2023 Annual Groundwater Monitoring and Corrective Action Report

CCR Annual Monitoring Report

Fly Ash Area Landfill and Bottom Ash Area Landfill

Bonanza Power Plant
Vernal, Utah

Prepared for
Deseret Power Electric Cooperative

January 2024

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Acronyms

Acronym	Description
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
FGD	Flue Gas Desulfurization
SSI	Statistically Significant Increase

Summary for CCR Units §257.90(e)(6)

At the beginning, end, and throughout 2023, the CCR units were operating under a detection monitoring program as described in 40 CFR 257.94. Pursuant to §257.94, statistically significant increases (SSIs) were determined for pH at monitoring wells BA-DG1 and BA-DG3 during the Fall 2022 sampling event, for fluoride at monitoring well FA-DG4 during the spring 2023 and fall 2023 sampling events and for pH at monitoring well BA-DG3 during the spring 2023 and fall 2023 sampling events. The 2023 monitoring data are shown on the (oversized) Large Table 1.

An alternative source demonstration (ASD) has been completed for these well/parameter SSIs for the fall 2022 and spring 2023 events, as summarized in Appendix B of this report. The statistical results of the fall 2023 detection monitoring event have been evaluated, and an alternative source investigation is ongoing, with results, including an ASD if appropriate, anticipated in spring 2024. Therefore, no assessment monitoring program (§257.95), or related corrective or remedial measures (§§257.96, 257.97, and 257.98), were necessary for 2023.

1 Introduction

Deseret Power Electric Cooperative (Deseret) operates Bonanza Power Plant, a 500 MW coal-fired generation unit near Vernal, Utah. Coal combustion residuals (CCR) from the generating station are placed in two on-site CCR units: the Fly Ash Area Landfill and the Bottom Ash Landfill as shown on Figure 1.

These landfills are existing CCR landfills that are required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261 Disposal of Coal Combustion Residuals from Electric Utilities). The Fly Ash Area landfill contains primarily fly ash and flue gas desulfurization (FGD) solids. The Bottom Ash Area landfill is used to manage bottom ash and boiler slag from the facility.

The location of each of the landfills and their associated groundwater monitoring systems are depicted in Figure 1. These systems are not considered Multiunit Groundwater Monitoring Systems.

1.1 Purpose

As stated in §257.90(e), the purpose of the Annual Groundwater Monitoring and Corrective Action Report (Annual Report) is to:

- Document the status of the monitoring and corrective action program for the CCR units
- Summarize key actions completed
- Describe any problems encountered
- Discuss actions to resolve the problems
- Highlight key activities for the upcoming year

1.2 Status of the Groundwater Monitoring and Corrective Action Program

- Both CCR units were in detection monitoring
- All wells in the CCR groundwater monitoring system were sampled and analyzed for Appendix III parameters

1.3 CCR Rule Requirements

This Annual Report has been prepared in accordance with the requirements of §257.90(e) of the CCR Rule, as outlined in the following Table 1-1.

Table 1-1 CCR Rule Requirements

CCR Rule Reference	Content Required in Report	Location
§257.90(e)(1)	Map showing the CCR unit and all monitoring wells that are part of the groundwater monitoring system	Section 2.1.1 Documentation; see Figure 1
§257.90(e)(2)	Discuss any new or decommissioned monitoring wells	Section 2.1.2 Changes to Monitoring System
§257.90(e)(3)	Provide the number and date groundwater samples were collected, and the monitoring (i.e., detection or assessment)	Section 2.2 Monitoring and Analytical Results
§257.90(e)(4)	Discuss any transition between monitoring programs	Not applicable- no transition between monitoring programs has occurred.
§257.90(e)(5)	Other information specified in §257.90 through §257.98	Section 2.4 Key Actions Completed/Problems Encountered
§257.90(e)(6)	Overview at beginning of annual report	Summary for CCR Units §257.90(e)(6)

2 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR units for 2023. The groundwater monitoring system is described in Section 2.1, the monitoring and analytical results are described in Section 2.2, groundwater direction and flow rates in Section 2.3, key actions completed and problems encountered are described in Section 2.4, and key activities planned for 2024 are described in Section 2.5.

2.1 Groundwater Monitoring System

2.1.1 Documentation

Figure 1 shows an aerial image of the CCR units and all background (or upgradient) and downgradient monitoring wells, including the well identification numbers, that are part of the groundwater monitoring program, as required by §257.90(e)(1).

2.1.2 Changes to Monitoring System

An existing water level piezometer in the Fly Ash Area previously labeled PZ-212 was added to the groundwater monitoring system in late 2022 as a downgradient well (Figure 1). This well was installed in late 2021 during the hydrogeologic investigation being conducted separately from the CCR monitoring. PZ-212 was renamed FA-DG5 to join the CCR groundwater monitoring system. A baseline sampling program was initiated in December 2022 to collect eight independent samples per the CCR Rule. Baseline monitoring concluded in September 2023, and FA-DG5 was included in the SSI evaluation during the fall 2023 monitoring event.

The location of FA-DG5 is downgradient of the boundary between where upgradient groundwater predominantly from the north (represented by FA-UG1) mixes with groundwater from the west (Figure 3).

In early 2023, downgradient well BA-DG4 was added to the well network for the Bottom Ash Area (Figure 1). A baseline sampling program has been initiated to collect eight independent samples per the CCR Rule. A well log is included in Appendix D. The baseline samples will be collected on an approximately 6-week schedule.

The results of 2022-2023 baseline sampling for FA-DG5 and BA-DG4 are included in Appendix D.

2.2 Monitoring and Analytical Results

2.2.1 Existing Monitoring System Wells

As shown in Table 2-1 below, a total of nine detection monitoring groundwater samples were collected during the spring 2023 semiannual sampling event, and ten samples were collected during the fall 2023 semiannual sampling event from the monitoring system wells. Results from the 2023 sampling events are included in Table 2-2, Table 2-3, Large Table 1, and Appendix A.

Table 2-1 Semiannual Detection Monitoring Well Sample Events

Well	Spring 2023 Semiannual Monitoring Date	Spring 2023 Resampling Date	Fall 2023 Semiannual Monitoring Date
FA-UG1	5/1/2023	--	10/18/2023
FA-UG2 (PZ-11)	5/1/2023	--	10/18/2023
FA-DG2	5/1/2023	--	10/24/2023
FA-DG3	5/2/2023	--	10/24/2023
FA-DG4	5/2/2023	6/28/2023	10/24/2023
FA-DG5	--	--	10/16/2023
BA-UG1	5/8/2023	--	10/18/2023
BA-DG1	5/8/2023	6/28/2023	10/17/2023
BA-DG2	5/8/2023	--	10/17/2023
BA-DG3	5/8/2023	6/28/2023	10/17/2023

Fall 2022 SSIs and Subsequent ASD

Sampling for the fall 2022 monitoring event was conducted on October 10-12 and 17, 2022. Data received on October 31, 2022, indicated two potential SSIs for the fall 2022 event: pH at BA-DG1 and BA-DG3. On December 6-7, 2022, verification resamples were taken from wells BA-DG1 and BA-DG3 to verify the potential pH SSIs identified from the fall 2022 event. This information was included in the 2022 Annual Report (Barr, 2023). SSIs were determined for pH at monitoring wells BA-DG1 and BA-DG3.

An Alternative Source Demonstration (ASD) memorandum regarding the fall 2022 SSIs was completed on April 29, 2023. The results of the ASD concluded that the SSIs were attributable to a source other than the CCR units listed in this report. The ASD is provided in Appendix B.

Spring 2023 SSIs and Subsequent ASD

Table 2-2 summarizes the verified SSIs determined from the spring 2023 event. During the May 1-2 and 8, 2023, sampling event, potential SSIs for fluoride at BA-DG1 and FA-DG4 and pH at BA-DG1 and BA-DG3 were identified. Verification resampling was conducted on June 28, 2023. The complete dataset for the detection monitoring event can be found in Large Table 1.

Table 2-2 Verified SSIs for the Spring 2023 Event

Well	Constituent/SSI
BA-DG3	pH
FA-DG4	Fluoride

An ASD was completed with regard to the SSIs for pH and fluoride identified in Table 2-2 on October 31, 2023. The ASD is included in Appendix B and concluded that the SSIs were attributable to a source other than the CCR unit.

Fall 2023 Sampling Event

Sampling for the fall 2023 monitoring event was conducted on October 16-18 and 24, 2023. Preliminary statistical assessment of the fall 2023 results again indicated elevated pH at monitoring well BA-DG3 and elevated fluoride at monitoring well FA-DG4 (Large Table 1).

Table 2-3 summarizes the preliminary SSIs determined from the fall event. If verified, the fall 2023 SSIs will be evaluated against previous ASDs, and a new ASD will be generated if appropriate.

Table 2-3 Preliminary SSIs for the Fall 2023 Event

Well	Constituent/SSI
BA-DG3	pH
FA-DG4	Fluoride

2.3 Groundwater Flow Direction and Rates

Groundwater flow rates and gradients were calculated using the data collected from the 2023 water level measurements and from aquifer property data presented in the 2017 Groundwater Monitoring System Certification (Burns & McDonnell, 2017a). The calculation tables for groundwater flow rates, directions, and gradients are located in Appendix C. Groundwater elevation contours are shown for each semiannual sampling event on Figure 2 and Figure 3 for the Fly Ash Area and on Figure 4 and Figure 5 for the Bottom Ash Area.

The groundwater in the Fly Ash Landfill area generally flows in the southeast direction (Figure 2 and Figure 3) at rates ranging from a low of 0.002 ft/day to a high of 0.099 ft/day with an average horizontal gradient of 0.004. Groundwater in the Bottom Ash Landfill area generally flows south (Figure 4 and Figure 5) at rates ranging from 0.006 ft/day to 0.051 ft/day with an average horizontal gradient of 0.004 (Appendix C).

The flow direction in the northeast corner of the North Evaporation Pond is deflected to the east likely due to mounding of the water table under the pond. Groundwater flow upgradient of the Bottom Ash Landfill is partly influenced by the capture zone created by the Pumpback system, which creates an area of drawdown near the center of the plant site and creates a flow divide north of BA-UG1 so that groundwater flow is generally inward toward the main power block (Loughlin, 2017).

2.4 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program through 2023:

- Completed semiannual detection monitoring sampling for each background and downgradient well.
- Conducted statistical evaluation of the spring 2023 and fall 2023 groundwater detection monitoring data.

- Determined, pursuant to §257.93(h), that an SSI over background levels did not occur for any of the constituents listed in Appendix III at any downgradient monitoring well with the exception of pH at BA-DG3 and fluoride at FA-DG4 during the spring and fall 2023 events, as shown in Table 2-2 and Table 2-3.
- Successful ASDs concluded that the source of the SSIs in fall 2022 and spring 2023 was not the CCR unit. The ASDs for fall 2022 and spring 2023 are provided in Appendix B.
- Conducted baseline sample collection at FA-DG5 and added FA-DG5 to the CCR monitoring network for the fall 2023 semiannual monitoring event.
- Implemented baseline sample collection at BA-DG4.

No problems were encountered in 2023.

2.5 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2024:

- Continue semiannual detection monitoring according to the Sampling and Analysis Program (Deseret, 2016).
- Evaluate analytical results from two 2024 semiannual detection monitoring events for SSIs according to the CCR Selected Statistical Method Certification (Burns & McDonnell, 2017b).
- Review the conceptual site model and provide recommendations for improvements to the monitoring well network if needed.
- The fall 2023 SSIs will be evaluated against previous ASDs, and a new ASD will be generated for the fall 2023 results per the CCR rule and included in the 2024 Annual CCR Report if appropriate; the site will transition to assessment monitoring if no successful ASD is completed.
- Add BA-DG4 to the CCR monitoring network once baseline sampling is completed.

3 References

Barr, 2023, 2022 Annual Groundwater Monitoring and Corrective Action Report, Bonanza Power Plant. Prepared for Deseret Power Electric Cooperative. January 2023.

Burns & McDonnell, 2017a, Groundwater Monitoring System Certification – Bonanza Power Plant, Vernal, Utah. October 2017.

Burns & McDonnell, 2017b, Selected Statistical Method Certification, Deseret Generation and Transmission Cooperative – Bonanza Power Plant, Vernal, Utah. October 2017.

Deseret Power Electric Cooperative, 2016, Bonanza Power Plant CCR Groundwater Monitoring Wells Sampling and Analysis Program. May 2016.

Loughlin Water Associates, 2017. Bonanza Power Plant, Coal Combustion Residuals, Monitoring Well Installation Report. Pumpback Capture Zone shown on Drawing 6. January 2017.

Large Tables

Large Table 1
Water Quality Analytical Data Summary
2023 CCR Annual Report
Deseret Power Cooperative

Appendix III Parameters			Boron, total	Calcium, total	Chloride	Fluoride	pH [1]	Solids, total dissolved	Sulfate, as SO4	Water Level Elevation
Analysis Location			Lab	Lab	Lab	Lab	Field	Lab	Lab	Field
Units			mg/l	mg/l	mg/l	mg/l	pH units	mg/l	mg/l	ft asml
Location	Date	Sample Type								
Bottom Ash Landfill										
BA - DG1	5/08/2023	N	**15.5**	**165**	**1360**	**7.80**	**7.1**	**9700**	**4420**	**4986.78**
BA - DG1	6/28/2023	R	--	--	--	**3.99**	**7.3**	--	--	**4986.63**
BA - DG1	6/28/2023	R/FD	--	--	--	**3.97**	--	--	--	--
BA - DG1	10/17/2023	N	**10.8**	**187**	**748**	< 0.100 U	**7.4**	**10600**	**4800**	**4986.33**
BA - DG2	5/08/2023	N	**53.5**	**363**	**719**	**5.04**	**7.1**	**12300**	**7530**	**4986.69**
BA - DG2	10/17/2023	N	**37.0**	**392**	**709**	**3.33**	**7.2**	**13100**	**7770**	**4986.36**
BA - DG3	5/08/2023	N	**9.73**	**29.2**	**428**	**9.39**	**8.1**	**5000**	**2610**	**4985.44**
BA - DG3	6/28/2023	R	--	--	--	--	**8.2**	--	--	**4985.37**
BA - DG3	10/17/2023	N	**8.96**	**32.4**	**399**	**9.77**	**8.1**	**5000**	**2460**	**4985.07**
BA - DG3	10/17/2023	FD	**7.66**	**27.1**	**532**	**7.95**	--	**5130**	**2150**	--
BA - UG1	5/08/2023	N	**218**	**353**	**1370**	**15.0**	**6.9**	**19400**	**10500**	**4995.8**
BA - UG1	10/18/2023	N	**138**	**444**	**1450**	**7.57**	**7.1**	**17600**	**9940**	**4995.67**
Fly Ash Landfill										
FA - DG2	5/01/2023	N	**8.30**	< 2.0 U	**715**	**50.1**	**9.0**	**13500 H**	**4980**	**5025.66**
FA - DG2	10/24/2023	N	**7.71**	< 2.0 U	**730**	**47.8**	**9.1**	**12600**	**5130**	**5025.41**
FA - DG3	5/02/2023	N	**2.25**	**2.8**	**237**	**8.06**	**8.6**	**3900 H**	**1560**	**5025.93**
FA - DG3	10/24/2023	N	**2.29**	**3.1**	**220**	**7.67**	**8.7**	**3550**	**1630**	**5025.53**
FA - DG4	5/02/2023	N	**11.3**	**56.2**	**984**	**6.45**	**7.5**	**9500 H**	**3930**	**5025.36**
FA - DG4	6/28/2023	R	--	--	--	**5.38**	**7.6**	--	--	**5025.19**
FA - DG5	10/16/2023	N	**62.2**	**536**	**1810**	**0.981**	**7.3**	**12100 J**	**8910**	**5026.24**
FA - DG5	10/16/2023	FD	**62.1**	**548**	**1940**	**1.03**	--	**19000 J**	**9460**	--
FA - UG1	5/01/2023	N	**0.78**	**8.0**	**33.6**	**2.03**	**7.9**	**1010 H**	**360 J-**	**5044.23**
FA - UG1	5/01/2023	FD	**0.73**	**9.6**	**35.8**	**2.32**	--	**1050 H**	**384**	--
FA - UG1	10/18/2023	N	**0.76**	**7.4**	**616**	**1.95**	**8.2**	**1720**	**329**	**5043.94**
FA - UG2	5/01/2023	N	**55.5**	**506**	**1650**	**0.206**	**6.8**	**15300 H**	**8120**	**5040.58**
FA - UG2	10/18/2023	N	**46.8**	**536**	**1530**	**0.740**	**7.0**	**16800**	**7910**	**5040.36**

Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

--	Not analyzed/Not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
R	Sample Type: Verification Resample
NA	NA (not applicable) indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
1	pH was rounded to the nearest tenth for statistical analysis due to instrument precision
H	Recommended sample preservation, extraction or analysis holding time was exceeded.
J-	The result is an estimated quantity and may be biased low.
J	Estimated detected value. Either certain QC criteria were not met or the concentration is between the laboratory's detection and quantitation limits.
U	The analyte was analyzed for, but was not detected.

Figures

FA-UG1
Fly Ash Landfill
FA-UG2
FA-DG1
FA-DG2
FA-DG4
FA-DG3
FA-DG5
North Evaporation Pond
Raw Water Storage Pond
South Evaporation Pond
Recycle Pond
Coal Pile
Main Power Block
Sludge Pond
Sludge Pond
Emergency Holding Pond
Circulating Water Blowdown Pond
Cooling Tower #1
BA-UG1
Bottom Ash Landfill
BA-DG1
BA-DG3
BA-DG2
BA-DG4
Site Location

Monitoring Locations
Building
Coal Pile
Landfill
Pond
Property Boundary

N
0 450 900
Feet

SITE LOCATION
Bonanza Plant
Deseret Power
Uinta County, Utah

FIGURE 1

BARR

Imagery: USDA NAIP, 2021

Barr Footer: ArcGIS 10.8.1, 2024-01-17 22:32 File: I:\Projects\44\24\1001\Maps\Reports\2023_Annual_Report\Figure 2 - Groundwater Elevation Contours, Fly Ash Area, May 2023.mxd User: ACR

FA-UG1
5044.23

FA-UG2
5040.58

FA-DG2
5025.79

FA-DG3
5025.84

FA-DG4
5025.33

5044
5043
5042
5041
5040
5039
5038
5037
5036
5035
5034
5033
5032
5031
5030
5029
5028
5035

DRY
DRY

Fly Ash Landfill

North Evaporation Pond

South Evaporation Pond

Recycle Pond

Raw Water
Storage Pond

Coal Pile

Main Power Block

Sludge Pond

Sludge Pond

Emergency
Holding Pond

Circulating Water
Blowdown Pond

Monitoring Locations

Approximate Interpreted Limits of
Continuously Saturated Aquifer

Estimated Pumpback System
Capture Zone (Loughlin, 2017)

Building
Coal Pile
Landfill
Pond
Property Boundary

May 2023 Groundwater Contours

N

0 500 1,000
Feet

GROUNDWATER ELEVATION CONTOURS
FLY ASH AREA
Measured: May 2023
Bonanza Plant
Deseret Power
Uinta County, Utah

FIGURE 2

BARR

Imagery: USDA NAIP, 2018

FA-UG1
5043.95

FA-UG2
5040.35

FA-DG2
5025.49

FA-DG3
5025.63

FA-DG4
5024.77

FA-DG5
5026.08

Fly Ash Landfill

North Evaporation Pond

South Evaporation Pond

Recycle Pond

Raw Water
Storage Pond

Coal Pile

Main Power Block

Sludge Pond

Sludge Pond

Emergency
Holding Pond

Circulating Water
Blowdown Pond

DRY

DRY

5043
5042
5041
5040
5039
5038
5037
5036
5035
5034
5033
5032
5031
5030
5029
5028
5034

Monitoring Locations

Approximate Interpreted Limits of Continuously Saturated Aquifer

Estimated Pumpback System Capture Zone (Loughlin, 2017)

Building
Coal Pile
Landfill
Pond
Property Boundary

October 2023 Groundwater Contours

N

0 500 1,000
Feet

GROUNDWATER ELEVATION CONTOURS
FLY ASH AREA
Measured: October 2023
Bonanza Plant
Deseret Power
Uinta County, Utah

FIGURE 3

BARR

Imagery: USDA NAIP, 2018

Main Power Block

Sludge Pond

Sludge Pond

Emergency Holding Pond

Circulating Water Blowdown Pond

Cooling Tower #1

Bottom Ash Landfill

BA-UG1
4995.84

4995

4994

4993

4992

4991

4990

4989

4988

4987

4986

BA-DG1
4986.77

BA-DG2
4986.73

BA-DG3
4985.52

Monitoring Locations

Estimated Pumpback System Capture Zone (Loughlin, 2017)

May 2023 Groundwater Contours

Building

Coal Pile

Landfill

Pond

Property Boundary

N

0 500 1,000

Feet

GROUNDWATER ELEVATION CONTOURS
BOTTOM ASH AREA
Measured: May 2023
Bonanza Plant
Deseret Power
Uinta County, Utah

FIGURE 4

BARR

Imagery: USDA NAIP, 2018

Main Power Block

Sludge Pond

Sludge Pond

Emergency Holding Pond

Circulating Water Blowdown Pond

Cooling Tower #1

BA-UG1
4995.71

Bottom Ash Landfill

4995

4994

4993

4992

4991

4990

4990

4989

4988

4987

4986

BA-DG1
4986.35

BA-DG2
4986.36

BA-DG3
4985.06

BA-DG4
4985.37

Monitoring Locations

Estimated Pumpback System Capture Zone (Loughlin, 2017)

October 2023 Groundwater Contours

Building

Coal Pile

Landfill

Pond

Property Boundary

N

0 500 1,000

Feet

GROUNDWATER ELEVATION CONTOURS
BOTTOM ASH AREA
Measured: October 2023
Bonanza Plant
Deseret Power
Uinta County, Utah

FIGURE 5

BARR

Imagery: USDA NAIP, 2018

Appendices

Appendix A

Laboratory Reports and Field Sheets

CHEMTECH-FORD
LABORATORIES

2/10/2023

Work Order: 23B0145
Project: PZ-212

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories
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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **183244**
Receipt: **2/2/23 10:30 @ 1.6** °C
Date Reported: 2/10/2023
Project Name: **PZ-212**

Sample ID: **PZ-212**

Matrix: **Water**
Lab ID: **23B0145-01**
Date Sampled: **1/31/23 9:23**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Alkalinity - Bicarbonate (as CaCO3)	359	mg/L	1.0	SM 2320 B	2/3/23	2/3/23	
Alkalinity - Carbonate (as CaCO3)	ND	mg/L	1.0	SM 2320 B	2/3/23	2/3/23	
Alkalinity - Hydroxide (as CaCO3)	ND	mg/L	1.0	SM 2320 B	2/3/23	2/3/23	
Alkalinity - Total (as CaCO3)	359	mg/L	1.0	SM 2320 B	2/3/23	2/3/23	
Chloride	1970	mg/L	20.0	EPA 300.0	2/2/23	2/2/23	
Fluoride	0.202	mg/L	0.100	EPA 300.0	2/2/23	2/2/23	
Sulfate	8800	mg/L	100	EPA 300.0	2/6/23	2/6/23	
Total Dissolved Solids (TDS)	32500	mg/L	500	SM 2540 C	2/2/23	2/2/23	
Metals							
Antimony, Total	ND	mg/L	0.0010	EPA 200.8	2/3/23	2/6/23	
Arsenic, Total	0.0195	mg/L	0.0010	EPA 200.8	2/3/23	2/6/23	
Barium, Total	0.068	mg/L	0.005	EPA 200.7	2/3/23	2/6/23	
Beryllium, Total	ND	mg/L	0.0010	EPA 200.8	2/3/23	2/6/23	
Boron, Total	57.5	mg/L	0.05	EPA 200.7	2/3/23	2/6/23	
Cadmium, Total	ND	mg/L	0.0004	EPA 200.8	2/3/23	2/6/23	
Calcium, Total	533	mg/L	0.2	EPA 200.7	2/3/23	2/6/23	
Chromium, Total	0.0069	mg/L	0.0010	EPA 200.8	2/3/23	2/6/23	
Cobalt, Total	0.03	mg/L	0.01	EPA 200.7	2/3/23	2/6/23	
Lead, Total	0.0026	mg/L	0.0010	EPA 200.8	2/3/23	2/6/23	
Lithium, Total	0.736	mg/L	0.005	EPA 200.7	2/3/23	2/6/23	
Magnesium, Total	856	mg/L	0.2	EPA 200.7	2/3/23	2/6/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	2/2/23	2/3/23	
Molybdenum, Total	0.02	mg/L	0.01	EPA 200.7	2/3/23	2/6/23	
Phosphorus, Total as P	0.2	mg/L	0.01	EPA 200.7	2/3/23	2/6/23	
Potassium, Total	5.6	mg/L	0.5	EPA 200.7	2/3/23	2/6/23	
Selenium, Total	0.0535	mg/L	0.0010	EPA 200.8	2/3/23	2/6/23	
Sodium, Total	3840	mg/L	25.0	EPA 200.7	2/3/23	2/6/23	
Thallium, Total	ND	mg/L	0.0004	EPA 200.8	2/3/23	2/6/23	

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **183244**
Receipt: **2/2/23 10:30 @ 1.6** °C
Date Reported: 2/10/2023
Project Name: **PZ-212**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 183244

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23B0145 Racks on 23B1048

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. PZ-212	1-31-23	09:23	Water		X	X	X	X	X	X	X	X	X	X										
	2.																								
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

UPS

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
( ) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: DB

Aq-1233, M-1264

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.6

Special Instructions: * Ba,B,Ca,Co,Li,Mo,Mg,K,Na,P ** Sb,As,Be,Cd,Cr,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	2-1-23 11:55		2-1-23 11:55 am
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	2-1-23 3:00 pm		2/2/23 10:30
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS TRACKING #: 1Z 849 747 01 6512 4293

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXB0141-BLK1	Batch: BXB0141								
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Cobalt, Total					ND			0.01	1.00
Lithium, Total					ND			0.005	1.00
Magnesium, Total					ND			0.2	1.00
Molybdenum, Total					ND			0.01	1.00
Phosphorus, Total as P					ND			0.01	1.00
Potassium, Total					ND			0.5	1.00
Sodium, Total					ND			0.5	1.00
LCS - EPA 200.7									
QC Sample ID: BXB0141-BS1	Batch: BXB0141								
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Barium, Total	101		85 - 115		0.202		0.200	0.005	1.00
Boron, Total	101		85 - 115		0.50		0.500	0.05	1.00
Calcium, Total	102		85 - 115		10.5		10.2	0.2	1.00
Cobalt, Total	105		85 - 115		0.21		0.200	0.01	1.00
Lithium, Total	113		85 - 115		0.225		0.200	0.005	1.00
Magnesium, Total	103		85 - 115		10.5		10.2	0.2	1.00
Molybdenum, Total	101		85 - 115		0.20		0.200	0.01	1.00
Phosphorus, Total as P	106		85 - 115		1.1		1.00	0.01	1.00
Potassium, Total	104		85 - 115		10.4		10.0	0.5	1.00
Sodium, Total	104		85 - 115		10.4		10.0	0.5	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXB0141-MS1	Batch: BXB0141			QC Source Sample: XXXXXXX-XX					
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Barium, Total	99.0		70 - 130		1.56	1.36	0.200	0.005	1.00
Boron, Total	101		70 - 130		1.67	1.16	0.500	0.05	1.00
Calcium, Total	101		70 - 130		41.0	30.7	10.2	0.2	1.00
Cobalt, Total	110		70 - 130		0.22	ND	0.200	0.01	1.00
Lithium, Total	117		70 - 130		0.235	0.001	0.200	0.005	1.00
Magnesium, Total	101		70 - 130		23.9	13.5	10.2	0.2	1.00
Molybdenum, Total	110		70 - 130		0.22	0.001	0.200	0.01	1.00
Phosphorus, Total as P	106		70 - 130		1.7	0.7	1.00	0.01	1.00
Potassium, Total	102		70 - 130		77.8	67.6	10.0	0.5	1.00
Sodium, Total	93.9		70 - 130		139	130	10.0	0.5	1.00
QC Sample ID: BXB0141-MS2	Batch: BXB0141			QC Source Sample: XXXXXXX-XX					
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Barium, Total	101		70 - 130		0.283	0.081	0.200	0.005	1.00
Boron, Total	101		70 - 130		0.87	0.37	0.500	0.05	1.00
Calcium, Total	103		70 - 130		104	93.5	10.2	0.2	1.00
Cobalt, Total	99.9		70 - 130		0.20	ND	0.200	0.01	1.00
Lithium, Total	111		70 - 130		0.271	0.049	0.200	0.005	1.00
Magnesium, Total	104		70 - 130		52.2	41.6	10.2	0.2	1.00
Molybdenum, Total	99.0		70 - 130		0.20	0.007	0.200	0.01	1.00
Phosphorus, Total as P	96.4		70 - 130		5.1	4.2	1.00	0.01	1.00
Potassium, Total	104		70 - 130		27.9	17.5	10.0	0.5	1.00
Sodium, Total	119		70 - 130		236	224	10.0	0.5	1.00
Matrix Spike Dup - EPA 200.7									

Matrix Spike Dup - EPA 200.7 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXB0141-MSD1	Batch: BXB0141		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Barium, Total	91.8	0.927	70 - 130	20	1.55	1.36	0.200	0.005	1.00
Boron, Total	97.1	1.28	70 - 130	20	1.65	1.16	0.500	0.05	1.00
Calcium, Total	98.3	0.580	70 - 130	20	40.8	30.7	10.2	0.2	1.00
Cobalt, Total	98.9	10.8	70 - 130	20	0.20	ND	0.200	0.01	1.00
Lithium, Total	108	8.14	70 - 130	20	0.217	0.001	0.200	0.005	1.00
Magnesium, Total	102	0.143	70 - 130	20	23.9	13.5	10.2	0.2	1.00
Molybdenum, Total	100	9.16	70 - 130	20	0.20	0.001	0.200	0.01	1.00
Phosphorus, Total as P	109	1.32	70 - 130	20	1.8	0.7	1.00	0.01	1.00
Potassium, Total	94.4	1.04	70 - 130	20	77.0	67.6	10.0	0.5	1.00
Sodium, Total	77.4	1.19	70 - 130	20	138	130	10.0	0.5	1.00
QC Sample ID: BXB0141-MSD2	Batch: BXB0141		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Barium, Total	102	0.247	70 - 130	20	0.284	0.081	0.200	0.005	1.00
Boron, Total	102	0.947	70 - 130	20	0.88	0.37	0.500	0.05	1.00
Calcium, Total	105	0.204	70 - 130	20	104	93.5	10.2	0.2	1.00
Cobalt, Total	99.8	0.100	70 - 130	20	0.20	ND	0.200	0.01	1.00
Lithium, Total	113	1.21	70 - 130	20	0.274	0.049	0.200	0.005	1.00
Magnesium, Total	105	0.242	70 - 130	20	52.3	41.6	10.2	0.2	1.00
Molybdenum, Total	101	1.79	70 - 130	20	0.21	0.007	0.200	0.01	1.00
Phosphorus, Total as P	96.2	0.0350	70 - 130	20	5.1	4.2	1.00	0.01	1.00
Potassium, Total	105	0.429	70 - 130	20	28.0	17.5	10.0	0.5	1.00
Sodium, Total	119	0.0172	70 - 130	20	236	224	10.0	0.5	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXB0150-BLK1	Batch: BXB0150								
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXB0150-BS1	Batch: BXB0150								
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Antimony, Total	106		85 - 115		0.042		0.0400	0.0005	1.00
Arsenic, Total	105		85 - 115		0.042		0.0400	0.0005	1.00
Beryllium, Total	101		85 - 115		0.040		0.0400	0.0005	1.00
Cadmium, Total	102		85 - 115		0.041		0.0400	0.0002	1.00
Chromium, Total	107		85 - 115		0.043		0.0400	0.0005	1.00
Lead, Total	104		85 - 115		0.041		0.0400	0.0005	1.00
Selenium, Total	106		85 - 115		0.043		0.0400	0.0005	1.00
Thallium, Total	108		85 - 115		0.043		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXB0150-MS1	Batch: BXB0150			QC Source Sample: XXXXXXX-XX					
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Antimony, Total	110		70 - 130		0.044	0.00006	0.0400	0.0005	1.00
Arsenic, Total	103		70 - 130		0.043	0.002	0.0400	0.0005	1.00
Beryllium, Total	99.6		70 - 130		0.040	ND	0.0400	0.0005	1.00
Cadmium, Total	100		70 - 130		0.040	ND	0.0400	0.0002	1.00
Chromium, Total	98.6		70 - 130		0.056	0.017	0.0400	0.0005	1.00
Lead, Total	101		70 - 130		0.041	0.0004	0.0400	0.0005	1.00
Selenium, Total	102		70 - 130		0.041	0.0007	0.0400	0.0005	1.00
Thallium, Total	106		70 - 130		0.042	ND	0.0400	0.0002	1.00
QC Sample ID: BXB0150-MS2	Batch: BXB0150			QC Source Sample: XXXXXXX-XX					
Date Prepared: 02/03/2023	Date Analyzed: 02/06/2023								
Antimony, Total	108		70 - 130		0.045	0.001	0.0400	0.0005	1.00
Arsenic, Total	107		70 - 130		0.048	0.006	0.0400	0.0005	1.00
Beryllium, Total	97.5		70 - 130		0.039	ND	0.0400	0.0005	1.00
Cadmium, Total	98.8		70 - 130		0.040	0.00003	0.0400	0.0002	1.00
Chromium, Total	101		70 - 130		0.046	0.006	0.0400	0.0005	1.00
Lead, Total	97.2		70 - 130		0.039	0.0005	0.0400	0.0005	1.00
Selenium, Total	108		70 - 130		0.044	0.0009	0.0400	0.0005	1.00
Thallium, Total	103		70 - 130		0.041	ND	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23B0145

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXB0092-BLK1	Batch: BXB0092								
Date Prepared: 02/02/2023	Date Analyzed: 02/03/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXB0092-BS1	Batch: BXB0092								
Date Prepared: 02/02/2023	Date Analyzed: 02/03/2023								
Mercury, Total	99.1		85 - 115		0.00496		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXB0092-MS1	Batch: BXB0092				QC Source Sample: XXXXXXX-XX				
Date Prepared: 02/02/2023	Date Analyzed: 02/03/2023								
Mercury, Total	98.9		75 - 125		0.00494	ND	0.00500	0.00015	1.00
QC Sample ID: BXB0092-MS2	Batch: BXB0092				QC Source Sample: XXXXXXX-XX				
Date Prepared: 02/02/2023	Date Analyzed: 02/03/2023								
Mercury, Total	99.0		75 - 125		0.00495	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXB0092-MSD1	Batch: BXB0092				QC Source Sample: XXXXXXX-XX				
Date Prepared: 02/02/2023	Date Analyzed: 02/03/2023								
Mercury, Total	99.6	0.673	75 - 125	20	0.00498	ND	0.00500	0.00015	1.00
QC Sample ID: BXB0092-MSD2	Batch: BXB0092				QC Source Sample: XXXXXXX-XX				
Date Prepared: 02/02/2023	Date Analyzed: 02/03/2023								
Mercury, Total	100	1.32	75 - 125	20	0.00502	ND	0.00500	0.00015	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXB0083-BLK1	Batch: BXB0083								
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
QC Sample ID: BXB0189-BLK1	Batch: BXB0189								
Date Prepared: 02/06/2023	Date Analyzed: 02/06/2023								
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXB0083-BS1	Batch: BXB0083								
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Chloride	96.0		90 - 110		48.0		50.0	1.00	1.00
Fluoride	94.4		90 - 110		4.72		5.00	0.100	1.00
QC Sample ID: BXB0189-BS1	Batch: BXB0189								
Date Prepared: 02/06/2023	Date Analyzed: 02/06/2023								
Sulfate	97.4		90 - 110		48.7		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXB0083-MS1	Batch: BXB0083		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Chloride	148		80 - 120		78.6	48.9	20.0	2.20	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Fluoride	144		80 - 120		2.89	ND	2.00	0.220	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXB0083-MS2	Batch: BXB0083		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Chloride	93.0		80 - 120		96.2	3.19	100	11.0	1.00
Fluoride	99.6		80 - 120		9.96	ND	10.0	1.10	1.00
QC Sample ID: BXB0189-MS1	Batch: BXB0189		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/06/2023	Date Analyzed: 02/06/2023								
Sulfate	113		80 - 120		246	133	100	11.0	1.00
QC Sample ID: BXB0189-MS2	Batch: BXB0189		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/06/2023	Date Analyzed: 02/06/2023								
Sulfate	106		80 - 120		142	130	11.1	1.11	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXB0083-MSD1	Batch: BXB0083		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Chloride	155	1.68	80 - 120	20	79.9	48.9	20.0	2.20	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Fluoride	145	0.175	80 - 120	20	2.89	ND	2.00	0.220	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXB0083-MSD2	Batch: BXB0083		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								

Matrix Spike Dup - EPA 300.0 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXB0083-MSD2	Batch: BXB0083		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Chloride	94.2	1.20	80 - 120	20	97.3	3.19	100	11.0	1.00
Fluoride	101	1.35	80 - 120	20	10.1	ND	10.0	1.10	1.00
QC Sample ID: BXB0189-MSD1	Batch: BXB0189		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/06/2023	Date Analyzed: 02/06/2023								
Sulfate	90.9	9.34	80 - 120	20	224	133	100	11.0	1.00
QC Sample ID: BXB0189-MSD2	Batch: BXB0189		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/06/2023	Date Analyzed: 02/06/2023								
Sulfate	96.9	0.685	80 - 120	20	141	130	11.1	1.11	1.00

QC Report for Work Order (WO) - 23B0145

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2320 B									
QC Sample ID: BXB0145-BLK1	Batch: BXB0145								
Date Prepared: 02/03/2023	Date Analyzed: 02/03/2023								
Alkalinity - Bicarbonate (as CaCO3)					ND			1.0	1.00
Alkalinity - Carbonate (as CaCO3)					ND			1.0	1.00
Alkalinity - Hydroxide (as CaCO3)					ND			1.0	1.00
Alkalinity - Total (as CaCO3)					ND			1.0	1.00
Duplicate - SM 2320 B									
QC Sample ID: BXB0145-DUP1	Batch: BXB0145		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/03/2023	Date Analyzed: 02/03/2023								
Alkalinity - Bicarbonate (as CaCO3)		1.08		20	285	288		1.0	1.00
Alkalinity - Carbonate (as CaCO3)				20	ND	ND		1.0	1.00
Alkalinity - Hydroxide (as CaCO3)				20	ND	ND		1.0	1.00
Alkalinity - Total (as CaCO3)		1.08		20	285	288		1.0	1.00
LCS - SM 2320 B									
QC Sample ID: BXB0145-BS1	Batch: BXB0145								
Date Prepared: 02/03/2023	Date Analyzed: 02/03/2023								
Alkalinity - Total (as CaCO3)	102		90 - 110		241		236	1.0	1.00

QC Report for Work Order (WO) - 23B0145

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXB0082-BLK1	Batch: BXB0082								
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXB0082-DUP1	Batch: BXB0082		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Total Dissolved Solids (TDS)		4		10	4500	4340		20	1.00
QC Sample ID: BXB0082-DUP2	Batch: BXB0082		QC Source Sample: XXXXXXX-XX						
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Total Dissolved Solids (TDS)		2		10	984	1000		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXB0082-BS1	Batch: BXB0082								
Date Prepared: 02/02/2023	Date Analyzed: 02/02/2023								
Total Dissolved Solids (TDS)	104		90 - 110		416		400	20	1.00

CHEMTECH-FORD
LABORATORIES

5/2/2023

Work Order: 23B0148
Project: PZ-212

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 23B0148-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	1/31/2023 9:23 AM
Sample Site:	PZ-212	***Receipt Date:***	2/2/2023 10:30 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	PZ-212
PO Number:	183244	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.74 ± 0.443	5	0.27	pCi/L	EPA 903.0	02/10/2023	02/10/2023	SL-62
Radium-228	0.45 ± 0.36	5	0.64	pCi/L	EPA 904.0	03/06/2023	03/06/2023	SL-62

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 183244

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23B1048

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED													Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228						Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. PZ-212	1-31-23	09:23	Water		X	X	X	X	X	X	X	X	X	X									
	2.																							
	3.																							
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Sample Receipt Conditions: UPS

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: DB

Ag(2)-1183

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.6

Special Instructions: * Ba,B,Ca,Co,Li,Mo,Mg,K,Na,P ** Sb,As,Be,Cd,Cr,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 2-1-23 11:55	Received by: [signature]	Date/Time 2-1-23 11:55 am
Relinquished by: [signature]	Date/Time 2-1-23 3:00 pm	Received by: [signature]	Date/Time 2/2/23 10:30
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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UPS TRACKING #: 1Z 849 747 01 6512 4293

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.736		0.443	0.269	02/10/2023 17:53	WG1999636
(T) Barium	*125*			*30.0-143*	*02/10/2023 17:53*	WG1999636

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.451	J	0.360	0.642	03/06/2023 14:28	WG2012603
(T) Barium	*127*			*30.0-143*	*03/06/2023 14:28*	WG2012603
(T) Yttrium	*112*			*30.0-136*	*03/06/2023 14:28*	WG2012603

Method Blank (MB)

(MB) R3890149-1 02/10/23 15:21

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-226	-0.0163	U	0.0450	0.207
(T) Barium	*99.8*		*99.8*	

L1582382-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1582382-05 02/10/23 15:52 • (DUP) R3890149-5 02/10/23 15:52

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-226	0.244	0.348	0.497	0.213	0.441	0.497	1	13.3	0.0541	J	20	3
(T) Barium	*94.1*			*91.0*	*91.0*							

Laboratory Control Sample (LCS)

(LCS) R3890149-2 02/10/23 15:21

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	4.82	96.2	80.0-120	
(T) Barium			*99.7*		

L1581984-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1581984-01 02/10/23 16:52 • (MS) R3890149-3 02/10/23 15:21 • (MSD) R3890149-4 02/10/23 15:21

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.0	0.0986	20.0	18.3	99.4	90.9	1	75.0-125			8.94		20
(T) Barium		*101*			*99.9*	*99.6*							

Method Blank (MB)

(MB) R3898550-1 03/06/23 14:28

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-228	0.220	J	0.139	0.249
(T) Barium	*97.5*		*97.5*	
(T) Yttrium	*97.0*		*97.0*	

L1582382-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1582382-07 03/06/23 14:28 • (DUP) R3898550-5 03/06/23 14:28

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.835	0.378	0.664	1.19	0.439	0.664	1	34.7	0.606		20	3
(T) Barium	*96.9*			*88.0*	*88.0*							
(T) Yttrium	*87.8*			*86.6*	*86.6*							

Laboratory Control Sample (LCS)

(LCS) R3898550-2 03/06/23 14:28

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.24	84.8	80.0-120	
(T) Barium			*92.4*		
(T) Yttrium			*92.9*		

L1582382-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1582382-03 03/06/23 14:28 • (MS) R3898550-3 03/06/23 14:28 • (MSD) R3898550-4 03/06/23 14:28

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	2.23	11.9	11.1	96.2	88.5	1	70.0-130			6.72		20
(T) Barium		*96.2*			*106*	*108*							
(T) Yttrium		*102*			*107*	*102*							

CHEMTECH-FORD
LABORATORIES

3/16/2023

Work Order: 23C0713
Project: PZ-212/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

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NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

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www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **183244**
Receipt: **3/9/23 11:00 @ 3.1** °C
Date Reported: 3/16/2023
Project Name: **PZ-212/BA-DG4**

Sample ID: **PZ-212 (FA-DG5)**

Matrix: **Water**
Lab ID: **23C0713-01**
Date Sampled: **3/7/23 15:08**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1750	mg/L	20.0	EPA 300.0	3/10/23	3/10/23	
Fluoride	0.573	mg/L	0.100	EPA 300.0	3/10/23	3/10/23	
Sulfate	9050	mg/L	100	EPA 300.0	3/13/23	3/13/23	
Total Dissolved Solids (TDS)	16800	mg/L	500	SM 2540 C	3/10/23	3/10/23	
Metals							
Antimony, Total	ND	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Arsenic, Total	0.0080	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Barium, Total	0.027	mg/L	0.005	EPA 200.7	3/9/23	3/10/23	
Beryllium, Total	ND	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Boron, Total	57.7	mg/L	0.05	EPA 200.7	3/9/23	3/10/23	
Cadmium, Total	ND	mg/L	0.0010	EPA 200.8	3/9/23	3/14/23	
Calcium, Total	516	mg/L	0.2	EPA 200.7	3/9/23	3/10/23	
Chromium, Total	0.0038	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Cobalt, Total	0.03	mg/L	0.01	EPA 200.7	3/9/23	3/10/23	
Lead, Total	ND	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Lithium, Total	0.738	mg/L	0.005	EPA 200.7	3/9/23	3/10/23	
Magnesium, Total	913	mg/L	0.2	EPA 200.7	3/9/23	3/10/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	3/13/23	3/13/23	
Molybdenum, Total	0.03	mg/L	0.01	EPA 200.7	3/9/23	3/10/23	
Phosphorus, Total as P	0.1	mg/L	0.01	EPA 200.7	3/9/23	3/10/23	
Potassium, Total	4.6	mg/L	0.5	EPA 200.7	3/9/23	3/10/23	
Selenium, Total	0.0154	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Sodium, Total	3540	mg/L	10.0	EPA 200.7	3/9/23	3/10/23	
Thallium, Total	ND	mg/L	0.0010	EPA 200.8	3/9/23	3/14/23	

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Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **183244**
Receipt: **3/9/23 11:00 @ 3.1** °C
Date Reported: 3/16/2023
Project Name: **PZ-212/BA-DG4**

Sample ID: **BA-DG4**

Matrix: **Water**
Lab ID: **23C0713-02**
Date Sampled: **3/7/23 10:15**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	539	mg/L	20.0	EPA 300.0	3/10/23	3/10/23	
Fluoride	2.57	mg/L	0.100	EPA 300.0	3/10/23	3/10/23	
Sulfate	6190	mg/L	100	EPA 300.0	3/13/23	3/13/23	
Total Dissolved Solids (TDS)	11400	mg/L	500	SM 2540 C	3/10/23	3/10/23	
Metals							
Antimony, Total	ND	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Arsenic, Total	0.0050	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Barium, Total	0.031	mg/L	0.005	EPA 200.7	3/9/23	3/10/23	
Beryllium, Total	ND	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Boron, Total	28.1	mg/L	0.05	EPA 200.7	3/9/23	3/10/23	
Cadmium, Total	ND	mg/L	0.0010	EPA 200.8	3/9/23	3/14/23	
Calcium, Total	282	mg/L	0.2	EPA 200.7	3/9/23	3/10/23	
Chromium, Total	0.0033	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Cobalt, Total	ND	mg/L	0.01	EPA 200.7	3/9/23	3/10/23	
Lead, Total	ND	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Lithium, Total	0.240	mg/L	0.005	EPA 200.7	3/9/23	3/10/23	
Magnesium, Total	500	mg/L	0.2	EPA 200.7	3/9/23	3/10/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	3/13/23	3/13/23	
Molybdenum, Total	0.09	mg/L	0.01	EPA 200.7	3/9/23	3/10/23	
Phosphorus, Total as P	0.04	mg/L	0.01	EPA 200.7	3/9/23	3/10/23	
Potassium, Total	8.1	mg/L	0.5	EPA 200.7	3/9/23	3/10/23	
Selenium, Total	0.0193	mg/L	0.0025	EPA 200.8	3/9/23	3/14/23	
Sodium, Total	2410	mg/L	10.0	EPA 200.7	3/9/23	3/10/23	
Thallium, Total	ND	mg/L	0.0010	EPA 200.8	3/9/23	3/14/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **183244**
Receipt: **3/9/23 11:00 @ 3.1** °C
Date Reported: 3/16/2023
Project Name: **PZ-212/BA-DG4**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 183244

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Sample Receipt Conditions: UPS
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: NB

Aq-1296, M-1264

23C0713 Radson 23C0715

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED														Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. PZ-212 (FA-DG5)	3-7-23	15:08	Water			X	X	X	X	X	X	X	X	X										
-02	2. BA-DG4	3-7-23	10:15	Water			X	X	X	X	X	X	X	X	X										
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 3.1

Special Instructions: * Ba,B,Ca,Co,Li,Mo,Mg,K,Na ** Sb,As,Be,Cd,Cr,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 3/8/23 11:00	Received by: [signature]	Date/Time 3/8/23 11:00am
Relinquished by: [signature]	Date/Time 3/8/23 3:00pm	Received by: [signature]	Date/Time 3/9/23 11:00
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS NEXT DAY AIR
TRACKING #: 1Z 849 747 01 636

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXC0423-BLK1	Batch: BXC0423								
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Cobalt, Total					ND			0.01	1.00
Lithium, Total					ND			0.005	1.00
Magnesium, Total					ND			0.2	1.00
Molybdenum, Total					ND			0.01	1.00
Phosphorus, Total as P					ND			0.01	1.00
Potassium, Total					ND			0.5	1.00
Sodium, Total					ND			0.5	1.00
LCS - EPA 200.7									
QC Sample ID: BXC0423-BS1	Batch: BXC0423								
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Barium, Total	101		85 - 115		0.202		0.200	0.005	1.00
Boron, Total	103		85 - 115		0.52		0.500	0.05	1.00
Calcium, Total	101		85 - 115		10.3		10.2	0.2	1.00
Cobalt, Total	100		85 - 115		0.20		0.200	0.01	1.00
Lithium, Total	114		85 - 115		0.227		0.200	0.005	1.00
Magnesium, Total	103		85 - 115		10.5		10.2	0.2	1.00
Molybdenum, Total	101		85 - 115		0.20		0.200	0.01	1.00
Phosphorus, Total as P	110		85 - 115		1.1		1.00	0.01	1.00
Potassium, Total	102		85 - 115		10.2		10.0	0.5	1.00
Sodium, Total	100		85 - 115		10.0		10.0	0.5	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXC0423-MS1	Batch: BXC0423			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Barium, Total	99.8		70 - 130		0.271	0.071	0.200	0.005	1.00
Boron, Total	105		70 - 130		0.52	ND	0.500	0.05	1.00
Calcium, Total	98.3		70 - 130		32.7	22.7	10.2	0.2	1.00
Cobalt, Total	103		70 - 130		0.21	ND	0.200	0.01	1.00
Lithium, Total	117		70 - 130		0.234	ND	0.200	0.005	1.00
Magnesium, Total	102		70 - 130		15.5	5.1	10.2	0.2	1.00
Molybdenum, Total	106		70 - 130		0.21	ND	0.200	0.01	1.00
Phosphorus, Total as P	110		70 - 130		1.1	0.02	1.00	0.01	1.00
Potassium, Total	103		70 - 130		10.6	0.4	10.0	0.5	1.00
Sodium, Total	99.4		70 - 130		12.1	2.1	10.0	0.5	1.00
QC Sample ID: BXC0423-MS2	Batch: BXC0423			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Barium, Total	100		70 - 130		0.258	0.058	0.200	0.005	1.00
Boron, Total	101		70 - 130		0.87	0.37	0.500	0.05	1.00
Calcium, Total	109		70 - 130		107	96.3	10.2	0.2	1.00
Cobalt, Total	99.2		70 - 130		0.20	ND	0.200	0.01	1.00
Lithium, Total	112		70 - 130		0.239	0.015	0.200	0.005	1.00
Magnesium, Total	105		70 - 130		33.5	22.7	10.2	0.2	1.00
Molybdenum, Total	103		70 - 130		0.21	0.001	0.200	0.01	1.00
Phosphorus, Total as P	135		70 - 130		20.5	19.1	1.00	0.01	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike - EPA 200.7 (cont.)									
QC Sample ID: BXC0423-MS2	Batch: BXC0423		QC Source Sample: XXXXXXX-XX						
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Potassium, Total	105		70 - 130		38.5	28.0	10.0	0.5	1.00
Sodium, Total	119		70 - 130		427	415	10.0	0.5	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXC0423-MSD1	Batch: BXC0423		QC Source Sample: XXXXXXX-XX						
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Barium, Total	99.2	0.407	70 - 130	20	0.270	0.071	0.200	0.005	1.00
Boron, Total	104	1.11	70 - 130	20	0.52	ND	0.500	0.05	1.00
Calcium, Total	97.8	0.153	70 - 130	20	32.7	22.7	10.2	0.2	1.00
Cobalt, Total	97.1	5.46	70 - 130	20	0.19	ND	0.200	0.01	1.00
Lithium, Total	111	5.04	70 - 130	20	0.222	ND	0.200	0.005	1.00
Magnesium, Total	101	0.556	70 - 130	20	15.4	5.1	10.2	0.2	1.00
Molybdenum, Total	103	3.20	70 - 130	20	0.21	ND	0.200	0.01	1.00
Phosphorus, Total as P	110	0.170	70 - 130	20	1.1	0.02	1.00	0.01	1.00
Potassium, Total	102	0.946	70 - 130	20	10.5	0.4	10.0	0.5	1.00
Sodium, Total	98.7	0.595	70 - 130	20	12.0	2.1	10.0	0.5	1.00
QC Sample ID: BXC0423-MSD2	Batch: BXC0423		QC Source Sample: XXXXXXX-XX						
Date Prepared: 03/09/2023	Date Analyzed: 03/10/2023								
Barium, Total	100	0.309	70 - 130	20	0.259	0.058	0.200	0.005	1.00
Boron, Total	104	1.60	70 - 130	20	0.89	0.37	0.500	0.05	1.00
Calcium, Total	114	0.449	70 - 130	20	108	96.3	10.2	0.2	1.00
Cobalt, Total	98.9	0.252	70 - 130	20	0.20	ND	0.200	0.01	1.00
Lithium, Total	111	0.672	70 - 130	20	0.237	0.015	0.200	0.005	1.00
Magnesium, Total	107	0.450	70 - 130	20	33.6	22.7	10.2	0.2	1.00
Molybdenum, Total	103	0.193	70 - 130	20	0.21	0.001	0.200	0.01	1.00
Phosphorus, Total as P	143	0.389	70 - 130	20	20.6	19.1	1.00	0.01	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Potassium, Total	107	0.451	70 - 130	20	38.7	28.0	10.0	0.5	1.00
Sodium, Total	142	0.529	70 - 130	20	429	415	10.0	0.5	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXC0434-BLK1	Batch: BXC0434								
Date Prepared: 03/09/2023	Date Analyzed: 03/14/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXC0434-BS1	Batch: BXC0434								
Date Prepared: 03/09/2023	Date Analyzed: 03/14/2023								
Antimony, Total	103		85 - 115		0.041		0.0400	0.0005	1.00
Arsenic, Total	101		85 - 115		0.040		0.0400	0.0005	1.00
Beryllium, Total	103		85 - 115		0.041		0.0400	0.0005	1.00
Cadmium, Total	102		85 - 115		0.041		0.0400	0.0002	1.00
Chromium, Total	99.7		85 - 115		0.040		0.0400	0.0005	1.00
Lead, Total	101		85 - 115		0.041		0.0400	0.0005	1.00
Selenium, Total	99.3		85 - 115		0.040		0.0400	0.0005	1.00
Thallium, Total	105		85 - 115		0.042		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXC0434-MS1	Batch: BXC0434			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/09/2023	Date Analyzed: 03/14/2023								
Antimony, Total	104		70 - 130		0.042	0.00004	0.0400	0.0005	1.00
Arsenic, Total	105		70 - 130		0.043	0.0006	0.0400	0.0005	1.00
Beryllium, Total	106		70 - 130		0.042	0.00006	0.0400	0.0005	1.00
Cadmium, Total	103		70 - 130		0.041	0.00004	0.0400	0.0002	1.00
Chromium, Total	102		70 - 130		0.041	0.0003	0.0400	0.0005	1.00
Lead, Total	101		70 - 130		0.041	0.0002	0.0400	0.0005	1.00
Selenium, Total	105		70 - 130		0.042	ND	0.0400	0.0005	1.00
Thallium, Total	105		70 - 130		0.042	0.00003	0.0400	0.0002	1.00
QC Sample ID: BXC0434-MS2	Batch: BXC0434			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/09/2023	Date Analyzed: 03/14/2023								
Antimony, Total	101		70 - 130		0.040	0.0002	0.0400	0.0005	1.00
Arsenic, Total	100		70 - 130		0.041	0.0005	0.0400	0.0005	1.00
Beryllium, Total	90.2		70 - 130		0.036	0.00005	0.0400	0.0005	1.00
Cadmium, Total	94.4		70 - 130		0.038	0.00007	0.0400	0.0002	1.00
Chromium, Total	94.8		70 - 130		0.039	0.0008	0.0400	0.0005	1.00
Lead, Total	94.0		70 - 130		0.040	0.002	0.0400	0.0005	1.00
Selenium, Total	96.8		70 - 130		0.039	ND	0.0400	0.0005	1.00
Thallium, Total	97.6		70 - 130		0.039	0.00005	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23C0713

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXC0549-BLK1	Batch: BXC0549								
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXC0549-BS1	Batch: BXC0549								
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Mercury, Total	106		85 - 115		0.00532		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXC0549-MS1	Batch: BXC0549			QC Source Sample: 23C0713-02					
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Mercury, Total	103		75 - 125		0.00513	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXC0549-MSD1	Batch: BXC0549			QC Source Sample: 23C0713-02					
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Mercury, Total	105	2.02	75 - 125	20	0.00523	ND	0.00500	0.00015	1.00

QC Report for Work Order (WO) - 23C0713

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXC0477-BLK1	Batch: BXC0477								
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
QC Sample ID: BXC0559-BLK1	Batch: BXC0559								
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXC0477-BS1	Batch: BXC0477								
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Chloride	98.3		90 - 110		49.2		50.0	1.00	1.00
Fluoride	96.6		90 - 110		4.83		5.00	0.100	1.00
QC Sample ID: BXC0559-BS1	Batch: BXC0559								
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Sulfate	97.7		90 - 110		48.8		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXC0477-MS1	Batch: BXC0477			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Chloride	97.2		80 - 120		12.2	1.43	11.1	1.11	1.00
Fluoride	99.9		80 - 120		1.11	ND	1.11	0.111	1.00
QC Sample ID: BXC0477-MS2	Batch: BXC0477			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Chloride	99.1		80 - 120		15.8	4.80	11.1	1.11	1.00
Fluoride	93.1		80 - 120		1.20	0.166	1.11	0.111	1.00
QC Sample ID: BXC0559-MS1	Batch: BXC0559			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Sulfate	97.4		80 - 120		106	8.21	100	11.0	1.00
QC Sample ID: BXC0559-MS2	Batch: BXC0559			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Sulfate	93.2		80 - 120		104	10.9	100	11.0	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXC0477-MSD1	Batch: BXC0477			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Chloride	98.9	1.51	80 - 120	20	12.4	1.43	11.1	1.11	1.00
Fluoride	101	0.639	80 - 120	20	1.12	ND	1.11	0.111	1.00
QC Sample ID: BXC0477-MSD2	Batch: BXC0477			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Chloride	101	1.42	80 - 120	20	16.0	4.80	11.1	1.11	1.00
Fluoride	94.7	1.50	80 - 120	20	1.22	0.166	1.11	0.111	1.00
QC Sample ID: BXC0559-MSD1	Batch: BXC0559			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Sulfate	94.8	2.57	80 - 120	20	103	8.21	100	11.0	1.00
QC Sample ID: BXC0559-MSD2	Batch: BXC0559			QC Source Sample: XXXXXXX-XX					
Date Prepared: 03/13/2023	Date Analyzed: 03/13/2023								
Sulfate	94.2	0.967	80 - 120	20	105	10.9	100	11.0	1.00

QC Report for Work Order (WO) - 23C0713

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXC0458-BLK1	Batch: BXC0458								
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXC0458-DUP1	Batch: BXC0458		QC Source Sample: XXXXXXX-XX						
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Total Dissolved Solids (TDS)		1		10	1810	1830		20	1.00
QC Sample ID: BXC0458-DUP2	Batch: BXC0458		QC Source Sample: XXXXXXX-XX						
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Total Dissolved Solids (TDS)		3		10	640	660		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXC0458-BS1	Batch: BXC0458								
Date Prepared: 03/10/2023	Date Analyzed: 03/10/2023								
Total Dissolved Solids (TDS)	106		90 - 110		424		400	20	1.00

CHEMTECH-FORD
LABORATORIES

5/3/2023

Work Order: 23C0715
Project: PZ-212/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23C0715-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	3/7/2023 3:08 PM
Sample Site:	PZ-212 (FA-DG5)	***Receipt Date:***	3/9/2023 11:00 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	PZ-212/BA-DG4
PO Number:	183244	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.58 ± 0.35	5	0.36	pCi/L	EPA 903.0	03/23/2023	04/28/2023	SL-62
Radium-228	0.44 ± 0.172	5	0.31	pCi/L	EPA 904.0	04/07/2023	04/28/2023	SL-62

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23C0715-02

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	3/7/2023 10:15 AM
Sample Site:	BA-DG4	***Receipt Date:***	3/9/2023 11:00 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	PZ-212/BA-DG4
PO Number:	183244	***System No.:***	
Source Code:		***Sample Point:***	
		Report to State:	

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.51 ± 0.315	5	0.30	pCi/L	EPA 903.0	03/23/2023	04/28/2023	SL-62
Radium-228	0.85 ± 0.25	5	0.44	pCi/L	EPA 904.0	04/07/2023	04/28/2023	SL-62

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 183244

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

UPS

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: KB

Ag(Z)-1183

23C0715

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. PZ-212 (FA-DG5)	3-7-23	15:08	Water		X	X	X	X	X	X	X	X	X										
-02	2. BA-DG4	3-7-23	10:15	Water		X	X	X	X	X	X	X	X	X										
	3.																							
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 3.1

Special Instructions: * Ba,B,Ca,Co,Li,Mo,Mg,K,Na ** Sb,As,Be,Cd,Cr,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	3/8/23 11:00	Dustin Schwartz	3/8/23 11:00am
Dustin Schwartz	3/8/23 3:00pm		3/9/23 1100
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS NEXT DAY AIR
TRACKING #: 1Z 849 747 01 6362

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.584		0.350	0.364	03/23/2023 17:40	WG2025441
(T) Barium	*99.0*			*30.0-143*	*03/23/2023 17:40*	WG2025441

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.440		0.172	0.307	04/07/2023 14:00	WG2034950
(T) Barium	*131*			*30.0-143*	*04/07/2023 14:00*	WG2034950
(T) Yttrium	*103*			*30.0-136*	*04/07/2023 14:00*	WG2034950

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.506		0.315	0.305	03/23/2023 14:37	WG2025441
(T) Barium	*100*			*30.0-143*	*03/23/2023 14:37*	WG2025441

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.851		0.250	0.439	04/07/2023 14:00	WG2034950
(T) Barium	*124*			*30.0-143*	*04/07/2023 14:00*	WG2034950
(T) Yttrium	*103*			*30.0-136*	*04/07/2023 14:00*	WG2034950

Method Blank (MB)

(MB) R3905203-1 03/23/23 13:37

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-226	0.0602	U	0.104	0.182
(T) Barium	*97.8*		*97.8*	

L1594131-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1594131-08 03/23/23 14:37 • (DUP) R3905203-5 03/23/23 14:37

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-226	0.506	0.315	0.305	0.779	0.571	0.305	1	42.4	0.418		20	3
(T) Barium	*100*			*104*	*104*							

Laboratory Control Sample (LCS)

(LCS) R3905203-2 03/23/23 13:37

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	5.04	101	80.0-120	
(T) Barium			*99.6*		

L1594131-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1594131-03 03/23/23 14:37 • (MS) R3905203-6 03/24/23 14:28 • (MSD) R3905203-4 03/23/23 13:37

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.0	1.04	19.1	17.5	90.4	82.3	1	75.0-125			8.90		20
(T) Barium		*102*			*100*	*103*							

Method Blank (MB)

(MB) R3911281-1 04/07/23 14:00

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-228	0.291		0.127	0.227
(T) Barium	*106*		*106*	
(T) Yttrium	*103*		*103*	

L1594131-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1594131-09 04/07/23 14:00 • (DUP) R3911281-5 04/07/23 14:00

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-228	0.604	0.253	0.453	1.04	0.336	0.453	1	52.8	1.03		20	3
(T) Barium	*106*			*110*	*110*							
(T) Yttrium	*88.9*			*98.7*	*98.7*							

Laboratory Control Sample (LCS)

(LCS) R3911281-2 04/07/23 14:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	4.06	81.1	80.0-120	
(T) Barium			*104*		
(T) Yttrium			*98.5*		

L1594146-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1594146-07 04/07/23 14:00 • (MS) R3911281-3 04/07/23 14:00 • (MSD) R3911281-4 04/07/23 14:00

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-228	10.0	0.455	8.34	9.22	78.9	87.7	1	70.0-130			9.99		20
(T) Barium		*108*			*107*	*110*							
(T) Yttrium		*93.4*			*101*	*120*							

CHEMTECH-FORD
LABORATORIES

5/1/2023

Work Order: 23D0936
Project: PZ-212, Round 4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories
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Sandy, UT 84070
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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **4/13/23 12:05 @ 7.8** °C
Date Reported: 5/1/2023
Project Name: **PZ-212, Round 4**

Sample ID: **FA-DG5 (PZ-212)**

Matrix: **Water**
Lab ID: **23D0936-01**
Date Sampled: **4/11/23 13:36**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1690	mg/L	100	EPA 300.0	4/26/23	4/27/23	
Fluoride	0.295	mg/L	0.100	EPA 300.0	4/26/23	4/27/23	
Sulfate	8440	mg/L	100	EPA 300.0	4/27/23	4/27/23	
Total Dissolved Solids (TDS)	16800	mg/L	500	SM 2540 C	4/13/23	4/13/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Arsenic, Total	0.0083	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Barium, Total	0.024	mg/L	0.005	EPA 200.7	4/13/23	4/18/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Boron, Total	65.2	mg/L	0.05	EPA 200.7	4/13/23	4/18/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8	4/14/23	4/17/23	
Calcium, Total	508	mg/L	0.2	EPA 200.7	4/13/23	4/18/23	
Chromium, Total	0.0024	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Cobalt, Total	0.0261	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Lithium, Total	0.767	mg/L	0.005	EPA 200.7	4/13/23	4/18/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	4/17/23	4/18/23	
Molybdenum, Total	0.03	mg/L	0.01	EPA 200.7	4/13/23	4/18/23	
Selenium, Total	0.0096	mg/L	0.0005	EPA 200.8	4/14/23	4/17/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8	4/14/23	4/17/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **4/13/23 12:05 @ 7.8** °C
Date Reported: 5/1/2023
Project Name: **PZ-212, Round 4**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Special Instruction
- Change -

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212, Round 4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318 ✓

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23D0936 Rads on 23D0941

Lab Use Only	CLIENT SAMPLE INFORMATION				
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine
01	1. FA-DG5 (PZ-212)	4-11-23	13:36	Water	
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
	9.				
	10.				

TESTS REQUESTED																	Bacteria			
	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228								Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
	X	X	X	X	X	X	X	X	X											

AQ 1296 M 1279

Sample Receipt Conditions:

( ) Custody Seals Present	(✓) Correct Containers	( ) Headspace Present (VOC)
(✓) Containers Intact	(✓) COC Included	( ) Temperature Blank
(✓) COC and Labels Match	(✓) COC Complete	(✓) Received within Hold
(✓) Received on Ice	(✓) Sufficient Sample Volume	Checked by: LO

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 7.8

Special Instructions: * Ba,B,Ca,~~Cr~~,Li,Mo 200.7 ** Sb,As,Be,Cd,Cr,Pb,Se,Tl 200.8 ,Co

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	4-12-23 12:45		4-12-23 12:45
Dustin Schmidt	4-12-23 3:00		4/13/23 12:05

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS 1Z 849 747 01 6507 783

QC Report for Work Order (WO) - 23D0936

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXD0525-BLK1	Batch: BXD0525								
Date Prepared: 04/13/2023	Date Analyzed: 04/18/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXD0525-BS1	Batch: BXD0525								
Date Prepared: 04/13/2023	Date Analyzed: 04/18/2023								
Barium, Total	94.9		85 - 115		0.190		0.200	0.005	1.00
Boron, Total	93.2		85 - 115		0.47		0.500	0.05	1.00
Calcium, Total	94.5		85 - 115		9.6		10.2	0.2	1.00
Lithium, Total	92.6		85 - 115		0.185		0.200	0.005	1.00
Molybdenum, Total	99.6		85 - 115		0.20		0.200	0.01	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXD0525-MS1	Batch: BXD0525				QC Source Sample: XXXXXXX-XX				
Date Prepared: 04/13/2023	Date Analyzed: 04/18/2023								
Barium, Total	99.8		70 - 130		0.321	0.122	0.200	0.005	1.00
Boron, Total	102		70 - 130		0.74	0.23	0.500	0.05	1.00
Calcium, Total	101		70 - 130		49.8	39.5	10.2	0.2	1.00
Lithium, Total	96.9		70 - 130		0.278	0.085	0.200	0.005	1.00
Molybdenum, Total	102		70 - 130		0.21	0.003	0.200	0.01	1.00
QC Sample ID: BXD0525-MS2	Batch: BXD0525				QC Source Sample: XXXXXXX-XX				
Date Prepared: 04/13/2023	Date Analyzed: 04/18/2023								
Barium, Total	100		70 - 130		0.260	0.060	0.200	0.005	1.00
Boron, Total	102		70 - 130		0.55	0.04	0.500	0.05	1.00
Calcium, Total	137		70 - 130		201	187	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	99.8		70 - 130		0.205	0.005	0.200	0.005	1.00
Molybdenum, Total	104		70 - 130		0.21	0.002	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXD0525-MSD1	Batch: BXD0525				QC Source Sample: XXXXXXX-XX				
Date Prepared: 04/13/2023	Date Analyzed: 04/18/2023								
Barium, Total	89.5	6.60	70 - 130	20	0.300	0.122	0.200	0.005	1.00
Boron, Total	93.1	6.05	70 - 130	20	0.69	0.23	0.500	0.05	1.00
Calcium, Total	70.5	6.50	70 - 130	20	46.7	39.5	10.2	0.2	1.00
Lithium, Total	88.7	6.07	70 - 130	20	0.262	0.085	0.200	0.005	1.00
Molybdenum, Total	98.1	4.14	70 - 130	20	0.20	0.003	0.200	0.01	1.00
QC Sample ID: BXD0525-MSD2	Batch: BXD0525				QC Source Sample: XXXXXXX-XX				
Date Prepared: 04/13/2023	Date Analyzed: 04/18/2023								
Barium, Total	96.4	2.84	70 - 130	20	0.253	0.060	0.200	0.005	1.00
Boron, Total	98.5	3.00	70 - 130	20	0.54	0.04	0.500	0.05	1.00
Calcium, Total	73.5	3.27	70 - 130	20	194	187	10.2	0.2	1.00
Lithium, Total	97.9	1.87	70 - 130	20	0.201	0.005	0.200	0.005	1.00
Molybdenum, Total	102	2.28	70 - 130	20	0.20	0.002	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXD0526-BLK1	Batch: BXD0526								
Date Prepared: 04/14/2023	Date Analyzed: 04/17/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXD0526-BS1	Batch: BXD0526								
Date Prepared: 04/14/2023	Date Analyzed: 04/17/2023								
Antimony, Total	101		85 - 115		0.041		0.0400	0.0005	1.00
Arsenic, Total	99.0		85 - 115		0.040		0.0400	0.0005	1.00
Beryllium, Total	102		85 - 115		0.041		0.0400	0.0005	1.00
Cadmium, Total	99.6		85 - 115		0.040		0.0400	0.0002	1.00
Chromium, Total	94.3		85 - 115		0.038		0.0400	0.0005	1.00
Cobalt, Total	97.0		85 - 115		0.039		0.0400	0.0005	1.00
Lead, Total	95.6		85 - 115		0.038		0.0400	0.0005	1.00
Selenium, Total	102		85 - 115		0.041		0.0400	0.0005	1.00
Thallium, Total	101		85 - 115		0.040		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXD0526-MS1	Batch: BXD0526			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/14/2023	Date Analyzed: 04/17/2023								
Antimony, Total	102		70 - 130		0.041	0.0005	0.0400	0.0005	1.00
Arsenic, Total	99.0		70 - 130		0.055	0.015	0.0400	0.0005	1.00
Beryllium, Total	101		70 - 130		0.040	ND	0.0400	0.0005	1.00
Cadmium, Total	97.3		70 - 130		0.039	0.0001	0.0400	0.0002	1.00
Chromium, Total	92.6		70 - 130		0.043	0.006	0.0400	0.0005	1.00
Cobalt, Total	91.6		70 - 130		0.037	0.0004	0.0400	0.0005	1.00
Lead, Total	79.9		70 - 130		0.032	0.0002	0.0400	0.0005	1.00
Selenium, Total	100		70 - 130		0.051	0.011	0.0400	0.0005	1.00
Thallium, Total	101		70 - 130		0.041	0.0001	0.0400	0.0002	1.00
QC Sample ID: BXD0526-MS2	Batch: BXD0526			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/14/2023	Date Analyzed: 04/17/2023								
Antimony, Total	102		70 - 130		0.041	0.0001	0.0400	0.0005	1.00
Arsenic, Total	98.8		70 - 130		0.040	0.0007	0.0400	0.0005	1.00
Beryllium, Total	98.8		70 - 130		0.040	ND	0.0400	0.0005	1.00
Cadmium, Total	97.8		70 - 130		0.039	0.0003	0.0400	0.0002	1.00
Chromium, Total	96.2		70 - 130		0.039	0.0002	0.0400	0.0005	1.00
Cobalt, Total	94.1		70 - 130		0.038	0.0007	0.0400	0.0005	1.00
Lead, Total	98.2		70 - 130		0.040	0.0005	0.0400	0.0005	1.00
Selenium, Total	104		70 - 130		0.042	0.0004	0.0400	0.0005	1.00
Thallium, Total	102		70 - 130		0.041	0.00003	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23D0936

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXD0664-BLK1	Batch: BXD0664								
Date Prepared: 04/17/2023	Date Analyzed: 04/18/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXD0664-BS1	Batch: BXD0664								
Date Prepared: 04/17/2023	Date Analyzed: 04/18/2023								
Mercury, Total	102		85 - 115		0.00512		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXD0664-MS1	Batch: BXD0664		QC Source Sample: XXXXXXX-XX						
Date Prepared: 04/17/2023	Date Analyzed: 04/18/2023								
Mercury, Total	98.4		75 - 125		0.00502	0.00010	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXD0664-MSD1	Batch: BXD0664		QC Source Sample: XXXXXXX-XX						
Date Prepared: 04/17/2023	Date Analyzed: 04/18/2023								
Mercury, Total	101	2.79	75 - 125	20	0.00516	0.00010	0.00500	0.00015	1.00

QC Report for Work Order (WO) - 23D0936

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXD1211-BLK1	Batch: BXD1211								
Date Prepared: 04/26/2023	Date Analyzed: 04/27/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
QC Sample ID: BXD1277-BLK1	Batch: BXD1277								
Date Prepared: 04/27/2023	Date Analyzed: 04/27/2023								
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXD1211-BS1	Batch: BXD1211								
Date Prepared: 04/26/2023	Date Analyzed: 04/27/2023								
Chloride	98.8		90 - 110		49.4		50.0	1.00	1.00
Fluoride	101		90 - 110		5.07		5.00	0.100	1.00
QC Sample ID: BXD1277-BS1	Batch: BXD1277								
Date Prepared: 04/27/2023	Date Analyzed: 04/27/2023								
Sulfate	99.6		90 - 110		49.8		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXD1211-MS1	Batch: BXD1211			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/26/2023	Date Analyzed: 04/27/2023								
Chloride	106		80 - 120		35400	24800	10000	1100	1.00
Fluoride	103		80 - 120		1030	ND	1000	110	1.00
QC Sample ID: BXD1211-MS2	Batch: BXD1211			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/26/2023	Date Analyzed: 04/27/2023								
Chloride	106		80 - 120		262	156	100	11.0	1.00
Fluoride	105		80 - 120		10.5	ND	10.0	1.10	1.00
QC Sample ID: BXD1277-MS1	Batch: BXD1277			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/27/2023	Date Analyzed: 04/27/2023								
Sulfate	106		80 - 120		2310	1780	500	55.0	1.00
QC Sample ID: BXD1277-MS2	Batch: BXD1277			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/27/2023	Date Analyzed: 04/27/2023								
Sulfate	106		80 - 120		13000	2390	10000	1100	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXD1211-MSD1	Batch: BXD1211			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/26/2023	Date Analyzed: 04/27/2023								
Chloride	107	0.378	80 - 120	20	35500	24800	10000	1100	1.00
Fluoride	102	0.931	80 - 120	20	1020	ND	1000	110	1.00
QC Sample ID: BXD1211-MSD2	Batch: BXD1211			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/26/2023	Date Analyzed: 04/27/2023								
Chloride	107	0.180	80 - 120	20	263	156	100	11.0	1.00
Fluoride	106	1.11	80 - 120	20	10.6	ND	10.0	1.10	1.00
QC Sample ID: BXD1277-MSD1	Batch: BXD1277			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/27/2023	Date Analyzed: 04/27/2023								
Sulfate	108	0.333	80 - 120	20	2320	1780	500	55.0	1.00
QC Sample ID: BXD1277-MSD2	Batch: BXD1277			QC Source Sample: XXXXXXX-XX					
Date Prepared: 04/27/2023	Date Analyzed: 04/27/2023								
Sulfate	107	1.23	80 - 120	20	13100	2390	10000	1100	1.00

QC Report for Work Order (WO) - 23D0936

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXD0520-BLK1	Batch: BXD0520								
Date Prepared: 04/13/2023	Date Analyzed: 04/13/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXD0520-DUP1	Batch: BXD0520		QC Source Sample: XXXXXXX-XX						
Date Prepared: 04/13/2023	Date Analyzed: 04/13/2023								
Total Dissolved Solids (TDS)		0.8		10	9980	9900		100	1.00
QC Sample ID: BXD0520-DUP2	Batch: BXD0520		QC Source Sample: XXXXXXX-XX						
Date Prepared: 04/13/2023	Date Analyzed: 04/13/2023								
Total Dissolved Solids (TDS)		0		10	824	824		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXD0520-BS1	Batch: BXD0520								
Date Prepared: 04/13/2023	Date Analyzed: 04/13/2023								
Total Dissolved Solids (TDS)		107	90 - 110		428		400	20	1.00

CHEMTECH-FORD
LABORATORIES

6/12/2023

Work Order: 23D0941
Project: PZ-212, Round 4 RADS

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 23D0941-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	4/11/2023 1:36 PM
Sample Site:	FA-DG5 (PZ-212)	***Receipt Date:***	4/13/2023 12:05 PM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	PZ-212, Round 4 RADS
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.41 ± 0.283	5	0.29	pCi/L	EPA 903.0	05/17/2023	06/01/2023	SL-62
Radium-228	0.07 ± 0.409	5	0.76	pCi/L	EPA 904.0	05/18/2023	05/27/2023	SL-62

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

Special Instruction
- Change -

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212, Round 4 RADS
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23D0941

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5 (PZ-212)	4-11-23	13:36	Water		X	X	X	X	X	X	X	X	X										
	2.																							
	3.																							
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Ag (2) - 1238

Sample Receipt Conditions:

- (✓) Custody Seals Present
- (✓) Containers Intact
- (✓) COC and Labels Match
- (✓) Received on Ice
- (✓) Correct Containers
- (✓) COC Included
- (✓) COC Complete
- (✓) Sufficient Sample Volume
- ( ) Headspace Present (VOC)
- ( ) Temperature Blank
- (✓) Received within Hold

Checked by: JD

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 7.8

Special Instructions: * Ba,B,Ca,~~X~~,Li,Mo 200.7 ** Sb,As,Be,Cd,Cr,Pb,Se,Tl,Co 200.8

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	4-12-23 12:45		4-12-23 12:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	4-12-23 3:00		4/13/23 12:05
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS 1Z849747016507035

ANALYTICAL REPORT

June 06, 2023

Chemtech-Ford Laboratories

Sample Delivery Group:	L1607916
Samples Received:	04/21/2023
Project Number:	
Description:	

Report To: Mark Broadhead
9632 S 500 S
Sandy, UT 84070

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

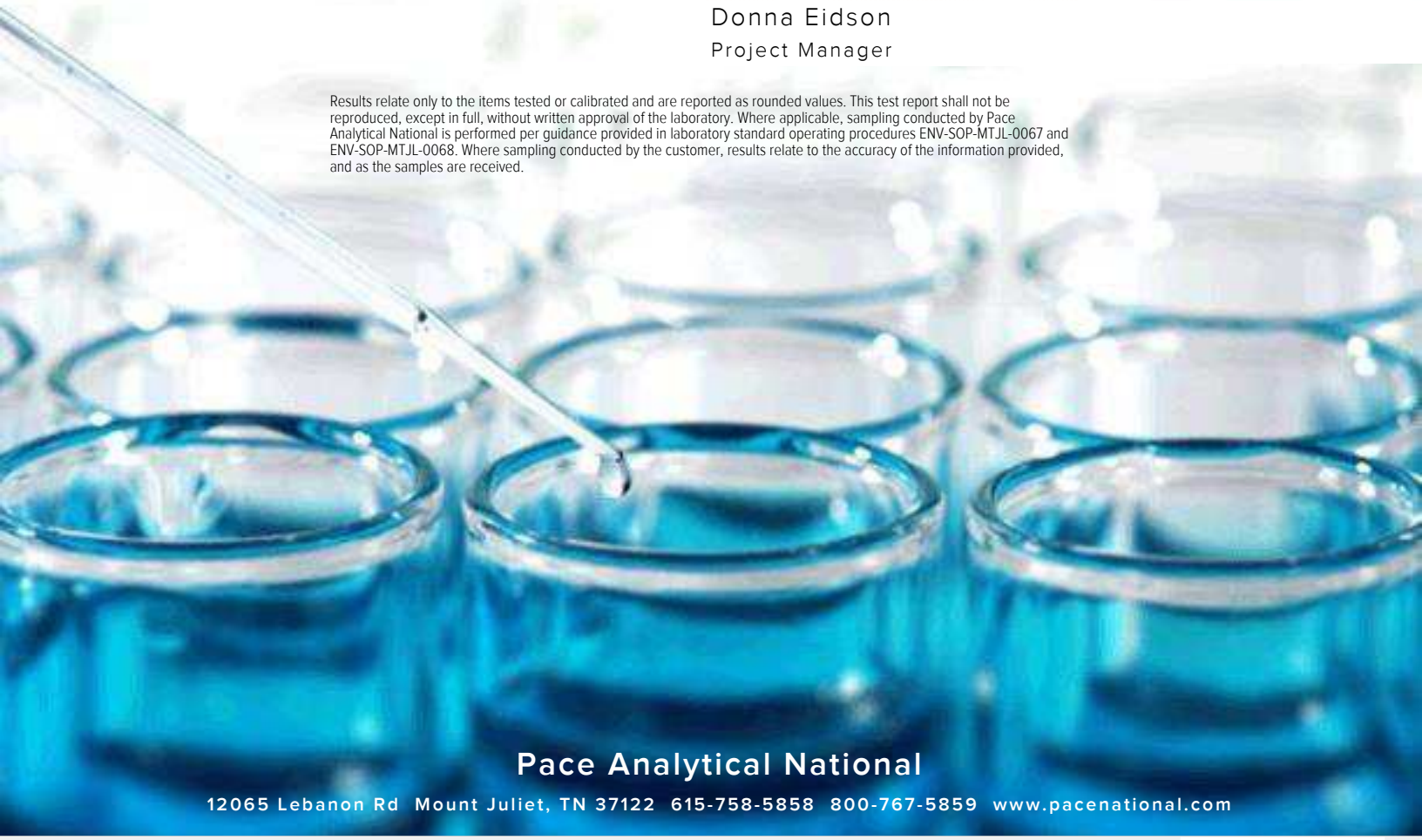


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23D0668-01 L1607916-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/11/23 11:00	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2053937	1	05/04/23 10:43	05/05/23 18:50	SWM	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D0687-01 L1607916-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/11/23 08:30	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:04	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D0687-02 L1607916-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/11/23 08:45	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:04	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D0687-03 L1607916-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/11/23 09:00	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:04	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D0780-01 L1607916-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/10/23 09:00	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2053937	1	05/04/23 10:43	05/05/23 18:50	SWM	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D0852-01 L1607916-06 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/12/23 14:40	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2053937	1	05/04/23 10:43	05/05/23 23:02	SWM	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D0941-01 L1607916-07 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/11/23 13:36	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:34	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	05/27/23 10:05	SNR	Mt. Juliet, TN

23D1422-01 L1607916-08 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/18/23 09:40	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2053937	1	05/04/23 10:43	05/05/23 23:02	SWM	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2062530	1	05/18/23 20:05	06/01/23 17:00	SNR	Mt. Juliet, TN

23D1413-01 L1607916-09 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/19/23 10:05	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2053937	1	05/04/23 10:43	05/05/23 23:02	SWM	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-01 L1607916-10 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/12/23 10:40	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:34	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-02 L1607916-11 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/12/23 14:50	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:34	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-03 L1607916-12 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/12/23 12:50	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 14:34	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-04 L1607916-13 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/12/23 11:50	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 15:05	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-05 L1607916-14 Non-Potable Water

Collected by	Collected date/time	Received date/time
	04/12/23 13:30	04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 15:05	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-06 L1607916-15 Non-Potable Water

Collected by | Collected date/time 04/12/23 12:40 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055954	1	05/17/23 09:43	06/01/23 15:05	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-07 L1607916-16 Non-Potable Water

Collected by | Collected date/time 04/12/23 14:00 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 00:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-08 L1607916-17 Non-Potable Water

Collected by | Collected date/time 04/12/23 17:30 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 00:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-09 L1607916-18 Non-Potable Water

Collected by | Collected date/time 04/12/23 18:15 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 00:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-10 L1607916-19 Non-Potable Water

Collected by | Collected date/time 04/13/23 10:20 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 01:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-11 L1607916-20 Non-Potable Water

Collected by | Collected date/time 04/13/23 09:40 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 01:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-12 L1607916-21 Non-Potable Water

Collected by | Collected date/time 04/13/23 08:50 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 01:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-13 L1607916-22 Non-Potable Water

Collected by | Collected date/time 04/13/23 10:55 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 01:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-14 L1607916-23 Non-Potable Water

Collected by | Collected date/time 04/13/23 19:20 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 02:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-15 L1607916-24 Non-Potable Water

Collected by | Collected date/time 04/13/23 11:45 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 02:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-16 L1607916-25 Non-Potable Water

Collected by | Collected date/time 04/13/23 00:00 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 02:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

23D1088-17 L1607916-26 Non-Potable Water

Collected by | Collected date/time 04/13/23 10:20 | Received date/time 04/21/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2055959	1	05/19/23 11:59	05/25/23 02:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2063388	1	05/19/23 19:29	05/24/23 12:47	SNR	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Donna Eidson
Project Manager

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	27.8		4.78	2.68	05/05/2023 18:50	WG2053937
GROSS BETA	17.0		2.80	2.74	05/05/2023 18:50	WG2053937

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.413	J	0.304	0.539	06/01/2023 17:00	WG2062530
(T) Barium	*81.8*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*105*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	4.47		0.840	0.234	06/01/2023 14:04	WG2055954
(T) Barium	*100*			*30.0-143*	*06/01/2023 14:04*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	3.89		0.339	0.505	06/01/2023 17:00	WG2062530
(T) Barium	*90.6*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*106*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.352		0.273	0.305	06/01/2023 14:04	WG2055954
(T) Barium	*91.4*			*30.0-143*	*06/01/2023 14:04*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.121	U	0.294	0.532	06/01/2023 17:00	WG2062530
(T) Barium	*77.7*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*101*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.658		0.327	0.226	06/01/2023 14:04	WG2055954
(T) Barium	*104*			*30.0-143*	*06/01/2023 14:04*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.0913	U	0.257	0.465	06/01/2023 17:00	WG2062530
(T) Barium	*86.2*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*108*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	1.45		1.09	1.36	05/05/2023 18:50	WG2053937
GROSS BETA	0.917	J	1.17	1.52	05/05/2023 18:50	WG2053937

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.347	J	0.378	0.676	06/01/2023 17:00	WG2062530
(T) Barium	*79.6*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*92.8*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	3.49		1.82	1.98	05/05/2023 23:02	WG2053937
GROSS BETA	2.91	J	3.05	3.96	05/05/2023 23:02	WG2053937

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.533	J	0.311	0.551	06/01/2023 17:00	WG2062530
(T) Barium	*83.1*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*107*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.413		0.283	0.294	06/01/2023 14:34	WG2055954
(T) Barium	*116*			*30.0-143*	*06/01/2023 14:34*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.0684	U	0.409	0.765	05/27/2023 10:05	WG2062530
(T) Barium	*61.2*			*30.0-143*	*05/27/2023 10:05*	WG2062530
(T) Yttrium	*115*			*30.0-136*	*05/27/2023 10:05*	WG2062530

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	7.51		1.50	0.845	05/05/2023 23:02	WG2053937
GROSS BETA	6.23		1.43	1.54	05/05/2023 23:02	WG2053937

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-1.31	U	0.326	0.636	06/01/2023 17:00	WG2062530
(T) Barium	*76.7*			*30.0-143*	*06/01/2023 17:00*	WG2062530
(T) Yttrium	*113*			*30.0-136*	*06/01/2023 17:00*	WG2062530

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	1.51	J	1.40	1.81	05/05/2023 23:02	WG2053937
GROSS BETA	3.04	J	3.06	3.99	05/05/2023 23:02	WG2053937

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.517		0.265	0.469	05/24/2023 12:47	WG2063388
(T) Barium	*107*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*131*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.89		0.574	0.246	06/01/2023 14:34	WG2055954
(T) Barium	*91.8*			*30.0-143*	*06/01/2023 14:34*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	2.77		0.289	0.453	05/24/2023 12:47	WG2063388
(T) Barium	*102*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*104*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.965		0.402	0.285	06/01/2023 14:34	WG2055954
(T) Barium	*101*			*30.0-143*	*06/01/2023 14:34*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.342	J	0.252	0.451	05/24/2023 12:47	WG2063388
(T) Barium	*118*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*141*	C1		*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.299		0.228	0.223	06/01/2023 14:34	WG2055954
(T) Barium	*107*			*30.0-143*	*06/01/2023 14:34*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.338	J	0.288	0.516	05/24/2023 12:47	WG2063388
(T) Barium	*113*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*121*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.295	J	0.250	0.321	06/01/2023 15:05	WG2055954
(T) Barium	*101*			*30.0-143*	*06/01/2023 15:05*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.0460	U	0.263	0.483	05/24/2023 12:47	WG2063388
(T) Barium	*121*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*93.2*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.835		0.370	0.226	06/01/2023 15:05	WG2055954
(T) Barium	*106*			*30.0-143*	*06/01/2023 15:05*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.937		0.247	0.425	05/24/2023 12:47	WG2063388
(T) Barium	*116*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*111*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.01		0.410	0.273	06/01/2023 15:05	WG2055954
(T) Barium	*108*			*30.0-143*	*06/01/2023 15:05*	WG2055954

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.18		0.239	0.403	05/24/2023 12:47	WG2063388
(T) Barium	*132*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*112*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.753		0.346	0.225	05/25/2023 00:32	WG2055959
(T) Barium	*99.9*			*30.0-143*	*05/25/2023 00:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.43		0.226	0.367	05/24/2023 12:47	WG2063388
(T) Barium	*127*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*142*	C1		*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.360		0.260	0.236	05/25/2023 00:32	WG2055959
(T) Barium	*92.8*			*30.0-143*	*05/25/2023 00:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.304	U	0.268	0.496	05/24/2023 12:47	WG2063388
(T) Barium	*119*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*118*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.271	J	0.251	0.304	05/25/2023 00:32	WG2055959
(T) Barium	*95.1*			*30.0-143*	*05/25/2023 00:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.296	J	0.201	0.362	05/24/2023 12:47	WG2063388
(T) Barium	*111*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*112*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.505		0.283	0.216	05/25/2023 01:32	WG2055959
(T) Barium	*101*			*30.0-143*	*05/25/2023 01:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.299	J	0.224	0.402	05/24/2023 12:47	WG2063388
(T) Barium	*119*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*119*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.648		0.326	0.227	05/25/2023 01:32	WG2055959
(T) Barium	*98.0*			*30.0-143*	*05/25/2023 01:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.29		0.265	0.446	05/24/2023 12:47	WG2063388
(T) Barium	*98.2*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*119*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.494		0.288	0.227	05/25/2023 01:32	WG2055959
(T) Barium	*97.0*			*30.0-143*	*05/25/2023 01:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.297	U	0.266	0.496	05/24/2023 12:47	WG2063388
(T) Barium	*96.8*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*159*	C1		*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.841		0.392	0.313	05/25/2023 01:32	WG2055959
(T) Barium	*91.2*			*30.0-143*	*05/25/2023 01:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.58		0.250	0.406	05/24/2023 12:47	WG2063388
(T) Barium	*109*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*111*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.501		0.281	0.208	05/25/2023 02:32	WG2055959
(T) Barium	*106*			*30.0-143*	*05/25/2023 02:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.597		0.215	0.377	05/24/2023 12:47	WG2063388
(T) Barium	*108*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*126*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.542		0.304	0.230	05/25/2023 02:32	WG2055959
(T) Barium	*95.7*			*30.0-143*	*05/25/2023 02:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.372	U	0.263	0.497	05/24/2023 12:47	WG2063388
(T) Barium	*105*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*122*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.595		0.309	0.223	05/25/2023 02:32	WG2055959
(T) Barium	*98.4*			*30.0-143*	*05/25/2023 02:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.373	J	0.267	0.481	05/24/2023 12:47	WG2063388
(T) Barium	*115*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*98.9*			*30.0-136*	*05/24/2023 12:47*	WG2063388

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.281	J	0.261	0.314	05/25/2023 02:32	WG2055959
(T) Barium	*90.2*			*30.0-143*	*05/25/2023 02:32*	WG2055959

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.655		0.222	0.386	05/24/2023 12:47	WG2063388
(T) Barium	*105*			*30.0-143*	*05/24/2023 12:47*	WG2063388
(T) Yttrium	*137*	C1		*30.0-136*	*05/24/2023 12:47*	WG2063388

Method Blank (MB)

(MB) R3922064-1 05/05/23 18:50

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
GROSS ALPHA	-0.141	U	0.555	0.882
GROSS BETA	-0.441	U	1.18	1.62

L1611790-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1611790-05 05/07/23 08:33 • (DUP) R3922064-5 05/05/23 18:50

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
GROSS ALPHA	0.909	0.807	1.04	1.09	0.822	1.04	1	17.7	0.153		20	3
GROSS BETA	2.47	1.22	1.53	2.78	1.18	1.53	1	11.8	0.183		20	3

Laboratory Control Sample (LCS)

(LCS) R3922064-2 05/05/23 18:50

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
GROSS ALPHA	15.0	13.4	89.1	80.0-120	
GROSS BETA	32.2	29.6	91.8	80.0-120	

L1607916-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1607916-05 05/05/23 18:50 • (MS) R3922064-3 05/05/23 18:50 • (MSD) R3922064-4 05/05/23 18:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
GROSS ALPHA	15.0	1.45	14.4	17.1	86.4	104	1	70.0-130			16.8		20
GROSS BETA	32.2	0.917	38.1	36.2	116	110	1	70.0-130			5.14		20

Method Blank (MB)

(MB) R3931841-1 06/01/23 12:33

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-226	0.111	J	0.115	0.215
(T) Barium	*97.7*		*97.7*	

L1607421-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1607421-02 06/01/23 13:03 • (DUP) R3931841-5 06/01/23 13:03

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.604	0.325	0.285	0.197	0.362	0.285	1	102	0.836	J	20	3
(T) Barium	*101*			*103*	*103*							

Laboratory Control Sample (LCS)

(LCS) R3931841-2 06/01/23 12:33

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	5.84	117	80.0-120	
(T) Barium			*98.0*		

L1607916-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1607916-10 06/01/23 14:34 • (MS) R3931841-3 06/01/23 12:33 • (MSD) R3931841-4 06/01/23 12:33

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	1.89	26.3	23.7	122	109	1	75.0-125			10.3		20
(T) Barium		*91.8*			*103*	*107*							

Method Blank (MB)

(MB) R3929917-1 05/24/23 23:31

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-226	0.243		0.142	0.137
(T) Barium	*97.8*		*97.8*	

L1607916-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1607916-17 05/25/23 00:32 • (DUP) R3929917-5 05/25/23 00:32

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-226	0.360	0.260	0.236	0.438	0.404	0.236	1	19.4	0.161		20	3
(T) Barium	*92.8*			*99.6*	*99.6*							

Laboratory Control Sample (LCS)

(LCS) R3929917-2 05/24/23 23:31

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	5.29	105	80.0-120	
(T) Barium			*99.3*		

L1611124-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1611124-01 05/25/23 04:33 • (MS) R3929917-3 05/24/23 23:31 • (MSD) R3929917-4 05/24/23 23:31

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.0	0.461	24.0	20.5	118	100	1	75.0-125			15.7		20
(T) Barium		*91.9*			*97.9*	*94.7*							

Method Blank (MB)

(MB) R3932971-2 06/01/23 17:00

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-228	0.000	U	0.136	0.249
(T) Barium	*101*		*101*	
(T) Yttrium	*113*		*113*	

L1607643-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1607643-01 06/01/23 17:00 • (DUP) R3932971-4 06/01/23 17:00

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	-0.308	0.330	0.597	-0.496	0.394	0.597	1	0.000	0.366	U	20	3
(T) Barium	*87.4*			*88.9*	*88.9*							
(T) Yttrium	*97.7*			*110*	*110*							

Laboratory Control Sample (LCS)

(LCS) R3932971-1 05/27/23 10:05

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.72	114	80.0-120	
(T) Barium			*92.8*		
(T) Yttrium			*69.0*		

L1607916-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1607916-02 06/01/23 17:00 • (MS) R3932971-3 06/01/23 17:00 • (MSD) R3932971-5 06/01/23 17:00

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	3.89	12.9	11.9	90.3	80.1	1	70.0-130			8.22		20
(T) Barium		*90.6*			*92.1*	*93.2*							
(T) Yttrium		*106*			*113*	*112*							

Method Blank (MB)

(MB) R3930453-1 05/24/23 12:47

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-228	0.110	J	0.128	0.232
(T) Barium	*118*		*118*	
(T) Yttrium	*106*		*106*	

L1607916-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1607916-13 05/24/23 12:47 • (DUP) R3930453-5 05/24/23 12:47

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	-0.0460	0.263	0.483	-0.813	0.388	0.483	1	0.000	1.64	U	20	3
(T) Barium	*121*			*114*	*114*							
(T) Yttrium	*93.2*			*139*	*139*					C1		

Laboratory Control Sample (LCS)

(LCS) R3930453-2 05/24/23 12:47

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.00	100	80.0-120	
(T) Barium			*113*		
(T) Yttrium			*123*		

L1607916-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1607916-10 05/24/23 12:47 • (MS) R3930453-3 05/24/23 12:47 • (MSD) R3930453-4 05/24/23 12:47

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	2.77	12.9	12.2	101	94.3	1	70.0-130			5.50		20
(T) Barium		*102*			*117*	*116*							
(T) Yttrium		*104*			*126*	*100*							

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
C1	Tracer recovery limits have been exceeded; values are outside upper control limits.
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

K063

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number 23D0668

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5 run Rad 226

L1607916

Laboratory ID: 23D0668-01 — **Matrix:** Water — 01
Sampled: 04/11/2023 11:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N	MSLV1 NOTB	
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N	1.6to1.6 18 received	

Released By — Date 4/11/23 — Received By — 09:00 — Date 4/20/23

Released By PNSLCUT 17:00 — Date 4/20/23 — Received By — Date 4/21/23 0800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D0687

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: L609916

Laboratory ID: 23D0687-01 — **Matrix:** Water -02 — **Sampled:** 04/11/2023 08:30

Requested Test	Suggested Analytical Method *
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0

Laboratory ID: 23D0687-02 — **Matrix:** Water -03 — **Sampled:** 04/11/2023 08:45

Requested Test	Suggested Analytical Method *
Radium-228	EPA 904.0
Radium-226	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226 LLD	EPA 903.0

Laboratory ID: 23D0687-03 — **Matrix:** Water -04 — **Sampled:** 04/11/2023 09:00

Requested Test	Suggested Analytical Method *
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0

Released By	Date	Received By	Date
	4/11/23	09:00	4/20/23
1645CT 17:00	4/20/23	(12)	4/21/23 0800

Released By / Date / Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D0780

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha >5, run Radium-226

L1607916

Laboratory ID: 23D0780-01
Matrix: Water -05
Sampled: 04/10/2023 09:00

Requested Test	Suggested Analytical Method *
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0

Released By	Date	Received By	Date
	4/12/23	09:00	4/20/23
PNSLCUT 17:00	4/20/23	(17)	4/21/23 0800

Released By / Date / Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D0852

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is > 5, RUN Radium 226.

L1609116

Laboratory ID: 23D0852-01 **Matrix:** Water -06
Sampled: 04/12/2023 14:40

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
	4.12.23	09:00	4/20/23
PNELCUT 17:00	4/20/23	(12)	4/21/23 0800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D0941

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: L16079116

Laboratory ID: 23D0941-01 **Matrix:** Water -07
Sampled: 04/11/2023 13:36

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0

Released By	Date	Received By	Date
Denise Brew	4/13/23	09:00	4/20/23
Fedex	17:00 4/20/23	(12)	4/21/23 0800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1422

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5, run Radium 226.

L1609116

Laboratory ID: 23D1422-01 **Matrix:** Water -08
Sampled: 04/18/2023 09:40

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By Denise Brew Date 4/19/23 | Received By [illegible] 09:00 Date 4/20/23

Released By [illegible] FEDEX 17:00 Date 4/20/23 | Received By [illegible] (12) 0800 Date 4/21/23

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1413

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: ~~If Gross Alpha is >5, Run Radium 226~~ CF 4.19.23

L1607916

Laboratory ID: 23D1413-01 **Matrix:** Water -09
Sampled: 04/19/2023 10:05

Requested Test	Suggested Analytical Method *
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0

Released By	Date	Received By	Date
[signature]	4.19.23	[signature] 09:00	4/20/23
[signature] PNLCST	17:00 4/20/23	[signature] (12) 0800	4/21/23

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1088

K038

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: Use sample #1 for QC 3.

L1607916

Laboratory ID: 23D1088-01 QC 3 **Matrix:** Water -10
Sampled: 04/12/2023 10:40

Requested Test	Suggested Analytical Method *
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0

Laboratory ID: 23D1088-02 **Matrix:** Water -11
Sampled: 04/12/2023 14:50

Requested Test	Suggested Analytical Method *
Radium-226 Variance	EPA 903.0
Radium-228 Variance	EPA 904.0
Radium-228	EPA 904.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Radium-228 LLD	EPA 904.0

Laboratory ID: 23D1088-03 **Matrix:** Water -12
Sampled: 04/12/2023 12:50

Requested Test	Suggested Analytical Method *
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N	HCL L607916	NaTB
Sufficient volume sent:	Y N		34 received
RAD Screen <0.5 mR/hr:	Y N		

Released By 4/19/23 Date — Received By 09:00 4/20/23 Date

Released By PNSLOT 17:00 4/20/23 Date — Received By (17) 0800 4/21/23 Date

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1088

L1607916

Laboratory ID: 23D1088-04		Matrix: Water -13
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/12/2023 11:50
Radium-226 LLD	EPA 903.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	

Laboratory ID: 23D1088-05		Matrix: Water -14
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 13:30
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23D1088-06		Matrix: Water -15
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 12:40
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	

Laboratory ID: 23D1088-07		Matrix: Water -16
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 14:00
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	

Released By	Date	Received By	Date
		09:00	4/20/23
FEDEX COURIER	17:00 4/20/23	(12) 0800	4/21/23

Released By Date Received By Date

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1088

4160916

Laboratory ID: 23D1088-08		**Matrix:** Water -17
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/12/2023 17:30
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	

Laboratory ID: 23D1088-09		**Matrix:** Water -18
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/12/2023 18:15
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23D1088-10		**Matrix:** Water -19
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 10:20
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	

Laboratory ID: 23D1088-11		**Matrix:** Water -20
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 09:40
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Released By	Date	Received By	Date
		09:00	4/20/23
PNSECUT	17:00 4/20/23	(12) 0800	4/21/23

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1088

L1600916

Laboratory ID: 23D1088-12		Matrix: Water -21
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 08:50
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	
Radium-226 Variance	EPA 903.0	

Laboratory ID: 23D1088-13		Matrix: Water -22
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 10:55
Radium-228 LLD	EPA 904.0	
Radium-226	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226 LLD	EPA 903.0	

Laboratory ID: 23D1088-14		Matrix: Water -23
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/12/2023 19:20
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-226	EPA 903.0	

Laboratory ID: 23D1088-15		Matrix: Water -24
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 11:45
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	

Released By — Date — Received By — Date: 09:00 4/20/23

Released By: PNSECOT 17:00 4/20/23. — Date — Received By: (12) 0800 — Date: 4/21/23

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23D1088

L1607916

Laboratory ID: 23D1088-16		**Matrix:** Water -25
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 00:00
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23D1088-17		**Matrix:** Water -26
Requested Test	**Suggested Analytical Method ***	**Sampled:** 04/13/2023 10:20
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	

Released By	Date	Received By	Date
		09:00	4/20/23
PNSLCUT 17:00	4/20/23	(12) 0800	4/21/23
Released By	Date	Received By	Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

U607916

Tracking Numbers	MSLV1 Temperature
	1.6+0=1.6
	.1+0=.1
	3.4+0=3.4
	1.0+0=1.0
	.4+0=.4
	.1+0=.1

BNA

.6+0=.6

3.5+0=3.5

1.4+0=1.4

CHEMTECH-FORD
LABORATORIES

5/12/2023

Work Order: 23E0458
Project: 2023 CCR Spring Sampling

Deseret Power Electric Cooperative
Attn: Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

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www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **FA-UG1**

Matrix: **Water**
Lab ID: **23E0458-01**
Date Sampled: **5/1/23 9:00**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	33.6	mg/L	1.00	EPA 300.0	5/5/23	5/6/23	
Fluoride	2.03	mg/L	0.100	EPA 300.0	5/5/23	5/6/23	
Sulfate	360	mg/L	10.0	EPA 300.0	5/5/23	5/6/23	
Total Dissolved Solids (TDS)	1010	mg/L	20	SM 2540 C	5/4/23	5/4/23	
Metals							
Boron, Total	0.78	mg/L	0.05	EPA 200.7	5/9/23	5/9/23	
Calcium, Total	8.0	mg/L	0.2	EPA 200.7	5/9/23	5/9/23	

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PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **FA-UG2**

Matrix: **Water**
Lab ID: **23E0458-02**
Date Sampled: **5/1/23 13:15**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1650	mg/L	50.0	EPA 300.0	5/9/23	5/9/23	
Fluoride	0.206	mg/L	0.100	EPA 300.0	5/5/23	5/6/23	
Sulfate	8120	mg/L	500	EPA 300.0	5/9/23	5/9/23	
Total Dissolved Solids (TDS)	15300	mg/L	500	SM 2540 C	5/4/23	5/4/23	
Metals							
Boron, Total	55.5	mg/L	0.05	EPA 200.7	5/9/23	5/10/23	
Calcium, Total	506	mg/L	0.2	EPA 200.7	5/9/23	5/10/23	

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PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **FA-DG2**

Matrix: **Water**
Lab ID: **23E0458-03**
Date Sampled: **5/1/23 15:05**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	715	mg/L	10.0	EPA 300.0	5/5/23	5/6/23	
Fluoride	50.1	mg/L	1.00	EPA 300.0	5/5/23	5/6/23	
Sulfate	4980	mg/L	100	EPA 300.0	5/9/23	5/9/23	
Total Dissolved Solids (TDS)	13500	mg/L	500	SM 2540 C	5/5/23	5/5/23	
Metals							
Boron, Total	8.30	mg/L	0.50	EPA 200.7	5/9/23	5/9/23	
Calcium, Total	ND	mg/L	2.0	EPA 200.7	5/9/23	5/9/23	

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Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **FA-DG3**

Matrix: **Water**
Lab ID: **23E0458-04**
Date Sampled: **5/2/23 13:45**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	237	mg/L	10.0	EPA 300.0	5/5/23	5/6/23	
Fluoride	8.06	mg/L	0.100	EPA 300.0	5/5/23	5/6/23	
Sulfate	1560	mg/L	50.0	EPA 300.0	5/9/23	5/9/23	
Total Dissolved Solids (TDS)	3900	mg/L	500	SM 2540 C	5/5/23	5/5/23	
Metals							
Boron, Total	2.25	mg/L	0.05	EPA 200.7	5/9/23	5/9/23	
Calcium, Total	2.8	mg/L	0.2	EPA 200.7	5/9/23	5/9/23	

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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **FA-DG4**

Matrix: **Water**
Lab ID: **23E0458-05**
Date Sampled: **5/2/23 15:05**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	984	mg/L	10.0	EPA 300.0	5/5/23	5/6/23	
Fluoride	6.45	mg/L	1.00	EPA 300.0	5/5/23	5/6/23	
Sulfate	3930	mg/L	50.0	EPA 300.0	5/9/23	5/9/23	
Total Dissolved Solids (TDS)	9500	mg/L	500	SM 2540 C	5/5/23	5/5/23	
Metals							
Boron, Total	11.3	mg/L	0.50	EPA 200.7	5/9/23	5/9/23	
Calcium, Total	56.2	mg/L	2.0	EPA 200.7	5/9/23	5/9/23	

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Trenton Keller
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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **CCR-QA Dup**

Matrix: **Water**
Lab ID: **23E0458-06**
Date Sampled: **5/1/23 10:00**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	35.8	mg/L	1.00	EPA 300.0	5/5/23	5/6/23	
Fluoride	2.32	mg/L	1.00	EPA 300.0	5/5/23	5/6/23	
Sulfate	384	mg/L	10.0	EPA 300.0	5/5/23	5/6/23	
Total Dissolved Solids (TDS)	1050	mg/L	20	SM 2540 C	5/4/23	5/4/23	
Metals							
Boron, Total	0.73	mg/L	0.05	EPA 200.7	5/9/23	5/9/23	
Calcium, Total	9.6	mg/L	0.2	EPA 200.7	5/9/23	5/9/23	

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PO#: **185318**
Receipt: **5/4/23 12:15 @ 6.6** °C
Date Reported: 5/12/2023
Project Name: **2023 CCR Spring Sampling**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Spring Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*

~~Page 1/2~~
LO 5/4/23

Please fill out the fields highlighted in light blue.

