Limits: 40-140%	1	12/02/21 18:31	MMK	MAEPH LA

**Analytical Method:** SW-DRYWT

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	14.2	%		1	12/02/21 15:01	BMB	A70617

**Qualifiers/  
Definitions**

\*

Outside QC Limit

DF

Dilution Factor

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Prep:** L587066      **QC Analytical Batch(es):** L587163  
**QC Prep Batch Method:** 3546      **Analysis Method:** 8270D  
**Analysis Description:** Semivolatile Organic Compounds - GC/MS

**Lab Reagent Blank**      LRB-L587066      Matrix: SOL  
Associated Lab Samples: 59248, 59249, 59250, 59251, 59252

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Acenaphthene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Acenaphthylene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Anthracene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Benzo(a)anthracene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Benzo(a)pyrene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Benzo(b)fluoranthene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Benzo(g,h,i)perylene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Benzo(k)fluoranthene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Chrysene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Dibenz(a,h)anthracene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Fluoranthene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Fluorene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Indeno(1,2,3-cd)pyrene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
2-Methylnaphthalene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Naphthalene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Phenanthrene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
Pyrene	µg/Kg	< 66.7	66.7	11/30/21 11:20		
2-Fluorobiphenyl (S)				11/30/21 11:20	52.5	20-120
2-Fluorophenol (S)				11/30/21 11:20	44.4	10-85
Nitrobenzene-d5 (S)				11/30/21 11:20	69.3	22-120
Phenol-d6 (S)				11/30/21 11:20	48.3	10-96
4-Terphenyl-d14 (S)				11/30/21 11:20	55.2	22-120
2,4,6-Tribromophenol (S)				11/30/21 11:20	55.8	10-112

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Prep:** L587066      **QC Analytical Batch(es):** L587163  
**QC Prep Batch Method:** 3546      **Analysis Method:** 8270D  
**Analysis Description:** Semivolatile Organic Compounds - GC/MS

**Laboratory Control Sample**      LCS-L587066

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Acenaphthene	µg/Kg	1670	884	52.9	10-146
Acenaphthylene	µg/Kg	1670	765	45.8	10-146
Anthracene	µg/Kg	1670	1010	60.4	10-146
Benzo(a)anthracene	µg/Kg	1670	974	58.3	10-146
Benzo(a)pyrene	µg/Kg	1670	941	56.3	10-146
Benzo(b)fluoranthene	µg/Kg	1670	1130	67.6	10-146
Benzo(g,h,i)perylene	µg/Kg	1670	839	50.2	10-146
Benzo(k)fluoranthene	µg/Kg	1670	1050	62.8	10-146
Chrysene	µg/Kg	1670	975	58.3	10-146
Dibenz(a,h)anthracene	µg/Kg	1670	883	52.8	10-146
Fluoranthene	µg/Kg	1670	1060	63.4	10-146
Fluorene	µg/Kg	1670	933	55.8	10-146
Indeno(1,2,3-cd)pyrene	µg/Kg	1670	872	52.2	10-146
2-Methylnaphthalene	µg/Kg	1670	868	51.9	10-146
Naphthalene	µg/Kg	1670	795	47.6	37-148
Phenanthrene	µg/Kg	1670	1010	60.4	10-146
Pyrene	µg/Kg	1670	1150	68.8	10-146
2-Fluorobiphenyl (S)				44.4	20-120
2-Fluorophenol (S)				36.0	10-85
Nitrobenzene-d5 (S)				53.1	22-120
Phenol-d6 (S)				38.1	10-96
4-Terphenyl-d14 (S)				59.1	22-120
2,4,6-Tribromophenol (S)				53.1	10-112

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Prep:** L587066 **QC Analytical Batch(es):** L587163  
**QC Prep Batch Method:** 3546 **Analysis Method:** 8270D  
**Analysis Description:** Semivolatile Organic Compounds - GC/MS