01-06 AQ 1296 M 1279

Sample Receipt Conditions:

- ( ) Custody Seals Present
- (✓) Containers Intact
- ( ) COC and Labels Match
- (✓) Received on Ice
- (✓) Correct Containers
- (✓) COC Included
- (✓) COC Complete
- ( ) Sufficient Sample Volume
- ( ) Headspace Present (VOC)
- ( ) Temperature Blank
- (✓) Received within Hold

Checked by: LO

23E0458

Lab Use Only	CLIENT SAMPLE INFORMATION					TDS	Anions: Cl, F, SO4	ICP Metals: B,Ca	Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine				Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-UG1	5-1-23	09:00	Water		X	X	X				
02	2. FA-UG2	5-1-23	13:15	Water		X	X	X				
03	3. FA-DG2	5-1-23	15:05	Water		X	X	X				
04	4. FA-DG3	5-2-23	13:45	Water		X	X	X				
05	5. FA-DG4	5-2-23	15:05	Water		X	X	X				
	6. BA-UG1			Water		X	X	X				
	7. BA-DG1			Water		X	X	X				
	8. BA-DG2			Water		X	X	X				
	9. BA-DG3			Water		X	X	X				
06	10. CCR - QA Dup	5-1-23	10:00	Water		X	X	X				

Sampled by: [print] Trenton Keller Sampled by: [signature] Trenton Keller

ON ICE NOT ON ICE Temp (C°): 6.6

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Trenton Keller	5-3-23 12:45		5/3/23 12:45 pm
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			5/4/23 1215
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

UPS 1Z849747016589

QC Report for Work Order (WO) - 23E0458

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXE0425-BLK1	Batch: BXE0425								
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
QC Sample ID: BXE0431-BLK1	Batch: BXE0431								
Date Prepared: 05/09/2023	Date Analyzed: 05/10/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
LCS - EPA 200.7									
QC Sample ID: BXE0425-BS1	Batch: BXE0425								
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Boron, Total	93.6		85 - 115		0.47		0.500	0.05	1.00
Calcium, Total	96.2		85 - 115		9.8		10.2	0.2	1.00
QC Sample ID: BXE0431-BS1	Batch: BXE0431								
Date Prepared: 05/09/2023	Date Analyzed: 05/10/2023								
Boron, Total	101		85 - 115		0.18		0.175	0.05	1.00
Calcium, Total	101		85 - 115		3.7		3.70	0.2	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXE0425-MS1	Batch: BXE0425		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Boron, Total	97.6		70 - 130		0.52	0.04	0.500	0.05	1.00
Calcium, Total	88.8		70 - 130		60.3	51.2	10.2	0.2	1.00
QC Sample ID: BXE0425-MS2	Batch: BXE0425		QC Source Sample: 23E0458-06						
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Boron, Total	110		70 - 130		1.28	0.73	0.500	0.05	1.00
Calcium, Total	103		70 - 130		20.1	9.6	10.2	0.2	1.00
QC Sample ID: BXE0431-MS1	Batch: BXE0431		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/10/2023								
Calcium, Total	212		70 - 130		76.7	68.9	3.70	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BXE0431-MS2	Batch: BXE0431		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/10/2023								
Boron, Total	149		70 - 130		2.72	2.46	0.175	0.05	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Calcium, Total	105		70 - 130		174	170	3.70	0.2	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXE0425-MSD1	Batch: BXE0425		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Boron, Total	98.2	0.571	70 - 130	20	0.53	0.04	0.500	0.05	1.00
Calcium, Total	96.4	1.27	70 - 130	20	61.0	51.2	10.2	0.2	1.00
QC Sample ID: BXE0425-MSD2	Batch: BXE0425		QC Source Sample: 23E0458-06						
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Boron, Total	113	1.40	70 - 130	20	1.30	0.73	0.500	0.05	1.00
Calcium, Total	105	0.847	70 - 130	20	20.3	9.6	10.2	0.2	1.00

Matrix Spike Dup - EPA 200.7 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXE0431-MSD1	Batch: BXE0431		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/10/2023								
Calcium, Total	72.1	6.97	70 - 130	20	71.5	68.9	3.70	0.2	1.00
QC Sample ID: BXE0431-MSD2	Batch: BXE0431		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/10/2023								
Boron, Total	163	0.846	70 - 130	20	2.74	2.46	0.175	0.05	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Calcium, Total	203	2.06	70 - 130	20	177	170	3.70	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXE0323-BLK1	Batch: BXE0323								
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
QC Sample ID: BXE0432-BLK1	Batch: BXE0432								
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Chloride					ND			1.00	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXE0323-BS1	Batch: BXE0323								
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Chloride	98.8		90 - 110		49.4		50.0	1.00	1.00
Fluoride	104		90 - 110		5.18		5.00	0.100	1.00
Sulfate	99.2		90 - 110		49.6		50.0	1.00	1.00
QC Sample ID: BXE0432-BS1	Batch: BXE0432								
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Chloride	97.5		90 - 110		48.7		50.0	1.00	1.00
Sulfate	97.0		90 - 110		48.5		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXE0323-MS1	Batch: BXE0323			QC Source Sample: 23E0458-01					
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Chloride	97.5		80 - 120		131	33.6	100	11.0	1.00
Fluoride	104		80 - 120		12.4	2.03	10.0	1.10	1.00
Sulfate	77.2		80 - 120		438	360	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0323-MS2	Batch: BXE0323			QC Source Sample: XXXXXXX-XX					
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Chloride	103		80 - 120		76000	24500	50000	5500	1.00
Fluoride	98.7		80 - 120		4940	ND	5000	550	1.00
Sulfate	108		80 - 120		53800	ND	50000	5500	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0432-MS1	Batch: BXE0432			QC Source Sample: XXXXXXX-XX					
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Chloride	92.7		80 - 120		10.3	ND	11.1	1.11	1.00
Sulfate	94.8		80 - 120		14.4	3.84	11.1	1.11	1.00
QC Sample ID: BXE0432-MS2	Batch: BXE0432			QC Source Sample: XXXXXXX-XX					
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Chloride	93.0		80 - 120		10.3	ND	11.1	1.11	1.00
Sulfate	97.2		80 - 120		21.8	11.0	11.1	1.11	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXE0323-MSD1	Batch: BXE0323			QC Source Sample: 23E0458-01					
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Chloride	96.9	0.463	80 - 120	20	131	33.6	100	11.0	1.00
Fluoride	103	0.400	80 - 120	20	12.4	2.03	10.0	1.10	1.00

Matrix Spike Dup - EPA 300.0 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXE0323-MSD1	Batch: BXE0323		QC Source Sample: 23E0458-01						
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Sulfate	75.9	0.289	80 - 120	20	436	360	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0323-MSD2	Batch: BXE0323		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/05/2023	Date Analyzed: 05/06/2023								
Chloride	102	0.621	80 - 120	20	75500	24500	50000	5500	1.00
Fluoride	97.4	1.35	80 - 120	20	4870	ND	5000	550	1.00
Sulfate	106	1.32	80 - 120	20	53100	ND	50000	5500	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0432-MSD1	Batch: BXE0432		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Chloride	94.0	1.45	80 - 120	20	10.4	ND	11.1	1.11	1.00
Sulfate	96.2	1.03	80 - 120	20	14.5	3.84	11.1	1.11	1.00
QC Sample ID: BXE0432-MSD2	Batch: BXE0432		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/09/2023	Date Analyzed: 05/09/2023								
Chloride	94.3	1.36	80 - 120	20	10.5	ND	11.1	1.11	1.00
Sulfate	97.5	0.145	80 - 120	20	21.8	11.0	11.1	1.11	1.00

QC Report for Work Order (WO) - 23E0458

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXE0253-BLK1	Batch: BXE0253								
Date Prepared: 05/04/2023	Date Analyzed: 05/08/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
QC Sample ID: BXE0304-BLK1	Batch: BXE0304								
Date Prepared: 05/05/2023	Date Analyzed: 05/05/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXE0253-DUP1	Batch: BXE0253		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/04/2023	Date Analyzed: 05/08/2023								
Total Dissolved Solids (TDS)		1		10	716	708		20	1.00
QC Sample ID: BXE0253-DUP2	Batch: BXE0253		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/04/2023	Date Analyzed: 05/04/2023								
Total Dissolved Solids (TDS)		0.3		10	1240	1240		20	1.00
QC Sample ID: BXE0304-DUP1	Batch: BXE0304		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/05/2023	Date Analyzed: 05/05/2023								
Total Dissolved Solids (TDS)		0.5		10	342000	340000		1000	1.00
QC Sample ID: BXE0304-DUP2	Batch: BXE0304		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/05/2023	Date Analyzed: 05/05/2023								
Total Dissolved Solids (TDS)		1		10	1120	1130		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXE0253-BS1	Batch: BXE0253								
Date Prepared: 05/04/2023	Date Analyzed: 05/08/2023								
Total Dissolved Solids (TDS)	103		90 - 110		412		400	20	1.00
QC Sample ID: BXE0304-BS1	Batch: BXE0304								
Date Prepared: 05/05/2023	Date Analyzed: 05/05/2023								
Total Dissolved Solids (TDS)	106		90 - 110		424		400	20	1.00

CHEMTECH-FORD
LABORATORIES

5/23/2023

Work Order: 23E0859
Project: 2023 CCR Spring Sampling

Deseret Power Electric Cooperative
Attn: Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

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www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/10/23 10:30 @ 0.5** °C
Date Reported: 5/23/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **BA-UG1**

Matrix: **Water**
Lab ID: **23E0859-01**
Date Sampled: **5/8/23 9:10**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1370	mg/L	100	EPA 300.0	5/10/23	5/11/23	
Fluoride	15.0	mg/L	2.00	EPA 300.0	5/10/23	5/11/23	
Sulfate	10500	mg/L	500	EPA 300.0	5/11/23	5/12/23	
Total Dissolved Solids (TDS)	19400	mg/L	500	SM 2540 C	5/10/23	5/10/23	
Metals							
Boron, Total	218	mg/L	0.50	EPA 200.7	5/18/23	5/19/23	
Calcium, Total	353	mg/L	0.2	EPA 200.7	5/18/23	5/18/23	

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PO#: **185318**
Receipt: **5/10/23 10:30 @ 0.5** °C
Date Reported: 5/23/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **BA-DG1**

Matrix: **Water**
Lab ID: **23E0859-02**
Date Sampled: **5/8/23 13:31**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1360	mg/L	100	EPA 300.0	5/10/23	5/11/23	
Fluoride	7.80	mg/L	1.00	EPA 300.0	5/10/23	5/11/23	
Sulfate	4420	mg/L	500	EPA 300.0	5/11/23	5/12/23	
Total Dissolved Solids (TDS)	9700	mg/L	500	SM 2540 C	5/10/23	5/10/23	
Metals							
Boron, Total	15.5	mg/L	0.50	EPA 200.7	5/18/23	5/19/23	
Calcium, Total	165	mg/L	0.2	EPA 200.7	5/18/23	5/18/23	

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PO#: **185318**
Receipt: **5/10/23 10:30 @ 0.5** °C
Date Reported: 5/23/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **BA-DG2**

Matrix: **Water**
Lab ID: **23E0859-03**
Date Sampled: **5/8/23 10:57**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	719	mg/L	10.0	EPA 300.0	5/10/23	5/11/23	
Fluoride	5.04	mg/L	1.00	EPA 300.0	5/10/23	5/11/23	
Sulfate	7530	mg/L	100	EPA 300.0	5/10/23	5/11/23	
Total Dissolved Solids (TDS)	12300	mg/L	500	SM 2540 C	5/10/23	5/10/23	
Metals							
Boron, Total	53.5	mg/L	0.50	EPA 200.7	5/18/23	5/19/23	
Calcium, Total	363	mg/L	0.2	EPA 200.7	5/18/23	5/18/23	

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Trenton Keller
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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/10/23 10:30 @ 0.5** °C
Date Reported: 5/23/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **BA-DG3**

Matrix: **Water**
Lab ID: **23E0859-04**
Date Sampled: **5/8/23 10:17**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	428	mg/L	10.0	EPA 300.0	5/10/23	5/11/23	
Fluoride	9.39	mg/L	1.00	EPA 300.0	5/10/23	5/11/23	
Sulfate	2610	mg/L	100	EPA 300.0	5/10/23	5/11/23	
Total Dissolved Solids (TDS)	5000	mg/L	500	SM 2540 C	5/10/23	5/10/23	
Metals							
Boron, Total	9.73	mg/L	0.50	EPA 200.7	5/18/23	5/19/23	
Calcium, Total	29.2	mg/L	0.2	EPA 200.7	5/18/23	5/18/23	

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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/10/23 10:30 @ 0.5** °C
Date Reported: 5/23/2023
Project Name: **2023 CCR Spring Sampling**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Spring Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Ag 1296, MR279

Sample Receipt Conditions:

(X) Custody Seals Present
(X) Containers Intact
(X) COC and Labels Match
(X) Received on Ice
(X) Correct Containers
(X) COC Included
(X) COC Complete
(X) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(X) Received within Hold
Checked by: A

23E0859

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		TDS	Anions: Cl, F, SO4	ICP Metals: B,Ca												Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
	1. FA-UG1			Water			X	X	X															
	2. FA-UG2			Water			X	X	X															
	3. FA-DG2			Water			X	X	X															
	4. FA-DG3			Water			X	X	X															
	5. FA-DG4			Water			X	X	X															
01	6. BA-UG1	5/8/23	09:10	Water			X	X	X															
02	7. BA-DG1	5/8/23	13:31	Water			X	X	X															
03	8. BA-DG2	5/8/23	10:57	Water			X	X	X															
04	9. BA-DG3	5/8/23	10:17	Water			X	X	X															
05 5/8/23	10. CCR - QA Dup			Water			X	X	X															

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 0.5

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	5/9/23 13:01		5/9/23 13:01
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			5/10/23 1034
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS: 1Z8497470164096905

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXE0948-BLK1	Batch: BXE0948								
Date Prepared: 05/18/2023	Date Analyzed: 05/18/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
LCS - EPA 200.7									
QC Sample ID: BXE0948-BS1	Batch: BXE0948								
Date Prepared: 05/18/2023	Date Analyzed: 05/18/2023								
Boron, Total	94.6		85 - 115		0.47		0.500	0.05	1.00
Calcium, Total	96.3		85 - 115		9.8		10.2	0.2	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXE0948-MS1	Batch: BXE0948				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/18/2023	Date Analyzed: 05/18/2023								
Boron, Total	96.0		70 - 130		0.48	0.03	0.500	0.05	1.00
Calcium, Total	53.8		70 - 130		49.4	43.9	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BXE0948-MS2	Batch: BXE0948				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/18/2023	Date Analyzed: 05/18/2023								
Boron, Total	82.2		70 - 130		5.62	5.21	0.500	0.05	1.00
Calcium, Total	16.6		70 - 130		399	397	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXE0948-MSD1	Batch: BXE0948				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/18/2023	Date Analyzed: 05/18/2023								
Boron, Total	101	4.82	70 - 130	20	0.50	0.03	0.500	0.05	1.00
Calcium, Total	68.5	3.00	70 - 130	20	50.9	43.9	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BXE0948-MSD2	Batch: BXE0948				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/18/2023	Date Analyzed: 05/18/2023								
Boron, Total	109	2.33	70 - 130	20	5.76	5.21	0.500	0.05	1.00
Calcium, Total	69.3	1.34	70 - 130	20	404	397	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXE0518-BLK1	Batch: BXE0518								
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
QC Sample ID: BXE0587-BLK1	Batch: BXE0587								
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXE0518-BS1	Batch: BXE0518								
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								
Chloride	98.3		90 - 110		49.1		50.0	1.00	1.00
Fluoride	101		90 - 110		5.03		5.00	0.100	1.00
Sulfate	98.5		90 - 110		49.3		50.0	1.00	1.00
QC Sample ID: BXE0587-BS1	Batch: BXE0587								
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Sulfate	104		90 - 110		51.8		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXE0518-MS1	Batch: BXE0518		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								
Chloride	105		80 - 120		17.1	5.36	11.1	1.11	1.00
Fluoride	100		80 - 120		1.20	0.083	1.11	0.111	1.00
Sulfate	97.9		80 - 120		13.5	2.61	11.1	1.11	1.00
QC Sample ID: BXE0518-MS2	Batch: BXE0518		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								
Chloride	94.5		80 - 120		66.4	47.5	20.0	2.20	1.00
Fluoride	101		80 - 120		2.30	0.283	2.00	0.220	1.00
Sulfate	102		80 - 120		35.5	15.1	20.0	2.20	1.00
QC Sample ID: BXE0587-MS1	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Sulfate	95.7		80 - 120		187	91.2	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0587-MS2	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Sulfate	95.6		80 - 120		187	91.4	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXE0518-MSD1	Batch: BXE0518		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								
Chloride	109	2.59	80 - 120	20	17.5	5.36	11.1	1.11	1.00
Fluoride	105	4.55	80 - 120	20	1.25	0.083	1.11	0.111	1.00
Sulfate	102	3.52	80 - 120	20	14.0	2.61	11.1	1.11	1.00
QC Sample ID: BXE0518-MSD2	Batch: BXE0518		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								

Matrix Spike Dup - EPA 300.0 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXE0518-MSD2	Batch: BXE0518		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/11/2023								
Chloride	96.5	0.610	80 - 120	20	66.8	47.5	20.0	2.20	1.00
Fluoride	95.8	4.65	80 - 120	20	2.20	0.283	2.00	0.220	1.00
Sulfate	99.1	1.67	80 - 120	20	34.9	15.1	20.0	2.20	1.00
QC Sample ID: BXE0587-MSD1	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Sulfate	94.7	0.529	80 - 120	20	186	91.2	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0587-MSD2	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Sulfate	93.2	1.32	80 - 120	20	185	91.4	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									

QC Report for Work Order (WO) - 23E0859

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXE0505-BLK1	Batch: BXE0505								
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXE0505-DUP1	Batch: BXE0505		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)		1		10	50400	50900		500	1.00
QC Sample ID: BXE0505-DUP2	Batch: BXE0505		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)		2		10	28300	27800		500	1.00
LCS - SM 2540 C									
QC Sample ID: BXE0505-BS1	Batch: BXE0505								
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)	103		90 - 110		412		400	20	1.00

CHEMTECH-FORD
LABORATORIES

5/17/2023

Work Order: 23E0868
Project: 2023 CCR Spring Sampling

Deseret Power Electric Cooperative
Attn: Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/10/23 10:29 @ 0.5** °C
Date Reported: 5/17/2023
Project Name: **2023 CCR Spring Sampling**

Sample ID: **NEP**

Matrix: **Water**
Lab ID: **23E0868-01**
Date Sampled: **5/8/23 14:25**
Sampled By: **Treton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Alkalinity - Bicarbonate (as CaCO3)	497	mg/L	1.0	SM 2320 B	5/11/23	5/11/23	
Alkalinity - Carbonate (as CaCO3)	63.0	mg/L	1.0	SM 2320 B	5/11/23	5/11/23	
Alkalinity - Hydroxide (as CaCO3)	ND	mg/L	1.0	SM 2320 B	5/11/23	5/11/23	
Alkalinity - Total (as CaCO3)	560	mg/L	1.0	SM 2320 B	5/11/23	5/11/23	
Chloride	3380	mg/L	500	EPA 300.0	5/11/23	5/12/23	
Fluoride	59.3	mg/L	2.00	EPA 300.0	5/11/23	5/12/23	
Sulfate	17000	mg/L	500	EPA 300.0	5/11/23	5/12/23	
Total Dissolved Solids (TDS)	27800	mg/L	500	SM 2540 C	5/10/23	5/10/23	
Metals							
Boron, Total	79.6	mg/L	5.00	EPA 200.7	5/11/23	5/12/23	
Calcium, Total	569	mg/L	20.0	EPA 200.7	5/11/23	5/12/23	
Magnesium, Total	1560	mg/L	20.0	EPA 200.7	5/11/23	5/12/23	
Potassium, Total	80.9	mg/L	50.0	EPA 200.7	5/11/23	5/12/23	
Sodium, Total	3770	mg/L	50.0	EPA 200.7	5/11/23	5/12/23	

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Certificate of Analysis

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Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/10/23 10:29 @ 0.5** °C
Date Reported: 5/17/2023
Project Name: **2023 CCR Spring Sampling**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Spring Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Page 2/2

Sample Receipt Conditions: Ag 1296, M1279

- (Y) Custody Seals Present
- (Y) Containers Intact
- (Y) COC and Labels Match
- (Y) Received on Ice
- (Y) Correct Containers
- (Y) COC Included
- (Y) COC Complete
- (Y) Sufficient Sample Volume
- ( ) Headspace Present (VOC)
- ( ) Temperature Blank
- ( ) Received within Hold

Checked by: AV

23E08668

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	TDS	Anions: Cl, F, SO4	ICP Metals: B, Ca, Mg, K, Na													Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	11. NEP	5/8/23	14:25	Water		X	X	X	X																
	2.																								
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 0.5

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 5/9/23 13:01	Received by: [signature]	Date/Time 5/9/23 13:01
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 5/10/23 1030
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS: 1Z 849 747 01 6409 6905

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXE0630-BLK1	Batch: BXE0630								
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Magnesium, Total					ND			0.2	1.00
Potassium, Total					ND			0.5	1.00
Sodium, Total					ND			0.5	1.00
LCS - EPA 200.7									
QC Sample ID: BXE0630-BS1	Batch: BXE0630								
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Boron, Total	101		85 - 115		0.51		0.500	0.05	1.00
Calcium, Total	102		85 - 115		10.4		10.2	0.2	1.00
Magnesium, Total	103		85 - 115		10.5		10.2	0.2	1.00
Potassium, Total	103		85 - 115		10.3		10.0	0.5	1.00
Sodium, Total	104		85 - 115		10.4		10.0	0.5	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXE0630-MS1	Batch: BXE0630		QC Source Sample: 23E0868-01						
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Boron, Total	-128		70 - 130		79.0	79.6	0.500	5.00	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Calcium, Total	28.7		70 - 130		572	569	10.2	20.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Magnesium, Total	-93.9		70 - 130		1550	1560	10.2	20.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Potassium, Total	89.1		70 - 130		89.8	80.9	10.0	50.0	100.0(
Sodium, Total	-538		70 - 130		3720	3770	10.0	50.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BXE0630-MS2	Batch: BXE0630		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Boron, Total	95.1		70 - 130		0.65	0.17	0.500	0.05	1.00
Calcium, Total	79.5		70 - 130		82.5	74.4	10.2	0.2	1.00
Magnesium, Total	90.9		70 - 130		46.9	37.6	10.2	0.2	1.00
Potassium, Total	94.0		70 - 130		24.9	15.5	10.0	0.5	1.00
Sodium, Total	54.9		70 - 130		154	148	10.0	0.5	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXE0630-MSD1	Batch: BXE0630		QC Source Sample: 23E0868-01						
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Boron, Total	-240	0.712	70 - 130	20	78.4	79.6	0.500	5.00	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									

Matrix Spike Dup - EPA 200.7 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXE0630-MSD1	Batch: BXE0630		QC Source Sample: 23E0868-01						
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Calcium, Total	-29.3	1.04	70 - 130	20	566	569	10.2	20.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Magnesium, Total	-269	1.16	70 - 130	20	1540	1560	10.2	20.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Potassium, Total	31.4	6.64	70 - 130	20	84.0	80.9	10.0	50.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Sodium, Total	-907	0.997	70 - 130	20	3680	3770	10.0	50.0	100.0(
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BXE0630-MSD2	Batch: BXE0630		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/12/2023								
Boron, Total	96.0	0.756	70 - 130	20	0.65	0.17	0.500	0.05	1.00
Calcium, Total	104	3.01	70 - 130	20	85.0	74.4	10.2	0.2	1.00
Magnesium, Total	104	2.88	70 - 130	20	48.3	37.6	10.2	0.2	1.00
Potassium, Total	99.5	2.15	70 - 130	20	25.4	15.5	10.0	0.5	1.00
Sodium, Total	103	3.11	70 - 130	20	158	148	10.0	0.5	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXE0587-BLK1	Batch: BXE0587								
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXE0587-BS1	Batch: BXE0587								
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Chloride	101		90 - 110		50.6		50.0	1.00	1.00
Fluoride	107		90 - 110		5.34		5.00	0.100	1.00
Sulfate	104		90 - 110		51.8		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXE0587-MS1	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Chloride	71.7		80 - 120		461	390	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Fluoride	92.8		80 - 120		9.28		10.0	1.10	1.00
Sulfate	95.7		80 - 120		187	91.2	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0587-MS2	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Chloride	101		80 - 120		462	360	100	11.0	1.00
Fluoride	93.4		80 - 120		9.34		10.0	1.10	1.00
Sulfate	95.6		80 - 120		187	91.4	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXE0587-MSD1	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Chloride	65.2	1.41	80 - 120	20	455	390	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Fluoride	94.3	1.61	80 - 120	20	9.43		10.0	1.10	1.00
Sulfate	94.7	0.529	80 - 120	20	186	91.2	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXE0587-MSD2	Batch: BXE0587		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Chloride	90.5	2.35	80 - 120	20	451	360	100	11.0	1.00
Fluoride	94.3	0.926	80 - 120	20	9.43		10.0	1.10	1.00
Sulfate	93.2	1.32	80 - 120	20	185	91.4	100	11.0	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2320 B									
QC Sample ID: BXE0614-BLK1	Batch: BXE0614								
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Alkalinity - Bicarbonate (as CaCO3)					ND			1.0	1.00
Alkalinity - Carbonate (as CaCO3)					ND			1.0	1.00
Alkalinity - Hydroxide (as CaCO3)					ND			1.0	1.00
Alkalinity - Total (as CaCO3)					ND			1.0	1.00
Duplicate - SM 2320 B									
QC Sample ID: BXE0614-DUP1	Batch: BXE0614		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Alkalinity - Bicarbonate (as CaCO3)		0.523		20	211	210		1.0	1.00
Alkalinity - Carbonate (as CaCO3)				20	ND	ND		1.0	1.00
Alkalinity - Hydroxide (as CaCO3)				20	ND	ND		1.0	1.00
Alkalinity - Total (as CaCO3)		0.523		20	211	210		1.0	1.00
LCS - SM 2320 B									
QC Sample ID: BXE0614-BS1	Batch: BXE0614								
Date Prepared: 05/11/2023	Date Analyzed: 05/11/2023								
Alkalinity - Total (as CaCO3)	93.3		90 - 110		220		236	1.0	1.00

QC Report for Work Order (WO) - 23E0868

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXE0505-BLK1	Batch: BXE0505								
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXE0505-DUP1	Batch: BXE0505		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)		1		10	50400	50900		500	1.00
QC Sample ID: BXE0505-DUP2	Batch: BXE0505		QC Source Sample: 23E0868-01						
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)		2		10	28300	27800		500	1.00
LCS - SM 2540 C									
QC Sample ID: BXE0505-BS1	Batch: BXE0505								
Date Prepared: 05/10/2023	Date Analyzed: 05/10/2023								
Total Dissolved Solids (TDS)	103		90 - 110		412		400	20	1.00

CHEMTECH-FORD
LABORATORIES

6/22/2023

Work Order: 23E1866
Project: FA-DG5/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/23/23 10:00 @ 1.9** °C
Date Reported: 6/22/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23E1866-01**
Date Sampled: **5/21/23 10:00**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1770	mg/L	100	EPA 300.0	5/23/23	5/24/23	
Fluoride	ND	mg/L	0.100	EPA 300.0	5/23/23	5/24/23	
Sulfate	9170	mg/L	100	EPA 300.0	5/23/23	5/24/23	
Total Dissolved Solids (TDS)	21600	mg/L	20	SM 2540 C	5/23/23	5/23/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Arsenic, Total	0.0068	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Barium, Total	0.011	mg/L	0.005	EPA 200.7	5/24/23	5/25/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Boron, Total	59.2	mg/L	0.05	EPA 200.7	5/24/23	5/25/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8	5/24/23	5/25/23	
Calcium, Total	457	mg/L	0.2	EPA 200.7	5/24/23	5/25/23	
Chromium, Total	0.0020	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Cobalt, Total	0.0238	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Lithium, Total	0.665	mg/L	0.005	EPA 200.7	5/24/23	5/25/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	5/25/23	5/25/23	
Molybdenum, Total	0.03	mg/L	0.01	EPA 200.7	5/24/23	5/25/23	
Selenium, Total	0.0100	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8	5/24/23	5/25/23	

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Tyler Esplin
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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/23/23 10:00 @ 1.9** °C
Date Reported: 6/22/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **BA-DG4**

Matrix: **Water**
Lab ID: **23E1866-02**
Date Sampled: **5/21/23 14:57**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	566	mg/L	100	EPA 300.0	5/23/23	5/24/23	
Fluoride	1.32	mg/L	0.100	EPA 300.0	5/23/23	5/24/23	
Sulfate	6570	mg/L	100	EPA 300.0	5/23/23	5/24/23	
Total Dissolved Solids (TDS)	12600	mg/L	20	SM 2540 C	5/23/23	5/23/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/24/23	
Arsenic, Total	0.0077	mg/L	0.0005	EPA 200.8	5/24/23	5/24/23	
Barium, Total	0.020	mg/L	0.005	EPA 200.7	6/1/23	6/1/23	
Beryllium, Total	ND	mg/L	0.0010	EPA 200.8	5/24/23	5/24/23	
Boron, Total	29.4	mg/L	0.05	EPA 200.7	6/1/23	6/1/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8	5/24/23	5/24/23	
Calcium, Total	242	mg/L	0.2	EPA 200.7	6/1/23	6/1/23	
Chromium, Total	0.0030	mg/L	0.0005	EPA 200.8	5/24/23	5/24/23	
Cobalt, Total	0.0016	mg/L	0.0005	EPA 200.8	5/24/23	5/24/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/24/23	
Lithium, Total	0.196	mg/L	0.005	EPA 200.7	6/1/23	6/1/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	5/25/23	5/25/23	
Molybdenum, Total	0.07	mg/L	0.01	EPA 200.7	6/1/23	6/1/23	
Selenium, Total	0.0305	mg/L	0.0005	EPA 200.8	5/24/23	5/24/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8	5/24/23	5/24/23	

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Tyler Esplin
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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/23/23 10:00 @ 1.9** °C
Date Reported: 6/22/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **Duplicate**

Matrix: **Water**
Lab ID: **23E1866-03**
Date Sampled: **5/21/23 11:20**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1780	mg/L	100	EPA 300.0	5/23/23	5/24/23	
Fluoride	ND	mg/L	0.100	EPA 300.0	5/23/23	5/24/23	
Sulfate	9250	mg/L	100	EPA 300.0	5/23/23	5/24/23	
Total Dissolved Solids (TDS)	17300	mg/L	20	SM 2540 C	5/23/23	5/23/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Arsenic, Total	0.0068	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Barium, Total	0.015	mg/L	0.005	EPA 200.7	5/24/23	5/25/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Boron, Total	60.9	mg/L	0.05	EPA 200.7	5/24/23	5/25/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8	5/24/23	5/25/23	
Calcium, Total	471	mg/L	0.2	EPA 200.7	5/24/23	5/25/23	
Chromium, Total	0.0023	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Cobalt, Total	0.0267	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Lithium, Total	0.683	mg/L	0.005	EPA 200.7	5/24/23	5/25/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	5/25/23	5/25/23	
Molybdenum, Total	0.03	mg/L	0.01	EPA 200.7	5/24/23	5/25/23	
Selenium, Total	0.0104	mg/L	0.0005	EPA 200.8	5/24/23	5/25/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8	5/24/23	5/25/23	

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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **5/23/23 10:00 @ 1.9** °C
Date Reported: 6/22/2023
Project Name: **FA-DG5/BA-DG4**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

(Shipping Rad. samples in another box)

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

UPS: 1Z8497470164843937

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AT

23E1866

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5	5-21-23	10:00	Water		X	X	X	X	X	X	X	X	X										
02	2. BA-DG4	5-21-23	14:57	Water		X	X	X	X	X	X	X	X	X										
03	3. Duplicate	5-21-23	11:20	Water		X	X	X	X	X	X	X	X	X										
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Ag - 1296 M - 1303

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.9

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 5/22/23 12:20	Received by: [signature] Ryan Dockery	Date/Time 5/22/23
Relinquished by: [signature]	Date/Time	Received by: [signature] AJ Wade Teel	Date/Time 5/23/23 1000
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXE1262-BLK1	Batch: BXE1262								
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
QC Sample ID: BXF0002-BLK1	Batch: BXF0002								
Date Prepared: 06/01/2023	Date Analyzed: 06/01/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXE1262-BS1	Batch: BXE1262								
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Barium, Total	95.4		85 - 115		0.191		0.200	0.005	1.00
Boron, Total	97.6		85 - 115		0.49		0.500	0.05	1.00
Calcium, Total	92.6		85 - 115		9.4		10.2	0.2	1.00
Lithium, Total	97.6		85 - 115		0.195		0.200	0.005	1.00
Molybdenum, Total	103		85 - 115		0.21		0.200	0.01	1.00
QC Sample ID: BXF0002-BS1	Batch: BXF0002								
Date Prepared: 06/01/2023	Date Analyzed: 06/01/2023								
Barium, Total	96.6		85 - 115		0.193		0.200	0.005	1.00
Boron, Total	95.8		85 - 115		0.48		0.500	0.05	1.00
Calcium, Total	95.0		85 - 115		9.7		10.2	0.2	1.00
Lithium, Total	99.0		85 - 115		0.198		0.200	0.005	1.00
Molybdenum, Total	104		85 - 115		0.21		0.200	0.01	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXE1262-MS1	Batch: BXE1262		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Barium, Total	105		70 - 130		0.608	0.398	0.200	0.005	1.00
Boron, Total	108		70 - 130		0.76	0.22	0.500	0.05	1.00
Calcium, Total	167		70 - 130		268	251	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	101		70 - 130		0.287	0.084	0.200	0.005	1.00
Molybdenum, Total	108		70 - 130		0.24	0.02	0.200	0.01	1.00
QC Sample ID: BXE1262-MS2	Batch: BXE1262		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/25/2023								
Barium, Total	103		70 - 130		0.253	0.047	0.200	0.005	1.00
Boron, Total	109		70 - 130		0.82	0.28	0.500	0.05	1.00
Calcium, Total	172		70 - 130		82.2	64.7	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	100		70 - 130		0.222	0.021	0.200	0.005	1.00
Molybdenum, Total	110		70 - 130		0.22	0.002	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike - EPA 200.7 (cont.)									
QC Sample ID: BXF0002-MS1	Batch: BXF0002		QC Source Sample: XXXXXXX-XX						
Date Prepared: 06/01/2023	Date Analyzed: 06/01/2023								
Barium, Total	97.6		70 - 130		0.195	ND	0.200	0.005	1.00
Boron, Total	100		70 - 130		0.50	ND	0.500	0.05	1.00
Calcium, Total	96.0		70 - 130		9.8	ND	10.2	0.2	1.00
Lithium, Total	99.5		70 - 130		0.199	ND	0.200	0.005	1.00
Molybdenum, Total	104		70 - 130		0.21	ND	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXE1262-MSD1	Batch: BXE1262		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Barium, Total	102	1.01	70 - 130	20	0.602	0.398	0.200	0.005	1.00
Boron, Total	106	1.67	70 - 130	20	0.75	0.22	0.500	0.05	1.00
Calcium, Total	152	0.598	70 - 130	20	266	251	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	100	0.911	70 - 130	20	0.284	0.084	0.200	0.005	1.00
Molybdenum, Total	106	1.35	70 - 130	20	0.24	0.02	0.200	0.01	1.00
QC Sample ID: BXE1262-MSD2	Batch: BXE1262		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/25/2023								
Barium, Total	99.3	3.25	70 - 130	20	0.245	0.047	0.200	0.005	1.00
Boron, Total	103	3.66	70 - 130	20	0.79	0.28	0.500	0.05	1.00
Calcium, Total	134	4.82	70 - 130	20	78.4	64.7	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	96.7	3.26	70 - 130	20	0.214	0.021	0.200	0.005	1.00
Molybdenum, Total	108	2.53	70 - 130	20	0.22	0.002	0.200	0.01	1.00
QC Sample ID: BXF0002-MSD1	Batch: BXF0002		QC Source Sample: XXXXXXX-XX						
Date Prepared: 06/01/2023	Date Analyzed: 06/01/2023								
Barium, Total	96.4	1.13	70 - 130	20	0.193	ND	0.200	0.005	1.00
Boron, Total	99.1	1.06	70 - 130	20	0.50	ND	0.500	0.05	1.00
Calcium, Total	95.0	0.997	70 - 130	20	9.7	ND	10.2	0.2	1.00
Lithium, Total	99.5	0.00	70 - 130	20	0.199	ND	0.200	0.005	1.00
Molybdenum, Total	104	0.720	70 - 130	20	0.21	ND	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXE1263-BLK1	Batch: BXE1263								
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
QC Sample ID: BXE1285-BLK1	Batch: BXE1285								
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXE1263-BS1	Batch: BXE1263								
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total	98.4		85 - 115		0.039		0.0400	0.0005	1.00
Arsenic, Total	97.0		85 - 115		0.039		0.0400	0.0005	1.00
Beryllium, Total	97.7		85 - 115		0.039		0.0400	0.0005	1.00
Cadmium, Total	95.1		85 - 115		0.038		0.0400	0.0002	1.00
Chromium, Total	101		85 - 115		0.040		0.0400	0.0005	1.00
Cobalt, Total	99.4		85 - 115		0.040		0.0400	0.0005	1.00
Lead, Total	93.2		85 - 115		0.037		0.0400	0.0005	1.00
Selenium, Total	98.3		85 - 115		0.039		0.0400	0.0005	1.00
Thallium, Total	99.7		85 - 115		0.040		0.0400	0.0002	1.00
QC Sample ID: BXE1285-BS1	Batch: BXE1285								
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total	98.3		85 - 115		0.039		0.0400	0.0005	1.00
Arsenic, Total	96.4		85 - 115		0.039		0.0400	0.0005	1.00
Beryllium, Total	95.7		85 - 115		0.038		0.0400	0.0005	1.00
Cadmium, Total	95.2		85 - 115		0.038		0.0400	0.0002	1.00
Chromium, Total	98.6		85 - 115		0.039		0.0400	0.0005	1.00
Cobalt, Total	96.3		85 - 115		0.039		0.0400	0.0005	1.00
Lead, Total	91.5		85 - 115		0.037		0.0400	0.0005	1.00
Selenium, Total	95.2		85 - 115		0.038		0.0400	0.0005	1.00
Thallium, Total	96.7		85 - 115		0.039		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXE1263-MS1	Batch: BXE1263		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total	97.5		70 - 130		0.041	0.002	0.0400	0.0005	1.00
Arsenic, Total	97.7		70 - 130		0.049	0.010	0.0400	0.0005	1.00
Beryllium, Total	94.9		70 - 130		0.038	ND	0.0400	0.0005	1.00

Matrix Spike - EPA 200.8 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXE1263-MS1	Batch: BXE1263		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Cadmium, Total	89.8		70 - 130		0.036	0.00003	0.0400	0.0002	1.00
Chromium, Total	91.1		70 - 130		0.040	0.003	0.0400	0.0005	1.00
Cobalt, Total	87.2		70 - 130		0.035	0.0004	0.0400	0.0005	1.00
Lead, Total	85.8		70 - 130		0.035	0.0004	0.0400	0.0005	1.00
Selenium, Total	98.5		70 - 130		0.043	0.004	0.0400	0.0005	1.00
Thallium, Total	92.5		70 - 130		0.037	ND	0.0400	0.0002	1.00
QC Sample ID: BXE1263-MS2	Batch: BXE1263		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total	102		70 - 130		0.041	0.0004	0.0400	0.0005	1.00
Arsenic, Total	99.6		70 - 130		0.042	0.002	0.0400	0.0005	1.00
Beryllium, Total	94.6		70 - 130		0.038	ND	0.0400	0.0005	1.00
Cadmium, Total	92.3		70 - 130		0.037	0.00004	0.0400	0.0002	1.00
Chromium, Total	95.8		70 - 130		0.039	0.0008	0.0400	0.0005	1.00
Cobalt, Total	92.0		70 - 130		0.037	0.0003	0.0400	0.0005	1.00
Lead, Total	89.1		70 - 130		0.036	0.0002	0.0400	0.0005	1.00
Selenium, Total	94.1		70 - 130		0.040	0.002	0.0400	0.0005	1.00
Thallium, Total	97.6		70 - 130		0.039	ND	0.0400	0.0002	1.00
QC Sample ID: BXE1285-MS1	Batch: BXE1285		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total	98.1		70 - 130		0.039	ND	0.0400	0.0005	1.00
Arsenic, Total	101		70 - 130		0.048	0.007	0.0400	0.0005	1.00
Beryllium, Total	97.0		70 - 130		0.039	ND	0.0400	0.0005	1.00
Cadmium, Total	92.5		70 - 130		0.037	0.0001	0.0400	0.0002	1.00
Chromium, Total	94.8		70 - 130		0.040	0.002	0.0400	0.0005	1.00
Cobalt, Total	91.2		70 - 130		0.036	ND	0.0400	0.0005	1.00
Lead, Total	88.3		70 - 130		0.036	0.001	0.0400	0.0005	1.00
Selenium, Total	103		70 - 130		0.041	0.0002	0.0400	0.0005	1.00
Thallium, Total	94.9		70 - 130		0.038	ND	0.0400	0.0002	1.00
QC Sample ID: BXE1285-MS2	Batch: BXE1285		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/24/2023	Date Analyzed: 05/24/2023								
Antimony, Total	98.0		70 - 130		0.039	0.0002	0.0400	0.0005	1.00
Arsenic, Total	98.2		70 - 130		0.039	0.0002	0.0400	0.0005	1.00
Beryllium, Total	97.3		70 - 130		0.039	ND	0.0400	0.0005	1.00
Cadmium, Total	92.6		70 - 130		0.037	0.00003	0.0400	0.0002	1.00
Chromium, Total	97.4		70 - 130		0.040	0.001	0.0400	0.0005	1.00
Cobalt, Total	94.4		70 - 130		0.038	0.00008	0.0400	0.0005	1.00
Lead, Total	90.1		70 - 130		0.039	0.003	0.0400	0.0005	1.00
Selenium, Total	98.0		70 - 130		0.040	0.0004	0.0400	0.0005	1.00
Thallium, Total	96.7		70 - 130		0.039	ND	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23E1866

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXE1346-BLK1	Batch: BXE1346								
Date Prepared: 05/25/2023	Date Analyzed: 05/25/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXE1346-BS1	Batch: BXE1346								
Date Prepared: 05/25/2023	Date Analyzed: 05/25/2023								
Mercury, Total	111		85 - 115		0.00553		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXE1346-MS1	Batch: BXE1346				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/25/2023	Date Analyzed: 05/25/2023								
Mercury, Total	110		75 - 125		0.00552	ND	0.00500	0.00015	1.00
QC Sample ID: BXE1346-MS2	Batch: BXE1346				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/25/2023	Date Analyzed: 05/25/2023								
Mercury, Total	109		75 - 125		0.00543	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXE1346-MSD1	Batch: BXE1346				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/25/2023	Date Analyzed: 05/25/2023								
Mercury, Total	109	1.26	75 - 125	20	0.00545	ND	0.00500	0.00015	1.00
QC Sample ID: BXE1346-MSD2	Batch: BXE1346				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/25/2023	Date Analyzed: 05/25/2023								
Mercury, Total	109	0.500	75 - 125	20	0.00546	ND	0.00500	0.00015	1.00

QC Report for Work Order (WO) - 23E1866

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXE1205-BLK1	Batch: BXE1205								
Date Prepared: 05/23/2023	Date Analyzed: 05/23/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXE1205-BS1	Batch: BXE1205								
Date Prepared: 05/23/2023	Date Analyzed: 05/23/2023								
Chloride	98.3		90 - 110		49.1		50.0	1.00	1.00
Fluoride	95.0		90 - 110		4.75		5.00	0.100	1.00
Sulfate	98.1		90 - 110		49.0		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXE1205-MS1	Batch: BXE1205				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/23/2023	Date Analyzed: 05/24/2023								
Chloride	95.8		80 - 120		22900	13300	10000	1100	1.00
Fluoride	90.2		80 - 120		902	ND	1000	110	1.00
Sulfate	86.6		80 - 120		9410	757	10000	1100	1.00
QC Sample ID: BXE1205-MS2	Batch: BXE1205				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/23/2023	Date Analyzed: 05/24/2023								
Chloride	89.6		80 - 120		180	90.1	100	11.0	1.00
Fluoride	93.7		80 - 120		9.37	ND	10.0	1.10	1.00
Sulfate	96.0		80 - 120		201	105	100	11.0	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXE1205-MSD1	Batch: BXE1205				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/23/2023	Date Analyzed: 05/24/2023								
Chloride	95.3	0.241	80 - 120	20	22800	13300	10000	1100	1.00
Fluoride	89.0	1.34	80 - 120	20	890	ND	1000	110	1.00
Sulfate	87.1	0.616	80 - 120	20	9470	757	10000	1100	1.00
QC Sample ID: BXE1205-MSD2	Batch: BXE1205				QC Source Sample: XXXXXXX-XX				
Date Prepared: 05/23/2023	Date Analyzed: 05/24/2023								
Chloride	83.3	3.60	80 - 120	20	173	90.1	100	11.0	1.00
Fluoride	89.7	4.38	80 - 120	20	8.97	ND	10.0	1.10	1.00
Sulfate	88.6	3.76	80 - 120	20	194	105	100	11.0	1.00

QC Report for Work Order (WO) - 23E1866

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXE1209-BLK1	Batch: BXE1209								
Date Prepared: 05/23/2023	Date Analyzed: 05/23/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXE1209-DUP1	Batch: BXE1209		QC Source Sample: XXXXXXX-XX						
Date Prepared: 05/23/2023	Date Analyzed: 05/23/2023								
Total Dissolved Solids (TDS)		0.8		10	25000	25200		500	1.00
QC Sample ID: BXE1209-DUP2	Batch: BXE1209		QC Source Sample: 23E1866-03						
Date Prepared: 05/23/2023	Date Analyzed: 05/23/2023								
Total Dissolved Solids (TDS)		0.6		10	17400	17300		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXE1209-BS1	Batch: BXE1209								
Date Prepared: 05/23/2023	Date Analyzed: 05/23/2023								
Total Dissolved Solids (TDS)	102		90 - 110		408		400	20	1.00

CHEMTECH-FORD
LABORATORIES

9/26/2023

Work Order: 23E2029
Project: FA-GD5/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23E2029-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	5/21/2023 10:00 AM
Sample Site:	FA-DG5	***Receipt Date:***	5/24/2023 10:43 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	FA-GD5/BA-DG4
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.28 ± 0.218	5	0.24	pCi/L	EPA 903.0	06/26/2023	06/26/2023	SL-62
Radium-228	0.79 ± 0.212	5	0.36	pCi/L	EPA 904.0	06/23/2000	06/23/2023	SL-62

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23E2029-02

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	5/21/2023 2:57 PM
Sample Site:	BA-DG4	***Receipt Date:***	5/24/2023 10:43 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	FA-GD5/BA-DG4
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.82 ± 0.326	5	0.20	pCi/L	EPA 903.0	06/26/2023	06/26/2023	SL-62
Radium-228	0.08 ± 0.267	5	0.49	pCi/L	EPA 904.0	06/23/2000	06/23/2023	SL-62

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23E2029-03

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	5/21/2023 11:20 AM
Sample Site:	Duplicate	***Receipt Date:***	5/24/2023 10:43 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	FA-GD5/BA-DG4
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.34 ± 0.262	5	0.31	pCi/L	EPA 903.0	06/26/2023	06/26/2023	SL-62
Radium-228	0.52 ± 0.256	5	0.45	pCi/L	EPA 904.0	06/23/2000	06/23/2023	SL-62

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

(Shipping Rad. samples in another box)

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX:
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

UPS: 1Z8457470163849746

Sample Receipt Conditions:

(✓) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
( ) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: A

23E2029

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED														Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228						Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. FA-DG5	5-21-23	10:00	Water			X	X	X	X	X	X	X	X	X									
-02	2. BA-DG4	5-21-23	14:57	Water			X	X	X	X	X	X	X	X	X									
-03	3. Duplicate	5-21-23	11:20	Water			X	X	X	X	X	X	X	X	X									
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 21.4

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	5/22/23 12:20	Ryan Dockstader	5/22/23
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
		Alvaro Tori	5/24/23 1043
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

Ag: 1298 (2)

ANALYTICAL REPORT

September 13, 2023

Revised Report

Chemtech-Ford Laboratories

Sample Delivery Group:	L1620418
Samples Received:	05/26/2023
Project Number:	
Description:	

Report To: Dave Gayer
9632 S 500 S
Sandy, UT 84070

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

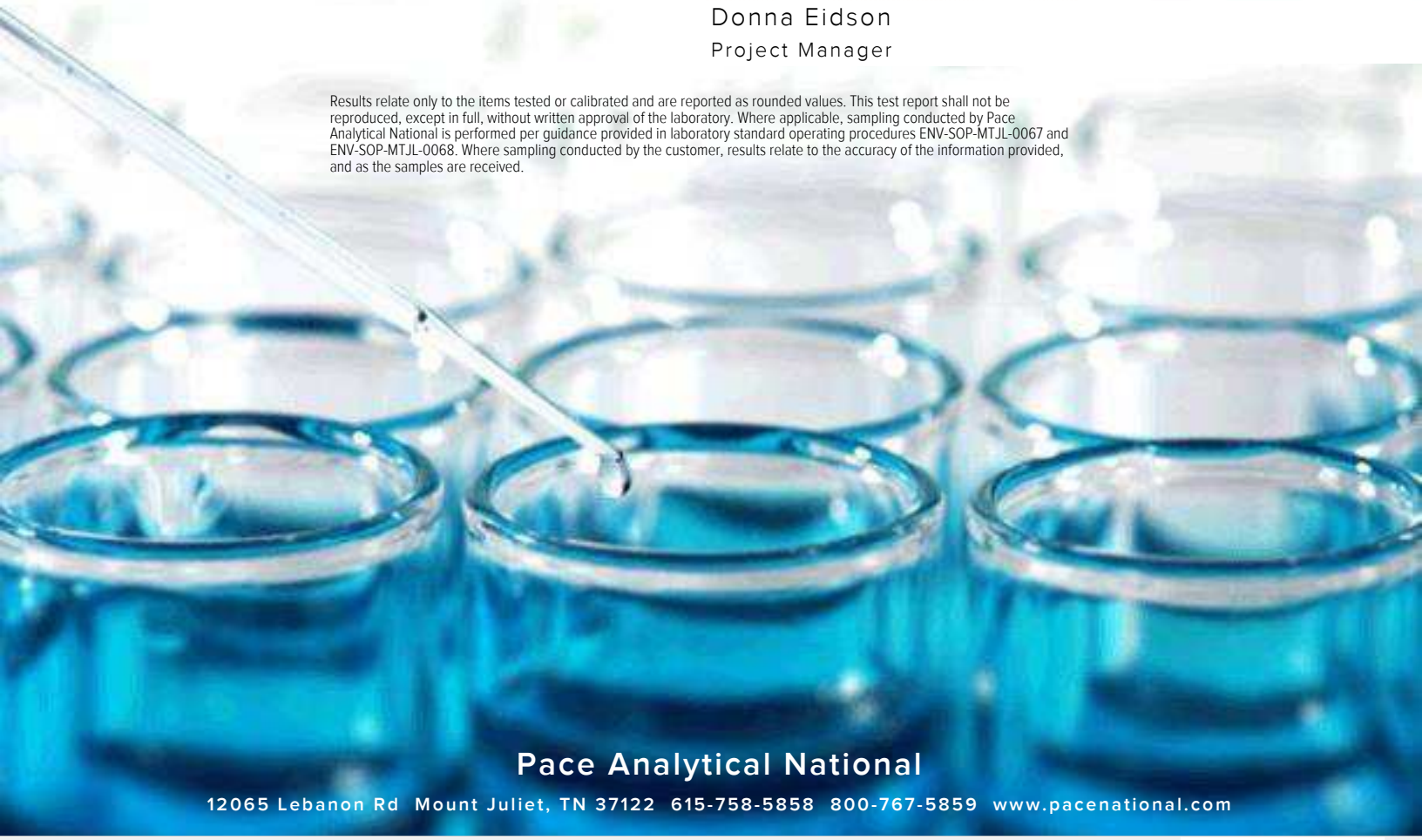


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23E1817-01 L1620418-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/22/23 08:35	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2075967	1	06/14/23 07:51	06/16/23 15:40	RRE	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E1922-01 L1620418-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/22/23 11:05	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2075967	1	06/14/23 07:51	06/16/23 15:40	RRE	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2029-01 L1620418-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/21/23 10:00	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 17:19	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2029-02 L1620418-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/21/23 14:57	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 17:19	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2029-03 L1620418-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/21/23 11:20	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 18:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2049-01 L1620418-06 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/24/23 08:37	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2075967	1	06/14/23 07:51	06/16/23 15:40	RRE	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2139-01 L1620418-07 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/24/23 13:30	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2075967	1	06/14/23 07:51	06/16/23 15:40	RRE	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2141-01 L1620418-08 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/24/23 13:05	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2075967	1	06/14/23 07:51	06/16/23 15:40	RRE	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2079379	1	06/16/23 19:49	06/23/23 17:28	SNR	Mt. Juliet, TN

23E2126-01 L1620418-09 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 09:35	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 18:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2126-02 L1620418-10 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 09:35	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 18:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2126-03 L1620418-11 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 10:22	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 18:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2126-04 L1620418-12 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 11:18	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 19:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2126-05 L1620418-13 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 11:50	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 19:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-01 L1620418-14 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/22/23 14:55	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 19:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-02 L1620418-15 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 09:00	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 19:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-03 L1620418-16 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 13:08	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 20:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-04 L1620418-17 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 13:52	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 20:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-05 L1620418-18 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 13:52	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 20:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-06 L1620418-19 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 14:47	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2080313	1	06/22/23 11:05	06/26/23 20:20	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-07 L1620418-20 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 15:45	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2083650	1	06/27/23 12:43	07/07/23 19:57	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

23E2113-08 L1620418-21 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/23/23 16:24	05/26/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2083650	1	06/27/23 12:43	07/07/23 20:57	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2080396	1	06/19/23 18:04	06/29/23 16:25	SNR	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Donna Eidson
Project Manager

Report Revision History

Level II Report - Version 1: 07/19/23 17:10
Level IV Report - Version 2: 07/19/23 17:17

Project Narrative

Corrected -03,-04,-05 IDs.

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	17.4		2.72	1.81	06/16/2023 15:40	WG2075967
GROSS BETA	6.24		1.62	1.78	06/16/2023 15:40	WG2075967

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.70		0.299	0.495	06/23/2023 17:28	WG2079379
(T) Barium	*120*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*118*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	8.62		3.63	3.55	06/16/2023 15:40	WG2075967
GROSS BETA	5.59		2.86	3.56	06/16/2023 15:40	WG2075967

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.503		0.231	0.405	06/23/2023 17:28	WG2079379
(T) Barium	*116*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*117*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.277		0.218	0.238	06/26/2023 17:19	WG2080313
(T) Barium	*108*			*30.0-143*	*06/26/2023 17:19*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.791		0.212	0.359	06/23/2023 17:28	WG2079379
(T) Barium	*137*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*109*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.818		0.326	0.196	06/26/2023 17:19	WG2080313
(T) Barium	*98.2*			*30.0-143*	*06/26/2023 17:19*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.0778	U	0.267	0.486	06/23/2023 17:28	WG2079379
(T) Barium	*143*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*123*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.337		0.262	0.312	06/26/2023 18:20	WG2080313
(T) Barium	*109*			*30.0-143*	*06/26/2023 18:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.525		0.256	0.450	06/23/2023 17:28	WG2079379
(T) Barium	*134*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*118*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	1.35	J	1.11	1.42	06/16/2023 15:40	WG2075967
GROSS BETA	1.22	J	1.23	1.60	06/16/2023 15:40	WG2075967

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.314	J	0.213	0.379	06/23/2023 17:28	WG2079379
(T) Barium	*116*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*112*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	3.10		2.28	2.83	06/16/2023 15:40	WG2075967
GROSS BETA	0.383	U	2.33	3.13	06/16/2023 15:40	WG2075967

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.886		0.249	0.425	06/23/2023 17:28	WG2079379
(T) Barium	*102*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*121*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	3.40		2.19	2.64	06/16/2023 15:40	WG2075967
GROSS BETA	0.553	U	2.28	3.04	06/16/2023 15:40	WG2075967

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.252	J	0.234	0.420	06/23/2023 17:28	WG2079379
(T) Barium	*95.9*			*30.0-143*	*06/23/2023 17:28*	WG2079379
(T) Yttrium	*117*			*30.0-136*	*06/23/2023 17:28*	WG2079379

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.01		0.381	0.304	06/26/2023 18:20	WG2080313
(T) Barium	*99.2*			*30.0-143*	*06/26/2023 18:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.24		0.387	0.680	06/29/2023 16:25	WG2080396
(T) Barium	*77.3*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*98.0*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.879		0.355	0.264	06/26/2023 18:20	WG2080313
(T) Barium	*94.2*			*30.0-143*	*06/26/2023 18:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.69		0.315	0.533	06/29/2023 16:25	WG2080396
(T) Barium	*83.2*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*108*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.654		0.293	0.195	06/26/2023 18:20	WG2080313
(T) Barium	*98.8*			*30.0-143*	*06/26/2023 18:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.51		0.356	0.614	06/29/2023 16:25	WG2080396
(T) Barium	*72.1*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*115*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.365		0.284	0.359	06/26/2023 19:20	WG2080313
(T) Barium	*92.1*			*30.0-143*	*06/26/2023 19:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.85		0.335	0.563	06/29/2023 16:25	WG2080396
(T) Barium	*68.2*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*99.8*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.810		0.346	0.300	06/26/2023 19:20	WG2080313
(T) Barium	*100*			*30.0-143*	*06/26/2023 19:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.02		0.308	0.540	06/29/2023 16:25	WG2080396
(T) Barium	*72.3*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*106*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.611		0.293	0.251	06/26/2023 19:20	WG2080313
(T) Barium	*100*			*30.0-143*	*06/26/2023 19:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.284	J	0.342	0.623	06/29/2023 16:25	WG2080396
(T) Barium	*83.6*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*102*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.59		0.458	0.204	06/26/2023 19:20	WG2080313
(T) Barium	*92.6*			*30.0-143*	*06/26/2023 19:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.750		0.279	0.493	06/29/2023 16:25	WG2080396
(T) Barium	*79.3*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*111*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.791		0.365	0.356	06/26/2023 20:20	WG2080313
(T) Barium	*92.3*			*30.0-143*	*06/26/2023 20:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.69		0.306	0.517	06/29/2023 16:25	WG2080396
(T) Barium	*83.7*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*100*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.52		0.451	0.295	06/26/2023 20:20	WG2080313
(T) Barium	*102*			*30.0-143*	*06/26/2023 20:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	2.68		0.315	0.501	06/29/2023 16:25	WG2080396
(T) Barium	*89.7*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*102*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.76		0.486	0.264	06/26/2023 20:20	WG2080313
(T) Barium	*93.4*			*30.0-143*	*06/26/2023 20:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.96		0.312	0.520	06/29/2023 16:25	WG2080396
(T) Barium	*87.0*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*106*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.741		0.309	0.194	06/26/2023 20:20	WG2080313
(T) Barium	*98.8*			*30.0-143*	*06/26/2023 20:20*	WG2080313

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	2.38		0.300	0.480	06/29/2023 16:25	WG2080396
(T) Barium	*85.1*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*107*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.636		0.257	0.205	07/07/2023 19:57	WG2083650
(T) Barium	*97.8*			*30.0-143*	*07/07/2023 19:57*	WG2083650

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.0594	U	0.237	0.445	06/29/2023 16:25	WG2080396
(T) Barium	*90.4*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*114*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	1.60		0.418	0.306	07/07/2023 20:57	WG2083650
(T) Barium	*93.2*			*30.0-143*	*07/07/2023 20:57*	WG2083650

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.18		0.351	0.615	06/29/2023 16:25	WG2080396
(T) Barium	*79.9*			*30.0-143*	*06/29/2023 16:25*	WG2080396
(T) Yttrium	*107*			*30.0-136*	*06/29/2023 16:25*	WG2080396

Method Blank (MB)

(MB) R3950134-1 06/15/23 14:26

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
GROSS ALPHA	0.247	J	0.328	0.466
GROSS BETA	0.238	U	1.12	1.52

L1620418-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1620418-06 06/16/23 15:40 • (DUP) R3950134-5 06/15/23 14:26

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
GROSS ALPHA	1.35	1.11	1.42	2.05	1.11	1.42	1	40.9	0.442		20	3
GROSS BETA	1.22	1.23	1.60	2.17	1.19	1.60	1	56.0	0.554		20	3

Laboratory Control Sample (LCS)

(LCS) R3950134-2 06/15/23 14:26

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
GROSS ALPHA	15.0	12.4	82.5	80.0-120	
GROSS BETA	41.2	40.8	99.1	80.0-120	

L1620418-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620418-01 06/16/23 15:40 • (MS) R3950134-3 06/15/23 14:26 • (MSD) R3950134-4 06/15/23 14:26

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
GROSS ALPHA	15.0	17.4	28.3	33.1	72.9	105	1	70.0-130			15.8		20
GROSS BETA	41.2	6.24	43.2	43.6	89.6	90.7	1	70.0-130			1.01		20

Method Blank (MB)

(MB) R3941859-1 06/26/23 15:19

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-226	0.109	J	0.118	0.195
(T) Barium	*99.6*		*99.6*	

L1620418-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1620418-04 06/26/23 17:19 • (DUP) R3941859-5 06/26/23 16:19

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.818	0.326	0.196	0.743	0.542	0.196	1	9.64	0.119		20	3
(T) Barium	*98.2*			*107*	*107*							

Laboratory Control Sample (LCS)

(LCS) R3941859-2 06/26/23 15:19

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	5.17	103	80.0-120	
(T) Barium			*100*		

L1620418-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620418-13 06/26/23 19:20 • (MS) R3941859-3 06/26/23 15:19 • (MSD) R3941859-4 06/26/23 15:19

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.810	17.7	20.1	84.6	96.3	1	75.0-125			12.4		20
(T) Barium		*100*			*96.0*	*105*							

Method Blank (MB)

(MB) R3946582-1 07/07/23 18:56

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-226	0.0960	J	0.0815	0.129
(T) Barium	*95.8*		*95.8*	

L1621698-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1621698-12 07/07/23 22:57 • (DUP) R3946582-5 07/07/23 19:57

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.280	0.205	0.260	0.459	0.337	0.260	1	48.4	0.454		20	3
(T) Barium	*103*			*106*	*106*							

Laboratory Control Sample (LCS)

(LCS) R3946582-2 07/07/23 18:56

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	5.72	114	80.0-120	
(T) Barium			*96.8*		

L1621698-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1621698-06 07/07/23 20:57 • (MS) R3946582-3 07/07/23 19:57 • (MSD) R3946582-4 07/07/23 19:57

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.769	23.1	24.3	112	118	1	75.0-125			5.32		20
(T) Barium		*86.8*			*98.8*	*101*							

Method Blank (MB)

(MB) R3943555-1 06/23/23 17:28

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-228	-0.188	U	0.160	0.300
(T) Barium	*124*		*124*	
(T) Yttrium	*85.0*		*85.0*	

L1619064-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1619064-01 06/28/23 17:56 • (DUP) R3943555-6 06/28/23 17:56

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-228	0.735	0.384	0.668	0.649	0.329	0.668	1	12.3	0.168		20	3
(T) Barium	*95.3*			*98.9*	*98.9*							
(T) Yttrium	*111*			*115*	*115*							

Laboratory Control Sample (LCS)

(LCS) R3943555-2 06/23/23 17:28

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	4.71	94.2	80.0-120	
(T) Barium			*132*		
(T) Yttrium			*112*		

L1620418-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620418-01 06/23/23 17:28 • (MS) R3943555-3 06/23/23 17:28 • (MSD) R3943555-4 06/23/23 17:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-228	10.0	1.70	11.1	9.81	93.5	81.1	1	70.0-130			11.9		20
(T) Barium		*120*			*111*	*116*							
(T) Yttrium		*118*			*110*	*109*							

Method Blank (MB)

(MB) R3943542-2 06/29/23 16:25

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-228	-0.218	U	0.184	0.347
(T) Barium	*91.3*		*91.3*	
(T) Yttrium	*117*		*117*	

L1620729-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1620729-01 06/29/23 16:25 • (DUP) R3943542-5 06/29/23 16:25

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-228	0.514	0.408	0.721	1.03	0.453	0.721	1	67.1	0.850		20	3
(T) Barium	*86.6*			*83.0*	*83.0*							
(T) Yttrium	*110*			*113*	*113*							

Laboratory Control Sample (LCS)

(LCS) R3943542-1 06/27/23 21:48

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	4.48	89.5	80.0-120	
(T) Barium			*87.0*		
(T) Yttrium			*110*		

L1620418-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620418-11 06/29/23 16:25 • (MS) R3943542-3 06/29/23 16:25 • (MSD) R3943542-4 06/29/23 16:25

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-228	10.0	1.51	8.68	8.62	71.6	71.1	1	70.0-130			0.671		20
(T) Barium		*72.1*			*87.1*	*77.9*							
(T) Yttrium		*115*			*116*	*117*							

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E1817

B0

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5, run Radium-226

ULL20418

Laboratory ID: 23E1817-01 **Matrix:** Water -01
Sampled: 05/22/2023 08:35

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Sample Receipt Checklist

COC Seal Present/Intact:	Y / N	If Applicable	
COC Signed/Accurate:	Y / N	VOA Zero Headspace:	Y / N
Bottles arrive intact:	Y / N	Pres.Correct/Check:	Y / N
Correct bottles used:	Y / N		
Sufficient volume sent:	Y / N		
RAD Screen <0.5 mR/hr:	Y / N		

Released By	Date	Received By	Date
	5/22/23	08:00	5/25/23
PWSLCOT 17:00	5/25/23	9 10	5.26.23 9:00

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E1922

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is > 5, run radium 226

L1620418

Laboratory ID: 23E1922-01 -02
Matrix: Water
Sampled: 05/22/2023 11:05

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
	5/23/23	08:00	5/25/23
FEDEX 17:00	5/25/23	10	5.26.23 9:00

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2029

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments:

L1620418

Laboratory ID: 23E2029-01 — **Matrix:** Water — 03 — **Sampled:** 05/21/2023 10:00

Requested Test	Suggested Analytical Method *
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0

Laboratory ID: 23E2029-02 — **Matrix:** Water — 04 — **Sampled:** 05/21/2023 14:57

Requested Test	Suggested Analytical Method *
Radium-228	EPA 904.0
Radium-226	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226 LLD	EPA 903.0

Laboratory ID: 23E2029-03 — **Matrix:** Water — 05 — **Sampled:** 05/21/2023 11:20

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0

Released By	Date	Received By	Date
Denise Bev	5/24/23	09:00	5/25/23
PNSLCST 17:00	5/25/23		5.26.23 9.00

Released By — Date — Received By — Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2049

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5, run Radium 226.

U620418

Laboratory ID: 23E2049-01 **Matrix:** Water -06
Sampled: 05/24/2023 08:37

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Denise Brun 5/24/23 — 08:00 5/25/23
Released By / Date — Received By / Date

PNSLCOT 17:00 5/25/23 — 10 5.26.23 9:00
Released By / Date — Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2139

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross alpha is >5, run radium 226

LL02418

Laboratory ID: 23E2139-01 **Matrix:** Water -07
Sampled: 05/24/2023 13:30

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
	5/24/23	08:00	5/25/23
PNKLCOT 17:00	5/25/23		5-26-23 8:00

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2141

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments:

L1620418

Laboratory ID: 23E2141-01 **Matrix:** Water
Sampled: 05/24/2023 13:05

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
	5/24/23 17:00	08:00	5/25/23
PINSCOT	5/25/23		5.26.23 9:00

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2126

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments:

L1620418

Laboratory ID: 23E2126-01		**Matrix:** Water -09
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 09:35
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	

Laboratory ID: 23E2126-02		**Matrix:** Water -10
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 09:35
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23E2126-03		**Matrix:** Water -11
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 10:22
Radium-228	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	

Released By	Date	Received By	Date
	5/24/23	08:00	5/25/23
PARCOT 17:00	5/25/23		5.26.23 0700

Released By | Date | Received By | Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2126

L162048

Laboratory ID: 23E2126-04		**Matrix:** Water -12
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 11:18
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23E2126-05		**Matrix:** Water -13
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 11:50
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Released By	Date	Received By	Date
	5/24/23	08:00	5/25/23
PNKECOT	17:00 5/25/23		5-26-23 9:00

Released By Date Received By Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2113

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: QC 4 Report to MDL.

462041B

Laboratory ID: 23E2113-01 — **Matrix:** Water — -14 — **Sampled:** 05/22/2023 14:55

Requested Test	Suggested Analytical Method *
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0

Laboratory ID: 23E2113-02 — **Matrix:** Water — -15 — **Sampled:** 05/23/2023 09:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0

Laboratory ID: 23E2113-03 — **Matrix:** Water — -16 — **Sampled:** 05/23/2023 13:08

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0

Released By	Date	Received By	Date
	5/24/23	08:00	5/25/23
FEDEX 17:00	5/25/23	10	5.26.23 9:00

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2113

L1620418

Laboratory ID: 23E2113-04		**Matrix:** Water -17
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 13:52
Radium-228 LLD	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23E2113-05		**Matrix:** Water -18
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 13:52
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	

Laboratory ID: 23E2113-06		**Matrix:** Water -19
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 14:47
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23E2113-07		**Matrix:** Water -20
Requested Test	**Suggested Analytical Method ***	**Sampled:** 05/23/2023 15:45
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	

Released By	Date	Received By	Date
[signature]	5-24-23	[signature] 08:00	5/25/23
[signature] PAUSCOT 17:00	5/25/23	[signature] 10	5-26-23 9:00

Released By / Date / Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23E2113

L1620418

Laboratory ID: 23E2113-08 **Matrix:** Water

Sampled: 05/23/2023 16:24

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0

Released By	Date	Received By	Date
5-24-23		08:00	5/25/23
Released By	Date	Received By	Date
PNSLCUT 17:00	5/25/23	10	5.26.23 9:00

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

L1620418

Tracking Numbers	Temperature
Sw.1+	NSA70.5+0=0.5
	NSA70.4+0=0.4
	NSA7 1.0+0=1.0
	NSA7 4.4+0=4.4
	NSA7 0.1+0=0.1
	NSA7 4.3+0=4.3
	NSA70.7+0=0.7

CHEMTECH-FORD
LABORATORIES

Amended

8/1/2023

Work Order: 23F2445
Project: Round 6/Resamples

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Deseret Power Electric Cooperative
Tyler Esplin

REPORT NARRATIVE

Sample Group

Laboratory ID	Sample Name
23F2445-01	FA-DG5
23F2445-02	BA-DG1 Resample
23F2445-03	FA-DG4 Resample
23F2445-04	Duplicate

There was a question regarding the fluoride value on sample -02, resulting in poor precision for the duplicate value. Upon investigation of the anion chromatogram, it appeared that the fluoride peak was not fully integrated, on a baseline to baseline basis. Therefore, there was lost area in the resulting calculation. When that process was corrected, the entire peak was able to be integrated. This resulted in a slightly different value for sample -02. That corrected value is reflected in this amended report.

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www.ChemtechFord.com

Amended

Certificate of Analysis

Amended

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **6/30/23 12:02 @ 1.8** °C
Date Reported: 8/1/2023
Project Name: **Round 6/Resamples**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23F2445-01**
Date Sampled: **6/28/23 10:47**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1760	mg/L	100	EPA 300.0	7/3/23	7/4/23	
Fluoride	ND	mg/L	0.100	EPA 300.0	7/3/23	7/4/23	
Sulfate	8800	mg/L	100	EPA 300.0	7/3/23	7/4/23	
Total Dissolved Solids (TDS)	17000	mg/L	500	SM 2540 C	6/30/23	6/30/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Arsenic, Total	0.0071	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Barium, Total	0.012	mg/L	0.005	EPA 200.7	7/3/23	7/5/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Boron, Total	60.8	mg/L	0.05	EPA 200.7	7/3/23	7/5/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8	7/3/23	7/5/23	
Calcium, Total	543	mg/L	1.0	EPA 200.7	7/3/23	7/5/23	
Chromium, Total	0.0017	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Cobalt, Total	0.0235	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Lithium, Total	0.743	mg/L	0.005	EPA 200.7	7/3/23	7/5/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	7/3/23	7/5/23	
Molybdenum, Total	0.03	mg/L	0.01	EPA 200.7	7/3/23	7/5/23	
Selenium, Total	0.0120	mg/L	0.0005	EPA 200.8	7/3/23	7/5/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8	7/3/23	7/5/23	

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Amended **Certificate of Analysis** ***Amended***

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **6/30/23 12:02 @ 1.8** °C
Date Reported: 8/1/2023
Project Name: **Round 6/Resamples**

Sample ID: **BA-DG1 Resample**
Matrix: **Water**
Lab ID: **23F2445-02**
Date Sampled: **6/28/23 14:28**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Fluoride	3.99	mg/L	0.100	EPA 300.0	7/3/23	7/4/23	

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Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **6/30/23 12:02 @ 1.8** °C
Date Reported: 8/1/2023
Project Name: **Round 6/Resamples**

Sample ID: **FA-DG4 Resample**
Matrix: **Water**
Lab ID: **23F2445-03**
Date Sampled: **6/28/23 16:07**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Fluoride	5.38	mg/L	0.100	EPA 300.0	7/7/23	7/7/23	

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Amended **Certificate of Analysis** ***Amended***

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **6/30/23 12:02 @ 1.8** °C
Date Reported: 8/1/2023
Project Name: **Round 6/Resamples**

Sample ID: **Duplicate**

Matrix: **Water**
Lab ID: **23F2445-04**
Date Sampled: **6/28/23 14:58**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Fluoride	3.97	mg/L	0.100	EPA 300.0	7/7/23	7/7/23	

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Amended **Certificate of Analysis** ***Amended***

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **6/30/23 12:02 @ 1.8** °C
Date Reported: 8/1/2023
Project Name: **Round 6/Resamples**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

UPS 1Z 849 747 01 6509 6136

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: Round 6/Resamples
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Ap1282 M covered Ag covered Ag1238

Sample Receipt:

(X) COC Complete
(X) Containers Intact
(X) Sample Volume OK
(X) COC/Labels Linked
( ) Headspace Present (VOC)
(X) Received on Ice
( ) Temp Blank
(X) Correct Containers
(X) Within Hold Time
(X) COC Included
Checked by: JV

23F2445

Lab Use Only					: Residual Chlorine
01	1. FA-DG5	6-28-23	10:47	Water	
02	2. BA-DG1 Resample	6-28-23	14:28	Water	
03	3. FA-DG4 Resample	6-28-23	16:07	Water	
04	4. Duplicate	6-28-23	14:58	Water	
	5.				
	6.				
	7.				
	8.				
	9.				
	10.				

TESTS REQUESTED																		Bacteria			
	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228									Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	X	X	X	X	X	X	X	X	X												
02		X																			
03		X																			
04		X																			

Sampled by: [print] Trenton Keller Sampled by: [signature] Trenton Keller

ON ICE NOT ON ICE Temp (C°): 1.8

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature] Trenton Keller	Date/Time 6-29-23 12:52	Received by: [signature] Ryan Addamey	Date/Time 6/29/23 1:05pm
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 06/30/23 1202
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

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866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

QC Report for Work Order (WO) - 23F2445

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXG0036-BLK1	Batch: BXG0036								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXG0036-BS1	Batch: BXG0036								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Barium, Total	98.9		85 - 115		0.198		0.200	0.005	1.00
Boron, Total	97.6		85 - 115		0.49		0.500	0.05	1.00
Calcium, Total	97.7		85 - 115		10.0		10.2	0.2	1.00
Lithium, Total	111		85 - 115		0.222		0.200	0.005	1.00
Molybdenum, Total	100		85 - 115		0.20		0.200	0.01	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXG0036-MS1	Batch: BXG0036				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Barium, Total	100		70 - 130		0.267	0.066	0.200	0.005	1.00
Boron, Total	107		70 - 130		0.53	ND	0.500	0.05	1.00
Calcium, Total	106		70 - 130		53.1	42.3	10.2	0.2	1.00
Lithium, Total	111		70 - 130		0.236	0.014	0.200	0.005	1.00
Molybdenum, Total	101		70 - 130		0.21	0.003	0.200	0.01	1.00
QC Sample ID: BXG0036-MS2	Batch: BXG0036				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Barium, Total	98.0		70 - 130		0.425	0.229	0.200	0.005	1.00
Boron, Total	96.3		70 - 130		1.52	1.04	0.500	0.05	1.00
Calcium, Total	38.2		70 - 130		178	174	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	111		70 - 130		0.269	0.048	0.200	0.005	1.00
Molybdenum, Total	104		70 - 130		0.22	0.01	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXG0036-MSD1	Batch: BXG0036				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Barium, Total	101	0.486	70 - 130	20	0.268	0.066	0.200	0.005	1.00
Boron, Total	108	1.49	70 - 130	20	0.54	ND	0.500	0.05	1.00
Calcium, Total	101	1.07	70 - 130	20	52.6	42.3	10.2	0.2	1.00
Lithium, Total	111	0.0425	70 - 130	20	0.235	0.014	0.200	0.005	1.00
Molybdenum, Total	102	1.55	70 - 130	20	0.21	0.003	0.200	0.01	1.00
QC Sample ID: BXG0036-MSD2	Batch: BXG0036				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Barium, Total	103	2.33	70 - 130	20	0.435	0.229	0.200	0.005	1.00
Boron, Total	104	2.57	70 - 130	20	1.56	1.04	0.500	0.05	1.00
Calcium, Total	93.5	3.12	70 - 130	20	184	174	10.2	0.2	1.00
Lithium, Total	111	0.297	70 - 130	20	0.270	0.048	0.200	0.005	1.00
Molybdenum, Total	104	0.137	70 - 130	20	0.22	0.01	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXG0035-BLK1	Batch: BXG0035								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
QC Sample ID: BXG0035-BLK2	Batch: BXG0035								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXG0035-BS1	Batch: BXG0035								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total	102		85 - 115		0.041		0.0400	0.0005	1.00
Arsenic, Total	98.5		85 - 115		0.039		0.0400	0.0005	1.00
Beryllium, Total	101		85 - 115		0.041		0.0400	0.0005	1.00
Cadmium, Total	99.5		85 - 115		0.040		0.0400	0.0002	1.00
Chromium, Total	99.8		85 - 115		0.040		0.0400	0.0005	1.00
Cobalt, Total	98.7		85 - 115		0.039		0.0400	0.0005	1.00
Lead, Total	97.9		85 - 115		0.039		0.0400	0.0005	1.00
Selenium, Total	101		85 - 115		0.040		0.0400	0.0005	1.00
Thallium, Total	103		85 - 115		0.041		0.0400	0.0002	1.00
QC Sample ID: BXG0035-BS2	Batch: BXG0035								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total	98.9		85 - 115		0.040		0.0400	0.0005	1.00
Arsenic, Total	99.8		85 - 115		0.040		0.0400	0.0005	1.00
Cadmium, Total	96.6		85 - 115		0.039		0.0400	0.0002	1.00
Lead, Total	94.9		85 - 115		0.038		0.0400	0.0005	1.00
Selenium, Total	101		85 - 115		0.041		0.0400	0.0005	1.00
Thallium, Total	106		85 - 115		0.042		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXG0035-MS1	Batch: BXG0035		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total	51.5		70 - 130		0.021	0.0002	0.0400	0.0005	1.00
NR - No analyte requiring this QC element is included in this analytical bracket.									
Arsenic, Total	90.1		70 - 130		0.039	0.003	0.0400	0.0005	1.00
Beryllium, Total	101		70 - 130		0.041	0.0002	0.0400	0.0005	1.00
Cadmium, Total	96.3		70 - 130		0.039	0.0003	0.0400	0.0002	1.00
Chromium, Total	99.9		70 - 130		0.044	0.004	0.0400	0.0005	1.00
Cobalt, Total	93.3		70 - 130		0.041	0.004	0.0400	0.0005	1.00
Lead, Total	106		70 - 130		0.048	0.006	0.0400	0.0005	1.00
Selenium, Total	76.7		70 - 130		0.031	0.0002	0.0400	0.0005	1.00

Matrix Spike - EPA 200.8 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXG0035-MS1	Batch: BXG0035		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Thallium, Total	91.0		70 - 130		0.036	ND	0.0400	0.0002	1.00
QC Sample ID: BXG0035-MS2	Batch: BXG0035		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total	103		70 - 130		0.042	0.001	0.0400	0.0005	1.00
Arsenic, Total	98.8		70 - 130		0.044	0.004	0.0400	0.0005	1.00
Beryllium, Total	101		70 - 130		0.041	ND	0.0400	0.0005	1.00
Cadmium, Total	97.8		70 - 130		0.039	0.00003	0.0400	0.0002	1.00
Chromium, Total	97.4		70 - 130		0.041	0.002	0.0400	0.0005	1.00
Cobalt, Total	95.5		70 - 130		0.038	0.0002	0.0400	0.0005	1.00
Lead, Total	96.1		70 - 130		0.039	0.0002	0.0400	0.0005	1.00
Selenium, Total	100		70 - 130		0.041	0.0006	0.0400	0.0005	1.00
Thallium, Total	100		70 - 130		0.040	ND	0.0400	0.0002	1.00
QC Sample ID: BXG0035-MS3	Batch: BXG0035		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total	50.7		70 - 130		0.020	0.0002	0.0400	0.0005	1.00
NR - No analyte requiring this QC element is included in this analytical bracket.									
Arsenic, Total	91.5		70 - 130		0.040	0.003	0.0400	0.0005	1.00
Cadmium, Total	93.2		70 - 130		0.038	0.0003	0.0400	0.0002	1.00
Lead, Total	98.8		70 - 130		0.045	0.006	0.0400	0.0005	1.00
Selenium, Total	75.0		70 - 130		0.030	0.0002	0.0400	0.0005	1.00
Thallium, Total	89.2		70 - 130		0.036	ND	0.0400	0.0002	1.00
QC Sample ID: BXG0035-MS4	Batch: BXG0035		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Antimony, Total	100		70 - 130		0.041	0.001	0.0400	0.0005	1.00
Arsenic, Total	104		70 - 130		0.046	0.004	0.0400	0.0005	1.00
Cadmium, Total	93.0		70 - 130		0.037	0.00003	0.0400	0.0002	1.00
Lead, Total	87.4		70 - 130		0.035	0.0002	0.0400	0.0005	1.00
Selenium, Total	105		70 - 130		0.043	0.0006	0.0400	0.0005	1.00
Thallium, Total	94.7		70 - 130		0.038	ND	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23F2445

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXG0008-BLK1	Batch: BXG0008								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXG0008-BS1	Batch: BXG0008								
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Mercury, Total	105		85 - 115		0.00523		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXG0008-MS1	Batch: BXG0008				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Mercury, Total	97.6		75 - 125		0.00488	ND	0.00500	0.00015	1.00
QC Sample ID: BXG0008-MS2	Batch: BXG0008				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Mercury, Total	94.6		75 - 125		0.00473	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXG0008-MSD1	Batch: BXG0008				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Mercury, Total	95.2	2.50	75 - 125	20	0.00476	ND	0.00500	0.00015	1.00
QC Sample ID: BXG0008-MSD2	Batch: BXG0008				QC Source Sample: XXXXXXX-XX				
Date Prepared: 07/03/2023	Date Analyzed: 07/05/2023								
Mercury, Total	103	8.61	75 - 125	20	0.00516	ND	0.00500	0.00015	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXG0022-BLK1	Batch: BXG0022								
Date Prepared: 07/03/2023	Date Analyzed: 07/03/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
QC Sample ID: BXG0191-BLK1	Batch: BXG0191								
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								
Fluoride					ND			0.100	1.00
LCS - EPA 300.0									
QC Sample ID: BXG0022-BS1	Batch: BXG0022								
Date Prepared: 07/03/2023	Date Analyzed: 07/03/2023								
Chloride	102		90 - 110		50.9		50.0	1.00	1.00
Fluoride	102		90 - 110		5.08		5.00	0.100	1.00
Sulfate	104		90 - 110		52.2		50.0	1.00	1.00
QC Sample ID: BXG0191-BS1	Batch: BXG0191								
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								
Fluoride	99.0		90 - 110		4.95		5.00	0.100	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXG0022-MS1	Batch: BXG0022			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/03/2023	Date Analyzed: 07/03/2023								
Chloride	89.4		80 - 120		466	377	100	11.0	1.00
Fluoride	108		80 - 120		10.8	ND	10.0	1.10	1.00
Sulfate	105		80 - 120		301	196	100	11.0	1.00
QC Sample ID: BXG0022-MS2	Batch: BXG0022			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/03/2023	Date Analyzed: 07/03/2023								
Chloride	100		80 - 120		521	420	100	11.0	1.00
Fluoride	104		80 - 120		11.0	0.597	10.0	1.10	1.00
Sulfate	105		80 - 120		346	241	100	11.0	1.00
QC Sample ID: BXG0191-MS1	Batch: BXG0191			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								
Fluoride	99.8		80 - 120		9.98	ND	10.0	1.10	1.00
QC Sample ID: BXG0191-MS2	Batch: BXG0191			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								
Fluoride	97.5		80 - 120		9.75	ND	10.0	1.10	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXG0022-MSD1	Batch: BXG0022			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/03/2023	Date Analyzed: 07/03/2023								
Chloride	93.5	0.875	80 - 120	20	470	377	100	11.0	1.00
Fluoride	105	2.29	80 - 120	20	10.5	ND	10.0	1.10	1.00
Sulfate	109	1.15	80 - 120	20	304	196	100	11.0	1.00
QC Sample ID: BXG0022-MSD2	Batch: BXG0022			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/03/2023	Date Analyzed: 07/04/2023								
Chloride	103	0.454	80 - 120	20	523	420	100	11.0	1.00
Fluoride	104	0.0702	80 - 120	20	11.0	0.597	10.0	1.10	1.00
Sulfate	107	0.515	80 - 120	20	348	241	100	11.0	1.00
QC Sample ID: BXG0191-MSD1	Batch: BXG0191			QC Source Sample: XXXXXXX-XX					
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								

Matrix Spike Dup - EPA 300.0 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXG0191-MSD1	Batch: BXG0191		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								
Fluoride	99.5	0.287	80 - 120	20	9.95	ND	10.0	1.10	1.00
QC Sample ID: BXG0191-MSD2	Batch: BXG0191		QC Source Sample: XXXXXXX-XX						
Date Prepared: 07/07/2023	Date Analyzed: 07/07/2023								
Fluoride	96.9	0.589	80 - 120	20	9.69	ND	10.0	1.10	1.00

QC Report for Work Order (WO) - 23F2445

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXF1471-BLK1	Batch: BXF1471								
Date Prepared: 06/30/2023	Date Analyzed: 06/30/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXF1471-DUP1	Batch: BXF1471		QC Source Sample: XXXXXXX-XX						
Date Prepared: 06/30/2023	Date Analyzed: 06/30/2023								
Total Dissolved Solids (TDS)		0.2		10	1740	1740		20	1.00
QC Sample ID: BXF1471-DUP2	Batch: BXF1471		QC Source Sample: XXXXXXX-XX						
Date Prepared: 06/30/2023	Date Analyzed: 06/30/2023								
Total Dissolved Solids (TDS)		1		10	616	624		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXF1471-BS1	Batch: BXF1471								
Date Prepared: 06/30/2023	Date Analyzed: 06/30/2023								
Total Dissolved Solids (TDS)		100	90 - 110		400		400	20	1.00

CHEMTECH-FORD
LABORATORIES

9/8/2023

Work Order: 23F2451
Project: Round 6/Resamples

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23F2451-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	6/28/2023 10:47 AM
Sample Site:	FA-DG5	***Receipt Date:***	6/30/2023 12:02 PM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	Round 6/Resamples
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.50 ± 0.346	5	0.35	pCi/L	EPA 903.0	07/14/2023	07/19/2023	SL-62
Radium-228	0.23 ± 0.28	5	0.50	pCi/L	EPA 904.0	07/14/2023	07/26/2023	SL-62

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

UPS 1Z 849 747 01 6509 6136

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: Round 6/Resamples
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Ap1282 M covered Ag covered Ag1238

Sample Receipt:

( ) Custody Seals
(X) Containers Intact
(X) COC/Labels Linked
(X) Received on Ice
(X) Correct Containers
(X) COC Included
(X) COC Complete
(X) Sample Volume OK
( ) Headspace Present (VOC)
( ) Temp Blank
(X) Within Hold Time

Checked by: JN

23F2451

Lab Use Only						Residual Chlorine
01	1. FA-DG5	6-28-23	10:47	Water		
02	2. BA-DG1 Resample	6-28-23	14:28	Water		
03	3. FA-DG4 Resample	6-28-23	16:07	Water		
04	4. Duplicate	6-28-23	14:58	Water		
	5.					
	6.					
	7.					
	8.					
	9.					
	10.					

TESTS REQUESTED																		Bacteria			
	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228									Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
	X	X	X	X	X	X	X	X	X												
		X																			
		X																			
		X																			

Preserved in Rec

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.8

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

	Date/Time		Date/Time
Relinquished by: [signature]	6-29-23 12:52	Received by: [signature]	6/29/23 1:04pm
Relinquished by: [signature]		Received by: [signature]	06/30/23 1202
Relinquished by: [signature]		Received by: [signature]	

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

ANALYTICAL REPORT

August 14, 2023

Chemtech-Ford Laboratories

Sample Delivery Group:	L1633304
Samples Received:	07/07/2023
Project Number:	
Description:	

Report To: Dave Gayer
9632 S 500 S
Sandy, UT 84070

Entire Report Reviewed By:



Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

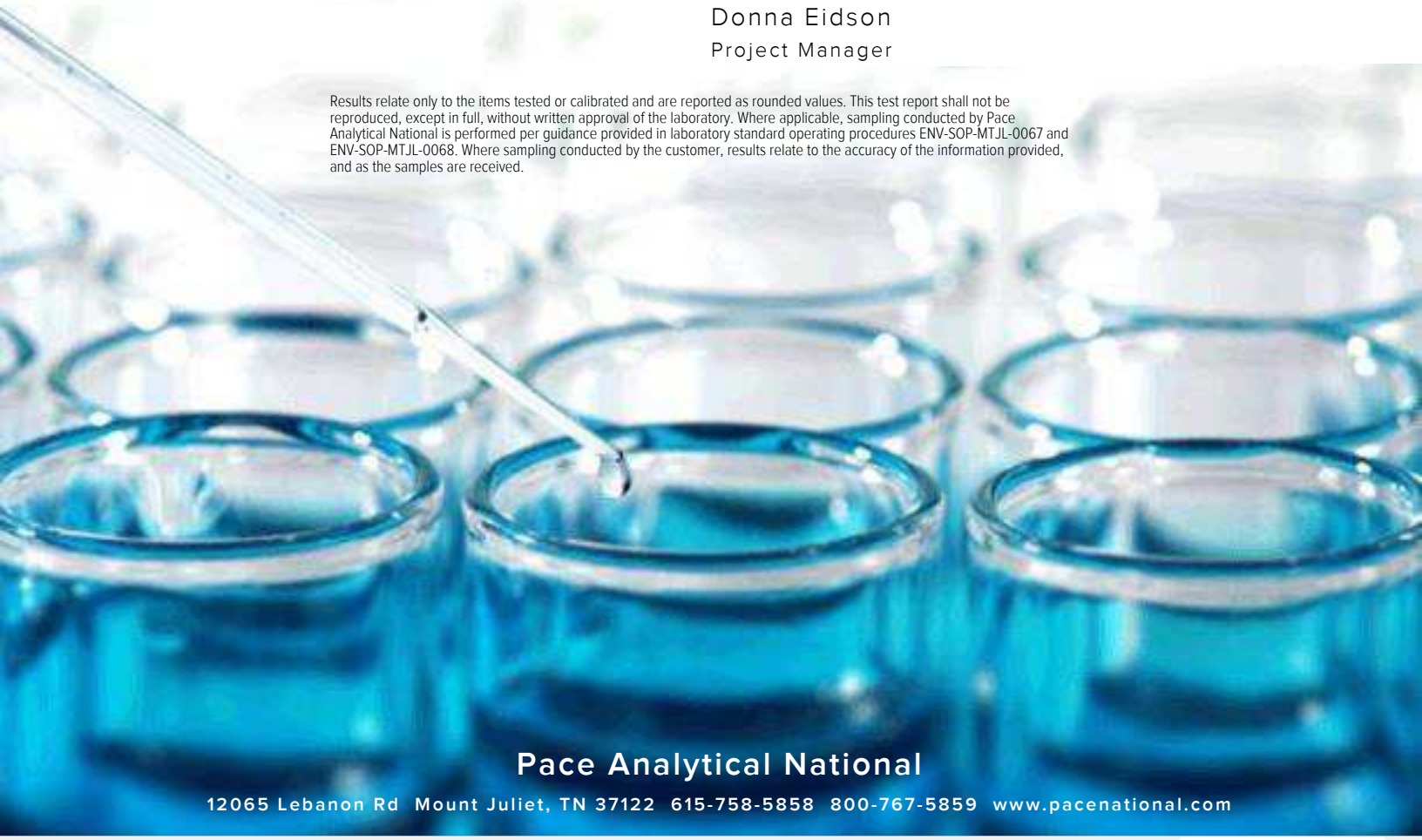


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23G0028-01 L1633304-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	07/03/23 10:30	07/07/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2095121	1	07/17/23 13:13	07/21/23 13:31	RRE	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2097147	1	07/18/23 18:39	07/26/23 21:01	SNR	Mt. Juliet, TN

23G0021-01 L1633304-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	06/27/23 13:00	07/07/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2095121	1	07/17/23 13:13	07/21/23 13:31	RRE	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2095081	1	07/14/23 14:37	07/19/23 14:45	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2097147	1	07/18/23 18:39	07/26/23 21:01	SNR	Mt. Juliet, TN

23F2451-01 L1633304-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	06/28/23 10:47	07/07/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2095081	1	07/14/23 14:37	07/19/23 15:46	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2097147	1	07/18/23 18:39	07/26/23 21:01	SNR	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Donna Eidson
Project Manager

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	0.0919	U	0.986	1.60	07/21/2023 13:31	WG2095121
GROSS BETA	1.89		1.46	1.88	07/21/2023 13:31	WG2095121

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.0253	U	0.271	0.496	07/26/2023 21:01	WG2097147
(T) Barium	*119*			*30.0-143*	*07/26/2023 21:01*	WG2097147
(T) Yttrium	*84.2*			*30.0-136*	*07/26/2023 21:01*	WG2097147

Radiochemistry by Method 900

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
GROSS ALPHA	2.27		1.26	1.36	07/21/2023 13:31	WG2095121
GROSS BETA	0.393	J	1.17	1.56	07/21/2023 13:31	WG2095121

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.0841	U	0.233	0.388	07/19/2023 14:45	WG2095081
(T) Barium	*100*			*30.0-143*	*07/19/2023 14:45*	WG2095081

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.853	U	0.284	0.539	07/26/2023 21:01	WG2097147
(T) Barium	*112*			*30.0-143*	*07/26/2023 21:01*	WG2097147
(T) Yttrium	*92.0*			*30.0-136*	*07/26/2023 21:01*	WG2097147

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.499		0.346	0.350	07/19/2023 15:46	WG2095081
(T) Barium	*112*			*30.0-143*	*07/19/2023 15:46*	WG2095081

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.227	J	0.280	0.503	07/26/2023 21:01	WG2097147
(T) Barium	*151*	C1		*30.0-143*	*07/26/2023 21:01*	WG2097147
(T) Yttrium	*94.9*			*30.0-136*	*07/26/2023 21:01*	WG2097147

Method Blank (MB)

(MB) R3960027-1 07/21/23 13:31

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
GROSS ALPHA	0.469	J	0.646	0.888
GROSS BETA	0.360	U	1.22	1.63

L1633317-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1633317-03 07/21/23 13:31 • (DUP) R3960027-5 07/21/23 13:31

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
GROSS ALPHA	2.72	1.31	1.34	2.83	1.30	1.34	1	3.92	0.0591		20	3
GROSS BETA	7.67	1.36	1.40	9.17	1.54	1.40	1	17.7	0.727		20	3

Laboratory Control Sample (LCS)

(LCS) R3960027-2 07/21/23 13:31

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
GROSS ALPHA	30.0	25.5	84.8	80.0-120	
GROSS BETA	41.2	44.4	108	80.0-120	

L1633317-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1633317-02 07/21/23 13:31 • (MS) R3960027-3 07/21/23 13:31 • (MSD) R3960027-4 07/21/23 13:31

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
GROSS ALPHA	15.0	2.43	15.6	14.8	87.7	82.7	1	70.0-130			4.87		20
GROSS BETA	41.2	5.46	50.4	41.9	109	88.5	1	70.0-130			18.3		20

Method Blank (MB)

(MB) R3950673-1 07/19/23 13:45

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-226	0.247		0.181	0.231
(T) Barium	*96.6*		*96.6*	

L1622818-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1622818-02 07/19/23 14:45 • (DUP) R3950673-4 07/19/23 14:45

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-226	0.504	0.350	0.373	0.773	0.652	0.373	1	42.1	0.364		20	3
(T) Barium	*105*			*97.6*	*97.6*							

Laboratory Control Sample (LCS)

(LCS) R3950673-2 07/19/23 13:45

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	5.13	102	80.0-120	
(T) Barium			*102*		

L1633304-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1633304-02 07/19/23 14:45 • (MS) R3950673-3 07/19/23 13:45

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
	pCi/l	pCi/l	pCi/l	%		%	
Radium-226	20.0	0.0841	21.9	109	1	75.0-125	
(T) Barium		*100*		*98.2*			

Method Blank (MB)

(MB) R3955116-2 07/26/23 21:01

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / - pCi/l	MB MDA pCi/l
Radium-228	-0.236	U	0.183	0.343
(T) Barium	*108*		*108*	
(T) Yttrium	*91.7*		*91.7*	

L1633304-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1633304-01 07/26/23 21:01 • (DUP) R3955116-5 07/26/23 21:01

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.0253	0.271	0.496	0.193	0.380	0.496	1	154	0.358	U	20	3
(T) Barium	*119*			*119*	*119*							
(T) Yttrium	*84.2*			*96.9*	*96.9*							

Laboratory Control Sample (LCS)

(LCS) R3955116-1 07/26/23 21:01

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.30	86.1	80.0-120	
(T) Barium			*125*		
(T) Yttrium			*108*		

L1632987-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1632987-01 07/26/23 21:01 • (MS) R3955116-3 07/26/23 21:01 • (MSD) R3955116-4 07/26/23 21:01

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	0.668	9.21	9.88	85.4	92.1	1	70.0-130			6.94		20
(T) Barium		*114*			*120*	*120*							
(T) Yttrium		*98.2*			*100*	*121*							

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
C1	Tracer recovery limits have been exceeded; values are outside upper control limits.
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

C157

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23G0028

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5, run Radium 226.