**Matrix Spike & Matrix Spike Duplicate** A 59248-MS-L587066 A 59248-MSD-L587066

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Acenaphthene	µg/Kg	< 66.7	1630	1630	1050	872	64.4	53.4	10-146	18.5	30.0
Acenaphthylene	µg/Kg	< 66.7	1630	1630	929	789	56.9	48.4	10-146	16.2	30.0
Anthracene	µg/Kg	< 66.7	1630	1630	1070	971	65.6	59.5	10-146	9.7	30.0
Benzo(a)anthracene	µg/Kg	< 66.7	1630	1630	1180	1060	72.3	65.0	10-146	10.7	30.0
Benzo(a)pyrene	µg/Kg	< 66.7	1630	1630	1060	961	65.0	58.9	10-146	9.7	30.0
Benzo(b)fluoranthene	µg/Kg	< 66.7	1630	1630	1170	1150	71.7	70.5	10-146	1.7	30.0
Benzo(g,h,i)perylene	µg/Kg	< 66.7	1630	1630	1170	1070	71.7	65.6	10-146	8.9	30.0
Benzo(k)fluoranthene	µg/Kg	< 66.7	1630	1630	1230	1070	75.4	65.6	10-146	13.9	30.0
Chrysene	µg/Kg	< 66.7	1630	1630	1090	998	66.8	61.2	10-146	8.8	30.0
Dibenz(a,h)anthracene	µg/Kg	< 66.7	1630	1630	1220	1100	74.8	67.4	10-146	10.3	30.0
Fluoranthene	µg/Kg	< 66.7	1630	1630	1150	995	70.5	61.0	10-146	14.4	30.0
Fluorene	µg/Kg	< 66.7	1630	1630	1100	897	67.4	55.0	10-146	20.3	30.0
Indeno(1,2,3-cd)pyrene	µg/Kg	< 66.7	1630	1630	1220	1050	74.8	64.4	10-146	14.9	30.0
2-Methylnaphthalene	µg/Kg	< 66.7	1630	1630	1050	889	64.4	54.5	10-146	16.6	30.0
Naphthalene	µg/Kg	< 66.7	1630	1630	987	855	60.5	52.4	37-148	14.3	30.0
Phenanthrene	µg/Kg	< 66.7	1630	1630	1130	975	69.3	59.8	10-146	14.7	30.0
Pyrene	µg/Kg	< 66.7	1630	1630	1370	1320	84.0	80.9	10-146	3.7	30.0
2-Fluorobiphenyl (S)							55.0	48.1	20-120		
2-Fluorophenol (S)							48.6	33.1	10-85		
Nitrobenzene-d5 (S)							65.4	56.1	22-120		
Phenol-d6 (S)							50.1	40.4	10-96		
4-Terphenyl-d14 (S)							77.6	75.7	22-120		
2,4,6-Tribromophenol (S)							72.7	63.8	10-112		

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Prep:** L587227      **QC Analytical Batch(es):** L587672  
**QC Prep Batch Method:** MAEPH LA (Soil)      **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Lab Reagent Blank**      LRB-L587227      Matrix: SOL  
Associated Lab Samples: 59248, 59249, 59251, 59252

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C10-C12	mg/Kg	<2.00	2.00	12/02/21 10:41		
Aliphatic >C12-C16	mg/Kg	<2.00	2.00	12/02/21 10:41		
Aliphatic >C16-C35	mg/Kg	<4.00	4.00	12/02/21 10:41		
Aromatic >C10-C12	mg/Kg	<1.00	1.00	12/02/21 09:53		
Aromatic >C12-C16	mg/Kg	<2.00	2.00	12/02/21 09:53		
Aromatic >C16-C21	mg/Kg	<2.00	2.00	12/02/21 09:53		
Aromatic >C21-C35	mg/Kg	<2.00	2.00	12/02/21 09:53		
Chlorooctadecane (S)				12/02/21 10:41	65.2	40-140
OTP Surrogate (S)				12/02/21 09:53	71.2	40-140

**Laboratory Control Sample**      LCS-L587227

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C12-C16	mg/Kg	3.33	2.81	84.3	40-140
Aliphatic >C16-C35	mg/Kg	10.0	9.47	94.7	40-140
Aromatic >C10-C12	mg/Kg	3.33	1.68	50.4	40-140
Aromatic >C12-C16	mg/Kg	6.67	3.83	57.4	40-140
Aromatic >C16-C21	mg/Kg	3.33	3.81	114	40-140
Chlorooctadecane (S)				83.8	40-140
OTP Surrogate (S)				89.2	40-140

**Matrix Spike & Matrix Spike Duplicate**      A 59249-MS-L587227      A 59249-MSD-L587227

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aliphatic >C12-C16	mg/Kg	<2.00	3.31	3.32	3.24	2.94	97.8	88.5	40-140	9.7	25
Aliphatic >C16-C35	mg/Kg	<4.00	9.93	9.97	10.5	8.28	106	83.0	40-140	23.6	25



### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Prep:** L587227 **QC Analytical Batch(es):** L587672  
**QC Prep Batch Method:** MAEPH LA (Soil) **Analysis Method:** MAEPH LA  
**Analysis Description:** MADEP EPH Rev 1.1

**Matrix Spike & Matrix Spike Duplicate** A 59249-MS-L587227 A 59249-MSD-L587227

Parameter	Units	Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS %Rec	MSD %Rec	%Rec Limits	RPD	Max RPD
Aromatic >C10-C12	mg/Kg	<1.00	3.31	3.32	2.14	2.40	64.6	72.2	40-140	11.4	25
Aromatic >C12-C16	mg/Kg	<2.00	6.62	6.64	3.92	5.26	59.2	79.2	40-140	29.1*	25
Aromatic >C16-C21	mg/Kg	<2.00	3.31	3.32	3.20	4.82	96.6	145*	40-140	40.3*	25
Chlorooctadecane (S)							75.3	51.8	40-140		
OTP Surrogate (S)							74.6	86.1	40-140		

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Prep:** L587480      **QC Analytical Batch(es):** L587485  
**QC Prep Batch Method:** MAVPH LA (Soil)      **Analysis Method:** MAVPH LA  
**Analysis Description:** MADEP VPH Rev 1.1

**Lab Reagent Blank** LRB-L587480      Matrix: SOL  
Associated Lab Samples: 59248, 59249, 59251, 59252

Parameter	Units	Blank Result	MQL	Analyzed	% Recovery	% Rec Limits
Aliphatic >C6-C8	mg/Kg	<3.00	3.00	11/30/21 17:02		
Aliphatic >C8-C10	mg/Kg	<6.00	6.00	11/30/21 17:02		
Aromatic >C8-C10	mg/Kg	<4.00	4.00	11/30/21 17:02		
2,5-Dibromotoluene (S)				11/30/21 17:02	96.0	50-150

**Laboratory Control Sample** LCS-L587480

Parameter	Units	Spike Conc.	LCS Result	LCS %Rec	% Rec Limits
Aliphatic >C6-C8	mg/Kg	60.0	70.3	117	50-150
Aliphatic >C8-C10	mg/Kg	120	145	121	50-150
Aromatic >C8-C10	mg/Kg	80.0	74.2	92.7	50-150
2,5-Dibromotoluene (S)				120	50-150

**Quality Control Data**

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Analytical Batch:** A70617  
**Analysis Method:** SW-DRYWT  
**Analysis Description:** Dry Weight Determination

**Duplicate** A 59242-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
% Moisture	%	25.9	27.3	5.2	20.0	12/02/21 15:01

### Quality Control Data

**Client ID:** ERM  
**Project Description:** Project: Henning Management, Hayes, LA  
**Report No:** 21-326-0003

**QC Analytical Batch:** L588092  
**Analysis Method:** SW-DRYWT  
**Analysis Description:** Dry Weight Determination

**Duplicate** A 59250-DUP

Parameter	Units	Result	DUP Result	RPD	Max RPD	Analyzed
% Moisture	%	20.1	18.7	7.2	20.0	12/04/21 11:26

### Shipment Receipt Form

Customer Number: **01308**  
 Customer Name: **ERM**  
 Report Number: **21-326-0003**