L1633304

Laboratory ID: 23G0028-01 — **Matrix:** Water — 01
Sampled: 07/03/2023 10:30

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

PH-10BDH4321 TRC 2144141
CR6-2022:V

Sample Receipt Checklist — pH <2

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N	GBAG 3.2+0=3.2	
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N	526 9040 5382 0004	

Released By	Date	Received By	Date
Denise Brw	7/3/23	8:20	7/6/23
PARCEL 17:00	7/6/23	GRACE BARRON (7)	7.7.23 0800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

C158

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23G0021

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

LIMS 33304

Work Order Comments:

Laboratory ID: 23G0021-01 **Matrix:** Water -02
Sampled: 06/27/2023 13:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

PH-10PDH4321 TRC-2144141
CR6-20221y

Sample Receipt Checklis

<2 pH

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N	GBAG 3.2+0=3.2	
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N	526 9040 5302 0004	

Released By	Date	Received By	Date
Denise Brun	7/3/23	[illegible] 8:20	7/6/23
[illegible] PANSCUT 17:00	7/6/23	GAGE BARRON	7.7.23 0800

Released By / Date / Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

C159

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23F2451

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

LIL633304

Work Order Comments:

Laboratory ID: 23F2451-01 **Matrix:** Water
Sampled: 06/28/2023 10:47

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0

PH-10BDH4321 TRC-2144141
CR6-20221
pH<2

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N	GBAG 3.2+0=3.2	
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N	5260 9040 5302 0004	

Released By	6/30/23 Date	Received By	8:20 7/6/23 Date
PYKECOT 17:00 Released By	7/6/23 Date	BRACE BARRON Received By	7.7.23 0800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

9/28/2023

Work Order: 23H0938
Project: FA-DG5/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23H0938-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	8/8/2023 9:48 AM
Sample Site:	FA-DG5	***Receipt Date:***	8/10/2023 8:20 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	FA-DG5/BA-DG4
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.40 ± 0.239	5	0.21	pCi/L	EPA 903.0	08/29/2023	09/05/2023	
Radium-228	0.47 ± 0.241	5	0.43	pCi/L	EPA 904.0	08/18/2023	08/30/2023	

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23H0938-02

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	8/8/2023 2:17 PM
Sample Site:	BA-DG4	***Receipt Date:***	8/10/2023 8:20 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	FA-DG5/BA-DG4
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.49 ± 0.258	5	0.23	pCi/L	EPA 903.0	08/29/2023	09/05/2023	
Radium-228	0.10 ± 0.369	5	0.68	pCi/L	EPA 904.0	08/18/2023	08/30/2023	

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23H0938-03

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	8/8/2023 10:34 AM
Sample Site:	Duplicate	***Receipt Date:***	8/10/2023 8:20 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	FA-DG5/BA-DG4
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.29 ± 0.209	5	0.21	pCi/L	EPA 903.0	08/29/2023	09/05/2023	
Radium-228	-0.39 ± 0.245	5	0.46	pCi/L	EPA 904.0	08/18/2023	08/30/2023	

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23H0938

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. FA-DG5	8-8-23	09:48	Water		X	X	X	X	X	X	X	X	X										
-02	2. BA-DG4	8-8-23	14:17	Water		X	X	X	X	X	X	X	X	X										
-03	3. Duplicate	8-8-23	10:34	Water		X	X	X	X	X	X	X	X	X										
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
( ) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: DB

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 3.3

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

11303
AQ1296
AQ1298

	Date/Time		Date/Time
Relinquished by: [signature]	8-9-23 12:45	Received by: [signature]	8/9/23 12:49
Relinquished by: [signature]		Received by: [signature]	8/10/23 8:20
Relinquished by: [signature]		Received by: [signature]	

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's

UPS NEXT DAY AIR EARLY
TRACKING #: 1Z 849 747 15 6356 6865

ANALYTICAL REPORT

September 11, 2023

Chemtech-Ford Laboratories

Sample Delivery Group:	L1646771
Samples Received:	08/16/2023
Project Number:	
Description:	

Report To: Dave Gayer
9632 S 500 S
Sandy, UT 84070

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

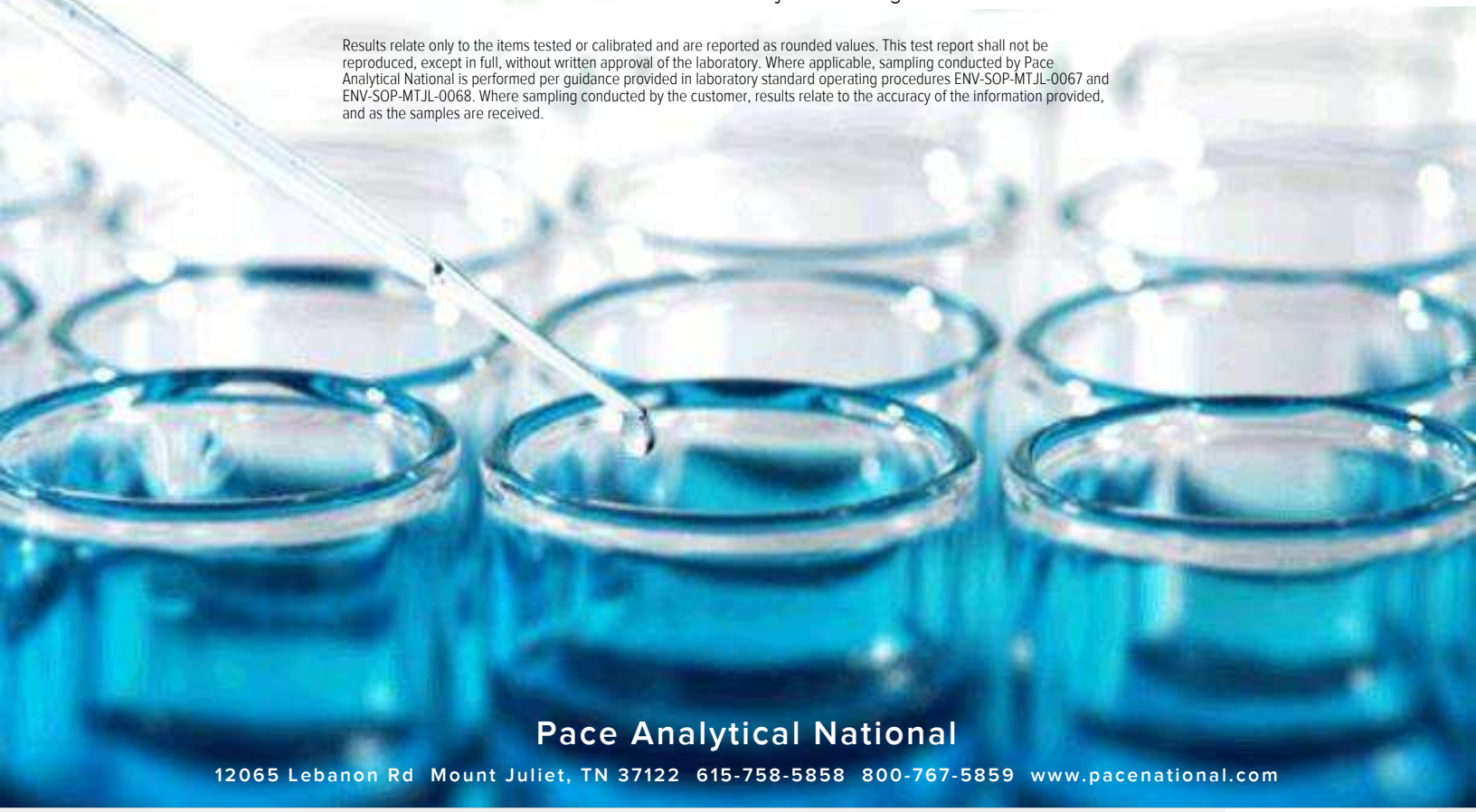


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23H1006-01 L1646771-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/08/23 17:00	08/16/23 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2119868	1	08/29/23 16:49	09/05/23 15:59	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2116625	1	08/18/23 11:06	08/30/23 16:43	SNR	Mt. Juliet, TN

23H0938-01 L1646771-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/08/23 09:48	08/16/23 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2119868	1	08/29/23 16:49	09/05/23 15:59	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2116625	1	08/18/23 11:06	08/30/23 16:43	SNR	Mt. Juliet, TN

23H0938-02 L1646771-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/08/23 14:17	08/16/23 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2119868	1	08/29/23 16:49	09/05/23 15:59	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2116625	1	08/18/23 11:06	08/30/23 16:43	SNR	Mt. Juliet, TN

23H0938-03 L1646771-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/08/23 10:34	08/16/23 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2119868	1	08/29/23 16:49	09/05/23 16:59	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2116625	1	08/18/23 11:06	08/30/23 16:43	SNR	Mt. Juliet, TN

23H0987-01 L1646771-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/08/23 19:00	08/16/23 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2119868	1	08/29/23 16:49	09/05/23 16:59	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2116625	1	08/18/23 11:06	08/30/23 16:43	SNR	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Donna Eidson
Project Manager

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.647		0.305	0.284	09/05/2023 15:59	WG2119868
(T) Barium	*101*			*30.0-143*	*09/05/2023 15:59*	WG2119868

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.714		0.378	0.674	08/30/2023 16:43	WG2116625
(T) Barium	*99.1*			*30.0-143*	*08/30/2023 16:43*	WG2116625
(T) Yttrium	*90.1*			*30.0-136*	*08/30/2023 16:43*	WG2116625

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.402		0.239	0.213	09/05/2023 15:59	WG2119868
(T) Barium	*116*			*30.0-143*	*09/05/2023 15:59*	WG2119868

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.469		0.241	0.430	08/30/2023 16:43	WG2116625
(T) Barium	*121*			*30.0-143*	*08/30/2023 16:43*	WG2116625
(T) Yttrium	*122*			*30.0-136*	*08/30/2023 16:43*	WG2116625

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Radium-226	0.488		0.258	0.226	09/05/2023 15:59	WG2119868
(T) Barium	*107*			*30.0-143*	*09/05/2023 15:59*	WG2119868

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.0980	U	0.369	0.682	08/30/2023 16:43	WG2116625
(T) Barium	*116*			*30.0-143*	*08/30/2023 16:43*	WG2116625
(T) Yttrium	*77.8*			*30.0-136*	*08/30/2023 16:43*	WG2116625

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.286		0.209	0.210	09/05/2023 16:59	WG2119868
(T) Barium	*117*			*30.0-143*	*09/05/2023 16:59*	WG2119868

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.393	U	0.245	0.465	08/30/2023 16:43	WG2116625
(T) Barium	*118*			*30.0-143*	*08/30/2023 16:43*	WG2116625
(T) Yttrium	*97.2*			*30.0-136*	*08/30/2023 16:43*	WG2116625

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Radium-226	0.557		0.287	0.274	09/05/2023 16:59	WG2119868
(T) Barium	*105*			*30.0-143*	*09/05/2023 16:59*	WG2119868

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.681		0.270	0.477	08/30/2023 16:43	WG2116625
(T) Barium	*112*			*30.0-143*	*08/30/2023 16:43*	WG2116625
(T) Yttrium	*125*			*30.0-136*	*08/30/2023 16:43*	WG2116625

Method Blank (MB)

(MB) R3971548-1 09/05/23 13:56

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-226	0.203		0.121	0.146
(T) Barium	*99.3*		*99.3*	

L1645193-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1645193-07 09/05/23 14:56 • (DUP) R3971548-5 09/05/23 14:56

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-226	0.951	0.344	0.230	1.15	0.552	0.230	1	18.9	0.306		20	3
(T) Barium	*106*			*104*	*104*							

Laboratory Control Sample (LCS)

(LCS) R3971548-2 09/05/23 13:56

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	5.50	110	80.0-120	
(T) Barium			*101*		

L1646771-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1646771-01 09/05/23 15:59 • (MS) R3971548-3 09/05/23 13:56 • (MSD) R3971548-4 09/05/23 13:56

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.0	0.647	20.4	21.7	98.8	105	1	75.0-125			6.08		20
(T) Barium		*101*			*102*	*103*							

Method Blank (MB)

(MB) R3971570-1 08/30/23 16:43

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-228	0.104	U	0.157	0.288
(T) Barium	*110*		*110*	
(T) Yttrium	*92.8*		*92.8*	

L1646771-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1646771-03 08/30/23 16:43 • (DUP) R3971570-5 08/30/23 16:43

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-228	0.0980	0.369	0.682	-0.258	0.362	0.682	1	200	0.689	U	20	3
(T) Barium	*116*			*124*	*124*							
(T) Yttrium	*77.8*			*127*	*127*							

Laboratory Control Sample (LCS)

(LCS) R3971570-2 08/30/23 16:43

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	4.34	86.8	80.0-120	
(T) Barium			*121*		
(T) Yttrium			*150*		C1

L1646081-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1646081-01 08/30/23 16:43 • (MS) R3971570-3 08/30/23 16:43 • (MSD) R3971570-4 08/30/23 16:43

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-228	16.7	0.711	16.1	19.0	92.1	109	1	70.0-130			16.5		20
(T) Barium		*105*			*106*	*110*							
(T) Yttrium		*94.9*			*90.6*	*90.9*							

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
C1	Tracer recovery limits have been exceeded; values are outside upper control limits.
U	Below Detectable Limits: Indicates that the analyte was not detected.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23H1006

A223

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: QC 2

L1646771

Laboratory ID: 23H1006-01 — **Matrix:** Water — 01
Sampled: 08/08/2023 17:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N	GRH-8 5.1 to 5.1	

Denise Brun 8/10/23 — Released By — Date
Received By — 851 — 8/15/23 — Date

1700 8/15/23 — Released By — PNSLCUT — Date
Received By — 8 — 8.16.23 0845 — Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23H0938

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

L1646771

Work Order Comments:

Laboratory ID: 23H0938-01		**Matrix:** Water -02
Requested Test	**Suggested Analytical Method ***	**Sampled:** 08/08/2023 09:48
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	

Laboratory ID: 23H0938-02		**Matrix:** Water -03
Requested Test	**Suggested Analytical Method ***	**Sampled:** 08/08/2023 14:17
Radium-228	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	

Laboratory ID: 23H0938-03		**Matrix:** Water -04
Requested Test	**Suggested Analytical Method ***	**Sampled:** 08/08/2023 10:34
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Released By	Date	Received By	Date
Jessie Braun	8/10/23	Jessie Braun	851 8/15/23
Released By	Date	Received By	Date
Jessie Braun 1700 PNSLCUT	8/15/23	(8)	8.6.23 - 0845

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23H0987

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: QC 2

L1246771

Laboratory ID: 23H0987-01 — **Matrix:** Water -05
Sampled: 08/08/2023 19:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0

Denise Brown 8/10/23 — Released By / Date
[illegible] 851 8/15/23 — Received By / Date
[illegible] 1700 8/15/23 — Released By / Date
PNSLCUT
[illegible] 0845 — Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

10/6/2023

Work Order: 23H0944
Project: FA-DG5/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **8/10/23 8:20 @ 3.3** °C
Date Reported: 10/6/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23H0944-01**
Date Sampled: **8/8/23 9:48**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1860	mg/L	100	EPA 300.0	8/15/23	8/15/23	
Fluoride	ND	mg/L	0.100	EPA 300.0	8/15/23	8/15/23	
Sulfate	9480	mg/L	100	EPA 300.0	8/15/23	8/15/23	
Total Dissolved Solids (TDS)	14400	mg/L	100	SM 2540 C	8/10/23	8/10/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Arsenic, Total	0.0078	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Barium, Total	ND	mg/L	0.050	EPA 200.7/200.2	8/11/23	8/14/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Boron, Total	68.8	mg/L	0.50	EPA 200.7/200.2	8/11/23	8/14/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	8/10/23	8/11/23	
Calcium, Total	603	mg/L	2.0	EPA 200.7/200.2	8/11/23	8/14/23	
Chromium, Total	0.0063	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Cobalt, Total	0.0242	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Lithium, Total	0.721	mg/L	0.050	EPA 200.7/200.2	8/11/23	8/14/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	8/11/23	8/14/23	
Molybdenum, Total	ND	mg/L	0.10	EPA 200.7/200.2	8/11/23	8/15/23	
Selenium, Total	0.0123	mg/L	0.0005	EPA 200.8/200.2	8/10/23	8/11/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	8/10/23	8/11/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **8/10/23 8:20 @ 3.3** °C
Date Reported: 10/6/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **BA-DG4**

Matrix: **Water**
Lab ID: **23H0944-02**
Date Sampled: **8/8/23 14:17**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	604	mg/L	100	EPA 300.0	8/15/23	8/15/23	
Fluoride	1.53	mg/L	0.100	EPA 300.0	8/15/23	8/15/23	
Sulfate	6780	mg/L	100	EPA 300.0	8/15/23	8/15/23	
Total Dissolved Solids (TDS)	10600	mg/L	100	SM 2540 C	8/10/23	8/10/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/14/23	8/14/23	
Arsenic, Total	0.0093	mg/L	0.0005	EPA 200.8/200.2	8/14/23	8/14/23	
Barium, Total	ND	mg/L	0.050	EPA 200.7/200.2	8/14/23	8/14/23	
Beryllium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	8/14/23	8/14/23	
Boron, Total	30.2	mg/L	0.50	EPA 200.7/200.2	8/14/23	8/14/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	8/14/23	8/14/23	
Calcium, Total	289	mg/L	2.0	EPA 200.7/200.2	8/14/23	8/14/23	
Chromium, Total	0.0033	mg/L	0.0005	EPA 200.8/200.2	8/14/23	8/14/23	
Cobalt, Total	0.0025	mg/L	0.0005	EPA 200.8/200.2	8/14/23	8/14/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/14/23	8/14/23	
Lithium, Total	0.191	mg/L	0.050	EPA 200.7/200.2	8/14/23	8/14/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	8/11/23	8/14/23	
Molybdenum, Total	ND	mg/L	0.10	EPA 200.7/200.2	8/14/23	8/14/23	
Selenium, Total	0.0322	mg/L	0.0005	EPA 200.8/200.2	8/14/23	8/14/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	8/14/23	8/14/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **8/10/23 8:20 @ 3.3** °C
Date Reported: 10/6/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **Duplicate**

Matrix: **Water**
Lab ID: **23H0944-03**
Date Sampled: **8/8/23 10:34**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1870	mg/L	100	EPA 300.0	8/15/23	8/15/23	
Fluoride	ND	mg/L	0.100	EPA 300.0	8/15/23	8/15/23	
Sulfate	9540	mg/L	100	EPA 300.0	8/15/23	8/15/23	
Total Dissolved Solids (TDS)	17100	mg/L	100	SM 2540 C	8/10/23	8/10/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Arsenic, Total	0.0058	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Barium, Total	ND	mg/L	0.050	EPA 200.7/200.2	8/11/23	9/13/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Boron, Total	58.3	mg/L	0.50	EPA 200.7/200.2	8/11/23	9/13/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	8/11/23	8/14/23	
Calcium, Total	537	mg/L	2.0	EPA 200.7/200.2	8/11/23	9/13/23	
Chromium, Total	0.0016	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Cobalt, Total	0.0229	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Lithium, Total	0.681	mg/L	0.050	EPA 200.7/200.2	8/11/23	9/13/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	8/11/23	8/14/23	
Molybdenum, Total	ND	mg/L	0.10	EPA 200.7/200.2	9/12/23	9/13/23	
Selenium, Total	0.0110	mg/L	0.0005	EPA 200.8/200.2	8/11/23	8/14/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	8/11/23	8/14/23	

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **8/10/23 8:20 @ 3.3** °C
Date Reported: 10/6/2023
Project Name: **FA-DG5/BA-DG4**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23H0944 Radium on 23H0938

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228								Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. FA-DG5	8-8-23	09:48	Water		X	X	X	X	X	X	X	X	X											
-02	2. BA-DG4	8-8-23	14:17	Water		X	X	X	X	X	X	X	X	X											
-03	3. Duplicate	8-8-23	10:34	Water		X	X	X	X	X	X	X	X	X											
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: DB

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 3.3

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

M 1303
AQ 1296
AG 1240

	Date/Time		Date/Time
Relinquished by: [signature]	8-9-23 12:45	Received by: [signature] Hunter	8/9/23 12:49
Relinquished by: [signature]		Received by: [signature] Denise Brun	8/10/23 8:20
Relinquished by: [signature]		Received by: [signature]	

CHEMTECH-FORD
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Sandy, UT 84070

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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's

UPS NEXT DAY AIR EARLY
TRACKING #: 1Z 849 747 15 6356 6865

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXH0561-BLK1	Batch: BXH0561								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
QC Sample ID: BXH0591-BLK1	Batch: BXH0591								
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
QC Sample ID: BXI0515-BLK1	Batch: BXI0515								
Date Prepared: 09/12/2023	Date Analyzed: 09/13/2023								
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXH0561-BS1	Batch: BXH0561								
Date Prepared: 08/11/2023	Date Analyzed: 08/15/2023								
Barium, Total	104		85 - 115		0.207		0.200	0.005	1.00
Boron, Total	105		85 - 115		0.52		0.500	0.05	1.00
Calcium, Total	104		85 - 115		10.6		10.2	0.2	1.00
Lithium, Total	110		85 - 115		0.220		0.200	0.005	1.00
Molybdenum, Total	108		85 - 115		0.22		0.200	0.01	1.00
QC Sample ID: BXH0591-BS1	Batch: BXH0591								
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Barium, Total	102		85 - 115		0.205		0.200	0.005	1.00
Boron, Total	98.8		85 - 115		0.49		0.500	0.05	1.00
Calcium, Total	99.3		85 - 115		10.1		10.2	0.2	1.00
Lithium, Total	104		85 - 115		0.208		0.200	0.005	1.00
Molybdenum, Total	106		85 - 115		0.21		0.200	0.01	1.00
QC Sample ID: BXI0515-BS1	Batch: BXI0515								
Date Prepared: 09/12/2023	Date Analyzed: 09/13/2023								
Molybdenum, Total	96.6		85 - 115		0.19		0.200	0.01	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXH0561-MS1	Batch: BXH0561		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Barium, Total	119		70 - 130		0.291	0.053	0.200	0.005	1.00
Boron, Total	245		70 - 130		1.90	0.68	0.500	0.05	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Calcium, Total	1460		70 - 130		311	162	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	244		70 - 130		0.810	0.322	0.200	0.005	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike - EPA 200.7 (cont.)									
QC Sample ID: BXH0561-MS1	Batch: BXH0561		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Molybdenum, Total	107		70 - 130		0.21	ND	0.200	0.01	1.00
QC Sample ID: BXH0561-MS2	Batch: BXH0561		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Barium, Total	103		70 - 130		0.260	0.054	0.200	0.005	1.00
Boron, Total	106		70 - 130		0.56	0.03	0.500	0.05	1.00
Calcium, Total	109		70 - 130		58.9	47.8	10.2	0.2	1.00
Lithium, Total	106		70 - 130		0.223	0.012	0.200	0.005	1.00
Molybdenum, Total	111		70 - 130		0.22	ND	0.200	0.01	1.00
QC Sample ID: BXH0591-MS1	Batch: BXH0591		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Barium, Total	75.7		70 - 130		0.180	0.029	0.200	0.005	1.00
Boron, Total	81.5		70 - 130		0.44	0.03	0.500	0.05	1.00
Calcium, Total	77.6		70 - 130		64.1	56.2	10.2	0.2	1.00
Lithium, Total	79.9		70 - 130		0.160	ND	0.200	0.005	1.00
Molybdenum, Total	87.2		70 - 130		0.17	ND	0.200	0.01	1.00
QC Sample ID: BXH0591-MS2	Batch: BXH0591		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Barium, Total	76.6		70 - 130		0.197	0.044	0.200	0.005	1.00
Boron, Total	82.9		70 - 130		0.60	0.19	0.500	0.05	1.00
Calcium, Total	61.7		70 - 130		98.8	92.5	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	76.4		70 - 130		0.153	ND	0.200	0.005	1.00
Molybdenum, Total	84.9		70 - 130		0.17	ND	0.200	0.01	1.00
QC Sample ID: BXI0515-MS1	Batch: BXI0515		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/12/2023	Date Analyzed: 09/13/2023								
Molybdenum, Total	108		70 - 130		0.22	0.003	0.200	0.01	1.00
QC Sample ID: BXI0515-MS2	Batch: BXI0515		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/12/2023	Date Analyzed: 09/13/2023								
Molybdenum, Total	102		70 - 130		0.20	ND	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXH0561-MSD1	Batch: BXH0561		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Barium, Total	109	7.07	70 - 130	20	0.271	0.053	0.200	0.005	1.00
Boron, Total	240	1.45	70 - 130	20	1.88	0.68	0.500	0.05	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Calcium, Total	1470	0.329	70 - 130	20	312	162	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	248	0.995	70 - 130	20	0.818	0.322	0.200	0.005	1.00

Matrix Spike Dup - EPA 200.7 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXH0561-MSD1	Batch: BXH0561		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
Molybdenum, Total	112	4.54	70 - 130	20	0.22	ND	0.200	0.01	1.00
QC Sample ID: BXH0561-MSD2	Batch: BXH0561		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Barium, Total	102	0.500	70 - 130	20	0.259	0.054	0.200	0.005	1.00
Boron, Total	106	0.429	70 - 130	20	0.56	0.03	0.500	0.05	1.00
Calcium, Total	107	0.269	70 - 130	20	58.7	47.8	10.2	0.2	1.00
Lithium, Total	100	5.06	70 - 130	20	0.212	0.012	0.200	0.005	1.00
Molybdenum, Total	108	3.38	70 - 130	20	0.22	ND	0.200	0.01	1.00
QC Sample ID: BXH0591-MSD1	Batch: BXH0591		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Barium, Total	85.8	10.6	70 - 130	20	0.200	0.029	0.200	0.005	1.00
Boron, Total	89.0	8.13	70 - 130	20	0.48	0.03	0.500	0.05	1.00
Calcium, Total	85.5	1.26	70 - 130	20	64.9	56.2	10.2	0.2	1.00
Lithium, Total	86.8	8.28	70 - 130	20	0.174	ND	0.200	0.005	1.00
Molybdenum, Total	92.2	5.69	70 - 130	20	0.18	ND	0.200	0.01	1.00
QC Sample ID: BXH0591-MSD2	Batch: BXH0591		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Barium, Total	95.0	17.1	70 - 130	20	0.234	0.044	0.200	0.005	1.00
Boron, Total	97.7	11.6	70 - 130	20	0.68	0.19	0.500	0.05	1.00
Calcium, Total	79.4	1.81	70 - 130	20	101	92.5	10.2	0.2	1.00
Lithium, Total	90.9	17.3	70 - 130	20	0.182	ND	0.200	0.005	1.00
Molybdenum, Total	98.0	14.3	70 - 130	20	0.20	ND	0.200	0.01	1.00
QC Sample ID: BXI0515-MSD1	Batch: BXI0515		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/12/2023	Date Analyzed: 09/13/2023								
Molybdenum, Total	105	2.59	70 - 130	20	0.21	0.003	0.200	0.01	1.00
QC Sample ID: BXI0515-MSD2	Batch: BXI0515		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/12/2023	Date Analyzed: 09/13/2023								
Molybdenum, Total	103	0.881	70 - 130	20	0.21	ND	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXH0513-BLK1	Batch: BXH0513								
Date Prepared: 08/10/2023	Date Analyzed: 08/11/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
QC Sample ID: BXH0562-BLK1	Batch: BXH0562								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
QC Sample ID: BXH0583-BLK1	Batch: BXH0583								
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXH0513-BS1	Batch: BXH0513								
Date Prepared: 08/10/2023	Date Analyzed: 08/11/2023								
Antimony, Total	104	85 - 115			0.041		0.0400	0.0005	1.00
Arsenic, Total	97.7	85 - 115			0.039		0.0400	0.0005	1.00
Beryllium, Total	102	85 - 115			0.041		0.0400	0.0005	1.00
Cadmium, Total	99.1	85 - 115			0.040		0.0400	0.0002	1.00
Chromium, Total	98.7	85 - 115			0.039		0.0400	0.0005	1.00
Cobalt, Total	97.9	85 - 115			0.039		0.0400	0.0005	1.00
Lead, Total	98.9	85 - 115			0.040		0.0400	0.0005	1.00
Selenium, Total	98.8	85 - 115			0.040		0.0400	0.0005	1.00
Thallium, Total	101	85 - 115			0.041		0.0400	0.0002	1.00
QC Sample ID: BXH0562-BS1	Batch: BXH0562								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Antimony, Total	100	85 - 115			0.040		0.0400	0.0005	1.00
Arsenic, Total	97.6	85 - 115			0.039		0.0400	0.0005	1.00
Beryllium, Total	100	85 - 115			0.040		0.0400	0.0005	1.00
Cadmium, Total	96.8	85 - 115			0.039		0.0400	0.0002	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
LCS - EPA 200.8 (cont.)									
QC Sample ID: BXH0562-BS1	Batch: BXH0562								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Chromium, Total	97.4		85 - 115		0.039		0.0400	0.0005	1.00
Cobalt, Total	96.9		85 - 115		0.039		0.0400	0.0005	1.00
Lead, Total	98.6		85 - 115		0.039		0.0400	0.0005	1.00
Selenium, Total	97.6		85 - 115		0.039		0.0400	0.0005	1.00
Thallium, Total	101		85 - 115		0.040		0.0400	0.0002	1.00
QC Sample ID: BXH0583-BS1	Batch: BXH0583								
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Antimony, Total	94.4		85 - 115		0.038		0.0400	0.0005	1.00
Arsenic, Total	93.7		85 - 115		0.037		0.0400	0.0005	1.00
Beryllium, Total	90.6		85 - 115		0.036		0.0400	0.0005	1.00
Cadmium, Total	92.0		85 - 115		0.037		0.0400	0.0002	1.00
Chromium, Total	93.9		85 - 115		0.038		0.0400	0.0005	1.00
Cobalt, Total	91.5		85 - 115		0.037		0.0400	0.0005	1.00
Lead, Total	92.8		85 - 115		0.037		0.0400	0.0005	1.00
Selenium, Total	94.5		85 - 115		0.038		0.0400	0.0005	1.00
Thallium, Total	99.5		85 - 115		0.040		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXH0513-MS1	Batch: BXH0513			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/10/2023	Date Analyzed: 08/11/2023								
Antimony, Total	101		70 - 130		0.042	0.001	0.0400	0.0005	1.00
Arsenic, Total	100		70 - 130		0.041	0.0005	0.0400	0.0005	1.00
Beryllium, Total	103		70 - 130		0.041	ND	0.0400	0.0005	1.00
Cadmium, Total	97.8		70 - 130		0.039	ND	0.0400	0.0002	1.00
Chromium, Total	97.6		70 - 130		0.039	0.0003	0.0400	0.0005	1.00
Cobalt, Total	95.2		70 - 130		0.038	ND	0.0400	0.0005	1.00
Lead, Total	97.6		70 - 130		0.039	ND	0.0400	0.0005	1.00
Selenium, Total	97.9		70 - 130		0.039	ND	0.0400	0.0005	1.00
Thallium, Total	101		70 - 130		0.041	ND	0.0400	0.0002	1.00
QC Sample ID: BXH0513-MS2	Batch: BXH0513			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/10/2023	Date Analyzed: 08/11/2023								
Antimony, Total	105		70 - 130		0.042	0.0003	0.0400	0.0005	1.00
Arsenic, Total	99.7		70 - 130		0.041	0.001	0.0400	0.0005	1.00
Beryllium, Total	104		70 - 130		0.042	ND	0.0400	0.0005	1.00
Cadmium, Total	100		70 - 130		0.040	ND	0.0400	0.0002	1.00
Chromium, Total	98.1		70 - 130		0.040	0.0006	0.0400	0.0005	1.00
Cobalt, Total	96.2		70 - 130		0.038	ND	0.0400	0.0005	1.00
Lead, Total	100		70 - 130		0.040	0.0002	0.0400	0.0005	1.00
Selenium, Total	101		70 - 130		0.040	ND	0.0400	0.0005	1.00
Thallium, Total	103		70 - 130		0.041	ND	0.0400	0.0002	1.00
QC Sample ID: BXH0562-MS1	Batch: BXH0562			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Antimony, Total	105		70 - 130		0.043	0.0005	0.0400	0.0005	1.00
Arsenic, Total	103		70 - 130		0.042	0.0004	0.0400	0.0005	1.00
Beryllium, Total	107		70 - 130		0.043	ND	0.0400	0.0005	1.00
Cadmium, Total	99.8		70 - 130		0.040	0.0002	0.0400	0.0002	1.00
Chromium, Total	99.5		70 - 130		0.040	0.0004	0.0400	0.0005	1.00
Cobalt, Total	98.7		70 - 130		0.040	0.0007	0.0400	0.0005	1.00
Lead, Total	101		70 - 130		0.041	0.0009	0.0400	0.0005	1.00
Selenium, Total	101		70 - 130		0.040	ND	0.0400	0.0005	1.00

Matrix Spike - EPA 200.8 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXH0562-MS1	Batch: BXH0562		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Thallium, Total	104		70 - 130		0.041	0.00004	0.0400	0.0002	1.00
QC Sample ID: BXH0562-MS2	Batch: BXH0562		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Antimony, Total	103		70 - 130		0.043	0.002	0.0400	0.0005	1.00
Arsenic, Total	101		70 - 130		0.042	0.002	0.0400	0.0005	1.00
Beryllium, Total	104		70 - 130		0.042	ND	0.0400	0.0005	1.00
Cadmium, Total	98.6		70 - 130		0.040	0.00009	0.0400	0.0002	1.00
Chromium, Total	99.5		70 - 130		0.042	0.002	0.0400	0.0005	1.00
Cobalt, Total	98.7		70 - 130		0.040	0.0003	0.0400	0.0005	1.00
Lead, Total	101		70 - 130		0.041	0.0005	0.0400	0.0005	1.00
Selenium, Total	103		70 - 130		0.042	0.001	0.0400	0.0005	1.00
Thallium, Total	104		70 - 130		0.041	ND	0.0400	0.0002	1.00
QC Sample ID: BXH0583-MS1	Batch: BXH0583		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Antimony, Total	89.9		70 - 130		0.052	0.016	0.0400	0.0005	1.00
Arsenic, Total	90.8		70 - 130		0.123	0.086	0.0400	0.0005	1.00
Beryllium, Total	91.6		70 - 130		0.037	ND	0.0400	0.0005	1.00
Cadmium, Total	84.1		70 - 130		0.037	0.003	0.0400	0.0002	1.00
Chromium, Total	88.1		70 - 130		0.038	0.002	0.0400	0.0005	1.00
Cobalt, Total	85.1		70 - 130		0.045	0.011	0.0400	0.0005	1.00
Lead, Total	82.7		70 - 130		0.039	0.006	0.0400	0.0005	1.00
Selenium, Total	95.0		70 - 130		0.041	0.003	0.0400	0.0005	1.00
Thallium, Total	90.6		70 - 130		0.044	0.008	0.0400	0.0002	1.00
QC Sample ID: BXH0583-MS2	Batch: BXH0583		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/14/2023	Date Analyzed: 08/14/2023								
Antimony, Total	78.0		70 - 130		0.046	0.014	0.0400	0.0005	1.00
Arsenic, Total	71.4		70 - 130		0.110	0.082	0.0400	0.0005	1.00
Beryllium, Total	78.6		70 - 130		0.031	ND	0.0400	0.0005	1.00
Cadmium, Total	73.3		70 - 130		0.032	0.002	0.0400	0.0002	1.00
Chromium, Total	75.7		70 - 130		0.032	0.002	0.0400	0.0005	1.00
Cobalt, Total	72.4		70 - 130		0.037	0.008	0.0400	0.0005	1.00
Lead, Total	72.6		70 - 130		0.034	0.005	0.0400	0.0005	1.00
Selenium, Total	79.8		70 - 130		0.035	0.003	0.0400	0.0005	1.00
Thallium, Total	79.0		70 - 130		0.039	0.007	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23H0944

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXH0531-BLK1	Batch: BXH0531								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXH0531-BS1	Batch: BXH0531								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total	86.1		85 - 115		0.00431		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXH0531-MS1	Batch: BXH0531				QC Source Sample: XXXXXXX-XX				
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total	99.4		75 - 125		0.00497	ND	0.00500	0.00015	1.00
QC Sample ID: BXH0531-MS2	Batch: BXH0531				QC Source Sample: XXXXXXX-XX				
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total	97.9		75 - 125		0.00490	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXH0531-MSD1	Batch: BXH0531				QC Source Sample: XXXXXXX-XX				
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total	99.4	0.0563	75 - 125	20	0.00497	ND	0.00500	0.00015	1.00
QC Sample ID: BXH0531-MSD2	Batch: BXH0531				QC Source Sample: XXXXXXX-XX				
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total	98.5	0.584	75 - 125	20	0.00493	ND	0.00500	0.00015	1.00
MRL Check - EPA 245.1									
QC Sample ID: BXH0531-MRL1	Batch: BXH0531								
Date Prepared: 08/11/2023	Date Analyzed: 08/14/2023								
Mercury, Total	116		50 - 150		0.00017		0.000150	0.00015	1.00

QC Report for Work Order (WO) - 23H0944

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXH0653-BLK1	Batch: BXH0653								
Date Prepared: 08/15/2023	Date Analyzed: 08/15/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXH0653-BS1	Batch: BXH0653								
Date Prepared: 08/15/2023	Date Analyzed: 08/15/2023								
Chloride	103		90 - 110		51.4		50.0	1.00	1.00
Fluoride	99.9		90 - 110		5.00		5.00	0.100	1.00
Sulfate	101		90 - 110		50.7		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXH0653-MS1	Batch: BXH0653			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/15/2023	Date Analyzed: 08/15/2023								
Chloride	110		80 - 120		12.2	ND	11.1	1.11	1.00
Fluoride	99.0		80 - 120		1.16	0.064	1.11	0.111	1.00
Sulfate	106		80 - 120		11.8	ND	11.1	1.11	1.00
QC Sample ID: BXH0653-MS2	Batch: BXH0653			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/15/2023	Date Analyzed: 08/15/2023								
Chloride	102		80 - 120		111	99.3	11.1	1.11	1.00
Fluoride	97.8		80 - 120		1.51	0.422	1.11	0.111	1.00
Sulfate	103		80 - 120		25.2	13.8	11.1	1.11	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXH0653-MSD1	Batch: BXH0653			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/15/2023	Date Analyzed: 08/15/2023								
Chloride	101	8.87	80 - 120	20	11.2	ND	11.1	1.11	1.00
Fluoride	89.4	9.62	80 - 120	20	1.06	0.064	1.11	0.111	1.00
Sulfate	96.7	9.09	80 - 120	20	10.7	ND	11.1	1.11	1.00
QC Sample ID: BXH0653-MSD2	Batch: BXH0653			QC Source Sample: XXXXXXX-XX					
Date Prepared: 08/15/2023	Date Analyzed: 08/15/2023								
Chloride	101	0.169	80 - 120	20	111	99.3	11.1	1.11	1.00
Fluoride	96.8	0.732	80 - 120	20	1.50	0.422	1.11	0.111	1.00
Sulfate	102	0.491	80 - 120	20	25.0	13.8	11.1	1.11	1.00

QC Report for Work Order (WO) - 23H0944

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXH0481-BLK1	Batch: BXH0481								
Date Prepared: 08/10/2023	Date Analyzed: 08/10/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXH0481-DUP1	Batch: BXH0481		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/10/2023	Date Analyzed: 08/10/2023								
Total Dissolved Solids (TDS)		2		10	1470	1440		20	1.00
QC Sample ID: BXH0481-DUP2	Batch: BXH0481		QC Source Sample: XXXXXXX-XX						
Date Prepared: 08/10/2023	Date Analyzed: 08/10/2023								
Total Dissolved Solids (TDS)		4		10	1400	1340		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXH0481-BS1	Batch: BXH0481								
Date Prepared: 08/10/2023	Date Analyzed: 08/10/2023								
Total Dissolved Solids (TDS)	97		90 - 110		388		400	20	1.00

9/27/2023

Work Order: 23I1216
Project: [none]

Deseret Power Electric Cooperative
Attn: Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

Approved By:

Dave Gayer, Laboratory Director

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Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **9/15/23 10:30 @ 2.6** °C
Date Reported: 9/27/2023
Project Name: **[none]**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23I1216-01**
Date Sampled: **9/12/23 11:10**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1910	mg/L	100	EPA 300.0	9/21/23	9/22/23	
Fluoride	0.354	mg/L	0.100	EPA 300.0	9/21/23	9/22/23	
Sulfate	8540	mg/L	500	EPA 300.0	9/25/23	9/26/23	
Total Dissolved Solids (TDS)	17000	mg/L	500	SM 2540 C	9/15/23	9/15/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Arsenic, Total	0.0056	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Barium, Total	0.012	mg/L	0.005	EPA 200.7/200.2	9/15/23	9/18/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Boron, Total	57.2	mg/L	0.05	EPA 200.7/200.2	9/15/23	9/18/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	9/15/23	9/18/23	
Calcium, Total	449	mg/L	0.2	EPA 200.7/200.2	9/15/23	9/18/23	
Chromium, Total	0.0018	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Cobalt, Total	0.0256	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Lithium, Total	0.725	mg/L	0.005	EPA 200.7/200.2	9/15/23	9/18/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	9/19/23	9/20/23	
Molybdenum, Total	0.22	mg/L	0.01	EPA 200.7/200.2	9/15/23	9/18/23	
Selenium, Total	0.0103	mg/L	0.0005	EPA 200.8/200.2	9/15/23	9/18/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	9/15/23	9/18/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **9/15/23 10:30 @ 2.6** °C
Date Reported: 9/27/2023
Project Name: **[none]**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5 Round 8
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
( ) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AT

23I1216

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	~~Radium-226~~	~~Radium-228~~							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5	9-12-23	11:10	Water		X	X	X	X	X	X	X	X	X										
	2.																							
	3.																							
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.					~~AG~~		AQ			M														
	10.					1298		1272			1325													

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 2.6

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	9-14-23/1145		9/14/23 1030
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070
801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

AG 1298 (2) M1325
AQ 1272

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

TRACKING #: 1Z 849 747 01 6455 1029

UPS

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXI0766-BLK1	Batch: BXI0766								
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
QC Sample ID: BXI0766-BLK2	Batch: BXI0766								
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXI0766-BS1	Batch: BXI0766								
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total	95.4		85 - 115		0.191		0.200	0.005	1.00
Boron, Total	94.5		85 - 115		0.47		0.500	0.05	1.00
Calcium, Total	86.1		85 - 115		8.8		10.2	0.2	1.00
Lithium, Total	102		85 - 115		0.204		0.200	0.005	1.00
Molybdenum, Total	103		85 - 115		0.21		0.200	0.01	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXI0766-MS1	Batch: BXI0766			QC Source Sample: XXXXXXX-XX					
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total	95.5		70 - 130		0.296	0.105	0.200	0.005	1.00
Boron, Total	96.8		70 - 130		0.65	0.16	0.500	0.05	1.00
Calcium, Total	49.5		70 - 130		167	162	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	101		70 - 130		0.212	0.010	0.200	0.005	1.00
Molybdenum, Total	98.6		70 - 130		0.21	0.02	0.200	0.01	1.00
QC Sample ID: BXI0766-MS2	Batch: BXI0766			QC Source Sample: XXXXXXX-XX					
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total	96.0		70 - 130		0.230	0.038	0.200	0.005	1.00
Boron, Total	97.1		70 - 130		0.53	0.04	0.500	0.05	1.00
Calcium, Total	77.5		70 - 130		97.9	90.0	10.2	0.2	1.00
Lithium, Total	97.9		70 - 130		0.196	ND	0.200	0.005	1.00
Molybdenum, Total	94.8		70 - 130		0.19	0.004	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXI0766-MSD1	Batch: BXI0766			QC Source Sample: XXXXXXX-XX					
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total	97.6	1.41	70 - 130	20	0.300	0.105	0.200	0.005	1.00
Boron, Total	98.5	1.32	70 - 130	20	0.66	0.16	0.500	0.05	1.00
Calcium, Total	81.4	1.92	70 - 130	20	171	162	10.2	0.2	1.00
Lithium, Total	104	2.47	70 - 130	20	0.218	0.010	0.200	0.005	1.00
Molybdenum, Total	100	1.31	70 - 130	20	0.22	0.02	0.200	0.01	1.00
QC Sample ID: BXI0766-MSD2	Batch: BXI0766			QC Source Sample: XXXXXXX-XX					
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								

Matrix Spike Dup - EPA 200.7 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXI0766-MSD2	Batch: BXI0766		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Barium, Total	96.8	0.651	70 - 130	20	0.231	0.038	0.200	0.005	1.00
Boron, Total	98.4	1.21	70 - 130	20	0.53	0.04	0.500	0.05	1.00
Calcium, Total	83.0	0.564	70 - 130	20	98.4	90.0	10.2	0.2	1.00
Lithium, Total	88.9	9.64	70 - 130	20	0.178	ND	0.200	0.005	1.00
Molybdenum, Total	89.6	5.51	70 - 130	20	0.18	0.004	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXI0767-BLK1	Batch: BXI0767								
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXI0767-BS1	Batch: BXI0767								
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Antimony, Total	103		85 - 115		0.041		0.0400	0.0005	1.00
Arsenic, Total	99.2		85 - 115		0.040		0.0400	0.0005	1.00
Beryllium, Total	101		85 - 115		0.040		0.0400	0.0005	1.00
Cadmium, Total	101		85 - 115		0.040		0.0400	0.0002	1.00
Chromium, Total	99.5		85 - 115		0.040		0.0400	0.0005	1.00
Cobalt, Total	98.2		85 - 115		0.039		0.0400	0.0005	1.00
Lead, Total	99.8		85 - 115		0.040		0.0400	0.0005	1.00
Selenium, Total	99.9		85 - 115		0.040		0.0400	0.0005	1.00
Thallium, Total	105		85 - 115		0.042		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXI0767-MS1	Batch: BXI0767		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Antimony, Total	102		70 - 130		0.041	ND	0.0400	0.0005	1.00
Arsenic, Total	102		70 - 130		0.041	0.0005	0.0400	0.0005	1.00
Beryllium, Total	102		70 - 130		0.041	ND	0.0400	0.0005	1.00
Cadmium, Total	98.2		70 - 130		0.039	ND	0.0400	0.0002	1.00
Chromium, Total	101		70 - 130		0.040	ND	0.0400	0.0005	1.00
Cobalt, Total	96.1		70 - 130		0.039	0.0001	0.0400	0.0005	1.00
Lead, Total	97.1		70 - 130		0.039	ND	0.0400	0.0005	1.00
Selenium, Total	98.8		70 - 130		0.040	ND	0.0400	0.0005	1.00
Thallium, Total	101		70 - 130		0.040	ND	0.0400	0.0002	1.00
QC Sample ID: BXI0767-MS2	Batch: BXI0767		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/15/2023	Date Analyzed: 09/18/2023								
Antimony, Total	101		70 - 130		0.040	0.00004	0.0400	0.0005	1.00
Arsenic, Total	101		70 - 130		0.041	0.0009	0.0400	0.0005	1.00
Beryllium, Total	99.9		70 - 130		0.040	ND	0.0400	0.0005	1.00
Cadmium, Total	97.8		70 - 130		0.039	0.0001	0.0400	0.0002	1.00
Chromium, Total	95.6		70 - 130		0.039	0.0003	0.0400	0.0005	1.00
Cobalt, Total	91.7		70 - 130		0.037	0.0004	0.0400	0.0005	1.00
Lead, Total	95.4		70 - 130		0.038	0.0001	0.0400	0.0005	1.00
Selenium, Total	98.2		70 - 130		0.039	ND	0.0400	0.0005	1.00
Thallium, Total	99.3		70 - 130		0.040	ND	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23I1216

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXI0874-BLK1	Batch: BXI0874								
Date Prepared: 09/19/2023	Date Analyzed: 09/20/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXI0874-BS1	Batch: BXI0874								
Date Prepared: 09/19/2023	Date Analyzed: 09/20/2023								
Mercury, Total	89.5		85 - 115		0.00448		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXI0874-MS1	Batch: BXI0874			QC Source Sample: XXXXXXX-XX					
Date Prepared: 09/19/2023	Date Analyzed: 09/20/2023								
Mercury, Total	93.1		75 - 125		0.00465	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXI0874-MSD1	Batch: BXI0874			QC Source Sample: XXXXXXX-XX					
Date Prepared: 09/19/2023	Date Analyzed: 09/20/2023								
Mercury, Total	96.2	3.29	75 - 125	20	0.00481	ND	0.00500	0.00015	1.00

QC Report for Work Order (WO) - 23I1216

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXI1034-BLK1	Batch: BXI1034								
Date Prepared: 09/21/2023	Date Analyzed: 09/22/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
QC Sample ID: BXI1192-BLK1	Batch: BXI1192								
Date Prepared: 09/25/2023	Date Analyzed: 09/25/2023								
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXI1034-BS1	Batch: BXI1034								
Date Prepared: 09/21/2023	Date Analyzed: 09/22/2023								
Chloride	99.5		90 - 110		49.7		50.0	1.00	1.00
Fluoride	100		90 - 110		5.01		5.00	0.100	1.00
QC Sample ID: BXI1192-BS1	Batch: BXI1192								
Date Prepared: 09/25/2023	Date Analyzed: 09/25/2023								
Sulfate	102		90 - 110		51.1		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXI1034-MS1	Batch: BXI1034		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/21/2023	Date Analyzed: 09/22/2023								
Chloride	95.4		80 - 120		109	13.3	100	11.0	1.00
Fluoride	93.0		80 - 120		9.30	ND	10.0	1.10	1.00
QC Sample ID: BXI1034-MS2	Batch: BXI1034		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/21/2023	Date Analyzed: 09/22/2023								
Chloride	107		80 - 120		107	ND	100	11.0	1.00
Fluoride	93.9		80 - 120		9.39	ND	10.0	1.10	1.00
QC Sample ID: BXI1192-MS1	Batch: BXI1192		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/25/2023	Date Analyzed: 09/25/2023								
Sulfate	105		80 - 120		29.3	17.7	11.1	1.11	1.00
QC Sample ID: BXI1192-MS2	Batch: BXI1192		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/25/2023	Date Analyzed: 09/25/2023								
Sulfate	113		80 - 120		36.6	24.1	11.1	1.11	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXI1034-MSD1	Batch: BXI1034		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/21/2023	Date Analyzed: 09/22/2023								
Chloride	95.4	0.0820	80 - 120	20	109	13.3	100	11.0	1.00
Fluoride	92.8	0.225	80 - 120	20	9.28	ND	10.0	1.10	1.00
QC Sample ID: BXI1034-MSD2	Batch: BXI1034		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/21/2023	Date Analyzed: 09/22/2023								
Chloride	98.6	7.85	80 - 120	20	98.6	ND	100	11.0	1.00
Fluoride	93.4	0.575	80 - 120	20	9.34	ND	10.0	1.10	1.00
QC Sample ID: BXI1192-MSD1	Batch: BXI1192		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/25/2023	Date Analyzed: 09/25/2023								
Sulfate	103	0.440	80 - 120	20	29.2	17.7	11.1	1.11	1.00
QC Sample ID: BXI1192-MSD2	Batch: BXI1192		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/25/2023	Date Analyzed: 09/25/2023								
Sulfate	113	0.0149	80 - 120	20	36.6	24.1	11.1	1.11	1.00

QC Report for Work Order (WO) - 23I1216

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXI0747-BLK1	Batch: BXI0747								
Date Prepared: 09/15/2023	Date Analyzed: 09/15/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXI0747-DUP1	Batch: BXI0747		QC Source Sample: 23I1216-01						
Date Prepared: 09/15/2023	Date Analyzed: 09/15/2023								
Total Dissolved Solids (TDS)		0.6		10	16900	17000		500	1.00
QC Sample ID: BXI0747-DUP2	Batch: BXI0747		QC Source Sample: XXXXXXX-XX						
Date Prepared: 09/15/2023	Date Analyzed: 09/15/2023								
Total Dissolved Solids (TDS)		3		10	392	404		20	1.00
LCS - SM 2540 C									
QC Sample ID: BXI0747-BS1	Batch: BXI0747								
Date Prepared: 09/15/2023	Date Analyzed: 09/15/2023								
Total Dissolved Solids (TDS)		104	90 - 110		416		400	20	1.00

CHEMTECH-FORD
LABORATORIES

11/6/2023

Work Order: 23I1235
Project: FA-DG5 Round 8

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

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Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **9/15/23 10:30 @ 2.6** °C
Date Reported: 11/6/2023
Project Name: **FA-DG5 Round 8**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23I1235-01**
Date Sampled: **9/12/23 11:10**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Radiochemistry							
Radium-226	0.43	pCi/L	0.35	SM 7500 Ra B	9/28/23	10/5/23	SL-62
Radium-228	1.6	pCi/L	0.35	EPA 904.0	10/9/23	10/13/23	SL-62

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **9/15/23 10:30 @ 2.6** °C
Date Reported: 11/6/2023
Project Name: **FA-DG5 Round 8**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5 Round 8
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
( ) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AT

23I1235

Lab Use Only	CLIENT SAMPLE INFORMATION				
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine
01	1. FA-DG5	9-12-23	11:10	Water	
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
	9.				
	10.				

TESTS REQUESTED																	Bacteria			
	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228								Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	X	X	X	X	X	X	X	X	X											

AG(1) AQ M
1298 1272 1325

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 2.6

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	9-14-23/1145		9/14/23 1030
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

AG 1298 (2) M1325
AQ 1272

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees

TRACKING #: 1Z 849 747 01 6455 1029

UPS

ANALYTICAL REPORT

November 02, 2023

Chemtech-Ford Laboratories

Sample Delivery Group:	L1658999
Samples Received:	09/23/2023
Project Number:	
Description:	

Report To: Dave Gayer
9632 S 500 S
Sandy, UT 84070

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

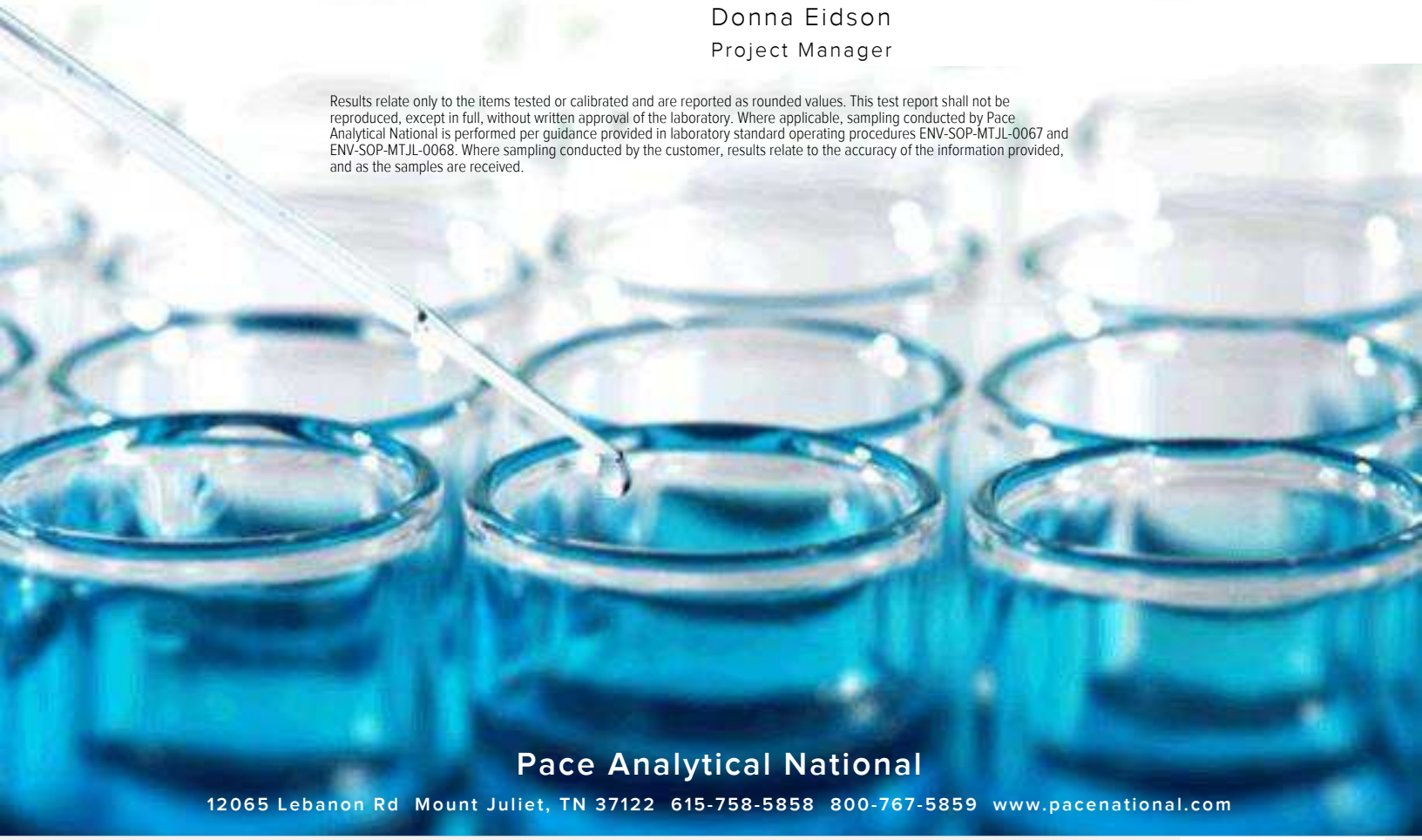


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23I1747-01 L1658999-01 Non-Potable Water

Collected by | Collected date/time 09/21/23 09:30 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149205	1	10/13/23 13:04	10/17/23 13:56	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN

23I1592-01 L1658999-02 Non-Potable Water

Collected by | Collected date/time 09/20/23 10:46 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149205	1	10/13/23 13:04	10/24/23 22:19	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN

23I1567-01 L1658999-03 Non-Potable Water

Collected by | Collected date/time 09/18/23 09:45 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149205	1	10/13/23 13:04	10/17/23 13:56	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN

23I1562-01 L1658999-04 Non-Potable Water

Collected by | Collected date/time 09/19/23 13:20 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149205	1	10/13/23 13:04	10/17/23 20:13	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN

23I1235-01 L1658999-05 Non-Potable Water

Collected by | Collected date/time 09/14/23 00:00 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 16:08	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN

23I1780-01 L1658999-06 Non-Potable Water

Collected by | Collected date/time 09/20/23 09:00 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149205	1	10/13/23 13:04	10/24/23 22:19	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 16:08	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/04/23 22:37	RGT	Mt. Juliet, TN

23I1780-02 L1658999-07 Non-Potable Water

Collected by | Collected date/time 09/20/23 10:20 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149205	1	10/13/23 13:04	10/24/23 22:19	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 16:08	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/04/23 22:37	RGT	Mt. Juliet, TN

23I1780-03 L1658999-08 Non-Potable Water

Collected by | Collected date/time 09/20/23 11:22 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 17:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/12/23 00:19	RGT	Mt. Juliet, TN

23I1780-04 L1658999-09 Non-Potable Water

Collected by | Collected date/time 09/20/23 12:09 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 17:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/12/23 00:19	RGT	Mt. Juliet, TN

23I1780-05 L1658999-10 Non-Potable Water

Collected by | Collected date/time 09/20/23 12:09 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 17:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/12/23 00:19	RGT	Mt. Juliet, TN

23I1780-06 L1658999-11 Non-Potable Water

Collected by | Collected date/time 09/20/23 13:30 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 17:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/04/23 22:37	RGT	Mt. Juliet, TN

23I1627-01 L1658999-12 Non-Potable Water

Collected by | Collected date/time 09/19/23 16:50 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 18:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/04/23 22:37	RGT	Mt. Juliet, TN

23I1627-02 L1658999-13 Non-Potable Water

Collected by | Collected date/time 09/19/23 16:03 | Received date/time 09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 18:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2143393	1	10/03/23 16:50	10/04/23 22:37	RGT	Mt. Juliet, TN

23I1627-03 L1658999-14 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/19/23 18:33	09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2141010	1	09/28/23 15:05	10/05/23 18:09	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148066	1	10/09/23 21:51	10/13/23 18:15	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2152286	1	10/16/23 22:27	10/18/23 23:27	RRE	Mt. Juliet, TN

23I1627-04 L1658999-15 Non-Potable Water

Collected by	Collected date/time	Received date/time
	09/19/23 17:39	09/23/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2149279	1	10/11/23 13:48	10/31/23 12:39	SNR	Mt. Juliet, TN
Radiochemistry by Method 903.0/9315	WG2144074	1	10/04/23 15:35	10/10/23 14:44	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2148168	1	10/13/23 18:16	10/23/23 14:22	DDD	Mt. Juliet, TN
Radiochemistry by Method LANL ER200M	WG2152286	1	10/16/23 22:27	10/18/23 23:27	RRE	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Donna Eidson
Project Manager

Report Revision History

Level II Report - Version 1: 11/02/23 10:18

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	11.1		2.30		1.69		10/17/2023 13:56	WG2149205
GROSS BETA	5.88		2.25		2.70		10/17/2023 13:56	WG2149205

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.390		0.193		0.341		10/13/2023 18:15	WG2148066
(T) Barium	*110*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*105*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method 900

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
GROSS ALPHA	25.9	J3 J5	3.35		1.74		10/24/2023 22:19	WG2149205
GROSS BETA	11.1		1.76		1.77		10/24/2023 22:19	WG2149205

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.857		0.210		0.355		10/13/2023 18:15	WG2148066
(T) Barium	*112*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*113*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	15.7		2.91		1.96		10/17/2023 13:56	WG2149205
GROSS BETA	11.8		2.59		2.82		10/17/2023 13:56	WG2149205

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.0359	U	0.214		0.394		10/13/2023 18:15	WG2148066
(T) Barium	*95.5*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*99.0*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	64.8		22.8		24.6		10/17/2023 20:13	WG2149205
GROSS BETA	202		13.9		10.4		10/17/2023 20:13	WG2149205

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	2.02		0.230		0.348		10/13/2023 18:15	WG2148066
(T) Barium	*124*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*98.3*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.429		0.313		0.346		10/05/2023 16:08	WG2141010
(T) Barium	*112*					*30.0-143*	*10/05/2023 16:08*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	1.65		0.224		0.346		10/13/2023 18:15	WG2148066
(T) Barium	*138*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*92.5*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	1160		414		399		10/24/2023 22:19	WG2149205
GROSS BETA	2000		329		358		10/24/2023 22:19	WG2149205

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	46.8		2.69		0.237		10/05/2023 16:08	WG2141010
(T) Barium	*86.8*					*30.0-143*	*10/05/2023 16:08*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	10.4		0.487		0.606		10/13/2023 18:15	WG2148066
(T) Barium	*67.7*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*99.2*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	0.405		0.185		0.225		10/04/2023 22:37	WG2143393
THORIUM-230	-0.123	U	0.233		0.469		10/04/2023 22:37	WG2143393
THORIUM-232	0.207		0.125		0.190		10/04/2023 22:37	WG2143393
(T) THORIUM-229	*85.1*					*30.0-110*	*10/04/2023 22:37*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	981		506		594		10/24/2023 22:19	WG2149205
GROSS BETA	2030		353		395		10/24/2023 22:19	WG2149205

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	46.7		2.69		0.315		10/05/2023 16:08	WG2141010
(T) Barium	*86.7*					*30.0-143*	*10/05/2023 16:08*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	15.0		0.949		1.34		10/13/2023 18:15	WG2148066
(T) Barium	*36.1*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*98.4*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	0.383		0.173		0.207		10/04/2023 22:37	WG2143393
THORIUM-230	-0.469	U	0.158		0.453		10/04/2023 22:37	WG2143393
THORIUM-232	0.312		0.150		0.189		10/04/2023 22:37	WG2143393
(T) THORIUM-229	*85.8*					*30.0-110*	*10/04/2023 22:37*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	468		324	193	392	235	10/31/2023 12:39	WG2149279
GROSS BETA	418		265	115	335	176	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	16.2		1.60		0.376		10/05/2023 17:09	WG2141010
(T) Barium	*85.6*					*30.0-143*	*10/05/2023 17:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	2.84		0.323		0.503		10/13/2023 18:15	WG2148066
(T) Barium	*83.2*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*114*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	10.7		0.885		0.207		10/12/2023 00:19	WG2143393
THORIUM-230	1.59		0.425		0.480		10/12/2023 00:19	WG2143393
THORIUM-232	4.07		0.554		0.257		10/12/2023 00:19	WG2143393
(T) THORIUM-229	*73.0*					*30.0-110*	*10/12/2023 00:19*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	73.4	U	278	171	422	251	10/31/2023 12:39	WG2149279
GROSS BETA	256	J	232	98.6	299	158	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	15.7		1.61		0.443		10/05/2023 17:09	WG2141010
(T) Barium	*84.0*					*30.0-143*	*10/05/2023 17:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	1.83		0.307		0.507		10/13/2023 18:15	WG2148066
(T) Barium	*92.5*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*109*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	9.92		0.827		0.255		10/12/2023 00:19	WG2143393
THORIUM-230	1.78		0.427		0.463		10/12/2023 00:19	WG2143393
THORIUM-232	4.07		0.534		0.242		10/12/2023 00:19	WG2143393
(T) THORIUM-229	*76.6*					*30.0-110*	*10/12/2023 00:19*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	370	J	348	210	455	265	10/31/2023 12:39	WG2149279
GROSS BETA	188	J	245	79.0	318	168	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	16.6		1.62		0.240		10/05/2023 17:09	WG2141010
(T) Barium	*85.0*					*30.0-143*	*10/05/2023 17:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	4.58		0.420		0.634		10/13/2023 18:15	WG2148066
(T) Barium	*68.1*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*110*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	9.44		0.757		0.219		10/12/2023 00:19	WG2143393
THORIUM-230	1.87		0.403		0.423		10/12/2023 00:19	WG2143393
THORIUM-232	3.38		0.451		0.172		10/12/2023 00:19	WG2143393
(T) THORIUM-229	*85.5*					*30.0-110*	*10/12/2023 00:19*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	0.0830	J3 U	0.450	0.278	0.699	0.418	10/31/2023 12:39	WG2149279
GROSS BETA	0.849	J	1.29	0.565	1.71	0.892	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.500		0.297		0.285		10/05/2023 17:09	WG2141010
(T) Barium	*97.3*					*30.0-143*	*10/05/2023 17:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.750		0.265		0.460		10/13/2023 18:15	WG2148066
(T) Barium	*108*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*100*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	0.165	J	0.154		0.272		10/04/2023 22:37	WG2143393
THORIUM-230	0.315	J	0.336		0.556		10/04/2023 22:37	WG2143393
THORIUM-232	0.458		0.223		0.258		10/04/2023 22:37	WG2143393
(T) THORIUM-229	*54.0*					*30.0-110*	*10/04/2023 22:37*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	36.7	J	51.6	31.2	71.9	42.5	10/31/2023 12:39	WG2149279
GROSS BETA	65.6		46.2	19.9	58.6	30.9	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.598		0.358		0.371		10/05/2023 18:09	WG2141010
(T) Barium	*86.4*					*30.0-143*	*10/05/2023 18:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	-0.513	U	0.289		0.537		10/13/2023 18:15	WG2148066
(T) Barium	*98.4*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*105*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	0.113	J	0.0936		0.186		10/04/2023 22:37	WG2143393
THORIUM-230	0.806		0.333		0.451		10/04/2023 22:37	WG2143393
THORIUM-232	0.0262	U	0.0725		0.203		10/04/2023 22:37	WG2143393
(T) THORIUM-229	*85.3*					*30.0-110*	*10/04/2023 22:37*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	11.0	U	53.8	33.2	82.9	49.3	10/31/2023 12:39	WG2149279
GROSS BETA	0.390	U	44.9	1.20	60.8	31.9	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.282	J	0.344		0.487		10/05/2023 18:09	WG2141010
(T) Barium	*75.3*					*30.0-143*	*10/05/2023 18:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.267	J	0.305		0.545		10/13/2023 18:15	WG2148066
(T) Barium	*98.9*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*112*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	-0.0143	U	0.0843		0.214		10/04/2023 22:37	WG2143393
THORIUM-230	0.539		0.278		0.406		10/04/2023 22:37	WG2143393
THORIUM-232	0.108	J	0.0911		0.176		10/04/2023 22:37	WG2143393
(T) THORIUM-229	*90.8*					*30.0-110*	*10/04/2023 22:37*	WG2143393

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	98.2	J	99.2	59.1	131	79.5	10/31/2023 12:39	WG2149279
GROSS BETA	123		87.0	38.0	111	58.3	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.934		0.380		0.224		10/05/2023 18:09	WG2141010
(T) Barium	*92.5*					*30.0-143*	*10/05/2023 18:09*	WG2141010

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	2.93		0.308		0.481		10/13/2023 18:15	WG2148066
(T) Barium	*99.7*					*30.0-143*	*10/13/2023 18:15*	WG2148066
(T) Yttrium	*100*					*30.0-136*	*10/13/2023 18:15*	WG2148066

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	0.141	J	0.119		0.210		10/18/2023 23:27	WG2152286
THORIUM-230	-0.154	U	0.210		0.438		10/18/2023 23:27	WG2152286
THORIUM-232	0.108	J	0.0888		0.179		10/18/2023 23:27	WG2152286
(T) THORIUM-229	*85.0*					*30.0-110*	*10/18/2023 23:27*	WG2152286

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	-15.7	U	72.2	-45.8	123	74.0	10/31/2023 12:39	WG2149279
GROSS BETA	93.4	J	106	47.1	138	73.4	10/31/2023 12:39	WG2149279

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.464		0.279		0.320		10/10/2023 14:44	WG2144074
(T) Barium	*99.3*					*30.0-143*	*10/10/2023 14:44*	WG2144074

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.966	J3 J5	0.413		0.724		10/23/2023 14:22	WG2148168
(T) Barium	*85.7*					*30.0-143*	*10/23/2023 14:22*	WG2148168
(T) Yttrium	*69.0*					*30.0-136*	*10/23/2023 14:22*	WG2148168

Radiochemistry by Method LANL ER200M

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
THORIUM-228	0.0831	U	0.0755		0.169		10/18/2023 23:27	WG2152286
THORIUM-230	0.00756	U	0.221		0.413		10/18/2023 23:27	WG2152286
THORIUM-232	0.113	J	0.0863		0.169		10/18/2023 23:27	WG2152286
(T) THORIUM-229	*82.9*					*30.0-110*	*10/18/2023 23:27*	WG2152286

Method Blank (MB)

(MB) R3992645-1 10/17/23 00:57

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
GROSS ALPHA	0.109	U	0.693	1.00	
GROSS BETA	0.204	U	1.01	1.34	

L1658573-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1658573-13 10/17/23 00:57 • (DUP) R3992645-5 10/17/23 13:56

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
GROSS ALPHA	9.81	2.70	2.59		4.45	1.88	2.11		75.2	1.63		20	3
GROSS BETA	4.03	1.62	1.96		4.71	1.59	1.90		15.6	0.301		20	3

Laboratory Control Sample (LCS)

(LCS) R3992645-2 10/17/23 00:57

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
GROSS ALPHA	15.0	13.7	91.5	80.0-120	
GROSS BETA	40.9	42.1	103	80.0-120	

L1658999-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1658999-02 10/24/23 22:19 • (MS) R3992645-6 10/24/23 22:19 • (MSD) R3992645-7 10/24/23 22:19

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
GROSS ALPHA	30.0	25.9	66.4	47.4	135	71.4	1	70.0-130	J5	J3	33.4		20
GROSS BETA	40.9	11.1	56.1	51.8	110	99.4	1	70.0-130			8.05		20

Method Blank (MB)

(MB) R3993846-2 10/31/23 12:39

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
GROSS ALPHA	-0.0221	U	0.530	0.807	0.461
GROSS BETA	-0.413	U	1.17	1.61	0.842

L1660430-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1660430-03 10/31/23 16:06 • (DUP) R3993846-5 10/31/23 12:39

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
GROSS ALPHA	5.26	1.28	1.02	0.601	4.11	1.09	0.931	0.547	24.7	0.688		20	3
GROSS BETA	8.82	1.37	1.39	0.734	6.79	1.47	1.63	0.852	26.1	1.01		20	3

Laboratory Control Sample (LCS)

(LCS) R3993846-1 10/30/23 14:07

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
GROSS ALPHA	15.0	12.4	82.3	80.0-120	
GROSS BETA	40.9	38.6	94.4	80.0-120	

L1658999-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1658999-11 10/31/23 12:39 • (MS) R3993846-3 10/31/23 12:39 • (MSD) R3993846-4 10/31/23 12:39

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
GROSS ALPHA	15.0	0.0830	18.4	14.4	122	95.3	1	70.0-130		J3	24.4		20
GROSS BETA	40.9	0.849	40.1	34.6	96.0	82.4	1	70.0-130			14.9		20

Method Blank (MB)

(MB) R3987100-1 10/05/23 14:08

Analyte	MB Result	MB Qualifier	MB 2 sigma CE	MB MDA	MB Lc
	pCi/l		+ / -	pCi/l	pCi/l
Radium-226	0.211		0.147	0.191	
(T) Barium	*101*		*101*		

L1658999-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1658999-11 10/05/23 17:09 • (DUP) R3987100-5 10/05/23 15:08

Analyte	Original Result	Original 2 sigma CE	Original MDA	Original Lc	DUP Result	DUP 2 sigma CE	DUP MDA	DUP Lc	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	pCi/l	+ / -	pCi/l	pCi/l	%			%	
Radium-226	0.500	0.297	0.285		0.636	0.536	0.619		23.9	0.222		20	3
(T) Barium	*97.3*				*99.2*	*99.2*							

Laboratory Control Sample (LCS)

(LCS) R3987100-2 10/05/23 14:08

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	5.59	112	80.0-120	
(T) Barium			*98.9*		

L1656665-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1656665-05 10/05/23 15:08 • (MS) R3987100-3 10/05/23 14:08 • (MSD) R3987100-4 10/05/23 14:08

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.0	5.60	28.1	27.9	113	111	1	75.0-125			0.964		20
(T) Barium		*98.2*			*98.2*	*99.7*							

Method Blank (MB)

(MB) R3985919-1 10/10/23 12:21

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-226	0.248		0.137	0.167	
(T) Barium	*99.6*		*99.6*		

L1661246-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1661246-02 10/10/23 15:44 • (DUP) R3985919-4 10/10/23 14:44

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.823	0.346	0.322		1.12	0.601	0.597		30.6	0.429		20	3
(T) Barium	*100*				*100*	*100*							

Laboratory Control Sample (LCS)

(LCS) R3985919-2 10/10/23 12:21

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	5.45	109	80.0-120	
(T) Barium			*100*		

L1661246-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1661246-01 10/10/23 15:44 • (MS) R3985919-3 10/10/23 14:44

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Radium-226	20.0	16.4	38.6	111	1	75.0-125	
(T) Barium		*99.5*		*101*			

Method Blank (MB)

(MB) R3987468-1 10/13/23 18:15

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-228	0.142	U	0.184	0.331	
(T) Barium	*113*		*113*		
(T) Yttrium	*99.3*		*99.3*		

L1658999-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1658999-01 10/13/23 18:15 • (DUP) R3987468-5 10/13/23 18:15

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.390	0.193	0.341		0.611	0.329	0.583		44.2	0.580		20	3
(T) Barium	*110*				*133*	*133*							
(T) Yttrium	*105*				*107*	*107*							

Laboratory Control Sample (LCS)

(LCS) R3987468-2 10/13/23 18:15

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.55	91.0	80.0-120	
(T) Barium			*120*		
(T) Yttrium			*103*		

L1658999-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1658999-06 10/13/23 18:15 • (MS) R3987468-3 10/13/23 18:15 • (MSD) R3987468-4 10/13/23 18:15

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	10.4	23.0	22.1	127	117	1	70.0-130			4.21		20
(T) Barium		*67.7*			*109*	*111*							
(T) Yttrium		*99.2*			*105*	*109*							

Method Blank (MB)

(MB) R3990582-1 10/18/23 15:11

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-228	0.150	U	0.238	0.429	
(T) Barium	*87.9*		*87.9*		
(T) Yttrium	*82.5*		*82.5*		

L1658484-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1658484-02 10/18/23 15:11 • (DUP) R3990582-3 10/18/23 15:11

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	9.65	0.519	0.640		8.15	0.466	0.607		16.8	2.14		20	3
(T) Barium	*106*				*113*	*113*							
(T) Yttrium	*76.0*				*90.4*	*90.4*							

Laboratory Control Sample (LCS)

(LCS) R3990582-2 10/18/23 15:11

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.49	110	80.0-120	
(T) Barium			*97.0*		
(T) Yttrium			*111*		

L1658999-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1658999-15 10/23/23 14:22 • (MS) R3990582-6 10/23/23 14:22 • (MSD) R3990582-7 10/23/23 14:22

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	0.966	11.5	15.6	106	146	1	70.0-130		J3 J5	29.7		20
(T) Barium		*85.7*			*76.4*	*80.0*							
(T) Yttrium		*69.0*			*111*	*81.3*							

Method Blank (MB)

(MB) R3985073-1 10/04/23 22:37

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
THORIUM-228	0.0602	J	0.0491	0.0767	
THORIUM-230	0.0886	J	0.0820	0.132	
THORIUM-232	0.0711	J	0.0491	0.0725	
(T) THORIUM-229	*61.7*		*61.7*		

L1655833-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1655833-07 10/04/23 22:37 • (DUP) R3985073-5 10/04/23 22:37

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
THORIUM-228	0.146	0.235	0.409		-0.0107	0.171	0.351		200	0.538	U	20	3
THORIUM-230	0.654	0.397	0.581		0.426	0.336	0.524		42.2	0.439	J	20	3
THORIUM-232	0.159	0.147	0.266		0.0857	0.119	0.248		59.9	0.388	U	20	3
(T) THORIUM-229	*58.3*				*62.3*	*62.3*							

Laboratory Control Sample (LCS)

(LCS) R3985073-2 10/04/23 22:37

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
THORIUM-228	2.01	1.67	82.8	80.0-120	
THORIUM-230	1.99	1.60	80.3	80.0-120	
THORIUM-232	2.01	1.67	83.1	80.0-120	
(T) THORIUM-229			*92.5*		

L1655833-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1655833-06 10/04/23 22:37 • (MS) R3985073-3 10/04/23 22:37 • (MSD) R3985073-4 10/04/23 22:37

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
THORIUM-228	8.03	0.0658	7.80	7.91	96.3	97.7	1	75.0-125			1.44		20
THORIUM-230	7.96	0.0489	8.55	7.95	107	99.3	1	75.0-125			7.31		20
THORIUM-232	8.03	0.235	8.52	7.78	103	94.0	1	75.0-125			9.07		20
(T) THORIUM-229		*72.4*			*87.0*	*92.7*							

Method Blank (MB)

(MB) R3990071-6 10/18/23 23:27

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
THORIUM-228	0.0165	U	0.0570	0.106	
THORIUM-230	0.0921	J	0.0921	0.149	
THORIUM-232	0.0658	J	0.0483	0.0732	
(T) THORIUM-229	*50.7*		*50.7*		

L1664041-15 Original Sample (OS) • Duplicate (DUP)

(OS) L1664041-15 10/18/23 23:28 • (DUP) R3990071-10 10/18/23 23:27

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
THORIUM-228	0.302	0.171	0.233		0.0722	0.150	0.284		123	1.01	U	20	3
THORIUM-230	0.714	0.352	0.495		0.0235	0.244	0.457		187	1.61	U	20	3
THORIUM-232	0.385	0.180	0.210		0.262	0.139	0.191		38.1	0.542		20	3
(T) THORIUM-229	*73.4*				*71.6*	*71.6*							

Laboratory Control Sample (LCS)

(LCS) R3990071-7 10/18/23 23:27

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
THORIUM-228	2.01	1.62	80.3	80.0-120	
THORIUM-230	1.99	1.71	86.1	80.0-120	
THORIUM-232	2.01	1.64	81.7	80.0-120	
(T) THORIUM-229			*77.6*		

L1663896-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1663896-01 10/18/23 23:28 • (MS) R3990071-8 10/18/23 23:27 • (MSD) R3990071-9 10/18/23 23:27

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
THORIUM-228	8.03		6.75	7.65	82.1	93.4	1	75.0-125			12.5		20
THORIUM-230	7.96	0.376	7.41	8.64	88.3	104	1	75.0-125			15.3		20
THORIUM-232	8.03		7.88	7.80	93.9	93.0	1	75.0-125			0.995		20
(T) THORIUM-229		*63.6*			*97.4*	*76.7*							

900 Radiochemistry

Radiochemistry Raw Data

GROSS ALPHA AND GROSS BETA DATA REPORT
EPA 900/9310
WG2149205

SAMPLE ID	GROSS ALPHA pCi/l				GROSS BETA pCi/l				PREP DATE	ANALYSIS DATE
	result	error	MDA/MDC	SDWA	result	error	MDA/MDC	SDWA		
BLANK WG2149205	0.11	0.69	1.00	0.61	0.20	1.01	1.34	0.80	10/13/23 13:02	10/17/23 0:57
LCS WG2149205	13.73	1.66	0.83	0.51	42.09	2.36	1.68	1.00	10/13/23 13:02	10/17/23 0:57
MS L1658999-02 WG2149205	66.36	6.63	2.33	1.46	56.10	2.76	1.64	0.98	10/13/23 13:02	10/24/23 22:19
MSD L1658999-02 WG2149205	47.35	5.00	2.15	1.32	51.76	2.72	1.82	1.09	10/13/23 13:02	10/24/23 22:19
DUP L1658573-13 WG2149205	4.45	1.88	2.11	1.28	4.71	1.59	1.90	1.14	10/13/23 13:02	10/17/23 13:56
L1658573-12 WG2149205	2.47	1.17	1.27	0.78	4.35	1.56	1.89	1.13	10/13/23 13:02	10/17/23 0:57
L1658573-13 WG2149205	9.81	2.70	2.59	1.57	4.03	1.62	1.96	1.17	10/13/23 13:02	10/17/23 0:57
L1658573-14 WG2149205	7.46	3.00	3.00	1.86	2.76	2.93	3.79	2.26	10/13/23 13:02	10/17/23 0:57
L1658573-15 WG2149205	4.34	2.16	2.52	1.53	6.31	2.54	3.11	1.86	10/13/23 13:02	10/17/23 0:58
L1658573-16 WG2149205	2.20	1.28	1.55	0.94	2.93	1.42	1.75	1.05	10/13/23 13:02	10/17/23 0:58
L1658573-17 WG2149205	10.36	4.08	4.41	2.69	4.58	2.25	2.77	1.65	10/13/23 13:02	10/17/23 0:58
L1658573-18 WG2149205	4.13	1.81	1.96	1.20	3.01	1.33	1.62	0.97	10/13/23 13:02	10/17/23 0:58
L1658573-19 WG2149205	3.66	1.09	1.03	0.63	5.60	1.24	1.34	0.80	10/13/23 13:02	10/17/23 0:58
L1658573-20 WG2149205	6.80	2.09	1.91	1.18	-1.15	1.41	1.91	1.14	10/13/23 13:02	10/17/23 0:58
L1658573-21 WG2149205	1.67	17.27	25.74	15.69	106.33	13.03	12.31	7.37	10/13/23 13:02	10/17/23 0:58
L1658573-22 WG2149205	1.78	1.30	1.61	0.99	1.22	1.30	1.69	1.01	10/13/23 13:02	10/17/23 13:56
L1658573-23 WG2149205	-0.04	0.69	1.05	0.64	0.02	1.31	1.77	1.06	10/13/23 13:02	10/17/23 13:56
L1658573-24 WG2149205	2.44	0.84	0.87	0.53	86.36	3.02	1.62	0.97	10/13/23 13:02	10/17/23 13:56
L1658731-01 WG2149205	256.60	101.16	105.25	64.61	-1.70	18.03	23.94	14.33	10/13/23 13:02	10/17/23 13:56
L1658999-01 WG2149205	11.09	2.30	1.69	1.04	5.88	2.25	2.70	1.61	10/13/23 13:02	10/17/23 13:56
L1658999-02 WG2149205	25.92	3.35	1.74	1.07	11.11	1.76	1.77	1.06	10/13/23 13:02	10/24/23 22:19
L1658999-03 WG2149205	15.70	2.91	1.96	1.21	11.83	2.59	2.82	1.69	10/13/23 13:02	10/17/23 13:56
L1658999-04 WG2149205	64.78	22.78	24.56	14.89	201.62	13.92	10.41	6.24	10/13/23 13:02	10/17/23 20:13
L1658999-06 WG2149205	1162.48	413.82	399.24	246.56	1996.70	329.13	357.87	214.11	10/13/23 13:02	10/24/23 22:19
L1658999-07 WG2149205	980.84	506.42	594.02	361.63	2031.08	352.90	395.03	236.21	10/13/23 13:02	10/24/23 22:19
DNRMS L1658999-02 WG2149205	45.09	5.53	2.33	1.46	50.86	2.56	1.64	0.98	10/13/23 13:02	10/17/23 0:57
DNRMSD L1658999-02 WG21492(	33.231	4.252294	2.146	1.323	48.2	2.6	1.819	1.088	10/13/23 13:02	10/17/23 0:57
DNRL1658999-02 WG2149205	1.844	1.744945	2.287	1.394	6.5	1.3	1.480	0.887	10/13/23 13:02	10/17/23 13:56

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SGD GROUP: WG2149205
METHOD EPA 900/9310
PREP DATE: 10/13/23 13:02
PREP: ELP3947
ANALYST: SNR961

BACKGROUNI	CPM	ALPHA	BETA
	DET1	0.191	1.22
	DET2	0.084	1.82
	DET3	0.048	1.39
	DET4	0.074	1.80
	DET5	0.078	1.75
	DET6	0.070	1.76
	DET7	0.145	2.21
	DET8	0.061	2.39
	DET9	0.156	2.01
	DET10	0.139	1.72
	DET11	0.135	1.75
	DET12	0.091	1.43
	DET13	0.111	1.09
	DET14	0.080	2.09
	DET15	0.133	1.18
	DET16	0.076	1.54

COUNT DATE/TIME	SAMPLE ID	SAMPLE VOL(mL	TARE WEIGHT GRAMS	GROSS WEIGHT GRAMS	NET WT. mg	ALPHA EFF	BETA EFF	DET NO.	ALPHA BKG	BETA BKG	ALPHA COUNTS	BETA COUNTS	COUNT TIME	ALPHA MDA	BETA MDA	Th-230 Std Xtalk	DET (1-8) Th-230 Std Xtalk	DET (9-16) Th-230 Std Xtalk
10/17/23 0:57	BLANK WG2149205	200	7.58053	7.58263	2.1	28.4	49.7	1	0.191	1.22	41	268	200	**1.005**	**1.344**	0.366	0.366	NA
10/17/23 0:57	LCS WG2149205	200	7.59264	7.6015	8.9	24.1	48.2	2	0.084	1.82	311	2297	200	**0.831**	**1.678**	0.427	0.427	NA
10/24/23 22:19	MS L1658999-02 WG2149205	200	7.61391	7.6783	64.4	6.8	43.2	3	0.048	1.39	412	2637	200	**2.330**	**1.644**	0.499	0.499	NA
10/24/23 22:19	MSD L1658999-02 WG2149205	200	7.66417	7.72369	59.5	8.9	44.2	4	0.074	1.80	387	2597	200	**2.146**	**1.819**	0.530	0.530	NA
10/17/23 13:56	DUP L1658573-13 WG2149205	200	7.60038	7.64813	47.7	12.4	44.6	9	0.156	2.01	80	628	200	**2.108**	**1.901**	0.493	NA	0.493
10/17/23 0:57	L1658573-12 WG2149205	180	7.62057	7.65365	33.1	16.2	46.8	6	0.070	1.76	46	536	200	**1.271**	**1.888**	0.464	0.464	NA
10/17/23 0:57	L1658573-13 WG2149205	200	7.63025	7.68197	51.7	9.8	45.3	7	0.145	2.21	114	661	200	**2.586**	**1.959**	0.500	0.500	NA
10/17/23 0:57	L1658573-14 WG2149205	88	7.62078	7.66337	42.6	13.3	55.3	8	0.061	2.39	51	562	200	**2.997**	**3.787**	0.478	0.478	NA
10/17/23 0:58	L1658573-15 WG2149205	118	7.58906	7.6173	28.2	17.5	46.2	9	0.156	2.01	71	586	200	**2.520**	**3.108**	0.441	NA	0.441
10/17/23 0:58	L1658573-16 WG2149205	200	7.62134	7.65305	31.7	16.0	45.0	10	0.139	1.72	59	489	200	**1.548**	**1.748**	0.475	NA	0.475
10/17/23 0:58	L1658573-17 WG2149205	130	7.58952	7.6427	53.2	8.5	44.1	11	0.135	1.75	78	504	200	**4.413**	**2.765**	0.478	NA	0.478
10/17/23 0:58	L1658573-18 WG2149205	200	7.57589	7.6227	46.8	10.6	44.6	12	0.091	1.43	57	435	200	**1.957**	**1.616**	0.523	NA	0.523
10/17/23 0:58	L1658573-19 WG2149205	200	7.55084	7.56915	18.3	21.8	47.3	13	0.111	1.09	93	490	200	**1.034**	**1.338**	0.396	NA	0.396
10/17/23 0:58	L1658573-20 WG2149205	200	7.60992	7.66822	58.3	10.3	45.1	14	0.080	2.09	78	414	200	**1.911**	**1.913**	0.538	NA	0.538
10/17/23 0:58	L1658573-21 WG2149205	25	7.62114	7.72023	99.1	7.6	42.7	15	0.133	1.18	28	758	200	**25.742**	**12.307**	0.633	NA	0.633
10/17/23 13:56	L1658573-22 WG2149205	200	7.60001	7.6495	49.5	11.9	44.2	16	0.076	1.54	34	374	200	**1.613**	**1.689**	0.535	NA	0.535
10/17/23 13:56	L1658573-23 WG2149205	186	7.58699	7.59211	5.1	25.5	47.9	10	0.139	1.72	27	356	200	**1.047**	**1.767**	0.419	NA	0.419
10/17/23 13:56	L1658573-24 WG2149205	200	7.61729	7.61034	-6.9	28.1	48.9	11	0.135	1.75	88	4134	200	**0.869**	**1.621**	0.362	NA	0.362
10/17/23 13:56	L1658731-01 WG2149205	14	7.58294	7.6728	89.9	2.8	43.0	12	0.091	1.43	63	318	200	**105.246**	**23.942**	0.580	NA	0.580
10/17/23 13:56	L1658999-01 WG2149205	136	7.61041	7.64037	30.0	17.0	47.0	14	0.080	2.09	130	648	200	**1.695**	**2.700**	0.485	NA	0.485
10/24/23 22:19	L1658999-02 WG2149205	200	7.60266	7.65818	55.5	11.2	44.8	5	0.078	1.75	273	924	200	**1.735**	**1.771**	0.485	0.485	NA
10/17/23 13:56	L1658999-03 WG2149205	116	7.6112	7.6412	30.0	16.9	45.7	16	0.076	1.54	152	658	200	**1.957**	**2.816**	0.472	NA	0.472
10/17/23 20:13	L1658999-04 WG2149205	25	7.5982	7.66712	68.9	9.3	51.3	1	0.191	1.22	105	1392	200	**24.556**	**10.414**	0.487	0.487	NA
10/24/23 22:19	L1658999-06 WG2149205	1	7.61039	7.67747	67.1	9.3	44.4	6	0.070	1.76	62	746	200	**399.240**	**357.872**	0.534	0.534	NA
10/24/23 22:19	L1658999-07 WG2149205	1	7.61032	7.66772	57.4	8.5	44.9	7	0.145	2.21	66	847	200	**594.021**	**395.032**	0.502	0.502	NA
10/17/23 0:57	DNRMS L1658999-02 WG2149205	200	7.61391	7.6783	64.4	6.8	43.2	3	0.048	1.39	283	2230	200	**2.330**	**1.644**	0.499	0.499	NA
10/17/23 0:57	DNRMSD L1658999-02 WG21492(	200	7.66417	7.72369	59.5	8.9	44.2	4	0.074	1.80	276	2252	200	**2.146**	**1.819**	0.530	0.530	NA
10/17/23 13:56	DNRL1658999-02 WG2149205	200	7.60266	7.65818	55.5	10.6	44.4	15	0.133	1.18	44	491	200	**2.287**	**1.480**	0.542	NA	0.542
					0.0	#####	FALSE							**#VALUE!**	**#VALUE!**	FALSE	FALSE	NA
					0.0	#####	FALSE							**#VALUE!**	**#VALUE!**	FALSE	FALSE	NA

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GROSS ALPHA/BETA QC REPORT WG2149205

	MLS OF SAMPLE	MLS OF SPIKE	STD VALUE	LCS VALUE	MS VALUE
ALPHA SPIKE	200	2.0	**1.50**	**15.0**	**30**
BETA SPIKE	200	0.5	**16.36**	**40.9**	**40.9**

Analyte **Gross Alpha** units pCi/L
Matrix Water

	RESULT	ERROR	MDA	known	%REC	LIMITS LOW	LIMITS HIGH		RPD	LIMITS		RER/NAD	LIMITS	
BLANK WG2149205	0.109	0.693	1.005											
LCS WG2149205	13.734	1.657	0.831	15.0	**91.6%**	80%	120%							
L1658573-13 WG2149205	9.809	2.705	2.586											
DUP L1658573-13 WG2149205	4.448	1.884	2.108						**NC**	20%		**1.63**	2	
L1658999-02 WG2149205	25.916	3.352	1.735											
MS L1658999-02 WG2149205	66.356	6.635	2.330	30.0	**134.8%**	70%	130%	*						
MSD L1658999-02 WG2149205	47.353	4.998	2.146	30.0	**71.5%**	70%	130%		**33.42%**	20%	*	**2.288**	2	*

Analyte **Gross Beta** units pCi/L
Matrix Water

	RESULT	ERROR	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD	LIMITS	RER/NAD	LIMITS
BLANK WG2149205	0.204	1.005	1.344								
LCS WG2149205	42.091	2.364	1.678	40.9	**102.9%**	80%	120%				
L1658573-13 WG2149205	4.028	1.619	1.959								
DUP L1658573-13 WG2149205	4.711	1.589	1.901					**NC**	20%	**0.301**	2
L1658999-02 WG2149205	11.105	1.759	1.771								
MS L1658999-02 WG2149205	56.104	2.757	1.644	40.9	**110.0%**	70%	130%				
MSD L1658999-02 WG2149205	51.764	2.715	1.819	40.9	**99.4%**	70%	130%	**8.05%**	20%	**1.12**	2

*** - Outside Control Limits**

SAMPLES:

BLANK WG21492	L1658573-17 WG2149205	L1658999-03 WG2149205
LCS WG2149205	L1658573-18 WG2149205	L1658999-04 WG2149205
#REF!	L1658573-19 WG2149205	L1658999-06 WG2149205
MS L1658999-02 \	L1658573-20 WG2149205	
MSD L1658999-02	L1658573-21 WG2149205	
DUP L1658573-13	L1658573-22 WG2149205	
L1658573-12 WG2	L1658573-23 WG2149205	
L1658573-13 WG2	L1658573-24 WG2149205	
L1658573-14 WG2	L1658731-01 WG2149205	
L1658573-15 WG2	L1658999-01 WG2149205	
L1658573-16 WG2	L1658999-02 WG2149205	

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ERA
A Waters Company

Rad
1 X 500mL

23B20457

ESC53062

Pace National- Mount Juliet

Custom RadChem™ Standard

Catalog #: 089 **Lot #:** 01182303A

Reference Date: January 27, 2023 12:00 MST

Certificate of Calibration

Isotope	Certified Value pCi/mL	Half-life	Uncertainty (95% confidence level) Type A (Random) (%)	Type B (Systematic) (%)	Total (%)
Gross Alpha as Th-230	1.50	(7.54 ± 0.03)E+04 years	0.3	2.0	2.1

Packaging and Volume: (1) 500 mL clear glass boston round bottle containing 400 mL

Matrix and Preservative: This aqueous standard is preserved with 0.1M nitric acid

Radioimpurities: Ra-226 = 0.618% on 01-Mar-2020

Standard Preparation Instructions and User Notes: Standards are ready for preparation and analysis as received. Shake the standard well prior to removing an aliquot. If the standard is to be diluted, it is recommended that the diluting solution have an acidic composition comparable to that of the standard, especially if the standard is not analyzed immediately after dilution. Certified values are decay corrected to the reference date provided. Comparison of analytical results to these values should incorporate this correction.

NIST Traceability: This derived source standard complies with NIST traceability requirements in accordance with the guidelines set forth in ANSI N42.22 section 6.3. The derived source parent solution is traceable to a provider participating in the NIST Measurement Assurance Program.

Calibration Method: This derived source standard was manufactured via a documented and unbroken chain of gravimetric and volumetric measurements in accordance with ERA's Internal Measurement Assurance Program directly from a liquid source traceable to NIST. All gravimetric and volumetric measurements were performed using balances and volumetric glassware calibrated with NIST traceable weights. Furthermore, this standard was analytically verified by ERA using an alpha/beta discriminating liquid scintillation counting system. This standard was analytically verified using a calibration solution from a separate/independent source traceable to NIST.

Certified Values are equal to 100% of the "made to" values as determined by volumetric and/or gravimetric measurements of NIST SRMs or NIST traceable reference materials and analytically verified by ERA. Total Uncertainty is calculated at the 95% confidence level.

Manufactured by: CJ

Date: 25 Jan 2023

Reviewed by:

Date: 26 Jan 23

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Sr-90
2322-15-1
ESC51304-WS
GROSS BETA
23E17275

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 17-May-23
DATE OF CALIBRATION 13-Oct-23

Ao	=	0.10	nCi/ml
N	=	0.02	
T(1/2)	=	28.60	years
T	=	0.41	years
VOLUME OF ST		80.00	
FINAL VOL		1000.00	
dilution	=	12.50	

A	=	0.10	nCi				
A	=	18.16	dpm/ml				
A	=	**8.18**	+/-	**0.27**	**pCi/ml**	16.364576	36.3294

Uncertainty 3.20%

Volume (8 ml Aliquot) 1.00%
Volume (1000 ml) 0.03%

CSU 3.35%

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Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
GAB Curve 0723	A1	4A-1	76268	27086	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A2	4A-1	55585	21667	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A3	4A-1	46984	19289	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A4	4A-1	41979	17935	20	7/10/2023 15:11	7/10/2023 15:31		
GAB Curve 0723	A5	4A-1	35635	15476	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A6	4A-1	30411	14216	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A7	4A-1	27387	12995	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A8	4A-1	25232	12421	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A9	4A-1	22239	11110	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A10	4A-1	19780	10691	10	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A11	4A-1	18534	9950	10	7/10/2023 12:25	7/10/2023 12:45		
GAB Curve 0723	A1	4A-2	74240	28352	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A2	4A-2	54031	22841	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A3	4A-2	45403	20167	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A4	4A-2	40899	18637	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A5	4A-2	34409	16312	20	7/10/2023 15:11	7/10/2023 15:31		
GAB Curve 0723	A6	4A-2	29410	14982	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A7	4A-2	26324	13458	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A8	4A-2	24042	13185	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A9	4A-2	20797	11726	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A10	4A-2	18939	11141	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A11	4A-2	18006	10362	20	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A1	4A-3	74275	29812	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A2	4A-3	54808	22233	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A3	4A-3	46626	19654	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A4	4A-3	42056	18392	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A5	4A-3	35105	16170	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A6	4A-3	29796	14660	20	7/10/2023 15:11	7/10/2023 15:31		
GAB Curve 0723	A7	4A-3	26814	13246	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A8	4A-3	24889	12867	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A9	4A-3	21587	11550	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A10	4A-3	19666	10871	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A11	4A-3	18531	10152	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A1	4A-4	73630	29455	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A2	4A-4	54632	23183	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A3	4A-4	46127	20941	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A4	4A-4	40471	19115	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A5	4A-4	34405	16746	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A6	4A-4	29593	15192	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A7	4A-4	26247	14032	20	7/10/2023 15:11	7/10/2023 15:31		
GAB Curve 0723	A8	4A-4	24173	13584	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A9	4A-4	20941	12471	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A10	4A-4	19385	11229	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A11	4A-4	18194	10824	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A1	4B-1	74928	27698	20	7/10/2023 11:27	7/10/2023 11:47		
GAB Curve 0723	A2	4B-1	54981	22221	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A3	4B-1	46320	20157	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A4	4B-1	41635	18215	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A5	4B-1	35362	15912	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A6	4B-1	30053	14337	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A7	4B-1	26679	13152	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A8	4B-1	24636	12867	20	7/10/2023 15:12	7/10/2023 15:32		
GAB Curve 0723	A9	4B-1	21043	11947	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A10	4B-1	19939	10952	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A11	4B-1	18287	10439	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A1	4B-2	74889	28234	20	7/10/2023 12:01	7/10/2023 12:21		
GAB Curve 0723	A2	4B-2	54025	22828	20	7/10/2023 11:27	7/10/2023 11:47		
GAB Curve 0723	A3	4B-2	46030	20545	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A4	4B-2	40699	18803	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A5	4B-2	34881	16263	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A6	4B-2	28926	14887	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A7	4B-2	26350	13389	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A8	4B-2	24045	13399	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A9	4B-2	20895	11688	20	7/10/2023 15:12	7/10/2023 15:32		
GAB Curve 0723	A10	4B-2	19647	11103	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A11	4B-2	18044	10496	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A1	4B-3	74479	28434	20	7/10/2023 12:25	7/10/2023 12:45		
GAB Curve 0723	A2	4B-3	54585	22328	20	7/10/2023 12:01	7/10/2023 12:21		
GAB Curve 0723	A3	4B-3	45491	19935	20	7/10/2023 11:27	7/10/2023 11:47		
GAB Curve 0723	A4	4B-3	40901	18225	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A5	4B-3	34812	15984	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A6	4B-3	29553	14764	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A7	4B-3	26528	13357	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A8	4B-3	24060	12962	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A9	4B-3	20851	11653	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A10	4B-3	19370	10828	20	7/10/2023 15:12	7/10/2023 15:32		
GAB Curve 0723	A11	4B-3	18104	10475	20	7/10/2023 14:49	7/10/2023 15:09		
GAB Curve 0723	A1	4B-4	72373	28628	20	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A2	4B-4	53340	22687	20	7/10/2023 12:25	7/10/2023 12:45		
GAB Curve 0723	A3	4B-4	44560	20550	20	7/10/2023 12:01	7/10/2023 12:21		
GAB Curve 0723	A4	4B-4	40110	18494	20	7/10/2023 11:27	7/10/2023 11:47		
GAB Curve 0723	A5	4B-4	34304	16099	20	7/10/2023 10:38	7/10/2023 10:58		

Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
GAB Curve 0723	B1	4A-1	257	122718	20	7/10/23 12:01	7/10/23 12:21	35.5%	0.21%
GAB Curve 0723	B2	4A-1	196	119208	20	7/10/23 11:27	7/10/23 11:47	39.0%	0.16%
GAB Curve 0723	B3	4A-1	242	118333	20	7/10/23 10:38	7/10/23 10:58	41.1%	0.20%
GAB Curve 0723	B4	4A-1	215	108494	20	7/10/23 10:12	7/10/23 10:32	42.7%	0.20%
GAB Curve 0723	B5	4A-1	198	107321	20	7/10/23 9:49	7/10/23 10:09	43.4%	0.18%
GAB Curve 0723	B6	4A-1	149	111127	20	7/11/23 9:18	7/11/23 9:38	46.7%	0.13%
GAB Curve 0723	B7	4A-1	169	106219	20	7/11/23 15:53	7/11/23 16:13	47.4%	0.16%
GAB Curve 0723	B9	4A-1	181	111147	20	7/11/23 14:53	7/11/23 15:13	49.2%	0.16%
GAB Curve 0723	B8	4A-1	158	106308	20	7/12/23 9:45	7/12/23 10:05	50.0%	0.15%
GAB Curve 0723	B10	4A-1	167	103005	20	7/11/23 14:29	7/11/23 14:49	54.0%	0.16%
GAB Curve 0723	B11	4A-1	209	111834	20	7/11/23 14:02	7/11/23 14:22	53.7%	0.19%
GAB Curve 0723	B1	4A-2	266	120832	20	7/10/23 12:25	7/10/23 12:45	38.2%	0.22%
GAB Curve 0723	B2	4A-2	267	118471	20	7/10/23 12:01	7/10/23 12:21	42.3%	0.23%
GAB Curve 0723	B3	4A-2	257	117093	20	7/10/23 11:27	7/10/23 11:47	44.4%	0.22%
GAB Curve 0723	B4	4A-2	199	106270	20	7/10/23 10:38	7/10/23 10:58	45.6%	0.19%
GAB Curve 0723	B5	4A-2	227	105342	20	7/10/23 10:12	7/10/23 10:32	47.4%	0.22%
GAB Curve 0723	B6	4A-2	172	110529	20	7/11/23 9:45	7/11/23 10:05	50.9%	0.16%
GAB Curve 0723	B7	4A-2	167	104020	20	7/11/23 9:18	7/11/23 9:38	51.1%	0.16%
GAB Curve 0723	B8	4A-2	203	106850	20	7/11/23 15:53	7/11/23 16:13	54.8%	0.19%
GAB Curve 0723	B9	4A-2	188	107365	20	7/12/23 9:45	7/12/23 10:05	56.4%	0.18%
GAB Curve 0723	B10	4A-2	181	101828	20	7/11/23 14:53	7/11/23 15:13	58.8%	0.18%
GAB Curve 0723	B11	4A-2	224	110065	20	7/11/23 14:29	7/11/23 14:49	57.5%	0.20%
GAB Curve 0723	B1	4A-3	188	119559	20	7/10/23 12:49	7/10/23 13:09	40.1%	0.16%
GAB Curve 0723	B2	4A-3	180	117255	20	7/10/23 12:25	7/10/23 12:45	40.6%	0.15%
GAB Curve 0723	B3	4A-3	157	116266	20	7/10/23 12:01	7/10/23 12:21	42.2%	0.14%
GAB Curve 0723	B4	4A-3	179	105955	20	7/10/23 11:27	7/10/23 11:47	43.7%	0.17%
GAB Curve 0723	B5	4A-3	158	104998	20	7/10/23 10:38	7/10/23 10:58	46.1%	0.15%
GAB Curve 0723	B6	4A-3	146	109912	20	7/11/23 10:08	7/11/23 10:28	49.2%	0.13%
GAB Curve 0723	B7	4A-3	119	103740	20	7/11/23 9:45	7/11/23 10:05	49.4%	0.11%
GAB Curve 0723	B8	4A-3	119	105327	20	7/11/23 9:18	7/11/23 9:38	51.7%	0.11%
GAB Curve 0723	B9	4A-3	176	108672	20	7/11/23 15:53	7/11/23 16:13	53.5%	0.16%
GAB Curve 0723	B10	4A-3	133	108527	20	7/12/23 9:45	7/12/23 10:05	55.3%	0.12%
GAB Curve 0723	B11	4A-3	174	109281	20	7/11/23 14:53	7/11/23 15:13	54.8%	0.16%
GAB Curve 0723	B1	4A-4	131	124024	20	7/10/23 13:13	7/10/23 13:33	40.0%	0.11%
GAB Curve 0723	B2	4A-4	113	121449	20	7/10/23 12:49	7/10/23 13:09	42.4%	0.09%
GAB Curve 0723	B3	4A-4	100	119285	20	7/10/23 12:25	7/10/23 12:45	45.4%	0.08%
GAB Curve 0723	B4	4A-4	88	107570	20	7/10/23 12:01	7/10/23 12:21	47.2%	0.08%
GAB Curve 0723	B5	4A-4	79	107648	20	7/10/23 11:27	7/10/23 11:47	48.7%	0.07%
GAB Curve 0723	B6	4A-4	77	112646	20	7/11/23 10:30	7/11/23 10:50	51.3%	0.07%
GAB Curve 0723	B7	4A-4	79	106043	20	7/11/23 10:08	7/11/23 10:28	53.5%	0.07%
GAB Curve 0723	B8	4A-4	86	109106	20	7/11/23 9:45	7/11/23 10:05	56.2%	0.08%
GAB Curve 0723	B9	4A-4	82	111052	20	7/11/23 9:18	7/11/23 9:38	59.6%	0.07%
GAB Curve 0723	B10	4A-4	99	104364	20	7/11/23 15:53	7/11/23 16:13	57.9%	0.09%
GAB Curve 0723	B11	4A-4	82	103973	20	7/12/23 9:45	7/12/23 10:05	59.5%	0.08%
GAB Curve 0723	B1	4B-1	413	122561	20	7/10/23 13:37	7/10/23 13:57	37.0%	0.34%
GAB Curve 0723	B2	4B-1	436	120729	20	7/10/23 13:13	7/10/23 13:33	40.4%	0.36%
GAB Curve 0723	B3	4B-1	401	118449	20	7/10/23 12:49	7/10/23 13:09	43.5%	0.34%
GAB Curve 0723	B4	4B-1	356	107871	20	7/10/23 12:25	7/10/23 12:45	43.7%	0.33%
GAB Curve 0723	B5	4B-1	328	107164	20	7/10/23 12:01	7/10/23 12:21	45.0%	0.31%
GAB Curve 0723	B6	4B-1	290	112184	20	7/11/23 10:53	7/11/23 11:13	47.7%	0.26%
GAB Curve 0723	B7	4B-1	266	106492	20	7/11/23 10:30	7/11/23 10:50	49.3%	0.25%
GAB Curve 0723	B8	4B-1	275	108979	20	7/11/23 10:08	7/11/23 10:28	52.2%	0.25%
GAB Curve 0723	B9	4B-1	303	111478	20	7/11/23 9:45	7/11/23 10:05	56.8%	0.27%
GAB Curve 0723	B10	4B-1	223	102841	20	7/11/23 9:18	7/11/23 9:38	54.9%	0.22%
GAB Curve 0723	B11	4B-1	383	112293	20	7/11/23 15:53	7/11/23 16:13	57.1%	0.34%
GAB Curve 0723	B1	4B-2	298	123901	20	7/10/23 14:00	7/10/23 14:20	37.7%	0.24%
GAB Curve 0723	B2	4B-2	244	121650	20	7/10/23 13:37	7/10/23 13:57	42.3%	0.20%
GAB Curve 0723	B3	4B-2	245	119372	20	7/10/23 13:13	7/10/23 13:33	44.6%	0.21%
GAB Curve 0723	B4	4B-2	220	108899	20	7/10/23 12:49	7/10/23 13:09	46.2%	0.20%
GAB Curve 0723	B5	4B-2	222	107792	20	7/10/23 12:25	7/10/23 12:45	46.6%	0.21%
GAB Curve 0723	B6	4B-2	189	112992	20	7/11/23 11:21	7/11/23 11:41	51.5%	0.17%
GAB Curve 0723	B7	4B-2	169	106309	20	7/11/23 10:53	7/11/23 11:13	50.8%	0.16%
GAB Curve 0723	B8	4B-2	183	109349	20	7/11/23 10:30	7/11/23 10:50	55.7%	0.17%
GAB Curve 0723	B9	4B-2	187	111485	20	7/11/23 10:08	7/11/23 10:28	55.9%	0.17%
GAB Curve 0723	B10	4B-2	173	104123	20	7/11/23 9:45	7/11/23 10:05	56.5%	0.17%
GAB Curve 0723	B11	4B-2	170	112773	20	7/11/23 9:18	7/11/23 9:38	58.2%	0.15%
GAB Curve 0723	B1	4B-3	385	122208	20	7/10/23 14:22	7/10/23 14:42	38.2%	0.32%
GAB Curve 0723	B2	4B-3	374	121489	20	7/10/23 14:00	7/10/23 14:20	40.9%	0.31%
GAB Curve 0723	B3	4B-3	367	119938	20	7/10/23 13:37	7/10/23 13:57	43.8%	0.31%
GAB Curve 0723	B4	4B-3	348	108934	20	7/10/23 13:13	7/10/23 13:33	44.6%	0.32%
GAB Curve 0723	B5	4B-3	322	107768	20	7/10/23 12:49	7/10/23 13:09	45.9%	0.30%
GAB Curve 0723	B6	4B-3	265	112901	20	7/11/23 11:52	7/11/23 12:12	50.0%	0.23%
GAB Curve 0723	B7	4B-3	269	106103	20	7/11/23 11:21	7/11/23 11:41	50.4%	0.25%
GAB Curve 0723	B8	4B-3	248	109424	20	7/11/23 10:53	7/11/23 11:13	53.9%	0.23%
GAB Curve 0723	B9	4B-3	273	110417	20	7/11/23 10:30	7/11/23 10:50	55.9%	0.25%
GAB Curve 0723	B10	4B-3	241	104414	20	7/11/23 10:08	7/11/23 10:28	55.9%	0.23%
GAB Curve 0723	B11	4B-3	285	112572	20	7/11/23 9:45	7/11/23 10:05	57.9%	0.25%
GAB Curve 0723	B1	4B-4	219	121034	20	7/10/23 14:49	7/10/23 15:09	39.6%	0.18%
GAB Curve 0723	B2	4B-4	247	118883	20	7/10/23 14:22	7/10/23 14:42	42.5%	0.21%
GAB Curve 0723	B3	4B-4	222	117568	20	7/10/23 14:00	7/10/23 14:20	46.1%	0.19%
GAB Curve 0723	B4	4B-4	199	106116	20	7/10/23 13:37	7/10/23 13:57	4	
GAB Curve 0723	B5	4B-4	177	106482	20	7/10/23 13:13	7/10/23 13:33	4	