#### Shipping Method

Fed Ex       US Postal       Lab       Other :   
 UPS       Client       Courier      Thermometer ID:

Shipping container/cooler uncompromised?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Number of coolers/boxes received	<input type="text" value="1"/>		
Custody seals intact on shipping container/cooler?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Present
Custody seals intact on sample bottles?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Present
Chain of Custody (COC) present?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
COC agrees with sample label(s)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
COC properly completed	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Samples in proper containers?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sample containers intact?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sufficient sample volume for indicated test(s)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
All samples received within holding time?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Cooler temperature in compliance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun.	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Water - Sample containers properly preserved	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Water - VOA vials free of headspace	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Trip Blanks received with VOAs	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Soil VOA method 5035 – compliance criteria met	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
<input type="checkbox"/> High concentration container (48 hr)		<input type="checkbox"/> Low concentration EnCore samplers (48 hr)	
<input type="checkbox"/> High concentration pre-weighed (methanol -14 d)		<input type="checkbox"/> Low conc pre-weighed vials (Sod Bis -14 d)	
Special precautions or instructions included?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	

Comments:

Signature:

Date & Time:

21-326-0003  
 01308  
 11-22-2021  
 11-42-40



ERM  
 Project: Henning Management, Hayes, LA

Client Name/Address  
 ERM  
 Shawn Wiggins

Project Description  
 Henning Management  
 Hayes, LA

Project/Site Location (City/State)  
 Hayes, LA

Project Number  
 0526033

Project Manager/Contact  
 Shawn Wiggins

Project Manager Phone #

Project Manager Email

Purchase Order Number  
 0526033

Site/Facility ID #

Method of Shipment  
 Fed Ex  
 UPS  
 Courier  
 Client Drop Off  
 Other

RUSH - Additional charges apply  
 Special Detection Limit(s)  
 Date Results Needed

Matrix (Refer to Key)

Number of Containers  
 5  
 5  
 5  
 5  
 5

(G/rab or (C)omposite)

TPH Fractions  
 PAHs  
 % Moisture

Required Analysis / Preservative

Date  
 11/18/21 1520  
 11/19/21 1550  
 11/19/21 1625  
 11/19 915  
 11/19 950

Sample Identification  
 H-15N(6-8')  
 H-15W(6-8')  
 H-15R(6-8')  
 H-15S(6-8')  
 H-15E(6-8')

59 248  
 59 249  
 59 250  
 59 251  
 59 252

0 = extract & hold  
 0 = extract & hold  
 0 = extract & hold  
 0 = extract & hold

Comments/Notes

Client Remarks/Comments

Received by: (SIGNATURE)  
 11/19/21 1315  
 Received by: (SIGNATURE)  
 11-19-21 1800

Date Time  
 11-19-21 1315  
 11-19-21 1800

Date Time  
 11-19-21 1315  
 11-19-21 1800

Date	Time	Sample Identification	Number of Containers	Matrix (Refer to Key)	(G/rab or (C)omposite)	TPH Fractions	PAHs	% Moisture	Required Analysis / Preservative	Comments/Notes
11/18/21	1520	H-15N(6-8')	5	S G	X	0	0	X	59 248	0 = extract & hold
11/19/21	1550	H-15W(6-8')	5	S G	X	0	0	X	59 249	0 = extract & hold
11/19/21	1625	H-15R(6-8')	5	S G	X	0	0	X	59 250	
11/19	915	H-15S(6-8')	5	S G	X	0	0	X	59 251	0 = extract & hold
11/19	950	H-15E(6-8')	5	S G	X	0	0	X	59 252	0 = extract & hold

Sampled by (Name - Print)  
 Cory Hunter/David Sanguetti

Relinquished by: (SIGNATURE)  
 Cory Hunter  
 Relinquished by: (SIGNATURE)  
 David Sanguetti  
 Relinquished by: (SIGNATURE)

Relinquished by: (SIGNATURE)

For Laboratory Use Only

Ice  
 2/1N

Custody Seals  
 V10

Blank/Cooler Temp  
 2.3