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Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
GAB Curve 0723	A6	4B-4	28514	14807	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A7	4B-4	25474	13318	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A8	4B-4	23594	12981	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A9	4B-4	20261	11827	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A10	4B-4	18679	11108	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A11	4B-4	17344	10433	20	7/10/2023 15:12	7/10/2023 15:32		
GAB Curve 0723	A1	4C-1	73497	28480	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A2	4C-1	53864	22114	20	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A3	4C-1	44720	19816	20	7/10/2023 12:25	7/10/2023 12:45		
GAB Curve 0723	A4	4C-1	40860	17892	20	7/10/2023 12:01	7/10/2023 12:21		
GAB Curve 0723	A5	4C-1	34331	15794	20	7/10/2023 11:28	7/10/2023 11:48		
GAB Curve 0723	A6	4C-1	28722	14384	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A7	4C-1	26386	13065	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A8	4C-1	24334	13211	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A9	4C-1	20802	11561	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A10	4C-1	18844	10813	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A11	4C-1	17264	10274	20	7/10/2023 15:42	7/10/2023 16:02		
GAB Curve 0723	A1	4C-2	71264	29063	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A2	4C-2	53013	22412	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A3	4C-2	44171	20175	20	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A4	4C-2	40059	18840	20	7/10/2023 12:25	7/10/2023 12:45		
GAB Curve 0723	A5	4C-2	33641	16215	20	7/10/2023 12:01	7/10/2023 12:21		
GAB Curve 0723	A6	4C-2	28102	14979	20	7/10/2023 11:28	7/10/2023 11:48		
GAB Curve 0723	A7	4C-2	25693	13492	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A8	4C-2	22969	13645	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A9	4C-2	20375	11850	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A10	4C-2	17973	11311	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A11	4C-2	17480	10447	20	7/10/2023 16:07	7/10/2023 16:27		
GAB Curve 0723	A1	4C-3	76700	27805	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A2	4C-3	55962	22293	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A3	4C-3	46812	19402	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A4	4C-3	42422	17751	20	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A5	4C-3	36493	15591	20	7/10/2023 12:25	7/10/2023 12:45		
GAB Curve 0723	A6	4C-3	30592	14622	20	7/10/2023 12:01	7/10/2023 12:21		
GAB Curve 0723	A7	4C-3	26346	12626	20	7/10/2023 11:28	7/10/2023 11:48		
GAB Curve 0723	A8	4C-3	23784	12631	20	7/10/2023 10:38	7/10/2023 10:58		
GAB Curve 0723	A9	4C-3	21143	10894	20	7/10/2023 10:12	7/10/2023 10:32		
GAB Curve 0723	A10	4C-3	18798	10548	20	7/10/2023 9:49	7/10/2023 10:09		
GAB Curve 0723	A11	4C-3	17961	9729	20	7/10/2023 9:22	7/10/2023 9:42		
GAB Curve 0723	A1	4C-4	73717	28629	20	7/10/2023 14:22	7/10/2023 14:42		
GAB Curve 0723	A2	4C-4	53710	23307	20	7/10/2023 14:00	7/10/2023 14:20		
GAB Curve 0723	A3	4C-4	44837	20532	20	7/10/2023 13:37	7/10/2023 13:57		
GAB Curve 0723	A4	4C-4	40528	19025	20	7/10/2023 13:13	7/10/2023 13:33		
GAB Curve 0723	A5	4C-4	34114	16484	20	7/10/2023 12:49	7/10/2023 13:09		
GAB Curve 0723	A6	4C-4	28438	15379	20	7/10/23 12:25	7/10/23 12:45		
GAB Curve 0723	A7	4C-4	26209	13759	20	7/10/23 12:01	7/10/23 12:21		
GAB Curve 0723	A8	4C-4	23628	13596	20	7/10/23 11:28	7/10/23 11:48		
GAB Curve 0723	A9	4C-4	20942	11805	20	7/10/23 10:38	7/10/23 10:58		
GAB Curve 0723	A10	4C-4	18591	11068	20	7/10/23 10:12	7/10/23 10:32		
GAB Curve 0723	A11	4C-4	17746	10259	20	7/10/23 9:49	7/10/23 10:09		
GAB Curve 0723	A1	4D-1	75984	27070	20	7/10/23 14:49	7/10/23 15:09		
GAB Curve 0723	A2	4D-1	55942	21128	20	7/10/23 14:22	7/10/23 14:42		
GAB Curve 0723	A3	4D-1	46899	18621	20	7/10/23 14:00	7/10/23 14:20		
GAB Curve 0723	A4	4D-1	42473	17033	20	7/10/23 13:37	7/10/23 13:57		
GAB Curve 0723	A5	4D-1	36093	14887	20	7/10/23 13:14	7/10/23 13:34		
GAB Curve 0723	A6	4D-1	30682	13596	20	7/10/23 12:50	7/10/23 13:10		
GAB Curve 0723	A7	4D-1	27557	12281	20	7/10/23 12:25	7/10/23 12:45		
GAB Curve 0723	A8	4D-1	25159	12109	20	7/10/23 12:01	7/10/23 12:21		
GAB Curve 0723	A9	4D-1	22778	10524	20	7/10/23 11:28	7/10/23 11:48		
GAB Curve 0723	A10	4D-1	19891	10031	20	7/10/23 10:38	7/10/23 10:58		
GAB Curve 0723	A11	4D-1	19129	9260	20	7/10/23 10:12	7/10/23 10:32		
GAB Curve 0723	A1	4D-2	73384	29741	20	7/10/23 15:12	7/10/23 15:32		
GAB Curve 0723	A2	4D-2	54051	23805	20	7/10/23 14:49	7/10/23 15:09		
GAB Curve 0723	A3	4D-2	45802	21452	20	7/10/23 14:22	7/10/23 14:42		
GAB Curve 0723	A4	4D-2	40377	19342	20	7/10/23 14:00	7/10/23 14:20		
GAB Curve 0723	A5	4D-2	34208	17104	20	7/10/23 13:37	7/10/23 13:57		
GAB Curve 0723	A6	4D-2	28707	15751	20	7/10/23 13:14	7/10/23 13:34		
GAB Curve 0723	A7	4D-2	26173	13948	20	7/10/23 12:50	7/10/23 13:10		
GAB Curve 0723	A8	4D-2	23688	13616	20	7/10/23 12:25	7/10/23 12:45		
GAB Curve 0723	A9	4D-2	21001	12000	20	7/10/23 12:01	7/10/23 12:21		
GAB Curve 0723	A10	4D-2	18389	11574	20	7/10/23 11:28	7/10/23 11:48		
GAB Curve 0723	A11	4D-2	17846	10997	20	7/10/23 10:38	7/10/23 10:58		
GAB Curve 0723	A1	4D-3	72263	29317	20	7/10/23 15:42	7/10/23 16:02		
GAB Curve 0723	A2	4D-3	52525	23416	20	7/10/23 15:12	7/10/23 15:32		
GAB Curve 0723	A3	4D-3	44698	21035	20	7/10/23 14:49	7/10/23 15:09		
GAB Curve 0723	A4	4D-3	39471	19435	20	7/10/23 14:22	7/10/23 14:42		
GAB Curve 0723	A5	4D-3	33850	16385	20	7/10/23 14:00	7/10/23 14:20		
GAB Curve 0723	A6	4D-3	28075	15367	20	7/10/23 13:37	7/10/23 13:57		
GAB Curve 0723	A7	4D-3	25639	13736	20	7/10/23 13:14	7/10/23 13:34		
GAB Curve 0723	A8	4D-3	22998	13714	20	7/10/23 12:50	7/10/23 13:10		
GAB Curve 0723	A9	4D-3	20775	12078	20	7/10/23 12:25	7/10/23 12:45		
GAB Curve 0723	A10	4D-3	18246	11638	20	7/10/23 12:01	7/10/23 12:21		

Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
GAB Curve 0723	B6	4B-4	195	110957	20	7/11/23 12:16	7/11/23 12:36	51.9%	0.18%
GAB Curve 0723	B7	4B-4	152	104855	20	7/11/23 11:52	7/11/23 12:12	52.3%	0.14%
GAB Curve 0723	B8	4B-4	166	107496	20	7/11/23 11:21	7/11/23 11:41	55.0%	0.15%
GAB Curve 0723	B9	4B-4	177	110359	20	7/11/23 10:53	7/11/23 11:13	58.4%	0.16%
GAB Curve 0723	B10	4B-4	139	102029	20	7/11/23 10:30	7/11/23 10:50	59.5%	0.14%
GAB Curve 0723	B11	4B-4	173	110025	20	7/11/23 10:08	7/11/23 10:28	60.2%	0.16%
GAB Curve 0723	B1	4C-1	404	120238	20	7/10/23 15:12	7/10/23 15:32	38.7%	0.34%
GAB Curve 0723	B2	4C-1	409	121373	20	7/10/23 14:49	7/10/23 15:09	41.1%	0.34%
GAB Curve 0723	B3	4C-1	348	115931	20	7/10/23 14:22	7/10/23 14:42	44.3%	0.30%
GAB Curve 0723	B4	4C-1	303	106318	20	7/10/23 14:00	7/10/23 14:20	43.8%	0.28%
GAB Curve 0723	B5	4C-1	316	107755	20	7/10/23 13:37	7/10/23 13:57	46.0%	0.29%
GAB Curve 0723	B6	4C-1	246	110307	20	7/11/23 12:47	7/11/23 13:07	50.1%	0.22%
GAB Curve 0723	B7	4C-1	271	105379	20	7/11/23 12:16	7/11/23 12:36	49.5%	0.26%
GAB Curve 0723	B8	4C-1	211	106257	20	7/11/23 11:52	7/11/23 12:12	54.3%	0.20%
GAB Curve 0723	B9	4C-1	283	109038	20	7/11/23 11:21	7/11/23 11:41	55.6%	0.26%
GAB Curve 0723	B10	4C-1	238	102374	20	7/11/23 10:54	7/11/23 11:14	57.4%	0.23%
GAB Curve 0723	B11	4C-1	237	110622	20	7/11/23 10:30	7/11/23 10:50	59.5%	0.21%
GAB Curve 0723	B1	4C-2	59	118892	20	7/10/23 15:42	7/10/23 16:02	40.8%	0.05%
GAB Curve 0723	B2	4C-2	60	117641	20	7/10/23 15:12	7/10/23 15:32	42.3%	0.05%
GAB Curve 0723	B3	4C-2	60	114808	20	7/10/23 14:49	7/10/23 15:09	45.7%	0.05%
GAB Curve 0723	B4	4C-2	50	105042	20	7/10/23 14:22	7/10/23 14:42	47.0%	0.05%
GAB Curve 0723	B5	4C-2	39	104412	20	7/10/23 14:00	7/10/23 14:20	48.2%	0.04%
GAB Curve 0723	B6	4C-2	31	108725	20	7/11/23 13:09	7/11/23 13:29	53.3%	0.03%
GAB Curve 0723	B7	4C-2	40	103258	20	7/11/23 12:47	7/11/23 13:07	52.5%	0.04%
GAB Curve 0723	B8	4C-2	39	104474	20	7/11/23 12:16	7/11/23 12:36	59.4%	0.04%
GAB Curve 0723	B9	4C-2	36	107094	20	7/11/23 11:52	7/11/23 12:12	58.2%	0.03%
GAB Curve 0723	B10	4C-2	28	100662	20	7/11/23 11:21	7/11/23 11:41	62.9%	0.03%
GAB Curve 0723	B11	4C-2	39	107483	20	7/11/23 10:54	7/11/23 11:14	59.8%	0.04%
GAB Curve 0723	B1	4C-3	373	119357	20	7/10/23 16:07	7/10/23 16:27	36.3%	0.31%
GAB Curve 0723	B2	4C-3	375	118773	20	7/10/23 15:42	7/10/23 16:02	39.8%	0.32%
GAB Curve 0723	B3	4C-3	332	116913	20	7/10/23 15:12	7/10/23 15:32	41.4%	0.28%
GAB Curve 0723	B4	4C-3	299	105993	20	7/10/23 14:49	7/10/23 15:09	41.8%	0.28%
GAB Curve 0723	B5	4C-3	298	105742	20	7/10/23 14:22	7/10/23 14:42	42.7%	0.28%
GAB Curve 0723	B6	4C-3	277	109967	20	7/11/23 13:37	7/11/23 13:57	47.8%	0.25%
GAB Curve 0723	B7	4C-3	241	103367	20	7/11/23 13:09	7/11/23 13:29	47.9%	0.23%
GAB Curve 0723	B8	4C-3	269	107299	20	7/11/23 12:47	7/11/23 13:07	53.1%	0.25%
GAB Curve 0723	B9	4C-3	256	108685	20	7/11/23 12:16	7/11/23 12:36	51.5%	0.24%
GAB Curve 0723	B10	4C-3	224	101794	20	7/11/23 11:52	7/11/23 12:12	56.1%	0.22%
GAB Curve 0723	B11	4C-3	246	111038	20	7/11/23 11:21	7/11/23 11:41	54.2%	0.22%
GAB Curve 0723	B1	4C-4	244	119219	20	7/10/23 9:22	7/10/23 9:42	38.8%	0.20%
GAB Curve 0723	B2	4C-4	241	118669	20	7/10/23 16:07	7/10/23 16:27	43.4%	0.20%
GAB Curve 0723	B3	4C-4	248	116160	20	7/10/23 15:42	7/10/23 16:02	45.8%	0.21%
GAB Curve 0723	B4	4C-4	215	105766	20	7/10/23 15:12	7/10/23 15:32	46.9%	0.20%
GAB Curve 0723	B5	4C-4	207	105649	20	7/10/23 14:49	7/10/23 15:09	48.3%	0.20%
GAB Curve 0723	B6	4C-4	191	110388	20	7/11/23 14:02	7/11/23 14:22	54.1%	0.17%
GAB Curve 0723	B7	4C-4	183	103893	20	7/11/23 13:37	7/11/23 13:57	52.5%	0.18%
GAB Curve 0723	B8	4C-4	154	106470	20	7/11/23 13:09	7/11/23 13:29	57.5%	0.14%
GAB Curve 0723	B9	4C-4	223	109621	20	7/11/23 12:47	7/11/23 13:07	56.4%	0.20%
GAB Curve 0723	B10	4C-4	169	102724	20	7/11/23 12:16	7/11/23 12:36	59.5%	0.16%
GAB Curve 0723	B11	4C-4	172	109625	20	7/11/23 11:52	7/11/23 12:12	57.8%	0.16%
GAB Curve 0723	B1	4D-1	1044	120439	20	7/10/23 9:49	7/10/23 10:09	35.6%	0.87%
GAB Curve 0723	B2	4D-1	927	119347	20	7/10/23 9:22	7/10/23 9:42	37.8%	0.78%
GAB Curve 0723	B3	4D-1	919	116596	20	7/10/23 16:08	7/10/23 16:28	39.7%	0.79%
GAB Curve 0723	B4	4D-1	840	107998	20	7/10/23 15:42	7/10/23 16:02	40.1%	0.78%
GAB Curve 0723	B5	4D-1	847	107353	20	7/10/23 15:12	7/10/23 15:32	41.2%	0.79%
GAB Curve 0723	B6	4D-1	836	111369	20	7/11/23 14:29	7/11/23 14:49	44.3%	0.75%
GAB Curve 0723	B7	4D-1	749	104292	20	7/11/23 14:02	7/11/23 14:22	44.6%	0.72%
GAB Curve 0723	B8	4D-1	727	107560	20	7/11/23 13:37	7/11/23 13:57	48.1%	0.68%
GAB Curve 0723	B9	4D-1	698	109846	20	7/11/23 13:09	7/11/23 13:29	46.2%	0.64%
GAB Curve 0723	B10	4D-1	724	103274	20	7/11/23 12:47	7/11/23 13:07	50.4%	0.70%
GAB Curve 0723	B11	4D-1	741	111216	20	7/11/23 12:16	7/11/23 12:36	48.4%	0.67%
GAB Curve 0723	B1	4D-2	155	121868	20	7/10/23 10:12	7/10/23 10:32	40.5%	0.13%
GAB Curve 0723	B2	4D-2	134	120517	20	7/10/23 9:49	7/10/23 10:09	44.0%	0.11%
GAB Curve 0723	B3	4D-2	109	120062	20	7/10/23 9:22	7/10/23 9:42	46.8%	0.09%
GAB Curve 0723	B4	4D-2	112	109207	20	7/10/23 16:08	7/10/23 16:28	47.9%	0.10%
GAB Curve 0723	B5	4D-2	112	108713	20	7/10/23 15:42	7/10/23 16:02	50.0%	0.10%
GAB Curve 0723	B6	4D-2	93	113385	20	7/11/23 14:53	7/11/23 15:13	54.9%	0.08%
GAB Curve 0723	B7	4D-2	78	107415	20	7/11/23 14:29	7/11/23 14:49	53.3%	0.07%
GAB Curve 0723	B8	4D-2	81	109973	20	7/11/23 14:02	7/11/23 14:22	57.5%	0.07%
GAB Curve 0723	B9	4D-2	109	111976	20	7/11/23 13:37	7/11/23 13:57	57.1%	0.10%
GAB Curve 0723	B10	4D-2	84	104233	20	7/11/23 13:09	7/11/23 13:29	62.9%	0.08%
GAB Curve 0723	B11	4D-2	100	112171	20	7/11/23 12:47	7/11/23 13:07	61.6%	0.09%
GAB Curve 0723	B1	4D-3	75	119587	20	7/10/23 10:38	7/10/23 10:58	40.6%	0.06%
GAB Curve 0723	B2	4D-3	103	118385	20	7/10/23 10:12	7/10/23 10:32	44.6%	0.09%
GAB Curve 0723	B3	4D-3	109	116461	20	7/10/23 9:49	7/10/23 10:09	47.1%	0.09%
GAB Curve 0723	B4	4D-3	88	107237	20	7/10/23 9:22	7/10/23 9:42	49.2%	0.08%
GAB Curve 0723	B5	4D-3	77	106195	20	7/10/23 16:08	7/10/23 16:28	48.4%	0.07%
GAB Curve 0723	B6	4D-3	86	110850	20	7/11/23 15:31	7/11/23 15:51	54.7%	0.08%
GAB Curve 0723	B7	4D-3	84	104511	20	7/11/23 14:53	7/11/23 15:13	53.6%	0.08%
GAB Curve 0723	B8	4D-3	65	107090	20	7/11/23 14:29	7/11/23 14:49	59.6%	0.06%
GAB Curve 0723	B9	4D-3	67	109714	20	7/11/23 14:02	7/11/23 14:22	5	
GAB Curve 0723	B10	4D-3	58	101357	20	7/11/23 13:37	7/11/23 13:57	6	

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Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time
GAB Curve 0723	A11	4D-3	17471	10988	20	7/10/23 11:28	7/10/23 11:48
GAB Curve 0723	A1	4D-4	73050	28858	20	7/10/23 16:08	7/10/23 16:28
GAB Curve 0723	A2	4D-4	53155	23485	20	7/10/23 15:42	7/10/23 16:02
GAB Curve 0723	A3	4D-4	45254	21138	20	7/10/23 15:12	7/10/23 15:32
GAB Curve 0723	A4	4D-4	40256	18904	20	7/10/23 14:49	7/10/23 15:09
GAB Curve 0723	A5	4D-4	34661	16571	20	7/10/23 14:22	7/10/23 14:42
GAB Curve 0723	A6	4D-4	28895	15470	20	7/10/23 14:00	7/10/23 14:20
GAB Curve 0723	A7	4D-4	26081	13664	20	7/10/23 13:37	7/10/23 13:57
GAB Curve 0723	A8	4D-4	23950	13590	20	7/10/23 13:14	7/10/23 13:34
GAB Curve 0723	A9	4D-4	20966	11926	20	7/10/23 12:50	7/10/23 13:10
GAB Curve 0723	A10	4D-4	18897	11576	20	7/10/23 12:25	7/10/23 12:45
GAB Curve 0723	A11	4D-4	17942	10596	20	7/10/23 12:01	7/10/23 12:21

Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
GAB Curve 0723	B11	4D-3	59	110618	20	7/11/23 13:09	7/11/23 13:29	62.9%	0.05%
GAB Curve 0723	B1	4D-4	80	119311	20	7/10/23 11:28	7/10/23 11:48	39.5%	0.07%
GAB Curve 0723	B2	4D-4	79	117792	20	7/10/23 10:38	7/10/23 10:58	44.2%	0.07%
GAB Curve 0723	B3	4D-4	85	116234	20	7/10/23 10:12	7/10/23 10:32	46.7%	0.07%
GAB Curve 0723	B4	4D-4	87	105666	20	7/10/23 9:49	7/10/23 10:09	47.0%	0.08%
GAB Curve 0723	B5	4D-4	83	104731	20	7/10/23 9:22	7/10/23 9:42	47.8%	0.08%
GAB Curve 0723	B6	4D-4	60	109670	20	7/11/23 15:53	7/11/23 16:13	53.5%	0.05%
GAB Curve 0723	B7	4D-4	62	104026	20	7/11/23 15:31	7/11/23 15:51	52.4%	0.06%
GAB Curve 0723	B8	4D-4	60	105842	20	7/11/23 14:53	7/11/23 15:13	56.7%	0.06%
GAB Curve 0723	B9	4D-4	63	108193	20	7/11/23 14:29	7/11/23 14:49	56.9%	0.06%
GAB Curve 0723	B10	4D-4	55	100640	20	7/11/23 14:02	7/11/23 14:22	61.3%	0.05%
GAB Curve 0723	B11	4D-4	64	109837	20	7/11/23 13:37	7/11/23 13:57	59.1%	0.06%

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DATE 7/10/2023

alpha **11230 dpm** source 22I13361

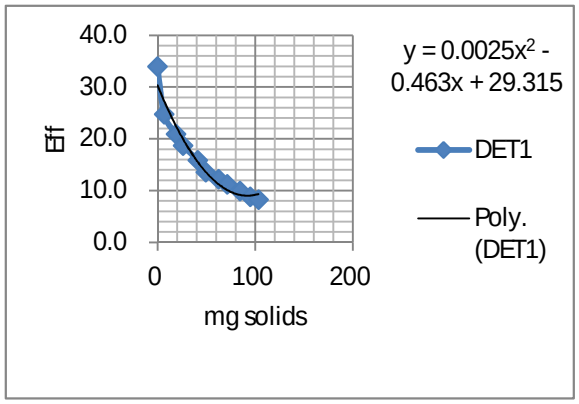
Tare (g)	Gross (g)	Net (mg)	4A-1	4A-2	4A-3	4A-4	4B-1	4B-2	4B-3	4B-4	4C-1	4C-2	4C-3	4C-4	4D-1	4D-2	4D-3	4D-4
7.71754	7.71755	0.01	76268	74240	74275	73630	74928	74889	74479	72373	73497	71264	76700	73717	75984	73384	72263	73050
7.74121	7.74786	6.65	55585	54031	54808	54632	54981	54025	54585	53340	53864	53013	55962	53710	55942	54051	52525	53155
7.77283	7.79170	18.87	46984	45403	46626	46127	46320	46030	45491	44560	44720	44171	46812	44837	46899	45802	44698	45254
7.79024	7.81627	26.03	41979	40899	42056	40471	41635	40699	40901	40110	40860	40059	42422	40528	42473	40377	39471	40256
7.71594	7.75704	41.1	35635	34409	35105	34405	35362	34881	34812	34304	34331	33641	36493	34114	36093	34208	33850	34661
7.74888	7.79815	49.27	30411	29410	29796	29593	30053	28926	29553	28514	28722	28102	30592	28438	30682	28707	28075	28895
7.73098	7.79330	62.32	27387	26324	26814	26247	26679	26350	26528	25474	26386	25693	26346	26209	27557	26173	25639	26081
7.77892	7.85031	71.39	25232	24042	24889	24173	24636	24045	24060	23594	24334	22969	23784	23628	25159	23688	22998	23950
7.72424	7.80867	84.43	22239	20797	21587	20941	21043	20895	20851	20261	20802	20375	21143	20942	22778	21001	20775	20966
7.75096	7.84600	95.04	19780	18939	19666	19385	19939	19647	19370	18679	18844	17973	18798	18591	19891	18389	18246	18897
7.77419	7.87751	103.32	18534	18006	18531	18194	18287	18044	18104	17344	17264	17480	17961	17746	19129	17846	17471	17942

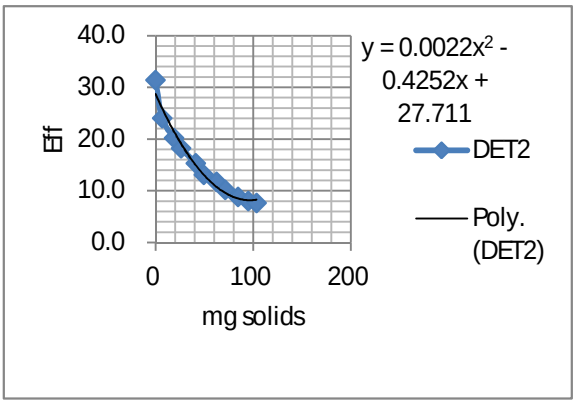
beta **12270 dpm** source ESC51613

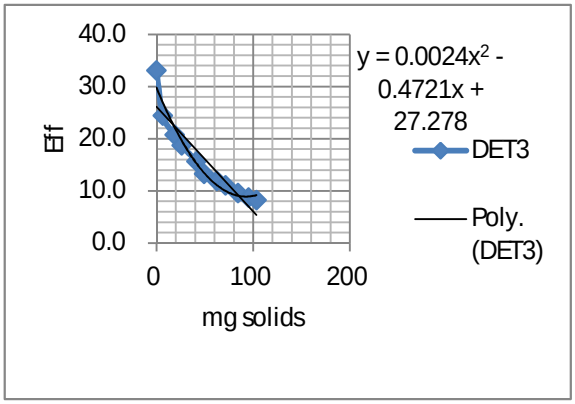
Tare (g)	Gross (g)	Net (mg)	4A-1	4A-2	4A-3	4A-4	4B-1	4B-2	4B-3	4B-4	4C-1	4C-2	4C-3	4C-4	4D-1	4D-2	4D-3	4D-4
7.77164	7.77164	0	122718	120832	119559	124024	122561	123901	122208	121034	120238	118892	119357	119219	120439	121868	119587	119311
7.75553	7.76486	9.33	119208	118471	117255	121449	120729	121650	121489	118883	121373	117641	118773	118669	119347	120517	118385	117792
7.75293	7.77293	20	118333	117093	116266	119285	118449	119372	119938	117568	115931	114808	116913	116160	116596	120062	116461	116234
7.7343	7.76424	29.94	111834	110065	109281	103973	112293	112773	112572	110025	110622	107483	111038	109625	111216	112171	110618	109837
7.78711	7.82773	40.62	111127	110529	109912	112646	112184	112992	112901	110957	110307	108725	109967	110388	111369	113385	110850	109670
7.81054	7.86505	54.51	111147	106850	105327	109106	108979	109349	109424	107496	106257	104474	107299	106470	107560	109973	107090	105842
7.70802	7.77341	65.39	108494	106270	105955	107570	107871	108899	108934	106116	106318	105042	105993	105766	107998	109207	107237	105666
7.74763	7.82409	76.46	107321	105342	104998	107648	107164	107792	107768	106482	107755	104412	105742	105649	107353	108713	106195	104731
7.75965	7.84626	86.61	106308	107365	108672	111052	111478	111485	110417	110359	109038	107094	108685	109621	109846	111976	109714	108193
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7.7624	7.87210	109.7	103005	101828	108527	104364	102841	104123	104414	102029	102374	100662	101794	102724	103274	104233	101357	100640

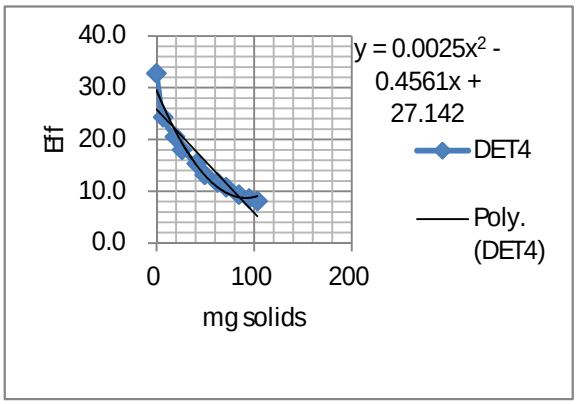
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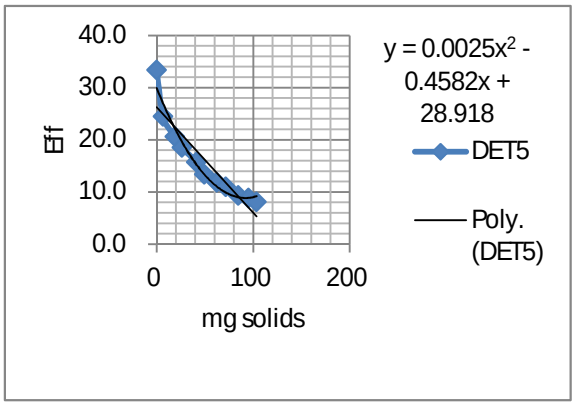
ALPHA SELF ABSORPTION CURVE

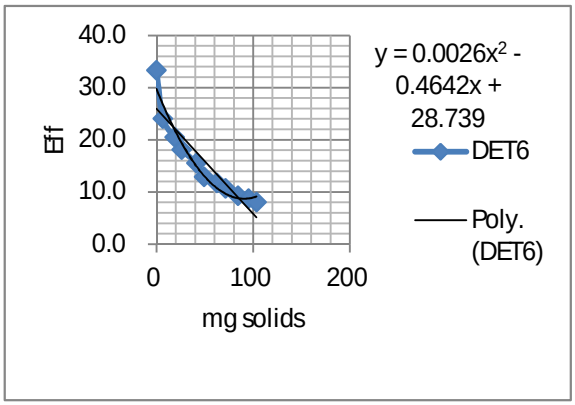


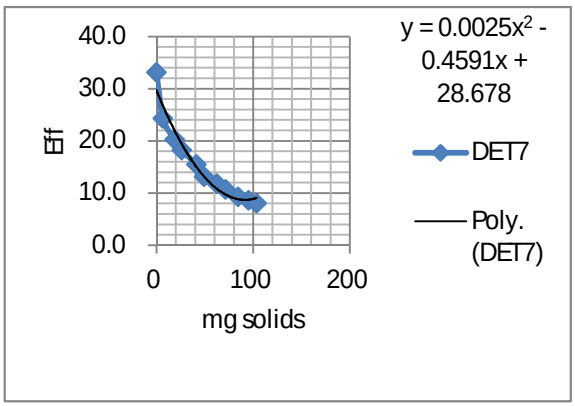


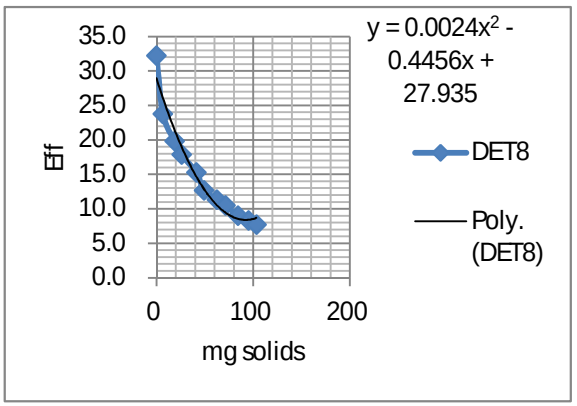






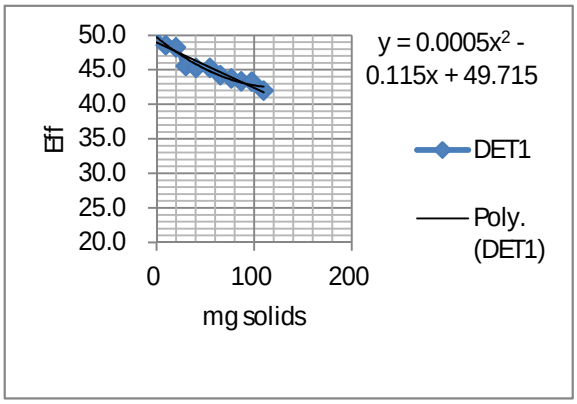


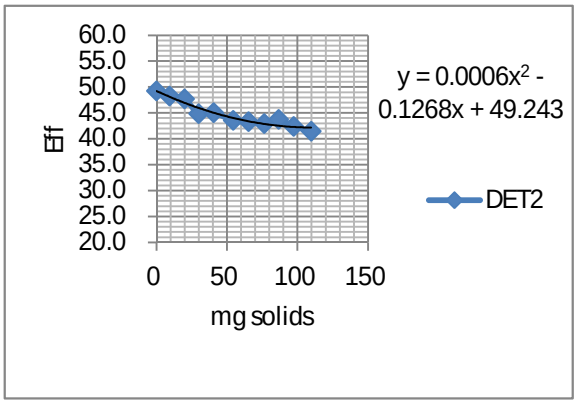


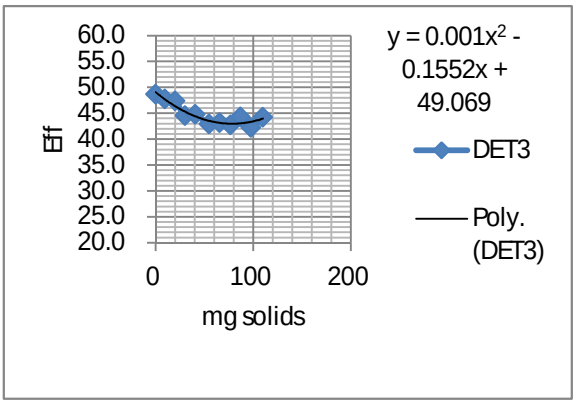


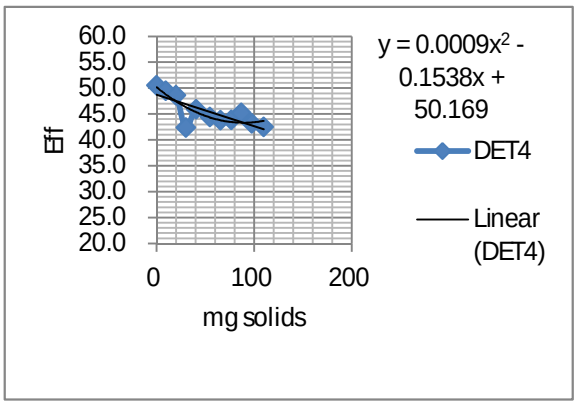
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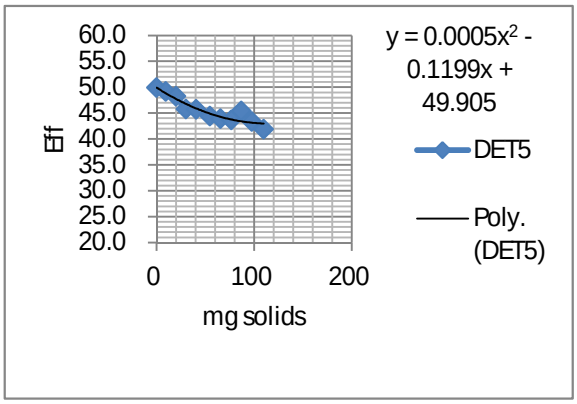
BETA SELF ABSORPTION CURVE

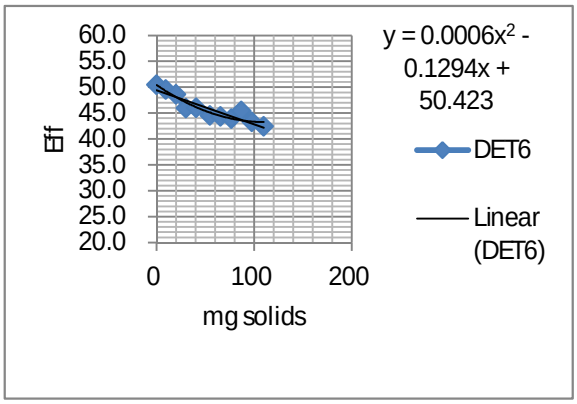


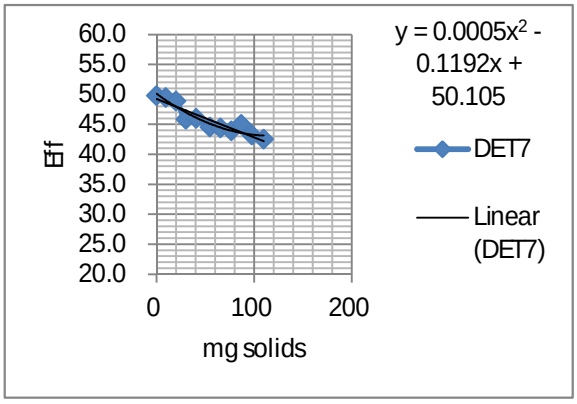


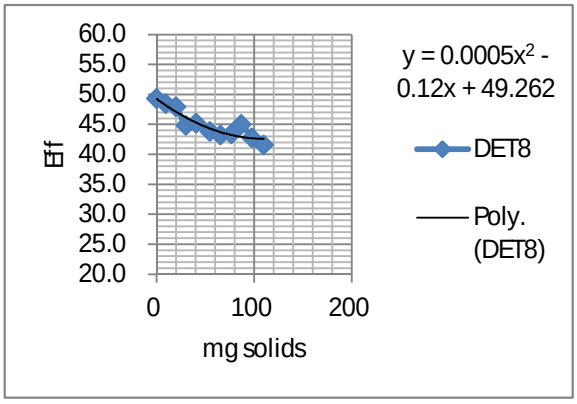






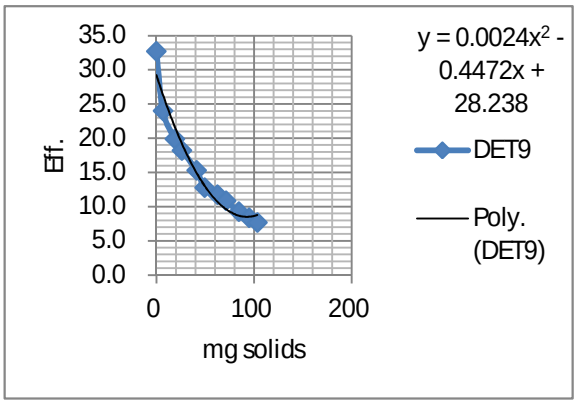


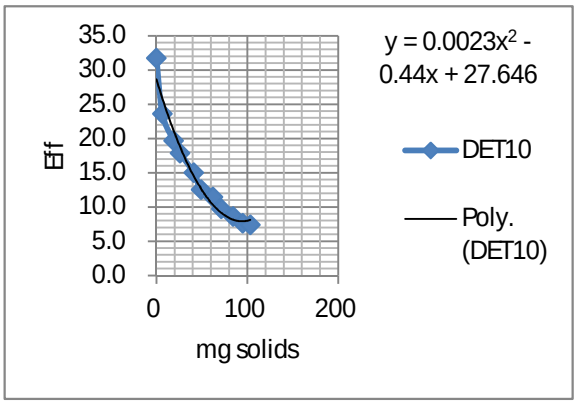


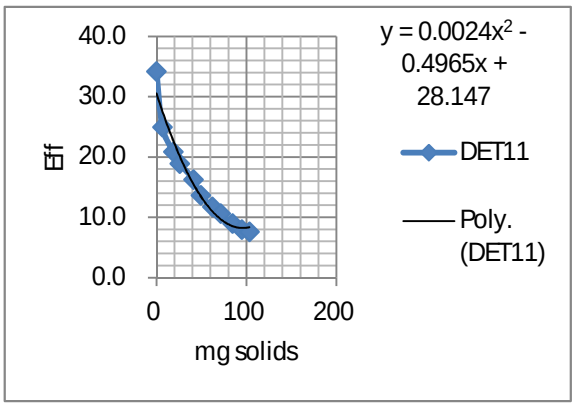


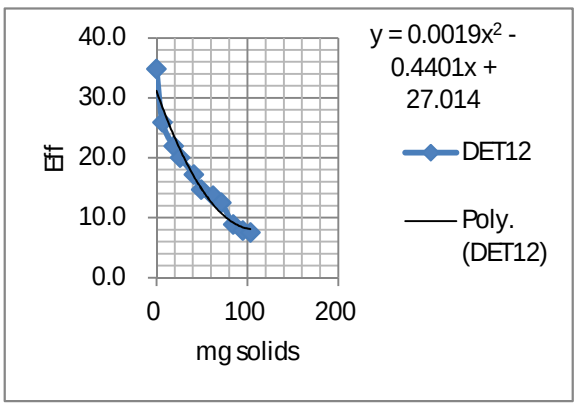
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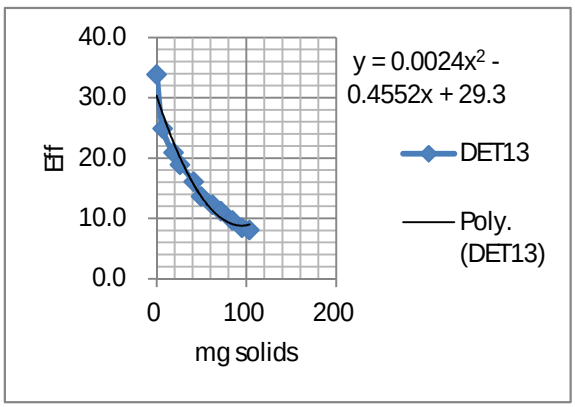
ALPHA SELF ABSORPTION CURVE

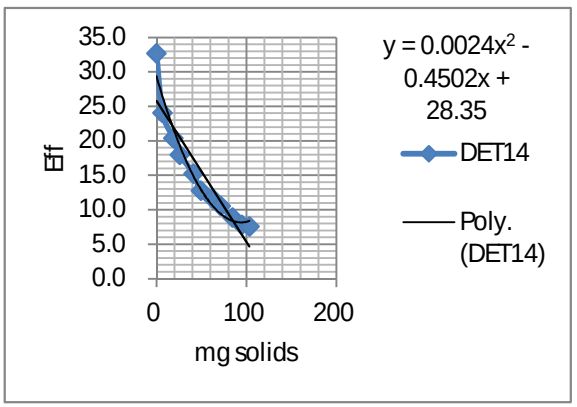


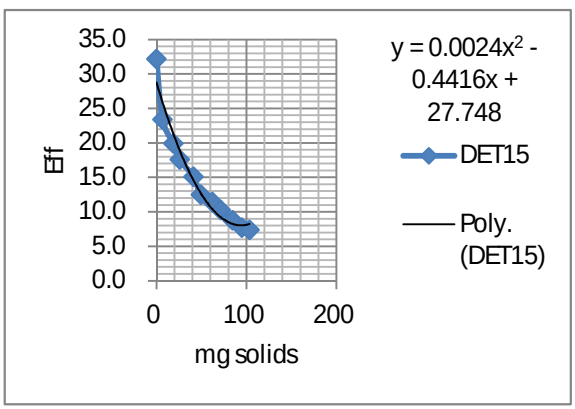


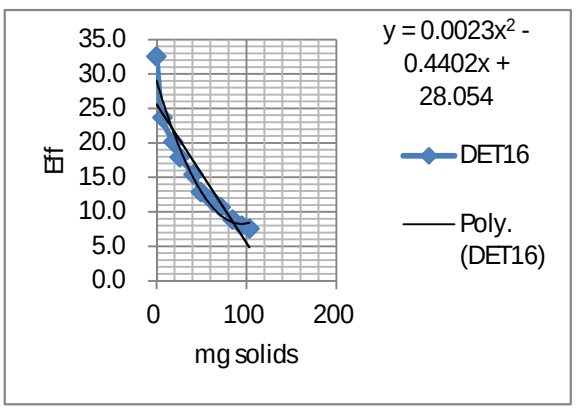






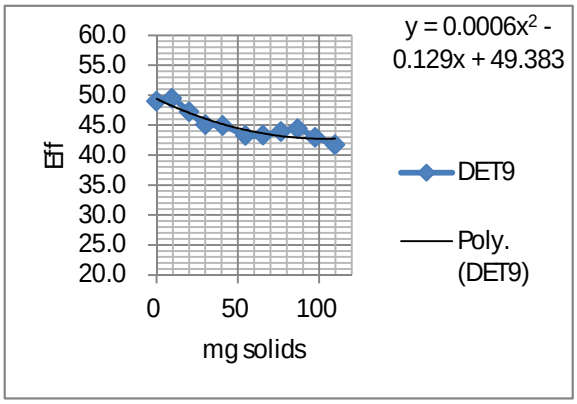


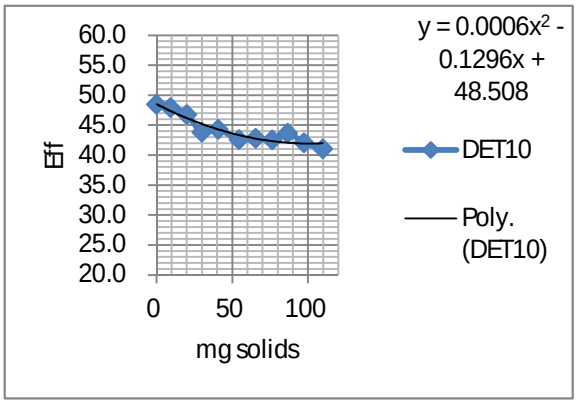


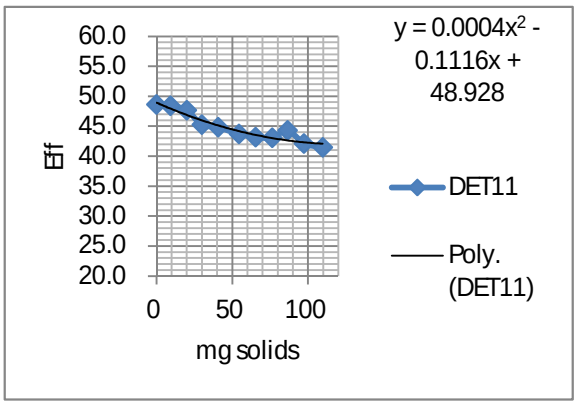


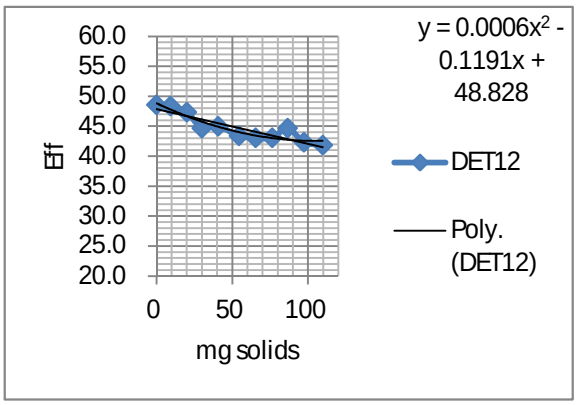
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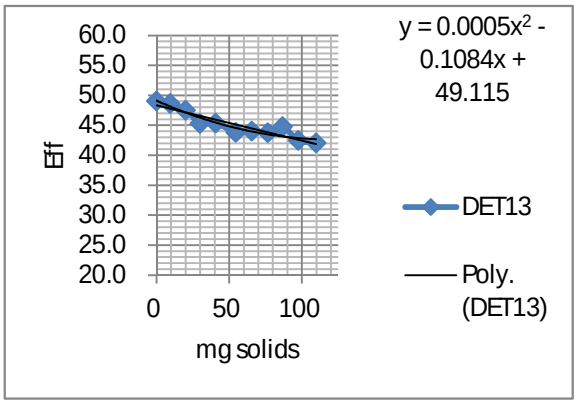
BETA SELF ABSORPTION CURVE

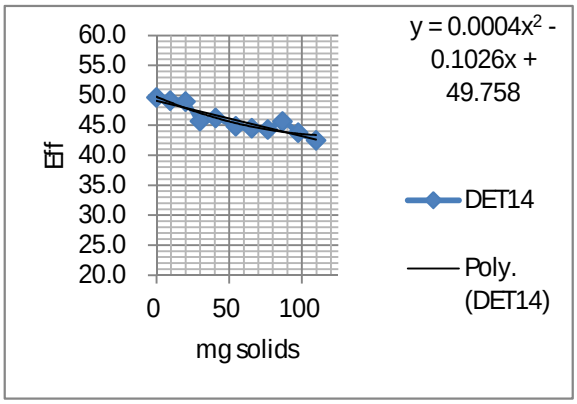


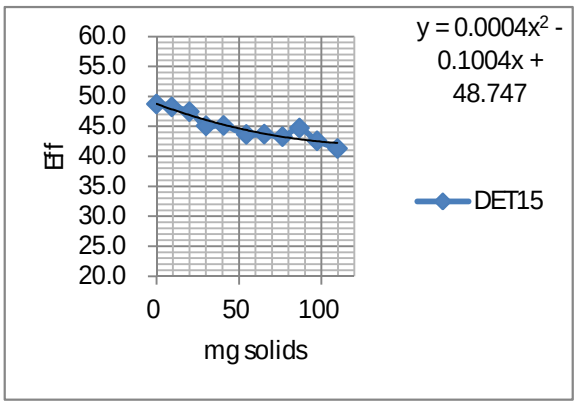


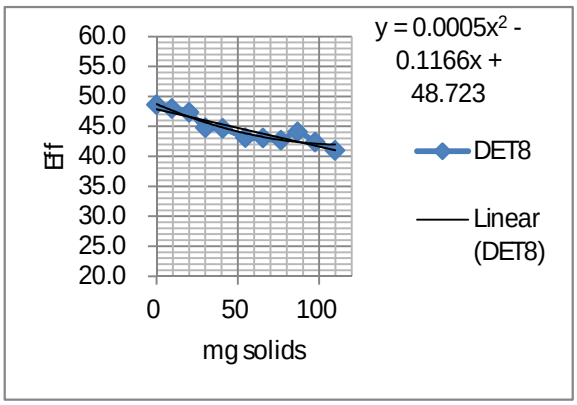












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DECAY CALCUALTION

Th230 Source
124007
ESC51614
22I13361

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 25-Aug-22
DATE OF CALIBRATION 10-Jul-23

Ao =	1011.73	nCi	
N =	0.00		
T(1/2) =	77000.00	years	28105000
T =	0.88	years	
dilution =	1000.00		
A =	1011.72	nCi	
A =	2246.03	dpm/ml	
A =	1011.72	pCi/ml	

Uncertainty	3.16%
Weight	0.05%
Volume	0.03%
CSU	3.16%

					pCi/l
Activity	**1011.7**	**+/-**	**32.0**	**pCi/ml**	1011725

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DECAY CALCUALTION

Sr-90
124007
ESC51613

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	25-Aug-22
DATE OF CALIBRATION	10-Jul-23
PREP:	13-Sep-22

Ao =	940.91	nCi
N =	0.02	
T(1/2) =	28.60	years
T =	0.87	years
dilution =	1000.00	

A =	921.20	nCi	SR90/Y90		
A =	2045.07	dpm/ml	4090.138	409.014	
A =	921.20	pCi/ml	1842.404		
A =	921.20	+/-	16.59545	pCi/ml	4090.137749

12270.41325

Uncertainty	0.0173
Weight	0.05%
Volume (1000 ml)	0.50%

CSU 1.80%

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View as PDF (CreatePDF?batchnum=WG2149205)

Gross Alpha/Beta Aqueous Radiochemistry Prep Benchsheet

Batch: WG2149205

Analyst: ALG3788 Prep Start Date/Time: 10/13/23 13:02-13:04 Prep End Date/Time: 10/21/23 13:39-10/30/23 10:18 Method: 900/900M SOP: ENV-SOP-MTJL-0302/327 Pipet ID: E-33, E-31 Bal ID: RADBAL3
Hot Plate ID's: G93, G71 Oven ID: O1

Gross Alpha spike: 23F19100 Amt. Used: 2 mL Exp. Date:06/19/33 Gross Beta Spike: 23E17275 Amt. Used: 1 mL Exp. Date:05/17/24 Nitric Acid: 23J02135 Amt. Used: 28 mL Exp. Date:04/02/24

Sample Number	Matrix	Sample Vol (mL)	Planchet Tare Wt (g)	Planchet Gross Wt (g)	Planchet Net Wt (g)	Review Analyst	Review Date
BLANK		200	7.58053	7.58263	0.0021	SNR961	10/30/23 10:18:04
LCS		200	7.59264	7.60150	0.00886	SNR961	10/30/23 10:18:04
MS(L1658999-02)		200	7.61391	7.67830	0.06439	SNR961	10/30/23 10:18:04
MSD(L1658999-02)		200	7.66417	7.72369	0.05952	SNR961	10/30/23 10:18:04
DUP(L1658573-13)		200	7.60038	7.64813	0.04775	SNR961	10/30/23 10:18:04
1. L1658573-12	NPW	180	7.62057	7.65365	0.03308	SNR961	10/30/23 10:18:04
2. L1658573-13	NPW	200	7.63025	7.68197	0.05172	SNR961	10/30/23 10:18:04
3. L1658573-14	NPW	88	7.62078	7.66337	0.04259	SNR961	10/30/23 10:18:04
4. L1658573-15	NPW	118	7.58906	7.61730	0.02824	SNR961	10/30/23 10:18:04
5. L1658573-16	NPW	200	7.62134	7.65305	0.03171	SNR961	10/30/23 10:18:04
6. L1658573-17	NPW	130	7.58952	7.64270	0.05318	SNR961	10/30/23 10:18:04
7. L1658573-18	NPW	200	7.57589	7.62270	0.04681	SNR961	10/30/23 10:18:04
8. L1658573-19	NPW	200	7.55084	7.56915	0.01831	SNR961	10/30/23 10:18:04
9. L1658573-20	NPW	200	7.60992	7.66822	0.0583	SNR961	10/30/23 10:18:04
10. L1658573-21	NPW	25	7.62114	7.72023	0.09909	SNR961	10/30/23 10:18:04
11. L1658573-22	NPW	200	7.60001	7.64950	0.04949	SNR961	10/30/23 10:18:04
12. L1658573-23	NPW	186	7.58699	7.59211	0.00512	SNR961	10/30/23 10:18:04
13. L1658573-24	NPW	200	7.61729	7.61034	-0.00695	SNR961	10/30/23 10:18:04
14. L1658731-01	NPW	14	7.58294	7.67280	0.08986	SNR961	10/30/23 10:18:04
15. L1658999-01	NPW	136	7.61041	7.64037	0.02996	SNR961	10/30/23 10:18:04
16. L1658999-02	NPW	200	7.60266	7.65818	0.05552	SNR961	10/30/23 10:18:04
17. L1658999-03	NPW	116	7.61120	7.64120	0.03	SNR961	10/30/23 10:18:04
18. L1658999-04	NPW	25	7.59820	7.66712	0.06892	SNR961	10/30/23 10:18:04
19. L1658999-06	NPW	1	7.61039	7.67747	0.06708	SNR961	10/30/23 10:18:04
20. L1658999-07	NPW	1	7.61032	7.66772	0.0574	SNR961	10/30/23 10:18:04

Comments:
Gross Alpha Waters// NPW and DWLot #s for Miscellaneous materials used to for this sample prep process:1) Manual Pipette tip (5-10 mL)/// Lot # 2301.512352) Auto Pipette tip (5 mL) // Batch # 2250

Reviewed By:SNR961 on 10/30/23 10:18:04

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G542 Run Log Gross Alpha/Beta Waters WG2149205

Sample Order Verified by SNR961

Sample ID	Alpha	Beta	LT	Det	Analyst	Start	End	
BLANK WG2149205	41	268	200	4A-1	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
LCS WG2149205	311	2297	200	4A-2	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
MS L1658999-02 WG2149205	283	2230	200	4A-3	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
MSD L1658999-02 WG2149205	276	2252	200	4A-4	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
DUP L1658573-13 WG2149205	80	628	200	4C-1	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658573-12 WG2149205	46	536	200	4B-2	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
L1658573-13 WG2149205	114	661	200	4B-3	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
L1658573-14 WG2149205	51	562	200	4B-4	ALG3788	10/16/2023 21:37	10/17/2023 0:57	
L1658573-15 WG2149205	71	586	200	4C-1	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-16 WG2149205	59	489	200	4C-2	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-17 WG2149205	78	504	200	4C-3	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-18 WG2149205	57	435	200	4C-4	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-19 WG2149205	93	490	200	4D-1	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-20 WG2149205	78	414	200	4D-3	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-21 WG2149205	28	758	200	4D-4	ALG3788	10/16/2023 21:38	10/17/2023 0:58	
L1658573-22 WG2149205	34	374	200	4C-2	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658573-23 WG2149205	27	356	200	4C-3	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658573-24 WG2149205	88	4134	200	4C-4	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658731-01 WG2149205	63	318	200	4D-1	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658999-01 WG2149205	130	648	200	4D-2	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658999-02 WG2149205	44	491	200	4D-3	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658999-03 WG2149205	152	658	200	4D-4	SNR961	10/17/2023 10:36	10/17/2023 13:56	
L1658999-04 WG2149205	105	1392	200	4A-1	DDD3903	10/17/2023 16:53	10/17/2023 20:13	
L1658999-06 WG2149205	62	746	200	4B-2	SNR961	10/24/2023 18:59	10/24/2023 22:19	
L1658999-07 WG2149205	66	847	200	4B-3	SNR961	10/24/2023 18:59	10/24/2023 22:19	
MS L1658999-02 WG2149205	412	2637	200	4A-3	SNR961	10/24/2023 18:59	10/24/2023 22:19	
MSD L1658999-02 WG2149205	387	2597	200	4A-4	SNR961	10/24/2023 18:59	10/24/2023 22:19	Rerun to verify
L1658999-02 WG2149205	273	924	200	4B-1	SNR961	10/24/2023 18:59	10/24/2023 22:19	

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GAS COUNTER G542 Unit: 4 MONTH: September-23
Alpha Source Check
Standard ID: 23F04822

Alpha Activity: **22460.4** **dpm** Count Time: **5** **min**
10117

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF
1	29994	26.7%	28886	25.7%	27940	24.9%	28828	25.7%	28941	25.8%	28982	25.8%	28888	25.7%	28189	25.1%	27785	24.7%	28807	25.7%	29364	26.1%	27759	24.7%	31039	27.6%	29194	26.0%	28191	25.1%	29719	26.5%
2																																
3																																
4																																
5	29639	26.4%	29087	25.9%	30316	27.0%	28485	25.4%	29348	26.1%	27544	24.5%	28621	25.5%	28181	25.1%	28728	25.6%	27386	24.4%	28444	25.3%	28411	25.3%	29628	26.4%	29195	26.0%	29026	25.8%	29465	26.2%
6	29309	26.1%	28277	25.2%	28999	25.8%	29226	26.0%	28993	25.8%	29168	26.0%	28502	25.4%	27960	24.9%	28002	24.9%	28364	25.3%	28616	25.5%	27328	24.3%	31002	27.6%	28580	25.4%	29045	25.9%	28702	25.6%
7	29510	26.3%	29036	25.9%	28699	25.6%	29192	26.0%	28998	25.8%	28740	25.6%	28418	25.3%	28438	25.3%	28874	25.7%	27761	24.7%	28519	25.4%	27521	24.5%	29823	26.6%	30059	26.8%	28920	25.8%	28166	25.1%
8	30303	27.0%	28486	25.4%	28341	25.2%	29714	26.5%	29390	26.2%	28563	25.4%	27753	24.7%	28734	25.6%	28755	25.6%	26204	23.3%	28499	25.4%	28515	25.4%	30438	27.1%	29366	26.1%	27672	24.6%	29087	25.9%
9																																
10																																
11	29922	26.6%	28919	25.8%	29109	25.9%	29105	25.9%	29723	26.5%	27887	24.8%	29087	25.9%	29468	26.2%	29146	26.0%	28931	25.8%	27888	24.8%	29188	26.0%	29638	26.4%	29366	26.1%	27895	24.8%	29295	26.1%
12	29624	26.4%	29175	26.0%	29817	26.6%	29130	25.9%	28815	25.7%	28449	25.3%	29366	26.1%	28786	25.6%	28222	25.1%	28151	25.1%	27852	24.8%	28058	25.0%	29526	26.3%	29741	26.5%	28457	25.3%	29596	26.4%
13	30013	26.7%	29534	26.3%	29181	26.0%	28627	25.5%	28755	25.6%	29599	26.4%	29024	25.8%	27959	24.9%	30394	27.1%	28229	25.1%	28444	25.3%	28911	25.7%	29988	26.7%	29165	26.0%	29122	25.9%	30193	26.9%
14	30605	27.3%	29142	25.9%	28206	25.1%	28503	25.4%	28679	25.5%	29015	25.8%	28924	25.8%	29433	26.2%	28259	25.2%	27701	24.7%	27163	24.2%	28090	25.0%	30799	27.4%	29655	26.4%	28422	25.3%	29136	25.9%
15	28981	25.8%	30459	27.1%	29259	26.1%	29199	26.0%	29253	26.0%	29704	26.5%	28151	25.1%	30102	26.8%	28893	25.7%	29890	26.6%	29397	26.2%	29651	26.4%	28374	25.3%	29069	25.9%	30965	27.6%	29569	26.3%
16																																
17																																
18	29997	26.7%	29701	26.4%	27860	24.8%	28804	25.6%	29417	26.2%	28705	25.6%	28118	25.0%	27626	24.6%	28497	25.4%	26972	24.0%	27436	24.4%	28657	25.5%	30371	27.0%	28741	25.6%	28576	25.4%	29147	26.0%
19	29525	26.3%	28644	25.5%	28668	25.5%	28764	25.6%	28872	25.7%	29927	26.6%	28467	25.3%	28640	25.5%	28881	25.7%	26465	23.6%	28918	25.8%	28992	25.8%	29750	26.5%	29744	26.5%	28704	25.6%	29021	25.8%
20	29693	26.4%	28098	25.0%	28138	25.1%	28903	25.7%	28749	25.6%	29367	26.2%	28633	25.5%	28255	25.2%	29096	25.9%	26340	23.5%	28011	24.9%	28316	25.2%	29441	26.2%	29485	26.3%	28848	25.7%	28134	25.1%
21	28846	25.7%	28819	25.7%	28348	25.2%	28597	25.5%	28390	25.3%	28881	25.7%	29987	26.7%	29047	25.9%	28208	25.1%	27634	24.6%	28622	25.5%	28565	25.4%	30246	26.9%	29899	26.6%	28490	25.4%	29131	25.9%
22	29970	26.7%	28945	25.8%	29261	26.1%	28569	25.4%	29761	26.5%	28790	25.6%	27369	24.4%	28452	25.3%	28608	25.5%	27922	24.9%	28853	25.7%	29184	26.0%	29526	26.3%	29659	26.4%	28128	25.0%	29064	25.9%
23																																
24																																
25	28719	25.6%	28842	25.7%	28355	25.2%	28972	25.8%	29822	26.6%	28431	25.3%	29192	26.0%	27867	24.8%	28474	25.4%	27218	24.2%	28599	25.5%	28538	25.4%	29625	26.4%	29932	26.7%	28700	25.6%	29983	26.7%
26	29671	26.4%	28582	25.5%	28900	25.7%	29021	25.8%	30085	26.8%	28375	25.3%	29505	26.3%	28033	25.0%	28451	25.3%	27764	24.7%	28003	24.9%	27488	24.5%	30073	26.8%	29240	26.0%	28226	25.1%	29245	26.0%
27	29702	26.4%	28744	25.6%	27892	24.8%	28096	25.0%	28587	25.5%	28727	25.6%	28856	25.7%	28787	25.6%	28911	25.7%	27854	24.8%	29094	25.9%	28251	25.2%	29378	26.2%	29539	26.3%	27640	24.6%	29709	26.5%
28	30830	27.5%	28985	25.8%	29016	25.8%	28091	25.0%	29644	26.4%	28780	25.6%	29482	26.3%	28638	25.5%	27097	24.1%	27891	24.8%	27259	24.3%	28909	25.7%	30518	27.2%	29108	25.9%	28927	25.8%	29031	25.9%
29	29785	26.5%	28477	25.4%	28292	25.2%	29056	25.9%	29738	26.5%	28079	25.0%	28389	25.3%	28503	25.4%	28691	25.5%	28267	25.2%	28690	25.5%	28332	25.2%	30666	27.3%	29448	26.2%	27599	24.6%	28381	25.3%
30																																
31																																
average	**29732**	**26.5%**	**28942**	**25.8%**	**28730**	**25.6%**	**28844.1**	**25.7%**	**29198**	**26.0%**	**28785.7**	**25.6%**	**28736.6**	**25.6%**	**28555**	**25.4%**	**28599**	**25.5%**	**27788**	**24.7%**	**28384**	**25.3%**	**28433.2**	**25.3%**	**29992.45**	**26.7%**	**29409.25**	**26.2%**	**28577.65**	**25.4%**	**29189**	**26.0%**
std dev	527	0.47%	524	0.00	654	0.01	395	0.00	485	0.00	594	0.01	629	0.01	611	0.01	644	0.57%	895	0.01	639	0.01	615	0.01	654	0.01	386	0.00	740	0.01	549	0.00
UCL	**31313**	**27.9%**	**30514**	**27.2%**	**30692**	**27.3%**	**30028**	**26.7%**	**30652**	**27.3%**	**30568**	**27.2%**	**30625**	**27.3%**	**30389**	**27.1%**	**30532**	**27.2%**	**30473**	**27.1%**	**30300**	**27.0%**	**30278**	**27.0%**	**31954**	**28.5%**	**30567**	**27.2%**	**30798**	**27.4%**	**30836**	**27.5%**
UWL	**30786**	**27.4%**	**29990**	**26.7%**	**30038**	**26.7%**	**29633**	**26.4%**	**30167**	**26.9%**	**29974**	**26.7%**	**29996**	**26.7%**	**29778**	**26.5%**	**29887**	**26.6%**	**29578**	**26.3%**	**29661**	**26.4%**	**29663**	**26.4%**	**31300**	**27.9%**	**30181**	**26.9%**	**30058**	**26.8%**	**30287**	**27.0%**
LWL	**28678**	**25.5%**	**27894**	**24.8%**	**27421**	**24.4%**	**28055**	**25.0%**	**28229**	**25.1%**	**27597**	**24.6%**	**27478**	**24.5%**	**27332**	**24.3%**	**27310**	**24.3%**	**25997**	**23.1%**	**27106**	**24.1%**	**27203**	**24.2%**	**28685**	**25.5%**	**28637**	**25.5%**	**27098**	**24.1%**	**28091**	**25.0%**
LCL	**28150**	**25.1%**	**27370**	**24.4%**	**26767**	**23.8%**	**27660**	**24.6%**	**27744**	**24.7%**	**27003**	**24.0%**	**26848**	**23.9%**	**26721**	**23.8%**	**26665**	**23.7%**	**25102**	**22.4%**	**26467**	**23.6%**	**26588**	**23.7%**	**28031**	**25.0%**	**28252**	**25.2%**	**26358**	**23.5%**	**27542**	**24.5%**

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GAS COUNTER G542 Unit: 4 MONTH: Sep-23 ALPHA BACKGROUND
Alpha Background

1 dpm Count Time: **100 min**

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	17	**0.17**	3	**0.03**	7	**0.07**	3	**0.03**	5	**0.05**	9	**0.09**	30	**0.30**	6	**0.06**	12	**0.12**	28	**0.28**	15	**0.15**	5	**0.05**	11	**0.11**	6	**0.06**	9	**0.09**	7	**0.07**
2																																
3																																
4	19.8	**0.20**	6.2	**0.06**	3.2	**0.03**	6.5	**0.07**	5.3	**0.05**	3.9	**0.04**	16.6	**0.17**	5.9	**0.06**	12	**0.12**	21.9	**0.22**	13.7	**0.14**	5.6	**0.06**	6.3	**0.06**	13.5	**0.14**	11.4	**0.11**	6.8	**0.07**
5	18	**0.18**	13	**0.13**	3	**0.03**	9	**0.09**	9	**0.09**	6	**0.06**	17	**0.17**	5	**0.05**	9	**0.09**	42	**0.42**	16	**0.16**	8	**0.08**	10	**0.10**	12	**0.12**	17	**0.17**	8	**0.08**
6	16	**0.16**	8	**0.08**	5	**0.05**	6	**0.06**	9	**0.09**	7	**0.07**	14	**0.14**	6	**0.06**	18	**0.18**	16	**0.16**	15	**0.15**	9	**0.09**	11	**0.11**	9	**0.09**	9	**0.09**	4	**0.04**
7	17	**0.17**	11	**0.11**	1	**0.01**	3	**0.03**	9	**0.09**	4	**0.04**	18	**0.18**	6	**0.06**	16	**0.16**	12	**0.12**	13	**0.13**	14	**0.14**	16	**0.16**	7	**0.07**	14	**0.14**	1	**0.01**
8	14	**0.14**	16	**0.16**	3	**0.03**	9	**0.09**	9	**0.09**	4	**0.04**	18	**0.18**	1	**0.01**	14	**0.14**	8	**0.08**	15	**0.15**	14	**0.14**	9	**0.09**	9	**0.09**	16	**0.16**	6	**0.06**
9																																
10																																
11	22	**0.22**	8	**0.08**	3	**0.03**	3	**0.03**	7	**0.07**	6	**0.06**	11	**0.11**	7	**0.07**	13	**0.13**	4	**0.04**	15	**0.15**	8	**0.08**	9	**0.09**	11	**0.11**	13	**0.13**	6	**0.06**
12	25	**0.25**	12	**0.12**	6	**0.06**	5	**0.05**	21	**0.21**	11	**0.11**	14	**0.14**	5	**0.05**	11	**0.11**	11	**0.11**	16	**0.16**	7	**0.07**	34	**0.34**	15	**0.15**	16	**0.16**	17	**0.17**
13	16	**0.16**	6	**0.06**	2	**0.02**	5	**0.05**	4	**0.04**	9	**0.09**	13	**0.13**	5	**0.05**	20	**0.20**	12	**0.12**	6	**0.06**	10	**0.10**	8	**0.08**	8	**0.08**	13	**0.13**	9	**0.09**
14	19	**0.19**	6	**0.06**	4	**0.04**	5	**0.05**	8	**0.08**	10	**0.10**	10	**0.10**	9	**0.09**	20	**0.20**	8	**0.08**	9	**0.09**	8	**0.08**	9	**0.09**	16	**0.16**	14	**0.14**	10	**0.10**
15	10	**0.10**	3	**0.03**	10	**0.10**	13	**0.13**	2	**0.02**	3	**0.03**	7	**0.07**	5	**0.05**	6	**0.06**	1	**0.01**	7	**0.07**	6	**0.06**	18	**0.18**	11	**0.11**	8	**0.08**	8	**0.08**
16																																
17																																
18	14	**0.14**	8	**0.08**	6	**0.06**	2	**0.02**	4	**0.04**	5	**0.05**	18	**0.18**	9	**0.09**	17	**0.17**	12	**0.12**	9	**0.09**	3	**0.03**	13	**0.13**	8	**0.08**	17	**0.17**	7	**0.07**
19	17	**0.17**	12	**0.12**	4	**0.04**	3	**0.03**	11	**0.11**	10	**0.10**	6	**0.06**	6	**0.06**	9	**0.09**	14	**0.14**	10	**0.10**	8	**0.08**	4	**0.04**	9	**0.09**	14	**0.14**	9	**0.09**
20	20	**0.20**	11	**0.11**	3	**0.03**	13	**0.13**	6	**0.06**	12	**0.12**	20	**0.20**	10	**0.10**	23	**0.23**	8	**0.08**	12	**0.12**	24	**0.24**	12	**0.12**	11	**0.11**	5	**0.05**	11	**0.11**
21	17	**0.17**	5	**0.05**	9	**0.09**	7	**0.07**	9	**0.09**	7	**0.07**	13	**0.13**	8	**0.08**	26	**0.26**	9	**0.09**	17	**0.17**	2	**0.02**	9	**0.09**	10	**0.10**	19	**0.19**	6	**0.06**
22	25	**0.25**	15	**0.15**	3	**0.03**	19	**0.19**	7	**0.07**	13	**0.13**	14	**0.14**	6	**0.06**	20	**0.20**	8	**0.08**	22	**0.22**	26	**0.26**	12	**0.12**	3	**0.03**	23	**0.23**	4	**0.04**
23																																
24																																
25	22	**0.22**	6	**0.06**	2	**0.02**	20	**0.20**	5	**0.05**	6	**0.06**	13	**0.13**	7	**0.07**	22	**0.22**	11	**0.11**	17	**0.17**	9	**0.09**	6	**0.06**	5	**0.05**	12	**0.12**	10	**0.10**
26	28	**0.28**	3	**0.03**	10	**0.10**	12	**0.12**	17	**0.17**	5	**0.05**	18	**0.18**	10	**0.10**	15	**0.15**	22	**0.22**	18	**0.18**	7	**0.07**	10	**0.10**	5	**0.05**	20	**0.20**	8	**0.08**
27	21	**0.21**	17	**0.17**	6	**0.06**	1	**0.01**	6	**0.06**	5	**0.05**	13	**0.13**	4	**0.04**	13	**0.13**	20	**0.20**	15	**0.15**	7	**0.07**	10	**0.10**	6	**0.06**	13	**0.13**	8	**0.08**
28	14	**0.14**	1	**0.01**	4	**0.04**	5	**0.05**	5	**0.05**	5	**0.05**	12	**0.12**	3	**0.03**	13	**0.13**	11	**0.11**	13	**0.13**	4	**0.04**	11	**0.11**	7	**0.07**	9	**0.09**	7	**0.07**
29	30	**0.30**	7	**0.07**	6	**0.06**	5	**0.05**	5	**0.05**	6	**0.06**	9	**0.09**	4	**0.04**	18	**0.18**	13	**0.13**	10	**0.10**	7	**0.07**	5	**0.05**	7	**0.07**	7	**0.07**	6	**0.06**
30																																
31																																
average	**19.133**	**0.191**	**8.438**	**0.084**	**4.771**	**0.048**	**7.357**	**0.074**	**7.776**	**0.078**	**6.995**	**0.070**	**14.505**	**0.145**	**6.090**	**0.061**	**15.571**	**0.156**	**13.900**	**0.139**	**13.510**	**0.135**	**9.124**	**0.091**	**11.110**	**0.111**	**8.976**	**0.090**	**13.305**	**0.133**	**7.562**	**0.076**
std dev	4.941	0.049	4.551	0.046	2.580	0.026	5.299	0.053	4.383	0.044	2.886	0.029	5.184	0.052	2.257	0.023	5.124	0.051	9.012	0.090	3.918	0.039	6.047	0.060	6.200	0.062	3.371	0.034	4.542	0.045	3.142	0.031
UCL	**33.956**	**0.340**	**22.091**	**0.221**	**12.512**	**0.125**	**23.254**	**0.233**	**20.926**	**0.209**	**15.654**	**0.157**	**30.056**	**0.301**	**12.860**	**0.129**	**30.944**	**0.309**	**40.935**	**0.409**	**25.264**	**0.253**	**27.264**	**0.273**	**29.710**	**0.297**	**19.088**	**0.191**	**26.931**	**0.269**	**16.987**	**0.170**
UWL	**29.015**	**0.290**	**17.540**	**0.175**	**9.932**	**0.099**	**17.955**	**0.180**	**16.542**	**0.165**	**12.768**	**0.128**	**24.872**	**0.249**	**10.604**	**0.106**	**25.820**	**0.258**	**31.923**	**0.319**	**21.346**	**0.213**	**21.217**	**0.212**	**23.510**	**0.235**	**15.718**	**0.157**	**22.389**	**0.224**	**13.845**	**0.138**
LWL	**9.251**	**0.093**	**-0.664**	**-0.007**	**-0.389**	**-0.004**	**-3.241**	**-0.032**	**-0.990**	**-0.010**	**1.223**	**0.012**	**4.137**	**0.041**	**1.577**	**0.016**	**5.323**	**0.053**	**-4.123**	**-0.041**	**5.673**	**0.057**	**-2.969**	**-0.030**	**-1.291**	**-0.013**	**2.235**	**0.022**	**4.221**	**0.042**	**1.278**	**0.013**
LCL	**4.310**	**0.043**	**-5.215**	**-0.052**	**-2.969**	**-0.030**	**-8.540**	**-0.085**	**-5.373**	**-0.054**	**-1.664**	**-0.017**	**-1.046**	**-0.010**	**-0.679**	**-0.007**	**0.199**	**0.002**	**-13.135**	**-0.131**	**1.755**	**0.018**	**-9.016**	**-0.090**	**-7.491**	**-0.075**	**-1.136**	**-0.011**	**-0.321**	**-0.003**	**-1.863**	**-0.019**

09_23_Unit4

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GAS COUNTER G542 Unit: 4 MONTH: September-23
Beta Source Check
23F05880

BETA Activity: **8284.32** **dpm** Count Time: **5** **min**

DATE	4A-1 COUNTS	4A-1 EFF	4A-2 COUNTS	4A-2 EFF	4A-3 COUNTS	4A-3 EFF	4A-4 COUNTS	4A-4 EFF	4B-1 COUNTS	4B-1 EFF	4B-2 COUNTS	4B-2 EFF	4B-3 COUNTS	4B-3 EFF	4B-4 COUNTS	4B-4 EFF	4C-1 COUNTS	4C-1 EFF	4C-2 COUNTS	4C-2 EFF	4C-3 COUNTS	4C-3 EFF	4C-4 COUNTS	4C-4 EFF	4D-1 COUNTS	4D-1 EFF	4D-2 COUNTS	4D-2 EFF	4D-3 COUNTS	4D-3 EFF	4D-4 COUNTS	4D-4 EFF	AVG
1	18826	45.4%	17502	42.3%	18431	44.5%	16883	40.8%	17415	42.0%	16688	40.3%	17063	41.2%	19044	46.0%	19173	46.3%	18181	43.9%	17397	42.0%	17953	43.3%	19048	46.0%	15922	38.4%	18717	45.2%	18987	45.8%	44.3%
2																																	44.3%
3																																	44.3%
4																																	44.3%
5	19309	46.6%	16288	39.3%	16818	40.6%	18443	44.5%	19132	46.2%	19498	47.1%	17108	41.3%	16824	40.6%	18810	45.4%	18522	44.7%	15015	36.2%	18541	44.8%	18934	45.7%	17697	42.7%	18800	45.4%	17347	41.9%	44.3%
6	19298	46.6%	18293	44.2%	18363	44.3%	18463	44.6%	19311	46.6%	16985	41.0%	19292	46.6%	17740	42.8%	15136	36.5%	16335	39.4%	18922	45.7%	17069	41.2%	17441	42.1%	19694	47.5%	18760	45.3%	17426	42.1%	44.3%
7	16566	40.0%	19072	46.0%	18257	44.1%	19223	46.4%	17618	42.5%	18253	44.1%	18097	43.7%	19426	46.9%	18529	44.7%	18231	44.0%	18378	44.4%	18777	45.3%	17794	43.0%	17049	41.2%	15297	36.9%	16895	40.8%	44.3%
8	17339	41.9%	15015	36.2%	18684	45.1%	18933	45.7%	19095	46.1%	18456	44.6%	19088	46.1%	18751	45.3%	19011	45.9%	18298	44.2%	16906	40.8%	16633	40.2%	17054	41.2%	18033	43.5%	16467	39.8%	18464	44.6%	44.3%
9																																	44.3%
10																																	44.3%
11	18919	45.7%	15090	36.4%	18891	45.6%	19529	47.1%	16965	41.0%	18007	43.5%	18510	44.7%	16483	39.8%	17233	41.6%	18865	45.5%	16580	40.0%	18342	44.3%	17165	41.4%	19497	47.1%	19167	46.3%	18798	45.4%	44.3%
12	18359	44.3%	18868	45.6%	16588	40.0%	18228	44.0%	16686	40.3%	19163	46.3%	18961	45.8%	18596	44.9%	15207	36.7%	17053	41.2%	18135	43.8%	16457	39.7%	18840	45.5%	19323	46.6%	17247	41.6%	18830	45.5%	44.3%
13	18748	45.3%	19035	46.0%	16209	39.1%	17223	41.6%	17993	43.4%	15654	37.8%	18979	45.8%	18955	45.8%	18572	44.8%	18212	44.0%	17335	41.9%	18234	44.0%	18552	44.8%	19292	46.6%	17260	41.7%	16308	39.4%	44.3%
14	18577	44.8%	17703	42.7%	16746	40.4%	18480	44.6%	18865	45.5%	16898	40.8%	19413	46.9%	18625	45.0%	16951	40.9%	18140	43.8%	15029	36.3%	18873	45.6%	19077	46.1%	17538	42.3%	18945	45.7%	17181	41.5%	44.3%
15	18142	43.8%	18723	45.2%	17315	41.8%	17941	43.3%	16807	40.6%	16369	39.5%	16807	40.6%	16536	39.9%	18678	45.1%	18686	45.1%	18610	44.9%	16209	39.1%	18729	45.2%	18095	43.7%	18554	44.8%	15059	36.4%	44.3%
16																																	44.3%
17																																	44.3%
18	18329	44.2%	19097	46.1%	17077	41.2%	16789	40.5%	19177	46.3%	19367	46.8%	17514	42.3%	18773	45.3%	17681	42.7%	16607	40.1%	18454	44.6%	18201	43.9%	18703	45.2%	17045	41.2%	19076	46.1%	15144	36.6%	44.3%
19	18974	45.8%	16818	40.6%	18226	44.0%	17657	42.6%	18039	43.5%	19622	47.4%	19070	46.0%	15283	36.9%	18667	45.1%	16947	40.9%	16621	40.1%	19131	46.2%	18620	45.0%	19183	46.3%	16460	39.7%	17955	43.3%	44.3%
20	16701	40.3%	17700	42.7%	15088	36.4%	19443	46.9%	17912	43.2%	19253	46.5%	19190	46.3%	17531	42.3%	18485	44.6%	18256	44.1%	16660	40.2%	18597	44.9%	19111	46.1%	19205	46.4%	16454	39.7%	17210	41.5%	44.3%
21	19059	46.0%	16601	40.1%	18505	44.7%	18136	43.8%	15871	38.3%	19451	47.0%	16698	40.3%	17218	41.6%	18556	44.8%	17476	42.2%	18709	45.2%	17221	41.6%	18804	45.4%	17307	41.8%	19030	45.9%	18558	44.8%	44.3%
22	18869	45.6%	18953	45.8%	16455	39.7%	19320	46.6%	19223	46.4%	15608	37.7%	16594	40.1%	18659	45.0%	17319	41.8%	17954	43.3%	16389	39.6%	17692	42.7%	17822	43.0%	19193	46.3%	18919	45.7%	17180	41.5%	44.3%
23																																	44.3%
24																																	44.3%
25	18937	45.7%	16250	39.2%	14883	35.9%	16940	40.9%	18912	45.7%	18744	45.3%	17674	42.7%	18929	45.7%	16679	40.3%	17444	42.1%	18224	44.0%	18984	45.8%	19276	46.5%	18804	45.4%	17076	41.2%	18789	45.4%	44.3%
26	17540	42.3%	18603	44.9%	18321	44.2%	18955	45.8%	18035	43.5%	18975	45.8%	19466	47.0%	17328	41.8%	16463	39.7%	15798	38.1%	18018	43.5%	18664	45.1%	18747	45.3%	15636	37.7%	17701	42.7%	17128	41.4%	
27	18790	45.4%	16935	40.9%	18170	43.9%	19258	46.5%	17230	41.6%	19533	47.2%	19270	46.5%	18947	45.7%	16231	39.2%	16954	40.9%	17005	41.1%	18226	44.0%	15378	37.1%	17541	42.3%	18706	45.2%	17899	43.2%	
28	17391	42.0%	18365	44.3%	18623	45.0%	16570	40.0%	16879	40.7%	19157	46.2%	19594	47.3%	17485	42.2%	17087	41.3%	18172	43.9%	16438	39.7%	15079	36.4%	18937	45.7%	19323	46.6%	18745	45.3%	18303	44.2%	
29	18141	43.8%	16924	40.9%	18025	43.5%	19143	46.2%	16775	40.5%	16944	40.9%	15499	37.4%	16824	40.6%	18648	45.0%	17140	41.4%	18790	45.4%	18649	45.0%	17491	42.2%	19365	46.8%	18677	45.1%	18409	44.4%	42.2%
30																																	
31																																	#VALUE!
average	**18341**	**44.3%**	**17592**	**42.5%**	**17484**	**42.2%**	**18277.9**	**44.1%**	**17897**	**43.2%**	**18131.3**	**43.8%**	**18194.4**	**43.9%**	**17898**	**43.2%**	**17656**	**42.6%**	**17664**	**42.6%**	**17381**	**42.0%**	**17877**	**43.2%**	**18276**	**44.1%**	**18237**	**44.0%**	**18003**	**43.5%**	**17594**	**42.5%**	
std dev	823	1.99%	1304	0.03	1197	0.03	976	0.02	1053	0.03	1374	0.03	1224	0.03	1127	0.03	1246	3.01%	844	0.02	1183	0.03	1092	0.03	976	2.36%	1228	0.03	1155	0.028	1142	0.028	
UCL	**20809**	**50.2%**	**21503**	**51.9%**	**21074**	**50.9%**	**21206**	**51.2%**	**21055**	**50.8%**	**22253**	**53.7%**	**21867**	**52.8%**	**21279**	**51.4%**	**21393**	**51.6%**	**20197**	**48.8%**	**20929**	**50.5%**	**21152**	**51.1%**	**21203**	**51.2%**	**21922**	**52.9%**	**21468**	**51.8%**	**21020**	**50.7%**	
UWL	**19986**	**48.3%**	**20200**	**48.8%**	**19877**	**48.0%**	**20230**	**48.8%**	**20002**	**48.3%**	**20879**	**50.4%**	**20643**	**49.8%**	**20152**	**48.7%**	**20147**	**48.6%**	**19352**	**46.7%**	**19746**	**47.7%**	**20060**	**48.4%**	**20227**	**48.8%**	**20694**	**50.0%**	**20313**	**49.0%**	**19878**	**48.0%**	
LWL	**16695**	**40.3%**	**14984**	**36.2%**	**15090**	**36.4%**	**16326**	**39.4%**	**15792**	**38.1%**	**15384**	**37.1%**	**15746**	**38.0%**	**15644**	**37.8%**	**15164**	**36.6%**	**15975**	**38.6%**	**15015**	**36.3%**	**15693**	**37.9%**	**16325**	**39.4%**	**15780**	**38.1%**	**15693**	**37.9%**	**15309**	**37.0%**	
LCL	**15872**	**38.3%**	**13680**	**33.0%**	**13893**	**33.5%**	**15349**	**37.1%**	**14739**	**35.6%**	**14010**	**33.8%**	**14522**	**35.1%**	**14517**	**35.0%**	**13918**	**33.6%**	**15130**	**36.5%**	**13833**	**33.4%**	**14602**	**35.3%**	**15349**	**37.1%**	**14552**	**35.1%**	**14538**	**35.1%**	**14167**	**34.2%**	

09_23_Unit4

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GAS COUNTER G542 Unit: 4 MONTH: Sep-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	121	**1.21**	194	**1.94**	143	**1.43**	175	**1.75**	178	**1.78**	197	**1.97**	245	**2.45**	245	**2.45**	186	**1.86**	167	**1.67**	154	**1.54**	141	**1.41**	126	**1.26**	208	**2.08**	114	**1.14**	151	**1.51**
2																																
3																																
4	116.5	**1.17**	184.3	**1.84**	131.7	**1.32**	177.1	**1.77**	172.6	**1.73**	182.4	**1.82**	229.3	**2.29**	234.3	**2.34**	201.3	**2.01**	184.4	**1.84**	163.4	**1.63**	133.9	**1.34**	114.4	**1.14**	222.8	**2.23**	109.3	**1.09**	159.4	**1.59**
5	111	**1.11**	149	**1.49**	125	**1.25**	182	**1.82**	170	**1.70**	176	**1.76**	216	**2.16**	219	**2.19**	190	**1.90**	169	**1.69**	184	**1.84**	141	**1.41**	109	**1.09**	224	**2.24**	107	**1.07**	134	**1.34**
6	131	**1.31**	176	**1.76**	129	**1.29**	166	**1.66**	176	**1.76**	193	**1.93**	197	**1.97**	268	**2.68**	220	**2.20**	167	**1.67**	198	**1.98**	144	**1.44**	103	**1.03**	247	**2.47**	106	**1.06**	164	**1.64**
7	107	**1.07**	200	**2.00**	134	**1.34**	189	**1.89**	161	**1.61**	154	**1.54**	209	**2.09**	247	**2.47**	191	**1.91**	170	**1.70**	163	**1.63**	153	**1.53**	101	**1.01**	210	**2.10**	137	**1.37**	169	**1.69**
8	120	**1.20**	184	**1.84**	135	**1.35**	167	**1.67**	190	**1.90**	200	**2.00**	228	**2.28**	275	**2.75**	197	**1.97**	154	**1.54**	174	**1.74**	141	**1.41**	110	**1.10**	241	**2.41**	140	**1.40**	159	**1.59**
9																																
10																																
11	126	**1.26**	178	**1.78**	124	**1.24**	190	**1.90**	173	**1.73**	194	**1.94**	215	**2.15**	218	**2.18**	184	**1.84**	168	**1.68**	184	**1.84**	151	**1.51**	96	**0.96**	215	**2.15**	108	**1.08**	163	**1.63**
12	129	**1.29**	176	**1.76**	141	**1.41**	196	**1.96**	217	**2.17**	198	**1.98**	212	**2.12**	226	**2.26**	229	**2.29**	178	**1.78**	177	**1.77**	138	**1.38**	215	**2.15**	203	**2.03**	134	**1.34**	173	**1.73**
13	113	**1.13**	204	**2.04**	153	**1.53**	146	**1.46**	162	**1.62**	187	**1.87**	229	**2.29**	228	**2.28**	203	**2.03**	182	**1.82**	159	**1.59**	151	**1.51**	106	**1.06**	196	**1.96**	140	**1.40**	179	**1.79**
14	107	**1.07**	186	**1.86**	119	**1.19**	178	**1.78**	166	**1.66**	198	**1.98**	237	**2.37**	230	**2.30**	189	**1.89**	158	**1.58**	179	**1.79**	120	**1.20**	105	**1.05**	206	**2.06**	100	**1.00**	138	**1.38**
15	138	**1.38**	168	**1.68**	130	**1.30**	145	**1.45**	116	**1.16**	94	**0.94**	112	**1.12**	195	**1.95**	86	**0.86**	144	**1.44**	122	**1.22**	74	**0.74**	97	**0.97**	82	**0.82**	102	**1.02**	96	**0.96**
16																																
17																																
18	121	**1.21**	166	**1.66**	117	**1.17**	149	**1.49**	157	**1.57**	169	**1.69**	225	**2.25**	241	**2.41**	206	**2.06**	165	**1.65**	150	**1.50**	139	**1.39**	109	**1.09**	199	**1.99**	109	**1.09**	163	**1.63**
19	125	**1.25**	184	**1.84**	139	**1.39**	178	**1.78**	178	**1.78**	175	**1.75**	235	**2.35**	243	**2.43**	196	**1.96**	206	**2.06**	192	**1.92**	154	**1.54**	103	**1.03**	226	**2.26**	114	**1.14**	144	**1.44**
20	139	**1.39**	176	**1.76**	140	**1.40**	220	**2.20**	176	**1.76**	171	**1.71**	227	**2.27**	264	**2.64**	190	**1.90**	183	**1.83**	186	**1.86**	182	**1.82**	98	**0.98**	207	**2.07**	112	**1.12**	154	**1.54**
21	114	**1.14**	172	**1.72**	160	**1.60**	189	**1.89**	187	**1.87**	173	**1.73**	232	**2.32**	223	**2.23**	270	**2.70**	154	**1.54**	193	**1.93**	162	**1.62**	86	**0.86**	232	**2.32**	118	**1.18**	144	**1.44**
22	141	**1.41**	211	**2.11**	158	**1.58**	224	**2.24**	167	**1.67**	171	**1.71**	218	**2.18**	259	**2.59**	215	**2.15**	155	**1.55**	198	**1.98**	171	**1.71**	111	**1.11**	201	**2.01**	139	**1.39**	153	**1.53**
23																																
24																																
25	136	**1.36**	197	**1.97**	151	**1.51**	232	**2.32**	183	**1.83**	166	**1.66**	247	**2.47**	222	**2.22**	214	**2.14**	159	**1.59**	184	**1.84**	132	**1.32**	97	**0.97**	211	**2.11**	97	**0.97**	152	**1.52**
26	114	**1.14**	177	**1.77**	160	**1.60**	180	**1.80**	230	**2.30**	186	**1.86**	253	**2.53**	254	**2.54**	208	**2.08**	213	**2.13**	169	**1.69**	136	**1.36**	111	**1.11**	221	**2.21**	130	**1.30**	166	**1.66**
27	120	**1.20**	205	**2.05**	133	**1.33**	159	**1.59**	171	**1.71**	170	**1.70**	234	**2.34**	256	**2.56**	204	**2.04**	208	**2.08**	187	**1.87**	161	**1.61**	107	**1.07**	197	**1.97**	118	**1.18**	157	**1.57**
28	112	**1.12**	170	**1.70**	149	**1.49**	171	**1.71**	171	**1.71**	177	**1.77**	228	**2.28**	230	**2.30**	219	**2.19**	173	**1.73**	177	**1.77**	128	**1.28**	75	**0.75**	220	**2.20**	105	**1.05**	165	**1.65**
29	110	**1.10**	168	**1.68**	148	**1.48**	166	**1.66**	182	**1.82**	160	**1.60**	219	**2.19**	233	**2.33**	226	**2.26**	164	**1.64**	188	**1.88**	160	**1.60**	109	**1.09**	229	**2.29**	136	**1.36**	157	**1.57**
30																																
31																																
average	**122**	**1.22**	**182**	**1.82**	**139**	**1.39**	**180**	**1.80**	**175**	**1.75**	**176**	**1.76**	**221**	**2.21**	**239**	**2.39**	**201**	**2.01**	**172**	**1.72**	**175**	**1.75**	**143**	**1.43**	**109**	**1.09**	**209**	**2.09**	**118**	**1.18**	**154**	**1.54**
std dev	11	0.11	15	0.15	13	0.13	24	0.24	22	0.22	23	0.23	28	0.28	20	0.20	33	0.33	18	0.18	18	0.18	22	0.22	26	0.26	32	0.32	15	0.15	17	0.17
UCL	**154**	**1.54**	**228**	**2.28**	**178**	**1.78**	**251**	**2.51**	**241**	**2.41**	**245**	**2.45**	**306**	**3.06**	**297**	**2.97**	**300**	**3.00**	**228**	**2.28**	**231**	**2.31**	**209**	**2.09**	**188**	**1.88**	**307**	**3.07**	**162**	**1.62**	**206**	**2.06**
UWL	**143**	**1.43**	**213**	**2.13**	**165**	**1.65**	**227**	**2.27**	**219**	**2.19**	**222**	**2.22**	**278**	**2.78**	**278**	**2.78**	**267**	**2.67**	**209**	**2.09**	**212**	**2.12**	**187**	**1.87**	**162**	**1.62**	**274**	**2.74**	**147**	**1.47**	**189**	**1.89**
LWL	**100**	**1.00**	**151**	**1.51**	**113**	**1.13**	**133**	**1.33**	**131**	**1.31**	**130**	**1.30**	**165**	**1.65**	**200**	**2.00**	**135**	**1.35**	**136**	**1.36**	**138**	**1.38**	**100**	**1.00**	**56**	**0.56**	**145**	**1.45**	**89**	**0.89**	**120**	**1.20**
LCL	**89**	**0.89**	**136**	**1.36**	**100**	**1.00**	**109**	**1.09**	**109**	**1.09**	**107**	**1.07**	**136**	**1.36**	**180**	**1.80**	**103**	**1.03**	**117**	**1.17**	**120**	**1.20**	**78**	**0.78**	**30**	**0.30**	**112**	**1.12**	**74**	**0.74**	**102**	**1.02**

09_23_Unit4

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GAS COUNTER G542 Unit: 4 MONTH: October-23
Alpha Source Check
Standard ID: 23F04822

Alpha Activity: **22460.2** **dpm** Count Time: **5** **min**
10117

DATE	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF
1																																
2	30545	27.2%	28753	25.6%	27802	24.8%	28394	25.3%	30059	26.8%	28816	25.7%	29193	26.0%	28856	25.7%	21555	19.2%	18380	16.4%	21335	19.0%	22015	19.6%	29891	26.6%	28539	25.4%	28268	25.2%	29834	26.6%
3	30007	26.7%	28249	25.2%	29158	26.0%	30255	26.9%	29085	25.9%	29289	26.1%	29575	26.3%	29352	26.1%	27088	24.1%	26453	23.6%	28408	25.3%	28051	25.0%	29852	26.6%	29123	25.9%	28818	25.7%	29024	25.8%
4	29559	26.3%	28831	25.7%	29439	26.2%	28264	25.2%	28986	25.8%	28343	25.2%	29002	25.8%	28803	25.6%	28062	25.0%	29328	26.1%	28837	25.7%	28429	25.3%	30507	27.2%	29174	26.0%	28784	25.6%	30098	26.8%
5	28250	25.2%	29214	26.0%	28771	25.6%	29325	26.1%	28251	25.2%	29253	26.0%	29562	26.3%	28323	25.2%	28435	25.3%	27605	24.6%	27942	24.9%	29002	25.8%	30487	27.1%	28879	25.7%	28554	25.4%	28995	25.8%
6	29621	26.4%	28430	25.3%	28122	25.0%	28769	25.6%	28772	25.6%	29051	25.9%	29159	26.0%	27783	24.7%	28438	25.3%	28439	25.3%	29028	25.8%	27931	24.9%	30771	27.4%	29598	26.4%	28236	25.1%	29471	26.2%
7																																
8																																
9	29294	26.1%	28712	25.6%	28898	25.7%	28913	25.7%	29673	26.4%	29219	26.0%	29463	26.2%	29431	26.2%	28212	25.1%	27489	24.5%	29218	26.0%	28933	25.8%	30522	27.2%	29421	26.2%	28315	25.2%	29740	26.5%
10	29797	26.5%	29443	26.2%	28899	25.7%	29800	26.5%	29130	25.9%	28046	25.0%	28367	25.3%	28496	25.4%	28800	25.6%	29080	25.9%	28596	25.5%	28454	25.3%	30364	27.0%	29351	26.1%	28721	25.6%	30414	27.1%
11	30652	27.3%	28986	25.8%	28847	25.7%	29930	26.7%	30061	26.8%	28967	25.8%	29298	26.1%	28804	25.6%	29575	26.3%	28036	25.0%	28562	25.4%	27361	24.4%	29519	26.3%	29181	26.0%	28969	25.8%	30576	27.2%
12	29720	26.5%	27492	24.5%	29203	26.0%	29167	26.0%	29252	26.0%	28588	25.5%	29592	26.4%	29014	25.8%	27050	24.1%	28077	25.0%	28388	25.3%	27418	24.4%	29557	26.3%	28982	25.8%	28173	25.1%	28291	25.2%
13	31177	27.8%	29168	26.0%	29099	25.9%	28814	25.7%	28484	25.4%	28420	25.3%	28414	25.3%	28519	25.4%	27465	24.5%	27921	24.9%	27671	24.6%	29098	25.9%	30192	26.9%	29095	25.9%	28942	25.8%	29454	26.2%
14																																
15																																
16	29553	26.3%	28842	25.7%	29349	26.1%	28809	25.7%	28568	25.4%	29139	25.9%	30135	26.8%	29587	26.3%	28033	25.0%	28548	25.4%	28404	25.3%	28397	25.3%	29424	26.2%	28554	25.4%	29920	26.6%	29268	26.1%
17	30910	27.5%	28433	25.3%	29004	25.8%	29610	26.4%	29708	26.5%	29610	26.4%	28763	25.6%	28309	25.2%	27842	24.8%	27039	24.1%	27956	24.9%	28184	25.1%	29659	26.4%	29611	26.4%	28151	25.1%	28427	25.3%
18	29102	25.9%	28024	25.0%	28384	25.3%	29249	26.0%	29161	26.0%	29395	26.2%	28458	25.3%	28853	25.7%	30170	26.9%	28114	25.0%	28786	25.6%	29466	26.2%	29778	26.5%	29093	25.9%	28932	25.8%	28938	25.8%
19	30115	26.8%	28793	25.6%	29023	25.8%	29979	26.7%	29225	26.0%	28690	25.5%	27872	24.8%	28683	25.5%	29139	25.9%	27038	24.1%	26844	23.9%	28672	25.5%	30902	27.5%	28431	25.3%	28877	25.7%	29947	26.7%
20	30583	27.2%	29237	26.0%	29095	25.9%	27962	24.9%	29192	26.0%	29001	25.8%	30136	26.8%	29001	25.8%	28766	25.6%	28220	25.1%	30276	27.0%	28422	25.3%	30273	27.0%	29960	26.7%	28617	25.5%	28951	25.8%
21																																
22																																
23	30755	27.4%	29418	26.2%	28587	25.5%	29052	25.9%	29263	26.1%	29249	26.0%	28730	25.6%	28592	25.5%	28339	25.2%	27743	24.7%	29431	26.2%	27786	24.7%	29881	26.6%	28277	25.2%	29253	26.0%	29922	26.6%
24	29659	26.4%	27728	24.7%	27708	24.7%	28369	25.3%	28585	25.5%	30028	26.7%	28362	25.3%	28769	25.6%	28305	25.2%	27634	24.6%	28903	25.7%	29079	25.9%	29059	25.9%	28772	25.6%	28523	25.4%	29605	26.4%
25	30018	26.7%	29210	26.0%	29162	26.0%	28526	25.4%	29700	26.4%	29006	25.8%	29162	26.0%	28801	25.6%	29892	26.6%	27497	24.5%	30714	27.3%	28848	25.7%	29951	26.7%	28224	25.1%	28275	25.2%	29212	26.0%
26	29257	26.1%	28561	25.4%	27926	24.9%	28501	25.4%	28533	25.4%	29260	26.1%	28671	25.5%	29252	26.0%	30004	26.7%	28057	25.0%	29240	26.0%	28214	25.1%	30606	27.3%	29291	26.1%	27935	24.9%	28164	25.1%
27	30490	27.2%	29394	26.2%	29247	26.0%	29382	26.2%	29040	25.9%	28495	25.4%	28779	25.6%	27905	24.8%	28069	25.0%	28562	25.4%	29073	25.9%	27978	24.9%	30248	26.9%	28723	25.6%	28479	25.4%	29355	26.1%
28																																
29																																
30																																
31																																
average	**29953**	**26.7%**	**28746**	**25.6%**	**28786**	**25.6%**	**29053.5**	**25.9%**	**29136.4**	**25.9%**	**28993.3**	**25.8%**	**29034.7**	**25.9%**	**28757**	**25.6%**	**28162**	**25.1%**	**27463**	**24.5%**	**28381**	**25.3%**	**28086.9**	**25.0%**	**30072.15**	**26.8%**	**29013.95**	**25.8%**	**28637.1**	**25.5%**	**29384**	**26.2%**
std dev	716	0.64%	557	0.00	526	0.00	636	0.01	515	0.00	468	0.00	605	0.01	465	0.00	1792	1.60%	2244	0.02	1865	0.02	1536	0.01	492	0.00	466	0.00	456	0.00	661	0.01
UCL	**32102**	**28.6%**	**30417**	**27.1%**	**30363**	**27.0%**	**30962**	**27.6%**	**30683**	**27.3%**	**30398**	**27.1%**	**30849**	**27.5%**	**30153**	**26.8%**	**33538**	**29.9%**	**34196**	**30.5%**	**33975**	**30.3%**	**32696**	**29.1%**	**31549**	**28.1%**	**30413**	**27.1%**	**30006**	**26.7%**	**31367**	**27.9%**
UWL	**31386**	**27.9%**	**29860**	**26.6%**	**29837**	**26.6%**	**30326**	**27.0%**	**30167**	**26.9%**	**29930**	**26.7%**	**30244**	**26.9%**	**29687**	**26.4%**	**31746**	**28.3%**	**31952**	**28.5%**	**32111**	**28.6%**	**31159**	**27.7%**	**31057**	**27.7%**	**29947**	**26.7%**	**29550**	**26.3%**	**30706**	**27.3%**
LWL	**28521**	**25.4%**	**27632**	**24.6%**	**27735**	**24.7%**	**27781**	**24.7%**	**28106**	**25.0%**	**28057**	**25.0%**	**27825**	**24.8%**	**27826**	**24.8%**	**24578**	**21.9%**	**22974**	**20.5%**	**24651**	**22.0%**	**25014**	**22.3%**	**29088**	**25.9%**	**28081**	**25.0%**	**27724**	**24.7%**	**28063**	**25.0%**
LCL	**27804**	**24.8%**	**27075**	**24.1%**	**27209**	**24.2%**	**27145**	**24.2%**	**27590**	**24.6%**	**27589**	**24.6%**	**27221**	**24.2%**	**27361**	**24.4%**	**22786**	**20.3%**	**20730**	**18.5%**	**22786**	**20.3%**	**23478**	**20.9%**	**28595**	**25.5%**	**27615**	**24.6%**	**27268**	**24.3%**	**27402**	**24.4%**

10_23_Unit4

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GAS COUNTER G542 Unit: 4 MONTH: Oct-23 ALPHA BACKGROUND
Alpha Background

1 dpm Count Time: 100 min

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	18.9	**0.19**	6.9	**0.07**	2.9	**0.03**	4.9	**0.05**	5.6	**0.06**	5.9	**0.06**	12.9	**0.13**	5.3	**0.05**	15.5	**0.16**	9.3	**0.09**	10.9	**0.11**	6.8	**0.07**	7.5	**0.08**	7.4	**0.07**	11.2	**0.11**	5	**0.05**
2	26	**0.26**	9	**0.09**	4	**0.04**	5	**0.05**	12	**0.12**	6	**0.06**	9	**0.09**	5	**0.05**	14	**0.14**	14	**0.14**	10	**0.10**	7	**0.07**	10	**0.10**	9	**0.09**	7	**0.07**	9	**0.09**
3	26	**0.26**	10	**0.10**	6	**0.06**	5	**0.05**	11	**0.11**	8	**0.08**	12	**0.12**	10	**0.10**	17	**0.17**	11	**0.11**	9	**0.09**	7	**0.07**	14	**0.14**	11	**0.11**	14	**0.14**	10	**0.10**
4	16	**0.16**	11	**0.11**	4	**0.04**	3	**0.03**	5	**0.05**	5	**0.05**	19	**0.19**	11	**0.11**	12	**0.12**	14	**0.14**	15	**0.15**	6	**0.06**	11	**0.11**	5	**0.05**	11	**0.11**	4	**0.04**
5	26	**0.26**	11	**0.11**	5	**0.05**	5	**0.05**	6	**0.06**	8	**0.08**	8	**0.08**	8	**0.08**	23	**0.23**	19	**0.19**	16	**0.16**	10	**0.10**	20	**0.20**	7	**0.07**	12	**0.12**	7	**0.07**
6	22	**0.22**	9	**0.09**	5	**0.05**	5	**0.05**	5	**0.05**	3	**0.03**	15	**0.15**	5	**0.05**	15	**0.15**	14	**0.14**	16	**0.16**	10	**0.10**	9	**0.09**	10	**0.10**	16	**0.16**	6	**0.06**
7																																
8																																
9	29	**0.29**	8	**0.08**	5	**0.05**	10	**0.10**	3	**0.03**	4	**0.04**	17	**0.17**	7	**0.07**	13	**0.13**	15	**0.15**	17	**0.17**	2	**0.02**	13	**0.13**	5	**0.05**	9	**0.09**	11	**0.11**
10	26	**0.26**	13	**0.13**	2	**0.02**	7	**0.07**	5	**0.05**	6	**0.06**	11	**0.11**	9	**0.09**	13	**0.13**	11	**0.11**	66	**0.66**	10	**0.10**	16	**0.16**	10	**0.10**	11	**0.11**	6	**0.06**
11	26	**0.26**	11	**0.11**	7	**0.07**	9	**0.09**	6	**0.06**	8	**0.08**	19	**0.19**	5	**0.05**	12	**0.12**	11	**0.11**	14	**0.14**	15	**0.15**	10	**0.10**	9	**0.09**	19	**0.19**	10	**0.10**
12	25	**0.25**	10	**0.10**	0	**0.00**	9	**0.09**	4	**0.04**	7	**0.07**	22	**0.22**	4	**0.04**	17	**0.17**	14	**0.14**	16	**0.16**	12	**0.12**	9	**0.09**	13	**0.13**	15	**0.15**	6	**0.06**
13	26	**0.26**	9	**0.09**	5	**0.05**	9	**0.09**	9	**0.09**	3	**0.03**	16	**0.16**	5	**0.05**	14	**0.14**	11	**0.11**	13	**0.13**	9	**0.09**	11	**0.11**	9	**0.09**	10	**0.10**	6	**0.06**
14																																
15																																
16	21	**0.21**	11	**0.11**	6	**0.06**	2	**0.02**	15	**0.15**	7	**0.07**	13	**0.13**	9	**0.09**	14	**0.14**	9	**0.09**	10	**0.10**	8	**0.08**	7	**0.07**	12	**0.12**	14	**0.14**	2	**0.02**
17	19	**0.19**	14	**0.14**	3	**0.03**	9	**0.09**	11	**0.11**	1	**0.01**	13	**0.13**	5	**0.05**	11	**0.11**	16	**0.16**	7	**0.07**	7	**0.07**	12	**0.12**	9	**0.09**	23	**0.23**	7	**0.07**
18	16	**0.16**	15	**0.15**	5	**0.05**	8	**0.08**	6	**0.06**	5	**0.05**	12	**0.12**	6	**0.06**	18	**0.18**	15	**0.15**	13	**0.13**	3	**0.03**	7	**0.07**	11	**0.11**	12	**0.12**	6	**0.06**
19	20	**0.20**	6	**0.06**	22	**0.22**	7	**0.07**	7	**0.07**	7	**0.07**	12	**0.12**	9	**0.09**	10	**0.10**	14	**0.14**	35	**0.35**	5	**0.05**	5	**0.05**	10	**0.10**	14	**0.14**	3	**0.03**
20	22	**0.22**	9	**0.09**	2	**0.02**	7	**0.07**	12	**0.12**	11	**0.11**	16	**0.16**	8	**0.08**	7	**0.07**	9	**0.09**	7	**0.07**	4	**0.04**	5	**0.05**	9	**0.09**	14	**0.14**	2	**0.02**
21																																
22																																
23	19	**0.19**	10	**0.10**	4	**0.04**	5	**0.05**	4	**0.04**	7	**0.07**	8	**0.08**	14	**0.14**	8	**0.08**	14	**0.14**	13	**0.13**	8	**0.08**	8	**0.08**	3	**0.03**	7	**0.07**	5	**0.05**
24	16	**0.16**	6	**0.06**	4	**0.04**	13	**0.13**	14	**0.14**	6	**0.06**	11	**0.11**	14	**0.14**	17	**0.17**	24	**0.24**	9	**0.09**	8	**0.08**	11	**0.11**	7	**0.07**	10	**0.10**	4	**0.04**
25	27	**0.27**	9	**0.09**	8	**0.08**	7	**0.07**	8	**0.08**	2	**0.02**	9	**0.09**	2	**0.02**	11	**0.11**	10	**0.10**	12	**0.12**	10	**0.10**	6	**0.06**	10	**0.10**	13	**0.13**	5	**0.05**
26	24	**0.24**	8	**0.08**	4	**0.04**	7	**0.07**	9	**0.09**	2	**0.02**	12	**0.12**	6	**0.06**	10	**0.10**	9	**0.09**	17	**0.17**	7	**0.07**	10	**0.10**	6	**0.06**	10	**0.10**	5	**0.05**
27	19	**0.19**	14	**0.14**	0	**0.00**	8	**0.08**	11	**0.11**	5	**0.05**	12	**0.12**	6	**0.06**	9	**0.09**	9	**0.09**	14	**0.14**	6	**0.06**	11	**0.11**	13	**0.13**	15	**0.15**	4	**0.04**
28																																
29																																
30																																
31																																
average	**22.376**	**0.224**	**9.995**	**0.100**	**4.948**	**0.049**	**6.900**	**0.069**	**8.029**	**0.080**	**5.567**	**0.056**	**13.281**	**0.133**	**7.300**	**0.073**	**13.357**	**0.134**	**12.967**	**0.130**	**16.186**	**0.162**	**7.657**	**0.077**	**10.119**	**0.101**	**8.829**	**0.088**	**12.724**	**0.127**	**5.857**	**0.059**
std dev	4.060	0.041	2.496	0.025	4.389	0.044	2.532	0.025	3.527	0.035	2.440	0.024	3.771	0.038	3.122	0.031	3.798	0.038	3.759	0.038	12.791	0.128	2.991	0.030	3.640	0.036	2.645	0.026	3.766	0.038	2.496	0.025
UCL	**34.556**	**0.346**	**17.484**	**0.175**	**18.116**	**0.181**	**14.495**	**0.145**	**18.608**	**0.186**	**12.887**	**0.129**	**24.593**	**0.246**	**16.667**	**0.167**	**24.753**	**0.248**	**24.245**	**0.242**	**54.559**	**0.546**	**16.631**	**0.166**	**21.038**	**0.210**	**16.764**	**0.168**	**24.021**	**0.240**	**13.344**	**0.133**
UWL	**30.496**	**0.305**	**14.987**	**0.150**	**13.727**	**0.137**	**11.964**	**0.120**	**15.082**	**0.151**	**10.447**	**0.104**	**20.822**	**0.208**	**13.545**	**0.135**	**20.954**	**0.210**	**20.486**	**0.205**	**41.768**	**0.418**	**13.640**	**0.136**	**17.399**	**0.174**	**14.119**	**0.141**	**20.256**	**0.203**	**10.849**	**0.108**
LWL	**14.257**	**0.143**	**5.003**	**0.050**	**-3.831**	**-0.038**	**1.836**	**0.018**	**0.975**	**0.010**	**0.687**	**0.007**	**5.740**	**0.057**	**1.055**	**0.011**	**5.760**	**0.058**	**5.448**	**0.054**	**-9.397**	**-0.094**	**1.674**	**0.017**	**2.840**	**0.028**	**3.538**	**0.035**	**5.192**	**0.052**	**0.866**	**0.009**
LCL	**10.197**	**0.102**	**2.507**	**0.025**	**-8.221**	**-0.082**	**-0.695**	**-0.007**	**-2.551**	**-0.026**	**-1.753**	**-0.018**	**1.969**	**0.020**	**-2.067**	**-0.021**	**1.962**	**0.020**	**1.688**	**0.017**	**-22.188**	**-0.222**	**-1.317**	**-0.013**	**-0.800**	**-0.008**	**0.893**	**0.009**	**1.426**	**0.014**	**-1.630**	**-0.016**

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GAS COUNTER G542 Unit: 4 MONTH: October-23
Beta Source Check
23F05880

BETA Activity: **8135.54** **dpm** Count Time: **5** **min**

DATE	4A-1 COUNTS	4A-1 EFF	4A-2 COUNTS	4A-2 EFF	4A-3 COUNTS	4A-3 EFF	4A-4 COUNTS	4A-4 EFF	4B-1 COUNTS	4B-1 EFF	4B-2 COUNTS	4B-2 EFF	4B-3 COUNTS	4B-3 EFF	4B-4 COUNTS	4B-4 EFF	4C-1 COUNTS	4C-1 EFF	4C-2 COUNTS	4C-2 EFF	4C-3 COUNTS	4C-3 EFF	4C-4 COUNTS	4C-4 EFF	4D-1 COUNTS	4D-1 EFF	4D-2 COUNTS	4D-2 EFF	4D-3 COUNTS	4D-3 EFF	4D-4 COUNTS	4D-4 EFF	AVG
1																																	44.2%
2	16991	41.8%	17856	43.9%	15343	37.7%	19136	47.0%	18944	46.6%	17975	44.2%	18780	46.2%	17246	42.4%	17836	43.8%	17885	44.0%	18518	45.5%	19030	46.8%	19130	47.0%	17033	41.9%	16470	40.5%	18830	46.3%	44.2%
3	16992	41.8%	18029	44.3%	14971	36.8%	18892	46.4%	18907	46.5%	17659	43.4%	18624	45.8%	16931	41.6%	17582	43.2%	17674	43.4%	18336	45.1%	18996	46.7%	19314	47.5%	16938	41.6%	16624	40.9%	18837	46.3%	44.2%
4	17477	43.0%	18721	46.0%	16348	40.2%	19093	46.9%	17717	43.6%	15622	38.4%	17191	42.3%	17111	42.1%	16124	39.6%	18448	45.4%	18570	45.7%	17844	43.9%	18590	45.7%	18632	45.8%	18834	46.3%	18939	46.6%	44.2%
5	15462	38.0%	19184	47.2%	17081	42.0%	17568	43.2%	18069	44.4%	19278	47.4%	19245	47.3%	19121	47.0%	16198	39.8%	17763	43.7%	19057	46.8%	18775	46.2%	19086	46.9%	18355	45.1%	16213	39.9%	17124	42.1%	44.2%
6	19024	46.8%	16357	40.2%	16379	40.3%	15246	37.5%	18460	45.4%	18660	45.9%	19141	47.1%	18068	44.4%	18748	46.1%	16723	41.1%	18609	45.7%	18445	45.3%	16609	40.8%	19169	47.1%	17031	41.9%	17232	42.4%	44.2%
7																																	44.2%
8																																	44.2%
9	18665	45.9%	18865	46.4%	16882	41.5%	19163	47.1%	17526	43.1%	16954	41.7%	19453	47.8%	15448	38.0%	16423	40.4%	17447	42.9%	16346	40.2%	16712	41.1%	19055	46.8%	19207	47.2%	18121	44.5%	18712	46.0%	44.2%
10	18280	44.9%	18375	45.2%	18370	45.2%	15399	37.9%	17612	43.3%	19643	48.3%	17467	42.9%	18752	46.1%	19344	47.6%	18382	45.2%	18451	45.4%	18824	46.3%	17700	43.5%	16790	41.3%	16514	40.6%	16939	41.6%	44.2%
11	18901	46.5%	19063	46.9%	18883	46.4%	17686	43.5%	19222	47.3%	15733	38.7%	19727	48.5%	18603	45.7%	18306	45.0%	16958	41.7%	16507	40.6%	17607	43.3%	17166	42.2%	19048	46.8%	16278	40.0%	16733	41.1%	44.2%
12	16823	41.4%	18177	44.7%	16659	41.0%	18100	44.5%	19231	47.3%	17602	43.3%	19262	47.4%	18763	46.1%	16886	41.5%	17778	43.7%	16383	40.3%	17775	43.7%	18680	45.9%	15678	38.5%	18904	46.5%	18577	45.7%	44.2%
13	16777	41.2%	18908	46.5%	18287	45.0%	19140	47.1%	17385	42.7%	15716	38.6%	18186	44.7%	19032	46.8%	16365	40.2%	15811	38.9%	17673	43.4%	18857	46.4%	17151	42.2%	19503	47.9%	18369	45.2%	18226	44.8%	44.2%
14																																	44.2%
15																																	44.2%
16	19272	47.4%	16384	40.3%	17052	41.9%	18954	46.6%	16879	41.5%	17801	43.8%	19095	46.9%	18390	45.2%	16109	39.6%	18161	44.6%	18653	45.9%	18698	46.0%	19354	47.6%	15629	38.4%	17353	42.7%	19004	46.7%	44.2%
17	19053	46.8%	18958	46.6%	18443	45.3%	16910	41.6%	17903	44.0%	19694	48.4%	16965	41.7%	18553	45.6%	18471	45.4%	16424	40.4%	18857	46.4%	15148	37.2%	17375	42.7%	18455	45.4%	18661	45.9%	16759	41.2%	44.2%
18	19118	47.0%	18521	45.5%	18872	46.4%	18801	46.2%	17332	42.6%	17181	42.2%	17869	43.9%	18819	46.3%	19044	46.8%	16084	39.5%	18653	45.9%	18292	45.0%	17412	42.8%	18350	45.1%	16559	40.7%	15170	37.3%	44.2%
19	16654	40.9%	18583	45.7%	16073	39.5%	19695	48.4%	15613	38.4%	19173	47.1%	17023	41.8%	18602	45.7%	17807	43.8%	18230	44.8%	18597	45.7%	18571	45.7%	17410	42.8%	17584	43.2%	17403	42.8%	18922	46.5%	44.2%
20	19304	47.5%	14872	36.6%	18427	45.3%	18239	44.8%	17298	42.5%	17758	43.7%	18853	46.3%	18841	46.3%	16538	40.7%	15973	39.3%	18402	45.2%	16525	40.6%	17548	43.1%	19225	47.3%	19069	46.9%	18272	44.9%	44.2%
21																																	44.2%
22																																	44.2%
23	17686	43.5%	17363	42.7%	18299	45.0%	16513	40.6%	19254	47.3%	17814	43.8%	18904	46.5%	15037	37.0%	18402	45.2%	16110	39.6%	18759	46.1%	17730	43.6%	18566	45.6%	18250	44.9%	18812	46.2%	16352	40.2%	44.2%
24	16882	41.5%	18041	44.4%	18043	44.4%	19322	47.5%	19135	47.0%	15575	38.3%	17614	43.3%	17336	42.6%	19544	48.0%	18380	45.2%	16342	40.2%	18764	46.1%	16563	40.7%	19233	47.3%	17251	42.4%	18626	45.8%	44.2%
25	19209	47.2%	17088	42.0%	18133	44.6%	16705	41.1%	19100	47.0%	19317	47.5%	18134	44.6%	17848	43.9%	18658	45.9%	16631	40.9%	18747	46.1%	16554	40.7%	19228	47.3%	18953	46.6%	15342	37.7%	16770	41.2%	44.2%
26	18172	44.7%	18296	45.0%	16416	40.4%	16599	40.8%	17525	43.1%	18972	46.6%	16910	41.6%	18878	46.4%	17017	41.8%	18300	45.0%	18120	44.5%	15079	37.1%	18902	46.5%	19860	48.8%	17568	43.2%	18649	45.8%	44.2%
27	18875	46.4%	18466	45.4%	16936	41.6%	16844	41.4%	17121	42.1%	19647	48.3%	15178	37.3%	18785	46.2%	19110	47.0%	17146	42.2%	18633	45.8%	16353	40.2%	17465	42.9%	16657	40.9%	18479	45.4%	18762	46.1%	44.2%
28																																	
29																																	#VALUE!
30																																	
31																																	#VALUE!
average	**17981**	**44.2%**	**18005**	**44.3%**	**17295**	**42.5%**	**17900.3**	**44.0%**	**18011.7**	**44.3%**	**17888.7**	**44.0%**	**18181.1**	**44.7%**	**18008**	**44.3%**	**17726**	**43.6%**	**17315**	**42.6%**	**18111**	**44.5%**	**17729**	**43.6%**	**18115**	**44.5%**	**18127**	**44.6%**	**17493**	**43.0%**	**17872**	**43.9%**	
std dev	1149	2.83%	1100	0.03	1171	0.03	1357	0.03	993	0.02	1418	0.03	1146	0.03	1163	0.03	1182	2.91%	911	0.02	925	0.02	1254	0.03	957	2.35%	1271	0.03	1105	0.027	1124	0.028	
UCL	**21429**	**52.7%**	**21305**	**52.4%**	**20807**	**51.2%**	**21971**	**54.0%**	**20991**	**51.6%**	**22144**	**54.4%**	**21619**	**53.1%**	**21496**	**52.8%**	**21273**	**52.3%**	**20048**	**49.3%**	**20884**	**51.3%**	**21491**	**52.8%**	**20986**	**51.6%**	**21940**	**53.9%**	**20807**	**51.2%**	**21245**	**52.2%**	
UWL	**20280**	**49.9%**	**20205**	**49.7%**	**19636**	**48.3%**	**20614**	**50.7%**	**19998**	**49.2%**	**20725**	**51.0%**	**20473**	**50.3%**	**20333**	**50.0%**	**20090**	**49.4%**	**19137**	**47.0%**	**19960**	**49.1%**	**20237**	**49.8%**	**20029**	**49.2%**	**20669**	**50.8%**	**19702**	**48.4%**	**20121**	**49.5%**	
LWL	**15682**	**38.6%**	**15806**	**38.9%**	**14953**	**36.8%**	**15186**	**37.3%**	**16025**	**39.4%**	**15052**	**37.0%**	**15889**	**39.1%**	**15683**	**38.6%**	**15361**	**37.8%**	**15494**	**38.1%**	**16261**	**40.0%**	**15221**	**37.4%**	**16201**	**39.8%**	**15586**	**38.3%**	**15283**	**37.6%**	**15623**	**38.4%**	
LCL	**14533**	**35.7%**	**14706**	**36.2%**	**13783**	**33.9%**	**13829**	**34.0%**	**15032**	**37.0%**	**13634**	**33.5%**	**14743**	**36.2%**	**14521**	**35.7%**	**14178**	**34.9%**	**14583**	**35.8%**	**15337**	**37.7%**	**13967**	**34.3%**	**15245**	**37.5%**	**14315**	**35.2%**	**14178**	**34.9%**	**14498**	**35.6%**	

10_23_Unit4

PDF created with pdfFactory trial version www.pdffactory.com

GAS COUNTER G542 Unit: 4 MONTH: Oct-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	108.5	**1.09**	183.4	**1.83**	136.1	**1.36**	173.4	**1.73**	185.2	**1.85**	178.7	**1.79**	232.4	**2.32**	230.8	**2.31**	252.5	**2.53**	348.9	**3.49**	162.9	**1.63**	139.4	**1.39**	91.7	**0.92**	212.1	**2.12**	116.9	**1.17**	155.1	**1.55**
2	121	**1.21**	175	**1.75**	137	**1.37**	168	**1.68**	174	**1.74**	186	**1.86**	209	**2.09**	246	**2.46**	264	**2.64**	349	**3.49**	167	**1.67**	133	**1.33**	86	**0.86**	243	**2.43**	109	**1.09**	156	**1.56**
3	116	**1.16**	181	**1.81**	130	**1.30**	195	**1.95**	185	**1.85**	181	**1.81**	240	**2.40**	254	**2.54**	209	**2.09**	201	**2.01**	189	**1.89**	155	**1.55**	106	**1.06**	212	**2.12**	115	**1.15**	155	**1.55**
4	145	**1.45**	180	**1.80**	137	**1.37**	184	**1.84**	176	**1.76**	188	**1.88**	235	**2.35**	253	**2.53**	189	**1.89**	147	**1.47**	171	**1.71**	136	**1.36**	104	**1.04**	199	**1.99**	127	**1.27**	152	**1.52**
5	109	**1.09**	190	**1.90**	149	**1.49**	197	**1.97**	191	**1.91**	191	**1.91**	203	**2.03**	206	**2.06**	194	**1.94**	185	**1.85**	160	**1.60**	147	**1.47**	111	**1.11**	196	**1.96**	119	**1.19**	180	**1.80**
6	120	**1.20**	171	**1.71**	137	**1.37**	183	**1.83**	187	**1.87**	172	**1.72**	220	**2.20**	230	**2.30**	190	**1.90**	165	**1.65**	158	**1.58**	130	**1.30**	118	**1.18**	214	**2.14**	90	**0.90**	167	**1.67**
7																																
8																																
9	125	**1.25**	186	**1.86**	137	**1.37**	185	**1.85**	177	**1.77**	169	**1.69**	235	**2.35**	253	**2.53**	215	**2.15**	168	**1.68**	180	**1.80**	162	**1.62**	90	**0.90**	208	**2.08**	116	**1.16**	173	**1.73**
10	131	**1.31**	228	**2.28**	146	**1.46**	170	**1.70**	175	**1.75**	176	**1.76**	214	**2.14**	249	**2.49**	212	**2.12**	181	**1.81**	237	**2.37**	140	**1.40**	112	**1.12**	221	**2.21**	137	**1.37**	195	**1.95**
11	97	**0.97**	196	**1.96**	129	**1.29**	171	**1.71**	190	**1.90**	193	**1.93**	249	**2.49**	239	**2.39**	217	**2.17**	190	**1.90**	177	**1.77**	159	**1.59**	119	**1.19**	217	**2.17**	135	**1.35**	172	**1.72**
12	189	**1.89**	188	**1.88**	125	**1.25**	172	**1.72**	184	**1.84**	184	**1.84**	231	**2.31**	228	**2.28**	230	**2.30**	185	**1.85**	169	**1.69**	163	**1.63**	112	**1.12**	234	**2.34**	85	**0.85**	159	**1.59**
13	138	**1.38**	187	**1.87**	144	**1.44**	189	**1.89**	155	**1.55**	181	**1.81**	240	**2.40**	239	**2.39**	191	**1.91**	180	**1.80**	195	**1.95**	132	**1.32**	103	**1.03**	210	**2.10**	123	**1.23**	147	**1.47**
14																																
15																																
16	96	**0.96**	198	**1.98**	160	**1.60**	197	**1.97**	304	**3.04**	158	**1.58**	271	**2.71**	227	**2.27**	220	**2.20**	190	**1.90**	189	**1.89**	128	**1.28**	111	**1.11**	193	**1.93**	104	**1.04**	142	**1.42**
17	122	**1.22**	169	**1.69**	150	**1.50**	183	**1.83**	218	**2.18**	166	**1.66**	229	**2.29**	234	**2.34**	225	**2.25**	178	**1.78**	173	**1.73**	147	**1.47**	113	**1.13**	210	**2.10**	125	**1.25**	173	**1.73**
18	127	**1.27**	188	**1.88**	167	**1.67**	193	**1.93**	217	**2.17**	173	**1.73**	207	**2.07**	215	**2.15**	216	**2.16**	182	**1.82**	189	**1.89**	129	**1.29**	103	**1.03**	217	**2.17**	122	**1.22**	184	**1.84**
19	129	**1.29**	177	**1.77**	177	**1.77**	172	**1.72**	190	**1.90**	172	**1.72**	216	**2.16**	251	**2.51**	207	**2.07**	200	**2.00**	195	**1.95**	130	**1.30**	84	**0.84**	202	**2.02**	117	**1.17**	155	**1.55**
20	110	**1.10**	162	**1.62**	108	**1.08**	194	**1.94**	209	**2.09**	170	**1.70**	229	**2.29**	253	**2.53**	209	**2.09**	176	**1.76**	165	**1.65**	159	**1.59**	124	**1.24**	237	**2.37**	129	**1.29**	160	**1.60**
21																																
22																																
23	149	**1.49**	198	**1.98**	141	**1.41**	189	**1.89**	187	**1.87**	192	**1.92**	228	**2.28**	237	**2.37**	208	**2.08**	198	**1.98**	165	**1.65**	154	**1.54**	114	**1.14**	227	**2.27**	109	**1.09**	159	**1.59**
24	139	**1.39**	170	**1.70**	144	**1.44**	234	**2.34**	200	**2.00**	205	**2.05**	195	**1.95**	257	**2.57**	199	**1.99**	231	**2.31**	156	**1.56**	152	**1.52**	90	**0.90**	218	**2.18**	108	**1.08**	173	**1.73**
25	120	**1.20**	176	**1.76**	127	**1.27**	174	**1.74**	191	**1.91**	165	**1.65**	208	**2.08**	195	**1.95**	215	**2.15**	164	**1.64**	160	**1.60**	137	**1.37**	94	**0.94**	203	**2.03**	124	**1.24**	155	**1.55**
26	128	**1.28**	165	**1.65**	136	**1.36**	168	**1.68**	178	**1.78**	203	**2.03**	224	**2.24**	216	**2.16**	195	**1.95**	193	**1.93**	153	**1.53**	166	**1.66**	103	**1.03**	213	**2.13**	94	**0.94**	169	**1.69**
27	108	**1.08**	176	**1.76**	126	**1.26**	183	**1.83**	206	**2.06**	171	**1.71**	225	**2.25**	256	**2.56**	196	**1.96**	167	**1.67**	183	**1.83**	140	**1.40**	92	**0.92**	207	**2.07**	124	**1.24**	158	**1.58**
28																																
29																																
30																																
31																																
average	**125**	**1.25**	**183**	**1.83**	**140**	**1.40**	**184**	**1.84**	**194**	**1.94**	**180**	**1.80**	**226**	**2.26**	**237**	**2.37**	**212**	**2.12**	**199**	**1.99**	**176**	**1.76**	**145**	**1.45**	**104**	**1.04**	**214**	**2.14**	**116**	**1.16**	**164**	**1.64**
std dev	20	0.20	15	0.15	15	0.15	15	0.15	29	0.29	12	0.12	17	0.17	18	0.18	19	0.19	53	0.53	19	0.19	13	0.13	12	0.12	13	0.13	14	0.14	13	0.13
UCL	**186**	**1.86**	**227**	**2.27**	**186**	**1.86**	**230**	**2.30**	**282**	**2.82**	**217**	**2.17**	**277**	**2.77**	**289**	**2.89**	**270**	**2.70**	**357**	**3.57**	**233**	**2.33**	**183**	**1.83**	**139**	**1.39**	**253**	**2.53**	**157**	**1.57**	**203**	**2.03**
UWL	**166**	**1.66**	**212**	**2.12**	**171**	**1.71**	**215**	**2.15**	**253**	**2.53**	**205**	**2.05**	**260**	**2.60**	**272**	**2.72**	**251**	**2.51**	**304**	**3.04**	**214**	**2.14**	**170**	**1.70**	**127**	**1.27**	**240**	**2.40**	**143**	**1.43**	**190**	**1.90**
LWL	**84**	**0.84**	**154**	**1.54**	**110**	**1.10**	**154**	**1.54**	**136**	**1.36**	**155**	**1.55**	**191**	**1.91**	**201**	**2.01**	**173**	**1.73**	**94**	**0.94**	**138**	**1.38**	**119**	**1.19**	**80**	**0.80**	**188**	**1.88**	**88**	**0.88**	**138**	**1.38**
LCL	**64**	**0.64**	**139**	**1.39**	**94**	**0.94**	**139**	**1.39**	**106**	**1.06**	**142**	**1.42**	**174**	**1.74**	**184**	**1.84**	**154**	**1.54**	**41**	**0.41**	**118**	**1.18**	**107**	**1.07**	**69**	**0.69**	**175**	**1.75**	**74**	**0.74**	**125**	**1.25**

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Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier

Run Date: 07/05/2023 11:03
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2570	2567	3
1520	3092	3088	4
1540	3543	3540	3
1560	4138	4135	3
1580	4479	4476	3
1600	4707	4704	3
1620	5160	5153	7
1640	5503	5496	7
1660	5585	5579	6
1680	5660	5653	7
1700	5732	5726	6
1720	5848	5842	6
1740	5971	5957	14
1760	5928	5900	28
1780	6072	5981	91
1800	6064	5899	165

Special Notes:

Report Generated: 07/05/2023

G542HV.RPT ver 2.0

Collected By: SNR661 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 11:40
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2380	2375	5
1520	2900	2898	2
1540	3417	3410	7
1560	3835	3834	1
1580	4344	4342	2
1600	4574	4567	7
1620	4901	4898	3
1640	5109	5099	10
1660	5317	5311	6
1680	5601	5596	5
1700	5630	5621	9
1720	5555	5550	5
1740	5628	5610	18
1760	5727	5695	32
1780	5535	5474	61
1800	5742	5575	167

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR161 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 12:17
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1966	1964	2
1520	2595	2594	1
1540	3063	3059	4
1560	3467	3463	4
1580	3907	3904	3
1600	4132	4130	2
1620	4401	4397	4
1640	4566	4561	5
1660	4747	4742	5
1680	4725	4721	4
1700	4871	4863	8
1720	4902	4896	6
1740	4941	4933	8
1760	4972	4941	31
1780	5070	4999	71
1800	5033	4913	120

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SUR561 **Date:** 7/5/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 12:42
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2468	2467	1
1520	2875	2874	1
1540	3240	3240	0
1560	3408	3407	1
1580	3768	3766	2
1600	3893	3890	3
1620	3869	3868	1
1640	4051	4051	0
1660	3935	3934	1
1680	3966	3963	3
1700	4142	4140	2
1720	4231	4226	5
1740	4087	4078	9
1760	4110	4090	20
1780	4122	4063	59
1800	4173	4039	134

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 13:05
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2327	2327	0
1520	2766	2763	3
1540	3167	3165	2
1560	3615	3612	3
1580	4057	4053	4
1600	4110	4105	5
1620	4285	4285	0
1640	4794	4789	5
1660	4641	4638	3
1680	4807	4800	7
1700	4961	4955	6
1720	4831	4827	4
1740	5084	5069	15
1760	5029	4995	33
1780	4908	4826	82
1800	4979	4823	155

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/14/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 13:24
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3793	3791	2
1520	4451	4445	6
1540	4940	4935	5
1560	5309	5307	2
1580	5566	5562	4
1600	5515	5510	5
1620	5944	5936	8
1640	6120	6112	8
1660	6128	6122	6
1680	6100	6097	3
1700	6199	6195	4
1720	6176	6162	14
1740	6319	6296	23
1760	6301	6243	58
1780	6268	6147	121
1800	6227	6020	207

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SNR961 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/6/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 14:04
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3144	3141	3
1520	3666	3662	4
1540	4055	4050	5
1560	4519	4515	4
1580	4731	4722	9
1600	4884	4883	1
1620	4978	4970	8
1640	5260	5254	6
1660	5321	5315	6
1680	5333	5324	9
1700	5305	5298	7
1720	5351	5339	12
1740	5397	5369	28
1760	5398	5342	55
1780	5439	5338	101
1800	5455	5258	197

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR661 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 14:27
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2060	2060	0
1520	2359	2359	0
1540	2784	2783	1
1560	3039	3038	1
1580	3296	3295	1
1600	3523	3522	1
1620	3576	3573	3
1640	3805	3804	1
1660	3929	3924	5
1680	3999	3996	3
1700	3935	3934	1
1720	4089	4086	3
1740	4035	4029	6
1760	4116	4095	21
1780	4013	3943	69
1800	4031	3907	124

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SNR 161 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 15:39
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2004	2001	3
1520	2409	2408	1
1540	2788	2785	3
1560	3232	3231	1
1580	3451	3449	2
1600	3743	3741	2
1620	4050	4045	5
1640	4315	4313	2
1660	4381	4374	7
1680	4500	4492	8
1700	4730	4723	7
1720	4800	4793	7
1740	4815	4812	3
1760	4879	4867	12
1780	4953	4918	35
1800	4846	4783	63

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SWR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:00
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1221	1219	2
1520	1882	1879	3
1540	2557	2556	1
1560	3222	3220	2
1580	3897	3893	4
1600	4250	4249	1
1620	4620	4617	3
1640	5151	5148	3
1660	5505	5499	6
1680	5778	5776	2
1700	5659	5655	4
1720	5967	5962	5
1740	5948	5943	5
1760	5965	5959	6
1780	6101	6082	19
1800	5979	5918	61

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (CIrcle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/11/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:18
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2183	2181	2
1520	2677	2676	1
1540	3085	3080	5
1560	3555	3552	3
1580	3947	3943	4
1600	4199	4195	4
1620	4528	4523	5
1640	4715	4711	4
1660	4988	4982	6
1680	5256	5243	13
1700	5328	5322	6
1720	5316	5307	9
1740	5270	5264	6
1760	5343	5321	22
1780	5432	5376	56
1800	5405	5283	122

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:40
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1503	1503	0
1520	1776	1776	0
1540	2098	2097	1
1560	2484	2484	0
1580	2790	2790	0
1600	3152	3152	0
1620	3355	3354	1
1640	3439	3436	3
1660	3709	3705	4
1680	3731	3729	2
1700	3946	3945	1
1720	3819	3819	0
1740	4000	3996	4
1760	3956	3945	11
1780	4117	4083	34
1800	4110	4021	89

Special Notes:

Report Generated: 07/05/2023

G542HV.RPT ver 2.0

Collected By: SNR961 **Date:** 7/5/23

Changes Needed: Yes No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:08
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2299	2296	3
1520	2729	2728	1
1540	3114	3112	2
1560	3595	3594	1
1580	3880	3880	0
1600	4055	4053	2
1620	4394	4390	4
1640	4647	4646	1
1660	4862	4861	1
1680	4793	4789	4
1700	4885	4882	3
1720	4990	4981	9
1740	4920	4910	10
1760	5029	4989	40
1780	4970	4893	77
1800	5172	5044	128

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:28
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3319	3318	1
1520	3872	3868	4
1540	4425	4421	4
1560	4759	4755	4
1580	5125	5120	5
1600	5482	5477	5
1620	5755	5751	4
1640	5641	5636	5
1660	5943	5938	5
1680	6001	5997	4
1700	6153	6140	13
1720	6059	6051	8
1740	6227	6218	9
1760	6184	6172	12
1780	6312	6285	27
1800	6267	6201	66

Special Notes:

Report Generated: 07/06/2023 G542HV.RPT ver 2.0

Collected By: SWR661 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:45
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2164	2164	0
1520	2616	2615	1
1540	3174	3171	3
1560	3445	3443	2
1580	4012	4012	0
1600	4422	4415	7
1620	4652	4646	6
1640	4799	4798	1
1660	4929	4923	6
1680	5251	5248	3
1700	5147	5141	6
1720	5188	5183	5
1740	5244	5240	4
1760	5235	5228	7
1780	5387	5370	17
1800	5426	5374	52

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SWR 961 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/11/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 11:37
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1075	1075	0
1520	1388	1388	0
1540	1709	1708	1
1560	2025	2023	2
1580	2402	2402	0
1600	2465	2463	2
1620	2869	2867	2
1640	3177	3173	4
1660	3334	3333	1
1680	3628	3624	4
1700	3690	3689	1
1720	3789	3787	2
1740	3794	3789	5
1760	3929	3925	4
1780	3949	3940	9
1800	3943	3914	29

Special Notes:

Report Generated: 07/06/2023 G542HV.RPT ver 2.0

Collected By: SWR961 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1 **Detector:** A
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 11:14
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3909	4
2	3913	4
3	3845	4
4	3765	2
5	3934	2
6	3831	2
7	3736	4
8	3855	2
9	3842	1
10	3773	5
11	3711	1
12	3880	2
13	3734	2
14	3840	6
15	3786	4
16	3833	6
17	3894	8
18	3809	4
19	3813	6
20	3811	1

(Xbar) Mean:	3825.70	3.50
Calculated Chi-Sqr Value:	19.34	21.43

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR661 **Date:** 7/7/23
Changes Needed: **Yes** **No** **(Circle One)**
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 11:35
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3333	2
2	3371	2
3	3361	3
4	3399	5
5	3425	1
6	3439	5
7	3412	2
8	3279	2
9	3298	1
10	3432	1
11	3423	1
12	3520	0
13	3366	2
14	3339	3
15	3372	4
16	3334	7
17	3342	1
18	3456	4
19	3441	2
20	3390	1

(Xbar) Mean:	3386.60	2.45
Calculated Chi-Sqr Value:	19.15	24.06

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWRGC1 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 11:57
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3387	6
2	3412	4
3	3269	2
4	3357	12
5	3431	12
6	3472	7
7	3386	6
8	3354	6
9	3455	10
10	3463	10
11	3500	4
12	3436	6
13	3386	16
14	3426	9
15	3415	5
16	3292	11
17	3493	9
18	3367	5
19	3362	3
20	3438	5

(Xbar) Mean:	3405.05	7.40
Calculated Chi-Sqr Value:	20.84	33.08

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNREG1 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 12:22
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3494	8
2	3512	8
3	3492	4
4	3554	7
5	3544	15
6	3528	10
7	3544	4
8	3608	6
9	3644	4
10	3697	11
11	3468	8
12	3530	2
13	3536	10
14	3451	10
15	3501	8
16	3587	6
17	3573	6
18	3534	4
19	3553	8
20	3555	10

(Xbar) Mean:	3545.25	7.45
Calculated Chi-Sqr Value:	17.93	24.29

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SW REG 1 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** A
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 12:45
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3865	2
2	3693	5
3	3808	6
4	3875	4
5	3755	2
6	3823	5
7	3856	3
8	3839	6
9	3754	1
10	3768	5
11	3889	4
12	3766	3
13	3711	6
14	3857	4
15	3776	6
16	3742	7
17	3757	3
18	3817	6
19	3794	4
20	3895	5

(Xbar) Mean:	3802.00	4.35
Calculated Chi-Sqr Value:	17.63	11.62

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWREG1 **Date:** 7/7/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 13:12
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3457	0
2	3620	2
3	3579	1
4	3541	1
5	3583	1
6	3614	2
7	3518	3
8	3498	1
9	3595	3
10	3548	2
11	3595	2
12	3586	3
13	3577	6
14	3453	0
15	3622	3
16	3538	4
17	3511	5
18	3514	2
19	3577	1
20	3554	2

(Xbar) Mean:	3554.00	2.20
Calculated Chi-Sqr Value:	13.35	20.55

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWRGLI **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/10/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 13:33
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3392	5
2	3358	3
3	3430	3
4	3488	2
5	3425	5
6	3518	2
7	3557	11
8	3415	3
9	3492	4
10	3487	9
11	3518	3
12	3400	4
13	3468	7
14	3496	2
15	3517	3
16	3451	5
17	3405	7
18	3411	5
19	3477	6
20	3463	3

(Xbar) Mean:	3458.40	4.60
Calculated Chi-Sqr Value:	14.98	24.09

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWREG1 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical

G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:01
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3593	14
2	3523	11
3	3398	9
4	3426	11
5	3424	10
6	3573	11
7	3436	5
8	3505	3
9	3459	6
10	3612	13
11	3481	6
12	3554	9
13	3526	6
14	3397	10
15	3541	12
16	3585	10
17	3512	8
18	3485	11
19	3596	5
20	3577	8

(Xbar) Mean:	3510.15	8.90
Calculated Chi-Sqr Value:	26.05	18.63

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR461 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/11/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** A
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3758	2
2	3685	6
3	3742	5
4	3586	3
5	3662	4
6	3737	6
7	3756	3
8	3765	3
9	3479	3
10	3770	6
11	3701	4
12	3697	2
13	3797	3
14	3705	6
15	3652	6
16	3630	9
17	3718	8
18	3656	4
19	3659	5
20	3674	2

(Xbar) Mean:	3691.45	4.50
Calculated Chi-Sqr Value:	27.65	16.67

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SNR961 **Date:** 7/7/23
Signature Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3179	0
2	3177	1
3	3298	0
4	3254	0
5	3262	2
6	3321	0
7	3368	1
8	3382	0
9	3397	0
10	3463	0
11	3369	0
12	3378	1
13	3390	1
14	3340	1
15	3287	0
16	3384	1
17	3390	1
18	3371	4
19	3341	2
20	3343	1

(Xbar) Mean:	3334.70	0.00
Calculated Chi-Sqr Value:	30.43	0.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SNR961 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: _____ **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3437	2
2	3384	2
3	3352	1
4	3332	1
5	3354	4
6	3353	3
7	3367	3
8	3358	1
9	3316	6
10	3355	5
11	3396	2
12	3393	2
13	3404	6
14	3415	0
15	3347	4
16	3413	3
17	3377	5
18	3392	3
19	3481	6
20	3391	5

(Xbar) Mean:	3380.85	3.20
Calculated Chi-Sqr Value:	8.28	20.38

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes: rerun to verify 7/7/23

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWR961 **Date:** 7/7/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3421	6
2	3439	3
3	3529	1
4	3451	8
5	3363	3
6	3408	6
7	3478	6
8	3514	5
9	3489	4
10	3538	0
11	3556	2
12	3579	7
13	3514	2
14	3509	3
15	3531	2
16	3403	2
17	3462	2
18	3510	6
19	3487	5
20	3436	4

(Xbar) Mean:	3480.85	3.85
Calculated Chi-Sqr Value:	17.58	23.52

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/7/23
Changes Needed: Yes (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 15:13
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3427	4
2	3425	5
3	3312	4
4	3360	1
5	3385	1
6	3294	4
7	3296	6
8	3340	5
9	3450	5
10	3358	1
11	3313	2
12	3458	6
13	3321	2
14	3402	5
15	3485	4
16	3360	2
17	3431	5
18	3442	2
19	3357	6
20	3366	3

(Xbar) Mean:	3379.10	3.65
Calculated Chi-Sqr Value:	18.89	16.04

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREG1 **Date:** 7/12/23
Changes Needed: Yes No (Circle One)
Approved By: **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: A
Voltage: 1740
Conf Level: 95.0 %
Test Date: 07/07/2023 16:06
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3836	11
2	3838	10
3	3687	20
4	3756	9
5	3715	16
6	3719	6
7	3789	11
8	3796	10
9	3809	10
10	3740	15
11	3876	15
12	3857	7
13	3642	11
14	3697	11
15	3762	11
16	3778	16
17	3800	17
18	3812	9
19	3840	7
20	3826	11

(Xbar) Mean:	3778.75	11.65
Calculated Chi-Sqr Value:	19.84	22.19

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWR961 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: B
Voltage: 1760
Conf Level: 95.0 %

Test Date: 07/07/2023 16:28
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3491	6
2	3599	6
3	3661	6
4	3634	4
5	3546	8
6	3536	10
7	3527	1
8	3621	5
9	3646	6
10	3556	7
11	3604	3
12	3522	7
13	3668	2
14	3573	2
15	3540	2
16	3592	5
17	3567	4
18	3510	7
19	3467	1
20	3638	2

(Xbar) Mean:	3574.90	4.70
Calculated Chi-Sqr Value:	18.02	26.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SNR661 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1760
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 16:55
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3430	4
2	3358	6
3	3453	7
4	3514	5
5	3361	1
6	3389	4
7	3367	3
8	3260	2
9	3393	1
10	3461	3
11	3459	3
12	3382	5
13	3387	6
14	3361	4
15	3496	4
16	3376	4
17	3350	1
18	3362	2
19	3327	7
20	3419	6

(Xbar) Mean:	3395.25	3.90
Calculated Chi-Sqr Value:	20.33	17.90

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWRGC1 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1760
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 17:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3467	3
2	3487	1
3	3525	2
4	3423	10
5	3394	2
6	3464	4
7	3541	4
8	3513	7
9	3546	3
10	3530	6
11	3469	3
12	3472	9
13	3397	3
14	3446	2
15	3560	4
16	3463	6
17	3474	4
18	3457	6
19	3417	4
20	3338	5

(Xbar) Mean:	3469.15	4.40
Calculated Chi-Sqr Value:	17.89	23.82

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREG1 **Date:** 7/7/23
Changes Needed: Yes (Circle One)
Approved By: [signature] **Date:** 7/12/23

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2136

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	16100	dpm	805	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	7694.29	dpm	384.71	dpm

44-9 PROBE
CPM Acceptance Range

1693	**50**	
1354	**1304**	**Low**
2031	**2081**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

3511	**176**	
3160	**2984**	**Low**
3862	**4038**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2137

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	23800	dpm	1190	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11374.16	dpm	568.71	dpm

44-9 PROBE
CPM Acceptance Range

2502	**74**	
2002	**1928**	**Low**
3003	**3077**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5190	**260**	
4671	**4412**	**Low**
5709	**5969**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2139

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	20700	dpm	1040	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.41	years	30.41	years
dilution =	1.00		1.00	
A =	9907.77	dpm	497.78	dpm

44-9 PROBE
CPM Acceptance Range

2180	**65**	
1744	**1679**	**Low**
2616	**2680**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

4521	**227**	
4069	**3842**	**Low**
4973	**5200**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2138

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	25000	dpm	1250	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11947.65	dpm	597.38	dpm

44-9 PROBE

CPM Acceptance Range		
2628	**78**	
2103	**2025**	**Low**
3154	**3232**	**High**

Gamma Products G5020-400

Efficienc 0.4563

CPM Acceptance Range		
5452	**273**	
4907	**4634**	**Low**
5997	**6269**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Sr-90
124007
ESC51613
22J11029

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	25-Aug-22
DATE OF CALIBRATION	01-Jan-23
PREP:	13-Sep-22

Ao =	940.91	nCi			
N =	0.02				
T(1/2) =	28.60	years			
T =	0.35	years			
dilution =	1000.00				
A =	932.92	nCi	SR90/Y90		
A =	2071.08	dpm/ml	4142.1618		41421.62
A =	932.92	pCi/ml	1865.8387		8284.324
A =	932.92	+/-	16.806536	pCi/ml	

Uncertainty	0.0173
Weight	0.05%
Volume (1000 ml)	0.50%
CSU	1.80%

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DECAY CALCUALTION

Th230 Source
124007
ESC51614
22I13361

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 25-Aug-22
DATE OF CALIBRATION 01-Jan-23

Ao =	1011.73	nCi	
N =	0.00		
T(1/2) =	77000.00	years	28105000
T =	0.35	years	
dilution =	1000.00		
A =	1011.73	nCi	
A =	2246.04	dpm/ml	22460.399
A =	1011.73	pCi/ml	

Uncertainty	3.16%
Weight	0.05%
Volume	0.03%
CSU	3.16%

					pCi/l
Activity	**1011.7**	**+/-**	**32.0**	**pCi/ml**	1011730

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GROSS ALPHA AND GROSS BETA DATA REPORT
EPA 900/9310
WG2149279

SAMPLE ID	GROSS ALPHA pCi/l						GROSS BETA pCi/l						PREP DATE	ANALYSIS DATE
	result	2σCE	TPU	Lc	MDA/MDC	SDWA	result	2σCE	TPU	Lc	MDA/MDC	SDWA		
BLANK WG2149279	-0.022	0.530	-0.332	0.461	0.807	0.492	-0.413	1.172	-1.129	0.842	1.608	0.962	10/11/23 13:46	10/31/23 12:39
LCS WG2149279	12.348	1.471	1.457	0.450	0.776	0.476	38.607	2.159	3.908	0.687	1.298	0.778	10/11/23 13:46	10/30/23 14:07
MS L1658999-11 WG2149279	18.379	2.012	2.114	0.504	0.845	0.523	40.112	2.363	4.074	0.870	1.662	0.995	10/11/23 13:46	10/31/23 12:39
MSD L1658999-11 WG2149279	14.382	1.900	1.751	0.604	1.034	0.635	34.548	2.236	3.518	0.828	1.576	0.944	10/11/23 13:46	10/31/23 12:39
DUP L1660430-03 WG2149279	4.108	1.093	0.725	0.547	0.931	0.573	6.788	1.468	0.888	0.852	1.626	0.973	10/11/23 13:46	10/31/23 12:39
L1658999-08 WG2149279	468.402	323.652	192.627	234.754	391.823	243.164	418.351	265.376	114.639	175.921	334.580	200.336	10/11/23 13:46	10/31/23 12:39
L1658999-09 WG2149279	73.407	277.667	170.868	250.812	421.931	260.973	255.932	231.759	98.569	158.267	299.249	179.335	10/11/23 13:46	10/31/23 12:39
L1658999-10 WG2149279	370.279	347.802	209.779	265.321	455.004	279.344	187.711	244.983	79.011	167.647	317.773	190.366	10/11/23 13:46	10/31/23 12:39
L1658999-11 WG2149279	0.083	0.450	0.278	0.418	0.699	0.433	0.849	1.293	0.565	0.892	1.707	1.021	10/11/23 13:46	10/31/23 12:39
L1658999-12 WG2149279	36.676	51.627	31.229	42.498	71.909	44.373	65.572	46.159	19.936	30.947	58.572	35.096	10/11/23 13:46	10/31/23 12:39
L1658999-13 WG2149279	11.044	53.814	33.216	49.329	82.853	51.280	0.390	44.901	1.201	31.916	60.821	36.408	10/11/23 13:46	10/31/23 12:39
L1658999-14 WG2149279	98.168	99.205	59.112	79.456	131.399	81.887	122.836	87.045	37.980	58.304	110.850	66.377	10/11/23 13:46	10/31/23 12:39
L1658999-15 WG2149279	-15.645	72.169	-45.834	74.016	122.969	76.471	93.400	105.557	47.065	73.371	138.445	82.994	10/11/23 13:46	10/31/23 12:39
L1659084-01 WG2149279	-8.078	31.132	-19.703	27.789	48.682	29.677	2.834	21.031	3.483	15.020	28.372	17.005	10/11/23 13:46	10/31/23 12:40
L1659084-02 WG2149279	-1.408	9.351	-5.904	9.238	15.481	9.591	7.436	10.651	4.485	7.461	14.081	8.441	10/11/23 13:46	10/31/23 12:40
L1659321-01 WG2149279	8.072	9.192	5.539	7.323	12.417	7.656	-0.115	10.251	-0.238	7.377	13.939	8.354	10/11/23 13:46	10/31/23 12:40
L1659739-01 WG2149279	3.471	2.342	1.423	1.658	2.899	1.768	3.642	1.533	0.696	0.976	1.863	1.115	10/11/23 13:46	10/31/23 16:06
L1659740-01 WG2149279	36.359	5.083	4.505	1.564	2.625	1.625	14.087	2.390	1.628	1.273	2.432	1.455	10/11/23 13:46	10/31/23 16:06
L1659975-01 WG2149279	-0.035	1.117	-0.699	1.024	1.752	1.077	1.121	1.267	0.531	0.869	1.654	0.990	10/11/23 13:46	10/31/23 16:06
L1659985-01 WG2149279	0.919	1.175	0.711	0.947	1.613	0.993	1.463	1.705	0.687	1.166	2.225	1.332	10/11/23 13:46	10/31/23 16:06
L1659985-02 WG2149279	2.237	1.995	1.190	1.542	2.574	1.598	8.255	2.689	1.406	1.680	3.196	1.913	10/11/23 13:46	10/31/23 16:06
L1660353-01 WG2149279	6.489	7.808	4.699	6.335	10.656	6.591	2.774	10.322	2.696	7.320	13.841	8.295	10/11/23 13:46	10/31/23 16:06
L1660430-01 WG2149279	21.299	8.801	5.420	5.431	9.313	5.718	16.062	6.292	3.437	4.052	7.680	4.601	10/11/23 13:46	10/31/23 16:06
L1660430-02 WG2149279	10.650	3.271	2.081	1.712	2.865	1.776	13.688	4.224	2.428	2.661	5.090	3.045	10/11/23 13:46	10/31/23 16:06
L1660430-03 WG2149279	5.264	1.281	0.871	0.601	1.017	0.627	8.822	1.366	1.052	0.734	1.389	0.832	10/11/23 13:46	10/31/23 16:06
0	#VALUE!	#DIV/0!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#DIV/0!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	10/11/23 13:46	1/0/00 0:00
0	#VALUE!	#DIV/0!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#DIV/0!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	10/11/23 13:46	1/0/00 0:00

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GROSS ALPHA AND GROSS BETA DATA REPORT
EPA 900/9310
WG2149279

SAMPLE ID	GROSS ALPHA Bq/l						GROSS BETA Bq/l						PREP DATE	ANALYSIS DATE
	result	2σCE	TPU	Lc	MDA/MDC	SDWA	result	2σCE	TPU	Lc	MDA/MDC	SDWA		
BLANK WG2149279	-0.001	0.020	-0.012	0.017	0.030	0.018	-0.015	0.043	-0.042	0.031	0.059	0.036	10/11/23 13:46	10/31/23 12:39
LCS WG2149279	0.457	0.054	0.054	0.017	0.029	0.018	1.428	0.080	0.145	0.025	0.048	0.029	10/11/23 13:46	10/30/23 14:07
MS L1658999-11 WG2149279	0.680	0.074	0.078	0.019	0.031	0.019	1.484	0.087	0.151	0.032	0.061	0.037	10/11/23 13:46	10/31/23 12:39
MSD L1658999-11 WG2149279	0.532	0.070	0.065	0.022	0.038	0.024	1.278	0.083	0.130	0.031	0.058	0.035	10/11/23 13:46	10/31/23 12:39
DUP L1660430-03 WG2149279	0.152	0.040	0.027	0.020	0.034	0.021	0.251	0.054	0.033	0.032	0.060	0.036	10/11/23 13:46	10/31/23 12:39
L1658999-08 WG2149279	17.329	11.974	7.126	8.685	14.496	8.996	15.477	9.818	4.241	6.508	12.378	7.412	10/11/23 13:46	10/31/23 12:39
L1658999-09 WG2149279	2.716	10.273	6.321	9.279	15.610	9.655	9.468	8.574	3.647	5.855	11.071	6.635	10/11/23 13:46	10/31/23 12:39
L1658999-10 WG2149279	13.699	12.867	7.761	9.816	16.833	10.335	6.945	9.063	2.923	6.202	11.756	7.043	10/11/23 13:46	10/31/23 12:39
L1658999-11 WG2149279	0.003	0.017	0.010	0.015	0.026	0.016	0.031	0.048	0.021	0.033	0.063	0.038	10/11/23 13:46	10/31/23 12:39
L1658999-12 WG2149279	1.357	1.910	1.155	1.572	2.660	1.642	2.426	1.708	0.738	1.145	2.167	1.298	10/11/23 13:46	10/31/23 12:39
L1658999-13 WG2149279	0.409	1.991	1.229	1.825	3.065	1.897	0.014	1.661	0.044	1.181	2.250	1.347	10/11/23 13:46	10/31/23 12:39
L1658999-14 WG2149279	3.632	3.670	2.187	2.940	4.861	3.029	4.544	3.220	1.405	2.157	4.101	2.456	10/11/23 13:46	10/31/23 12:39
L1658999-15 WG2149279	-0.579	2.670	-1.696	2.738	4.549	2.829	3.455	3.905	1.741	2.714	5.122	3.070	10/11/23 13:46	10/31/23 12:39
L1659084-01 WG2149279	-0.299	1.152	-0.729	1.028	1.801	1.098	0.105	0.778	0.129	0.556	1.050	0.629	10/11/23 13:46	10/31/23 12:40
L1659084-02 WG2149279	-0.052	0.346	-0.218	0.342	0.573	0.355	0.275	0.394	0.166	0.276	0.521	0.312	10/11/23 13:46	10/31/23 12:40
L1659321-01 WG2149279	0.299	0.340	0.205	0.271	0.459	0.283	-0.004	0.379	-0.009	0.273	0.516	0.309	10/11/23 13:46	10/31/23 12:40
L1659739-01 WG2149279	0.128	0.087	0.053	0.061	0.107	0.065	0.135	0.057	0.026	0.036	0.069	0.041	10/11/23 13:46	10/31/23 16:06
L1659740-01 WG2149279	1.345	0.188	0.167	0.058	0.097	0.060	0.521	0.088	0.060	0.047	0.090	0.054	10/11/23 13:46	10/31/23 16:06
L1659975-01 WG2149279	-0.001	0.041	-0.026	0.038	0.065	0.040	0.041	0.047	0.020	0.032	0.061	0.037	10/11/23 13:46	10/31/23 16:06
L1659985-01 WG2149279	0.034	0.043	0.026	0.035	0.060	0.037	0.054	0.063	0.025	0.043	0.082	0.049	10/11/23 13:46	10/31/23 16:06
L1659985-02 WG2149279	0.083	0.074	0.044	0.057	0.095	0.059	0.305	0.099	0.052	0.062	0.118	0.071	10/11/23 13:46	10/31/23 16:06
L1660353-01 WG2149279	0.240	0.289	0.174	0.234	0.394	0.244	0.103	0.382	0.100	0.271	0.512	0.307	10/11/23 13:46	10/31/23 16:06
L1660430-01 WG2149279	0.788	0.326	0.201	0.201	0.345	0.212	0.594	0.233	0.127	0.150	0.284	0.170	10/11/23 13:46	10/31/23 16:06
L1660430-02 WG2149279	0.394	0.121	0.077	0.063	0.106	0.066	0.506	0.156	0.090	0.098	0.188	0.113	10/11/23 13:46	10/31/23 16:06
L1660430-03 WG2149279	0.195	0.047	0.032	0.022	0.038	0.023	0.326	0.051	0.039	0.027	0.051	0.031	10/11/23 13:46	10/31/23 16:06

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SGD GROUP: WG2149279
METHOD EPA 900/9310
PREP DATE: 10/11/23 13:46

PREP: ELP3947
ANALYST: SNK961

BACKGROUN	CPM	ALPHA	BETA
	DET1	0.128	1.58
	DET2	0.063	1.63
	DET3	0.087	1.34
	DET4	0.080	1.55
	DET5	0.058	1.32
	DET6	0.066	1.03
	DET7	0.090	1.14
	DET8	0.061	1.76
	DET9	0.072	1.07
	DET10	0.064	1.45
	DET11	0.051	1.30
	DET12	0.054	0.95
	DET13	0.133	0.99
	DET14	0.062	0.95
	DET15	0.075	1.00
	DET16	0.102	1.02

COUNT DATE/TIME	SAMPLE ID	SAMPLE VOL(mL	TARE WEIGHT GRAMS	GROSS WEIGHT GRAMS	NET WT. mg	ALPHA EFF	BETA EFF	DET NO.	ALPHA BKG	BETA BKG	ALPHA COUNTS	BETA COUNTS	COUNT TIME	ALPHA Lc	BETA Lc	ALPHA MDA	BETA MDA	Th-230 Std Xtalk	DET (1-8) Th-230 Std Xtalk	DET (9-16) Th-230 Std Xtalk
10/31/23 12:39	BLANK WG2149279	200	7.61732	7.5857	-31.7	29.6	47.0	1	0.128	1.58	25	307	200	0.461	0.842	0.807	1.608	0.314	0.314	NA
10/30/23 14:07	LCS WG2149279	200	7.60902	7.5931	-15.9	28.0	47.2	16	0.102	1.02	327	1932	200	0.450	0.687	**0.776**	**1.298**	0.331	NA	0.331
10/31/23 12:39	MS L1658999-11 WG2149279	200	7.58552	7.6078	22.3	21.1	46.1	2	0.063	1.63	357	2114	200	0.504	0.870	**0.845**	**1.662**	0.405	0.405	NA
10/31/23 12:39	MSD L1658999-11 WG2149279	200	7.53961	7.5659	26.2	19.6	44.3	3	0.087	1.34	268	1748	200	0.604	0.828	**1.034**	**1.576**	0.448	0.448	NA
10/31/23 12:39	DUP L1660430-03 WG2149279	200	7.6142	7.6363	22.1	21.1	46.0	4	0.080	1.55	93	626	200	0.547	0.852	**0.931**	**1.626**	0.420	0.420	NA
10/31/23 12:39	L1658999-08 WG2149279	1	7.78555	7.8718	86.2	8.8	41.5	5	0.058	1.32	30	357	200	234.754	175.921	**391.823**	**334.580**	0.521	0.521	NA
10/31/23 12:39	L1658999-09 WG2149279	1	7.85703	7.9467	89.6	8.6	41.1	6	0.066	1.03	16	261	200	250.812	158.267	**421.931**	**299.249**	0.550	0.550	NA
10/31/23 12:39	L1658999-10 WG2149279	1	7.79876	7.8965	97.7	9.1	40.7	7	0.090	1.14	33	282	200	265.321	167.647	**455.004**	**317.773**	0.611	0.611	NA
10/31/23 12:39	L1658999-11 WG2149279	200	7.57831	7.5891	10.8	25.1	46.5	8	0.061	1.76	14	392	200	0.418	0.892	**0.699**	**1.707**	0.402	0.402	NA
10/31/23 12:39	L1658999-12 WG2149279	5	7.59933	7.6682	68.8	10.5	42.9	9	0.072	1.07	23	288	200	42.498	30.947	**71.909**	**58.572**	0.504	NA	0.504
10/31/23 12:39	L1658999-13 WG2149279	5	7.61769	7.7066	88.9	8.7	47.7	10	0.064	1.45	15	298	200	49.329	31.916	**82.853**	**60.821**	0.500	NA	0.500
10/31/23 12:39	L1658999-14 WG2149279	3	7.6006	7.7001	99.5	8.3	41.4	11	0.051	1.30	21	340	200	79.456	58.304	**131.399**	**110.850**	0.561	NA	0.561
10/31/23 12:39	L1658999-15 WG2149279	2	7.60968	7.6676	57.9	13.6	42.8	12	0.054	0.95	9	229	200	74.016	73.371	**122.969**	**138.445**	0.487	NA	0.487
10/31/23 12:40	L1659084-01 WG2149279	10	7.56833	7.6374	69.1	10.0	42.6	13	0.133	0.99	23	214	200	27.789	15.020	**48.682**	**28.372**	0.493	NA	0.493
10/31/23 12:40	L1659084-02 WG2149279	20	7.58171	7.6421	60.4	11.4	42.2	14	0.062	0.95	11	224	200	9.238	7.461	**15.481**	**14.081**	0.495	NA	0.495
10/31/23 12:40	L1659321-01 WG2149279	20	7.5573	7.6	42.7	15.4	43.6	15	0.075	1.00	26	210	200	7.323	7.377	**12.417**	**13.939**	0.402	NA	0.402
10/31/23 16:06	L1659739-01 WG2149279	200	7.6238	7.719	95.2	8.2	40.6	1	0.128	1.58	51	477	200	1.658	0.976	**2.899**	**1.863**	0.577	0.577	NA
10/31/23 16:06	L1659740-01 WG2149279	150	7.64408	7.7326	88.6	9.1	42.0	2	0.063	1.63	232	840	200	1.564	1.273	**2.625**	**2.432**	0.514	0.514	NA
10/31/23 16:06	L1659975-01 WG2149279	200	7.58975	7.6487	59.0	11.6	42.2	3	0.087	1.34	17	319	200	1.024	0.869	**1.752**	**1.654**	0.514	0.514	NA
10/31/23 16:06	L1659985-01 WG2149279	150	7.59473	7.6327	37.9	16.2	44.8	4	0.080	1.55	26	365	200	0.947	1.166	**1.613**	**2.225**	0.450	0.450	NA
10/31/23 16:06	L1659985-02 WG2149279	100	7.60386	7.6533	49.4	13.4	43.4	5	0.058	1.32	25	435	200	1.542	1.680	**2.574**	**3.196**	0.461	0.461	NA
10/31/23 16:06	L1660353-01 WG2149279	20	7.56984	7.6032	33.3	17.0	44.5	6	0.066	1.03	23	227	200	6.335	7.320	**10.656**	**13.841**	0.461	0.461	NA
10/31/23 16:06	L1660430-01 WG2149279	40	7.54284	7.6023	59.5	11.1	42.1	7	0.090	1.14	60	348	200	5.431	4.052	**9.313**	**7.680**	0.553	0.553	NA
10/31/23 16:06	L1660430-02 WG2149279	70	7.59702	7.6295	32.5	17.5	44.6	8	0.061	1.76	70	541	200	1.712	2.661	**2.865**	**5.090**	0.452	0.452	NA
10/31/23 16:06	L1660430-03 WG2149279	200	7.60209	7.6326	30.5	18.5	45.2	9	0.072	1.07	101	568	200	0.601	0.734	**1.017**	**1.389**	0.438	NA	0.438
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GROSS ALPHA/BETA QC REPORT WG2149279

	MLS OF SAMPLE	MLS OF SPIKE	STD VALUE	LCS VALUE	LSC Uncert	MS VALUE
ALPHA SPIKE	200	2.0	**1.50**	**15.0**	**0.315**	**15**
BETA SPIKE	200	0.5	**16.37**	**40.9**	**1.37**	**40.9**

Analyte **Gross Alpha** units pCi/L
Matrix Water

	RESULT	2σCE	TPU	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD	LIMITS		RER/NAD	LIMITS		
BLANK WG2149279	-0.022	0.530	-0.332	0.807										Z_{BLANK}	**0.07**
LCS WG2149279	12.348	1.471	1.457	0.776	15.0	**82.3%**	80%	120%						Z_{LCS}	**1.78**
L1660430-03 WG2149279	5.264	1.281	0.871	0.601											
DUP L1660430-03 WG2149279	4.108	1.093	0.725	0.931					**24.7%**	20%		**0.69**	2	Z_{REP}	**1.02**
L1658999-11 WG2149279	0.083	0.450	0.278	0.418											
MS L1658999-11 WG2149279	18.379	2.012	2.114	0.845	15.0	**122.0%**	70%	130%						Z_{MS}	**1.53**
MSD L1658999-11 WG2149279	14.382	1.900	1.751	1.034	15.0	**95.3%**	70%	130%	**24.40%**	20%	*	**1.445**	2		

Analyte **Gross Beta** units pCi/L
Matrix Water

	RESULT	2σCE	TPU	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD	LIMITS		RER/NAD	LIMITS		
BLANK WG2149279	-0.413	1.172	-1.129	1.608										Z_{BLANK}	**0.37**
LCS WG2149279	38.607	2.159	3.908	1.298	40.9	**94.4%**	80%	120%						Z_{LCS}	**0.56**
L1660430-03 WG2149279	8.822	1.366	1.052	0.734											
DUP L1660430-03 WG2149279	6.788	1.468	0.888	0.852					**26.05%**	20%		**1.014**	2	Z_{REP}	**1.48**
L1658999-11 WG2149279	0.849	1.293	0.565	0.892											
MS L1658999-11 WG2149279	40.112	2.363	4.074	1.662	40.9	**96.0%**	70%	130%						Z_{MS}	**0.38**
MSD L1658999-11 WG2149279	34.548	2.236	3.518	1.576	40.9	**82.4%**	70%	130%	**14.91%**	20%		**1.71**	2		

*** - Outside Control Limits**

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ERA
A Waters Company

Rad
1 X 500mL

23B20457

ESC53062

Pace National- Mount Juliet

Custom RadChem™ Standard

Catalog #: 089 **Lot #:** 01182303A

Reference Date: January 27, 2023 12:00 MST

Certificate of Calibration

Isotope	Certified Value pCi/mL	Half-life	Uncertainty (95% confidence level) Type A (Random) (%)	Type B (Systematic) (%)	Total (%)
Gross Alpha as Th-230	1.50	(7.54 ± 0.03)E+04 years	0.3	2.0	2.1

Packaging and Volume: (1) 500 mL clear glass boston round bottle containing 400 mL

Matrix and Preservative: This aqueous standard is preserved with 0.1M nitric acid

Radioimpurities: Ra-226 = 0.618% on 01-Mar-2020

Standard Preparation Instructions and User Notes: Standards are ready for preparation and analysis as received. Shake the standard well prior to removing an aliquot. If the standard is to be diluted, it is recommended that the diluting solution have an acidic composition comparable to that of the standard, especially if the standard is not analyzed immediately after dilution. Certified values are decay corrected to the reference date provided. Comparison of analytical results to these values should incorporate this correction.

NIST Traceability: This derived source standard complies with NIST traceability requirements in accordance with the guidelines set forth in ANSI N42.22 section 6.3. The derived source parent solution is traceable to a provider participating in the NIST Measurement Assurance Program.

Calibration Method: This derived source standard was manufactured via a documented and unbroken chain of gravimetric and volumetric measurements in accordance with ERA's Internal Measurement Assurance Program directly from a liquid source traceable to NIST. All gravimetric and volumetric measurements were performed using balances and volumetric glassware calibrated with NIST traceable weights. Furthermore, this standard was analytically verified by ERA using an alpha/beta discriminating liquid scintillation counting system. This standard was analytically verified using a calibration solution from a separate/independent source traceable to NIST.

Certified Values are equal to 100% of the "made to" values as determined by volumetric and/or gravimetric measurements of NIST SRMs or NIST traceable reference materials and analytically verified by ERA. Total Uncertainty is calculated at the 95% confidence level.

Manufactured by: CJ

Date: 25 Jan. 2023

Reviewed by:

Date: 26 Jan 2023

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Sr-90
2322-15-1
ESC51304-WS
GROSS BETA
23E17275

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 17-May-23
DATE OF CALIBRATION 11-Oct-23

Ao	=	0.10	nCi/ml
N	=	0.02	
T(1/2)	=	28.60	years
T	=	0.40	years
VOLUME OF STI		80.00	
FINAL VOL		1000.00	
dilution	=	12.50	

A	=	0.10	nCi				
A	=	18.17	dpm/ml				
A	=	**8.18**	+/-	**0.27**	**pCi/ml**	16.366715	36.3341

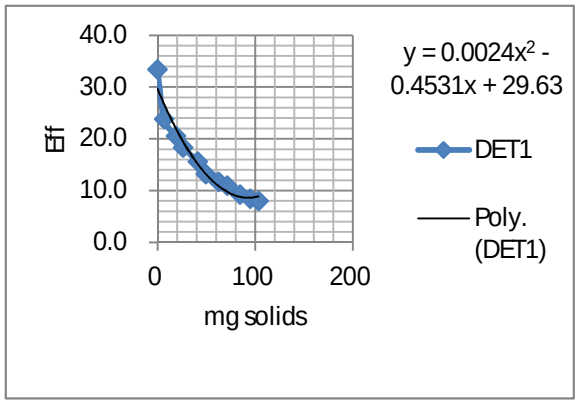
Uncertainty 3.20%

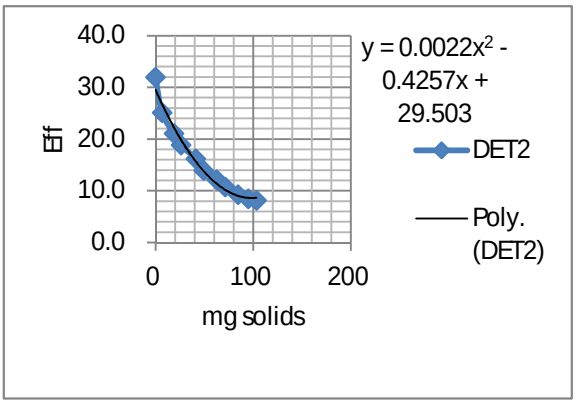
Volume (8 ml Aliquot) 1.00%
Volume (1000 ml) 0.03%

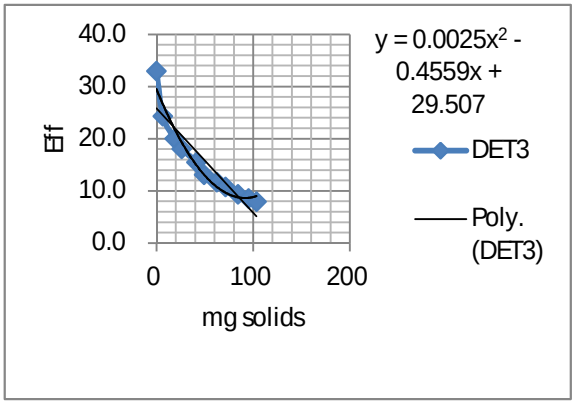
CSU 3.35%

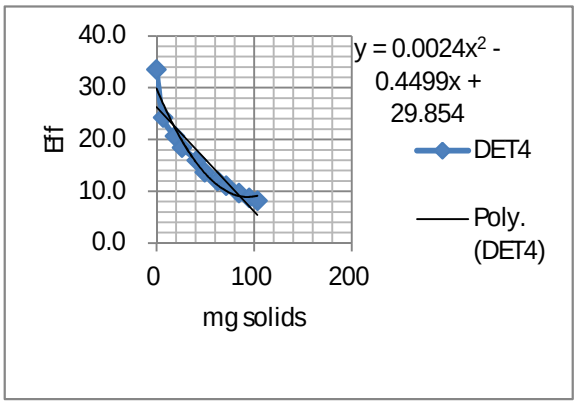
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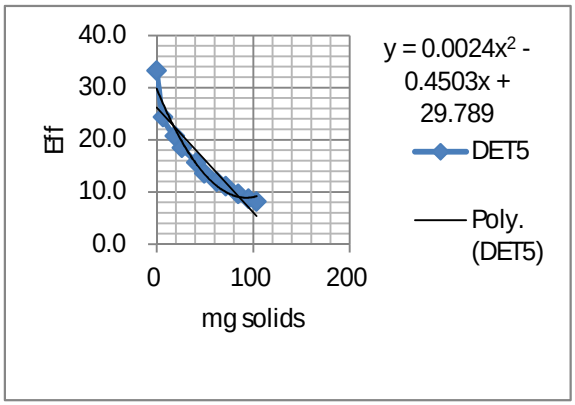
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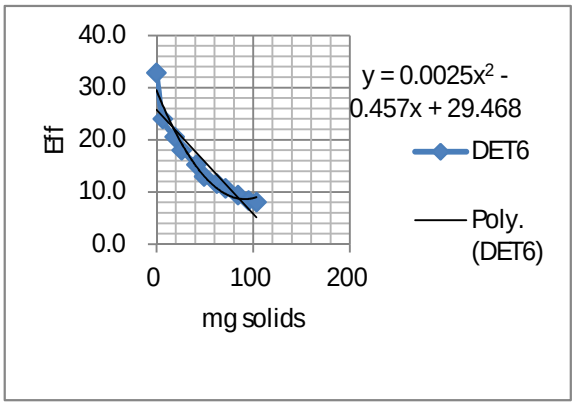


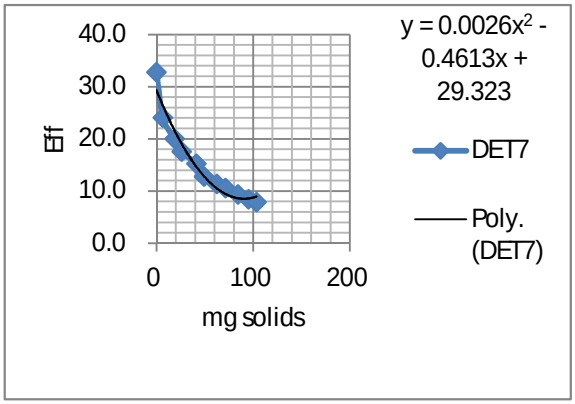


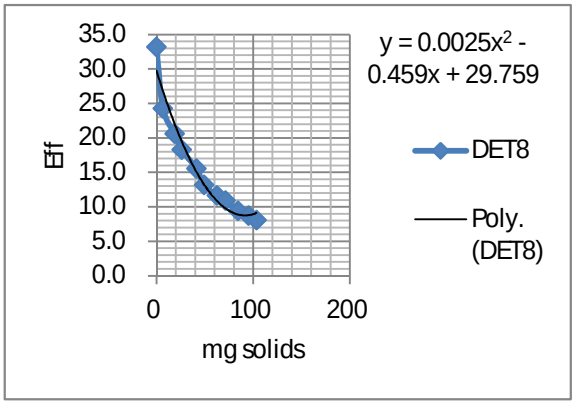






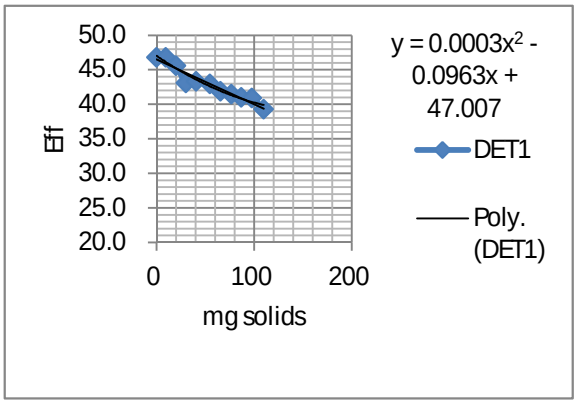


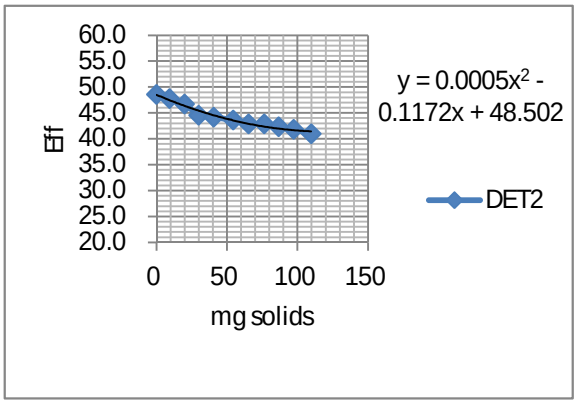


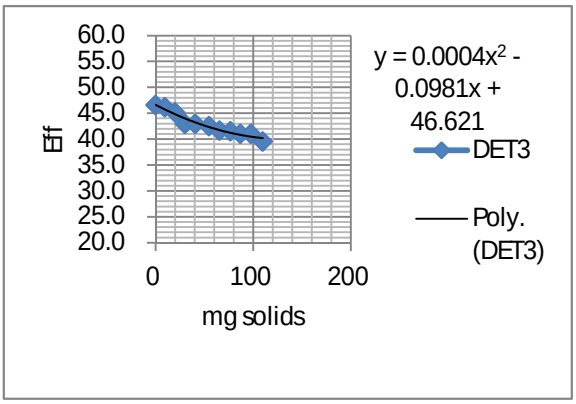


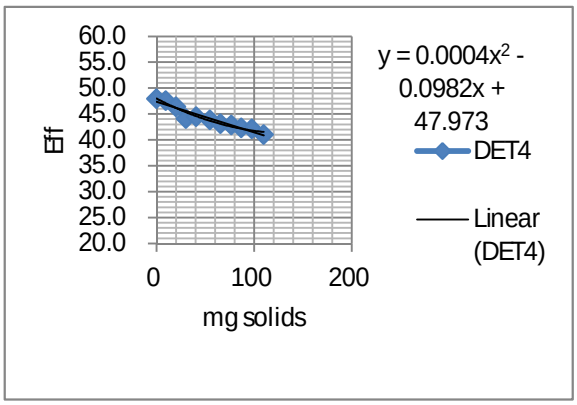
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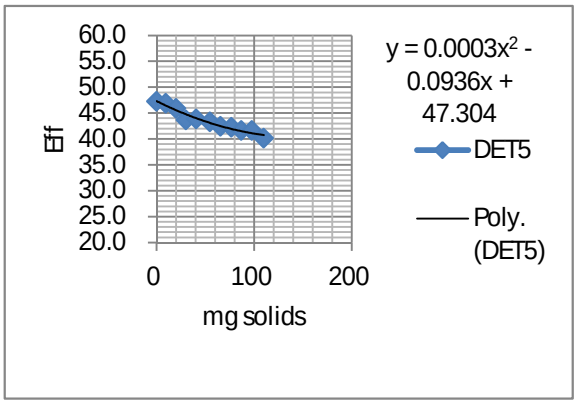
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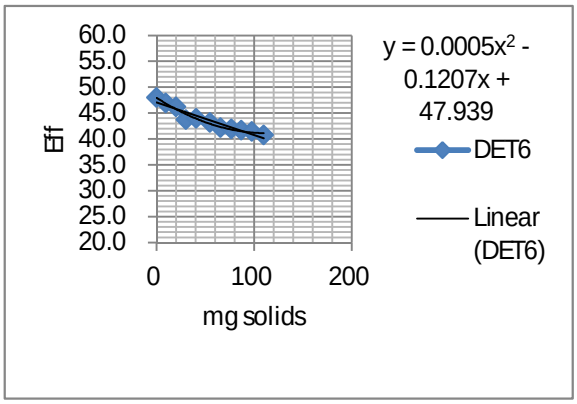


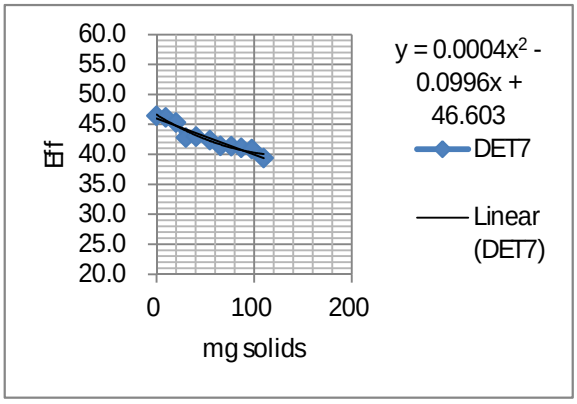


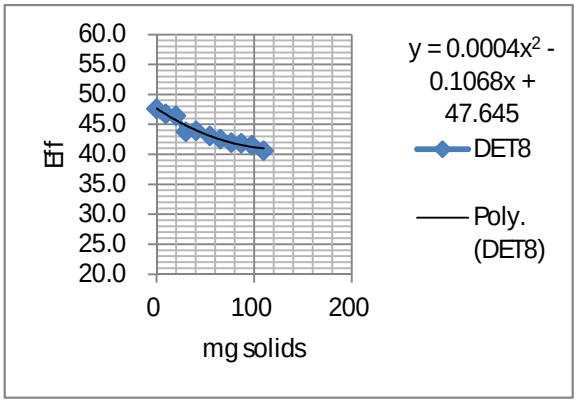






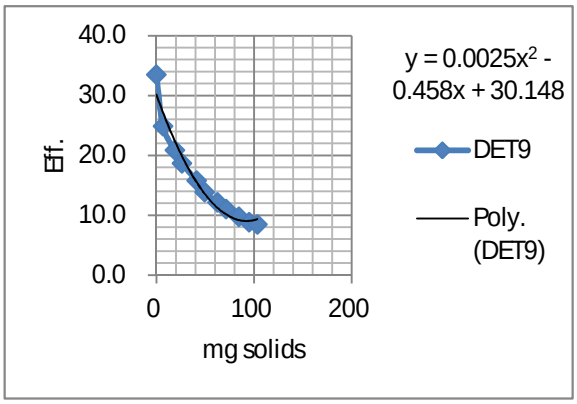


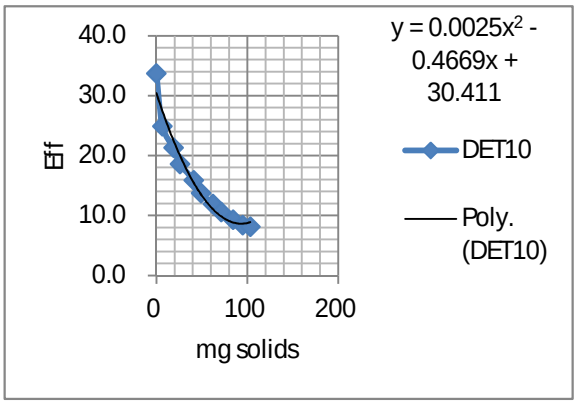


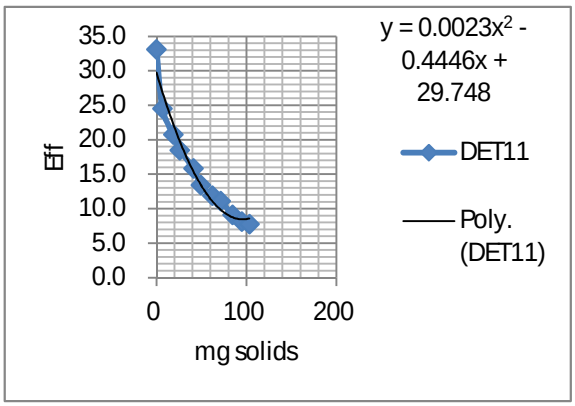


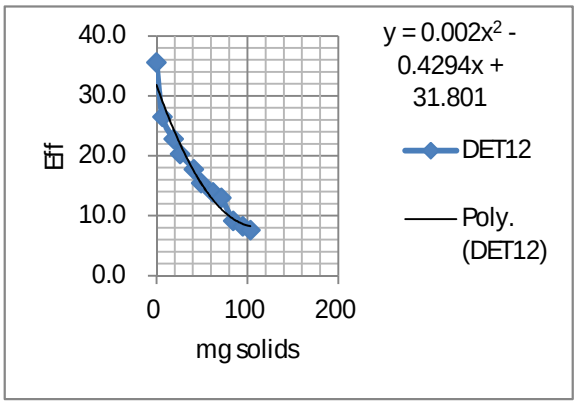
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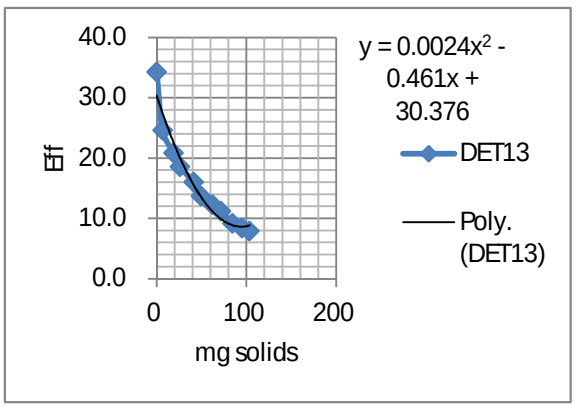
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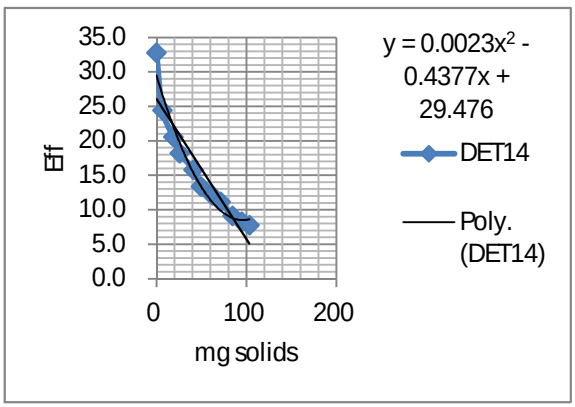


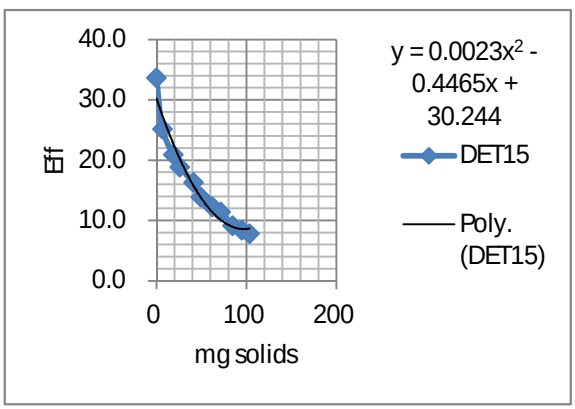


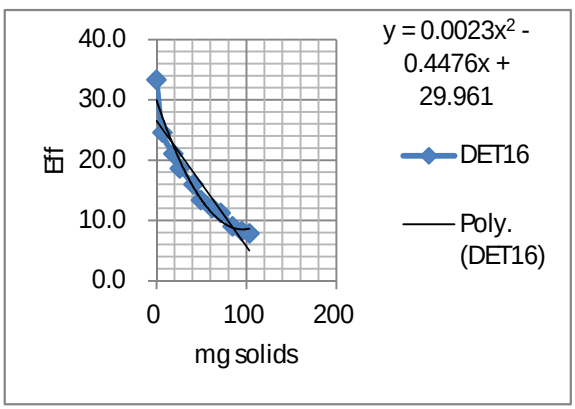






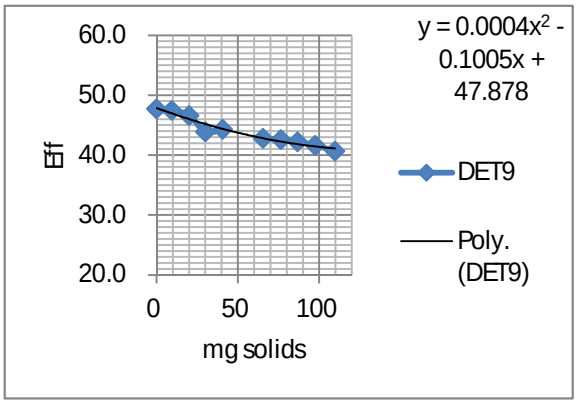


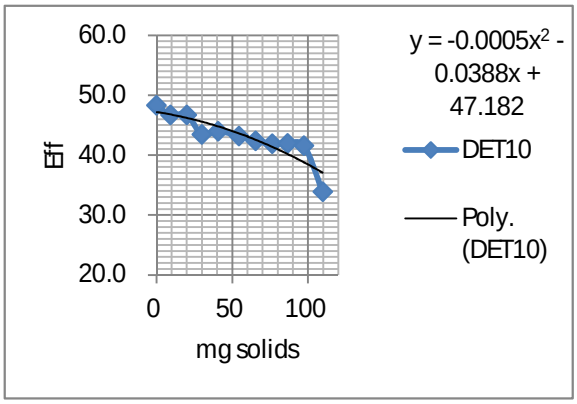


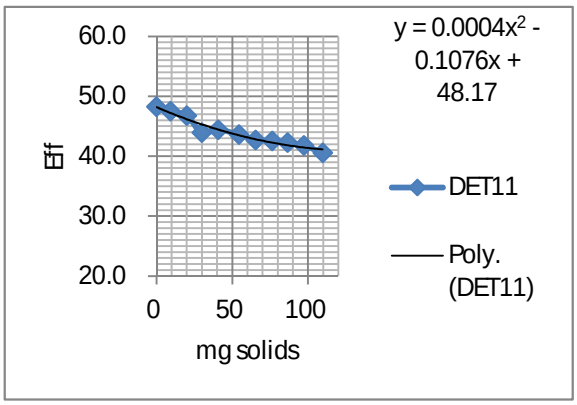


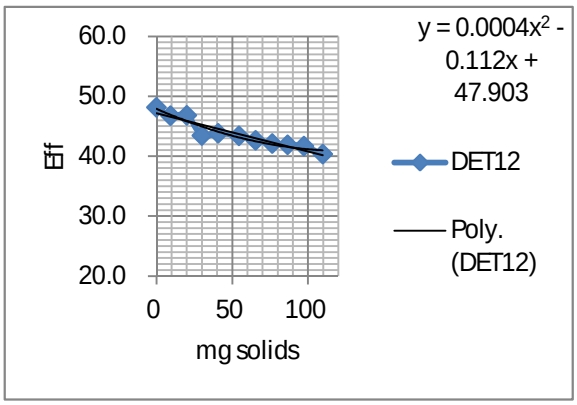
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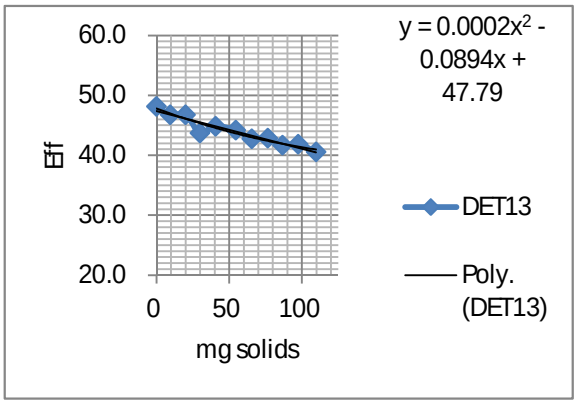
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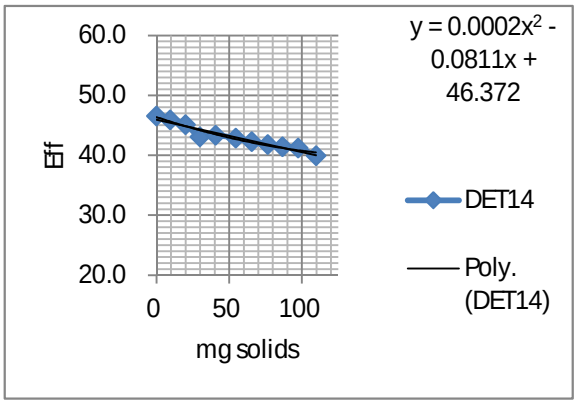


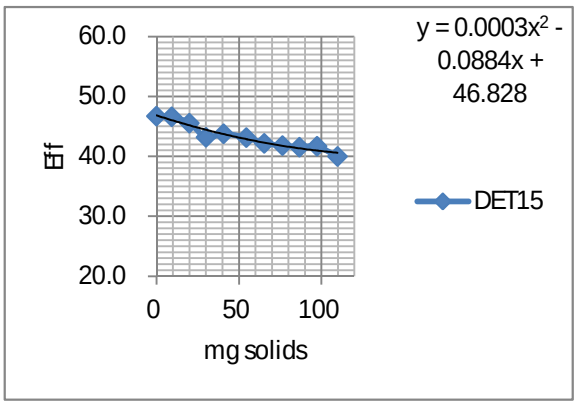


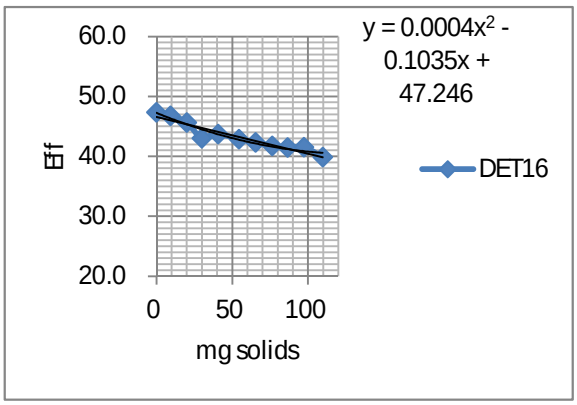






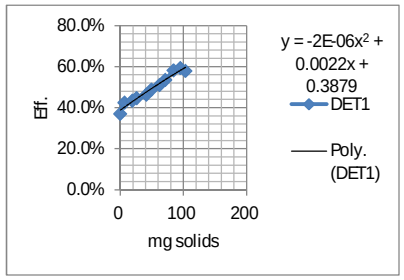


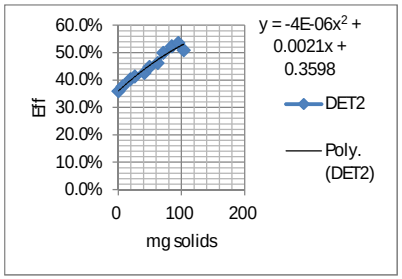


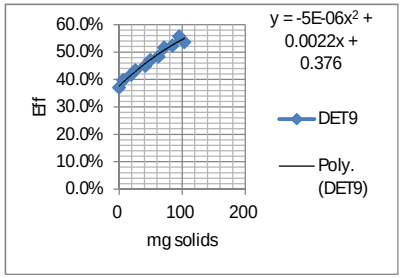


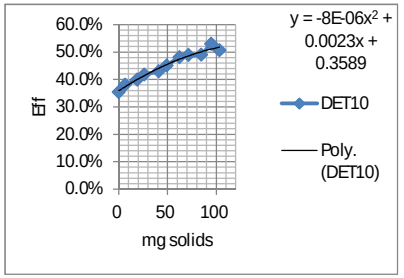
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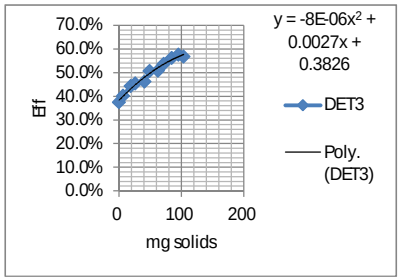
ALPHA X-TALK CURVE

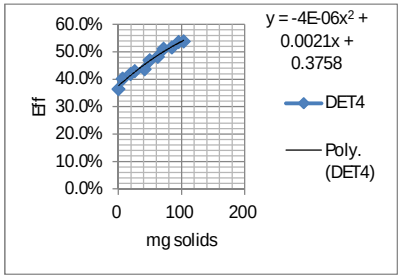


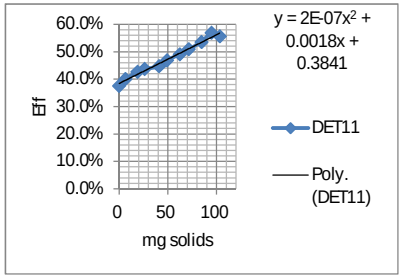


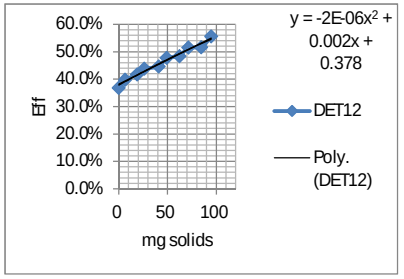


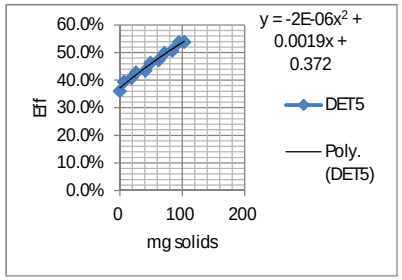


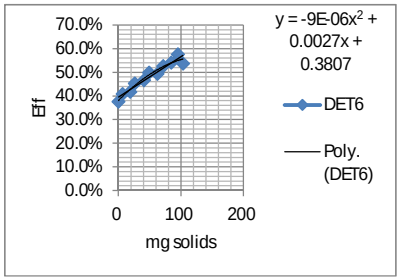


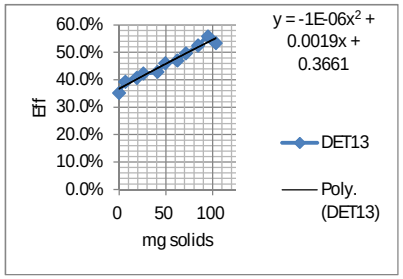


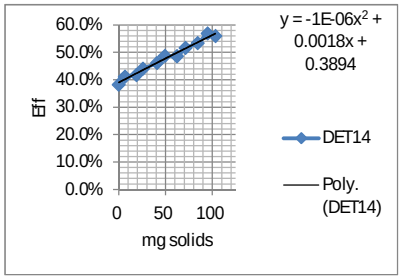


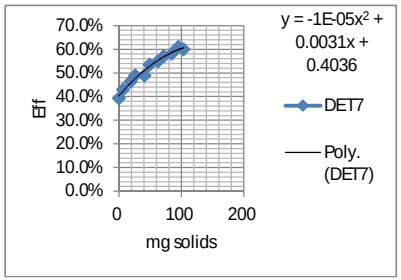


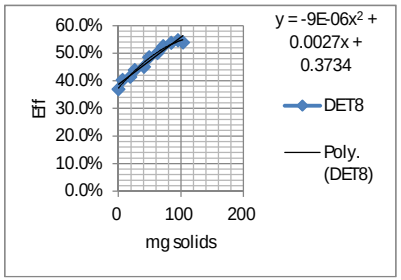


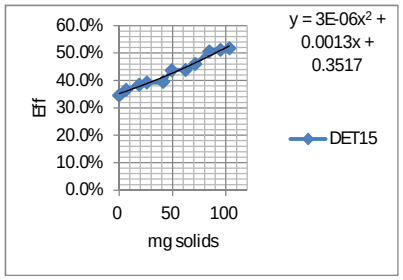


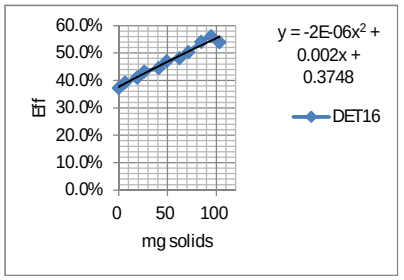












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SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time
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A3	3A-1	46115	20037	20	7/7/2023 16:11	7/7/2023 16:31
A4	3A-1	41186	18386	20	7/7/2023 15:48	7/7/2023 16:08
A5	3A-1	34990	16198	20	7/7/2023 15:22	7/7/2023 15:42
A6	3A-1	29627	14459	20	7/7/2023 14:55	7/7/2023 15:15
A7	3A-1	26257	13393	20	7/7/2023 14:29	7/7/2023 14:49
A8	3A-1	24655	13202	20	7/7/2023 14:04	7/7/2023 14:24
A9	3A-1	20736	12067	20	7/7/2023 13:42	7/7/2023 14:02
A10	3A-1	18954	11241	20	7/7/2023 13:14	7/7/2023 13:34
A11	3A-1	17884	10366	20	7/7/2023 12:41	7/7/2023 13:01
A1	3A-2	75514	27127	20	7/7/2023 10:38	7/7/2023 10:58
A2	3A-2	56385	21244	20	7/7/2023 10:14	7/7/2023 10:34
A3	3A-2	47325	19054	20	7/7/2023 16:35	7/7/2023 16:55
A4	3A-2	42276	17468	20	7/7/2023 16:11	7/7/2023 16:31
A5	3A-2	36327	15483	20	7/7/2023 15:48	7/7/2023 16:08
A6	3A-2	31222	13989	20	7/7/2023 15:22	7/7/2023 15:42
A7	3A-2	27287	12613	20	7/7/2023 14:55	7/7/2023 15:15
A8	3A-2	25403	12675	20	7/7/2023 14:29	7/7/2023 14:49
A9	3A-2	21830	11422	20	7/7/2023 14:04	7/7/2023 14:24
A10	3A-2	19993	10704	20	7/7/2023 13:42	7/7/2023 14:02
A11	3A-2	19169	9753	20	7/7/2023 13:14	7/7/2023 13:34
A1	3A-3	74035	27782	20	7/7/2023 11:05	7/7/2023 11:25
A2	3A-3	54535	21953	20	7/7/2023 10:38	7/7/2023 10:58
A3	3A-3	45000	19932	20	7/7/2023 10:14	7/7/2023 10:34
A4	3A-3	40529	18406	20	7/7/2023 16:35	7/7/2023 16:55
A5	3A-3	34798	16079	20	7/7/2023 16:11	7/7/2023 16:31
A6	3A-3	29364	14884	20	7/7/2023 15:48	7/7/2023 16:08
A7	3A-3	26203	13320	20	7/7/2023 15:22	7/7/2023 15:42
A8	3A-3	24126	12949	20	7/7/2023 14:55	7/7/2023 15:15
A9	3A-3	20939	11755	20	7/7/2023 14:29	7/7/2023 14:49
A10	3A-3	19122	11006	20	7/7/2023 14:04	7/7/2023 14:24
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A1	3A-4	75323	27430	20	7/7/2023 11:27	7/7/2023 11:47
A2	3A-4	54498	21903	20	7/7/2023 11:05	7/7/2023 11:25
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A4	3A-4	41416	17793	20	7/7/2023 10:14	7/7/2023 10:34
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A6	3A-4	30650	14400	20	7/7/2023 16:11	7/7/2023 16:31
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A9	3A-4	21646	11177	20	7/7/2023 14:55	7/7/2023 15:15
A10	3A-4	19555	10466	20	7/7/2023 14:29	7/7/2023 14:49
A11	3A-4	18390	9899	20	7/7/2023 14:04	7/7/2023 14:24
A1	3B-1	74686	26930	20	7/7/2023 11:49	7/7/2023 12:09
A2	3B-1	54741	21605	20	7/7/2023 11:27	7/7/2023 11:47
A3	3B-1	46637	19020	20	7/7/2023 11:05	7/7/2023 11:25
A4	3B-1	41447	17730	20	7/7/2023 10:38	7/7/2023 10:58
A5	3B-1	35224	15311	20	7/7/2023 10:14	7/7/2023 10:34
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A7	3B-1	26934	12742	20	7/7/2023 16:11	7/7/2023 16:31
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A9	3B-1	21660	10982	20	7/7/2023 15:22	7/7/2023 15:42
A10	3B-1	19555	10507	20	7/7/2023 14:55	7/7/2023 15:15
A11	3B-1	18400	9912	20	7/7/2023 14:29	7/7/2023 14:49
A1	3B-2	73753	27757	20	7/7/2023 12:14	7/7/2023 12:34
A2	3B-2	53922	22005	20	7/7/2023 11:49	7/7/2023 12:09
A3	3B-2	46171	19278	20	7/7/2023 11:27	7/7/2023 11:47
A4	3B-2	40365	18258	20	7/7/2023 11:05	7/7/2023 11:25
A5	3B-2	34220	15982	20	7/7/2023 10:38	7/7/2023 10:58
A6	3B-2	29149	14521	20	7/7/2023 10:14	7/7/2023 10:34
A7	3B-2	26009	12852	20	7/7/2023 16:35	7/7/2023 16:55
A8	3B-2	24024	12651	20	7/7/2023 16:11	7/7/2023 16:31
A9	3B-2	21051	11388	20	7/7/2023 15:48	7/7/2023 16:08
A10	3B-2	18841	10845	20	7/7/2023 15:22	7/7/2023 15:42
A11	3B-2	18143	9740	20	7/7/2023 14:55	7/7/2023 15:15
A1	3B-3	73568	28909	20	7/7/2023 12:41	7/7/2023 13:01
A2	3B-3	54010	23254	20	7/7/2023 12:14	7/7/2023 12:34
A3	3B-3	44958	20845	20	7/7/2023 11:49	7/7/2023 12:09
A4	3B-3	39452	19281	20	7/7/2023 11:27	7/7/2023 11:47
A5	3B-3	34134	16689	20	7/7/2023 11:05	7/7/2023 11:25
A6	3B-3	28657	15324	20	7/7/2023 10:38	7/7/2023 10:58
A7	3B-3	25469	13983	20	7/7/2023 10:14	7/7/2023 10:34
A8	3B-3	23692	13541	20	7/7/2023 16:35	7/7/2023 16:55

Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
Curve Data 0723	B1	3A-1	134	116941	20	7/7/23 12:14	7/7/23 12:34	37.0%	0.11%
Curve Data 0723	B2	3A-1	154	116894	20	7/7/23 11:49	7/7/23 12:09	42.5%	0.13%
Curve Data 0723	B3	3A-1	148	113894	20	7/7/23 11:27	7/7/23 11:47	43.5%	0.13%
Curve Data 0723	B4	3A-1	127	103534	20	7/7/23 11:05	7/7/23 11:25	44.6%	0.12%
Curve Data 0723	B5	3A-1	138	102419	20	7/7/23 10:38	7/7/23 10:58	46.3%	0.13%
Curve Data 0723	B6	3A-1	142	107635	20	7/7/23 17:07	7/7/23 17:27	48.8%	0.13%
Curve Data 0723	B7	3A-1	158	108249	20	7/10/23 9:46	7/10/23 10:06	51.0%	0.15%
Curve Data 0723	B8	3A-1	133	102240	20	7/10/23 9:24	7/10/23 9:44	53.5%	0.13%
Curve Data 0723	B9	3A-1	135	104592	20	7/7/23 23:17	7/7/23 23:37	58.2%	0.13%
Curve Data 0723	B10	3A-1	149	107283	20	7/7/23 22:56	7/7/23 23:16	59.3%	0.14%
Curve Data 0723	B11	3A-1	133	98130	20	7/7/23 22:34	7/7/23 22:54	58.0%	0.14%
Curve Data 0723	B1	3A-2	249	121280	20	7/7/23 12:41	7/7/23 13:01	35.9%	0.21%
Curve Data 0723	B2	3A-2	238	119263	20	7/7/23 12:14	7/7/23 12:34	37.7%	0.20%
Curve Data 0723	B3	3A-2	222	116608	20	7/7/23 11:49	7/7/23 12:09	40.3%	0.19%
Curve Data 0723	B4	3A-2	187	107063	20	7/7/23 11:27	7/7/23 11:47	41.3%	0.17%
Curve Data 0723	B5	3A-2	218	105678	20	7/7/23 11:05	7/7/23 11:25	42.6%	0.21%
Curve Data 0723	B6	3A-2	266	111256	20	7/7/23 17:38	7/7/23 17:58	44.8%	0.24%
Curve Data 0723	B7	3A-2	267	110261	20	7/7/23 17:07	7/7/23 17:27	46.2%	0.24%
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Curve Data 0723	B9	3A-2	189	107081	20	7/10/23 9:24	7/10/23 9:44	52.3%	0.18%
Curve Data 0723	B10	3A-2	236	108873	20	7/7/23 23:17	7/7/23 23:37	53.5%	0.22%
Curve Data 0723	B11	3A-2	212	102249	20	7/7/23 22:56	7/7/23 23:16	50.9%	0.21%
Curve Data 0723	B1	3A-3	202	116372	20	7/7/23 13:14	7/7/23 13:34	37.5%	0.17%
Curve Data 0723	B2	3A-3	168	115308	20	7/7/23 12:41	7/7/23 13:01	40.3%	0.15%
Curve Data 0723	B3	3A-3	167	112773	20	7/7/23 12:14	7/7/23 12:34	44.3%	0.15%
Curve Data 0723	B4	3A-3	153	103715	20	7/7/23 11:49	7/7/23 12:09	45.4%	0.15%
Curve Data 0723	B5	3A-3	170	102456	20	7/7/23 11:27	7/7/23 11:47	46.2%	0.17%
Curve Data 0723	B6	3A-3	163	107287	20	7/7/23 18:05	7/7/23 18:25	50.7%	0.15%
Curve Data 0723	B7	3A-3	156	107314	20	7/7/23 17:38	7/7/23 17:58	50.8%	0.15%
Curve Data 0723	B8	3A-3	159	102511	20	7/7/23 17:07	7/7/23 17:27	53.7%	0.16%
Curve Data 0723	B9	3A-3	178	104063	20	7/10/23 9:46	7/10/23 10:06	56.1%	0.17%
Curve Data 0723	B10	3A-3	169	106238	20	7/10/23 9:24	7/10/23 9:44	57.6%	0.16%
Curve Data 0723	B11	3A-3	168	98815	20	7/7/23 23:17	7/7/23 23:37	56.8%	0.17%
Curve Data 0723	B1	3A-4	166	119727	20	7/7/23 13:42	7/7/23 14:02	36.4%	0.14%
Curve Data 0723	B2	3A-4	157	118870	20	7/7/23 13:14	7/7/23 13:34	40.2%	0.13%
Curve Data 0723	B3	3A-4	147	115962	20	7/7/23 12:41	7/7/23 13:01	41.9%	0.13%
Curve Data 0723	B4	3A-4	135	107061	20	7/7/23 12:14	7/7/23 12:34	43.0%	0.13%
Curve Data 0723	B5	3A-4	112	105677	20	7/7/23 11:49	7/7/23 12:09	43.7%	0.11%
Curve Data 0723	B6	3A-4	144	110230	20	7/7/23 18:27	7/7/23 18:47	47.0%	0.13%
Curve Data 0723	B7	3A-4	129	111119	20	7/7/23 18:05	7/7/23 18:25	48.2%	0.12%
Curve Data 0723	B8	3A-4	140	105264	20	7/7/23 17:38	7/7/23 17:58	51.2%	0.13%
Curve Data 0723	B9	3A-4	126	107720	20	7/7/23 17:07	7/7/23 17:27	51.6%	0.12%
Curve Data 0723	B10	3A-4	133	109593	20	7/10/23 9:46	7/10/23 10:06	53.5%	0.12%
Curve Data 0723	B11	3A-4	137	102543	20	7/10/23 9:24	7/10/23 9:44	53.8%	0.13%
Curve Data 0723	B1	3B-1	426	118127	20	7/7/23 14:04	7/7/23 14:24	36.1%	0.36%
Curve Data 0723	B2	3B-1	361	117053	20	7/7/23 13:42	7/7/23 14:02	39.5%	0.31%
Curve Data 0723	B3	3B-1	423	114586	20	7/7/23 13:14	7/7/23 13:34	40.8%	0.37%
Curve Data 0723	B4	3B-1	339	105601	20	7/7/23 12:41	7/7/23 13:01	42.8%	0.32%
Curve Data 0723	B5	3B-1	301	104054	20	7/7/23 12:14	7/7/23 12:34	43.5%	0.29%
Curve Data 0723	B6	3B-1	373	109129	20	7/7/23 18:52	7/7/23 19:12	46.3%	0.34%
Curve Data 0723	B7	3B-1	330	109521	20	7/7/23 18:28	7/7/23 18:48	47.3%	0.30%
Curve Data 0723	B8	3B-1	343	103988	20	7/7/23 18:06	7/7/23 18:26	49.8%	0.33%
Curve Data 0723	B9	3B-1	325	105957	20	7/7/23 17:38	7/7/23 17:58	50.7%	0.31%
Curve Data 0723	B10	3B-1	303	108116	20	7/7/23 17:07	7/7/23 17:27	53.7%	0.28%
Curve Data 0724	B11	3B-1	287	100306	20	7/10/23 9:46	7/10/23 10:06	53.9%	0.29%
Curve Data 0723	B1	3B-2	153	119953	20	7/7/23 14:29	7/7/23 17:02	37.6%	0.13%
Curve Data 0723	B2	3B-2	149	117249	20	7/7/23 14:04	7/7/23 16:33	40.8%	0.13%
Curve Data 0723	B3	3B-2	125	115393	20	7/7/23 13:42	7/7/23 15:47	41.8%	0.11%
Curve Data 0723	B4	3B-2	106	104834	20	7/7/23 13:14	7/7/23 15:00	45.2%	0.10%
Curve Data 0723	B5	3B-2	116	104157	20	7/7/23 12:41	7/7/23 14:37	46.7%	0.11%
Curve Data 0723	B6	3B-2	140	109187	20	7/7/23 19:52	7/7/23 22:12	49.8%	0.13%
Curve Data 0723	B7	3B-2	139	109807	20	7/7/23 18:52	7/7/23 21:11	49.4%	0.13%
Curve Data 0723	B8	3B-2	110	103591	20	7/7/23 18:28	7/7/23 20:18	52.7%	0.11%
Curve Data 0723	B9	3B-2	127	105445	20	7/7/23 18:06	7/7/23 20:13	54.1%	0.12%
Curve Data 0723	B10	3B-2	136	107870	20	7/7/23 17:38	7/7/23 17:58	57.6%	0.13%
Curve Data 0723	B11	3B-2	116	101817	20	7/7/23 17:07	7/7/23 17:27	53.7%	0.11%
Curve Data 0723	B1	3B-3	10	116008	20	7/7/23 14:55	7/7/23 15:15	39.3%	0.01%
Curve Data 0723	B2	3B-3	14	115338	20	7/7/23 14:29	7/7/23 14:49	43.1%	0.01%
Curve Data 0723	B3	3B-3	16	113234	20	7/7/23 14:04	7/7/23 14:24	46.4%	0.01%
Curve Data 0723	B4	3B-3	8	103254	20	7/7/23 13:42	7/7/23 14:02	48.9%	0.01%
Curve Data 0723	B5	3B-3	8	102682	20	7/7/23 13:14	7/7/23 13:34	48.9%	0.01%
Curve Data 0723	B6	3B-3	8	106910	20	7/7/23 20:18	7/7/23 20:38	53.5%	0.01%
Curve Data 0723	B7	3B-3	16	107282	20	7/7/23 19:52	7/7/23 20:12	54.9%	
Curve Data 0723	B8	3B-3	14	102102	20	7/7/23 18:52	7/7/23 19:12	57.2	

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SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time
A9	3B-3	20917	12165	20	7/7/2023 16:11	7/7/2023 16:31
A10	3B-3	18889	11525	20	7/7/2023 15:48	7/7/2023 16:08
A11	3B-3	17700	10620	20	7/7/2023 15:22	7/7/2023 15:42
A1	3B-4	74587	27535	20	7/7/2023 13:14	7/7/2023 13:34
A2	3B-4	54523	21995	20	7/7/2023 12:41	7/7/2023 13:01
A3	3B-4	46249	19158	20	7/7/2023 12:14	7/7/2023 12:34
A4	3B-4	41056	18018	20	7/7/2023 11:49	7/7/2023 12:09
A5	3B-4	34961	15781	20	7/7/2023 11:27	7/7/2023 11:47
A6	3B-4	29659	14394	20	7/7/2023 11:05	7/7/2023 11:25
A7	3B-4	26173	13110	20	7/7/2023 10:38	7/7/2023 10:58
A8	3B-4	24476	12856	20	7/7/2023 10:14	7/7/2023 10:34
A9	3B-4	21165	11384	20	7/7/2023 16:35	7/7/2023 16:55
A10	3B-4	19552	10703	20	7/7/2023 16:11	7/7/2023 16:31
A11	3B-4	18151	9787	20	7/7/2023 15:48	7/7/2023 16:08
A1	3C-1	75248	27851	20	7/7/2023 13:42	7/7/2023 14:02
A2	3C-1	55882	22214	20	7/7/2023 13:14	7/7/2023 13:34
A3	3C-1	46808	19537	20	7/7/2023 12:41	7/7/2023 13:01
A4	3C-1	41932	18160	20	7/7/2023 12:14	7/7/2023 12:34
A5	3C-1	35429	15921	20	7/7/2023 11:49	7/7/2023 12:09
A6	3C-1	31153	14680	20	7/7/2023 11:27	7/7/2023 11:47
A7	3C-1	27323	13209	20	7/7/2023 11:05	7/7/2023 11:25
A8	3C-1	24767	12791	20	7/7/2023 10:38	7/7/2023 10:58
A9	3C-1	21831	11432	20	7/7/2023 10:14	7/7/2023 10:34
A10	3C-1	19804	11035	20	7/7/2023 16:35	7/7/2023 16:55
A11	3C-1	18951	10158	20	7/7/2023 16:11	7/7/2023 16:31
A1	3C-2	75704	26823	20	7/7/2023 14:04	7/7/2023 14:24
A2	3C-2	55941	21315	20	7/7/2023 13:42	7/7/2023 14:02
A3	3C-2	47856	19131	20	7/7/2023 13:14	7/7/2023 13:34
A4	3C-2	41781	17477	20	7/7/2023 12:41	7/7/2023 13:01
A5	3C-2	35683	15331	20	7/7/2023 12:14	7/7/2023 12:34
A6	3C-2	30771	13888	20	7/7/2023 11:49	7/7/2023 12:09
A7	3C-2	26801	12902	20	7/7/2023 11:27	7/7/2023 11:47
A8	3C-2	24954	12221	20	7/7/2023 11:05	7/7/2023 11:25
A9	3C-2	21983	10775	20	7/7/2023 10:38	7/7/2023 10:58
A10	3C-2	19812	10502	20	7/7/2023 10:14	7/7/2023 10:34
A11	3C-2	19218	9735	20	7/7/2023 16:35	7/7/2023 16:55
A1	3C-3	74333	27900	20	7/7/2023 14:29	7/7/2023 14:49
A2	3C-3	55049	22033	20	7/7/2023 14:04	7/7/2023 14:24
A3	3C-3	46579	19867	20	7/7/2023 13:42	7/7/2023 14:02
A4	3C-3	41526	18155	20	7/7/2023 13:14	7/7/2023 13:34
A5	3C-3	35547	15876	20	7/7/2023 12:41	7/7/2023 13:01
A6	3C-3	30151	14122	20	7/7/2023 12:14	7/7/2023 12:34
A7	3C-3	26743	13126	20	7/7/2023 11:49	7/7/2023 12:09
A8	3C-3	24904	12672	20	7/7/2023 11:27	7/7/2023 11:47
A9	3C-3	21567	11559	20	7/7/2023 11:05	7/7/2023 11:25
A10	3C-3	19261	10961	20	7/7/2023 10:38	7/7/2023 10:58
A11	3C-3	18349	10213	20	7/7/2023 10:14	7/7/2023 10:34
A1	3C-4	75389	27757	20	7/7/2023 14:55	7/7/2023 15:15
A2	3C-4	54949	21841	20	7/7/2023 14:29	7/7/2023 14:49
A3	3C-4	46688	19488	20	7/7/2023 14:04	7/7/2023 14:24
A4	3C-4	41050	17997	20	7/7/2023 13:42	7/7/2023 14:02
A5	3C-4	35372	15782	20	7/7/2023 13:14	7/7/2023 13:34
A6	3C-4	30151	14399	20	7/7/23 12:41	7/7/23 13:01
A7	3C-4	26646	12901	20	7/7/23 12:14	7/7/23 12:34
A8	3C-4	24646	12700	20	7/7/23 11:49	7/7/23 12:09
A9	3C-4	21565	11132	20	7/7/23 11:27	7/7/23 11:47
A10	3C-4	19419	10790	20	7/7/23 11:05	7/7/23 11:25
A11	3C-4	17872	10137	20	7/7/23 10:38	7/7/23 10:58
A1	3D-1	76981	27106	20	7/7/23 15:22	7/7/23 15:42
A2	3D-1	55285	21722	20	7/7/23 14:55	7/7/23 15:15
A3	3D-1	46852	19072	20	7/7/23 14:29	7/7/23 14:49
A4	3D-1	41690	17626	20	7/7/23 14:04	7/7/23 14:24
A5	3D-1	36022	15464	20	7/7/23 13:42	7/7/23 14:02
A6	3D-1	30701	14134	20	7/7/23 13:15	7/7/23 13:35
A7	3D-1	27491	12931	20	7/7/23 12:41	7/7/23 13:01
A8	3D-1	25118	12460	20	7/7/23 12:14	7/7/23 12:34
A9	3D-1	21644	11362	20	7/7/23 11:49	7/7/23 12:09
A10	3D-1	19762	11034	20	7/7/23 11:27	7/7/23 11:47
A11	3D-1	18663	9960	20	7/7/23 11:05	7/7/23 11:25
A1	3D-2	73574	28168	20	7/7/23 15:48	7/7/23 16:08
A2	3D-2	54894	22571	20	7/7/23 15:22	7/7/23 15:42
A3	3D-2	46235	19302	20	7/7/23 14:55	7/7/23 15:15
A4	3D-2	40923	18029	20	7/7/23 14:29	7/7/23 14:49

Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
Curve Data 0723	B9	3B-3	11	103464	20	7/7/23 18:28	7/7/23 18:48	58.2%	0.01%
Curve Data 0723	B10	3B-3	12	105810	20	7/7/23 18:06	7/7/23 18:26	61.0%	0.01%
Curve Data 0723	B11	3B-3	17	98383	20	7/7/23 17:38	7/7/23 17:58	60.0%	0.02%
Curve Data 0723	B1	3B-4	290	118870	20	7/7/23 15:22	7/7/23 15:42	36.9%	0.24%
Curve Data 0723	B2	3B-4	269	116825	20	7/7/23 14:55	7/7/23 15:15	40.3%	0.23%
Curve Data 0723	B3	3B-4	275	116015	20	7/7/23 14:29	7/7/23 14:49	41.4%	0.24%
Curve Data 0723	B4	3B-4	208	104737	20	7/7/23 14:04	7/7/23 14:24	43.9%	0.20%
Curve Data 0723	B5	3B-4	219	104562	20	7/7/23 13:42	7/7/23 14:02	45.1%	0.21%
Curve Data 0723	B6	3B-4	271	109298	20	7/7/23 20:43	7/7/23 21:03	48.5%	0.25%
Curve Data 0723	B7	3B-4	264	109761	20	7/7/23 20:18	7/7/23 20:38	50.1%	0.24%
Curve Data 0723	B8	3B-4	252	103741	20	7/7/23 19:52	7/7/23 20:12	52.5%	0.24%
Curve Data 0723	B9	3B-4	246	106273	20	7/7/23 18:52	7/7/23 19:12	53.8%	0.23%
Curve Data 0723	B10	3B-4	240	107570	20	7/7/23 18:28	7/7/23 18:48	54.7%	0.22%
Curve Data 0723	B11	3B-4	210	101421	20	7/7/23 18:06	7/7/23 18:26	53.9%	0.21%
Curve Data 0723	B1	3C-1	185	119222	20	7/7/23 15:48	7/7/23 16:08	37.0%	0.16%
Curve Data 0723	B2	3C-1	184	118515	20	7/7/23 15:22	7/7/23 15:42	39.8%	0.16%
Curve Data 0723	B3	3C-1	176	116428	20	7/7/23 14:55	7/7/23 15:15	41.7%	0.15%
Curve Data 0723	B4	3C-1	159	106365	20	7/7/23 14:29	7/7/23 14:49	43.3%	0.15%
Curve Data 0723	B5	3C-1	151	105452	20	7/7/23 14:04	7/7/23 14:24	44.9%	0.14%
Curve Data 0723	B6	3C-1	157	109606	20	7/7/23 21:18	7/7/23 21:38	47.1%	0.14%
Curve Data 0723	B7	3C-1	179	110593	20	7/7/23 20:43	7/7/23 21:03	48.3%	0.16%
Curve Data 0723	B8	3C-1	144	103938	20	7/7/23 20:18	7/7/23 20:38	51.6%	0.14%
Curve Data 0723	B9	3C-1	182	106929	20	7/7/23 19:52	7/7/23 20:12	52.4%	0.17%
Curve Data 0723	B10	3C-1	114	88560	20	7/7/23 18:53	7/7/23 19:13	55.7%	0.13%
Curve Data 0723	B11	3C-1	158	101543	20	7/7/23 18:28	7/7/23 18:48	53.6%	0.16%
Curve Data 0723	B1	3C-2	240	120686	20	7/7/23 16:11	7/7/23 16:31	35.4%	0.20%
Curve Data 0723	B2	3C-2	188	116654	20	7/7/23 15:48	7/7/23 16:08	38.1%	0.16%
Curve Data 0723	B3	3C-2	207	116645	20	7/7/23 15:22	7/7/23 15:42	40.0%	0.18%
Curve Data 0723	B4	3C-2	178	104632	20	7/7/23 14:55	7/7/23 15:15	41.8%	0.17%
Curve Data 0723	B5	3C-2	204	104828	20	7/7/23 14:29	7/7/23 14:49	43.0%	0.19%
Curve Data 0723	B6	3C-2	197	108559	20	7/7/23 21:40	7/7/23 22:00	45.1%	0.18%
Curve Data 0723	B7	3C-2	189	109801	20	7/7/23 21:18	7/7/23 21:38	48.1%	0.17%
Curve Data 0723	B8	3C-2	207	103802	20	7/7/23 20:43	7/7/23 21:03	49.0%	0.20%
Curve Data 0723	B9	3C-2	191	105894	20	7/7/23 20:18	7/7/23 20:38	49.0%	0.18%
Curve Data 0723	B10	3C-2	190	107863	20	7/7/23 19:52	7/7/23 20:12	53.0%	0.18%
Curve Data 0723	B11	3C-2	115	84637	20	7/7/23 18:53	7/7/23 19:13	50.7%	0.14%
Curve Data 0723	B1	3C-3	182	120454	20	7/7/23 16:35	7/7/23 16:55	37.5%	0.15%
Curve Data 0723	B2	3C-3	206	118570	20	7/7/23 16:11	7/7/23 16:31	40.0%	0.17%
Curve Data 0723	B3	3C-3	154	116735	20	7/7/23 15:48	7/7/23 16:08	42.7%	0.13%
Curve Data 0723	B4	3C-3	154	106257	20	7/7/23 15:22	7/7/23 15:42	43.7%	0.14%
Curve Data 0723	B5	3C-3	141	105574	20	7/7/23 14:55	7/7/23 15:15	44.7%	0.13%
Curve Data 0723	B6	3C-3	162	109699	20	7/7/23 22:07	7/7/23 22:27	46.8%	0.15%
Curve Data 0723	B7	3C-3	169	110965	20	7/7/23 21:40	7/7/23 22:00	49.1%	0.15%
Curve Data 0723	B8	3C-3	155	104346	20	7/7/23 21:18	7/7/23 21:38	50.9%	0.15%
Curve Data 0723	B9	3C-3	157	106683	20	7/7/23 20:43	7/7/23 21:03	53.6%	0.15%
Curve Data 0723	B10	3C-3	150	108849	20	7/7/23 20:18	7/7/23 20:38	56.9%	0.14%
Curve Data 0723	B11	3C-3	131	101233	20	7/7/23 19:52	7/7/23 20:12	55.7%	0.13%
Curve Data 0723	B1	3C-4	262	120283	20	7/7/23 10:14	7/7/23 10:34	36.8%	0.22%
Curve Data 0723	B2	3C-4	276	116713	20	7/7/23 16:35	7/7/23 16:55	39.7%	0.24%
Curve Data 0723	B3	3C-4	275	116930	20	7/7/23 16:11	7/7/23 16:31	41.7%	0.24%
Curve Data 0723	B4	3C-4	255	105111	20	7/7/23 15:48	7/7/23 16:08	43.8%	0.24%
Curve Data 0723	B5	3C-4	240	104607	20	7/7/23 15:22	7/7/23 15:42	44.6%	0.23%
Curve Data 0723	B6	3C-4	224	108515	20	7/7/23 22:34	7/7/23 22:54	47.8%	0.21%
Curve Data 0723	B7	3C-4	235	109431	20	7/7/23 22:07	7/7/23 22:27	48.4%	0.21%
Curve Data 0723	B8	3C-4	189	104054	20	7/7/23 21:40	7/7/23 22:00	51.5%	0.18%
Curve Data 0723	B9	3C-4	213	106442	20	7/7/23 21:18	7/7/23 21:38	51.6%	0.20%
Curve Data 0723	B10	3C-4	235	108305	20	7/7/23 20:43	7/7/23 21:03	55.6%	0.22%
Curve Data 0723	B11	3C-4	203	100757	20	7/7/23 20:18	7/7/23 20:38	56.7%	0.20%
Curve Data 0723	B1	3D-1	277	120232	20	7/7/23 10:38	7/7/23 10:58	35.2%	0.23%
Curve Data 0723	B2	3D-1	236	116818	20	7/7/23 10:14	7/7/23 10:34	39.3%	0.20%
Curve Data 0723	B3	3D-1	321	116704	20	7/7/23 16:35	7/7/23 16:55	40.7%	0.28%
Curve Data 0723	B4	3D-1	297	107037	20	7/7/23 16:11	7/7/23 16:31	42.3%	0.28%
Curve Data 0723	B5	3D-1	274	104092	20	7/7/23 15:48	7/7/23 16:08	42.9%	0.26%
Curve Data 0723	B6	3D-1	260	109223	20	7/7/23 22:56	7/7/23 23:16	46.0%	0.24%
Curve Data 0723	B7	3D-1	266	111985	20	7/7/23 22:34	7/7/23 22:54	47.0%	0.24%
Curve Data 0723	B8	3D-1	243	104554	20	7/7/23 22:07	7/7/23 22:27	49.6%	0.23%
Curve Data 0723	B9	3D-1	250	106765	20	7/7/23 21:40	7/7/23 22:00	52.5%	0.23%
Curve Data 0723	B10	3D-1	285	110366	20	7/7/23 21:18	7/7/23 21:38	55.8%	0.26%
Curve Data 0723	B11	3D-1	238	101297	20	7/7/23 20:43	7/7/23 21:03	53.4%	0.23%
Curve Data 0723	B1	3D-2	169	116214	20	7/7/23 11:05	7/7/23 11:25	38.3%	0.15%
Curve Data 0723	B2	3D-2	150	114569	20	7/7/23 10:38	7/7/23 10:58	41.1%	0.13%
Curve Data 0723	B3	3D-2	142	112601	20	7/7/23 10:14	7/7/23 10:34	41.7%	
Curve Data 0723	B4	3D-2	172	104425	20	7/7/23 16:35	7/7/23 16:55	44.1	

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SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time
A5	3D-2	35437	16350	20	7/7/23 14:04	7/7/23 14:24
A6	3D-2	30018	14614	20	7/7/23 13:42	7/7/23 14:02
A7	3D-2	27075	13169	20	7/7/23 13:15	7/7/23 13:35
A8	3D-2	24974	12893	20	7/7/23 12:41	7/7/23 13:01
A9	3D-2	21529	11488	20	7/7/23 12:14	7/7/23 12:34
A10	3D-2	19484	11088	20	7/7/23 11:49	7/7/23 12:09
A11	3D-2	18368	10288	20	7/7/23 11:27	7/7/23 11:47
A1	3D-3	75499	26110	20	7/7/23 16:11	7/7/23 16:31
A2	3D-3	56512	20663	20	7/7/23 15:48	7/7/23 16:08
A3	3D-3	47001	18070	20	7/7/23 15:22	7/7/23 15:42
A4	3D-3	42269	16565	20	7/7/23 14:55	7/7/23 15:15
A5	3D-3	36586	14460	20	7/7/23 14:29	7/7/23 14:49
A6	3D-3	31160	13626	20	7/7/23 14:04	7/7/23 14:24
A7	3D-3	27515	12052	20	7/7/23 13:42	7/7/23 14:02
A8	3D-3	25625	11777	20	7/7/23 13:15	7/7/23 13:35
A9	3D-3	21610	10930	20	7/7/23 12:41	7/7/23 13:01
A10	3D-3	19828	10162	20	7/7/23 12:14	7/7/23 12:34
A11	3D-3	18455	9560	20	7/7/23 11:49	7/7/23 12:09
A1	3D-4	74880	27893	20	7/7/23 16:35	7/7/23 16:55
A2	3D-4	55183	21639	20	7/7/23 16:11	7/7/23 16:31
A3	3D-4	47306	19414	20	7/7/23 15:48	7/7/23 16:08
A4	3D-4	41798	18077	20	7/7/23 15:22	7/7/23 15:42
A5	3D-4	35918	15993	20	7/7/23 14:55	7/7/23 15:15
A6	3D-4	30038	14135	20	7/7/23 14:29	7/7/23 14:49
A7	3D-4	27061	13036	20	7/7/23 14:04	7/7/23 14:24
A8	3D-4	25271	12717	20	7/7/23 13:42	7/7/23 14:02
A9	3D-4	21318	11542	20	7/7/23 13:15	7/7/23 13:35
A10	3D-4	19496	10950	20	7/7/23 12:41	7/7/23 13:01
A11	3D-4	18550	10009	20	7/7/23 12:14	7/7/23 12:34

Batch	SampleID	Det	Alpha Counts	Beta Counts	LT (min)	START Date/Time	END Date/Time	Th-230 xover	Sr-90 xov
Curve Data 0723	B5	3D-2	144	103409	20	7/7/23 16:11	7/7/23 16:31	46.1%	0.14%
Curve Data 0723	B6	3D-2	140	107627	20	7/7/23 23:17	7/7/23 23:37	48.7%	0.13%
Curve Data 0723	B7	3D-2	141	108254	20	7/7/23 22:56	7/7/23 23:16	48.6%	0.13%
Curve Data 0723	B8	3D-2	165	102960	20	7/7/23 22:34	7/7/23 22:54	51.6%	0.16%
Curve Data 0723	B9	3D-2	141	105548	20	7/7/23 22:07	7/7/23 22:27	53.4%	0.13%
Curve Data 0723	B10	3D-2	166	107057	20	7/7/23 21:40	7/7/23 22:00	56.9%	0.16%
Curve Data 0723	B11	3D-2	137	99712	20	7/7/23 21:18	7/7/23 21:38	56.0%	0.14%
Curve Data 0723	B1	3D-3	612	116667	20	7/7/23 11:27	7/7/23 11:47	34.6%	0.52%
Curve Data 0723	B2	3D-3	535	116323	20	7/7/23 11:05	7/7/23 11:25	36.6%	0.46%
Curve Data 0723	B3	3D-3	590	113748	20	7/7/23 10:38	7/7/23 10:58	38.4%	0.52%
Curve Data 0723	B4	3D-3	465	104423	20	7/7/23 10:14	7/7/23 10:34	39.2%	0.45%
Curve Data 0723	B5	3D-3	536	103721	20	7/7/23 16:35	7/7/23 16:55	39.5%	0.52%
Curve Data 0723	B6	3D-3	517	107795	20	7/10/23 9:25	7/10/23 9:45	43.7%	0.48%
Curve Data 0723	B7	3D-3	576	109239	20	7/7/23 23:17	7/7/23 23:37	43.8%	0.53%
Curve Data 0723	B8	3D-3	559	104049	20	7/7/23 22:56	7/7/23 23:16	46.0%	0.54%
Curve Data 0723	B9	3D-3	561	105330	20	7/7/23 22:34	7/7/23 22:54	50.6%	0.53%
Curve Data 0723	B10	3D-3	521	107660	20	7/7/23 22:07	7/7/23 22:27	51.3%	0.48%
Curve Data 0723	B11	3D-3	475	99801	20	7/7/23 21:40	7/7/23 22:00	51.8%	0.48%
Curve Data 0723	B1	3D-4	259	118184	20	7/7/23 11:49	7/7/23 12:09	37.3%	0.22%
Curve Data 0723	B2	3D-4	244	116822	20	7/7/23 11:27	7/7/23 11:47	39.2%	0.21%
Curve Data 0723	B3	3D-4	229	114010	20	7/7/23 11:05	7/7/23 11:25	41.0%	0.20%
Curve Data 0723	B4	3D-4	226	104190	20	7/7/23 10:38	7/7/23 10:58	43.2%	0.22%
Curve Data 0723	B5	3D-4	212	103527	20	7/7/23 10:14	7/7/23 10:34	44.5%	0.20%
Curve Data 0723	B6	3D-4	255	107466	20	7/10/23 9:47	7/10/23 10:07	47.1%	0.24%
Curve Data 0723	B7	3D-4	225	109108	20	7/10/23 9:25	7/10/23 9:45	48.2%	0.21%
Curve Data 0723	B8	3D-4	208	103708	20	7/7/23 23:17	7/7/23 23:37	50.3%	0.20%
Curve Data 0723	B9	3D-4	221	105710	20	7/7/23 22:56	7/7/23 23:16	54.1%	0.21%
Curve Data 0723	B10	3D-4	218	107093	20	7/7/23 22:34	7/7/23 22:54	56.2%	0.20%
Curve Data 0723	B11	3D-4	204	99525	20	7/7/23 22:07	7/7/23 22:27	54.0%	0.20%

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DATE 7/7/2023

alpha **11230 dpm** source 22I13361

Tare (g)	Gross (g)	Net (mg)	3A-1	3A-2	3A-3	3A-4	3B-1	3B-2	3B-3	3B-4	3C-1	3C-2	3C-3	3C-4	3D-1	3D-2	3D-3	3D-4	
7.71754	7.71755	0.01	74942	75514	74035	75323	74686	73753	73568	74587	75248	75704	74333	75389	76981	73574	75499	74880	1.21%
7.74121	7.74786	6.65	53468	56385	54535	54498	54741	53922	54010	54523	55882	55941	55049	54949	55285	54894	56512	55183	1.57%
7.77283	7.79170	18.87	46115	47325	45000	46414	46637	46171	44958	46249	46808	47856	46579	46688	46852	46235	47001	47306	1.64%
7.79024	7.81627	26.03	41186	42276	40529	41416	41447	40365	39452	41056	41932	41781	41526	41050	41690	40923	42269	41798	1.79%
7.71594	7.75704	41.1	34990	36327	34798	35918	35224	34220	34134	34961	35429	35683	35547	35372	36022	35437	36586	35918	1.93%
7.74888	7.79815	49.27	29627	31222	29364	30650	30453	29149	28657	29659	31153	30771	30151	30151	30701	30018	31160	30038	2.51%
7.73098	7.79330	62.32	26257	27287	26203	27028	26934	26009	25469	26173	27323	26801	26743	26646	27491	27075	27515	27061	2.19%
7.77892	7.85031	71.39	24655	25403	24126	24922	24970	24024	23692	24476	24767	24954	24904	24646	25118	24974	25625	25271	2.06%
7.72424	7.80867	84.43	20736	21830	20939	21646	21660	21051	20917	21165	21831	21983	21567	21565	21644	21529	21610	21318	1.73%
7.75096	7.84600	95.04	18954	19993	19122	19555	19555	18841	18889	19552	19804	19812	19261	19419	19762	19484	19828	19496	1.83%
7.77419	7.87751	103.32	17884	19169	17874	18390	18400	18143	17700	18151	18951	19218	18349	17872	18663	18368	18455	18550	2.47%
																			1.90%

beta **12487 dpm** source ESC51614

Tare (g)	Gross (g)	Net (mg)	3A-1	3A-2	3A-3	3A-4	3B-1	3B-2	3B-3	3B-4	3C-1	3C-2	3C-3	3C-4	3D-1	3D-2	3D-3	3D-4	
7.77164	7.77164	0	116941	121280	116372	119727	118127	119953	116008	118870	119222	120686	120454	120283	120232	116214	116667	118184	1.51%
7.75553	7.76486	9.33	116894	119263	115308	118870	117053	117249	115338	116825	118515	116654	118570	116713	116818	114569	116323	116822	1.12%
7.75293	7.77293	20	113894	116608	112773	115962	114586	115393	113234	116015	116428	116645	116735	116930	116704	112601	113748	114010	1.36%
7.7343	7.76424	29.94	107635	111256	107287	110230	109129	109187	106910	109298	109606	108559	109699	108515	109223	107627	107795	107466	1.10%
7.78711	7.82773	40.62	108249	110261	107314	111119	109521	109807	107282	109761	110593	109801	110965	109431	111985	108254	109239	109108	1.20%
7.81054	7.86505	54.51	107283	108873	106238	109593	108116	107870	105810	107570	88560	107863	108849	108305	110366	107057	107660	107093	4.66%
7.70802	7.77341	65.39	104592	107081	104063	107720	105957	105445	103464	106273	106929	105894	106683	106442	106765	105548	105330	105710	1.07%
7.74763	7.82409	76.46	103534	107063	103715	107061	105601	104834	103254	104737	106365	104632	106257	105111	107037	104425	104423	104190	1.22%
7.75965	7.84626	86.61	102419	105678	102456	105677	104054	104157	102682	104562	105452	104828	105574	104607	104092	103409	103721	103527	1.06%
7.74932	7.84672	97.4	102240	104491	102511	105264	103988	103591	102102	103741	103938	103802	104346	104054	104554	102960	104049	103708	0.84%
7.7624	7.87210	109.7	98130	102249	98815	102543	100306	101817	98383	101421	101543	84637	101233	100757	101297	99712	99801	99525	4.21%
																			1.76%

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View as PDF (CreatePDF?batchnum=WG2149279)

Gross Alpha/Beta Aqueous Radiochemistry Prep Benchsheet

Batch: WG2149279

Analyst: ELP3947 Prep Start Date/Time: 10/11/23 13:46-13:48 Prep End Date/Time: 10/13/23 10:49-10/24/23 15:28 Method: 900/900M SOP: ENV-SOP-MTJL-0302/327 Pipet ID: 141, E-33 Bal ID: RADBAL3

Hot Plate ID's: G89, G93 Oven ID: N/A

Gross Alpha spike: 23F19100 Amt. Used: 2 mL Exp. Date:06/19/33 Gross Beta Spike: 23E17276 Amt. Used: 1 mL Exp. Date:05/17/24 Nitric Acid: 23I26181 Amt. Used: 28 mL Exp. Date:05/31/28

Sample Number	Matrix	Sample Vol (mL)	Planchet Tare Wt (g)	Planchet Gross Wt (g)	Planchet Net Wt (g)	Review Analyst	Review Date
BLANK		200	7.61732	7.58566	-0.03166	SNR961	10/24/23 15:28:45
LCS		200	7.60902	7.59312	-0.0159	SNR961	10/24/23 15:28:45
MS(L1658999-11)		200	7.58552	7.60784	0.02232	SNR961	10/24/23 15:28:45
MSD(L1658999-11)		200	7.53961	7.56585	0.02624	SNR961	10/24/23 15:28:45
DUP(L1660430-03)		200	7.61420	7.63628	0.02208	SNR961	10/24/23 15:28:45
1. L1658999-08	NPW	1	7.78555	7.87175	0.0862	SNR961	10/24/23 15:28:45
2. L1658999-09	NPW	1	7.85703	7.94666	0.08963	SNR961	10/24/23 15:28:45
3. L1658999-10	NPW	1	7.79876	7.89646	0.0977	SNR961	10/24/23 15:28:45
4. L1658999-11	NPW	200	7.57831	7.58914	0.01083	SNR961	10/24/23 15:28:45
5. L1658999-12	NPW	5	7.59933	7.66815	0.06882	SNR961	10/24/23 15:28:45
6. L1658999-13	NPW	5	7.61769	7.70657	0.08888	SNR961	10/24/23 15:28:45
7. L1658999-14	NPW	3	7.60060	7.70013	0.09953	SNR961	10/24/23 15:28:45
8. L1658999-15	NPW	2	7.60968	7.66759	0.05791	SNR961	10/24/23 15:28:45
9. L1659084-01	NPW	10	7.56833	7.63740	0.06907	SNR961	10/24/23 15:28:45
10. L1659084-02	NPW	20	7.58171	7.64214	0.06043	SNR961	10/24/23 15:28:45
11. L1659321-01	NPW	20	7.55730	7.60000	0.0427	SNR961	10/24/23 15:28:45
12. L1659739-01	NPW	200	7.62380	7.71900	0.0952	SNR961	10/24/23 15:28:45
13. L1659740-01	NPW	150	7.64408	7.73264	0.08856	SNR961	10/24/23 15:28:45
14. L1659975-01	NPW	200	7.58975	7.64873	0.05898	SNR961	10/24/23 15:28:45
15. L1659985-01	NPW	150	7.59473	7.63267	0.03794	SNR961	10/24/23 15:28:45
16. L1659985-02	NPW	100	7.60386	7.65325	0.04939	SNR961	10/24/23 15:28:45
17. L1660353-01	NPW	20	7.56984	7.60319	0.03335	SNR961	10/24/23 15:28:45
18. L1660430-01	NPW	40	7.54284	7.60234	0.0595	SNR961	10/24/23 15:28:45
19. L1660430-02	NPW	70	7.59702	7.62954	0.03252	SNR961	10/24/23 15:28:45
20. L1660430-03	NPW	200	7.60209	7.63257	0.03048	SNR961	10/24/23 15:28:45

Comments:
Lot #s for Miscellaneous materials used to for this sample prep process:1) Manual Pipette tip (5-10 mL)/// Lot # 2301.512352) Auto Pipette tip (5 mL) // Batch # 22503) HNO3 // Lot # 230677

Reviewed By:SNR961 on 10/24/23 15:28:45

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G542 Run Log Gross Alpha/Beta Waters WG2149279

Sample Order Verified by SNR961

Sample ID	Alpha	Beta	LT	Det	Analyst	Start	End
BLANK WG2149279	25	307	200	3A-1	SNR961	10/31/2023 9:19	10/31/2023 12:39
LCS WG2149279	327	1932	200	3D-4	SNR961	10/30/2023 10:47	10/30/2023 14:07
MS L1658999-11 WG2149279	357	2114	200	3A-2	SNR961	10/31/2023 9:19	10/31/2023 12:39
MSD L1658999-11 WG2149279	268	1748	200	3A-3	SNR961	10/31/2023 9:19	10/31/2023 12:39
DUP L1660430-03 WG2149279	93	626	200	3A-4	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-08 WG2149279	30	357	200	3B-1	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-09 WG2149279	16	261	200	3B-2	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-10 WG2149279	33	282	200	3B-3	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-11 WG2149279	14	392	200	3B-4	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-12 WG2149279	23	288	200	3C-1	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-13 WG2149279	15	298	200	3C-2	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-14 WG2149279	21	340	200	3C-3	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-15 WG2149279	9	229	200	3C-4	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1659084-01 WG2149279	23	214	200	3D-1	SNR961	10/31/2023 9:20	10/31/2023 12:40
L1659084-02 WG2149279	11	224	200	3D-2	SNR961	10/31/2023 9:20	10/31/2023 12:40
L1659321-01 WG2149279	26	210	200	3D-3	SNR961	10/31/2023 9:20	10/31/2023 12:40
L1659739-01 WG2149279	51	477	200	3A-1	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659740-01 WG2149279	232	840	200	3A-2	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659975-01 WG2149279	17	319	200	3A-3	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659985-01 WG2149279	26	365	200	3A-4	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659985-02 WG2149279	25	435	200	3B-1	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660353-01 WG2149279	23	227	200	3B-2	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660430-01 WG2149279	60	348	200	3B-3	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660430-02 WG2149279	70	541	200	3B-4	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660430-03 WG2149279	101	568	200	3C-1	SNR961	10/31/2023 12:46	10/31/2023 16:06

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G542 Run Log Gross Alpha/Beta Waters WG2149279

Sample Order Verified by SNR961

Sample ID	Alpha	Beta	LT	Det	Analyst	Start	End
BLANK WG2149279	25	307	200	3A-1	SNR961	10/31/2023 9:19	10/31/2023 12:39
LCS WG2149279	327	1932	200	3D-4	SNR961	10/30/2023 10:47	10/30/2023 14:07
MS L1658999-11 WG2149279	357	2114	200	3A-2	SNR961	10/31/2023 9:19	10/31/2023 12:39
MSD L1658999-11 WG2149279	268	1748	200	3A-3	SNR961	10/31/2023 9:19	10/31/2023 12:39
DUP L1660430-03 WG2149279	93	626	200	3A-4	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-08 WG2149279	30	357	200	3B-1	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-09 WG2149279	16	261	200	3B-2	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-10 WG2149279	33	282	200	3B-3	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-11 WG2149279	14	392	200	3B-4	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-12 WG2149279	23	288	200	3C-1	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-13 WG2149279	15	298	200	3C-2	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-14 WG2149279	21	340	200	3C-3	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1658999-15 WG2149279	9	229	200	3C-4	SNR961	10/31/2023 9:19	10/31/2023 12:39
L1659084-01 WG2149279	23	214	200	3D-1	SNR961	10/31/2023 9:20	10/31/2023 12:40
L1659084-02 WG2149279	11	224	200	3D-2	SNR961	10/31/2023 9:20	10/31/2023 12:40
L1659321-01 WG2149279	26	210	200	3D-3	SNR961	10/31/2023 9:20	10/31/2023 12:40
L1659739-01 WG2149279	51	477	200	3A-1	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659740-01 WG2149279	232	840	200	3A-2	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659975-01 WG2149279	17	319	200	3A-3	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659985-01 WG2149279	26	365	200	3A-4	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1659985-02 WG2149279	25	435	200	3B-1	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660353-01 WG2149279	23	227	200	3B-2	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660430-01 WG2149279	60	348	200	3B-3	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660430-02 WG2149279	70	541	200	3B-4	SNR961	10/31/2023 12:46	10/31/2023 16:06
L1660430-03 WG2149279	101	568	200	3C-1	SNR961	10/31/2023 12:46	10/31/2023 16:06

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GAS COUNTER G542 Unit: 3 MONTH: September-23
Alpha Source Check
Standard ID: 23F04822

Alpha Activity: **22460.4** **dpm** Count Time: **5** **min**
10117

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF
1	28863	25.7%	29479	26.2%	28193	25.1%	30561	27.2%	30088	26.8%	28862	25.7%	28589	25.5%	29061	25.9%	28769	25.6%	30093	26.8%	28944	25.8%	29257	26.1%	29712	26.5%	29135	25.9%	29540	26.3%	29176	26.0%
2																																
3																																
4																																
5	28216	25.1%	30475	27.1%	28338	25.2%	29643	26.4%	30007	26.7%	28840	25.7%	28419	25.3%	29315	26.1%	28905	25.7%	29652	26.4%	28781	25.6%	28909	25.7%	29595	26.4%	30256	26.9%	29502	26.3%	29453	26.2%
6	28641	25.5%	30753	27.4%	29141	25.9%	30775	27.4%	29097	25.9%	28609	25.5%	28070	25.0%	28847	25.7%	28700	25.6%	28875	25.7%	29653	26.4%	28702	25.6%	30167	26.9%	28345	25.2%	29847	26.6%	29624	26.4%
7	28886	25.7%	29827	26.6%	29153	26.0%	29316	26.1%	30116	26.8%	28744	25.6%	28732	25.6%	28369	25.3%	29952	26.7%	29317	26.1%	28495	25.4%	30661	27.3%	29767	26.5%	28897	25.7%	29599	26.4%	29341	26.1%
8	29102	25.9%	30027	26.7%	28641	25.5%	30459	27.1%	28976	25.8%	28833	25.7%	29649	26.4%	28802	25.6%	28885	25.7%	29917	26.6%	28762	25.6%	29344	26.1%	29680	26.4%	29422	26.2%	30005	26.7%	29461	26.2%
9																																
10																																
11	28163	25.1%	30418	27.1%	28687	25.5%	29545	26.3%	30066	26.8%	28501	25.4%	28298	25.2%	28770	25.6%	29106	25.9%	29377	26.2%	29263	26.1%	29487	26.3%	28955	25.8%	29164	26.0%	29451	26.2%	30430	27.1%
12	28650	25.5%	30866	27.5%	28673	25.5%	28988	25.8%	30501	27.2%	28905	25.7%	29458	26.2%	29523	26.3%	29527	26.3%	29786	26.5%	29149	26.0%	28694	25.6%	29219	26.0%	28930	25.8%	29656	26.4%	30215	26.9%
13	28677	25.5%	30247	26.9%	29149	26.0%	29963	26.7%	28948	25.8%	29152	26.0%	28909	25.7%	28747	25.6%	29234	26.0%	28908	25.7%	29980	26.7%	29620	26.4%	29866	26.6%	29592	26.4%	30357	27.0%	31141	27.7%
14	29893	26.6%	29407	26.2%	28674	25.5%	30351	27.0%	29419	26.2%	29261	26.1%	28279	25.2%	29277	26.1%	28550	25.4%	30161	26.9%	29678	26.4%	29746	26.5%	28919	25.8%	28689	25.5%	30167	26.9%	29643	26.4%
15	28981	25.8%	30459	27.1%	29259	26.1%	29199	26.0%	29253	26.0%	29704	26.5%	28151	25.1%	30102	26.8%	28893	25.7%	29890	26.6%	29397	26.2%	29651	26.4%	28374	25.3%	29069	25.9%	30965	27.6%	29569	26.3%
16																																
17																																
18	28829	25.7%	29817	26.6%	28876	25.7%	29031	25.9%	29539	26.3%	28530	25.4%	28985	25.8%	29210	26.0%	29438	26.2%	30643	27.3%	29608	26.4%	29257	26.1%	29640	26.4%	28070	25.0%	30327	27.0%	29625	26.4%
19	28069	25.0%	30511	27.2%	28785	25.6%	30224	26.9%	29715	26.5%	30350	27.0%	28719	25.6%	28978	25.8%	29457	26.2%	29733	26.5%	29564	26.3%	28315	25.2%	30372	27.0%	29313	26.1%	30196	26.9%	29973	26.7%
20	29144	26.0%	29902	26.6%	27934	24.9%	30319	27.0%	29343	26.1%	30552	27.2%	28873	25.7%	30039	26.7%	29121	25.9%	29911	26.6%	29878	26.6%	28633	25.5%	29530	26.3%	29605	26.4%	29299	26.1%	28869	25.7%
21	28862	25.7%	29446	26.2%	27959	24.9%	29942	26.7%	30348	27.0%	28811	25.7%	29119	25.9%	29078	25.9%	30138	26.8%	29796	26.5%	29482	26.3%	28334	25.2%	29239	26.0%	29587	26.3%	30499	27.2%	29189	26.0%
22	28891	25.7%	31099	27.7%	28312	25.2%	29627	26.4%	30181	26.9%	28990	25.8%	28740	25.6%	29450	26.2%	29340	26.1%	30132	26.8%	29226	26.0%	28824	25.7%	28432	25.3%	29702	26.4%	30190	26.9%	29748	26.5%
23																																
24																																
25	29546	26.3%	29441	26.2%	29362	26.1%	28645	25.5%	29646	26.4%	29586	26.3%	28229	25.1%	28945	25.8%	29767	26.5%	29861	26.6%	30850	27.5%	29088	25.9%	28527	25.4%	28863	25.7%	29979	26.7%	29447	26.2%
26	29887	26.6%	28910	25.7%	29718	26.5%	29844	26.6%	29508	26.3%	29084	25.9%	28731	25.6%	28462	25.3%	29941	26.7%	29529	26.3%	30290	27.0%	29391	26.2%	29541	26.3%	28660	25.5%	29840	26.6%	29404	26.2%
27	29318	26.1%	29969	26.7%	28680	25.5%	30027	26.7%	30257	26.9%	28781	25.6%	28802	25.6%	29279	26.1%	28911	25.7%	30284	27.0%	28819	25.7%	28735	25.6%	29213	26.0%	28244	25.2%	30362	27.0%	29446	26.2%
28	29731	26.5%	30548	27.2%	29661	26.4%	29389	26.2%	28745	25.6%	29013	25.8%	29050	25.9%	29098	25.9%	29541	26.3%	29432	26.2%	29590	26.3%	29414	26.2%	28350	25.2%	28633	25.5%	30704	27.3%	29696	26.4%
29	28565	25.4%	30397	27.1%	27870	24.8%	29446	26.2%	29310	26.1%	28148	25.1%	28499	25.4%	29309	26.1%	29764	26.5%	28605	25.5%	29303	26.1%	28796	25.6%	30319	27.0%	29292	26.1%	30068	26.8%	29549	26.3%
30																																
31																																
average	**28946**	**25.8%**	**30100**	**26.8%**	**28753**	**25.6%**	**29764.7**	**26.5%**	**29653.2**	**26.4%**	**29062.8**	**25.9%**	**28715.1**	**25.6%**	**29133**	**25.9%**	**29297**	**26.1%**	**29695**	**26.4%**	**29436**	**26.2%**	**29142.9**	**26.0%**	**29370.85**	**26.2%**	**29073.4**	**25.9%**	**30027.65**	**26.7%**	**29650**	**26.4%**
std dev	529	0.47%	572	0.01	546	0.00	580	0.01	518	0.00	592	0.01	419	0.00	441	0.00	462	0.41%	503	0.00	560	0.00	558	0.00	624	0.01	547	0.00	442	0.00	494	0.00
UCL	**30532**	**27.2%**	**31817**	**28.3%**	**30391**	**27.1%**	**31504**	**28.1%**	**31208**	**27.8%**	**30840**	**27.5%**	**29971**	**26.7%**	**30457**	**27.1%**	**30682**	**27.3%**	**31205**	**27.8%**	**31116**	**27.7%**	**30817**	**27.4%**	**31243**	**27.8%**	**30714**	**27.3%**	**31354**	**27.9%**	**31133**	**27.7%**
UWL	**30003**	**26.7%**	**31244**	**27.8%**	**29845**	**26.6%**	**30924**	**27.5%**	**30689**	**27.3%**	**30248**	**26.9%**	**29552**	**26.3%**	**30016**	**26.7%**	**30220**	**26.9%**	**30702**	**27.3%**	**30556**	**27.2%**	**30259**	**26.9%**	**30619**	**27.3%**	**30167**	**26.9%**	**30912**	**27.5%**	**30639**	**27.3%**
LWL	**27888**	**24.8%**	**28955**	**25.8%**	**27661**	**24.6%**	**28605**	**25.5%**	**28617**	**25.5%**	**27878**	**24.8%**	**27878**	**24.8%**	**28251**	**25.2%**	**28374**	**25.3%**	**28688**	**25.5%**	**28315**	**25.2%**	**28027**	**25.0%**	**28123**	**25.0%**	**27980**	**24.9%**	**29143**	**26.0%**	**28661**	**25.5%**
LCL	**27360**	**24.4%**	**28383**	**25.3%**	**27116**	**24.1%**	**28025**	**25.0%**	**28099**	**25.0%**	**27285**	**24.3%**	**27459**	**24.5%**	**27809**	**24.8%**	**27912**	**24.9%**	**28185**	**25.1%**	**27755**	**24.7%**	**27469**	**24.5%**	**27499**	**24.5%**	**27433**	**24.4%**	**28701**	**25.6%**	**28167**	**25.1%**

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GAS COUNTER G542 Unit: 3 MONTH: Sep-23 ALPHA BACKGROUND
Alpha Background

1 dpm Count Time: 100 min

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	6	**0.06**	2	**0.02**	7	**0.07**	6	**0.06**	13	**0.13**	7	**0.07**	6	**0.06**	9	**0.09**	9	**0.09**	2	**0.02**	6	**0.06**	3	**0.03**	17	**0.17**	9	**0.09**	6	**0.06**	11	**0.11**
2																																
3	9.6	**0.10**	4.1	**0.04**	7.3	**0.07**	5.6	**0.06**	5.7	**0.06**	5.6	**0.06**	7.9	**0.08**	5.6	**0.06**	5	**0.05**	3.2	**0.03**	3.8	**0.04**	4.4	**0.04**	12.1	**0.12**	6.5	**0.07**	6.3	**0.06**	9.4	**0.09**
4																																
5	14	**0.14**	5	**0.05**	7	**0.07**	5	**0.05**	2	**0.02**	8	**0.08**	2	**0.02**	4	**0.04**	5	**0.05**	4	**0.04**	3	**0.03**	6	**0.06**	10	**0.10**	5	**0.05**	4	**0.04**	5	**0.05**
6	9	**0.09**	11	**0.11**	7	**0.07**	2	**0.02**	5	**0.05**	5	**0.05**	9	**0.09**	5	**0.05**	3	**0.03**	5	**0.05**	7	**0.07**	6	**0.06**	15	**0.15**	8	**0.08**	17	**0.17**	10	**0.10**
7	11	**0.11**	11	**0.11**	4	**0.04**	2	**0.02**	5	**0.05**	4	**0.04**	5	**0.05**	4	**0.04**	4	**0.04**	5	**0.05**	6	**0.06**	5	**0.05**	13	**0.13**	7	**0.07**	6	**0.06**	9	**0.09**
8	14	**0.14**	7	**0.07**	9	**0.09**	8	**0.08**	6	**0.06**	9	**0.09**	6	**0.06**	5	**0.05**	4	**0.04**	3	**0.03**	5	**0.05**	0	**0.00**	13	**0.13**	6	**0.06**	8	**0.08**	7	**0.07**
9																																
10																																
11	11	**0.11**	9	**0.09**	7	**0.07**	5	**0.05**	12	**0.12**	5	**0.05**	7	**0.07**	7	**0.07**	8	**0.08**	5	**0.05**	1	**0.01**	8	**0.08**	13	**0.13**	6	**0.06**	3	**0.03**	10	**0.10**
12	10	**0.10**	7	**0.07**	11	**0.11**	9	**0.09**	2	**0.02**	4	**0.04**	9	**0.09**	10	**0.10**	8	**0.08**	6	**0.06**	7	**0.07**	8	**0.08**	8	**0.08**	11	**0.11**	4	**0.04**	15	**0.15**
13	15	**0.15**	2	**0.02**	10	**0.10**	6	**0.06**	5	**0.05**	11	**0.11**	4	**0.04**	8	**0.08**	8	**0.08**	4	**0.04**	6	**0.06**	6	**0.06**	13	**0.13**	5	**0.05**	4	**0.04**	12	**0.12**
14	20	**0.20**	6	**0.06**	8	**0.08**	5	**0.05**	7	**0.07**	3	**0.03**	7	**0.07**	4	**0.04**	8	**0.08**	6	**0.06**	5	**0.05**	5	**0.05**	14	**0.14**	5	**0.05**	4	**0.04**	9	**0.09**
15	10	**0.10**	3	**0.03**	10	**0.10**	13	**0.13**	2	**0.02**	3	**0.03**	7	**0.07**	5	**0.05**	6	**0.06**	1	**0.01**	7	**0.07**	6	**0.06**	18	**0.18**	11	**0.11**	8	**0.08**	8	**0.08**
16																																
17																																
18	5	**0.05**	6	**0.06**	7	**0.07**	0	**0.00**	2	**0.02**	11	**0.11**	7	**0.07**	2	**0.02**	11	**0.11**	6	**0.06**	7	**0.07**	5	**0.05**	13	**0.13**	6	**0.06**	6	**0.06**	11	**0.11**
19	9	**0.09**	8	**0.08**	24	**0.24**	10	**0.10**	9	**0.09**	6	**0.06**	18	**0.18**	9	**0.09**	7	**0.07**	5	**0.05**	6	**0.06**	8	**0.08**	10	**0.10**	9	**0.09**	18	**0.18**	16	**0.16**
20	14	**0.14**	7	**0.07**	8	**0.08**	40	**0.40**	7	**0.07**	9	**0.09**	34	**0.34**	8	**0.08**	7	**0.07**	32	**0.32**	5	**0.05**	3	**0.03**	9	**0.09**	1	**0.01**	8	**0.08**	9	**0.09**
21	29	**0.29**	4	**0.04**	7	**0.07**	7	**0.07**	7	**0.07**	9	**0.09**	1	**0.01**	5	**0.05**	20	**0.20**	5	**0.05**	4	**0.04**	3	**0.03**	16	**0.16**	2	**0.02**	11	**0.11**	17	**0.17**
22	12	**0.12**	9	**0.09**	7	**0.07**	5	**0.05**	6	**0.06**	9	**0.09**	6	**0.06**	8	**0.08**	6	**0.06**	11	**0.11**	7	**0.07**	7	**0.07**	11	**0.11**	10	**0.10**	4	**0.04**	11	**0.11**
23																																
24																																
25	17	**0.17**	5	**0.05**	13	**0.13**	10	**0.10**	2	**0.02**	7	**0.07**	14	**0.14**	5	**0.05**	9	**0.09**	5	**0.05**	4	**0.04**	4	**0.04**	16	**0.16**	4	**0.04**	10	**0.10**	13	**0.13**
26	18	**0.18**	8	**0.08**	5	**0.05**	11	**0.11**	15	**0.15**	5	**0.05**	20	**0.20**	10	**0.10**	6	**0.06**	10	**0.10**	7	**0.07**	8	**0.08**	16	**0.16**	7	**0.07**	9	**0.09**	6	**0.06**
27	10	**0.10**	11	**0.11**	6	**0.06**	8	**0.08**	4	**0.04**	12	**0.12**	5	**0.05**	4	**0.04**	8	**0.08**	12	**0.12**	3	**0.03**	3	**0.03**	12	**0.12**	3	**0.03**	9	**0.09**	8	**0.08**
28	11	**0.11**	7	**0.07**	9	**0.09**	4	**0.04**	3	**0.03**	3	**0.03**	8	**0.08**	3	**0.03**	5	**0.05**	4	**0.04**	5	**0.05**	4	**0.04**	11	**0.11**	3	**0.03**	4	**0.04**	12	**0.12**
29	14	**0.14**	1	**0.01**	9	**0.09**	7	**0.07**	3	**0.03**	3	**0.03**	7	**0.07**	7	**0.07**	5	**0.05**	1	**0.01**	2	**0.02**	12	**0.12**	19	**0.19**	6	**0.06**	8	**0.08**	6	**0.06**
30																																
31																																
average	**12.790**	**0.128**	**6.338**	**0.063**	**8.681**	**0.087**	**8.029**	**0.080**	**5.843**	**0.058**	**6.600**	**0.066**	**9.043**	**0.090**	**6.076**	**0.061**	**7.238**	**0.072**	**6.438**	**0.064**	**5.086**	**0.051**	**5.448**	**0.054**	**13.290**	**0.133**	**6.214**	**0.062**	**7.490**	**0.075**	**10.210**	**0.102**
std dev	5.242	0.052	2.985	0.030	4.048	0.040	7.971	0.080	3.759	0.038	2.895	0.029	7.318	0.073	2.346	0.023	3.534	0.035	6.518	0.065	1.793	0.018	2.571	0.026	2.967	0.030	2.786	0.028	4.040	0.040	3.213	0.032
UCL	**28.517**	**0.285**	**15.293**	**0.153**	**20.825**	**0.208**	**31.942**	**0.319**	**17.119**	**0.171**	**15.284**	**0.153**	**30.998**	**0.310**	**13.113**	**0.131**	**17.841**	**0.178**	**25.994**	**0.260**	**10.464**	**0.105**	**13.159**	**0.132**	**22.191**	**0.222**	**14.574**	**0.146**	**19.611**	**0.196**	**19.848**	**0.198**
UWL	**23.275**	**0.233**	**12.308**	**0.123**	**16.777**	**0.168**	**23.971**	**0.240**	**13.360**	**0.134**	**12.390**	**0.124**	**23.680**	**0.237**	**10.767**	**0.108**	**14.306**	**0.143**	**19.475**	**0.195**	**8.671**	**0.087**	**10.589**	**0.106**	**19.224**	**0.192**	**11.787**	**0.118**	**15.571**	**0.156**	**16.635**	**0.166**
LWL	**2.306**	**0.023**	**0.368**	**0.004**	**0.585**	**0.006**	**-7.913**	**-0.079**	**-1.675**	**-0.017**	**0.810**	**0.008**	**-5.594**	**-0.056**	**1.385**	**0.014**	**0.170**	**0.002**	**-6.599**	**-0.066**	**1.500**	**0.015**	**0.307**	**0.003**	**7.357**	**0.074**	**0.641**	**0.006**	**-0.590**	**-0.006**	**3.784**	**0.038**
LCL	**-2.936**	**-0.029**	**-2.617**	**-0.026**	**-3.464**	**-0.035**	**-15.884**	**-0.159**	**-5.434**	**-0.054**	**-2.084**	**-0.021**	**-12.912**	**-0.129**	**-0.961**	**-0.010**	**-3.364**	**-0.034**	**-13.117**	**-0.131**	**-0.293**	**-0.003**	**-2.264**	**-0.023**	**4.390**	**0.044**	**-2.145**	**-0.021**	**-4.630**	**-0.046**	**0.571**	**0.006**

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GAS COUNTER G542 Unit: 3 MONTH: September-23
Beta Source Check
23F05880

BETA Activity: **8284.32** **dpm** Count Time: **5** **min**

DATE	3A-1 COUNTS	3A-1 EFF	3A-2 COUNTS	3A-2 EFF	3A-3 COUNTS	3A-3 EFF	3A-4 COUNTS	3A-4 EFF	3B-1 COUNTS	3B-1 EFF	3B-2 COUNTS	3B-2 EFF	3B-3 COUNTS	3B-3 EFF	3B-4 COUNTS	3B-4 EFF	3C-1 COUNTS	3C-1 EFF	3C-2 COUNTS	3C-2 EFF	3C-3 COUNTS	3C-3 EFF	3C-4 COUNTS	3C-4 EFF	3D-1 COUNTS	3D-1 EFF	3D-2 COUNTS	3D-2 EFF	3D-3 COUNTS	3D-3 EFF	3D-4 COUNTS	3D-4 EFF	AVG
1	18512	44.7%	17101	41.3%	18200	43.9%	19039	46.0%	16794	40.5%	17244	41.6%	17180	41.5%	18250	44.1%	15228	36.8%	18747	45.3%	18711	45.2%	16173	39.0%	16284	39.3%	18220	44.0%	18597	44.9%	16900	40.8%	41.9%
2																																	41.9%
3																																	41.9%
4																																	41.9%
5	16230	39.2%	17978	43.4%	17970	43.4%	18888	45.6%	15203	36.7%	16945	40.9%	16106	38.9%	17704	42.7%	18603	44.9%	17036	41.1%	18875	45.6%	18511	44.7%	18912	45.7%	18654	45.0%	18482	44.6%	16777	40.5%	41.9%
6	18225	44.0%	15375	37.1%	18164	43.9%	17354	41.9%	16446	39.7%	17513	42.3%	18397	44.4%	18318	44.2%	18777	45.3%	18758	45.3%	17863	43.1%	18009	43.5%	17171	41.5%	15789	38.1%	16429	39.7%	18900	45.6%	41.9%
7	16917	40.8%	19149	46.2%	18373	44.4%	16502	39.8%	18611	44.9%	18233	44.0%	16151	39.0%	17676	42.7%	18834	45.5%	15275	36.9%	17461	42.2%	18420	44.5%	16570	40.0%	17961	43.4%	16635	40.2%	18607	44.9%	41.9%
8	16514	39.9%	18897	45.6%	15856	38.3%	19012	45.9%	16250	39.2%	17751	42.9%	16708	40.3%	18580	44.9%	18062	43.6%	18784	45.3%	15066	36.4%	18414	44.5%	18592	44.9%	16862	40.7%	18251	44.1%	18374	44.4%	41.9%
9																																	41.9%
10																																	41.9%
11	18293	44.2%	19091	46.1%	14784	35.7%	18219	44.0%	18915	45.7%	18793	45.4%	16468	39.8%	17025	41.1%	18720	45.2%	16446	39.7%	17028	41.1%	18493	44.6%	18328	44.2%	16145	39.0%	17291	41.7%	18107	43.7%	41.9%
12	16359	39.5%	18338	44.3%	18271	44.1%	16943	40.9%	17278	41.7%	16951	40.9%	18121	43.7%	16146	39.0%	18819	45.4%	18474	44.6%	15276	36.9%	18649	45.0%	18267	44.1%	18282	44.1%	17011	41.1%	18424	44.5%	41.9%
13	18769	45.3%	18823	45.4%	15804	38.2%	16804	40.6%	15052	36.3%	18332	44.3%	18490	44.6%	17427	42.1%	19029	45.9%	17168	41.4%	17915	43.3%	18164	43.9%	18501	44.7%	16883	40.8%	16209	39.1%	18540	44.8%	41.9%
14	16778	40.5%	18834	45.5%	16693	40.3%	18744	45.3%	16899	40.8%	16215	39.1%	18338	44.3%	18636	45.0%	18573	44.8%	16587	40.0%	18595	44.9%	17424	42.1%	17921	43.3%	18408	44.4%	18568	44.8%	15084	36.4%	41.9%
15	18142	43.8%	18723	45.2%	17315	41.8%	17941	43.3%	16807	40.6%	16369	39.5%	16807	40.6%	16536	39.9%	18678	45.1%	18686	45.1%	18610	44.9%	16209	39.1%	18729	45.2%	18095	43.7%	18554	44.8%	15059	36.4%	41.9%
16																																	41.9%
17																																	41.9%
18	16001	38.6%	18837	45.5%	18239	44.0%	16851	40.7%	17322	41.8%	18495	44.7%	18171	43.9%	18719	45.2%	17039	41.1%	18442	44.5%	17410	42.0%	15976	38.6%	18149	43.8%	18497	44.7%	18500	44.7%	14928	36.0%	41.9%
19	15787	38.1%	15343	37.0%	18021	43.5%	16500	39.8%	18583	44.9%	19237	46.4%	18095	43.7%	18240	44.0%	17662	42.6%	19195	46.3%	17758	42.9%	16351	39.5%	16976	41.0%	18187	43.9%	18118	43.7%	16637	40.2%	41.9%
20	16967	41.0%	17157	41.4%	18113	43.7%	18824	45.4%	18562	44.8%	15015	36.2%	18088	43.7%	16439	39.7%	16280	39.3%	17109	41.3%	17565	42.4%	17449	42.1%	18668	45.1%	18429	44.5%	18221	44.0%	18563	44.8%	41.9%
21	18508	44.7%	17062	41.2%	16577	40.0%	18678	45.1%	18601	44.9%	18599	44.9%	18299	44.2%	18418	44.5%	16473	39.8%	15112	36.5%	17125	41.3%	18124	43.8%	17827	43.0%	18269	44.1%	17595	42.5%	16086	38.8%	41.9%
22	17025	41.1%	15335	37.0%	16264	39.3%	18468	44.6%	16977	41.0%	18499	44.7%	16040	38.7%	18629	45.0%	17367	41.9%	18622	45.0%	18530	44.7%	18749	45.3%	16176	39.1%	18637	45.0%	17536	42.3%	18460	44.6%	41.9%
23																																	41.9%
24																																	41.9%
25	16601	40.1%	18995	45.9%	18443	44.5%	15341	37.0%	18104	43.7%	17794	43.0%	16202	39.1%	18545	44.8%	18783	45.3%	18488	44.6%	18861	45.5%	16205	39.1%	16844	40.7%	16031	38.7%	18104	43.7%	17369	41.9%	41.9%
26	18318	44.2%	16296	39.3%	18007	43.5%	18742	45.2%	17367	41.9%	18074	43.6%	17571	42.4%	18644	45.0%	16724	40.4%	14818	35.8%	16729	40.4%	16366	39.5%	16965	41.0%	18389	44.4%	18234	44.0%	18938	45.7%	
27	17438	42.1%	18988	45.8%	16577	40.0%	17289	41.7%	18771	45.3%	18196	43.9%	15799	38.1%	18384	44.4%	18763	45.3%	18175	43.9%	16709	40.3%	16328	39.4%	18925	45.7%	18411	44.4%	14998	36.2%	17351	41.9%	
28	17417	42.0%	18778	45.3%	18520	44.7%	17105	41.3%	17378	42.0%	18832	45.5%	17848	43.1%	14917	36.0%	17170	41.5%	18586	44.9%	16723	40.4%	17929	43.3%	18927	45.7%	16043	38.7%	18454	44.6%	16493	39.8%	
29	18265	44.1%	18810	45.4%	15986	38.6%	16293	39.3%	18555	44.8%	17240	41.6%	18567	44.8%	18461	44.6%	17172	41.5%	18422	44.5%	17399	42.0%	18338	44.3%	18539	44.8%	16607	40.1%	17506	42.3%	14999	36.2%	**44.8%**
30																																	
31																																	**#VALUE!**
average	**17353**	**41.9%**	**17896**	**43.2%**	**17309**	**41.8%**	**17676.9**	**42.7%**	**17423.8**	**42.1%**	**17716.4**	**42.8%**	**17372.3**	**41.9%**	**17785**	**42.9%**	**17838**	**43.1%**	**17647**	**42.6%**	**17510**	**42.3%**	**17514**	**42.3%**	**17864**	**43.1%**	**17640**	**42.6%**	**17665**	**42.6%**	**17230**	**41.6%**	
std dev	954	2.30%	1365	0.03	1131	0.03	1109	0.03	1156	0.03	1045	0.03	983	0.02	1056	0.03	1095	2.64%	1366	0.03	1080	0.03	1025	0.02	939	2.27%	1024	0.02	981	0.024	1419	0.034	
UCL	**20216**	**48.8%**	**21990**	**53.1%**	**20703**	**50.0%**	**21005**	**50.7%**	**20892**	**50.4%**	**20853**	**50.3%**	**20320**	**49.1%**	**20953**	**50.6%**	**21123**	**51.0%**	**21745**	**52.5%**	**20750**	**50.1%**	**20589**	**49.7%**	**20680**	**49.9%**	**20712**	**50.0%**	**20607**	**49.7%**	**21487**	**51.9%**	
UWL	**19262**	**46.5%**	**20625**	**49.8%**	**19572**	**47.3%**	**19896**	**48.0%**	**19736**	**47.6%**	**19807**	**47.8%**	**19338**	**46.7%**	**19897**	**48.0%**	**20028**	**48.4%**	**20379**	**49.2%**	**19670**	**47.5%**	**19564**	**47.2%**	**19741**	**47.7%**	**19688**	**47.5%**	**19626**	**47.4%**	**20068**	**48.4%**	
LWL	**15445**	**37.3%**	**15166**	**36.6%**	**15046**	**36.3%**	**15458**	**37.3%**	**15112**	**36.5%**	**15626**	**37.7%**	**15407**	**37.2%**	**15673**	**37.8%**	**15648**	**37.8%**	**14914**	**36.0%**	**15351**	**37.1%**	**15464**	**37.3%**	**15986**	**38.6%**	**15592**	**37.6%**	**15703**	**37.9%**	**14392**	**34.7%**	
LCL	**14491**	**35.0%**	**13801**	**33.3%**	**13915**	**33.6%**	**14348**	**34.6%**	**13955**	**33.7%**	**14580**	**35.2%**	**14424**	**34.8%**	**14617**	**35.3%**	**14552**	**35.1%**	**13548**	**32.7%**	**14271**	**34.5%**	**14439**	**34.9%**	**15048**	**36.3%**	**14568**	**35.2%**	**14723**	**35.5%**	**12973**	**31.3%**	

09_23_Unit3

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GAS COUNTER G542 Unit: 3 MONTH: Sep-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	176	**1.76**	154	**1.54**	132	**1.32**	157	**1.57**	134	**1.34**	127	**1.27**	95	**0.95**	169	**1.69**	108	**1.08**	135	**1.35**	121	**1.21**	85	**0.85**	102	**1.02**	91	**0.91**	114	**1.14**	110	**1.10**
2																																
3	151.1	**1.51**	160.1	**1.60**	129.3	**1.29**	140.2	**1.40**	136.7	**1.37**	106.2	**1.06**	112.2	**1.12**	177.5	**1.78**	99.3	**0.99**	134.9	**1.35**	129.6	**1.30**	93.1	**0.93**	103.8	**1.04**	88.3	**0.88**	102	**1.02**	96.2	**0.96**
4																																
5	137	**1.37**	164	**1.64**	117	**1.17**	150	**1.50**	121	**1.21**	98	**0.98**	117	**1.17**	177	**1.77**	97	**0.97**	128	**1.28**	113	**1.13**	75	**0.75**	89	**0.89**	89	**0.89**	80	**0.80**	96	**0.96**
6	152	**1.52**	186	**1.86**	117	**1.17**	173	**1.73**	120	**1.20**	84	**0.84**	81	**0.81**	177	**1.77**	93	**0.93**	142	**1.42**	136	**1.36**	99	**0.99**	82	**0.82**	101	**1.01**	132	**1.32**	111	**1.11**
7	169	**1.69**	160	**1.60**	103	**1.03**	135	**1.35**	132	**1.32**	77	**0.77**	117	**1.17**	154	**1.54**	86	**0.86**	126	**1.26**	140	**1.40**	123	**1.23**	85	**0.85**	103	**1.03**	90	**0.90**	98	**0.98**
8	162	**1.62**	131	**1.31**	135	**1.35**	174	**1.74**	144	**1.44**	125	**1.25**	90	**0.90**	186	**1.86**	98	**0.98**	147	**1.47**	130	**1.30**	88	**0.88**	110	**1.10**	107	**1.07**	83	**0.83**	87	**0.87**
9																																
10																																
11	161	**1.61**	172	**1.72**	126	**1.26**	142	**1.42**	146	**1.46**	103	**1.03**	112	**1.12**	162	**1.62**	99	**0.99**	135	**1.35**	153	**1.53**	93	**0.93**	103	**1.03**	102	**1.02**	94	**0.94**	104	**1.04**
12	149	**1.49**	158	**1.58**	127	**1.27**	172	**1.72**	113	**1.13**	91	**0.91**	105	**1.05**	179	**1.79**	104	**1.04**	118	**1.18**	110	**1.10**	95	**0.95**	98	**0.98**	95	**0.95**	95	**0.95**	118	**1.18**
13	157	**1.57**	156	**1.56**	152	**1.52**	142	**1.42**	137	**1.37**	99	**0.99**	87	**0.87**	162	**1.62**	124	**1.24**	148	**1.48**	112	**1.12**	88	**0.88**	96	**0.96**	98	**0.98**	105	**1.05**	125	**1.25**
14	150	**1.50**	179	**1.79**	139	**1.39**	144	**1.44**	132	**1.32**	112	**1.12**	110	**1.10**	186	**1.86**	93	**0.93**	145	**1.45**	140	**1.40**	89	**0.89**	87	**0.87**	97	**0.97**	106	**1.06**	91	**0.91**
15	138	**1.38**	168	**1.68**	130	**1.30**	145	**1.45**	116	**1.16**	94	**0.94**	112	**1.12**	195	**1.95**	86	**0.86**	144	**1.44**	122	**1.22**	74	**0.74**	97	**0.97**	82	**0.82**	102	**1.02**	96	**0.96**
16																																
17																																
18	173	**1.73**	161	**1.61**	132	**1.32**	134	**1.34**	137	**1.37**	93	**0.93**	100	**1.00**	160	**1.60**	111	**1.11**	134	**1.34**	131	**1.31**	89	**0.89**	111	**1.11**	91	**0.91**	88	**0.88**	80	**0.80**
19	151	**1.51**	163	**1.63**	178	**1.78**	156	**1.56**	165	**1.65**	114	**1.14**	156	**1.56**	166	**1.66**	107	**1.07**	177	**1.77**	148	**1.48**	91	**0.91**	103	**1.03**	94	**0.94**	137	**1.37**	99	**0.99**
20	164	**1.64**	167	**1.67**	150	**1.50**	238	**2.38**	104	**1.04**	85	**0.85**	199	**1.99**	170	**1.70**	118	**1.18**	225	**2.25**	132	**1.32**	111	**1.11**	88	**0.88**	105	**1.05**	91	**0.91**	112	**1.12**
21	176	**1.76**	157	**1.57**	125	**1.25**	149	**1.49**	138	**1.38**	113	**1.13**	126	**1.26**	178	**1.78**	145	**1.45**	165	**1.65**	138	**1.38**	120	**1.20**	108	**1.08**	107	**1.07**	97	**0.97**	98	**0.98**
22	167	**1.67**	196	**1.96**	118	**1.18**	150	**1.50**	130	**1.30**	111	**1.11**	110	**1.10**	200	**2.00**	138	**1.38**	156	**1.56**	118	**1.18**	90	**0.90**	107	**1.07**	113	**1.13**	105	**1.05**	116	**1.16**
23																																
24																																
25	163	**1.63**	164	**1.64**	137	**1.37**	159	**1.59**	137	**1.37**	111	**1.11**	103	**1.03**	185	**1.85**	115	**1.15**	131	**1.31**	131	**1.31**	83	**0.83**	93	**0.93**	86	**0.86**	98	**0.98**	114	**1.14**
26	148	**1.48**	161	**1.61**	141	**1.41**	142	**1.42**	151	**1.51**	98	**0.98**	156	**1.56**	200	**2.00**	122	**1.22**	167	**1.67**	132	**1.32**	98	**0.98**	116	**1.16**	84	**0.84**	88	**0.88**	103	**1.03**
27	175	**1.75**	139	**1.39**	122	**1.22**	153	**1.53**	131	**1.31**	106	**1.06**	101	**1.01**	177	**1.77**	111	**1.11**	141	**1.41**	128	**1.28**	91	**0.91**	98	**0.98**	103	**1.03**	96	**0.96**	92	**0.92**
28	152	**1.52**	152	**1.52**	159	**1.59**	151	**1.51**	121	**1.21**	95	**0.95**	91	**0.91**	171	**1.71**	108	**1.08**	126	**1.26**	134	**1.34**	117	**1.17**	86	**0.86**	86	**0.86**	93	**0.93**	109	**1.09**
29	151	**1.51**	177	**1.77**	147	**1.47**	145	**1.45**	130	**1.30**	115	**1.15**	113	**1.13**	157	**1.57**	85	**0.85**	121	**1.21**	136	**1.36**	94	**0.94**	109	**1.09**	80	**0.80**	99	**0.99**	86	**0.86**
30																																
31																																
average	**158**	1.58	**163**	1.63	**134**	1.34	**155**	1.55	**132**	1.32	**103**	1.03	**114**	1.14	**176**	1.76	**107**	1.07	**145**	1.45	**130**	1.30	**95**	0.95	**99**	0.99	**95**	0.95	**100**	1.00	**102**	1.02
std dev	12	0.12	14	0.14	17	0.17	22	0.22	14	0.14	13	0.13	27	0.27	13	0.13	16	0.16	24	0.24	11	0.11	13	0.13	10	0.10	9	0.09	14	0.14	12	0.12
UCL	**193**	**1.93**	**206**	**2.06**	**184**	**1.84**	**221**	**2.21**	**173**	**1.73**	**142**	**1.42**	**196**	**1.96**	**215**	**2.15**	**155**	**1.55**	**217**	**2.17**	**164**	**1.64**	**134**	**1.34**	**128**	**1.28**	**123**	**1.23**	**142**	**1.42**	**137**	**1.37**
UWL	**182**	**1.82**	**192**	**1.92**	**167**	**1.67**	**199**	**1.99**	**159**	**1.59**	**129**	**1.29**	**168**	**1.68**	**202**	**2.02**	**139**	**1.39**	**193**	**1.93**	**153**	**1.53**	**121**	**1.21**	**118**	**1.18**	**114**	**1.14**	**128**	**1.28**	**125**	**1.25**
LWL	**135**	**1.35**	**134**	**1.34**	**101**	**1.01**	**110**	**1.10**	**105**	**1.05**	**76**	**0.76**	**60**	**0.60**	**149**	**1.49**	**75**	**0.75**	**97**	**0.97**	**108**	**1.08**	**68**	**0.68**	**79**	**0.79**	**77**	**0.77**	**72**	**0.72**	**78**	**0.78**
LCL	**123**	**1.23**	**120**	**1.20**	**84**	**0.84**	**88**	**0.88**	**91**	**0.91**	**63**	**0.63**	**32**	**0.32**	**136**	**1.36**	**59**	**0.59**	**73**	**0.73**	**97**	**0.97**	**55**	**0.55**	**69**	**0.69**	**67**	**0.67**	**57**	**0.57**	**67**	**0.67**

09_23_Unit3

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GAS COUNTER G542 Unit: 3 MONTH: October-23
Alpha Source Check
Standard ID: 23F04822

Alpha Activity: **22460.2** **dpm** Count Time: **5** **min**
10117

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF
1																																
2	30328	27.0%	30807	27.4%	28387	25.3%	29346	26.1%	29887	26.6%	28566	25.4%	29682	26.4%	29214	26.0%	29489	26.3%	28849	25.7%	28475	25.4%	29326	26.1%	29333	26.1%	29165	26.0%	29761	26.5%	30093	26.8%
3	29953	26.7%	30109	26.8%	28417	25.3%	29449	26.2%	30076	26.8%	28642	25.5%	29500	26.3%	29414	26.2%	29456	26.2%	28962	25.8%	28892	25.7%	29730	26.5%	29451	26.2%	28945	25.8%	29730	26.5%	29886	26.6%
4	29517	26.3%	30210	26.9%	29284	26.1%	29621	26.4%	29894	26.6%	28247	25.2%	28034	25.0%	29417	26.2%	29761	26.5%	28899	25.7%	29567	26.3%	28719	25.6%	28728	25.6%	28745	25.6%	30426	27.1%	30230	26.9%
5	29282	26.1%	30870	27.5%	28939	25.8%	29152	26.0%	29731	26.5%	29052	25.9%	28993	25.8%	29918	26.6%	29446	26.2%	30163	26.9%	28870	25.7%	29420	26.2%	29756	26.5%	29272	26.1%	29264	26.1%	30144	26.8%
6	28524	25.4%	29869	26.6%	29094	25.9%	29064	25.9%	28498	25.4%	28372	25.3%	28520	25.4%	29293	26.1%	29556	26.3%	28908	25.7%	30398	27.1%	28520	25.4%	29972	26.7%	30204	26.9%	30918	27.5%	29797	26.5%
7																																
8																																
9	29414	26.2%	29309	26.1%	30197	26.9%	29790	26.5%	30003	26.7%	29025	25.8%	30237	26.9%	28464	25.3%	29115	25.9%	29777	26.5%	30177	26.9%	29421	26.2%	29641	26.4%	29319	26.1%	30800	27.4%	29101	25.9%
10	29496	26.3%	30358	27.0%	29027	25.8%	30296	27.0%	29287	26.1%	28919	25.8%	30141	26.8%	30523	27.2%	29494	26.3%	29941	26.7%	28732	25.6%	29414	26.2%	29950	26.7%	29188	26.0%	29637	26.4%	29504	26.3%
11	29296	26.1%	30722	27.4%	29858	26.6%	29331	26.1%	29635	26.4%	29089	25.9%	29368	26.2%	28631	25.5%	29248	26.0%	29880	26.6%	30391	27.1%	28886	25.7%	28811	25.7%	28442	25.3%	29866	26.6%	29408	26.2%
12	29096	25.9%	30236	26.9%	29085	25.9%	29944	26.7%	29851	26.6%	28979	25.8%	28216	25.1%	29787	26.5%	30154	26.9%	30037	26.7%	29471	26.2%	28559	25.4%	29607	26.4%	29628	26.4%	30636	27.3%	28906	25.7%
13	29881	26.6%	29411	26.2%	29207	26.0%	29765	26.5%	29912	26.6%	29178	26.0%	28505	25.4%	29580	26.3%	29660	26.4%	29716	26.5%	29350	26.1%	29591	26.3%	30775	27.4%	29369	26.2%	29853	26.6%	30282	27.0%
14																																
15																																
16	29117	25.9%	29661	26.4%	29011	25.8%	29968	26.7%	29432	26.2%	28708	25.6%	30542	27.2%	28598	25.5%	30160	26.9%	30526	27.2%	29340	26.1%	29267	26.1%	30450	27.1%	29257	26.1%	29691	26.4%	29547	26.3%
17	29117	25.9%	29714	26.5%	29127	25.9%	30248	26.9%	29535	26.3%	29331	26.1%	28071	25.0%	29894	26.6%	29420	26.2%	30628	27.3%	28754	25.6%	28682	25.5%	29833	26.6%	29086	25.9%	29058	25.9%	29606	26.4%
18	28704	25.6%	29216	26.0%	29116	25.9%	28284	25.2%	30448	27.1%	28686	25.5%	29003	25.8%	29115	25.9%	29583	26.3%	29356	26.1%	29452	26.2%	29158	26.0%	28893	25.7%	29689	26.4%	30645	27.3%	29883	26.6%
19	28404	25.3%	29742	26.5%	27044	24.1%	29045	25.9%	30240	26.9%	29617	26.4%	28734	25.6%	29333	26.1%	29487	26.3%	29404	26.2%	28756	25.6%	29429	26.2%	30136	26.8%	29188	26.0%	30372	27.0%	30173	26.9%
20	27345	24.3%	30041	26.8%	26916	24.0%	29387	26.2%	29873	26.6%	28601	25.5%	28278	25.2%	29315	26.1%	30048	26.8%	30568	27.2%	28812	25.7%	30452	27.1%	29359	26.1%	29098	25.9%	30008	26.7%	29722	26.5%
21																																
22																																
23	28483	25.4%	29897	26.6%	27761	24.7%	27828	24.8%	29550	26.3%	28623	25.5%	29694	26.4%	29867	26.6%	29603	26.4%	30169	26.9%	29550	26.3%	29462	26.2%	30358	27.0%	28587	25.5%	30674	27.3%	28645	25.5%
24	28048	25.0%	30041	26.8%	25917	23.1%	27921	24.9%	29777	26.5%	28902	25.7%	29020	25.8%	29963	26.7%	29675	26.4%	29679	26.4%	28727	25.6%	28717	25.6%	29955	26.7%	29926	26.6%	30939	27.6%	29550	26.3%
25	28543	25.4%	29745	26.5%	26790	23.9%	27195	24.2%	30295	27.0%	28780	25.6%	29024	25.8%	29278	26.1%	30102	26.8%	29030	25.9%	30274	27.0%	29360	26.1%	29195	26.0%	28611	25.5%	29764	26.5%	28833	25.7%
26	27526	24.5%	30595	27.2%	26461	23.6%	28945	25.8%	28514	25.4%	28816	25.7%	29534	26.3%	28754	25.6%	29210	26.0%	29646	26.4%	29309	26.1%	28414	25.3%	29577	26.3%	29408	26.2%	29919	26.6%	30217	26.9%
27	26993	24.0%	29764	26.5%	27046	24.1%	28488	25.4%	28285	25.2%	28395	25.3%	29108	25.9%	28322	25.2%	28793	25.6%	28045	25.0%	28885	25.7%	28864	25.7%	29378	26.2%	29355	26.1%	28750	25.6%	29366	26.1%
28																																
29																																
30	27292	24.3%	29691	26.4%	26503	23.6%	28239	25.1%	30052	26.8%	28131	25.0%	29193	26.0%	28996	25.8%	30699	27.3%	29107	25.9%	28544	25.4%	29599	26.4%	29427	26.2%	28749	25.6%	30476	27.1%	29758	26.5%
31	26975	24.0%	28907	25.7%	26910	24.0%	28155	25.1%	29908	26.6%	28284	25.2%	28885	25.7%	29044	25.9%	29819	26.6%	29569	26.3%	30381	27.1%	28697	25.6%	29938	26.7%	28945	25.8%	30234	26.9%	29778	26.5%
average	**28697**	**25.6%**	**29951**	**26.7%**	**28186**	**25.1%**	**29066.4**	**25.9%**	**29667.4**	**26.4%**	**28770.1**	**25.6%**	**29103.7**	**25.9%**	**29305**	**26.1%**	**29635**	**26.4%**	**29585**	**26.3%**	**29323**	**26.1%**	**29167.59**	**26.0%**	**29660.14**	**26.4%**	**29189.82**	**26.0%**	**30064.59**	**26.8%**	**29656**	**26.4%**
std dev	984	0.88%	517	0.00	1262	0.01	846	0.01	574	0.01	369	0.00	695	0.01	553	0.00	415	0.37%	653	0.01	644	0.01	495	0.00	523	0.00	433	0.00	602	0.01	471	0.00
UCL	**31648**	**28.2%**	**31502**	**28.1%**	**31972**	**28.5%**	**31605**	**28.1%**	**31388**	**27.9%**	**29879**	**26.6%**	**31188**	**27.8%**	**30965**	**27.6%**	**30880**	**27.5%**	**31543**	**28.1%**	**31256**	**27.8%**	**30651**	**27.3%**	**31229**	**27.8%**	**30489**	**27.1%**	**31869**	**28.4%**	**31068**	**27.7%**
UWL	**30665**	**27.3%**	**30985**	**27.6%**	**30710**	**27.3%**	**30759**	**27.4%**	**30815**	**27.4%**	**29509**	**26.3%**	**30493**	**27.2%**	**30412**	**27.1%**	**30465**	**27.1%**	**30890**	**27.5%**	**30612**	**27.3%**	**30157**	**26.9%**	**30706**	**27.3%**	**30056**	**26.8%**	**31268**	**27.8%**	**30597**	**27.2%**
LWL	**26729**	**23.8%**	**28917**	**25.7%**	**25662**	**22.9%**	**27374**	**24.4%**	**28520**	**25.4%**	**28031**	**25.0%**	**27715**	**24.7%**	**28199**	**25.1%**	**28806**	**25.7%**	**28279**	**25.2%**	**28034**	**25.0%**	**28178**	**25.1%**	**28614**	**25.5%**	**28324**	**25.2%**	**28861**	**25.7%**	**28715**	**25.6%**
LCL	**25746**	**22.9%**	**28400**	**25.3%**	**24400**	**21.7%**	**26528**	**23.6%**	**27947**	**24.9%**	**27662**	**24.6%**	**27020**	**24.1%**	**27646**	**24.6%**	**28391**	**25.3%**	**27626**	**24.6%**	**27390**	**24.4%**	**27684**	**24.7%**	**28091**	**25.0%**	**27891**	**24.8%**	**28260**	**25.2%**	**28244**	**25.2%**

10_23_Unit3

PDF created with pdfFactory trial version www.pdffactory.com

GAS COUNTER G542 Unit: 3 MONTH: Oct-23 ALPHA BACKGROUND
Alpha Background

1 dpm Count Time: 100 min

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	12	**0.12**	3.6	**0.04**	7.5	**0.08**	5.3	**0.05**	4	**0.04**	4.8	**0.05**	9.3	**0.09**	3.3	**0.03**	5	**0.05**	4.7	**0.05**	3.6	**0.04**	3.5	**0.04**	12.5	**0.13**	3.4	**0.03**	6.5	**0.07**	10	**0.10**
2	11	**0.11**	6	**0.06**	13	**0.13**	7	**0.07**	4	**0.04**	5	**0.05**	12	**0.12**	2	**0.02**	7	**0.07**	6	**0.06**	8	**0.08**	3	**0.03**	12	**0.12**	6	**0.06**	5	**0.05**	11	**0.11**
3	16	**0.16**	5	**0.05**	8	**0.08**	6	**0.06**	5	**0.05**	5	**0.05**	12	**0.12**	11	**0.11**	6	**0.06**	6	**0.06**	8	**0.08**	4	**0.04**	15	**0.15**	5	**0.05**	8	**0.08**	12	**0.12**
4	5	**0.05**	5	**0.05**	8	**0.08**	2	**0.02**	2	**0.02**	5	**0.05**	10	**0.10**	4	**0.04**	12	**0.12**	1	**0.01**	10	**0.10**	4	**0.04**	12	**0.12**	7	**0.07**	6	**0.06**	13	**0.13**
5	11	**0.11**	3	**0.03**	8	**0.08**	6	**0.06**	6	**0.06**	6	**0.06**	9	**0.09**	8	**0.08**	6	**0.06**	3	**0.03**	2	**0.02**	5	**0.05**	8	**0.08**	4	**0.04**	4	**0.04**	20	**0.20**
6	20	**0.20**	6	**0.06**	6	**0.06**	4	**0.04**	6	**0.06**	9	**0.09**	4	**0.04**	4	**0.04**	7	**0.07**	4	**0.04**	7	**0.07**	4	**0.04**	9	**0.09**	3	**0.03**	8	**0.08**	8	**0.08**
7																																
8																																
9	14	**0.14**	2	**0.02**	11	**0.11**	5	**0.05**	5	**0.05**	6	**0.06**	7	**0.07**	4	**0.04**	4	**0.04**	6	**0.06**	4	**0.04**	8	**0.08**	12	**0.12**	1	**0.01**	6	**0.06**	11	**0.11**
10	10	**0.10**	10	**0.10**	9	**0.09**	6	**0.06**	9	**0.09**	12	**0.12**	58	**0.58**	8	**0.08**	5	**0.05**	3	**0.03**	5	**0.05**	6	**0.06**	17	**0.17**	4	**0.04**	39	**0.39**	10	**0.10**
11	13	**0.13**	11	**0.11**	11	**0.11**	5	**0.05**	2	**0.02**	10	**0.10**	9	**0.09**	6	**0.06**	9	**0.09**	3	**0.03**	5	**0.05**	7	**0.07**	9	**0.09**	6	**0.06**	10	**0.10**	15	**0.15**
12	11	**0.11**	5	**0.05**	11	**0.11**	12	**0.12**	6	**0.06**	8	**0.08**	23	**0.23**	9	**0.09**	9	**0.09**	4	**0.04**	5	**0.05**	4	**0.04**	21	**0.21**	6	**0.06**	27	**0.27**	12	**0.12**
13	14	**0.14**	4	**0.04**	11	**0.11**	10	**0.10**	5	**0.05**	9	**0.09**	5	**0.05**	7	**0.07**	6	**0.06**	1	**0.01**	3	**0.03**	4	**0.04**	19	**0.19**	3	**0.03**	9	**0.09**	14	**0.14**
14																																
15																																
16	7	**0.07**	7	**0.07**	7	**0.07**	5	**0.05**	10	**0.10**	11	**0.11**	5	**0.05**	1	**0.01**	8	**0.08**	6	**0.06**	2	**0.02**	4	**0.04**	15	**0.15**	2	**0.02**	5	**0.05**	18	**0.18**
17	16	**0.16**	6	**0.06**	3	**0.03**	6	**0.06**	6	**0.06**	2	**0.02**	11	**0.11**	4	**0.04**	3	**0.03**	4	**0.04**	6	**0.06**	3	**0.03**	17	**0.17**	5	**0.05**	7	**0.07**	9	**0.09**
18	9	**0.09**	8	**0.08**	12	**0.12**	4	**0.04**	6	**0.06**	8	**0.08**	7	**0.07**	6	**0.06**	6	**0.06**	6	**0.06**	0	**0.00**	2	**0.02**	10	**0.10**	9	**0.09**	3	**0.03**	13	**0.13**
19	11	**0.11**	4	**0.04**	8	**0.08**	9	**0.09**	3	**0.03**	8	**0.08**	6	**0.06**	4	**0.04**	6	**0.06**	2	**0.02**	1	**0.01**	1	**0.01**	5	**0.05**	2	**0.02**	7	**0.07**	8	**0.08**
20	10	**0.10**	5	**0.05**	7	**0.07**	5	**0.05**	6	**0.06**	8	**0.08**	6	**0.06**	8	**0.08**	12	**0.12**	4	**0.04**	5	**0.05**	6	**0.06**	14	**0.14**	4	**0.04**	6	**0.06**	9	**0.09**
21																																
22																																
23	10	**0.10**	2	**0.02**	13	**0.13**	2	**0.02**	3	**0.03**	11	**0.11**	10	**0.10**	7	**0.07**	4	**0.04**	4	**0.04**	11	**0.11**	6	**0.06**	13	**0.13**	4	**0.04**	6	**0.06**	10	**0.10**
24	11	**0.11**	8	**0.08**	13	**0.13**	4	**0.04**	11	**0.11**	8	**0.08**	20	**0.20**	7	**0.07**	10	**0.10**	6	**0.06**	7	**0.07**	6	**0.06**	16	**0.16**	3	**0.03**	4	**0.04**	8	**0.08**
25	12	**0.12**	3	**0.03**	6	**0.06**	4	**0.04**	7	**0.07**	4	**0.04**	9	**0.09**	2	**0.02**	9	**0.09**	4	**0.04**	5	**0.05**	1	**0.01**	9	**0.09**	3	**0.03**	3	**0.03**	12	**0.12**
26	15	**0.15**	1	**0.01**	4	**0.04**	4	**0.04**	9	**0.09**	3	**0.03**	4	**0.04**	3	**0.03**	6	**0.06**	2	**0.02**	4	**0.04**	3	**0.03**	9	**0.09**	3	**0.03**	6	**0.06**	4	**0.04**
27	7	**0.07**	2	**0.02**	4	**0.04**	4	**0.04**	4	**0.04**	7	**0.07**	5	**0.05**	3	**0.03**	2	**0.02**	4	**0.04**	2	**0.02**	1	**0.01**	7	**0.07**	1	**0.01**	4	**0.04**	7	**0.07**
28																																
29																																
30	13	**0.13**	7	**0.07**	10	**0.10**	3	**0.03**	7	**0.07**	7	**0.07**	7	**0.07**	15	**0.15**	2	**0.02**	4	**0.04**	5	**0.05**	7	**0.07**	7	**0.07**	5	**0.05**	5	**0.05**	9	**0.09**
31	20	**0.20**	4	**0.04**	10	**0.10**	4	**0.04**	3	**0.03**	6	**0.06**	14	**0.14**	6	**0.06**	8	**0.08**	4	**0.04**	3	**0.03**	4	**0.04**	13	**0.13**	3	**0.03**	3	**0.03**	11	**0.11**
average	**12.087**	**0.121**	**5.113**	**0.051**	**8.717**	**0.087**	**5.317**	**0.053**	**5.609**	**0.056**	**7.078**	**0.071**	**11.404**	**0.114**	**5.752**	**0.058**	**6.609**	**0.066**	**3.987**	**0.040**	**4.852**	**0.049**	**4.196**	**0.042**	**12.239**	**0.122**	**4.017**	**0.040**	**8.152**	**0.082**	**11.043**	**0.110**
std dev	3.716	0.037	2.573	0.026	2.950	0.029	2.381	0.024	2.445	0.024	2.600	0.026	11.205	0.112	3.240	0.032	2.759	0.028	1.559	0.016	2.759	0.028	1.958	0.020	4.123	0.041	1.923	0.019	8.259	0.083	3.522	0.035
UCL	**23.236**	**0.232**	**12.833**	**0.128**	**17.566**	**0.176**	**12.462**	**0.125**	**12.943**	**0.129**	**14.878**	**0.149**	**45.019**	**0.450**	**15.471**	**0.155**	**14.886**	**0.149**	**8.665**	**0.087**	**13.129**	**0.131**	**10.071**	**0.101**	**24.607**	**0.246**	**9.786**	**0.098**	**32.930**	**0.329**	**21.611**	**0.216**
UWL	**19.519**	**0.195**	**10.259**	**0.103**	**14.617**	**0.146**	**10.080**	**0.101**	**10.498**	**0.105**	**12.278**	**0.123**	**33.814**	**0.338**	**12.231**	**0.122**	**12.127**	**0.121**	**7.105**	**0.071**	**10.370**	**0.104**	**8.112**	**0.081**	**20.485**	**0.205**	**7.863**	**0.079**	**24.671**	**0.247**	**18.088**	**0.181**
LWL	**4.655**	**0.047**	**-0.033**	**0.000**	**2.818**	**0.028**	**0.554**	**0.006**	**0.719**	**0.007**	**1.879**	**0.019**	**-11.006**	**-0.110**	**-0.727**	**-0.007**	**1.090**	**0.011**	**0.869**	**0.009**	**-0.666**	**-0.007**	**0.279**	**0.003**	**3.994**	**0.040**	**0.171**	**0.002**	**-8.366**	**-0.084**	**3.999**	**0.040**
LCL	**0.938**	**0.009**	**-2.606**	**-0.026**	**-0.132**	**-0.001**	**-1.827**	**-0.018**	**-1.725**	**-0.017**	**-0.721**	**-0.007**	**-22.211**	**-0.222**	**-3.966**	**-0.040**	**-1.669**	**-0.017**	**-0.691**	**-0.007**	**-3.425**	**-0.034**	**-1.679**	**-0.017**	**-0.129**	**-0.001**	**-1.752**	**-0.018**	**-16.625**	**-0.166**	**0.476**	**0.005**

10_23_Unit3

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GAS COUNTER G542 Unit: 3 MONTH: October-23
Beta Source Check
23F05880

BETA Activity: **8135.54** **dpm** Count Time: **5** **min**

DATE	3A-1 COUNTS	3A-1 EFF	3A-2 COUNTS	3A-2 EFF	3A-3 COUNTS	3A-3 EFF	3A-4 COUNTS	3A-4 EFF	3B-1 COUNTS	3B-1 EFF	3B-2 COUNTS	3B-2 EFF	3B-3 COUNTS	3B-3 EFF	3B-4 COUNTS	3B-4 EFF	3C-1 COUNTS	3C-1 EFF	3C-2 COUNTS	3C-2 EFF	3C-3 COUNTS	3C-3 EFF	3C-4 COUNTS	3C-4 EFF	3D-1 COUNTS	3D-1 EFF	3D-2 COUNTS	3D-2 EFF	3D-3 COUNTS	3D-3 EFF	3D-4 COUNTS	3D-4 EFF	AVG
1																																	40.8%
2	18243	44.8%	17032	41.9%	17120	42.1%	14990	36.9%	16827	41.4%	18450	45.4%	16860	41.4%	18593	45.7%	18772	46.1%	17178	42.2%	18699	46.0%	17918	44.0%	18988	46.7%	18282	44.9%	16150	39.7%	16135	39.7%	40.8%
3	16402	40.3%	17809	43.8%	14597	35.9%	18367	45.2%	18287	45.0%	17329	42.6%	18092	44.5%	16915	41.6%	17517	43.1%	18509	45.5%	18293	45.0%	18215	44.8%	18654	45.9%	16475	40.5%	16084	39.5%	18490	45.5%	40.8%
4	15884	39.0%	17173	42.2%	16143	39.7%	15305	37.6%	18347	45.1%	18106	44.5%	16789	41.3%	18822	46.3%	18854	46.3%	17335	42.6%	17688	43.5%	18199	44.7%	18551	45.6%	18152	44.6%	17860	43.9%	16337	40.2%	40.8%
5	16936	41.6%	18719	46.0%	18346	45.1%	18617	45.8%	16380	40.3%	18678	45.9%	17952	44.1%	17453	42.9%	18921	46.5%	17487	43.0%	16960	41.7%	16159	39.7%	18853	46.3%	18309	45.0%	14940	36.7%	16799	41.3%	40.8%
6	17971	44.2%	15049	37.0%	16701	41.1%	19165	47.1%	18514	45.5%	18724	46.0%	15848	39.0%	17946	44.1%	16651	40.9%	18674	45.9%	18444	45.3%	16888	41.5%	17221	42.3%	16524	40.6%	18007	44.3%	18248	44.9%	40.8%
7																																	40.8%
8																																	40.8%
9	16370	40.2%	18775	46.2%	18250	44.9%	18008	44.3%	16824	41.4%	17418	42.8%	14565	35.8%	18681	45.9%	18692	46.0%	16949	41.7%	16581	40.8%	18574	45.7%	16636	40.9%	18054	44.4%	18747	46.1%	18801	46.2%	40.8%
10	15981	39.3%	18796	46.2%	18332	45.1%	19133	47.0%	18112	44.5%	14851	36.5%	16607	40.8%	18650	45.8%	18433	45.3%	17119	42.1%	19160	47.1%	16548	40.7%	18729	46.0%	16751	41.2%	17196	42.3%	17997	44.2%	40.8%
11	18251	44.9%	17387	42.7%	16346	40.2%	16472	40.5%	18519	45.5%	18481	45.4%	17866	43.9%	18783	46.2%	18679	45.9%	16812	41.3%	18638	45.8%	17104	42.0%	18536	45.6%	17516	43.1%	16634	40.9%	14977	36.8%	40.8%
12	16754	41.2%	17966	44.2%	18371	45.2%	18533	45.6%	18712	46.0%	18187	44.7%	18345	45.1%	18596	45.7%	18842	46.3%	16852	41.4%	15185	37.3%	16083	39.5%	18894	46.4%	16408	40.3%	16494	40.5%	16902	41.6%	40.8%
13	16699	41.1%	17444	42.9%	15621	38.4%	18601	45.7%	18677	45.9%	17482	43.0%	18308	45.0%	16594	40.8%	16628	40.9%	18383	45.2%	18797	46.2%	18287	45.0%	15321	37.7%	18333	45.1%	18072	44.4%	17777	43.7%	40.8%
14																																	40.8%
15																																	40.8%
16	17514	43.1%	19111	47.0%	14483	35.6%	19044	46.8%	17182	42.2%	17115	42.1%	15887	39.1%	18871	46.4%	17151	42.2%	18600	45.7%	16645	40.9%	16276	40.0%	18574	45.7%	18038	44.3%	18330	45.1%	18370	45.2%	40.8%
17	15778	38.8%	18640	45.8%	17606	43.3%	18888	46.4%	18702	46.0%	17622	43.3%	18847	46.3%	16461	40.5%	18389	45.2%	17234	42.4%	15127	37.2%	18600	45.7%	17477	43.0%	16469	40.5%	17909	44.0%	16098	39.6%	40.8%
18	18038	44.3%	18640	45.8%	18153	44.6%	17449	42.9%	16561	40.7%	16182	39.8%	16219	39.9%	16724	41.1%	18583	45.7%	18757	46.1%	18742	46.1%	17236	42.4%	18472	45.4%	18235	44.8%	16639	40.9%	15038	37.0%	40.8%
19	15711	38.6%	17276	42.5%	14587	35.9%	18260	44.9%	17980	44.2%	18254	44.9%	18738	46.1%	18281	44.9%	15164	37.3%	18151	44.6%	16417	40.4%	17963	44.2%	18711	46.0%	15967	39.3%	18480	45.4%	16001	39.3%	40.8%
20	17299	42.5%	18644	45.8%	15936	39.2%	17372	42.7%	18399	45.2%	16502	40.6%	16279	40.0%	16318	40.1%	18548	45.6%	14982	36.8%	18651	45.9%	16717	41.1%	17094	42.0%	18038	44.3%	18442	45.3%	17848	43.9%	40.8%
21																																	40.8%
22																																	40.8%
23	15770	38.8%	18827	46.3%	15371	37.8%	16329	40.1%	17865	43.9%	18560	45.6%	14850	36.5%	16401	40.3%	18856	46.4%	18965	46.6%	18148	44.6%	16937	41.6%	16487	40.5%	18236	44.8%	16020	39.4%	18126	44.6%	40.8%
24	15241	37.5%	18728	46.0%	15734	38.7%	14483	35.6%	16281	40.0%	18382	45.2%	16440	40.4%	18215	44.8%	17910	44.0%	18284	44.9%	18512	45.5%	16959	41.7%	18844	46.3%	16810	41.3%	18663	45.9%	16005	39.3%	40.8%
25	14707	36.2%	18892	46.4%	14446	35.5%	17982	44.2%	17195	42.3%	18388	45.2%	18381	45.2%	17935	44.1%	16415	40.4%	18162	44.6%	16992	41.8%	17586	43.2%	16434	40.4%	18721	46.0%	18071	44.4%	15041	37.0%	40.8%
26	16925	41.6%	18836	46.3%	14731	36.2%	18250	44.9%	18386	45.2%	18956	46.6%	16811	41.3%	16432	40.4%	18680	45.9%	14985	36.8%	18556	45.6%	17307	42.5%	17315	42.6%	18214	44.8%	15907	39.1%	16246	39.9%	40.8%
27	17198	42.3%	18554	45.6%	14673	36.1%	17811	43.8%	18942	46.6%	17150	42.2%	16997	41.8%	18484	45.4%	16448	40.4%	16044	39.4%	18582	45.7%	14714	36.2%	18396	45.2%	17292	42.5%	18687	45.9%	15909	39.1%	40.8%
28																																	
29																																	#VALUE!
30	16698	41.0%	16402	40.3%	15670	38.5%	16621	40.9%	18134	44.6%	18593	45.7%	15930	39.2%	16839	41.4%	16925	41.6%	18357	45.1%	18439	45.3%	17856	43.9%	17612	43.3%	18271	44.9%	14462	35.6%	16877	41.5%	
31	15045	37.0%	18937	46.6%	15546	38.2%	17674	43.4%	17749	43.6%	16600	40.8%	18272	44.9%	18509	45.5%	16976	41.7%	16128	39.6%	14865	36.5%	17728	43.6%	17151	42.2%	17820	43.8%	15999	39.3%	17900	44.0%	42.2%
average	**16610**	**40.8%**	**18074**	**44.4%**	**16217**	**39.9%**	**17607**	**43.3%**	**17844.3**	**43.9%**	**17727.7**	**43.6%**	**17040.1**	**41.9%**	**17750**	**43.6%**	**17820**	**43.8%**	**17452**	**42.9%**	**17642**	**43.4%**	**17266**	**42.4%**	**17861**	**43.9%**	**17587**	**43.2%**	**17172**	**42.2%**	**16906**	**41.6%**	
std dev	1031	2.53%	1026	0.03	1426	0.04	1362	0.03	837	0.02	1021	0.03	1239	0.03	964	0.02	1094	2.69%	1165	0.03	1327	0.03	956	0.02	1032	2.54%	833	0.02	1289	0.032	1209	0.030	
UCL	**19702**	**48.4%**	**21153**	**52.0%**	**20493**	**50.4%**	**21694**	**53.3%**	**20354**	**50.0%**	**20792**	**51.1%**	**20758**	**51.0%**	**20644**	**50.7%**	**21100**	**51.9%**	**20946**	**51.5%**	**21624**	**53.2%**	**20134**	**49.5%**	**20958**	**51.5%**	**20086**	**49.4%**	**21039**	**51.7%**	**20532**	**50.5%**	
UWL	**18671**	**45.9%**	**20127**	**49.5%**	**19068**	**46.9%**	**20332**	**50.0%**	**19517**	**48.0%**	**19770**	**48.6%**	**19519**	**48.0%**	**19679**	**48.4%**	**20007**	**49.2%**	**19781**	**48.6%**	**20296**	**49.9%**	**19178**	**47.1%**	**19926**	**49.0%**	**19253**	**47.3%**	**19750**	**48.6%**	**19323**	**47.5%**	
LWL	**14549**	**35.8%**	**16022**	**39.4%**	**13365**	**32.9%**	**14882**	**36.6%**	**16171**	**39.8%**	**15685**	**38.6%**	**14562**	**35.8%**	**15821**	**38.9%**	**15633**	**38.4%**	**15123**	**37.2%**	**14987**	**36.8%**	**15354**	**37.7%**	**15797**	**38.8%**	**15921**	**39.1%**	**14595**	**35.9%**	**14488**	**35.6%**	
LCL	**13518**	**33.2%**	**14995**	**36.9%**	**11940**	**29.4%**	**13520**	**33.2%**	**15335**	**37.7%**	**14664**	**36.0%**	**13322**	**32.8%**	**14857**	**36.5%**	**14539**	**35.7%**	**13958**	**34.3%**	**13660**	**33.6%**	**14398**	**35.4%**	**14765**	**36.3%**	**15088**	**37.1%**	**13306**	**32.7%**	**13279**	**32.6%**	

10_23_Unit3

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GAS COUNTER G542 Unit: 3 MONTH: Oct-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	156.3	**1.56**	155.2	**1.55**	123.8	**1.24**	152.3	**1.52**	128.9	**1.29**	103.8	**1.04**	104.2	**1.04**	169.6	**1.70**	98.5	**0.99**	135.4	**1.35**	120.3	**1.20**	94.7	**0.95**	98.1	**0.98**	105.8	**1.06**	91.2	**0.91**	102.6	**1.03**
2	145	**1.45**	162	**1.62**	150	**1.50**	141	**1.41**	155	**1.55**	113	**1.13**	104	**1.04**	168	**1.68**	119	**1.19**	148	**1.48**	118	**1.18**	104	**1.04**	101	**1.01**	94	**0.94**	99	**0.99**	106	**1.06**
3	148	**1.48**	170	**1.70**	117	**1.17**	128	**1.28**	128	**1.28**	96	**0.96**	115	**1.15**	170	**1.70**	99	**0.99**	151	**1.51**	137	**1.37**	127	**1.27**	99	**0.99**	91	**0.91**	91	**0.91**	124	**1.24**
4	149	**1.49**	158	**1.58**	118	**1.18**	150	**1.50**	119	**1.19**	119	**1.19**	102	**1.02**	181	**1.81**	109	**1.09**	128	**1.28**	123	**1.23**	114	**1.14**	112	**1.12**	92	**0.92**	97	**0.97**	121	**1.21**
5	170	**1.70**	160	**1.60**	119	**1.19**	136	**1.36**	118	**1.18**	109	**1.09**	105	**1.05**	157	**1.57**	106	**1.06**	127	**1.27**	108	**1.08**	85	**0.85**	102	**1.02**	99	**0.99**	96	**0.96**	95	**0.95**
6	185	**1.85**	151	**1.51**	132	**1.32**	130	**1.30**	132	**1.32**	97	**0.97**	99	**0.99**	178	**1.78**	108	**1.08**	131	**1.31**	132	**1.32**	103	**1.03**	113	**1.13**	96	**0.96**	105	**1.05**	92	**0.92**
7																																
8																																
9	152	**1.52**	163	**1.63**	132	**1.32**	146	**1.46**	121	**1.21**	99	**0.99**	110	**1.10**	176	**1.76**	114	**1.14**	138	**1.38**	125	**1.25**	104	**1.04**	100	**1.00**	92	**0.92**	109	**1.09**	106	**1.06**
10	170	**1.70**	162	**1.62**	130	**1.30**	141	**1.41**	149	**1.49**	92	**0.92**	257	**2.57**	158	**1.58**	89	**0.89**	146	**1.46**	131	**1.31**	86	**0.86**	87	**0.87**	89	**0.89**	218	**2.18**	97	**0.97**
11	149	**1.49**	156	**1.56**	153	**1.53**	158	**1.58**	126	**1.26**	87	**0.87**	114	**1.14**	197	**1.97**	104	**1.04**	139	**1.39**	125	**1.25**	111	**1.11**	121	**1.21**	111	**1.11**	101	**1.01**	98	**0.98**
12	191	**1.91**	189	**1.89**	135	**1.35**	147	**1.47**	124	**1.24**	111	**1.11**	152	**1.52**	176	**1.76**	99	**0.99**	141	**1.41**	138	**1.38**	111	**1.11**	112	**1.12**	86	**0.86**	145	**1.45**	108	**1.08**
13	173	**1.73**	175	**1.75**	139	**1.39**	143	**1.43**	134	**1.34**	104	**1.04**	119	**1.19**	194	**1.94**	107	**1.07**	150	**1.50**	135	**1.35**	89	**0.89**	97	**0.97**	104	**1.04**	88	**0.88**	77	**0.77**
14																																
15																																
16	157	**1.57**	167	**1.67**	129	**1.29**	128	**1.28**	136	**1.36**	102	**1.02**	118	**1.18**	165	**1.65**	133	**1.33**	126	**1.26**	140	**1.40**	107	**1.07**	97	**0.97**	108	**1.08**	98	**0.98**	71	**0.71**
17	166	**1.66**	150	**1.50**	105	**1.05**	128	**1.28**	151	**1.51**	96	**0.96**	103	**1.03**	191	**1.91**	120	**1.20**	143	**1.43**	178	**1.78**	107	**1.07**	112	**1.12**	97	**0.97**	96	**0.96**	98	**0.98**
18	157	**1.57**	162	**1.62**	144	**1.44**	150	**1.50**	120	**1.20**	103	**1.03**	93	**0.93**	196	**1.96**	127	**1.27**	118	**1.18**	133	**1.33**	96	**0.96**	104	**1.04**	96	**0.96**	132	**1.32**	112	**1.12**
19	133	**1.33**	194	**1.94**	144	**1.44**	136	**1.36**	122	**1.22**	103	**1.03**	117	**1.17**	202	**2.02**	126	**1.26**	168	**1.68**	120	**1.20**	100	**1.00**	87	**0.87**	78	**0.78**	106	**1.06**	84	**0.84**
20	159	**1.59**	167	**1.67**	131	**1.31**	147	**1.47**	133	**1.33**	103	**1.03**	118	**1.18**	168	**1.68**	123	**1.23**	150	**1.50**	139	**1.39**	92	**0.92**	89	**0.89**	90	**0.90**	79	**0.79**	95	**0.95**
21																																
22																																
23	139	**1.39**	155	**1.55**	122	**1.22**	138	**1.38**	130	**1.30**	95	**0.95**	113	**1.13**	171	**1.71**	85	**0.85**	140	**1.40**	149	**1.49**	89	**0.89**	105	**1.05**	88	**0.88**	91	**0.91**	98	**0.98**
24	181	**1.81**	171	**1.71**	136	**1.36**	146	**1.46**	139	**1.39**	95	**0.95**	103	**1.03**	185	**1.85**	111	**1.11**	157	**1.57**	162	**1.62**	97	**0.97**	103	**1.03**	88	**0.88**	98	**0.98**	80	**0.80**
25	160	**1.60**	145	**1.45**	119	**1.19**	134	**1.34**	144	**1.44**	87	**0.87**	112	**1.12**	161	**1.61**	96	**0.96**	134	**1.34**	125	**1.25**	81	**0.81**	80	**0.80**	92	**0.92**	91	**0.91**	93	**0.93**
26	155	**1.55**	169	**1.69**	112	**1.12**	150	**1.50**	116	**1.16**	108	**1.08**	118	**1.18**	180	**1.80**	107	**1.07**	134	**1.34**	122	**1.22**	88	**0.88**	96	**0.96**	75	**0.75**	98	**0.98**	94	**0.94**
27	131	**1.31**	156	**1.56**	97	**0.97**	141	**1.41**	137	**1.37**	102	**1.02**	101	**1.01**	167	**1.67**	110	**1.10**	163	**1.63**	129	**1.29**	108	**1.08**	105	**1.05**	87	**0.87**	83	**0.83**	85	**0.85**
28																																
29																																
30	153	**1.53**	156	**1.56**	118	**1.18**	152	**1.52**	129	**1.29**	98	**0.98**	103	**1.03**	177	**1.77**	126	**1.26**	164	**1.64**	131	**1.31**	111	**1.11**	107	**1.07**	91	**0.91**	103	**1.03**	119	**1.19**
31	154	**1.54**	156	**1.56**	125	**1.25**	127	**1.27**	148	**1.48**	86	**0.86**	97	**0.97**	149	**1.49**	103	**1.03**	129	**1.29**	120	**1.20**	95	**0.95**	103	**1.03**	80	**0.80**	102	**1.02**	96	**0.96**
average	**158**	**1.58**	**163**	**1.63**	**127**	**1.27**	**141**	**1.41**	**132**	**1.32**	**100**	**1.00**	**116**	**1.16**	**176**	**1.76**	**110**	**1.10**	**142**	**1.42**	**132**	**1.32**	**100**	**1.00**	**101**	**1.01**	**93**	**0.93**	**105**	**1.05**	**98**	**0.98**
std dev	15	0.15	12	0.12	14	0.14	9	0.09	11	0.11	8	0.08	33	0.33	14	0.14	13	0.13	13	0.13	15	0.15	11	0.11	10	0.10	9	0.09	28	0.28	14	0.14
UCL	**204**	**2.04**	**198**	**1.98**	**169**	**1.69**	**169**	**1.69**	**166**	**1.66**	**126**	**1.26**	**215**	**2.15**	**217**	**2.17**	**147**	**1.47**	**181**	**1.81**	**178**	**1.78**	**134**	**1.34**	**130**	**1.30**	**120**	**1.20**	**190**	**1.90**	**139**	**1.39**
UWL	**189**	**1.89**	**186**	**1.86**	**155**	**1.55**	**160**	**1.60**	**155**	**1.55**	**117**	**1.17**	**182**	**1.82**	**203**	**2.03**	**135**	**1.35**	**168**	**1.68**	**162**	**1.62**	**123**	**1.23**	**121**	**1.21**	**111**	**1.11**	**162**	**1.62**	**125**	**1.25**
LWL	**127**	**1.27**	**140**	**1.40**	**100**	**1.00**	**123**	**1.23**	**110**	**1.10**	**84**	**0.84**	**51**	**0.51**	**148**	**1.48**	**84**	**0.84**	**115**	**1.15**	**102**	**1.02**	**77**	**0.77**	**82**	**0.82**	**75**	**0.75**	**48**	**0.48**	**71**	**0.71**
LCL	**112**	**1.12**	**128**	**1.28**	**86**	**0.86**	**114**	**1.14**	**98**	**0.98**	**75**	**0.75**	**18**	**0.18**	**134**	**1.34**	**72**	**0.72**	**102**	**1.02**	**87**	**0.87**	**66**	**0.66**	**72**	**0.72**	**66**	**0.66**	**20**	**0.20**	**57**	**0.57**

PDF created with pdfFactory trial version www.pdffactory.com

Operating Parameters are set for each counting Drawer and not specific detectors
Below is the setting in each unit.

G542 Unit 3 Operating Parameters 011623

	HV	Slope
Drawer 1	1730	4.49
Drawer 2	1730	0.68
Drawer 3	1730	2.84
Drawer 4	1730	3.4

G542 Unit 4 Operating Parameters 062922

	HV	Slope
Drawer 1	1740	2.15
Drawer 2	1740	-1.24
Drawer 3	1740	2.7
Drawer 4	1740	3.42

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: Meier
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16260
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	7167	4783	0
1520	8392	5913	0
1540	9892	7058	0
1560	11301	8437	0
1580	12687	9768	0
1600	13982	10961	0
1620	15217	12507	0
1640	16198	13866	0
1660	16925	15031	0
1680	17426	16071	0
1700	17834	17751	1
1720	18200	17948	3
1740	18310	17993	16
1760	18779	18031	58
1780	18666	18148	123
1800	18983	18253	331

Slope = 4.49

Special Notes:

Report Generated: 08/20/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: Meier
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16265
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	10547	7481	0
1520	12132	8704	0
1540	13556	10315	0
1560	15256	12161	0
1580	16767	13873	0
1600	17157	14615	0
1620	18293	16292	0
1640	18909	17391	0
1660	19298	18222	0
1680	19738	19032	3
1700	19766	19185	6
1720	19875	19395	36
1740	19889	19426	135
1760	20052	19471	293
1780	20443	19604	606
1800	20365	19146	1022

Slope = 0.68

Special Notes:

Report Generated: 08/20/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: Meier
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16260
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	12004	5166	0
1520	13863	6708	0
1540	14843	7804	0
1560	16319	9266	0
1580	17131	10894	0
1600	17920	12109	0
1620	18305	13681	0
1640	18603	14986	0
1660	18780	16226	0
1680	19052	17211	3
1700	19181	18004	21
1720	19311	18081	72
1740	19737	18651	190
1760	19703	18537	418
1780	19896	18394	837
1800	20150	18236	1361

Slope = 2.84

Special Notes:

Report Generated: 08/20/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: Meier
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16265
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9557	4464	0
1520	11016	5510	0
1540	12618	6737	0
1560	14432	8206	0
1580	15365	9452	0
1600	16378	10682	0
1620	17519	12377	0
1640	18113	13978	0
1660	18439	15258	0
1680	18625	17286	3
1700	18812	17976	8
1720	19371	18022	35
1740	19459	18394	125
1760	19545	18510	317
1780	19701	18458	637
1800	19761	18167	1073

Slope = 3.40

Special Notes:

Report Generated: 08/20/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier

Run Date: 07/05/2023 11:03
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2570	2567	3
1520	3092	3088	4
1540	3543	3540	3
1560	4138	4135	3
1580	4479	4476	3
1600	4707	4704	3
1620	5160	5153	7
1640	5503	5496	7
1660	5585	5579	6
1680	5660	5653	7
1700	5732	5726	6
1720	5848	5842	6
1740	5971	5957	14
1760	5928	5900	28
1780	6072	5981	91
1800	6064	5899	165

Special Notes:

Report Generated: 07/05/2023

G542HV.RPT ver 2.0

Collected By: SNR661 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 11:40
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2380	2375	5
1520	2900	2898	2
1540	3417	3410	7
1560	3835	3834	1
1580	4344	4342	2
1600	4574	4567	7
1620	4901	4898	3
1640	5109	5099	10
1660	5317	5311	6
1680	5601	5596	5
1700	5630	5621	9
1720	5555	5550	5
1740	5628	5610	18
1760	5727	5695	32
1780	5535	5474	61
1800	5742	5575	167

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SNR161 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 12:17
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1966	1964	2
1520	2595	2594	1
1540	3063	3059	4
1560	3467	3463	4
1580	3907	3904	3
1600	4132	4130	2
1620	4401	4397	4
1640	4566	4561	5
1660	4747	4742	5
1680	4725	4721	4
1700	4871	4863	8
1720	4902	4896	6
1740	4941	4933	8
1760	4972	4941	31
1780	5070	4999	71
1800	5033	4913	120

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SUR 561 Date: 7/5/23

Changes Needed: Yes No (Circle One) New Voltage: 1740

Approved By: [signature] Date: 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 12:42
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2468	2467	1
1520	2875	2874	1
1540	3240	3240	0
1560	3408	3407	1
1580	3768	3766	2
1600	3893	3890	3
1620	3869	3868	1
1640	4051	4051	0
1660	3935	3934	1
1680	3966	3963	3
1700	4142	4140	2
1720	4231	4226	5
1740	4087	4078	9
1760	4110	4090	20
1780	4122	4063	59
1800	4173	4039	134

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 13:05
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2327	2327	0
1520	2766	2763	3
1540	3167	3165	2
1560	3615	3612	3
1580	4057	4053	4
1600	4110	4105	5
1620	4285	4285	0
1640	4794	4789	5
1660	4641	4638	3
1680	4807	4800	7
1700	4961	4955	6
1720	4831	4827	4
1740	5084	5069	15
1760	5029	4995	33
1780	4908	4826	82
1800	4979	4823	155

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/14/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 13:24
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3793	3791	2
1520	4451	4445	6
1540	4940	4935	5
1560	5309	5307	2
1580	5566	5562	4
1600	5515	5510	5
1620	5944	5936	8
1640	6120	6112	8
1660	6128	6122	6
1680	6100	6097	3
1700	6199	6195	4
1720	6176	6162	14
1740	6319	6296	23
1760	6301	6243	58
1780	6268	6147	121
1800	6227	6020	207

Special Notes:

Report Generated: 07/05/2023

G542HV.RPT ver 2.0

Collected By: SNR961 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/6/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 14:04
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3144	3141	3
1520	3666	3662	4
1540	4055	4050	5
1560	4519	4515	4
1580	4731	4722	9
1600	4884	4883	1
1620	4978	4970	8
1640	5260	5254	6
1660	5321	5315	6
1680	5333	5324	9
1700	5305	5298	7
1720	5351	5339	12
1740	5397	5369	28
1760	5398	5342	55
1780	5439	5338	101
1800	5455	5258	197

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR661 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 14:27
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2060	2060	0
1520	2359	2359	0
1540	2784	2783	1
1560	3039	3038	1
1580	3296	3295	1
1600	3523	3522	1
1620	3576	3573	3
1640	3805	3804	1
1660	3929	3924	5
1680	3999	3996	3
1700	3935	3934	1
1720	4089	4086	3
1740	4035	4029	6
1760	4116	4095	21
1780	4013	3943	69
1800	4031	3907	124

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SNR 161 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 15:39
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2004	2001	3
1520	2409	2408	1
1540	2788	2785	3
1560	3232	3231	1
1580	3451	3449	2
1600	3743	3741	2
1620	4050	4045	5
1640	4315	4313	2
1660	4381	4374	7
1680	4500	4492	8
1700	4730	4723	7
1720	4800	4793	7
1740	4815	4812	3
1760	4879	4867	12
1780	4953	4918	35
1800	4846	4783	63

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SWR661 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:00
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1221	1219	2
1520	1882	1879	3
1540	2557	2556	1
1560	3222	3220	2
1580	3897	3893	4
1600	4250	4249	1
1620	4620	4617	3
1640	5151	5148	3
1660	5505	5499	6
1680	5778	5776	2
1700	5659	5655	4
1720	5967	5962	5
1740	5948	5943	5
1760	5965	5959	6
1780	6101	6082	19
1800	5979	5918	61

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (CIrcle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/11/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:18
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2183	2181	2
1520	2677	2676	1
1540	3085	3080	5
1560	3555	3552	3
1580	3947	3943	4
1600	4199	4195	4
1620	4528	4523	5
1640	4715	4711	4
1660	4988	4982	6
1680	5256	5243	13
1700	5328	5322	6
1720	5316	5307	9
1740	5270	5264	6
1760	5343	5321	22
1780	5432	5376	56
1800	5405	5283	122

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:40
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1503	1503	0
1520	1776	1776	0
1540	2098	2097	1
1560	2484	2484	0
1580	2790	2790	0
1600	3152	3152	0
1620	3355	3354	1
1640	3439	3436	3
1660	3709	3705	4
1680	3731	3729	2
1700	3946	3945	1
1720	3819	3819	0
1740	4000	3996	4
1760	3956	3945	11
1780	4117	4083	34
1800	4110	4021	89

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23

Changes Needed: Yes No (Circle One) **New Voltage:** 1740

Approved By: **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:08
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2299	2296	3
1520	2729	2728	1
1540	3114	3112	2
1560	3595	3594	1
1580	3880	3880	0
1600	4055	4053	2
1620	4394	4390	4
1640	4647	4646	1
1660	4862	4861	1
1680	4793	4789	4
1700	4885	4882	3
1720	4990	4981	9
1740	4920	4910	10
1760	5029	4989	40
1780	4970	4893	77
1800	5172	5044	128

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:28
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3319	3318	1
1520	3872	3868	4
1540	4425	4421	4
1560	4759	4755	4
1580	5125	5120	5
1600	5482	5477	5
1620	5755	5751	4
1640	5641	5636	5
1660	5943	5938	5
1680	6001	5997	4
1700	6153	6140	13
1720	6059	6051	8
1740	6227	6218	9
1760	6184	6172	12
1780	6312	6285	27
1800	6267	6201	66

Special Notes:

Report Generated: 07/06/2023 G542HV.RPT ver 2.0

Collected By: SWR661 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:45
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2164	2164	0
1520	2616	2615	1
1540	3174	3171	3
1560	3445	3443	2
1580	4012	4012	0
1600	4422	4415	7
1620	4652	4646	6
1640	4799	4798	1
1660	4929	4923	6
1680	5251	5248	3
1700	5147	5141	6
1720	5188	5183	5
1740	5244	5240	4
1760	5235	5228	7
1780	5387	5370	17
1800	5426	5374	52

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SWR 961 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/11/23

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 11:37
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1075	1075	0
1520	1388	1388	0
1540	1709	1708	1
1560	2025	2023	2
1580	2402	2402	0
1600	2465	2463	2
1620	2869	2867	2
1640	3177	3173	4
1660	3334	3333	1
1680	3628	3624	4
1700	3690	3689	1
1720	3789	3787	2
1740	3794	3789	5
1760	3929	3925	4
1780	3949	3940	9
1800	3943	3914	29

Special Notes:

Report Generated: 07/06/2023

G542HV.RPT ver 2.0

Collected By: SWR961 **Date:** 7/6/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: A
Voltage: 1720
Conf Level: 95.0 %
Test Date: 07/07/2023 11:14
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3909	4
2	3913	4
3	3845	4
4	3765	2
5	3934	2
6	3831	2
7	3736	4
8	3855	2
9	3842	1
10	3773	5
11	3711	1
12	3880	2
13	3734	2
14	3840	6
15	3786	4
16	3833	6
17	3894	8
18	3809	4
19	3813	6
20	3811	1

(Xbar) Mean:	3825.70	3.50
Calculated Chi-Sqr Value:	19.34	21.43

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR661 **Date:** 7/7/23
Changes Needed: **Yes** **No** **(Circle One)**
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 11:35
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3333	2
2	3371	2
3	3361	3
4	3399	5
5	3425	1
6	3439	5
7	3412	2
8	3279	2
9	3298	1
10	3432	1
11	3423	1
12	3520	0
13	3366	2
14	3339	3
15	3372	4
16	3334	7
17	3342	1
18	3456	4
19	3441	2
20	3390	1

(Xbar) Mean:	3386.60	2.45
Calculated Chi-Sqr Value:	19.15	24.06

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWREC1 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: _____ **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 11:57
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3387	6
2	3412	4
3	3269	2
4	3357	12
5	3431	12
6	3472	7
7	3386	6
8	3354	6
9	3455	10
10	3463	10
11	3500	4
12	3436	6
13	3386	16
14	3426	9
15	3415	5
16	3292	11
17	3493	9
18	3367	5
19	3362	3
20	3438	5

(Xbar) Mean:	3405.05	7.40
Calculated Chi-Sqr Value:	20.84	33.08

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNREG1 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 12:22
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3494	8
2	3512	8
3	3492	4
4	3554	7
5	3544	15
6	3528	10
7	3544	4
8	3608	6
9	3644	4
10	3697	11
11	3468	8
12	3530	2
13	3536	10
14	3451	10
15	3501	8
16	3587	6
17	3573	6
18	3534	4
19	3553	8
20	3555	10

(Xbar) Mean:	3545.25	7.45
Calculated Chi-Sqr Value:	17.93	24.29

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SW REG 1 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** A
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 12:45
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3865	2
2	3693	5
3	3808	6
4	3875	4
5	3755	2
6	3823	5
7	3856	3
8	3839	6
9	3754	1
10	3768	5
11	3889	4
12	3766	3
13	3711	6
14	3857	4
15	3776	6
16	3742	7
17	3757	3
18	3817	6
19	3794	4
20	3895	5

(Xbar) Mean:	3802.00	4.35
Calculated Chi-Sqr Value:	17.63	11.62

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWREGI **Date:** 7/7/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1720
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 13:12
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3457	0
2	3620	2
3	3579	1
4	3541	1
5	3583	1
6	3614	2
7	3518	3
8	3498	1
9	3595	3
10	3548	2
11	3595	2
12	3586	3
13	3577	6
14	3453	0
15	3622	3
16	3538	4
17	3511	5
18	3514	2
19	3577	1
20	3554	2

(Xbar) Mean:	3554.00	2.20
Calculated Chi-Sqr Value:	13.35	20.55

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWRGLI **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/10/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1720
Conf Level: 95.0 %
Test Date: 07/07/2023 13:33
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3392	5
2	3358	3
3	3430	3
4	3488	2
5	3425	5
6	3518	2
7	3557	11
8	3415	3
9	3492	4
10	3487	9
11	3518	3
12	3400	4
13	3468	7
14	3496	2
15	3517	3
16	3451	5
17	3405	7
18	3411	5
19	3477	6
20	3463	3

(Xbar) Mean:	3458.40	4.60
Calculated Chi-Sqr Value:	14.98	24.09

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWREGI **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/12/23

Pace Analytical

G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:01
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3593	14
2	3523	11
3	3398	9
4	3426	11
5	3424	10
6	3573	11
7	3436	5
8	3505	3
9	3459	6
10	3612	13
11	3481	6
12	3554	9
13	3526	6
14	3397	10
15	3541	12
16	3585	10
17	3512	8
18	3485	11
19	3596	5
20	3577	8

(Xbar) Mean:	3510.15	8.90
Calculated Chi-Sqr Value:	26.05	18.63

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR461 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/10/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: A
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3758	2
2	3685	6
3	3742	5
4	3586	3
5	3662	4
6	3737	6
7	3756	3
8	3765	3
9	3479	3
10	3770	6
11	3701	4
12	3697	2
13	3797	3
14	3705	6
15	3652	6
16	3630	9
17	3718	8
18	3656	4
19	3659	5
20	3674	2

(Xbar) Mean:	3691.45	4.50
Calculated Chi-Sqr Value:	27.65	16.67

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SNR961 **Date:** 7/7/23
Signature Needed: Yes No (Circle One)
Approved By: **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3179	0
2	3177	1
3	3298	0
4	3254	0
5	3262	2
6	3321	0
7	3368	1
8	3382	0
9	3397	0
10	3463	0
11	3369	0
12	3378	1
13	3390	1
14	3340	1
15	3287	0
16	3384	1
17	3390	1
18	3371	4
19	3341	2
20	3343	1

(Xbar) Mean:	3334.70	0.00
Calculated Chi-Sqr Value:	30.43	0.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SNR961 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: _____ **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3437	2
2	3384	2
3	3352	1
4	3332	1
5	3354	4
6	3353	3
7	3367	3
8	3358	1
9	3316	6
10	3355	5
11	3396	2
12	3393	2
13	3404	6
14	3415	0
15	3347	4
16	3413	3
17	3377	5
18	3392	3
19	3481	6
20	3391	5

(Xbar) Mean:	3380.85	3.20
Calculated Chi-Sqr Value:	8.28	20.38

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes: rerun to verify 7/7/23

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWR961 **Date:** 7/7/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 14:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3421	6
2	3439	3
3	3529	1
4	3451	8
5	3363	3
6	3408	6
7	3478	6
8	3514	5
9	3489	4
10	3538	0
11	3556	2
12	3579	7
13	3514	2
14	3509	3
15	3531	2
16	3403	2
17	3462	2
18	3510	6
19	3487	5
20	3436	4

(Xbar) Mean:	3480.85	3.85
Calculated Chi-Sqr Value:	17.58	23.52

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/7/23
Changes Needed: Yes (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 15:13
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3427	4
2	3425	5
3	3312	4
4	3360	1
5	3385	1
6	3294	4
7	3296	6
8	3340	5
9	3450	5
10	3358	1
11	3313	2
12	3458	6
13	3321	2
14	3402	5
15	3485	4
16	3360	2
17	3431	5
18	3442	2
19	3357	6
20	3366	3

(Xbar) Mean:	3379.10	3.65
Calculated Chi-Sqr Value:	18.89	16.04

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWREG1 **Date:** 7/12/23
Changes Needed: Yes No (Circle One)
Approved By: **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: A
Voltage: 1740
Conf Level: 95.0 %
Test Date: 07/07/2023 16:06
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3836	11
2	3838	10
3	3687	20
4	3756	9
5	3715	16
6	3719	6
7	3789	11
8	3796	10
9	3809	10
10	3740	15
11	3876	15
12	3857	7
13	3642	11
14	3697	11
15	3762	11
16	3778	16
17	3800	17
18	3812	9
19	3840	7
20	3826	11

(Xbar) Mean:	3778.75	11.65
Calculated Chi-Sqr Value:	19.84	22.19

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWR961 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: B
Voltage: 1760
Conf Level: 95.0 %

Test Date: 07/07/2023 16:28
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3491	6
2	3599	6
3	3661	6
4	3634	4
5	3546	8
6	3536	10
7	3527	1
8	3621	5
9	3646	6
10	3556	7
11	3604	3
12	3522	7
13	3668	2
14	3573	2
15	3540	2
16	3592	5
17	3567	4
18	3510	7
19	3467	1
20	3638	2

(Xbar) Mean:	3574.90	4.70
Calculated Chi-Sqr Value:	18.02	26.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR661 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1760
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 16:55
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3430	4
2	3358	6
3	3453	7
4	3514	5
5	3361	1
6	3389	4
7	3367	3
8	3260	2
9	3393	1
10	3461	3
11	3459	3
12	3382	5
13	3387	6
14	3361	4
15	3496	4
16	3376	4
17	3350	1
18	3362	2
19	3327	7
20	3419	6

(Xbar) Mean:	3395.25	3.90
Calculated Chi-Sqr Value:	20.33	17.90

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SWRGC1 **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: [signature] **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1760
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/07/2023 17:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3467	3
2	3487	1
3	3525	2
4	3423	10
5	3394	2
6	3464	4
7	3541	4
8	3513	7
9	3546	3
10	3530	6
11	3469	3
12	3472	9
13	3397	3
14	3446	2
15	3560	4
16	3463	6
17	3474	4
18	3457	6
19	3417	4
20	3338	5

(Xbar) Mean:	3469.15	4.40
Calculated Chi-Sqr Value:	17.89	23.82

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREG1 **Date:** 7/7/23
Changes Needed: Yes (Circle One)
Approved By: _____ **Date:** 7/12/23

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2136

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	16100	dpm	805	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	7694.29	dpm	384.71	dpm

44-9 PROBE
CPM Acceptance Range

1693	**50**	
1354	**1304**	**Low**
2031	**2081**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

3511	**176**	
3160	**2984**	**Low**
3862	**4038**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2137

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	23800	dpm	1190	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11374.16	dpm	568.71	dpm

44-9 PROBE
CPM Acceptance Range

2502	**74**	
2002	**1928**	**Low**
3003	**3077**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5190	**260**	
4671	**4412**	**Low**
5709	**5969**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2139

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	20700	dpm	1040	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.41	years	30.41	years
dilution =	1.00		1.00	
A =	9907.77	dpm	497.78	dpm

44-9 PROBE
CPM Acceptance Range

2180	**65**	
1744	**1679**	**Low**
2616	**2680**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

4521	**227**	
4069	**3842**	**Low**
4973	**5200**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2138

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	25000	dpm	1250	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11947.65	dpm	597.38	dpm

44-9 PROBE

CPM Acceptance Range		
2628	**78**	
2103	**2025**	**Low**
3154	**3232**	**High**

Gamma Products G5020-400
Efficienc 0.4563

CPM Acceptance Range		
5452	**273**	
4907	**4634**	**Low**
5997	**6269**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Sr-90
124007
ESC51613
22J11029

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	25-Aug-22
DATE OF CALIBRATION	01-Jan-23
PREP:	13-Sep-22

Ao =	940.91	nCi			
N =	0.02				
T(1/2) =	28.60	years			
T =	0.35	years			
dilution =	1000.00				
A =	932.92	nCi	SR90/Y90		
A =	2071.08	dpm/ml	4142.1618		41421.62
A =	932.92	pCi/ml	1865.8387		8284.324
A =	932.92	+/-	16.806536	pCi/ml	

Uncertainty	0.0173
Weight	0.05%
Volume (1000 ml)	0.50%
CSU	1.80%

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DECAY CALCUALTION

Th230 Source
124007
ESC51614
22I13361

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 25-Aug-22
DATE OF CALIBRATION 01-Jan-23

Ao =	1011.73	nCi	
N =	0.00		
T(1/2) =	77000.00	years	28105000
T =	0.35	years	
dilution =	1000.00		
A =	1011.73	nCi	
A =	2246.04	dpm/ml	22460.399
A =	1011.73	pCi/ml	

Uncertainty	3.16%
Weight	0.05%
Volume	0.03%
CSU	3.16%

					pCi/l
Activity	**1011.7**	**+/-**	**32.0**	**pCi/ml**	1011730

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903.0/9315 Radiochemistry

Radiochemistry Raw Data

RADIUM-226

SDG: WG2141010
METHOD: EPA 903.0/9315
ANALYST: SNR961

	Ra226	error	SDWA DL	mda	Units	date prep	date analysis	Analyst	
BACKGROUND DET A	0.000	0.2	0.236	0.372	pCi/l	9/28/2023	10/5/2023	SNR961	
BACKGROUND DET B	0.000	0.2	0.262	0.431	pCi/l	9/28/2023	10/5/2023	SNR961	
BACKGROUND DET C	-0.040	0.1	0.188	0.236	pCi/l	9/28/2023	10/5/2023	SNR961	
BACKGROUND DET D	0.000	0.2	0.215	0.313	pCi/l	9/28/2023	10/5/2023	SNR961	
RA-0070-WS-903-1	605.40	11.9	0.261	0.500	pCi/l	9/28/2023	10/5/2023	SNR961	**104.2%**
RA-0070-WS-903-2	590.11	11.8	0.270	0.532	pCi/l	9/28/2023	10/5/2023	SNR961	**101.5%**
RA-0070-WS-903-3	582.06	11.6	0.235	0.412	pCi/l	9/28/2023	10/5/2023	SNR961	**100.2%**
RA-0070-WS-903-4	588.76	11.7	0.253	0.463	pCi/l	9/28/2023	10/5/2023	SNR961	**101.3%**
[redacted]						9/28/2023	[redacted]	SNR961	
BLANK WG2141010	0.211	0.147	0.104	0.191	pCi/l	9/28/2023	10/5/2023	SNR961	
LCS WG2141010	5.591	0.635	0.117	0.220	pCi/l	9/28/2023	10/5/2023	SNR961	
MS L1656665-05 WG2141010	28.130	2.795	0.339	0.385	pCi/l	9/28/2023	10/5/2023	SNR961	
MSD L1656665-05 WG2141010	27.863	2.769	0.380	0.516	pCi/l	9/28/2023	10/5/2023	SNR961	
DUP L1658999-11 WG2141010	0.636	0.536	0.417	0.619	pCi/l	9/28/2023	10/5/2023	SNR961	
L1656665-05 WG2141010	5.598	0.910	0.234	0.390	pCi/l	9/28/2023	10/5/2023	SNR961	
L1656665-06 WG2141010	0.535	0.288	0.168	0.216	pCi/l	9/28/2023	10/5/2023	SNR961	
L1657379-01 WG2141010	0.596	0.327	0.200	0.295	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658453-01 WG2141010	16.791	1.508	0.206	0.146	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-05 WG2141010	0.429	0.313	0.228	0.346	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-06 WG2141010	46.767	2.690	0.189	0.237	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-07 WG2141010	46.733	2.694	0.216	0.315	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-08 WG2141010	16.196	1.60	0.239	0.376	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-09 WG2141010	15.695	1.61	0.270	0.443	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-10 WG2141010	16.621	1.62	0.192	0.240	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-11 WG2141010	0.500	0.30	0.191	0.285	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-12 WG2141010	0.598	0.358	0.236	0.371	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-13 WG2141010	0.282	0.344	0.300	0.487	pCi/l	9/28/2023	10/5/2023	SNR961	
L1658999-14 WG2141010	0.934	0.380	0.176	0.224	pCi/l	9/28/2023	10/5/2023	SNR961	
L1660252-01 WG2141010	0.282	0.239	0.189	0.282	pCi/l	9/28/2023	10/5/2023	SNR961	
L1660252-02 WG2141010	0.378	0.278	0.203	0.327	pCi/l	9/28/2023	10/5/2023	SNR961	
L1660252-03 WG2141010	1.000	0.420	0.228	0.382	pCi/l	9/28/2023	10/5/2023	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	9/28/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	9/28/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	9/28/2023	1/0/1900	SNR961	
RA-0070-WS-903-1	608.072	11.911	0.261	0.500	pCi/l	9/28/2023	10/5/2023	SNR961	**104.6%**
RA-0070-WS-903-2	587.530	11.777	0.272	0.532	pCi/l	9/28/2023	10/5/2023	SNR961	**101.1%**
RA-0070-WS-903-3	594.973	11.715	0.240	0.412	pCi/l	9/28/2023	10/5/2023	SNR961	**102.4%**
RA-0070-WS-903-4	585.719	11.705	0.000	0.463	pCi/l	9/28/2023	10/5/2023	SNR961	**100.8%**
BACKGROUND DET A	-0.040	0.175	0.000	0.372	pCi/l	9/28/2023	10/5/2023	SNR961	

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Pace Analytical
National Center for Testing & Innovation

Radium EPA 903.0/9315
SDG: WG2141010
METHOD: EPA 903.0/9315
ANALYST: SNR961
Prep Date: 09/28/23

Detector	EFF	BKG COUNTS	COUNT TIME	BKG CPM
Detector A	**18.8%**	3	60	0.050
Detector B	**18.3%**	4	60	0.067
Detector C	**18.8%**	1	60	0.017
Detector D	**18.8%**	2	60	0.033

If Background is 0 use 1.

Ba Carrier ID: 23I13314
Standardization Date: 09/13/23 13:45

planchet tare	**planchet** gross	**net** weight
0.07766	**0.13255**	0.05489
0.07769	**0.13271**	0.05502
0.07754	**0.13311**	0.05557

ave = **0.05516**

id	sample size	alpha counts	count time	ppt time	time count end		igf	Detector #	CPM back	Bkg Counts	eff	planchet tare	planchet gross	ba rec			
BACKGROUND DET A	**1.000**	**3**	**60**	**10/5/23 10:22**	**10/5/23 10:22**	0	1.000	**A**	0.050	3.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET A
BACKGROUND DET B	**1.000**	**4**	**60**	**10/5/23 10:22**	**10/5/23 10:22**	0	1.000	**B**	0.067	4.0	18.3%			100.0%	100.0%	0.00000	BACKGROUND DET B
BACKGROUND DET C	**1.000**	**0**	**60**	**10/5/23 10:22**	**10/5/23 10:22**	0	1.000	**C**	0.017	1.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET C
BACKGROUND DET D	**1.000**	**2**	**60**	**10/5/23 10:22**	**10/5/23 10:22**	0	1.000	**D**	0.033	2.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET D
RA-0070-WS-903-1	**1.000**	**9969**	**10**	**4/6/21 14:15**	**10/5/23 11:06**	21885	4.000	**A**	0.050	0.5	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-1
RA-0070-WS-903-2	**1.000**	**9605**	**10**	**4/6/21 14:15**	**10/5/23 11:06**	21885	4.000	**B**	0.067	0.7	18.3%			100.6%	100.0%	0.00000	RA-0070-WS-903-2
RA-0070-WS-903-3	**1.000**	**9695**	**10**	**4/6/21 14:15**	**10/5/23 11:06**	21885	4.000	**C**	0.017	0.2	18.8%			102.2%	100.0%	0.00000	RA-0070-WS-903-3
RA-0070-WS-903-4	**1.000**	**9670**	**10**	**4/6/21 14:15**	**10/5/23 11:06**	21885	4.000	**D**	0.033	0.3	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-4
						0	1.000							0.0%			
BLANK WG2141010	**1.000**	**15**	**60**	**10/2/23 13:30**	**10/5/23 14:08**	73	2.266	**A**	0.050	3.0	18.8%	**0.07873**	**0.13438**	100.9%	100.0%	0.05565	BLANK WG2141010
LCS WG2141010	**1.000**	**310**	**60**	**10/2/23 13:30**	**10/5/23 14:08**	73	2.266	**B**	0.067	4.0	18.3%	**0.07865**	**0.13321**	98.9%	98.9%	0.05456	LCS WG2141010
MS L1656665-05 WG2141010	**0.250**	**392**	**60**	**10/2/23 13:30**	**10/5/23 14:08**	73	2.266	**C**	0.017	1.0	18.8%	**0.07862**	**0.13278**	98.2%	98.2%	0.05416	MS L1656665-05 WG2141010
MSD L1656665-05 WG2141010	**0.250**	**395**	**60**	**10/2/23 13:30**	**10/5/23 14:08**	73	2.266	**D**	0.033	2.0	18.8%	**0.07873**	**0.1337**	99.7%	99.7%	0.05497	MSD L1656665-05 WG2141010
DUP L1658999-11 WG2141010	**0.250**	**12**	**60**	**10/2/23 13:30**	**10/5/23 15:08**	74	2.280	**A**	0.050	3.0	18.8%	**0.07892**	**0.13365**	99.2%	99.2%	0.05473	DUP L1658999-11 WG2141010
L1656665-05 WG2141010	**0.500**	**157**	**60**	**10/2/23 13:30**	**10/5/23 15:08**	74	2.280	**B**	0.067	4.0	18.3%	**0.07866**	**0.13284**	98.2%	98.2%	0.05418	L1656665-05 WG2141010
L1656665-06 WG2141010	**0.500**	**16**	**60**	**10/2/23 13:30**	**10/5/23 15:08**	74	2.280	**C**	0.017	1.0	18.8%	**0.07875**	**0.13305**	98.4%	98.4%	0.05430	L1656665-06 WG2141010
L1657379-01 WG2141010	**0.500**	**18**	**60**	**10/2/23 13:30**	**10/5/23 15:08**	74	2.280	**D**	0.033	2.0	18.8%	**0.07859**	**0.13056**	94.2%	94.2%	0.05197	L1657379-01 WG2141010
L1658453-01 WG2141010	**0.500**	**485**	**60**	**10/2/23 13:30**	**10/5/23 16:08**	75	2.292	**A**	0.050	3.0	18.8%	**0.07884**	**0.2397**	291.6%	100.0%	0.16086	L1658453-01 WG2141010
L1658999-05 WG2141010	**0.500**	**16**	**60**	**10/2/23 13:30**	**10/5/23 16:08**	75	2.292	**B**	0.067	4.0	18.3%	**0.0788**	**0.14072**	112.3%	100.0%	0.06192	L1658999-05 WG2141010
L1658999-06 WG2141010	**0.500**	**1164**	**60**	**10/2/23 13:30**	**10/5/23 16:08**	75	2.292	**C**	0.017	1.0	18.8%	**0.07865**	**0.12655**	86.8%	86.8%	0.04790	L1658999-06 WG2141010
L1658999-07 WG2141010	**0.500**	**1162**	**60**	**10/2/23 13:30**	**10/5/23 16:08**	75	2.292	**D**	0.033	2.0	18.8%	**0.07894**	**0.12676**	86.7%	86.7%	0.04782	L1658999-07 WG2141010
L1658999-08 WG2141010	**0.500**	**403**	**60**	**10/2/23 13:30**	**10/5/23 17:09**	76	2.306	**A**	0.050	3.0	18.8%	**0.07891**	**0.1261**	85.6%	85.6%	0.04719	L1658999-08 WG2141010
L1658999-09 WG2141010	**0.500**	**375**	**60**	**10/2/23 13:30**	**10/5/23 17:09**	76	2.306	**B**	0.067	4.0	18.3%	**0.07876**	**0.12509**	84.0%	84.0%	0.04633	L1658999-09 WG2141010
L1658999-10 WG2141010	**0.500**	**408**	**60**	**10/2/23 13:30**	**10/5/23 17:09**	76	2.306	**C**	0.017	1.0	18.8%	**0.07871**	**0.12561**	85.0%	85.0%	0.04690	L1658999-10 WG2141010
L1658999-11 WG2141010	**0.500**	**16**	**60**	**10/2/23 13:30**	**10/5/23 17:09**	76	2.306	**D**	0.033	2.0	18.8%	**0.07875**	**0.13241**	97.3%	97.3%	0.05366	L1658999-11 WG2141010
L1658999-12 WG2141010	**0.500**	**18**	**60**	**10/2/23 13:30**	**10/5/23 18:09**	77	2.318	**A**	0.050	3.0	18.8%	**0.07868**	**0.12632**	86.4%	86.4%	0.04764	L1658999-12 WG2141010
L1658999-13 WG2141010	**0.500**	**10**	**60**	**10/2/23 13:30**	**10/5/23 18:09**	77	2.318	**B**	0.067	4.0	18.3%	**0.07865**	**0.12016**	75.3%	75.3%	0.04151	L1658999-13 WG2141010
L1658999-14 WG2141010	**0.500**	**26**	**60**	**10/2/23 13:30**	**10/5/23 18:09**	77	2.318	**C**	0.017	1.0	18.8%	**0.07871**	**0.12971**	92.5%	92.5%	0.05100	L1658999-14 WG2141010
L1660252-01 WG2141010	**0.500**	**10**	**60**	**10/2/23 13:30**	**10/5/23 18:09**	77	2.318	**D**	0.033	2.0	18.8%	**0.07847**	**0.13249**	97.9%	97.9%	0.05402	L1660252-01 WG2141010
L1660252-02 WG2141010	**0.500**	**14**	**60**	**10/2/23 13:30**	**10/5/23 19:09**	78	2.331	**A**	0.050	3.0	18.8%	**0.0787**	**0.13363**	99.6%	99.6%	0.05493	L1660252-02 WG2141010
L1660252-03 WG2141010	**0.500**	**32**	**60**	**10/2/23 13:30**	**10/5/23 19:09**	78	2.331	**B**	0.067	4.0	18.3%	**0.07865**	**0.13294**	98.4%	98.4%	0.05429	L1660252-03 WG2141010
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
RA-0070-WS-903-1	**1.000**	**10013**	**10**	**4/6/21 14:15**	**10/5/23 20:31**	21894	4.000	**A**	0.050	0.5	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-1
RA-0070-WS-903-2	**1.000**	**9563**	**10**	**4/6/21 14:15**	**10/5/23 20:31**	21894	4.000	**B**	0.067	0.7	18.3%			100.6%	100.0%	0.00000	RA-0070-WS-903-2
RA-0070-WS-903-3	**1.000**	**9910**	**10**	**4/6/21 14:15**	**10/5/23 20:31**	21894	4.000	**C**	0.017	0.2	18.8%			102.2%	100.0%	0.00000	RA-0070-WS-903-3
RA-0070-WS-903-4	**1.000**	**9620**	**10**	**4/6/21 14:15**	**10/5/23 20:31**	21894	4.000	**D**	0.033	0.3	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-4
BACKGROUND DET A	**1.000**	**2**	**60**	**10/5/23 20:10**	**10/5/23 20:10**	0	1.000	**A**	0.050	3.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET A
BACKGROUND DET B	**1.000**	**3**	**60**	**10/5/23 20:10**	**10/5/23 20:10**	0	1.000	**B**	0.067	4.0	18.3%			100.0%	100.0%	0.00000	BACKGROUND DET B
BACKGROUND DET C	**1.000**	**4**	**60**	**10/5/23 20:10**	**10/5/23 20:10**	0	1.000	**C**	0.017	1.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET C
BACKGROUND DET D	**1.000**	**1**	**60**	**10/5/23 20:10**	**10/5/23 20:10**	0	1.000	**D**	0.033	2.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET D
																	0

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QC REPORT

ANALYTE: Ra226
METHOD: EPA 903.0/9315
SDG: WG2141010
UNITS: pCi/L
STD ID: 23F16842 Vol. 1 ml

	RESULT	ERROR	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD	LIMITS	RER	LIMITS
BLANK WG2141010	0.211	0.147	0.191								
LCS WG2141010	5.591	0.635	0.220	5.01	111.7%	80%	120%				
L1658999-11 WG2141010	0.500	0.297	0.191								
DUP L1658999-11 WG2141010	0.636	0.536	0.417					NC	20%	0.222	3
L1656665-05 WG2141010	5.598	0.910	0.234								
MS L1656665-05 WG2141010	28.130	2.795	0.385	20.0	112.5%	75%	125%				
MSD L1656665-05 WG2141010	27.863	2.769	0.516	20.0	111.2%	75%	125%	0.96%			

*** - Outside Control Limits**

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Ra226 Source
No.3613
RA226-3613-WS3
23F16842

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 09-Mar-22
DATE OF CALIBRATION 28-Sep-23

Ao =	589.23	pCi/ml
N =	0.00	
T(1/2) =	1600.00	years
T =	1.56	years
Standard Volume	4.25	
Final Volume =	500.00	
dilution =	117.65	
A =	588.829	pCi/ml
A =	11.111	dpm/ml
A =	5.01	pCi/ml

A = 5.01 pCi/ml

Uncertainty	3.70%
Weight	0.00%
Volume (1000 ml	0.03%
Volume (100 ml /	0.40%
Volume (1000 ml	0.03%
CSU	3.72%

Activity 5.01 +/- 0.186 pCi/ml

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Amersham International

ESC37429

Certificate of calibration of radioactive reference solution

M 29913

Description	Principal radionuclide:	Radium 226	Product code: RAY 94
			Solution number: R-9131/127
Measurement	Reference time:	1200 GMT on 19 February 1998	
	Radioactive concentration of radium-226:	4.37n	kilobecquerels per gram of solution
	which is equivalent to:	118.3	nanocuries per gram of solution
	Mass of solution:	5.0345	grams
	Total activity of radium-226:	22.03	kilobecquerels
	which is equivalent to:	595.4	nanocuries
	Recommended half life:	1600.00	years

Method of measurement:
The activity of the solution was measured in a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

Accuracy: Overall uncertainty in the radioactive concentration quoted above: ± 3.7 %

Random uncertainty: ± 0.7 % Systematic uncertainty: ± 3.0 %

The limits of overall uncertainty were taken as the arithmetic sum of the uncertainty due to random variations, calculated at the 99.7% confidence level, and the estimated systematic uncertainties in the measurement.

Radionuclidic Purity: The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

ENVIRONMENTAL SCIENCE CENTRE

Chemical Composition: Carrier free in 0.5M HCl

Remarks: At the reference date radium 226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium-210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, U.S.A.

This product meets the quality assurance requirements of the NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Issuer Signatory: B D D Singleton

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Calibration Data EPA 903/9315

id	sample size	counts	time	ppt time	count time	Hours	igf	det	BKG	planchet tare	planchet gross	ba rec	eff		
RA-0070-WS-903-1	1	14782	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	A	0.042	7.85288	7.91579	98.6%	19.1%	0.06291	
RA-0070-WS-903-4	1	14194	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	A	0.042	7.85288	7.91579	98.6%	18.3%	0.06291	
RA-0070-WS-903-3	1	14422	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	A	0.042	7.86129	7.92648	102.2%	18.6%	0.06519	Avg
RA-0070-WS-903-2	1	14818	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	A	0.042	7.84269	7.90683	100.6%	19.1%	0.06414	
												100.0%	**18.8%**	0.06379	
RA-0070-WS-903-2	1	14310	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	B	0.058				18.5%		
RA-0070-WS-903-1	1	14238	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	B	0.058				18.4%		
RA-0070-WS-903-4	1	13968	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	B	0.058				18.0%		
RA-0070-WS-903-3	1	14236	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	B	0.058				18.4%		
													18.3%		
RA-0070-WS-903-3	1	14588	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	C	0.083				18.8%		
RA-0070-WS-903-2	1	14538	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	C	0.083				18.8%		
RA-0070-WS-903-1	1	14589	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	C	0.083				18.8%		
RA-0070-WS-903-4	1	14365	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	C	0.083				18.6%		
													18.8%		
RA-0070-WS-903-4	1	14185	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	D	0.033				18.3%		
RA-0070-WS-903-3	1	14527	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	D	0.033				18.8%		
RA-0070-WS-903-2	1	14657	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	D	0.033				18.9%		
RA-0070-WS-903-1	1	14697	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	D	0.033				19.0%		
													18.8%		

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DECAY CALCUALTION

Source: Ra-226
Lot No. R4/131/35
ID: **RA-0070-WS1**
19L06745

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 01-Nov-16
DATE OF CALIBRATION 10-Jul-23

Ao =	58.28	nCi
N =	0.00	
T(1/2) =	1600.00	years
T =	6.69	years
VOLUME OF STD	1.00	
FINAL VOL	100.00	
dilution =	100.00	
A =	58.11	nCi
A =	1290.10	dpm/ml
A =	**581**	pCi/ml

Uncertainty 3.70%

Volume 0.04%

CSU 3.70%

Activity 581 +/- 22 pCi/ml

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1 AD 1 x 5mL

RH-0065-V5

Amersham International plc
Amersham Laboratories

Certificate of calibration of radioactive reference solution

M 28796

NAMAS
CALIBRATION No. 0144

ESC38625

Description	Principal radionuclide:	Radium-226	Product code: RAY.44
			Solution number: R4/131/35
Measurement	Reference time:		1200 GMT on 2 September 1936
	Radioactive concentration of radium-226:	43.80	kilobecquerels per gram of solution
	which is equivalent to:	1.184	microcuries per gram of solution
	Mass of solution:	5.0330	grams
	Total activity of radium-226:	220.5	kilobecquerels
	which is equivalent to:	5.959	microcuries
	Recommended half life:	1600	years

Method of measurement used:
The activity of the solution was measured in a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

ENVIRONMENTAL CORP

Accuracy: Overall uncertainty in the radioactive concentration quoted above: ± 3.7 %

Random uncertainty: ± 0.7 % Systematic uncertainty: ± 3.0 %

The limits of overall uncertainty were taken as the arithmetic sum of the uncertainty due to random variations, calculated at the 99.7% confidence level, and the estimated systematic uncertainties in the measurement.

Radionuclidic Purity: The estimated activities of any radioactive impurities found by high resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Chemical Composition: Carrier free in 0.5M HCl

Remarks: At the reference time radium-226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium 210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, USA.

This product meets the quality assurance requirements of the NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Approved Signatory

W F Case

W F Case

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RA-226 903.0 Radiochemistry Prep Benchsheet

Batch: WG2141010

Analyst: ASN4036 Prep Start Date/Time: 09/28/23 09:55-15:10 Prep End Date/Time: 10/03/23 12:34 Method: EPA 903.0 SOP: ENV-SOP-MTJL-0353/0370 Pipet ID: E11,E22,E14, 126,62 Bal ID: RADBAL3 Stirrer ID's: St2,St7,St26,St27
Hot Plate ID: NA Centrifuge ID: C4

LCS/D Standard: 23F16842 Amt. Used: 1 mL Exp. Date:01/01/24 MS/D Standard: 23F16842 Amt. Used: 1 mL Exp. Date:01/01/24 16 mg/mL Barium Carrier: 23I13314 Amt. Used: 2 Exp. Date:09/13/24
Lead Nitrate Carrier: 23G12605 Amt. Used: 1 Exp. Date:11/04/23 Citric Acid: 23I06140 Amt. Used: 5 Exp. Date:01/06/24 1:1 H2SO4: 23H17177 Amt. Used: 20 Exp. Date:08/17/24 0.25M EDTA: 23I27512 Amt. Used: 15 Exp. Date:09/27/24
200 mg/mL Ammonium Sulfate: 23E18492 Amt. Used: 1 Exp. Date:05/18/24 Bromocresol Green: 23I19230 Amt. Used: 0.50 Exp. Date:09/19/24 Acetic Acid: 23G31289 Amt. Used: 3 Exp. Date:05/24/25

Sample Number	Collect Date	Sample Volume (mL)	Precipitation Time	Tare Wt (g)	Gross Wt (g)	Final Wt (g)	Review Analyst	Review Date
BLANK		1000	10/02/2023 13:30:00	0.07873	0.13438	0.05565	SNR961	10/17/23 11:51:03
LCS		1000	10/02/2023 13:30:00	0.07865	0.13321	0.05456	SNR961	10/17/23 11:51:03
MS(L1656665-05)		250	10/02/2023 13:30:00	0.07862	0.13278	0.05416	SNR961	10/17/23 11:51:03
MSD(L1656665-05)		250	10/02/2023 13:30:00	0.07873	0.13370	0.05497	SNR961	10/17/23 11:51:03
DUP(L1658999-11)		250	10/02/2023 13:30:00	0.07892	0.13365	0.05473	SNR961	10/17/23 11:51:03
1. L1656665-05	09/12/23 08:30	500	10/02/2023 13:30:00	0.07866	0.13284	0.05418	SNR961	10/17/23 11:51:03
2. L1656665-06	09/12/23 09:00	500	10/02/2023 13:30:00	0.07875	0.13305	0.0543	SNR961	10/17/23 11:51:03
3. L1657379-01	09/15/23 13:25	500	10/02/2023 13:30:00	0.07859	0.13056	0.05197	SNR961	10/17/23 11:51:03
4. L1658453-01	09/20/23 10:00	500	10/02/2023 13:30:00	0.07884	0.23970	0.16086	SNR961	10/17/23 11:51:03
5. L1658999-05	09/14/23 00:00	500	10/02/2023 13:30:00	0.07880	0.14072	0.06192	SNR961	10/17/23 11:51:03
6. L1658999-06	09/20/23 09:00	500	10/02/2023 13:30:00	0.07865	0.12655	0.0479	SNR961	10/17/23 11:51:03
7. L1658999-07	09/20/23 10:20	500	10/02/2023 13:30:00	0.07894	0.12676	0.04782	SNR961	10/17/23 11:51:03
8. L1658999-08	09/20/23 11:22	500	10/02/2023 13:30:00	0.07891	0.12610	0.04719	SNR961	10/17/23 11:51:03
9. L1658999-09	09/20/23 12:09	500	10/02/2023 13:30:00	0.07876	0.12509	0.04633	SNR961	10/17/23 11:51:03
10. L1658999-10	09/20/23 12:09	500	10/02/2023 13:30:00	0.07871	0.12561	0.0469	SNR961	10/17/23 11:51:03
11. L1658999-11	09/20/23 13:30	500	10/02/2023 13:30:00	0.07875	0.13241	0.05366	SNR961	10/17/23 11:51:03
12. L1658999-12	09/19/23 16:50	500	10/02/2023 13:30:00	0.07868	0.12632	0.04764	SNR961	10/17/23 11:51:03
13. L1658999-13	09/19/23 16:03	500	10/02/2023 13:30:00	0.07865	0.12016	0.04151	SNR961	10/17/23 11:51:03
14. L1658999-14	09/19/23 18:33	500	10/02/2023 13:30:00	0.07871	0.12971	0.051	SNR961	10/17/23 11:51:03
15. L1660252-01	08/21/23 08:00	500	10/02/2023 13:30:00	0.07847	0.13249	0.05402	SNR961	10/17/23 11:51:03
16. L1660252-02	08/18/23 12:45	500	10/02/2023 13:30:00	0.07870	0.13363	0.05493	SNR961	10/17/23 11:51:03
17. L1660252-03	08/21/23 10:40	500	10/02/2023 13:30:00	0.07865	0.13294	0.05429	SNR961	10/17/23 11:51:03

Comments:
50mL Tubes: 920128, 1mL tips: 2243, 2mL tips: 2215, 10mL electric tips: 2332, 10mL manual tips: P7565750, Transfer pipettes: 23140187

Reviewed By:SNR961 on 10/17/23 11:51:03

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G542 Run Log Ra-226 Waters by 903.0 WG2141010

Sample Order Verified by SNR961

Sample ID	Det	Alpha	LT	Analyst	Start	End
RA_BKG	A	3	60	SNR961	10/5/2023 9:22	10/5/2023 10:22
RA_BKG	B	4	60	SNR961	10/5/2023 9:22	10/5/2023 10:22
RA_BKG	C	0	60	SNR961	10/5/2023 9:22	10/5/2023 10:22
RA_BKG	D	2	60	SNR961	10/5/2023 9:22	10/5/2023 10:22
903 STD 1	A	9969	10	SNR961	10/5/2023 10:56	10/5/2023 11:06
903 STD 2	B	9605	10	SNR961	10/5/2023 10:56	10/5/2023 11:06
903 STD 3	C	9695	10	SNR961	10/5/2023 10:56	10/5/2023 11:06
903 STD 4	D	9670	10	SNR961	10/5/2023 10:56	10/5/2023 11:06
BLANK WG2141010	A	15	60	SNR961	10/5/2023 13:08	10/5/2023 14:08
LCS WG2141010	B	310	60	SNR961	10/5/2023 13:08	10/5/2023 14:08
MS L1656665-05 WG2141010	C	392	60	SNR961	10/5/2023 13:08	10/5/2023 14:08
MSD L1656665-05 WG2141010	D	395	60	SNR961	10/5/2023 13:08	10/5/2023 14:08
DUP L1658999-11 WG2141010	A	12	60	SNR961	10/5/2023 14:08	10/5/2023 15:08
L1656665-05 WG2141010	B	157	60	SNR961	10/5/2023 14:08	10/5/2023 15:08
L1656665-06 WG2141010	C	16	60	SNR961	10/5/2023 14:08	10/5/2023 15:08
L1657379-01 WG2141010	D	18	60	SNR961	10/5/2023 14:08	10/5/2023 15:08
L1658453-01 WG2141010	A	485	60	SNR961	10/5/2023 15:08	10/5/2023 16:08
L1658999-05 WG2141010	B	16	60	SNR961	10/5/2023 15:08	10/5/2023 16:08
L1658999-06 WG2141010	C	1164	60	SNR961	10/5/2023 15:08	10/5/2023 16:08
L1658999-07 WG2141010	D	1162	60	SNR961	10/5/2023 15:08	10/5/2023 16:08
L1658999-08 WG2141010	A	403	60	SNR961	10/5/2023 16:09	10/5/2023 17:09
L1658999-09 WG2141010	B	375	60	SNR961	10/5/2023 16:09	10/5/2023 17:09
L1658999-10 WG2141010	C	408	60	SNR961	10/5/2023 16:09	10/5/2023 17:09
L1658999-11 WG2141010	D	16	60	SNR961	10/5/2023 16:09	10/5/2023 17:09
L1658999-12 WG2141010	A	18	60	SNR961	10/5/2023 17:09	10/5/2023 18:09
L1658999-13 WG2141010	B	10	60	SNR961	10/5/2023 17:09	10/5/2023 18:09
L1658999-14 WG2141010	C	26	60	SNR961	10/5/2023 17:09	10/5/2023 18:09
L1660252-01 WG2141010	D	10	60	SNR961	10/5/2023 17:09	10/5/2023 18:09
L1660252-02 WG2141010	A	14	60	SNR961	10/5/2023 18:09	10/5/2023 19:09
L1660252-03 WG2141010	B	32	60	SNR961	10/5/2023 18:09	10/5/2023 19:09
RA_BKG	A	2	60	SNR961	10/5/2023 19:10	10/5/2023 20:10
RA_BKG	B	3	60	SNR961	10/5/2023 19:10	10/5/2023 20:10
RA_BKG	C	4	60	SNR961	10/5/2023 19:10	10/5/2023 20:10
RA_BKG	D	1	60	SNR961	10/5/2023 19:10	10/5/2023 20:10
903 STD 1	A	10013	10	SNR961	10/5/2023 20:21	10/5/2023 20:31
903 STD 2	B	9563	10	SNR961	10/5/2023 20:21	10/5/2023 20:31
903 STD 3	C	9910	10	SNR961	10/5/2023 20:21	10/5/2023 20:31
903 STD 4	D	9620	10	SNR961	10/5/2023 20:21	10/5/2023 20:31

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 11:04
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702136
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1803	1803	0
1520	2062	2061	1
1540	2378	2378	0
1560	2635	2635	0
1580	2888	2887	1
1600	3004	3003	1
1620	3140	3140	0
1640	3417	3416	1
1660	3439	3435	4
1680	3464	3462	2
1700	3607	3606	1
1720	3598	3597	1
1740	3528	3521	7
1760	3641	3618	23
1780	3653	3611	42
1800	3552	3467	85

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/19/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 11:36
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702137
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1995	1993	2
1520	2314	2314	0
1540	2791	2788	3
1560	3382	3380	2
1580	3832	3829	3
1600	4038	4034	4
1620	4546	4544	2
1640	4845	4838	7
1660	4979	4974	5
1680	5117	5108	9
1700	5164	5154	10
1720	5257	5245	12
1740	5429	5414	15
1760	5388	5362	26
1780	5530	5477	53
1800	5632	5495	137

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/19/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 12:35
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702139
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2059	2058	1
1520	2443	2440	3
1540	2824	2821	3
1560	3226	3225	1
1580	3521	3518	3
1600	3658	3654	4
1620	4123	4123	0
1640	4349	4347	2
1660	4500	4494	6
1680	4552	4550	2
1700	4540	4531	9
1720	4648	4639	9
1740	4651	4648	3
1760	4956	4926	30
1780	4814	4745	69
1800	4863	4757	106

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SNR961 **Date:** 6/19/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 12:55
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702136
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1533	1533	0
1520	1769	1768	1
1540	2054	2052	2
1560	2377	2377	0
1580	2657	2656	1
1600	2756	2756	0
1620	2936	2934	2
1640	3315	3314	1
1660	3445	3445	0
1680	3615	3613	2
1700	3460	3460	0
1720	3644	3637	7
1740	3534	3525	9
1760	3629	3605	24
1780	3674	3610	64
1800	3696	3573	123

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/19/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/11/23

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Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** A
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/13/2023 10:34
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702137
Isotope: Sr-90
Emission Type: Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 5 - 899	Chn 900 - 1023
1	5577	13
2	5421	13
3	5510	13
4	5500	15
5	5594	12
6	5568	10
7	5484	20
8	5622	11
9	5571	12
10	5494	13
11	5480	10
12	5447	10
13	5511	7
14	5427	16
15	5588	10
16	5530	11
17	5381	13
18	5407	8
19	5531	15
20	5520	12

(Xbar) Mean:	5508.15	12.20
Calculated Chi-Sqr Value:	15.63	13.21

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/13/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SNReci **Date:** 7/13/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/13/23

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Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 06/19/2023 14:18
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702137
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1	5391	11
2	5433	13
3	5372	15
4	5468	9
5	5302	7
6	5512	8
7	5518	7
8	5398	11
9	5394	13
10	5499	12
11	5498	13
12	5299	9
13	5455	14
14	5402	15
15	5555	8
16	5425	14
17	5365	14
18	5503	13
19	5422	16
20	5452	10

(Xbar) Mean:	5433.15	11.60
Calculated Chi-Sqr Value:	17.12	13.17

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 06/22/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SNR961 **Date:** 6/19/23
Changes Needed: Yes No (CIrcle One)
Approved By: [signature] **Date:** 7/12/23

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Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 06/19/2023 13:50
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702139
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1	4749	12
2	4806	8
3	4684	10
4	4737	14
5	4854	9
6	4666	4
7	4764	12
8	4680	13
9	4618	16
10	4739	11
11	4743	10
12	4771	12
13	4814	16
14	4812	15
15	4728	10
16	4745	6
17	4880	14
18	4795	8
19	4726	15
20	4791	7

(Xbar) Mean:	4755.10	11.10
Calculated Chi-Sqr Value:	16.36	19.98

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 06/22/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SNR161 **Date:** 6/19/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/6/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

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Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 06/22/2023 16:17
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702136
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1	3730	8
2	3592	7
3	3700	7
4	3678	7
5	3744	10
6	3680	2
7	3747	10
8	3672	7
9	3578	8
10	3647	8
11	3727	3
12	3593	8
13	3815	9
14	3662	9
15	3753	10
16	3663	5
17	3733	4
18	3600	4
19	3689	5
20	3771	7

(Xbar) Mean:	3688.70	6.90
Calculated Chi-Sqr Value:	21.90	15.33

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 06/22/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/22/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/12/23

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2136

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	16100	dpm	805	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	7694.29	dpm	384.71	dpm

44-9 PROBE
CPM Acceptance Range
1693 50
1354 1304 Low
2031 2081 High

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range
3511 176
3160 2984 Low
3862 4038 High

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2137

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	23800	dpm	1190	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11374.16	dpm	568.71	dpm

44-9 PROBE
CPM Acceptance Range

2502	**74**	
2002	**1928**	**Low**
3003	**3077**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5190	**260**	
4671	**4412**	**Low**
5709	**5969**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2139

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	20700	dpm	1040	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.41	years	30.41	years
dilution =	1.00		1.00	
A =	9907.77	dpm	497.78	dpm

44-9 PROBE
CPM Acceptance Range

2180	**65**	
1744	**1679**	**Low**
2616	**2680**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

4521	**227**	
4069	**3842**	**Low**
4973	**5200**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2138

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	25000	dpm	1250	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11947.65	dpm	597.38	dpm

44-9 PROBE

CPM	**Acceptance Range**	
2628	**78**	
2103	**2025**	**Low**
3154	**3232**	**High**

Gamma Products G5020-400
Efficienc 0.4563

CPM	**Acceptance Range**	
5452	**273**	
4907	**4634**	**Low**
5997	**6269**	**High**

Approval: _____ Date:_____

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RADIUM-226

SDG: WG2144074
METHOD: EPA 903.0/9315
ANALYST: SNR961

	Ra226	error	SDWA DL	mda	Units	date prep	date analysis	Analyst	
BACKGROUND DET A	0.000	0.3	0.303	0.541	pCi/l	10/4/2023	10/10/2023	SNR961	
BACKGROUND DET B	0.000	0.2	0.262	0.431	pCi/l	10/4/2023	10/10/2023	SNR961	
BACKGROUND DET C	0.000	0.2	0.237	0.372	pCi/l	10/4/2023	10/10/2023	SNR961	
BACKGROUND DET D	0.000	0.2	0.256	0.422	pCi/l	10/4/2023	10/10/2023	SNR961	
RA-0070-WS-903-1	614.59	12.0	0.291	0.605	pCi/l	10/4/2023	10/10/2023	SNR961	**105.8%**
RA-0070-WS-903-2	612.29	12.0	0.270	0.532	pCi/l	10/4/2023	10/10/2023	SNR961	**105.4%**
RA-0070-WS-903-3	603.60	11.8	0.252	0.493	pCi/l	10/4/2023	10/10/2023	SNR961	**103.9%**
RA-0070-WS-903-4	601.96	11.9	0.269	0.531	pCi/l	10/4/2023	10/10/2023	SNR961	**103.6%**
[redacted]						10/4/2023	[redacted]	SNR961	
BLANK WG2144074	0.248	0.137	0.086	0.167	pCi/l	10/4/2023	10/10/2023	SNR961	
LCS WG2144074	5.447	0.557	0.093	0.185	pCi/l	10/4/2023	10/10/2023	SNR961	
MS L1661246-01 WG2144074	38.573	2.949	0.437	0.754	pCi/l	10/4/2023	10/10/2023	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
DUP L1661246-02 WG2144074	1.120	0.601	0.377	0.597	pCi/l	10/4/2023	10/10/2023	SNR961	
DNRL1656526-01 WG2144074	10.517	1.649	0.384	0.573	pCi/l	10/4/2023	10/10/2023	SNR961	
L1658999-15 WG2144074	0.464	0.279	0.185	0.320	pCi/l	10/4/2023	10/10/2023	SNR961	
DNRL1661246-01 WG2144074	16.346	1.361	0.219	0.404	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661246-02 WG2144074	0.823	0.346	0.188	0.322	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661569-01 WG2144074	0.119	0.184	0.175	0.289	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661569-03 WG2144074	0.495	0.286	0.186	0.321	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661569-04 WG2144074	0.272	0.284	0.230	0.422	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661569-05 WG2144074	0.351	0.26	0.187	0.319	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661569-06 WG2144074	0.612	0.30	0.172	0.285	pCi/l	10/4/2023	10/10/2023	SNR961	
L1661569-07 WG2144074	0.725	0.33	0.185	0.320	pCi/l	10/4/2023	10/10/2023	SNR961	
DNRMS L1661246-01 WG214407	44.455	3.93	0.478	0.688	pCi/l	10/4/2023	10/17/2023	SNR961	
L1656526-01 WG2144074	9.244	1.904	0.497	0.663	pCi/l	10/4/2023	10/17/2023	SNR961	
L1661246-01 WG2144074	16.885	1.700	0.235	0.390	pCi/l	10/4/2023	10/17/2023	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
0	#DIV/0!	#DIV/0!	#DIV/0!	#####	pCi/l	10/4/2023	1/0/1900	SNR961	
RA-0070-WS-903-1	600.440	11.837	0.291	0.605	pCi/l	10/4/2023	10/17/2023	SNR961	**103.3%**
RA-0070-WS-903-2	606.270	11.963	0.272	0.532	pCi/l	10/4/2023	10/17/2023	SNR961	**104.3%**
RA-0070-WS-903-3	585.887	11.625	0.258	0.493	pCi/l	10/4/2023	10/17/2023	SNR961	**100.8%**
RA-0070-WS-903-4	598.363	11.831	0.000	0.531	pCi/l	10/4/2023	10/17/2023	SNR961	**103.0%**
BACKGROUND DET A	-0.160	0.247	0.000	0.541	pCi/l	10/4/2023	10/17/2023	SNR961	

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Pace Analytical
National Center for Testing & Innovation

Radium EPA 903.0/9315
SDG: WG2144074
METHOD: EPA 903.0/9315
ANALYST: SNR961
Prep Date: 10/04/23

Detector	EFF	BKG COUNTS	COUNT TIME	BKG CPM
Detector A	**18.8%**	7	60	0.117
Detector B	**18.3%**	4	60	0.067
Detector C	**18.8%**	3	60	0.050
Detector D	**18.8%**	4	60	0.067

If Background is 0 use 1.

Ba Carrier ID: 23I13314
Standardization Date: 09/13/23 13:45

planchet tare	**planchet** gross	**net** weight
0.07766	**0.13255**	0.05489
0.07769	**0.13271**	0.05502
0.07754	**0.13311**	0.05557

ave = **0.05516**

id	sample size	alpha counts	count time	ppt time	time count end		igf	Detector #	CPM back	Bkg Counts	eff	planchet tare	planchet gross	ba rec			
BACKGROUND DET A	**1.000**	**7**	**60**	**10/10/23 10:54**	**10/10/23 10:54**	0	1.000	**A**	0.117	7.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET A
BACKGROUND DET B	**1.000**	**4**	**60**	**10/10/23 10:54**	**10/10/23 10:54**	0	1.000	**B**	0.067	4.0	18.3%			100.0%	100.0%	0.00000	BACKGROUND DET B
BACKGROUND DET C	**1.000**	**3**	**60**	**10/10/23 10:54**	**10/10/23 10:54**	0	1.000	**C**	0.050	3.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET C
BACKGROUND DET D	**1.000**	**4**	**60**	**10/10/23 10:54**	**10/10/23 10:54**	0	1.000	**D**	0.067	4.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET D
RA-0070-WS-903-1	**1.000**	**10121**	**10**	**4/6/21 14:15**	**10/10/23 11:20**	22005	4.000	**A**	0.117	1.2	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-1
RA-0070-WS-903-2	**1.000**	**9966**	**10**	**4/6/21 14:15**	**10/10/23 11:20**	22005	4.000	**B**	0.067	0.7	18.3%			100.6%	100.0%	0.00000	RA-0070-WS-903-2
RA-0070-WS-903-3	**1.000**	**10054**	**10**	**4/6/21 14:15**	**10/10/23 11:20**	22005	4.000	**C**	0.050	0.5	18.8%			102.2%	100.0%	0.00000	RA-0070-WS-903-3
RA-0070-WS-903-4	**1.000**	**9887**	**10**	**4/6/21 14:15**	**10/10/23 11:20**	22005	4.000	**D**	0.067	0.7	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-4
						0	1.000							0.0%			
BLANK WG2144074	**1.000**	**20**	**60**	**10/5/23 15:45**	**10/10/23 12:21**	117	2.756	**C**	0.050	3.0	18.8%	**0.07887**	**0.13383**	99.6%	99.6%	0.05496	BLANK WG2144074
LCS WG2144074	**1.000**	**379**	**60**	**10/5/23 15:45**	**10/10/23 12:21**	117	2.756	**D**	0.067	4.0	18.8%	**0.07894**	**0.13413**	100.1%	100.0%	0.05519	LCS WG2144074
MS L1661246-01 WG2144074	**0.250**	**678**	**60**	**10/5/23 15:45**	**10/10/23 14:44**	119	2.778	**A**	0.117	7.0	18.8%	**0.07865**	**0.13409**	100.5%	100.0%	0.05544	MS L1661246-01 WG2144074
			60			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
DUP L1661246-02 WG2144074	**0.250**	**23**	**60**	**10/5/23 15:45**	**10/10/23 14:44**	119	2.778	**B**	0.067	4.0	18.3%	**0.07886**	**0.1342**	100.3%	100.0%	0.05534	DUP L1661246-02 WG2144074
DNRL1656526-01 WG2144074	**0.500**	**165**	**60**	**10/5/23 15:45**	**10/10/23 14:44**	119	2.778	**C**	0.050	3.0	18.8%	**0.07879**	**0.10327**	44.4%	44.4%	0.02448	DNRL1656526-01 WG2144074
L1658999-15 WG2144074	**0.500**	**20**	**60**	**10/5/23 15:45**	**10/10/23 14:44**	119	2.778	**D**	0.067	4.0	18.8%	**0.07892**	**0.13372**	99.3%	99.3%	0.05480	L1658999-15 WG2144074
DNRL1661246-01 WG2144074	**0.500**	**575**	**60**	**10/5/23 15:45**	**10/10/23 15:44**	120	2.788	**A**	0.117	7.0	18.8%	**0.07883**	**0.13374**	99.5%	99.5%	0.05491	DNRL1661246-01 WG2144074
L1661246-02 WG2144074	**0.500**	**32**	**60**	**10/5/23 15:45**	**10/10/23 15:44**	120	2.788	**B**	0.067	4.0	18.3%	**0.0787**	**0.13409**	100.4%	100.0%	0.05539	L1661246-02 WG2144074
L1661569-01 WG2144074	**0.500**	**7**	**60**	**10/5/23 15:45**	**10/10/23 15:44**	120	2.788	**C**	0.050	3.0	18.8%	**0.07861**	**0.13206**	96.9%	96.9%	0.05345	L1661569-01 WG2144074
L1661569-03 WG2144074	**0.500**	**21**	**60**	**10/5/23 15:45**	**10/10/23 15:44**	120	2.788	**D**	0.067	4.0	18.8%	**0.07882**	**0.1332**	98.6%	98.6%	0.05438	L1661569-03 WG2144074
L1661569-04 WG2144074	**0.500**	**16**	**60**	**10/5/23 15:45**	**10/10/23 16:45**	121	2.797	**A**	0.117	7.0	18.8%	**0.07884**	**0.13091**	94.4%	94.4%	0.05207	L1661569-04 WG2144074
L1661569-05 WG2144074	**0.500**	**16**	**60**	**10/5/23 15:45**	**10/10/23 16:45**	121	2.797	**B**	0.067	4.0	18.3%	**0.0786**	**0.13441**	101.2%	100.0%	0.05581	L1661569-05 WG2144074
L1661569-06 WG2144074	**0.500**	**24**	**60**	**10/5/23 15:45**	**10/10/23 16:45**	121	2.797	**C**	0.050	3.0	18.8%	**0.07869**	**0.13288**	98.2%	98.2%	0.05419	L1661569-06 WG2144074
L1661569-07 WG2144074	**0.500**	**29**	**60**	**10/5/23 15:45**	**10/10/23 16:45**	121	2.797	**D**	0.067	4.0	18.8%	**0.07868**	**0.13311**	98.7%	98.7%	0.05443	L1661569-07 WG2144074
DNRMS L1661246-01 WG2144074	**0.250**	**497**	**30**	**10/5/23 15:45**	**10/17/23 11:48**	284	3.649	**B**	0.067	2.0	18.3%	**0.07865**	**0.13409**	100.5%	100.0%	0.05544	DNRMS L1661246-01 WG2144074
L1656526-01 WG2144074	**0.500**	**95**	**30**	**10/5/23 15:45**	**10/17/23 11:48**	284	3.649	**C**	0.050	1.5	18.8%	**0.07879**	**0.10327**	44.4%	44.4%	0.02448	L1656526-01 WG2144074
L1661246-01 WG2144074	**0.500**	**385**	**30**	**10/5/23 15:45**	**10/17/23 11:48**	284	3.649	**D**	0.067	2.0	18.8%	**0.07883**	**0.13374**	99.5%	99.5%	0.05491	L1661246-01 WG2144074
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
	0.500		**60**			0	1.000		FALSE	0.0	FALSE			0.0%	0.0%	0.00000	0
RA-0070-WS-903-1	**1.000**	**9888**	**10**	**4/6/21 14:15**	**10/17/23 13:09**	22175	4.000	**A**	0.117	1.2	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-1
RA-0070-WS-903-2	**1.000**	**9868**	**10**	**4/6/21 14:15**	**10/17/23 13:09**	22175	4.000	**B**	0.067	0.7	18.3%			100.6%	100.0%	0.00000	RA-0070-WS-903-2
RA-0070-WS-903-3	**1.000**	**9759**	**10**	**4/6/21 14:15**	**10/17/23 13:09**	22175	4.000	**C**	0.050	0.5	18.8%			102.2%	100.0%	0.00000	RA-0070-WS-903-3
RA-0070-WS-903-4	**1.000**	**9828**	**10**	**4/6/21 14:15**	**10/17/23 13:09**	22175	4.000	**D**	0.067	0.7	18.8%			98.6%	98.6%	0.00000	RA-0070-WS-903-4
BACKGROUND DET A	**1.000**	**3**	**60**	**10/17/23 12:48**	**10/17/23 12:48**	0	1.000	**A**	0.117	7.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET A
BACKGROUND DET B	**1.000**	**1**	**60**	**10/17/23 12:48**	**10/17/23 12:48**	0	1.000	**B**	0.067	4.0	18.3%			100.0%	100.0%	0.00000	BACKGROUND DET B
BACKGROUND DET C	**1.000**	**1**	**60**	**10/17/23 12:48**	**10/17/23 12:48**	0	1.000	**C**	0.050	3.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET C
BACKGROUND DET D	**1.000**	**0**	**60**	**10/17/23 12:48**	**10/17/23 12:48**	0	1.000	**D**	0.067	4.0	18.8%			100.0%	100.0%	0.00000	BACKGROUND DET D
																	0

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QC REPORT

ANALYTE: Ra226
METHOD: EPA 903.0/9315
SDG: WG2144074
UNITS: pCi/L
STD ID: 23F16842 Vol. 1 ml

	RESULT	ERROR	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD	LIMITS	RER	LIMITS
BLANK WG2144074	0.248	0.137	0.167								
LCS WG2144074	5.447	0.557	0.185	5.01	108.8%	80%	120%				
L1661569-01 WG2144074	0.119	0.184	0.175								
DUP L1661246-02 WG2144074	1.120	0.601	0.377					NC	20%	1.595	3
L1661246-01 WG2144074	16.885	1.700	0.235								
MS L1661246-01 WG2144074	38.573	2.949	0.754	20.0	108.3%	75%	125%				
0	#DIV/0!	#DIV/0!	#DIV/0!	20.0	#DIV/0!	75%	125%	#DIV/0!			

*** - Outside Control Limits**

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Ra226 Source
No.3613
RA226-3613-WS3
23F16842

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 09-Mar-22
DATE OF CALIBRATION 04-Oct-23

Ao =	589.23	pCi/ml
N =	0.00	
T(1/2) =	1600.00	years
T =	1.57	years
Standard Volume	4.25	
Final Volume =	500.00	
dilution =	117.65	
A =	588.824	pCi/ml
A =	11.111	dpm/ml
A =	5.01	pCi/ml

A = 5.01 pCi/ml

Uncertainty	3.70%
Weight	0.00%
Volume (1000 ml	0.03%
Volume (100 ml /	0.40%
Volume (1000 ml	0.03%
CSU	3.72%

Activity 5.01 +/- 0.186 pCi/ml

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Amersham International

ESC37429

Certificate of calibration of radioactive reference solution

M 29913

Description	Principal radionuclide:	Radium 226	Product code: RAY 94
			Solution number: R/013/127
Measurement	Reference time:	1200 GMT on 19 February 1998	
	Radioactive concentration of radium-226:	4.37n	kilobecquerels per gram of solution
	which is equivalent to:	118.3	nanocuries per gram of solution
	Mass of solution:	5.0345	grams
	Total activity of radium-226:	22.03	kilobecquerels
	which is equivalent to:	595.4	nanocuries
	Recommended half life:	1600.00	years

Method of measurement:
The activity of the solution was measured in a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

Accuracy: Overall uncertainty in the radioactive concentration quoted above: ± 3.7 %

Random uncertainty: ± 0.7 % Systematic uncertainty: ± 3.0 %

The limits of overall uncertainty were taken as the arithmetic sum of the uncertainty due to random variations, calculated at the 99.7% confidence level, and the estimated systematic uncertainties in the measurement.

Radionuclidic Purity: The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

ENVIRONMENTAL SCIENCE CENTRE

Chemical Composition: Carrier free in 0.5M HCl

Remarks: At the reference date radium 226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium-210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, U.S.A.

This product meets the quality assurance requirements of the NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Issuer Signatory: B D D Singleton

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Amersham
The Health Science Group

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Calibration Data EPA 903/9315

id	sample size	counts	time	ppt time	count time	Hours	igf	det	BKG	planchet tare	planchet gross	ba rec	eff		
RA-0070-WS-903-1	1	14782	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	A	0.042	7.85288	7.91579	98.6%	19.1%	0.06291	
RA-0070-WS-903-4	1	14194	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	A	0.042	7.85288	7.91579	98.6%	18.3%	0.06291	
RA-0070-WS-903-3	1	14422	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	A	0.042	7.86129	7.92648	102.2%	18.6%	0.06519	Avg
RA-0070-WS-903-2	1	14818	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	A	0.042	7.84269	7.90683	100.6%	19.1%	0.06414	
												100.0%	**18.8%**	0.06379	
RA-0070-WS-903-2	1	14310	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	B	0.058				18.5%		
RA-0070-WS-903-1	1	14238	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	B	0.058				18.4%		
RA-0070-WS-903-4	1	13968	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	B	0.058				18.0%		
RA-0070-WS-903-3	1	14236	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	B	0.058				18.4%		
													18.3%		
RA-0070-WS-903-3	1	14588	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	C	0.083				18.8%		
RA-0070-WS-903-2	1	14538	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	C	0.083				18.8%		
RA-0070-WS-903-1	1	14589	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	C	0.083				18.8%		
RA-0070-WS-903-4	1	14365	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	C	0.083				18.6%		
													18.8%		
RA-0070-WS-903-4	1	14185	15	4/6/21 14:15	7/10/23 12:54	19798.7	4.000	D	0.033				18.3%		
RA-0070-WS-903-3	1	14527	15	4/6/21 14:15	7/10/23 13:11	19798.9	4.000	D	0.033				18.8%		
RA-0070-WS-903-2	1	14657	15	4/6/21 14:15	7/10/23 13:45	19799.5	4.000	D	0.033				18.9%		
RA-0070-WS-903-1	1	14697	15	4/6/21 14:15	7/10/23 14:15	19800.0	4.000	D	0.033				19.0%		
													18.8%		

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DECAY CALCUALTION

Source: Ra-226
Lot No. R4/131/35
ID: **RA-0070-WS1**
19L06745

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 01-Nov-16
DATE OF CALIBRATION 10-Jul-23

Ao =	58.28	nCi
N =	0.00	
T(1/2) =	1600.00	years
T =	6.69	years
VOLUME OF STD	1.00	
FINAL VOL	100.00	
dilution =	100.00	
A =	58.11	nCi
A =	1290.10	dpm/ml
A =	**581**	pCi/ml

Uncertainty 3.70%

Volume 0.04%

CSU 3.70%

Activity 581 +/- 22 pCi/ml

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1-AD 1x5mL

RH-0065-V5

Amersham International plc
Amersham Laboratories

Certificate of calibration of radioactive reference solution

M 28796

NAMAS
CALIBRATION
No. 0146

ESC38625

Description	Principal radionuclide:	Radium-226	Product code: RAY.44
			Solution number: R4/131/35
Measurement	Reference time:		1200 GMT on 2 September 1936
	Radioactive concentration of radium-226:	43.80	kilobecquerels per gram of solution
	which is equivalent to:	1.184	microcuries per gram of solution
	Mass of solution:	5.0330	grams
	Total activity of radium-226:	220.5	kilobecquerels
	which is equivalent to:	5.959	microcuries
	Recommended half life:	1600	years

Method of measurement used:
The activity of the solution was measured in a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

ENVIRONMENTAL CARE

Accuracy: Overall uncertainty in the radioactive concentration quoted above: ± 3.7 %

Random uncertainty: ± 0.7 % Systematic uncertainty: ± 3.0 %

The limits of overall uncertainty were taken as the arithmetic sum of the uncertainty due to random variations, calculated at the 99.7% confidence level, and the estimated systematic uncertainties in the measurement.

Radionuclidic Purity: The estimated activities of any radioactive impurities found by high resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Chemical Composition: Carrier free in 0.5M HCl

Remarks: At the reference time radium-226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium 210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, USA.

This product meets the quality assurance requirements of the NRC Regulatory Guide 4.15 for achieving implicit NIST traceability as defined in NCRP 58 (1985).

Approved Signatory

W F Case

W F Case

Page 1 of 1

Amersham
The Health Science Group

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RA-226 903.0 Radiochemistry Prep Benchsheet

Batch: WG2144074

Analyst: ASN4036 Prep Start Date/Time: 10/04/23 15:35 Prep End Date/Time: 10/06/23 17:34 Method: EPA 903.0 SOP: ENV-SOP-MTJL-0353/0370 Pipet ID: E11,E22,E14,126,62 Bal ID: RADBAL3 Stirrer ID's: St2,St7,St27
Hot Plate ID: NA Centrifuge ID: C4

LCS/D Standard: 23F16842 Amt. Used: 1 mL Exp. Date:01/01/24 MS/D Standard: 23F16842 Amt. Used: 1 mL Exp. Date:01/01/24 16 mg/mL Barium Carrier: 23I13314 Amt. Used: 2 Exp. Date:09/13/24
Lead Nitrate Carrier: 23G12605 Amt. Used: 1 Exp. Date:11/04/23 Citric Acid: 23I06140 Amt. Used: 5 Exp. Date:01/06/24 1:1 H2SO4: 23H17177 Amt. Used: 20 Exp. Date:08/17/24 0.25M EDTA: 23I27512 Amt. Used: 15 Exp. Date:09/27/24
200 mg/mL Ammonium Sulfate: 23E18492 Amt. Used: 1 Exp. Date:05/18/24 Bromocresol Green: 23I19230 Amt. Used: 0.50 Exp. Date:09/19/24 Acetic Acid: 23G31289 Amt. Used: 3 Exp. Date:05/24/25

Sample Number	Collect Date	Sample Volume (mL)	Precipitation Time	Tare Wt (g)	Gross Wt (g)	Final Wt (g)	Review Analyst	Review Date
BLANK		1000	10/05/2023 15:45:00	0.07887	0.13383	0.05496	SNR961	10/13/23 13:38:45
LCS		1000	10/05/2023 15:45:00	0.07894	0.13413	0.05519	SNR961	10/13/23 13:38:45
MS(L1661246-01)		250	10/05/2023 15:45:00	0.07865	0.13409	0.05544	SNR961	10/13/23 13:38:45
DUP(L1661246-02)		250	10/05/2023 15:45:00	0.07886	0.13420	0.05534	SNR961	10/13/23 13:38:45
1. L1656526-01	09/12/23 11:00	500	10/05/2023 15:45:00	0.07879	0.10327	0.02448	SNR961	10/13/23 13:38:45
2. L1658999-15	09/19/23 17:39	500	10/05/2023 15:45:00	0.07892	0.13372	0.0548	SNR961	10/13/23 13:38:45
3. L1661246-01	09/20/23 11:28	500	10/05/2023 15:45:00	0.07883	0.13374	0.05491	SNR961	10/13/23 13:38:45
4. L1661246-02	09/20/23 11:40	500	10/05/2023 15:45:00	0.07870	0.13409	0.05539	SNR961	10/13/23 13:38:45
5. L1661569-01	08/15/23 07:30	500	10/05/2023 15:45:00	0.07861	0.13206	0.05345	SNR961	10/13/23 13:38:45
6. L1661569-03	08/18/23 06:00	500	10/05/2023 15:45:00	0.07882	0.13320	0.05438	SNR961	10/13/23 13:38:45
7. L1661569-04	08/15/23 09:00	500	10/05/2023 15:45:00	0.07884	0.13091	0.05207	SNR961	10/13/23 13:38:45
8. L1661569-05	08/15/23 07:40	500	10/05/2023 15:45:00	0.07860	0.13441	0.05581	SNR961	10/13/23 13:38:45
9. L1661569-06	08/15/23 08:50	500	10/05/2023 15:45:00	0.07869	0.13288	0.05419	SNR961	10/13/23 13:38:45
10. L1661569-07	08/16/23 08:30	500	10/05/2023 15:45:00	0.07868	0.13311	0.05443	SNR961	10/13/23 13:38:45

Comments:
50mL Tubes: 920128, 1mL Tips: 2243, 2mL tips: 2215, 10mL electric tips: 2332, 10mL manual tips: P7565750, Transfer Pipettes: 23140187

Reviewed By:SNR961 on 10/13/23 13:38:45

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G5020 Run Log Ra-226 Waters by 903.0 WG2144074

Sample Order Verified by SNR961

Sample ID	Det	Alpha	LT	Analyst	Start	End	Notes
RA_BKG	A	7	60	SNR961	10/10/2023 9:54	10/10/2023 10:54	
RA_BKG	B	4	60	SNR961	10/10/2023 9:54	10/10/2023 10:54	
RA_BKG	C	3	60	SNR961	10/10/2023 9:54	10/10/2023 10:54	
RA_BKG	D	4	60	SNR961	10/10/2023 9:54	10/10/2023 10:54	
903 STD 1	A	10121	10	SNR961	10/10/2023 11:10	10/10/2023 11:20	
903 STD 2	B	9966	10	SNR961	10/10/2023 11:10	10/10/2023 11:20	
903 STD 3	C	10054	10	SNR961	10/10/2023 11:10	10/10/2023 11:20	
903 STD 4	D	9887	10	SNR961	10/10/2023 11:10	10/10/2023 11:20	
BLANK WG2144074	C	20	60	SNR961	10/10/2023 11:21	10/10/2023 12:21	
LCS WG2144074	D	379	60	SNR961	10/10/2023 11:21	10/10/2023 12:21	
RA_BKG	A	6	60	SNR961	10/10/2023 12:22	10/10/2023 13:22	
RA_BKG	B	2	60	SNR961	10/10/2023 12:22	10/10/2023 13:22	
RA_BKG	C	1	60	SNR961	10/10/2023 12:22	10/10/2023 13:22	
RA_BKG	D	0	60	SNR961	10/10/2023 12:22	10/10/2023 13:22	
903 STD 1	A	10120	10	SNR961	10/10/2023 13:33	10/10/2023 13:43	
903 STD 2	B	9843	10	SNR961	10/10/2023 13:33	10/10/2023 13:43	
903 STD 3	C	10112	10	SNR961	10/10/2023 13:33	10/10/2023 13:43	
903 STD 4	D	9837	10	SNR961	10/10/2023 13:33	10/10/2023 13:43	
MS L1661246-01 WG2144074	A	678	60	SNR961	10/10/2023 13:44	10/10/2023 14:44	
DUP L1661246-02 WG2144074	B	23	60	SNR961	10/10/2023 13:44	10/10/2023 14:44	
L1656526-01 WG2144074	C	165	60	SNR961	10/10/2023 13:44	10/10/2023 14:44	
L1658999-15 WG2144074	D	20	60	SNR961	10/10/2023 13:44	10/10/2023 14:44	
L1661246-01 WG2144074	A	575	60	SNR961	10/10/2023 14:44	10/10/2023 15:44	
L1661246-02 WG2144074	B	32	60	SNR961	10/10/2023 14:44	10/10/2023 15:44	
L1661569-01 WG2144074	C	7	60	SNR961	10/10/2023 14:44	10/10/2023 15:44	
L1661569-03 WG2144074	D	21	60	SNR961	10/10/2023 14:44	10/10/2023 15:44	
L1661569-04 WG2144074	A	16	60	SNR961	10/10/2023 15:45	10/10/2023 16:45	
L1661569-05 WG2144074	B	16	60	SNR961	10/10/2023 15:45	10/10/2023 16:45	
L1661569-06 WG2144074	C	24	60	SNR961	10/10/2023 15:45	10/10/2023 16:45	
L1661569-07 WG2144074	D	29	60	SNR961	10/10/2023 15:45	10/10/2023 16:45	
RA_BKG	A	1	60	SNR961	10/10/2023 16:45	10/10/2023 17:45	
RA_BKG	B	3	60	SNR961	10/10/2023 16:45	10/10/2023 17:45	
RA_BKG	C	2	60	SNR961	10/10/2023 16:45	10/10/2023 17:45	
RA_BKG	D	1	60	SNR961	10/10/2023 16:45	10/10/2023 17:45	
903 STD 1	A	10271	10	SNR961	10/10/2023 17:56	10/10/2023 18:06	
903 STD 2	B	9903	10	SNR961	10/10/2023 17:56	10/10/2023 18:06	
903 STD 3	C	10163	10	SNR961	10/10/2023 17:56	10/10/2023 18:06	
903 STD 4	D	9831	10	SNR961	10/10/2023 17:56	10/10/2023 18:06	
RA_BKG	A	3	60	SNR961	10/17/2023 9:39	10/17/2023 10:39	
RA_BKG	B	1	60	SNR961	10/17/2023 9:39	10/17/2023 10:39	
RA_BKG	C	1	60	SNR961	10/17/2023 9:39	10/17/2023 10:39	
RA_BKG	D	2	60	SNR961	10/17/2023 9:39	10/17/2023 10:39	
903 STD 1	A	10128	10	SNR961	10/17/2023 11:07	10/17/2023 11:17	
903 STD 2	B	10043	10	SNR961	10/17/2023 11:07	10/17/2023 11:17	
903 STD 3	C	9868	10	SNR961	10/17/2023 11:07	10/17/2023 11:17	
903 STD 4	D	9959	10	SNR961	10/17/2023 11:07	10/17/2023 11:17	
MS L1661246-01 WG2144074	B	497	30	SNR961	10/17/2023 11:18	10/17/2023 11:48	Rerun to verify
L1656526-01 WG2144074	C	95	30	SNR961	10/17/2023 11:18	10/17/2023 11:48	
L1661246-01 WG2144074	D	385	30	SNR961	10/17/2023 11:18	10/17/2023 11:48	
RA_BKG	A	3	60	SNR961	10/17/2023 11:48	10/17/2023 12:48	
RA_BKG	B	1	60	SNR961	10/17/2023 11:48	10/17/2023 12:48	
RA_BKG	C	1	60	SNR961	10/17/2023 11:48	10/17/2023 12:48	
RA_BKG	D	0	60	SNR961	10/17/2023 11:48	10/17/2023 12:48	
903 STD 1	A	9888	10	SNR961	10/17/2023 12:59	10/17/2023 13:09	
903 STD 2	B	9868	10	SNR961	10/17/2023 12:59	10/17/2023 13:09	
903 STD 3	C	9759	10	SNR961	10/17/2023 12:59	10/17/2023 13:09	
903 STD 4	D	9828	10	SNR961	10/17/2023 12:59	10/17/2023 13:09	

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End
10/10/2023 10:54
10/10/2023 10:54
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10/10/2023 10:54
10/10/2023 11:20
10/10/2023 11:20
10/10/2023 11:20
10/10/2023 11:20
10/10/2023 12:21
10/10/2023 12:21
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G5020 Run Log Ra-226 Waters by 903.0 WG2144074

Sample Order Verified by SNR961

Sample ID	Det	Alpha	LT	Analyst	Start	End
RA_BKG	A	7	60	SNR961	10/10/2023 9:54	10/10/2023 10:54
RA_BKG	B	4	60	SNR961	10/10/2023 9:54	10/10/2023 10:54
RA_BKG	C	3	60	SNR961	10/10/2023 9:54	10/10/2023 10:54
RA_BKG	D	4	60	SNR961	10/10/2023 9:54	10/10/2023 10:54
903 STD 1	A	10121	10	SNR961	10/10/2023 11:10	10/10/2023 11:20
903 STD 2	B	9966	10	SNR961	10/10/2023 11:10	10/10/2023 11:20
903 STD 3	C	10054	10	SNR961	10/10/2023 11:10	10/10/2023 11:20
903 STD 4	D	9887	10	SNR961	10/10/2023 11:10	10/10/2023 11:20
BLANK WG2144074	C	20	60	SNR961	10/10/2023 11:21	10/10/2023 12:21
LCS WG2144074	D	379	60	SNR961	10/10/2023 11:21	10/10/2023 12:21
RA_BKG	A	6	60	SNR961	10/10/2023 12:22	10/10/2023 13:22
RA_BKG	B	2	60	SNR961	10/10/2023 12:22	10/10/2023 13:22
RA_BKG	C	1	60	SNR961	10/10/2023 12:22	10/10/2023 13:22
RA_BKG	D	0	60	SNR961	10/10/2023 12:22	10/10/2023 13:22
903 STD 1	A	10120	10	SNR961	10/10/2023 13:33	10/10/2023 13:43
903 STD 2	B	9843	10	SNR961	10/10/2023 13:33	10/10/2023 13:43
903 STD 3	C	10112	10	SNR961	10/10/2023 13:33	10/10/2023 13:43
903 STD 4	D	9837	10	SNR961	10/10/2023 13:33	10/10/2023 13:43
MS L1661246-01 WG2144074	A	678	60	SNR961	10/10/2023 13:44	10/10/2023 14:44
DUP L1661246-02 WG2144074	B	23	60	SNR961	10/10/2023 13:44	10/10/2023 14:44
L1656526-01 WG2144074	C	165	60	SNR961	10/10/2023 13:44	10/10/2023 14:44
L1658999-15 WG2144074	D	20	60	SNR961	10/10/2023 13:44	10/10/2023 14:44
L1661246-01 WG2144074	A	575	60	SNR961	10/10/2023 14:44	10/10/2023 15:44
L1661246-02 WG2144074	B	32	60	SNR961	10/10/2023 14:44	10/10/2023 15:44
L1661569-01 WG2144074	C	7	60	SNR961	10/10/2023 14:44	10/10/2023 15:44
L1661569-03 WG2144074	D	21	60	SNR961	10/10/2023 14:44	10/10/2023 15:44
L1661569-04 WG2144074	A	16	60	SNR961	10/10/2023 15:45	10/10/2023 16:45
L1661569-05 WG2144074	B	16	60	SNR961	10/10/2023 15:45	10/10/2023 16:45
L1661569-06 WG2144074	C	24	60	SNR961	10/10/2023 15:45	10/10/2023 16:45
L1661569-07 WG2144074	D	29	60	SNR961	10/10/2023 15:45	10/10/2023 16:45
RA_BKG	A	1	60	SNR961	10/10/2023 16:45	10/10/2023 17:45
RA_BKG	B	3	60	SNR961	10/10/2023 16:45	10/10/2023 17:45
RA_BKG	C	2	60	SNR961	10/10/2023 16:45	10/10/2023 17:45
RA_BKG	D	1	60	SNR961	10/10/2023 16:45	10/10/2023 17:45
903 STD 1	A	10271	10	SNR961	10/10/2023 17:56	10/10/2023 18:06
903 STD 2	B	9903	10	SNR961	10/10/2023 17:56	10/10/2023 18:06
903 STD 3	C	10163	10	SNR961	10/10/2023 17:56	10/10/2023 18:06
903 STD 4	D	9831	10	SNR961	10/10/2023 17:56	10/10/2023 18:06

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 11:04
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702136
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1803	1803	0
1520	2062	2061	1
1540	2378	2378	0
1560	2635	2635	0
1580	2888	2887	1
1600	3004	3003	1
1620	3140	3140	0
1640	3417	3416	1
1660	3439	3435	4
1680	3464	3462	2
1700	3607	3606	1
1720	3598	3597	1
1740	3528	3521	7
1760	3641	3618	23
1780	3653	3611	42
1800	3552	3467	85

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/19/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 11:36
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702137
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1995	1993	2
1520	2314	2314	0
1540	2791	2788	3
1560	3382	3380	2
1580	3832	3829	3
1600	4038	4034	4
1620	4546	4544	2
1640	4845	4838	7
1660	4979	4974	5
1680	5117	5108	9
1700	5164	5154	10
1720	5257	5245	12
1740	5429	5414	15
1760	5388	5362	26
1780	5530	5477	53
1800	5632	5495	137

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/19/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 12:35
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702139
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2059	2058	1
1520	2443	2440	3
1540	2824	2821	3
1560	3226	3225	1
1580	3521	3518	3
1600	3658	3654	4
1620	4123	4123	0
1640	4349	4347	2
1660	4500	4494	6
1680	4552	4550	2
1700	4540	4531	9
1720	4648	4639	9
1740	4651	4648	3
1760	4956	4926	30
1780	4814	4745	69
1800	4863	4757	106

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SNR961 **Date:** 6/19/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

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Pace National
G-5400W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Test Date: 06/19/2023 12:55
System Serial #: 042101

Counting Time: 1 min 0 sec
Sample Position: 42 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR4702136
Isotope Name: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1533	1533	0
1520	1769	1768	1
1540	2054	2052	2
1560	2377	2377	0
1580	2657	2656	1
1600	2756	2756	0
1620	2936	2934	2
1640	3315	3314	1
1660	3445	3445	0
1680	3615	3613	2
1700	3460	3460	0
1720	3644	3637	7
1740	3534	3525	9
1760	3629	3605	24
1780	3674	3610	64
1800	3696	3573	123

Special Notes:

Report Generated: 06/22/2023 **G5400HV.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/19/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/11/23

PDF created with pdfFactory trial version www.pdffactory.com

Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** A
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 07/13/2023 10:34
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702137
Isotope: Sr-90
Emission Type: Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 5 - 899	Chn 900 - 1023
1	5577	13
2	5421	13
3	5510	13
4	5500	15
5	5594	12
6	5568	10
7	5484	20
8	5622	11
9	5571	12
10	5494	13
11	5480	10
12	5447	10
13	5511	7
14	5427	16
15	5588	10
16	5530	11
17	5381	13
18	5407	8
19	5531	15
20	5520	12

(Xbar) Mean:	5508.15	12.20
Calculated Chi-Sqr Value:	15.63	13.21

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/13/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SNRacl **Date:** 7/13/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/13/23

PDF created with pdfFactory trial version www.pdffactory.com

Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** B
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 06/19/2023 14:18
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702137
Isotope: Sr-90
Emission Type: Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 5 - 899	Chn 900 - 1023
1	5391	11
2	5433	13
3	5372	15
4	5468	9
5	5302	7
6	5512	8
7	5518	7
8	5398	11
9	5394	13
10	5499	12
11	5498	13
12	5299	9
13	5455	14
14	5402	15
15	5555	8
16	5425	14
17	5365	14
18	5503	13
19	5422	16
20	5452	10

(Xbar) Mean:	5433.15	11.60
Calculated Chi-Sqr Value:	17.12	13.17

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 06/22/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SNR961 **Date:** 6/19/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

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Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** C
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 06/19/2023 13:50
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702139
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1	4749	12
2	4806	8
3	4684	10
4	4737	14
5	4854	9
6	4666	4
7	4764	12
8	4680	13
9	4618	16
10	4739	11
11	4743	10
12	4771	12
13	4814	16
14	4812	15
15	4728	10
16	4745	6
17	4880	14
18	4795	8
19	4726	15
20	4791	7

(Xbar) Mean:	4755.10	11.10
Calculated Chi-Sqr Value:	16.36	19.98

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 06/22/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SNR161 **Date:** 6/19/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/6/23

PDF created with pdfFactory trial version www.pdffactory.com

Pace National
G-5400W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Sample Position: 42 **Detector:** D
Counting Time: 1 min 0 sec **Voltage:** 1740
Degrees of Freedom: N - 1 **Conf Level:** 95.0 %

Test Date: 06/22/2023 16:17
System Serial #: 042101
Number of Counts Performed: 20
Source Certificate: 92SR4702136
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 5 - 899	Alpha ROI Counts Chn 900 - 1023
1	3730	8
2	3592	7
3	3700	7
4	3678	7
5	3744	10
6	3680	2
7	3747	10
8	3672	7
9	3578	8
10	3647	8
11	3727	3
12	3593	8
13	3815	9
14	3662	9
15	3753	10
16	3663	5
17	3733	4
18	3600	4
19	3689	5
20	3771	7

(Xbar) Mean:	3688.70	6.90
Calculated Chi-Sqr Value:	21.90	15.33

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 06/22/2023 **G5400CHISQR.RPT ver 1.0**

Collected By: SWR961 **Date:** 6/22/23
Changes Needed: Yes (No) (Circle One)
Approved By: _____ **Date:** 7/12/23

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2136

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	16100	dpm	805	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	7694.29	dpm	384.71	dpm

44-9 PROBE
CPM Acceptance Range

1693	**50**	
1354	**1304**	**Low**
2031	**2081**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

3511	**176**	
3160	**2984**	**Low**
3862	**4038**	**High**

Approval: _____ Date:_____

PDF created with pdfFactory trial version www.pdffactory.com

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2137

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	23800	dpm	1190	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11374.16	dpm	568.71	dpm

44-9 PROBE
CPM Acceptance Range

2502	**74**	
2002	**1928**	**Low**
3003	**3077**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5190	**260**	
4671	**4412**	**Low**
5709	**5969**	**High**

Approval: _____ Date:_____

PDF created with pdfFactory trial version www.pdffactory.com

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2139

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	20700	dpm	1040	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.41	years	30.41	years
dilution =	1.00		1.00	
A =	9907.77	dpm	497.78	dpm

44-9 PROBE
CPM Acceptance Range

2180	**65**	
1744	**1679**	**Low**
2616	**2680**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

4521	**227**	
4069	**3842**	**Low**
4973	**5200**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2138

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	25000	dpm	1250	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11947.65	dpm	597.38	dpm

44-9 PROBE

CPM	**Acceptance Range**	
2628	**78**	
2103	**2025**	**Low**
3154	**3232**	**High**

Gamma Products G5020-400
Efficienc 0.4563

CPM	**Acceptance Range**	
5452	**273**	
4907	**4634**	**Low**
5997	**6269**	**High**

Approval: _____ Date:_____

PDF created with pdfFactory trial version www.pdffactory.com

904/9320 Radiochemistry

Radiochemistry Raw Data

RADIUM-228
METHOD: **EPA 904/9320**
SDG# WG2148066

Lab ID	Result	Error	SDWA DL	MDA	UNITS	PREP DATE	ANALYSIS DATE	ANALYST
BLANK WG2148066	0.142	0.184	0.330	0.331	pCi/l	10/9/2023	10/13/2023	DDD3903
LCS WG2148066	4.549	0.242	0.323	0.325	pCi/l	10/9/2023	10/13/2023	DDD3903
MS L1658999-06 WG2148066	23.031	0.625	0.597	0.603	pCi/l	10/9/2023	10/13/2023	DDD3903
MSD L1658999-06 WG2148066	22.076	0.607	0.588	0.594	pCi/l	10/9/2023	10/13/2023	DDD3903
DUP L1658999-01 WG2148066	0.611	0.329	0.577	0.583	pCi/l	10/9/2023	10/13/2023	DDD3903
L1656526-01 WG2148066	5.529	0.751	1.171	1.184	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658469-01 WG2148066	0.268	0.326	0.584	0.589	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658721-01 WG2148066	-0.285	0.405	0.736	0.744	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658722-03 WG2148066	4.597	0.580	0.889	0.903	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658722-06 WG2148066	2.225	0.667	1.129	1.148	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658731-01 WG2148066	0.926	0.544	0.955	0.966	pCi/l	10/9/2023	10/23/2023	DDD3903
L1658999-01 WG2148066	0.390	0.193	0.339	0.341	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-02 WG2148066	0.856	0.210	0.352	0.355	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-03 WG2148066	0.036	0.214	0.390	0.394	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-04 WG2148066	2.020	0.230	0.345	0.348	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-05 WG2148066	1.646	0.224	0.343	0.346	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-06 WG2148066	10.351	0.487	0.600	0.606	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-07 WG2148066	15.032	0.949	1.329	1.343	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-08 WG2148066	2.837	0.323	0.498	0.503	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-09 WG2148066	1.829	0.307	0.502	0.507	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-10 WG2148066	4.582	0.420	0.628	0.634	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-11 WG2148066	0.750	0.265	0.455	0.460	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-12 WG2148066	-0.513	0.289	0.531	0.537	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-13 WG2148066	0.266	0.305	0.539	0.545	pCi/l	10/9/2023	10/13/2023	DDD3903
L1658999-14 WG2148066	2.929	0.308	0.476	0.481	pCi/l	10/9/2023	10/13/2023	DDD3903
0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/9/2023	1/0/1900	
0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/9/2023	1/0/1900	
0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/9/2023	1/0/1900	

RADIUM-228
METHOD: EPA 904/9320
SDG# WG2148066
ANALYST: DDD3903
PREP DATE: 10/9/23 21:46

Matrix: NPW/DW

LAB ID	sample date	sample size (L)	ingrowth start	decay start	t3 min	count date/end time	counts	UNIT/DET no.	UNIT	DET no.	back CPM	COUNTER EFF	SAMPLE DECAY DAYS	SAMPLE DECAY FACTOR	t1 min	Count Time t2 min	λt_2 $(1-e^{-\lambda t}2)$	1 $(1-e^{-\lambda t}3)$	1 $e^{-\lambda t}1$	Ba % rec	Y %rec	Ra228 pCi/l
BLANK WG2148066	**10/9/23 21:46**	1.000	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	364	3A-1	3	1	1.73	43.83	0.01	1.00	126	200	1.200	1.000	1.267	100.0%	99.3%	0.142
LCS WG2148066	**10/9/23 21:46**	1.000	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	942	3A-2	3	2	1.75	44.67	0.01	1.00	126	200	1.200	1.000	1.267	100.0%	100.0%	4.549
MS L1658999-06 WG2148066	9/20/2023 9:00	0.500	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	1724	3A-3	3	3	1.39	43.38	0.06	1.01	126	200	1.200	1.000	1.267	100.0%	100.0%	23.031
MSD L1658999-06 WG2148066	9/20/2023 9:00	0.500	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	1712	3A-4	3	4	1.43	44.63	0.06	1.01	126	200	1.200	1.000	1.267	100.0%	100.0%	22.076
DUP L1658999-01 WG2148066	9/21/2023 9:30	0.500	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	307	3B-1	3	5	1.34	44.09	0.06	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	0.611
L1656526-01 WG2148066	9/12/2023 11:00	0.300	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	362	3B-2	3	6	1.04	44.64	0.09	1.01	126	200	1.200	1.000	1.268	84.2%	85.6%	5.529
L1658469-01 WG2148066	9/21/2023 12:15	0.500	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	254	3B-3	3	7	1.19	43.44	0.06	1.01	126	200	1.200	1.000	1.268	94.8%	100.0%	0.268
L1658721-01 WG2148066	9/20/2023 13:19	0.500	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	371	3B-4	3	8	1.94	44.50	0.06	1.01	126	200	1.200	1.000	1.268	100.0%	92.6%	-0.285
L1658722-03 WG2148066	8/29/2023 15:06	0.300	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	384	3C-1	3	9	1.07	44.58	0.12	1.02	126	200	1.200	1.000	1.268	96.2%	100.0%	4.597
L1658722-06 WG2148066	8/29/2023 20:04	0.300	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	376	3C-2	3	10	1.50	45.60	0.12	1.02	126	200	1.200	1.000	1.268	86.9%	100.0%	2.225
L1658731-01 WG2148066	9/20/2023 11:00	0.300	10/13/2023 18:15	10/23/2023 14:22	14167	10/23/23 19:47	261	4D-1	4	13	1.14	45.67	0.09	1.01	126	200	1.200	1.000	1.268	100.0%	90.1%	0.926
L1658999-01 WG2148066	9/21/2023 9:30	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	213	3C-4	3	12	0.89	44.31	0.06	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	0.390
L1658999-02 WG2148066	9/20/2023 10:46	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:41	271	3D-1	3	13	0.97	44.38	0.06	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	0.856
L1658999-03 WG2148066	9/18/2023 9:45	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:41	211	3D-2	3	14	1.04	43.71	0.07	1.01	126	200	1.200	1.000	1.268	95.5%	99.0%	0.036
L1658999-04 WG2148066	9/19/2023 13:20	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:41	353	3D-3	3	15	0.88	44.00	0.07	1.01	126	200	1.200	1.000	1.268	100.0%	98.3%	2.020
L1658999-05 WG2148066	9/14/2023 0:00	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:41	290	3D-4	3	16	0.77	44.18	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	92.5%	1.646
L1658999-06 WG2148066	9/20/2023 9:00	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	920	4A-1	4	1	1.38	45.71	0.06	1.01	126	200	1.200	1.000	1.267	67.7%	99.2%	10.351
L1658999-07 WG2148066	9/20/2023 10:20	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	862	4A-2	4	2	1.87	45.09	0.06	1.01	126	200	1.200	1.000	1.267	36.1%	98.4%	15.032
L1658999-08 WG2148066	9/20/2023 11:22	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	505	4A-3	4	3	1.44	45.38	0.06	1.01	126	200	1.200	1.000	1.267	83.2%	100.0%	2.837
L1658999-09 WG2148066	9/20/2023 12:09	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	536	4A-4	4	4	1.89	46.08	0.06	1.01	126	200	1.200	1.000	1.267	92.5%	100.0%	1.829
L1658999-10 WG2148066	9/20/2023 12:09	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	598	4B-1	4	5	1.55	45.55	0.06	1.01	126	200	1.200	1.000	1.268	68.1%	100.0%	4.582
L1658999-11 WG2148066	9/20/2023 13:30	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	432	4B-2	4	6	1.81	46.05	0.06	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	0.750
L1658999-12 WG2148066	9/19/2023 16:50	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	433	4B-3	4	7	2.40	45.93	0.07	1.01	126	200	1.200	1.000	1.268	98.4%	100.0%	-0.513
L1658999-13 WG2148066	9/19/2023 16:03	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	502	4B-4	4	8	2.39	44.98	0.07	1.01	126	200	1.200	1.000	1.268	98.9%	100.0%	0.266
L1658999-14 WG2148066	9/19/2023 18:33	0.700	10/10/2023 21:10	10/13/2023 18:15	4145	10/13/23 23:40	650	4C-1	4	9	1.91	45.32	0.07	1.01	126	200	1.200	1.000	1.268	99.7%	100.0%	2.929
					0								0.00	1.00	0		#DIV/0!	#DIV/0!	1.000	0.0%	0.0%	#DIV/0!
					0								0.00	1.00	0		#DIV/0!	#DIV/0!	1.000	0.0%	0.0%	#DIV/0!
					0								0.00	1.00	0		#DIV/0!	#DIV/0!	1.000	0.0%	0.0%	#DIV/0!
					0								0.00	1.00	0		#DIV/0!	#DIV/0!	1.000	0.0%	0.0%	#DIV/0!

=Average Monthly backgrounds used

RADIUM 228 QC REPORT

METHOD: EPA 904/9320
SDG# WG2148066
ANALYST: DDD3903

QC SPIKE INFORMATION
VOLUME USED: **0.5**
QC ID: TH232-86778-WS1
ACTIVITY: 10.0 pCi/ml

Analyte **Ra228** units pCi/L
Matrix
Sample 658999-01 WG2148066

	RESULT	ERROR	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD	LIMITS	RER	LIMITS
BLANK WG2148066	0.142	0.184	0.331								
LCS WG2148066	4.549	0.242	0.325	5.0	**91.0%**	80%	120%				
L1658999-01 WG2148066	0.390	0.193	0.339								
DUP L1658999-01 WG2148066	0.611	0.329	0.577					**NC**	20%	**0.580**	2
L1658999-06 WG2148066	10.351	0.487	0.600								
MS L1658999-06 WG2148066	23.03	0.625	0.603	10.0	**126.8%**	70%	130%				
MSD L1658999-06 WG2148066	22.08	0.607	0.594	10.0	**117.2%**	70%	130%	**4.2%**	20%	**1.10**	2

*** - Outside Control Limits**

SAMPLES:

BLANK WG2148066	L1658999-01 WG21	L1658999-12 WG2148066
LCS WG2148066	L1658999-02 WG21	L1658999-13 WG2148066
MS L1658999-06 WG2148066	L1658999-03 WG21	L1658999-14 WG2148066
MSD L1658999-06 WG2148066	L1658999-04 WG2148066	
DUP L1658999-01 WG2148066	L1658999-05 WG2148066	
L1656526-01 WG2148066	L1658999-06 WG2148066	
L1658469-01 WG2148066	L1658999-07 WG2148066	
L1658721-01 WG2148066	L1658999-08 WG2148066	
L1658722-03 WG2148066	L1658999-09 WG2148066	
L1658722-06 WG2148066	L1658999-10 WG2148066	
L1658731-01 WG2148066	L1658999-11 WG2148066	

10/24/2023

DECAY CALCUALTION

Th-232 Source
ORL# 867-78

ACTIVITY FORMULA A = Ao(e^^-NT)

TH232-86778-WS1

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	15-Feb-02
DATE OF CALIBRATION	09-Oct-23

Ao =	100.40	nCi
N =	0.00	
T(1/2) =	1.41E+10	years
T =	21.66	years
dilution =	1000.00	
A =	100.40	nCi
A =	222.89	dpm/ml
A =	100.40	pCi/ml
Stock =	100	pCi/ml
Stock	100	ml
DI	1000	pCi/ml
WS1 =	10.0	pCi/ml

Pace Analytical

View as PDF (CreatePDF?batchnum=WG2148066)

RA-228 Aqueous Radiochemistry Prep Benchsheet

Batch: WG2148066

Analyst: AUU3926 Prep Start Date/Time: 10/09/23 21:46-21:51 Prep End Date/Time: 10/14/23 00:00 Method: 904 SOP: RAD_02-10 Pipet ID: E-12E-21E-24 Balance ID: RADBAL3
Stirrer ID: ST-2ST-19ST-23ST-27 Hotplate ID: G-72 Centrifuge ID: C-5C_6

LCS/MS Spike: 22F12858 Amt. Used: 0.50 mL Exp. Date:06/03/24 16 mg/mL Barium Carrier: 23H30280 Amt. Used: 2 mL Exp. Date:08/30/24 1M Citric Acid: 23I27493 Amt. Used: 5 mL Exp. Date:01/25/24
Methyl Orange: 23H21708 Amt. Used: 0.20 mL Exp. Date:08/21/24 15 mg/mL Lead Carrier: 23J09234 Amt. Used: 10 mL Exp. Date:10/09/24 10 mg/mL Strontium Carrier: 23H30278 Amt. Used: 2 mL Exp. Date:08/30/24
18 mg/mL Yttrium Carrier: 23F16848 Amt. Used: 1 mL Exp. Date:06/16/24 Ammonium Hydroxide: 23E11487 Amt. Used: 10 mL Exp. Date:10/17/24 1:1 H2SO4: 23I27497 Amt. Used: 10 mL Exp. Date:09/27/24
200 mg/mL Ammonium Sulfate: 23J09231 Amt. Used: 16 mL Exp. Date:10/09/24 Nitric Acid: 23J02144 Amt. Used: 34 mL Exp. Date:10/01/24 0.25N Basic EDTA: 23I14597 Amt. Used: 85 mL Exp. Date:09/14/24
0.9mg/mL each Sr/Y Carrier: 23F16786 Amt. Used: 2 mL Exp. Date:06/01/24 Acetic Acid: 22L30146 Amt. Used: 20 mL Exp. Date:10/26/24 1.5mg/mL Lead Carrier: 23I18091 Amt. Used: 2 mL Exp. Date:09/06/24
2% NH4 Sulfide: 23I11894 Amt. Used: 0.50 mL Exp. Date:09/11/24 9 mg/mL Yttrium Carrier: 23J10477 Amt. Used: 1 mL Exp. Date:10/01/24 18N NaOH: 23I27547 Amt. Used: 5 mL Exp. Date:09/27/24
6N Nitric Acid: 23H30196 Amt. Used: 2 mL Exp. Date:08/30/24 10N NaOH: 23E10276 Amt. Used: 4 mL Exp. Date:05/10/24 1N Nitric Acid: 23H30283 Amt. Used: 3.50 mL Exp. Date:08/30/24
5% Ammonium Oxalate: 23J04596 Amt. Used: 3.50 mL Exp. Date:10/04/24

Sample Number	Collect Date	Sample Vol. (L or filt)	Ac-228 Ingrowth Time	Ac-228 Decay Time	Y Planchet Tare (g)	Y Planchet Gross (g)	Y Planchet Net (g)	Ba Planchet Tare (g)	Ba Planchet Gross (g)	Ba Planchet Net (g)	Review Analyst	Review Date
BLANK		1.000	10/10/23 21:10:00	10/13/23 18:15:00	7.60083	7.63191	0.03108	7.60206	7.66448	0.06242	DDD3903	10/24/23 18:17:44
LCS		1.000	10/10/23 21:10:00	10/13/23 18:15:00	7.62217	7.65457	0.0324	7.62079	7.68746	0.06667	DDD3903	10/24/23 18:17:44
MS(L1658999-06)		0.500	10/10/23 21:10:00	10/13/23 18:15:00	7.60170	7.63448	0.03278	7.61405	7.67447	0.06042	DDD3903	10/24/23 18:17:44
MSD(L1658999-06)		0.500	10/10/23 21:10:00	10/13/23 18:15:00	7.57194	7.60618	0.03424	7.59804	7.65933	0.06129	DDD3903	10/24/23 18:17:44
DUP(L1658999-01)		0.500	10/10/23 21:10:00	10/13/23 18:15:00	7.62250	7.65607	0.03357	7.60971	7.68319	0.07348	DDD3903	10/24/23 18:17:44
1. L1656526-01	09/12/23 11:00	0.300	10/10/23 21:10:00	10/13/23 18:15:00	7.62046	7.64726	0.0268	7.60586	7.65252	0.04666	DDD3903	10/24/23 18:17:44
2. L1658469-01	09/21/23 12:15	0.500	10/10/23 21:10:00	10/13/23 18:15:00	7.60349	7.63544	0.03195	7.61309	7.66564	0.05255	DDD3903	10/24/23 18:17:44
3. L1658721-01	09/20/23 13:19	0.500	10/10/23 21:10:00	10/13/23 18:15:00	7.58326	7.61226	0.029	7.59104	7.66208	0.07104	DDD3903	10/24/23 18:17:44
4. L1658722-03	08/29/23 15:06	0.300	10/10/23 21:10:00	10/13/23 18:15:00	7.62666	7.66026	0.0336	7.58519	7.63854	0.05335	DDD3903	10/24/23 18:17:44
5. L1658722-06	08/29/23 20:04	0.300	10/10/23 21:10:00	10/13/23 18:15:00	7.59171	7.62617	0.03446	7.60713	7.65530	0.04817	DDD3903	10/24/23 18:17:44
6. L1658731-01	09/20/23 11:00	0.300	10/13/23 18:15:00	10/23/23 14:22:00	7.58869	7.61690	0.02821	7.57718	7.63570	0.05852	DDD3903	10/24/23 18:17:44
7. L1658999-01	09/21/23 09:30	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.58589	7.61878	0.03289	7.57397	7.63907	0.0651	DDD3903	10/24/23 18:17:44
8. L1658999-02	09/20/23 10:46	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.62784	7.66318	0.03534	7.61698	7.67923	0.06225	DDD3903	10/24/23 18:17:44
9. L1658999-03	09/18/23 09:45	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.60940	7.64039	0.03099	7.61145	7.66441	0.05296	DDD3903	10/24/23 18:17:44
10. L1658999-04	09/19/23 13:20	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.59739	7.62818	0.03079	7.61722	7.68586	0.06864	DDD3903	10/24/23 18:17:44
11. L1658999-05	09/14/23 00:00	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.62652	7.65549	0.02897	7.61313	7.68941	0.07628	DDD3903	10/24/23 18:17:44
12. L1658999-06	09/20/23 09:00	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.62400	7.65505	0.03105	7.60737	7.64491	0.03754	DDD3903	10/24/23 18:17:44
13. L1658999-07	09/20/23 10:20	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.61142	7.64222	0.0308	7.61354	7.63356	0.02002	DDD3903	10/24/23 18:17:44
14. L1658999-08	09/20/23 11:22	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.63116	7.66685	0.03569	7.60785	7.65396	0.04611	DDD3903	10/24/23 18:17:44
15. L1658999-09	09/20/23 12:09	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.60224	7.63639	0.03415	7.57330	7.62458	0.05128	DDD3903	10/24/23 18:17:44
16. L1658999-10	09/20/23 12:09	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.60520	7.63956	0.03436	7.59946	7.63721	0.03775	DDD3903	10/24/23 18:17:44
17. L1658999-11	09/20/23 13:30	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.61809	7.64943	0.03134	7.59901	7.65883	0.05982	DDD3903	10/24/23 18:17:44
18. L1658999-12	09/19/23 16:50	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.61862	7.65158	0.03296	7.60437	7.65891	0.05454	DDD3903	10/24/23 18:17:44
19. L1658999-13	09/19/23 16:03	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.59589	7.63087	0.03498	7.58000	7.63480	0.0548	DDD3903	10/24/23 18:17:44
20. L1658999-14	09/19/23 18:33	0.700	10/10/23 21:10:00	10/13/23 18:15:00	7.59437	7.62583	0.03146	7.59877	7.65403	0.05526	DDD3903	10/24/23 18:17:44

Comments:
Tubes: 920104 1mL tips: 2243 2mL tips: 2215 10mL tips: 2312 10mL manual: P7565750 Transfer Pips: 23090149 Q5:17608280

Reviewed By:DDD3903 on 10/24/23 18:17:44

Yttrium Recovery

9 mg/ml(Y)

Known $Y_2(C_2O_4)_3 \cdot 9H_2O$

Standardized Value	9.22	mg/ml	Y_2	177.8 g/mol
Volume Added	1.00	mL	$Y_2(C_2O_4)_3.9H_2O$	603.8 g/mol
Mass Added	31.31	mg		

LAB ID	TARE(g)	GROSS(g)	NET(g)	Y %rec
BLANK WG2148066	7.60083	7.63191	0.0311	**99%**
LCS WG2148066	7.62217	7.65457	0.0324	**103.5%**
MSL1658999-06 WG2148066	7.6017	7.63448	0.0328	**104.7%**
MSD L1658999-06 WG2148066	7.57194	7.60618	0.0342	**109.4%**
DUP L1658999-01 WG2148066	7.6225	7.65607	0.0336	**107%**
L1656526-01 WG2148066	7.62046	7.64726	0.0268	**85.6%**
L1658469-01 WG2148066	7.60349	7.63544	0.0320	**102.0%**
L1658721-01 WG2148066	7.58326	7.61226	0.0290	**92.6%**
L1658722-03 WG2148066	7.62666	7.66026	0.0336	**107.3%**
L1658722-06 WG2148066	7.59171	7.62617	0.0345	**110.1%**
L1658731-01 WG2148066	7.58869	7.6169	0.0282	**90.1%**
L1658999-01 WG2148066	7.58589	7.61878	0.0329	**105%**
L1658999-02 WG2148066	7.62784	7.66318	0.0353	**112.9%**
L1658999-03 WG2148066	7.6094	7.64039	0.0310	**99.0%**
L1658999-04 WG2148066	7.59739	7.62818	0.0308	**98.3%**
L1658999-05 WG2148066	7.62652	7.65549	0.0290	**92.5%**
L1658999-06 WG2148066	7.624	7.65505	0.0311	**99.2%**
L1658999-07 WG2148066	7.61142	7.64222	0.0308	**98.4%**
L1658999-08 WG2148066	7.63116	7.66685	0.0357	**114.0%**
L1658999-09 WG2148066	7.60224	7.63639	0.0341	**109.1%**
L1658999-10 WG2148066	7.6052	7.63956	0.0344	**109.7%**
L1658999-11 WG2148066	7.61809	7.64943	0.0313	**100.1%**
L1658999-12 WG2148066	7.61862	7.65158	0.0330	**105.3%**
L1658999-13 WG2148066	7.59589	7.63087	0.0350	**111.7%**
L1658999-14 WG2148066	7.59437	7.62583	0.0315	**100.5%**
0			0.0000	**0.0%**
0			0.0000	**0.0%**
0			0.0000	**0.0%**

23J10477 Standardization Date: 10/13/23

		Y2(C2O4)3.9H2O	Y g/mL	Y mg/mL
Tare (g)	Gross (g)	Net (g)		
7.59263	7.62544	0.03281	0.00966	9.6615
7.60033	7.63026	0.02993	0.00881	8.8134
7.58013	7.61132	0.03119	0.00918	9.1845

Avg. Y mg/mL

9.2198 ± 4.61%

Barium Recovery

16 mg/ml(Ba)

Known $BaSO_4$

Standardized Value	16.30	mg/ml	Ba	137	g/mol
volume added	2.00	ml			
	55.43	mg	$BaSO_4$	233	g/mol

23H02773 Standardization Date: 09/06/23				
T	G	N		
7.68681	7.74200	0.05519	0.02759	0.0162
7.68632	7.74218	0.05586	0.02793	0.0164
7.69373	7.74898	0.05525	0.02763	0.0162

16.30 +/- 0.7%

LAB ID	TARE(g)	GROSS(g)	NET(g)	%rec
BLANK WG2148066	7.60206	7.66448	0.0624	**113%**
LCS WG2148066	7.62079	7.68746	0.0667	**120%**
MS L1658999-06 WG2148066	7.61405	7.67447	0.0604	**109%**
MSD L1658999-06 WG2148066	7.59804	7.65933	0.0613	**111%**
DUP L1658999-01 WG2148066	7.60971	7.68319	0.0735	**133%**
L1656526-01 WG2148066	7.60586	7.65252	0.0467	**84%**
L1658469-01 WG2148066	7.61309	7.66564	0.0526	**95%**
L1658721-01 WG2148066	7.59104	7.66208	0.0710	**128%**
L1658722-03 WG2148066	7.58519	7.63854	0.0534	**96%**
L1658722-06 WG2148066	7.60713	7.6553	0.0482	**87%**
L1658731-01 WG2148066	7.57718	7.6357	0.0585	**106%**
L1658999-01 WG2148066	7.57397	7.63467	0.0607	**110%**
L1658999-02 WG2148066	7.61698	7.67923	0.0622	**112%**
L1658999-03 WG2148066	7.61145	7.66441	0.0530	**96%**
L1658999-04 WG2148066	7.61722	7.68586	0.0686	**124%**
L1658999-05 WG2148066	7.61313	7.68941	0.0763	**138%**
L1658999-06 WG2148066	7.60737	7.64491	0.0375	**68%**
L1658999-07 WG2148066	7.61354	7.63356	0.0200	**36%**
L1658999-08 WG2148066	7.60785	7.65396	0.0461	**83%**
L1658999-09 WG2148066	7.5733	7.62458	0.0513	**93%**
L1658999-10 WG2148066	7.59946	7.63721	0.0378	**68%**
L1658999-11 WG2148066	7.59901	7.65883	0.0598	**108%**
L1658999-12 WG2148066	7.60437	7.65891	0.0545	**98%**
L1658999-13 WG2148066	7.58	7.6348	0.0548	**99%**
L1658999-14 WG2148066	7.59877	7.65403	0.0553	**100%**
0			0.0000	**0%**
0			0.0000	**0%**
0			0.0000	**0%**

G542 Runlog RA-228 Waters WG2148066
Sample order verified by DDD3903

Sample ID	Beta	LT	Det	Analyst	Start	End
BLANK WG2148066	364	200	3A-1	DDD3903	10/13/2023 20:20	10/13/2023 23:40
LCS WG2148066	942	200	3A-2	DDD3903	10/13/2023 20:20	10/13/2023 23:40
MS L1658999-06 WG2148066	1724	200	3A-3	DDD3903	10/13/2023 20:20	10/13/2023 23:40
MSD L1658999-06 WG2148066	1712	200	3A-4	DDD3903	10/13/2023 20:20	10/13/2023 23:40
DUP L1658999-01 WG2148066	307	200	3B-1	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1656526-01 WG2148066	362	200	3B-2	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658469-01 WG2148066	254	200	3B-3	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658721-01 WG2148066	371	200	3B-4	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658722-03 WG2148066	384	200	3C-1	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658722-06 WG2148066	376	200	3C-2	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658731-01 WG2148066	282	200	3C-3	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-01 WG2148066	213	200	3C-4	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-02 WG2148066	271	200	3D-1	DDD3903	10/13/2023 20:21	10/13/2023 23:41
L1658999-03 WG2148066	211	200	3D-2	DDD3903	10/13/2023 20:21	10/13/2023 23:41
L1658999-04 WG2148066	353	200	3D-3	DDD3903	10/13/2023 20:21	10/13/2023 23:41
L1658999-05 WG2148066	290	200	3D-4	DDD3903	10/13/2023 20:21	10/13/2023 23:41
L1658999-06 WG2148066	920	200	4A-1	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-07 WG2148066	862	200	4A-2	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-08 WG2148066	505	200	4A-3	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-09 WG2148066	536	200	4A-4	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-10 WG2148066	598	200	4B-1	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-11 WG2148066	432	200	4B-2	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-12 WG2148066	433	200	4B-3	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-13 WG2148066	502	200	4B-4	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658999-14 WG2148066	650	200	4C-1	DDD3903	10/13/2023 20:20	10/13/2023 23:40
L1658731-01 WG2148066	261	200	4D-1	ALG3788	10/23/2023 16:27	10/23/2023 19:47

		DET1	DET2	DET3	DET 4	DET 5	DET 6	DET 7	DET 8
	R=	-1	-1	-1	-1	-1	-1	-1	-1
0.06-9.96	B=	-0.114436331	-0.101176383	-0.06638501	-0.146797424	-0.047650538	-0.19393206	-0.159844189	-0.143130686
	A=	43.06076851	45.10758593	43.58466775	45.85913075	37.72861987	37.8330449	43.89967549	44.51114155
	R=	-1	-1	-1	1	-1	1	-1	1
9.96-25.53	B=	-0.034483799	-0.013419403	-0.038523175	0.007211235	-0.012345851	0.019860716	-0.022067463	0.007129905
	A=	42.26444129	44.2335264	43.30716387	44.32520451	37.37698519	35.70366884	42.5274193	43.01454606
	R=	1	1	1	1	1	1	1	1
25.53-43.06	B=	0.090319548	0.094412943	0.102190392	0.090030602	0.105708304	0.071461038	0.077943049	0.087165226
	A=	39.07821184	41.48056662	39.7147465	42.21082605	34.36306262	34.38631262	39.97415094	40.97124431
	R=	-1	-1	-1	-1	-1	-1	-1	-1
43.06-52.25	B=	-0.100312194	-0.087497587	-0.097051129	-0.153637495	-0.149600205	-0.051382441	-0.040326972	-0.048732252
	A=	47.28681466	49.31363402	48.29408642	52.70317433	45.35664701	39.67595285	45.06685803	46.82298972
	R=	-1	-1	-1	-1	-1	-1	-1	-1
52.25-76.72	B=	-0.153522716	-0.167322511	-0.153695213	-0.153298469	-0.195306769	-0.125954176	-0.165908032	-0.162285585
	A=	50.06706441	53.48448628	51.25373981	52.68546023	47.74481499	43.57232599	51.6284684	52.7561514
	R=	1	1	1	1	1	-1	1	1
76.72-103.8	B=	0.03455681	0.040059089	0.019951609	0.04088521	0.023712799	-0.035972127	0.029007768	0.021120648
	A=	35.63760322	37.57416995	37.93155563	37.78768832	30.94163375	36.66890318	36.67452822	38.68522515
	R=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
na	B=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	A=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	R=	-0.78380753	-0.719774123	-0.758364498	-0.754798126	-0.756303896	-0.801950918	-0.783603833	-0.714725114
full	B=	-0.039008477	-0.035525476	-0.037084594	-0.039190514	-0.047974565	-0.039916216	-0.039973077	-0.034221936
	A=	43.00452719	45.26027373	43.88260445	45.81127638	38.51409964	37.66592545	43.89967549	44.51788157

y = 0.0006x2 - 0.1108x + 46.69(y = 0.0007x2 - 0.1255x + 48 y = 0.0005x2 - 0.1065x + 46 y = 0.0006x2 - 0.1109x + 4 y = 0.0005x2 - 0.1040x + 47 y = 0.0007x2 - 0.1282x + 47 y = 0.0005x2 - 0.1057x + 46 y = 0.0006x2 - 0.1131x + 47.273

A	0.0006	0.0005	0.0005	0.0006	0.0005	0.0007	0.0005	0.0006
B	-0.1108	-0.1255	-0.1065	-0.1109	-0.104	-0.1282	-0.1057	-0.1131
C	46.696	48.209	46.332	47.722	47.015	47.574	46.302	47.273

SAMPLE ID	NET WT. mg	3A-1 BETA EFF	3A-2 BETA EFF	3A-3 BETA EFF	3A-4 BETA EFF	3B-1 BETA EFF	3B-2 BETA EFF	3B-3 BETA EFF	3B-4 BETA EFF
BLANK WG2148066	31.08	43.8	44.8	43.5	44.9	44.3	44.3	43.5	44.3
LCS WG2148066	32.4	43.7	44.7	43.4	44.8	44.2	44.2	43.4	44.2
MS L1658999-06 WG2148066	32.78	43.7	44.6	43.4	44.7	44.1	44.1	43.4	44.2
MSD L1658999-06 WG2148066	34.24	43.6	44.5	43.3	44.6	44.0	44.0	43.3	44.1
DUP L1658999-01 WG2148066	33.57	43.7	44.6	43.3	44.7	44.1	44.1	43.3	44.2
L1656526-01 WG2148066	26.8	44.2	45.2	43.8	45.2	44.6	44.6	43.8	44.7
L1658469-01 WG2148066	31.95	43.8	44.7	43.4	44.8	44.2	44.2	43.4	44.3
L1658721-01 WG2148066	29	44.0	45.0	43.7	45.0	44.4	44.4	43.7	44.5
L1658722-03 WG2148066	33.6	43.7	44.6	43.3	44.7	44.1	44.1	43.3	44.2
L1658722-06 WG2148066	34.46	43.6	44.5	43.3	44.6	44.0	44.0	43.3	44.1
L1658731-01 WG2148066	28.21	44.0	45.1	43.7	45.1	44.5	44.5	43.7	44.6
L1658999-01 WG2148066	32.89	43.7	44.6	43.4	44.7	44.1	44.1	43.4	44.2
L1658999-02 WG2148066	35.34	43.5	44.4	43.2	44.6	44.0	43.9	43.2	44.0
L1658999-03 WG2148066	30.99	43.8	44.8	43.5	44.9	44.3	44.3	43.5	44.3
L1658999-04 WG2148066	30.79	43.9	44.8	43.5	44.9	44.3	44.3	43.5	44.4
L1658999-05 WG2148066	28.97	44.0	45.0	43.7	45.0	44.4	44.4	43.7	44.5
L1658999-06 WG2148066	31.05	43.8	44.8	43.5	44.9	44.3	44.3	43.5	44.3
L1658999-07 WG2148066	30.8	43.9	44.8	43.5	44.9	44.3	44.3	43.5	44.4
L1658999-08 WG2148066	35.69	43.5	44.4	43.2	44.5	43.9	43.9	43.2	44.0
L1658999-09 WG2148066	34.15	43.6	44.5	43.3	44.6	44.0	44.0	43.3	44.1
L1658999-10 WG2148066	34.36	43.6	44.5	43.3	44.6	44.0	44.0	43.3	44.1
L1658999-11 WG2148066	31.34	43.8	44.8	43.5	44.8	44.2	44.2	43.5	44.3
L1658999-12 WG2148066	32.96	43.7	44.6	43.4	44.7	44.1	44.1	43.4	44.2
L1658999-13 WG2148066	34.98	43.6	44.4	43.2	44.6	44.0	43.9	43.2	44.1
L1658999-14 WG2148066	31.46	43.8	44.8	43.5	44.8	44.2	44.2	43.5	44.3
0									
0									
0									

		DET9	DET10	DET11	DET 12	DET 13	DET 14	DET 15	DET 16
	R=	-1	-1	-1	-1	-1	-1	-1	-1
0.06-9.96	B=	-0.079815503	-0.148971885	-0.136564667	-0.158394549	-0.163510927	-0.146882697	-0.167433484	-0.12100235
	A=	41.56107613	42.4621906	42.70246597	38.4616585	42.99913149	42.71321548	42.81912963	41.78050737
	R=	-1	-1	-1	-1	-1	-1	-1	-1
9.96-25.53	B=	-0.045897069	-0.021525265	-0.043186079	-0.022338562	-0.027164125	-0.035351316	-0.043186079	-0.051644369
	A=	41.22324852	41.19282226	41.77241522	37.10654087	41.64111734	41.60236292	41.58162547	41.08970188
	R=	1	1	1	1	1	1	1	1
25.53-43.06	B=	0.095737276	0.11817871	0.120249486	0.090993754	0.077798576	0.090825203	0.089934287	0.076618715
	A=	37.60732369	37.62617979	37.59990525	34.21316685	38.96141959	38.3810764	38.18306253	37.81514533
	R=	-1	-1	-1	-1	-1	-1	1	-1
43.06-52.25	B=	-0.056356713	-0.046573519	-0.045517117	-0.061822442	-0.070549235	-0.050753193	0.010931457	-0.041015929
	A=	44.15649088	44.72041076	44.7378152	41.79343225	45.34927636	44.47744213	41.5849244	42.88049313
	R=	-1	-1	-1	-1	-1	-1	-1	-1
52.25-76.72	B=	-0.168115999	-0.172980426	-0.17946633	-0.143224619	-0.149934769	-0.157214161	-0.181381051	-0.170358465
	A=	49.99591354	51.32517169	51.73666155	45.046696	49.4971705	50.04002768	51.63325297	49.63864065
	R=	1	1	1	1	1	1	1	1
76.72-103.8	B=	0.035040013	0.027324351	0.02205588	0.016927693	0.016460077	0.031252324	0.02560976	0.0267788
	A=	34.40978434	35.95778913	36.27587763	32.75981063	36.73135789	35.58087893	35.75291791	34.51426967
	R=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
na	B=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	A=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	R=	-0.746899575	-0.678490183	-0.725010271	-0.769086808	-0.823877171	-0.764360142	-0.760439437	-0.821642963
full	B=	-0.036712733	-0.033803466	-0.038671018	-0.035737697	-0.042438665	-0.036897915	-0.040225217	-0.044359558
	A=	41.69887474	42.3501083	42.63121239	38.1814887	42.70437803	42.43782966	42.47223206	41.66383969

	y = 0.0001x2 - 0.0928x + 47.58	y = 0.0003x2 - 0.0468x + 46	y = 0.0006x2 - 0.1179x + 4	y = 0.0007x2 - 0.1244x + 47	y = 0.0006x2 - 0.115x + 47.!	y = 0.0005x2 - 0.0937x + 4(	y = 0.0005x2 - 0.0971x + 46	y = 0.0006x2 - 0.1126x + 46.939
A	0.0001	0.0003	0.0006	0.0007	0.0006	0.0005	0.0005	0.0006
B	-0.0928	-0.0468	-0.1179	-0.1244	-0.1115	-0.0937	-0.0971	-0.1126
C	47.582	46.861	47.891	47.649	47.576	46.135	46.514	46.939

SAMPLE ID	NET WT. mg	3C-1 BETA	3C-1 EFF	3C-2 BETA	3C-2 EFF	3C-3 BETA	3C-3 EFF	3C-4 BETA	3C-4 EFF	3D-1 BETA	3D-1 EFF	3D-2 BETA	3D-2 EFF	3D-3 BETA	3D-3 EFF	3D-4 BETA	3D-4 EFF
BLANK WG2148066	31.08	44.8		45.7		44.8		44.5		44.7		43.7		44.0		44.0	
LCS WG2148066	32.4	44.7		45.7		44.7		44.4		44.6		43.6		43.9		43.9	
MS L1658999-06 WG2148066	32.78	44.6		45.6		44.7		44.3		44.6		43.6		43.9		43.9	
MSD L1658999-06 WG2148066	34.24	44.5		45.6		44.6		44.2		44.5		43.5		43.8		43.8	
DUP L1658999-01 WG2148066	33.57	44.6		45.6		44.6		44.3		44.5		43.6		43.8		43.8	
L1656526-01 WG2148066	26.8	45.2		45.8		45.2		44.8		45.0		44.0		44.3		44.4	
L1658469-01 WG2148066	31.95	44.7		45.7		44.7		44.4		44.6		43.7		43.9		44.0	
L1658721-01 WG2148066	29	45.0		45.8		45.0		44.6		44.8		43.8		44.1		44.2	
L1658722-03 WG2148066	33.6	44.6		45.6		44.6		44.3		44.5		43.6		43.8		43.8	
L1658722-06 WG2148066	34.46	44.5		45.6		44.5		44.2		44.4		43.5		43.8		43.8	
L1658731-01 WG2148066	28.21	45.0		45.8		45.0		44.7		44.9		43.9		44.2		44.2	
L1658999-01 WG2148066	32.89	44.6		45.6		44.7		44.3		44.6		43.6		43.9		43.9	
L1658999-02 WG2148066	35.34	44.4		45.6		44.5		44.1		44.4		43.4		43.7		43.7	
L1658999-03 WG2148066	30.99	44.8		45.7		44.8		44.5		44.7		43.7		44.0		44.0	
L1658999-04 WG2148066	30.79	44.8		45.7		44.8		44.5		44.7		43.7		44.0		44.0	
L1658999-05 WG2148066	28.97	45.0		45.8		45.0		44.6		44.8		43.8		44.1		44.2	
L1658999-06 WG2148066	31.05	44.8		45.7		44.8		44.5		44.7		43.7		44.0		44.0	
L1658999-07 WG2148066	30.8	44.8		45.7		44.8		44.5		44.7		43.7		44.0		44.0	
L1658999-08 WG2148066	35.69	44.4		45.6		44.4		44.1		44.4		43.4		43.7		43.7	
L1658999-09 WG2148066	34.15	44.5		45.6		44.6		44.2		44.5		43.5		43.8		43.8	
L1658999-10 WG2148066	34.36	44.5		45.6		44.5		44.2		44.5		43.5		43.8		43.8	
L1658999-11 WG2148066	31.34	44.8		45.7		44.8		44.4		44.7		43.7		44.0		44.0	
L1658999-12 WG2148066	32.96	44.6		45.6		44.7		44.3		44.6		43.6		43.9		43.9	
L1658999-13 WG2148066	34.98	44.5		45.6		44.5		44.2		44.4		43.5		43.7		43.7	
L1658999-14 WG2148066	31.46	44.8		45.7		44.8		44.4		44.7		43.7		44.0		44.0	
0 0		47.6		46.9		47.9		47.6		47.6		46.1		46.5		46.9	

		DET1	DET2	DET3	DET 4	DET 5	DET 6	DET 7	DET 8
	R=	-1	-1	-1	-1	-1	-1	-1	-1
0-9.33	B=	-0.30128	-0.202656887	-0.197764281	-0.221025618	-0.157250071	-0.193215016	-0.061715503	-0.184631497
	A=	98.27777	96.76738121	95.74790892	99.32366995	98.15203761	99.22516634	97.86934027	96.92915136
	R=	-1	-1	-1	-1	-1	-1	-1	-1
9.33-20	B=	-0.06567	-0.103426499	-0.074229904	-0.162420133	-0.171126572	-0.170976461	-0.116411103	-0.098698001
	A=	96.07955	95.84156169	94.59533317	98.77688077	98.28150537	99.01768063	98.37965021	96.12739185
	R=	-1	-1	-1	-1	-1	-1	-1	-1
20-29.94	B=	-0.79271	-0.871983562	-0.830732931	-0.943849897	-0.852244491	-0.843784888	-0.886566305	-0.922660607
	A=	110.6202	111.212703	109.7253937	114.4054761	111.9038637	112.4738492	113.7827543	112.606644
	R=	-1	-1	-1	1	-1	-1	-1	1
29.94-40.62	B=	-0.08796	-0.0695863	-0.071760872	0.005848849	-0.053014563	-0.083008658	-0.087432787	0.027444597
	A=	89.52004	87.18892894	87.00177029	85.97149562	87.9749197	89.69620883	89.85669673	84.16049415
	R=	1	1	1	1	1	1	1	1
40.62-54.51	B=	0.219439	0.299061857	0.28332176	0.288164867	0.289433299	0.299811386	0.295948432	0.25801076
	A=	77.03359	72.21444077	72.57831378	74.50381896	74.06468753	74.14605865	74.28375164	74.79489661
	R=	-1	-1	-1	-1	-1	-1	-1	-1
54.51-65.39	B=	-0.36126	-0.479106872	-0.45430137	-0.486025914	-0.41897009	-0.491914461	-0.500379247	-0.449148891
	A=	108.6876	114.6324182	112.7861506	116.7049584	112.6797563	117.3030346	117.6915734	113.3421692
	R=	1	1	1	1	1	1	1	1
65.39-76.46	B=	0.356509	0.204732052	0.114809105	0.221588083	0.179918238	0.219924183	0.240252701	0.191059134
	A=	61.75257	69.91619099	75.57201664	70.43407916	73.51844854	70.75590565	69.26165032	71.47896644
	R=	-1	1	1	1	1	1	1	1
76.46-86.61	B=	-0.3818	0.040633872	0.263922918	0.153540807	0.197172906	0.168531944	0.078348418	0.225892769
	A=	118.2037	82.46313779	64.17077449	75.6369739	72.19915658	74.68535623	81.64085181	68.81558666
	R=	-1	-1	-1	-1	-1	-1	-1	-1
86.61-97.4	B=	-0.24515	-0.410960521	-0.010762015	-0.496388651	-0.641044973	-0.546413464	-0.445547409	-0.61825919
	A=	106.3685	121.5757282	87.96123649	131.9273642	144.7972071	136.6067781	127.0154694	141.9275879
	R=	1	1	1	-1	1	1	1	1
97.4-109.7	B=	0.574849	0.536303929	0.049092286	-0.025457671	0.615411526	0.563194001	0.531160307	0.520612628
	A=	26.50052	29.31217077	82.13142757	86.05868677	22.41834414	28.53101092	31.88413778	31.0014728

		y = 0.0011x2 - 0.168x +	y = 0.0012x2 - 0.1750x +	y = 0.0012x2 - 0.1708x +	y = 0.0008x2 - 0.1447x +	y = 0.0012x2 - 0.1706x +	y = 0.0012x2 - 0.1813x +	y = 0.0011x2 - 0.1701x +	y = 0.0011x2 - 0.1627x + 48.566
	A	0.0011	0.0012	0.0013	0.0008	0.0012	0.0012	0.0012	0.0011
	B	-0.1718	-0.1781	-0.1738	-0.1473	-0.1736	-0.1844	-0.1731	-0.1655
	C	49.988	49.44	49.928	50.176	50.102	50.653	50.33	49.422
SAMPLE ID	NET WT. mg	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF
BLANK WG2148066	31.08	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.3
LCS WG2148066	32.4	45.6	44.9	45.7	46.2	45.7	45.9	46.0	45.2
MS L1658999-06 WG2148066	32.78	45.5	44.9	45.6	46.2	45.7	45.9	45.9	45.2
MSD L1658999-06 WG2148066	34.24	45.4	44.7	45.5	46.1	45.6	45.7	45.8	45.0
DUP L1658999-01 WG2148066	33.57	45.5	44.8	45.6	46.1	45.6	45.8	45.9	45.1
L1656526-01 WG2148066	26.8	46.2	45.5	46.2	46.8	46.3	46.6	46.6	45.8
L1658469-01 WG2148066	31.95	45.6	45.0	45.7	46.3	45.8	46.0	46.0	45.3
L1658721-01 WG2148066	29	45.9	45.3	46.0	46.6	46.1	46.3	46.3	45.5
L1658722-03 WG2148066	33.6	45.5	44.8	45.6	46.1	45.6	45.8	45.9	45.1
L1658722-06 WG2148066	34.46	45.4	44.7	45.5	46.1	45.5	45.7	45.8	45.0
L1658731-01 WG2148066	28.21	46.0	45.4	46.1	46.7	46.2	46.4	46.4	45.6
L1658999-01 WG2148066	32.89	45.5	44.9	45.6	46.2	45.7	45.9	45.9	45.2
L1658999-02 WG2148066	35.34	45.3	44.6	45.4	46.0	45.5	45.6	45.7	44.9
L1658999-03 WG2148066	30.99	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.3
L1658999-04 WG2148066	30.79	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.4
L1658999-05 WG2148066	28.97	45.9	45.3	46.0	46.6	46.1	46.3	46.3	45.6
L1658999-06 WG2148066	31.05	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.3
L1658999-07 WG2148066	30.8	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.4
L1658999-08 WG2148066	35.69	45.3	44.6	45.4	45.9	45.4	45.6	45.7	44.9
L1658999-09 WG2148066	34.15	45.4	44.8	45.5	46.1	45.6	45.8	45.8	45.1
L1658999-10 WG2148066	34.36	45.4	44.7	45.5	46.1	45.6	45.7	45.8	45.0
L1658999-11 WG2148066	31.34	45.7	45.0	45.8	46.3	45.8	46.1	46.1	45.3
L1658999-12 WG2148066	32.96	45.5	44.9	45.6	46.2	45.7	45.9	45.9	45.2
L1658999-13 WG2148066	34.98	45.3	44.7	45.4	46.0	45.5	45.7	45.7	45.0
L1658999-14 WG2148066	31.46	45.7	45.0	45.7	46.3	45.8	46.0	46.1	45.3
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4

		DET9	DET10	DET11	DET 12	DET 13	DET 14	DET 15	DET 16
	R=	-1	-1	-1	1	-1	-1	-1	-1
0-9.33	B=	-0.56325	-0.090813633	-0.059655458	0.02017127	-0.039140847	-0.018282896	-0.046179333	-0.000515011
	A=	46.72034	47.82390181	47.04548306	46.65066779	47.95924417	48.77690419	48.52063465	47.63089881
	R=	1	1	-1	-1	-1	-1	-1	-1
9.33-20	B=	0.046685	0.024993486	-0.001951443	-0.023267209	-0.098247668	-0.067549963	-0.119863656	-0.068075351
	A=	41.02965	46.74342139	46.5071046	47.0559488	48.51071081	49.23656593	49.20810938	48.26123678
	R=	1	-1	-1	-1	-1	-1	-1	-1
20-29.94	B=	0.062279	-0.43482355	-0.385838426	-0.369886033	-0.358928834	-0.469387068	-0.343620982	-0.416292993
	A=	40.71776	55.93976213	54.18484425	53.98832527	53.72433412	57.27330803	53.68325591	55.22558962
	R=	1	-1	-1	-1	-1	1	-1	-1
29.94-40.62	B=	0.119077	-0.084583348	-0.027369612	-0.074685297	-0.03321846	0.006973627	-0.011472741	-0.005248967
	A=	39.01724	45.45357046	43.45228796	45.15001523	43.97256553	43.01106882	43.73873757	42.91893146
	R=	1	1	1	1	1	1	1	1
40.62-54.51	B=	0.038572	0.17146905	0.0974387	0.104242113	0.116292224	0.154287552	0.113870671	0.133127787
	A=	42.28734	35.05272205	38.38257432	37.88198386	37.89944154	37.02717721	38.64728817	37.29806775
	R=	-1	-1	1	1	1	-1	1	-1
54.51-65.39	B=	-0.1799	-0.05019986	0.001987384	0.026572066	0.039085228	-0.04158786	0.026645673	-0.000588855
	A=	54.19597	47.13589433	43.58562556	42.11577808	42.10799489	47.70434592	43.40192278	44.58696186
	R=	1	-1	-1	-1	-1	-1	-1	-1
65.39-76.46	B=	0.063662	-0.139622919	-0.195689117	-0.216379352	-0.27743725	-0.173913729	-0.187876021	-0.22817134
	A=	38.26976	52.98326816	56.51169196	58.00237135	62.80539975	56.35713445	57.42949634	59.46858055
	R=	1	1	1	1	1	1	1	1
76.46-86.61	B=	0.069117	0.123242929	0.158511552	0.117483176	0.142573606	0.068012423	0.071010651	0.092392746
	A=	37.85268	32.88454544	29.42950883	32.47524242	30.69136967	37.85946088	37.63502147	34.95825054
	R=	-1	1	1	1	1	1	1	1
86.61-97.4	B=	-0.06531	0.022043575	0.011504223	0.055591373	0.062790789	0.061454815	0.044829358	0.083349948
	A=	49.49578	41.6494215	42.16181364	37.83569154	37.60135943	38.42741531	39.90258323	35.74144727
	R=	1	-1	-1	-1	-1	-1	-1	-1
97.4-109.7	B=	0.250996	-0.230291004	-0.213232411	-0.183933301	-0.219092233	-0.256985748	-0.212841756	-0.236020607
	A=	18.68719	66.22680945	64.05116173	61.16539473	65.05676578	69.44352617	64.99974971	66.8481394

y = 0.0011x2 - 0.171x + y = 0.0011x2 - 0.1655x + y = 0.0012x2 - 0.1704x + y = 0.0011x2 - 0.1600x + y = 0.0011x2 - 0.1617x + y = 0.0009x2 - 0.1458x + y = 0.0010x2 - 0.1544x + y = 0.0011x2 - 0.1663x + 48.087

A	0.0012	0.0011	0.0012	0.001	0.0011	0.001	0.001	0.0011
B	-0.1741	-0.1684	-0.1734	-0.1628	-0.1645	-0.1484	-0.1572	-0.1693
C	49.608	48.701	49.179	48.958	49.436	49.967	49.054	48.936

SAMPLE ID	WT. mg	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF
BLANK WG2148066	31.08	45.4	44.5	44.9	44.9	45.4	46.3	45.1	44.7
LCS WG2148066	32.4	45.2	44.4	44.8	44.7	45.3	46.2	45.0	44.6
MS L1658999-06 WG2148066	32.78	45.2	44.4	44.8	44.7	45.2	46.2	45.0	44.6
MSD L1658999-06 WG2148066	34.24	45.1	44.2	44.6	44.6	45.1	46.1	44.8	44.4
DUP L1658999-01 WG2148066	33.57	45.1	44.3	44.7	44.6	45.2	46.1	44.9	44.5
L1656526-01 WG2148066	26.8	45.8	45.0	45.4	45.3	45.8	46.7	45.6	45.2
L1658469-01 WG2148066	31.95	45.3	44.4	44.9	44.8	45.3	46.2	45.1	44.6
L1658721-01 WG2148066	29	45.6	44.7	45.2	45.1	45.6	46.5	45.3	45.0
L1658722-03 WG2148066	33.6	45.1	44.3	44.7	44.6	45.2	46.1	44.9	44.5
L1658722-06 WG2148066	34.46	45.0	44.2	44.6	44.5	45.1	46.0	44.8	44.4
L1658731-01 WG2148066	28.21	45.7	44.8	45.2	45.2	45.7	46.6	45.4	45.0
L1658999-01 WG2148066	32.89	45.2	44.4	44.8	44.7	45.2	46.2	45.0	44.6
L1658999-02 WG2148066	35.34	45.0	44.1	44.5	44.5	45.0	46.0	44.7	44.3
L1658999-03 WG2148066	30.99	45.4	44.5	45.0	44.9	45.4	46.3	45.1	44.7
L1658999-04 WG2148066	30.79	45.4	44.6	45.0	44.9	45.4	46.3	45.2	44.8
L1658999-05 WG2148066	28.97	45.6	44.7	45.2	45.1	45.6	46.5	45.3	45.0
L1658999-06 WG2148066	31.05	45.4	44.5	45.0	44.9	45.4	46.3	45.1	44.7
L1658999-07 WG2148066	30.8	45.4	44.6	45.0	44.9	45.4	46.3	45.2	44.8
L1658999-08 WG2148066	35.69	44.9	44.1	44.5	44.4	45.0	45.9	44.7	44.3
L1658999-09 WG2148066	34.15	45.1	44.2	44.7	44.6	45.1	46.1	44.9	44.4
L1658999-10 WG2148066	34.36	45.0	44.2	44.6	44.5	45.1	46.0	44.8	44.4
L1658999-11 WG2148066	31.34	45.3	44.5	44.9	44.8	45.4	46.3	45.1	44.7
L1658999-12 WG2148066	32.96	45.2	44.3	44.8	44.7	45.2	46.2	45.0	44.6
L1658999-13 WG2148066	34.98	45.0	44.2	44.6	44.5	45.0	46.0	44.8	44.4
L1658999-14 WG2148066	31.46	45.3	44.5	44.9	44.8	45.3	46.3	45.1	44.7
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9

GAS COUNTER G542 Unit: 3 MONTH: October-23
Beta Source Check
23F05880

BETA Activity: **8135.54** **dpm** Count Time: **5** **min**

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4		
DATE	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	AVG
1																																	41.2%
2	18243	44.8%	17032	41.9%	17120	42.1%	14990	36.9%	16827	41.4%	18450	45.4%	16860	41.4%	18593	45.7%	18772	46.1%	17178	42.2%	18699	46.0%	17918	44.0%	18988	46.7%	18282	44.9%	16150	39.7%	16135	39.7%	41.2%
3	16402	40.3%	17809	43.8%	14597	35.9%	18367	45.2%	18287	45.0%	17329	42.6%	18092	44.5%	16915	41.6%	17517	43.1%	18509	45.5%	18293	45.0%	18215	44.8%	18654	45.9%	16475	40.5%	16084	39.5%	18490	45.5%	41.2%
4	15884	39.0%	17173	42.2%	16143	39.7%	15305	37.6%	18347	45.1%	18106	44.5%	16789	41.3%	18822	46.3%	18854	46.3%	17335	42.6%	17688	43.5%	18199	44.7%	18551	45.6%	18152	44.6%	17860	43.9%	16337	40.2%	41.2%
5	16936	41.6%	18719	46.0%	18346	45.1%	18617	45.8%	16380	40.3%	18678	45.9%	17952	44.1%	17453	42.9%	18921	46.5%	17487	43.0%	16960	41.7%	16159	39.7%	18853	46.3%	18309	45.0%	14940	36.7%	16799	41.3%	41.2%
6	17971	44.2%	15049	37.0%	16701	41.1%	19165	47.1%	18514	45.5%	18724	46.0%	15848	39.0%	17946	44.1%	16651	40.9%	18674	45.9%	18444	45.3%	16888	41.5%	17221	42.3%	16524	40.6%	18007	44.3%	18248	44.9%	41.2%
7																																	41.2%
8																																	41.2%
9	16370	40.2%	18775	46.2%	18250	44.9%	18008	44.3%	16824	41.4%	17418	42.8%	14565	35.8%	18681	45.9%	18692	46.0%	16949	41.7%	16581	40.8%	18574	45.7%	16636	40.9%	18054	44.4%	18747	46.1%	18801	46.2%	41.2%
10	15981	39.3%	18796	46.2%	18332	45.1%	19133	47.0%	18112	44.5%	14851	36.5%	16607	40.8%	18650	45.8%	18433	45.3%	17119	42.1%	19160	47.1%	16548	40.7%	18729	46.0%	16751	41.2%	17196	42.3%	17997	44.2%	41.2%
11	18251	44.9%	17387	42.7%	16346	40.2%	16472	40.5%	18519	45.5%	18481	45.4%	17866	43.9%	18783	46.2%	18679	45.9%	16812	41.3%	18638	45.8%	17104	42.0%	18536	45.6%	17516	43.1%	16634	40.9%	14977	36.8%	41.2%
12	16754	41.2%	17966	44.2%	18371	45.2%	18533	45.6%	18712	46.0%	18187	44.7%	18345	45.1%	18596	45.7%	18842	46.3%	16852	41.4%	15185	37.3%	16083	39.5%	18894	46.4%	16408	40.3%	16494	40.5%	16902	41.6%	41.2%
13	16699	41.1%	17444	42.9%	15621	38.4%	18601	45.7%	18677	45.9%	17482	43.0%	18308	45.0%	16594	40.8%	16628	40.9%	18383	45.2%	18797	46.2%	18287	45.0%	15321	37.7%	18333	45.1%	18072	44.4%	17777	43.7%	41.2%
14																																	41.2%
15																																	41.2%
16	17514	43.1%	19111	47.0%	14483	35.6%	19044	46.8%	17182	42.2%	17115	42.1%	15887	39.1%	18871	46.4%	17151	42.2%	18600	45.7%	16645	40.9%	16276	40.0%	18574	45.7%	18038	44.3%	18330	45.1%	18370	45.2%	41.2%
17	15778	38.8%	18640	45.8%	17606	43.3%	18888	46.4%	18702	46.0%	17622	43.3%	18847	46.3%	16461	40.5%	18389	45.2%	17234	42.4%	15127	37.2%	18600	45.7%	17477	43.0%	16469	40.5%	17909	44.0%	16098	39.6%	41.2%
18	18038	44.3%	18640	45.8%	18153	44.6%	17449	42.9%	16561	40.7%	16182	39.8%	16219	39.9%	16724	41.1%	18583	45.7%	18757	46.1%	18742	46.1%	17236	42.4%	18472	45.4%	18235	44.8%	16639	40.9%	15038	37.0%	41.2%
19	15711	38.6%	17276	42.5%	14587	35.9%	18260	44.9%	17980	44.2%	18254	44.9%	18738	46.1%	18281	44.9%	15164	37.3%	18151	44.6%	16417	40.4%	17963	44.2%	18711	46.0%	15967	39.3%	18480	45.4%	16001	39.3%	41.2%
20	17299	42.5%	18644	45.8%	15936	39.2%	17372	42.7%	18399	45.2%	16502	40.6%	16279	40.0%	16318	40.1%	18548	45.6%	14982	36.8%	18651	45.9%	16717	41.1%	17094	42.0%	18038	44.3%	18442	45.3%	17848	43.9%	41.2%
21																																	41.2%
22																																	41.2%
23	15770	38.8%	18827	46.3%	15371	37.8%	16329	40.1%	17865	43.9%	18560	45.6%	14850	36.5%	16401	40.3%	18856	46.4%	18965	46.6%	18148	44.6%	16937	41.6%	16487	40.5%	18236	44.8%	16020	39.4%	18126	44.6%	41.2%
24	15241	37.5%	18728	46.0%	15734	38.7%	14483	35.6%	16281	40.0%	18382	45.2%	16440	40.4%	18215	44.8%	17910	44.0%	18284	44.9%	18512	45.5%	16959	41.7%	18844	46.3%	16810	41.3%	18663	45.9%	16005	39.3%	41.2%
25																																	41.2%
26																																	
27																																	
28																																	
29																																	#VALUE!
30																																	
31																																	#VALUE!
average	**16755**	**41.2%**	**18001**	**44.3%**	**16570**	**40.7%**	**17589.2**	**43.2%**	**17774.6**	**43.7%**	**17666.1**	**43.4%**	**16970.1**	**41.7%**	**17783**	**43.7%**	**18035**	**44.3%**	**17663**	**43.4%**	**17687**	**43.5%**	**17333**	**42.6%**	**18002**	**44.3%**	**17447**	**42.9%**	**17333**	**42.6%**	**17056**	**41.9%**	
std dev	982	2.41%	1031	0.03	1416	0.03	1529	0.04	887	0.02	1047	0.03	1313	0.03	994	0.02	1067	2.62%	1018	0.03	1286	0.03	864	0.02	1085	2.67%	864	0.02	1146	0.028	1235	0.030	
UCL	**19701**	**48.4%**	**21094**	**51.9%**	**20818**	**51.2%**	**22176**	**54.5%**	**20437**	**50.2%**	**20807**	**51.2%**	**20908**	**51.4%**	**20764**	**51.0%**	**21236**	**52.2%**	**20717**	**50.9%**	**21546**	**53.0%**	**19924**	**49.0%**	**21259**	**52.3%**	**20040**	**49.3%**	**20772**	**51.1%**	**20761**	**51.0%**	
UWL	**18719**	**46.0%**	**20063**	**49.3%**	**19402**	**47.7%**	**20647**	**50.8%**	**19549**	**48.1%**	**19760**	**48.6%**	**19595**	**48.2%**	**19770**	**48.6%**	**20169**	**49.6%**	**19699**	**48.4%**	**20260**	**49.8%**	**19060**	**46.9%**	**20173**	**49.6%**	**19175**	**47.1%**	**19626**	**48.2%**	**19526**	**48.0%**	
LWL	**14792**	**36.4%**	**15939**	**39.2%**	**13739**	**33.8%**	**14532**	**35.7%**	**16000**	**39.3%**	**15572**	**38.3%**	**14345**	**35.3%**	**15795**	**38.8%**	**15900**	**39.1%**	**15627**	**38.4%**	**15115**	**37.2%**	**15606**	**38.4%**	**15832**	**38.9%**	**15718**	**38.6%**	**15041**	**37.0%**	**14585**	**35.9%**	
LCL	**13810**	**33.9%**	**14908**	**36.6%**	**12323**	**30.3%**	**13003**	**32.0%**	**15112**	**37.2%**	**14525**	**35.7%**	**13032**	**32.0%**	**14801**	**36.4%**	**14833**	**36.5%**	**14609**	**35.9%**	**13829**	**34.0%**	**14742**	**36.2%**	**14746**	**36.3%**	**14854**	**36.5%**	**13895**	**34.2%**	**13350**	**32.8%**	

GAS COUNTER G542 Unit: 3 MONTH: Oct-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	156.3	**1.56**	155.2	**1.55**	123.8	**1.24**	152.3	**1.52**	128.9	**1.29**	103.8	**1.04**	104.2	**1.04**	169.6	**1.70**	98.5	**0.99**	135.4	**1.35**	120.3	**1.20**	94.7	**0.95**	98.1	**0.98**	105.8	**1.06**	91.2	**0.91**	102.6	**1.03**
2	145	**1.45**	162	**1.62**	150	**1.50**	141	**1.41**	155	**1.55**	113	**1.13**	104	**1.04**	168	**1.68**	119	**1.19**	148	**1.48**	118	**1.18**	104	**1.04**	101	**1.01**	94	**0.94**	99	**0.99**	106	**1.06**
3	148	**1.48**	170	**1.70**	117	**1.17**	128	**1.28**	128	**1.28**	96	**0.96**	115	**1.15**	170	**1.70**	99	**0.99**	151	**1.51**	137	**1.37**	127	**1.27**	99	**0.99**	91	**0.91**	91	**0.91**	124	**1.24**
4	149	**1.49**	158	**1.58**	118	**1.18**	150	**1.50**	119	**1.19**	119	**1.19**	102	**1.02**	181	**1.81**	109	**1.09**	128	**1.28**	123	**1.23**	114	**1.14**	112	**1.12**	92	**0.92**	97	**0.97**	121	**1.21**
5	170	**1.70**	160	**1.60**	119	**1.19**	136	**1.36**	118	**1.18**	109	**1.09**	105	**1.05**	157	**1.57**	106	**1.06**	127	**1.27**	108	**1.08**	85	**0.85**	102	**1.02**	99	**0.99**	96	**0.96**	95	**0.95**
6	185	**1.85**	151	**1.51**	132	**1.32**	130	**1.30**	132	**1.32**	97	**0.97**	99	**0.99**	178	**1.78**	108	**1.08**	131	**1.31**	132	**1.32**	103	**1.03**	113	**1.13**	96	**0.96**	105	**1.05**	92	**0.92**
7																																
8																																
9	152	**1.52**	163	**1.63**	132	**1.32**	146	**1.46**	121	**1.21**	99	**0.99**	110	**1.10**	176	**1.76**	114	**1.14**	138	**1.38**	125	**1.25**	104	**1.04**	100	**1.00**	92	**0.92**	109	**1.09**	106	**1.06**
10	170	**1.70**	162	**1.62**	130	**1.30**	141	**1.41**	149	**1.49**	92	**0.92**	257	**2.57**	158	**1.58**	89	**0.89**	146	**1.46**	131	**1.31**	86	**0.86**	87	**0.87**	89	**0.89**	218	**2.18**	97	**0.97**
11	149	**1.49**	156	**1.56**	153	**1.53**	158	**1.58**	126	**1.26**	87	**0.87**	114	**1.14**	197	**1.97**	104	**1.04**	139	**1.39**	125	**1.25**	111	**1.11**	121	**1.21**	111	**1.11**	101	**1.01**	98	**0.98**
12	191	**1.91**	189	**1.89**	135	**1.35**	147	**1.47**	124	**1.24**	111	**1.11**	152	**1.52**	176	**1.76**	99	**0.99**	141	**1.41**	138	**1.38**	111	**1.11**	112	**1.12**	86	**0.86**	145	**1.45**	108	**1.08**
13	173	**1.73**	175	**1.75**	139	**1.39**	143	**1.43**	134	**1.34**	104	**1.04**	119	**1.19**	194	**1.94**	107	**1.07**	150	**1.50**	135	**1.35**	89	**0.89**	97	**0.97**	104	**1.04**	88	**0.88**	77	**0.77**
14																																
15																																
16	157	**1.57**	167	**1.67**	129	**1.29**	128	**1.28**	136	**1.36**	102	**1.02**	118	**1.18**	165	**1.65**	133	**1.33**	126	**1.26**	140	**1.40**	107	**1.07**	97	**0.97**	108	**1.08**	98	**0.98**	71	**0.71**
17	166	**1.66**	150	**1.50**	105	**1.05**	128	**1.28**	151	**1.51**	96	**0.96**	103	**1.03**	191	**1.91**	120	**1.20**	143	**1.43**	178	**1.78**	107	**1.07**	112	**1.12**	97	**0.97**	96	**0.96**	98	**0.98**
18	157	**1.57**	162	**1.62**	144	**1.44**	150	**1.50**	120	**1.20**	103	**1.03**	93	**0.93**	196	**1.96**	127	**1.27**	118	**1.18**	133	**1.33**	96	**0.96**	104	**1.04**	96	**0.96**	132	**1.32**	112	**1.12**
19	133	**1.33**	194	**1.94**	144	**1.44**	136	**1.36**	122	**1.22**	103	**1.03**	117	**1.17**	202	**2.02**	126	**1.26**	168	**1.68**	120	**1.20**	100	**1.00**	87	**0.87**	78	**0.78**	106	**1.06**	84	**0.84**
20	159	**1.59**	167	**1.67**	131	**1.31**	147	**1.47**	133	**1.33**	103	**1.03**	118	**1.18**	168	**1.68**	123	**1.23**	150	**1.50**	139	**1.39**	92	**0.92**	89	**0.89**	90	**0.90**	79	**0.79**	95	**0.95**
21																																
22																																
23	139	**1.39**	155	**1.55**	122	**1.22**	138	**1.38**	130	**1.30**	95	**0.95**	113	**1.13**	171	**1.71**	85	**0.85**	140	**1.40**	149	**1.49**	89	**0.89**	105	**1.05**	88	**0.88**	91	**0.91**	98	**0.98**
24	181	**1.81**	171	**1.71**	136	**1.36**	146	**1.46**	139	**1.39**	95	**0.95**	103	**1.03**	185	**1.85**	111	**1.11**	157	**1.57**	162	**1.62**	97	**0.97**	103	**1.03**	88	**0.88**	98	**0.98**	80	**0.80**
25																																
26																																
27																																
28																																
29																																
30																																
31																																
average	**160**	**1.60**	**165**	**1.65**	**131**	**1.31**	**141**	**1.41**	**131**	**1.31**	**102**	**1.02**	**119**	**1.19**	**178**	**1.78**	**110**	**1.10**	**141**	**1.41**	**134**	**1.34**	**101**	**1.01**	**102**	**1.02**	**95**	**0.95**	**108**	**1.08**	**98**	**0.98**
std dev	16	0.16	12	0.12	12	0.12	9	0.09	11	0.11	8	0.08	37	0.37	14	0.14	13	0.13	12	0.12	17	0.17	11	0.11	9	0.09	8	0.08	32	0.32	14	0.14
UCL	**208**	**2.08**	**200**	**2.00**	**168**	**1.68**	**169**	**1.69**	**165**	**1.65**	**125**	**1.25**	**229**	**2.29**	**219**	**2.19**	**149**	**1.49**	**178**	**1.78**	**184**	**1.84**	**134**	**1.34**	**130**	**1.30**	**120**	**1.20**	**202**	**2.02**	**140**	**1.40**
UWL	**192**	**1.92**	**189**	**1.89**	**156**	**1.56**	**159**	**1.59**	**154**	**1.54**	**117**	**1.17**	**192**	**1.92**	**205**	**2.05**	**136**	**1.36**	**166**	**1.66**	**167**	**1.67**	**123**	**1.23**	**121**	**1.21**	**112**	**1.12**	**171**	**1.71**	**126**	**1.26**
LWL	**128**	**1.28**	**141**	**1.41**	**106**	**1.06**	**123**	**1.23**	**109**	**1.09**	**86**	**0.86**	**46**	**0.46**	**151**	**1.51**	**84**	**0.84**	**116**	**1.16**	**101**	**1.01**	**79**	**0.79**	**83**	**0.83**	**78**	**0.78**	**45**	**0.45**	**70**	**0.70**
LCL	**112**	**1.12**	**129**	**1.29**	**94**	**0.94**	**114**	**1.14**	**98**	**0.98**	**78**	**0.78**	**9**	**0.09**	**137**	**1.37**	**70**	**0.70**	**104**	**1.04**	**84**	**0.84**	**68**	**0.68**	**74**	**0.74**	**69**	**0.69**	**13**	**0.13**	**56**	**0.56**

GAS COUNTER G542 Unit: 4 MONTH: October-23
Beta Source Check
23F05880

BETA Activity: **8135.54** **dpm** Count Time: **5** **min**

DATE	4A-1 COUNTS	4A-1 EFF	4A-2 COUNTS	4A-2 EFF	4A-3 COUNTS	4A-3 EFF	4A-4 COUNTS	4A-4 EFF	4B-1 COUNTS	4B-1 EFF	4B-2 COUNTS	4B-2 EFF	4B-3 COUNTS	4B-3 EFF	4B-4 COUNTS	4B-4 EFF	4C-1 COUNTS	4C-1 EFF	4C-2 COUNTS	4C-2 EFF	4C-3 COUNTS	4C-3 EFF	4C-4 COUNTS	4C-4 EFF	4D-1 COUNTS	4D-1 EFF	4D-2 COUNTS	4D-2 EFF	4D-3 COUNTS	4D-3 EFF	4D-4 COUNTS	4D-4 EFF	AVG
1																																		43.9%
2	16991	41.8%	17856	43.9%	15343	37.7%	19136	47.0%	18944	46.6%	17975	44.2%	18780	46.2%	17246	42.4%	17836	43.8%	17885	44.0%	18518	45.5%	19030	46.8%	19130	47.0%	17033	41.9%	16470	40.5%	18830	46.3%		43.9%
3	16992	41.8%	18029	44.3%	14971	36.8%	18892	46.4%	18907	46.5%	17659	43.4%	18624	45.8%	16931	41.6%	17582	43.2%	17674	43.4%	18336	45.1%	18996	46.7%	19314	47.5%	16938	41.6%	16624	40.9%	18837	46.3%		43.9%
4	17477	43.0%	18721	46.0%	16348	40.2%	19093	46.9%	17717	43.6%	15622	38.4%	17191	42.3%	17111	42.1%	16124	39.6%	18448	45.4%	18570	45.7%	17844	43.9%	18590	45.7%	18632	45.8%	18834	46.3%	18939	46.6%		43.9%
5	15462	38.0%	19184	47.2%	17081	42.0%	17568	43.2%	18069	44.4%	19278	47.4%	19245	47.3%	19121	47.0%	16198	39.8%	17763	43.7%	19057	46.8%	18775	46.2%	19086	46.9%	18355	45.1%	16213	39.9%	17124	42.1%		43.9%
6	19024	46.8%	16357	40.2%	16379	40.3%	15246	37.5%	18460	45.4%	18660	45.9%	19141	47.1%	18068	44.4%	18748	46.1%	16723	41.1%	18609	45.7%	18445	45.3%	16609	40.8%	19169	47.1%	17031	41.9%	17232	42.4%		43.9%
7																																		43.9%
8																																		43.9%
9	18665	45.9%	18865	46.4%	16882	41.5%	19163	47.1%	17526	43.1%	16954	41.7%	19453	47.8%	15448	38.0%	16423	40.4%	17447	42.9%	16346	40.2%	16712	41.1%	19055	46.8%	19207	47.2%	18121	44.5%	18712	46.0%		43.9%
10	18280	44.9%	18375	45.2%	18370	45.2%	15399	37.9%	17612	43.3%	19643	48.3%	17467	42.9%	18752	46.1%	19344	47.6%	18382	45.2%	18451	45.4%	18824	46.3%	17700	43.5%	16790	41.3%	16514	40.6%	16939	41.6%		43.9%
11	18901	46.5%	19063	46.9%	18883	46.4%	17686	43.5%	19222	47.3%	15733	38.7%	19727	48.5%	18603	45.7%	18306	45.0%	16958	41.7%	16507	40.6%	17607	43.3%	17166	42.2%	19048	46.8%	16278	40.0%	16733	41.1%		43.9%
12	16823	41.4%	18177	44.7%	16659	41.0%	18100	44.5%	19231	47.3%	17602	43.3%	19262	47.4%	18763	46.1%	16886	41.5%	17778	43.7%	16383	40.3%	17775	43.7%	18680	45.9%	15678	38.5%	18904	46.5%	18577	45.7%		43.9%
13	16777	41.2%	18908	46.5%	18287	45.0%	19140	47.1%	17385	42.7%	15716	38.6%	18186	44.7%	19032	46.8%	16365	40.2%	15811	38.9%	17673	43.4%	18857	46.4%	17151	42.2%	19503	47.9%	18369	45.2%	18226	44.8%		43.9%
14																																		43.9%
15																																		43.9%
16	19272	47.4%	16384	40.3%	17052	41.9%	18954	46.6%	16879	41.5%	17801	43.8%	19095	46.9%	18390	45.2%	16109	39.6%	18161	44.6%	18653	45.9%	18698	46.0%	19354	47.6%	15629	38.4%	17353	42.7%	19004	46.7%		43.9%
17	19053	46.8%	18958	46.6%	18443	45.3%	16910	41.6%	17903	44.0%	19694	48.4%	16965	41.7%	18553	45.6%	18471	45.4%	16424	40.4%	18857	46.4%	15148	37.2%	17375	42.7%	18455	45.4%	18661	45.9%	16759	41.2%		43.9%
18	19118	47.0%	18521	45.5%	18872	46.4%	18801	46.2%	17332	42.6%	17181	42.2%	17869	43.9%	18819	46.3%	19044	46.8%	16084	39.5%	18653	45.9%	18292	45.0%	17412	42.8%	18350	45.1%	16559	40.7%	15170	37.3%		43.9%
19	16654	40.9%	18583	45.7%	16073	39.5%	19695	48.4%	15613	38.4%	19173	47.1%	17023	41.8%	18602	45.7%	17807	43.8%	18230	44.8%	18597	45.7%	18571	45.7%	17410	42.8%	17584	43.2%	17403	42.8%	18922	46.5%		43.9%
20	19304	47.5%	14872	36.6%	18427	45.3%	18239	44.8%	17298	42.5%	17758	43.7%	18853	46.3%	18841	46.3%	16538	40.7%	15973	39.3%	18402	45.2%	16525	40.6%	17548	43.1%	19225	47.3%	19069	46.9%	18272	44.9%		43.9%
21																																		43.9%
22																																		43.9%
23	17686	43.5%	17363	42.7%	18299	45.0%	16513	40.6%	19254	47.3%	17814	43.8%	18904	46.5%	15037	37.0%	18402	45.2%	16110	39.6%	18759	46.1%	17730	43.6%	18566	45.6%	18250	44.9%	18812	46.2%	16352	40.2%		43.9%
24	16882	41.5%	18041	44.4%	18043	44.4%	19322	47.5%	19135	47.0%	15575	38.3%	17614	43.3%	17336	42.6%	19544	48.0%	18380	45.2%	16342	40.2%	18764	46.1%	16563	40.7%	19233	47.3%	17251	42.4%	18626	45.8%		43.9%
25																																		43.9%
26																																		
27																																		
28																																		
29																																		#VALUE!
30																																		
31																																		#VALUE!
average	**17845**	**43.9%**	**18015**	**44.3%**	**17318**	**42.6%**	**18109.2**	**44.5%**	**18028.6**	**44.3%**	**17637.5**	**43.4%**	**18435.2**	**45.3%**	**17921**	**44.1%**	**17631**	**43.3%**	**17308**	**42.5%**	**18042**	**44.4%**	**18035**	**44.3%**	**18042**	**44.4%**	**18063**	**44.4%**	**17557**	**43.2%**	**17838**	**43.9%**	
std dev	1184	2.91%	1168	0.03	1236	0.03	1369	0.03	1016	0.02	1388	0.03	909	0.02	1229	0.03	1202	2.96%	945	0.02	984	0.02	1061	0.03	969	2.38%	1244	0.03	1046	0.026	1156	0.028		
UCL	**21397**	**52.6%**	**21521**	**52.9%**	**21025**	**51.7%**	**22217**	**54.6%**	**21077**	**51.8%**	**21803**	**53.6%**	**21163**	**52.0%**	**21608**	**53.1%**	**21237**	**52.2%**	**20144**	**49.5%**	**20993**	**51.6%**	**21217**	**52.2%**	**20949**	**51.5%**	**21796**	**53.6%**	**20696**	**50.9%**	**21308**	**52.4%**		
UWL	**20213**	**49.7%**	**20352**	**50.0%**	**19790**	**48.6%**	**20848**	**51.3%**	**20061**	**49.3%**	**20414**	**50.2%**	**20254**	**49.8%**	**20379**	**50.1%**	**20035**	**49.3%**	**19198**	**47.2%**	**20009**	**49.2%**	**20156**	**49.6%**	**19980**	**49.1%**	**20552**	**50.5%**	**19649**	**48.3%**	**20151**	**49.5%**		
LWL	**15476**	**38.0%**	**15678**	**38.5%**	**14847**	**36.5%**	**15370**	**37.8%**	**15996**	**39.3%**	**14861**	**36.5%**	**16617**	**40.9%**	**15463**	**38.0%**	**15227**	**37.4%**	**15417**	**37.9%**	**16074**	**39.5%**	**15914**	**39.1%**	**16104**	**39.6%**	**15575**	**38.3%**	**15464**	**38.0%**	**15526**	**38.2%**		
LCL	**14292**	**35.1%**	**14510**	**35.7%**	**13612**	**33.5%**	**14001**	**34.4%**	**14980**	**36.8%**	**13472**	**33.1%**	**15708**	**38.6%**	**14234**	**35.0%**	**14025**	**34.5%**	**14472**	**35.6%**	**15091**	**37.1%**	**14853**	**36.5%**	**15135**	**37.2%**	**14331**	**35.2%**	**14418**	**35.4%**	**14369**	**35.3%**		

GAS COUNTER G542 Unit: 4 MONTH: Oct-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	108.5	**1.09**	183.4	**1.83**	136.1	**1.36**	173.4	**1.73**	185.2	**1.85**	178.7	**1.79**	232.4	**2.32**	230.8	**2.31**	252.5	**2.53**	348.9	**3.49**	162.9	**1.63**	139.4	**1.39**	91.7	**0.92**	212.1	**2.12**	116.9	**1.17**	155.1	**1.55**
2	121	**1.21**	175	**1.75**	137	**1.37**	168	**1.68**	174	**1.74**	186	**1.86**	209	**2.09**	246	**2.46**	264	**2.64**	349	**3.49**	167	**1.67**	133	**1.33**	86	**0.86**	243	**2.43**	109	**1.09**	156	**1.56**
3	116	**1.16**	181	**1.81**	130	**1.30**	195	**1.95**	185	**1.85**	181	**1.81**	240	**2.40**	254	**2.54**	209	**2.09**	201	**2.01**	189	**1.89**	155	**1.55**	106	**1.06**	212	**2.12**	115	**1.15**	155	**1.55**
4	145	**1.45**	180	**1.80**	137	**1.37**	184	**1.84**	176	**1.76**	188	**1.88**	235	**2.35**	253	**2.53**	189	**1.89**	147	**1.47**	171	**1.71**	136	**1.36**	104	**1.04**	199	**1.99**	127	**1.27**	152	**1.52**
5	109	**1.09**	190	**1.90**	149	**1.49**	197	**1.97**	191	**1.91**	191	**1.91**	203	**2.03**	206	**2.06**	194	**1.94**	185	**1.85**	160	**1.60**	147	**1.47**	111	**1.11**	196	**1.96**	119	**1.19**	180	**1.80**
6	120	**1.20**	171	**1.71**	137	**1.37**	183	**1.83**	187	**1.87**	172	**1.72**	220	**2.20**	230	**2.30**	190	**1.90**	165	**1.65**	158	**1.58**	130	**1.30**	118	**1.18**	214	**2.14**	90	**0.90**	167	**1.67**
7																																
8																																
9	125	**1.25**	186	**1.86**	137	**1.37**	185	**1.85**	177	**1.77**	169	**1.69**	235	**2.35**	253	**2.53**	215	**2.15**	168	**1.68**	180	**1.80**	162	**1.62**	90	**0.90**	208	**2.08**	116	**1.16**	173	**1.73**
10	131	**1.31**	228	**2.28**	146	**1.46**	170	**1.70**	175	**1.75**	176	**1.76**	214	**2.14**	249	**2.49**	212	**2.12**	181	**1.81**	237	**2.37**	140	**1.40**	112	**1.12**	221	**2.21**	137	**1.37**	195	**1.95**
11	97	**0.97**	196	**1.96**	129	**1.29**	171	**1.71**	190	**1.90**	193	**1.93**	249	**2.49**	239	**2.39**	217	**2.17**	190	**1.90**	177	**1.77**	159	**1.59**	119	**1.19**	217	**2.17**	135	**1.35**	172	**1.72**
12	189	**1.89**	188	**1.88**	125	**1.25**	172	**1.72**	184	**1.84**	184	**1.84**	231	**2.31**	228	**2.28**	230	**2.30**	185	**1.85**	169	**1.69**	163	**1.63**	112	**1.12**	234	**2.34**	85	**0.85**	159	**1.59**
13	138	**1.38**	187	**1.87**	144	**1.44**	189	**1.89**	155	**1.55**	181	**1.81**	240	**2.40**	239	**2.39**	191	**1.91**	180	**1.80**	195	**1.95**	132	**1.32**	103	**1.03**	210	**2.10**	123	**1.23**	147	**1.47**
14																																
15																																
16	96	**0.96**	198	**1.98**	160	**1.60**	197	**1.97**	304	**3.04**	158	**1.58**	271	**2.71**	227	**2.27**	220	**2.20**	190	**1.90**	189	**1.89**	128	**1.28**	111	**1.11**	193	**1.93**	104	**1.04**	142	**1.42**
17	122	**1.22**	169	**1.69**	150	**1.50**	183	**1.83**	218	**2.18**	166	**1.66**	229	**2.29**	234	**2.34**	225	**2.25**	178	**1.78**	173	**1.73**	147	**1.47**	113	**1.13**	210	**2.10**	125	**1.25**	173	**1.73**
18	127	**1.27**	188	**1.88**	167	**1.67**	193	**1.93**	217	**2.17**	173	**1.73**	207	**2.07**	215	**2.15**	216	**2.16**	182	**1.82**	189	**1.89**	129	**1.29**	103	**1.03**	217	**2.17**	122	**1.22**	184	**1.84**
19	129	**1.29**	177	**1.77**	177	**1.77**	172	**1.72**	190	**1.90**	172	**1.72**	216	**2.16**	251	**2.51**	207	**2.07**	200	**2.00**	195	**1.95**	130	**1.30**	84	**0.84**	202	**2.02**	117	**1.17**	155	**1.55**
20	110	**1.10**	162	**1.62**	108	**1.08**	194	**1.94**	209	**2.09**	170	**1.70**	229	**2.29**	253	**2.53**	209	**2.09**	176	**1.76**	165	**1.65**	159	**1.59**	124	**1.24**	237	**2.37**	129	**1.29**	160	**1.60**
21																																
22																																
23	149	**1.49**	198	**1.98**	141	**1.41**	189	**1.89**	187	**1.87**	192	**1.92**	228	**2.28**	237	**2.37**	208	**2.08**	198	**1.98**	165	**1.65**	154	**1.54**	114	**1.14**	227	**2.27**	109	**1.09**	159	**1.59**
24	139	**1.39**	170	**1.70**	144	**1.44**	234	**2.34**	200	**2.00**	205	**2.05**	195	**1.95**	257	**2.57**	199	**1.99**	231	**2.31**	156	**1.56**	152	**1.52**	90	**0.90**	218	**2.18**	108	**1.08**	173	**1.73**
25																																
26																																
27																																
28																																
29																																
30																																
31																																
average	**126**	**1.26**	**185**	**1.85**	**142**	**1.42**	**186**	**1.86**	**195**	**1.95**	**180**	**1.80**	**227**	**2.27**	**239**	**2.39**	**214**	**2.14**	**203**	**2.03**	**178**	**1.78**	**144**	**1.44**	**105**	**1.05**	**215**	**2.15**	**116**	**1.16**	**164**	**1.64**
std dev	22	0.22	15	0.15	16	0.16	16	0.16	31	0.31	12	0.12	18	0.18	14	0.14	20	0.20	56	0.56	20	0.20	13	0.13	12	0.12	14	0.14	14	0.14	14	0.14
UCL	**191**	**1.91**	**230**	**2.30**	**189**	**1.89**	**233**	**2.33**	**289**	**2.89**	**214**	**2.14**	**281**	**2.81**	**282**	**2.82**	**274**	**2.74**	**371**	**3.71**	**236**	**2.36**	**182**	**1.82**	**141**	**1.41**	**256**	**2.56**	**157**	**1.57**	**206**	**2.06**
UWL	**170**	**1.70**	**215**	**2.15**	**173**	**1.73**	**217**	**2.17**	**257**	**2.57**	**203**	**2.03**	**263**	**2.63**	**268**	**2.68**	**254**	**2.54**	**315**	**3.15**	**217**	**2.17**	**169**	**1.69**	**129**	**1.29**	**243**	**2.43**	**143**	**1.43**	**192**	**1.92**
LWL	**83**	**0.83**	**155**	**1.55**	**110**	**1.10**	**155**	**1.55**	**132**	**1.32**	**157**	**1.57**	**191**	**1.91**	**210**	**2.10**	**173**	**1.73**	**91**	**0.91**	**139**	**1.39**	**119**	**1.19**	**81**	**0.81**	**188**	**1.88**	**88**	**0.88**	**137**	**1.37**
LCL	**61**	**0.61**	**140**	**1.40**	**95**	**0.95**	**139**	**1.39**	**101**	**1.01**	**145**	**1.45**	**172**	**1.72**	**196**	**1.96**	**153**	**1.53**	**36**	**0.36**	**119**	**1.19**	**107**	**1.07**	**69**	**0.69**	**174**	**1.74**	**75**	**0.75**	**123**	**1.23**

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16260
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	12004	5166	0
1520	13863	6708	0
1540	14843	7804	0
1560	16319	9266	0
1580	17131	10894	0
1600	17920	12109	0
1620	18305	13681	0
1640	18603	14986	0
1660	18780	16226	0
1680	19052	17211	3
1700	19181	17604	21
1720	19311	18081	72
1740	19737	18651	190
1760	19703	18537	418
1780	19896	18394	837
1800	20150	18236	1361

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16260
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	7167	4783	0
1520	8392	5913	0
1540	9892	7058	0
1560	11301	8437	0
1580	12687	9768	0
1600	13982	10961	0
1620	15217	12507	0
1640	16198	13866	0
1660	16925	15031	0
1680	17426	16071	0
1700	17834	16751	1
1720	18200	17448	3
1740	18310	17693	16
1760	18779	18331	58
1780	18666	18148	123
1800	18983	18353	331

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16261
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	11091	5372	0
1520	13054	6670	0
1540	14491	8024	0
1560	15748	9570	0
1580	16869	11099	0
1600	17413	12116	0
1620	18298	13770	0
1640	18536	15165	0
1660	18978	16493	0
1680	18998	17197	10
1700	19243	17806	31
1720	19299	18210	101
1740	19495	18444	257
1760	19625	18492	519
1780	19861	18467	862
1800	19735	17890	1386

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16261
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	12831	8384	0
1520	14278	9774	0
1540	15606	11358	0
1560	16751	12970	0
1580	17783	14640	0
1600	18319	15529	0
1620	18731	16697	0
1640	19048	17597	0
1660	19377	18400	0
1680	19595	18822	1
1700	19982	19364	1
1720	19800	19268	19
1740	20006	19517	73
1760	19902	19355	181
1780	20357	19607	447
1800	20497	19407	796

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16263
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	13170	5704	0
1520	14574	6942	0
1540	16282	8407	0
1560	17721	10169	0
1580	18402	11555	1
1600	18994	12858	0
1620	19217	14204	0
1640	19993	16240	1
1660	20143	17467	0
1680	20358	18405	4
1700	20575	19020	17
1720	20689	19531	58
1740	20922	19889	193
1760	20833	19675	479
1780	20619	19329	745
1800	21166	19323	1387

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16263
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	8531	6111	0
1520	9916	7285	0
1540	11709	8926	0
1560	13432	10505	0
1580	14810	11971	0
1600	15761	13165	0
1620	16899	14651	0
1640	18148	16327	0
1660	18748	17444	0
1680	18973	18075	0
1700	19584	18859	1
1720	19501	19001	10
1740	20052	19612	68
1760	19773	19328	184
1780	20021	19376	410
1800	20131	19194	744

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16264
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9016	4240	0
1520	10777	5362	0
1540	12032	6577	0
1560	13683	7883	0
1580	15217	9387	0
1600	15865	10415	0
1620	16805	11733	0
1640	17773	13594	0
1660	18234	14835	0
1680	18603	16112	0
1700	19085	17113	4
1720	18989	17578	35
1740	19342	18239	99
1760	19399	18360	268
1780	19647	18485	539
1800	19596	18229	891

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16264
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	12591	8260	0
1520	13941	9525	0
1540	15299	11065	0
1560	16781	12816	0
1580	17824	14399	0
1600	18251	15394	0
1620	19040	16788	0
1640	19424	17961	1
1660	19635	18547	0
1680	19799	19020	2
1700	20076	19436	1
1720	19999	19561	6
1740	20103	19696	36
1760	20131	19675	140
1780	20809	20201	319
1800	20534	19687	611

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16265
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9557	4464	0
1520	11016	5510	0
1540	12618	6737	0
1560	14432	8206	0
1580	15365	9452	0
1600	16378	10682	0
1620	17519	12377	0
1640	18113	13978	0
1660	18439	15258	0
1680	18625	16286	3
1700	18812	16976	8
1720	19371	18022	35
1740	19459	18394	125
1760	19545	18510	317
1780	19701	18458	637
1800	19761	18167	1073

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16265
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	10547	7481	0
1520	12132	8704	0
1540	13556	10315	0
1560	15256	12161	0
1580	16767	13873	0
1600	17157	14615	0
1620	18293	16292	0
1640	18909	17391	0
1660	19298	18222	0
1680	19738	19032	3
1700	19766	19185	6
1720	19875	19395	36
1740	19889	19426	135
1760	20052	19471	293
1780	20443	19604	606
1800	20365	19146	1022

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16266
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	7834	3800	0
1520	9401	4786	0
1540	10875	5771	0
1560	12514	7041	0
1580	14025	8501	0
1600	15250	9759	0
1620	16200	11113	1
1640	17212	12618	0
1660	18040	14335	0
1680	18478	15699	1
1700	18752	16532	2
1720	19179	17547	16
1740	19252	18024	75
1760	19710	18574	211
1780	19790	18725	426
1800	19847	18527	788

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16266
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	13667	9323	0
1520	14913	10815	0
1540	16216	12356	0
1560	17544	14115	0
1580	18532	15769	0
1600	18910	16652	0
1620	19151	17496	0
1640	19543	18418	0
1660	19571	18776	0
1680	20105	19547	0
1700	20315	19839	2
1720	20253	19831	22
1740	20542	20099	104
1760	20258	19773	220
1780	20707	19986	490
1800	20559	19451	897

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16267
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9948	5280	1
1520	11630	6461	0
1540	13300	7799	0
1560	14790	9442	0
1580	16094	10823	0
1600	16925	12018	0
1620	17805	13686	0
1640	18406	15144	2
1660	18937	16524	3
1680	19127	17327	24
1700	19582	18217	54
1720	19527	18450	183
1740	19572	18439	399
1760	19777	18491	698
1780	19782	18182	1151
1800	19885	17672	1801

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16267
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	10636	6551	0
1520	12071	7767	0
1540	13936	9389	0
1560	15457	10969	0
1580	16641	12489	0
1600	17353	13492	0
1620	18228	15111	0
1640	18704	16263	0
1660	19343	17607	0
1680	19636	18316	0
1700	19463	18504	0
1720	19930	19200	3
1740	20641	20041	6
1760	20553	20057	37
1780	20267	19793	117
1800	20357	19732	308

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16268
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	7993	3915	0
1520	9574	4956	0
1540	11254	6165	0
1560	12797	7381	0
1580	14445	8809	0
1600	15455	9892	0
1620	16835	11471	0
1640	17798	13221	0
1660	18752	15008	0
1680	19386	16412	0
1700	19477	17203	6
1720	19818	18175	29
1740	20124	18944	88
1760	20321	19195	299
1780	20253	19068	584
1800	20603	19158	969

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16268
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	11725	7888	1
1520	13399	9467	0
1540	15176	11175	0
1560	16210	12701	0
1580	17472	14482	0
1600	17736	15146	0
1620	18468	16566	0
1640	18714	17430	0
1660	18977	18046	0
1680	19368	18699	1
1700	19472	18872	9
1720	19878	19363	33
1740	19861	19387	68
1760	19773	19218	245
1780	20181	19437	493
1800	20083	19004	850

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 11:03
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2570	2567	3
1520	3092	3088	4
1540	3543	3540	3
1560	4138	4135	3
1580	4479	4476	3
1600	4707	4704	3
1620	5160	5153	7
1640	5503	5496	7
1660	5585	5579	6
1680	5660	5653	7
1700	5732	5726	6
1720	5848	5842	6
1740	5971	5957	14
1760	5928	5900	28
1780	6072	5981	91
1800	6064	5899	165

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR661 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 11:40
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** B **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2137
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2380	2375	5
1520	2900	2898	2
1540	3417	3410	7
1560	3835	3834	1
1580	4344	4342	2
1600	4574	4567	7
1620	4901	4898	3
1640	5109	5099	10
1660	5317	5311	6
1680	5601	5596	5
1700	5630	5621	9
1720	5555	5550	5
1740	5628	5610	18
1760	5727	5695	32
1780	5535	5474	61
1800	5742	5575	167

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (CIrcle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 12:17
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1966	1964	2
1520	2595	2594	1
1540	3063	3059	4
1560	3467	3463	4
1580	3907	3904	3
1600	4132	4130	2
1620	4401	4397	4
1640	4566	4561	5
1660	4747	4742	5
1680	4725	4721	4
1700	4871	4863	8
1720	4902	4896	6
1740	4941	4933	8
1760	4972	4941	31
1780	5070	4999	71
1800	5033	4913	120

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SVR961 **Date:** 7/5/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 12:42
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** D **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2136
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2468	2467	1
1520	2875	2874	1
1540	3240	3240	0
1560	3408	3407	1
1580	3768	3766	2
1600	3893	3890	3
1620	3869	3868	1
1640	4051	4051	0
1660	3935	3934	1
1680	3966	3963	3
1700	4142	4140	2
1720	4231	4226	5
1740	4087	4078	9
1760	4110	4090	20
1780	4122	4063	59
1800	4173	4039	134

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 13:05
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2138
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2327	2327	0
1520	2766	2763	3
1540	3167	3165	2
1560	3615	3612	3
1580	4057	4053	4
1600	4110	4105	5
1620	4285	4285	0
1640	4794	4789	5
1660	4641	4638	3
1680	4807	4800	7
1700	4961	4955	6
1720	4831	4827	4
1740	5084	5069	15
1760	5029	4995	33
1780	4908	4826	82
1800	4979	4823	155

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 13:24
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** B **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2137
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3793	3791	2
1520	4451	4445	6
1540	4940	4935	5
1560	5309	5307	2
1580	5566	5562	4
1600	5515	5510	5
1620	5944	5936	8
1640	6120	6112	8
1660	6128	6122	6
1680	6100	6097	3
1700	6199	6195	4
1720	6176	6162	14
1740	6319	6296	23
1760	6301	6243	58
1780	6268	6147	121
1800	6227	6020	207

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/6/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 14:04
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** C **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2139
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3144	3141	3
1520	3666	3662	4
1540	4055	4050	5
1560	4519	4515	4
1580	4731	4722	9
1600	4884	4883	1
1620	4978	4970	8
1640	5260	5254	6
1660	5321	5315	6
1680	5333	5324	9
1700	5305	5298	7
1720	5351	5339	12
1740	5397	5369	28
1760	5398	5342	55
1780	5439	5338	101
1800	5455	5258	197

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/6/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 14:27
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2060	2060	0
1520	2359	2359	0
1540	2784	2783	1
1560	3039	3038	1
1580	3296	3295	1
1600	3523	3522	1
1620	3576	3573	3
1640	3805	3804	1
1660	3929	3924	5
1680	3999	3996	3
1700	3935	3934	1
1720	4089	4086	3
1740	4035	4029	6
1760	4116	4095	21
1780	4013	3943	69
1800	4031	3907	124

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR 961 **Date:** 715123

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 15:39
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2004	2001	3
1520	2409	2408	1
1540	2788	2785	3
1560	3232	3231	1
1580	3451	3449	2
1600	3743	3741	2
1620	4050	4045	5
1640	4315	4313	2
1660	4381	4374	7
1680	4500	4492	8
1700	4730	4723	7
1720	4800	4793	7
1740	4815	4812	3
1760	4879	4867	12
1780	4953	4918	35
1800	4846	4783	63

Special Notes:

Report Generated: 07/05/2023 G542HV.RPT ver 2.0

Collected By: SWR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 16:00
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** B **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2137
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1221	1219	2
1520	1882	1879	3
1540	2557	2556	1
1560	3222	3220	2
1580	3897	3893	4
1600	4250	4249	1
1620	4620	4617	3
1640	5151	5148	3
1660	5505	5499	6
1680	5778	5776	2
1700	5659	5655	4
1720	5967	5962	5
1740	5948	5943	5
1760	5965	5959	6
1780	6101	6082	19
1800	5979	5918	61

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/11/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 16:18
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** C **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2139
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2183	2181	2
1520	2677	2676	1
1540	3085	3080	5
1560	3555	3552	3
1580	3947	3943	4
1600	4199	4195	4
1620	4528	4523	5
1640	4715	4711	4
1660	4988	4982	6
1680	5256	5243	13
1700	5328	5322	6
1720	5316	5307	9
1740	5270	5264	6
1760	5343	5321	22
1780	5432	5376	56
1800	5405	5283	122

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 16:40
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1503	1503	0
1520	1776	1776	0
1540	2098	2097	1
1560	2484	2484	0
1580	2790	2790	0
1600	3152	3152	0
1620	3355	3354	1
1640	3439	3436	3
1660	3709	3705	4
1680	3731	3729	2
1700	3946	3945	1
1720	3819	3819	0
1740	4000	3996	4
1760	3956	3945	11
1780	4117	4083	34
1800	4110	4021	89

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNK961 **Date:** 7/5/23

Changes Needed: Yes No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/06/2023 10:08
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2138
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2299	2296	3
1520	2729	2728	1
1540	3114	3112	2
1560	3595	3594	1
1580	3880	3880	0
1600	4055	4053	2
1620	4394	4390	4
1640	4647	4646	1
1660	4862	4861	1
1680	4793	4789	4
1700	4885	4882	3
1720	4990	4981	9
1740	4920	4910	10
1760	5029	4989	40
1780	4970	4893	77
1800	5172	5044	128

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:28
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3319	3318	1
1520	3872	3868	4
1540	4425	4421	4
1560	4759	4755	4
1580	5125	5120	5
1600	5482	5477	5
1620	5755	5751	4
1640	5641	5636	5
1660	5943	5938	5
1680	6001	5997	4
1700	6153	6140	13
1720	6059	6051	8
1740	6227	6218	9
1760	6184	6172	12
1780	6312	6285	27
1800	6267	6201	66

Special Notes:

Report Generated: 07/06/2023 G542HV.RPT ver 2.0

Collected By: SWR 661 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:45
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2164	2164	0
1520	2616	2615	1
1540	3174	3171	3
1560	3445	3443	2
1580	4012	4012	0
1600	4422	4415	7
1620	4652	4646	6
1640	4799	4798	1
1660	4929	4923	6
1680	5251	5248	3
1700	5147	5141	6
1720	5188	5183	5
1740	5244	5240	4
1760	5235	5228	7
1780	5387	5370	17
1800	5426	5374	52

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SWR 961 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/11/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/06/2023 11:37
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** D **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2136
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1075	1075	0
1520	1388	1388	0
1540	1709	1708	1
1560	2025	2023	2
1580	2402	2402	0
1600	2465	2463	2
1620	2869	2867	2
1640	3177	3173	4
1660	3334	3333	1
1680	3628	3624	4
1700	3690	3689	1
1720	3789	3787	2
1740	3794	3789	5
1760	3929	3925	4
1780	3949	3940	9
1800	3943	3914	29

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 11:14
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3909	4
2	3913	4
3	3845	4
4	3765	2
5	3934	2
6	3831	2
7	3736	4
8	3855	2
9	3842	1
10	3773	5
11	3711	1
12	3880	2
13	3734	2
14	3840	6
15	3786	4
16	3833	6
17	3894	8
18	3809	4
19	3813	6
20	3811	1

(Xbar) Mean:	3825.70	3.50
Calculated Chi-Sqr Value:	19.34	21.43

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR661 **Date:** 7/7/23

Changes Needed: **Yes** **No** **(Circle One)**

Approved By: _____ **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 11:35
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3333	2
2	3371	2
3	3361	3
4	3399	5
5	3425	1
6	3439	5
7	3412	2
8	3279	2
9	3298	1
10	3432	1
11	3423	1
12	3520	0
13	3366	2
14	3339	3
15	3372	4
16	3334	7
17	3342	1
18	3456	4
19	3441	2
20	3390	1

(Xbar) Mean:	3386.60	2.45
Calculated Chi-Sqr Value:	19.15	24.06

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREC1 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 11:57
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3387	6
2	3412	4
3	3269	2
4	3357	12
5	3431	12
6	3472	7
7	3386	6
8	3354	6
9	3455	10
10	3463	10
11	3500	4
12	3436	6
13	3386	16
14	3426	9
15	3415	5
16	3292	11
17	3493	9
18	3367	5
19	3362	3
20	3438	5

(Xbar) Mean:	3405.05	7.40
Calculated Chi-Sqr Value:	20.84	33.08

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNREGI **Date:** 7/7/23
Changes Needed: Yes No (Circle One)
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 12:22
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	D	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3494	8
2	3512	8
3	3492	4
4	3554	7
5	3544	15
6	3528	10
7	3544	4
8	3608	6
9	3644	4
10	3697	11
11	3468	8
12	3530	2
13	3536	10
14	3451	10
15	3501	8
16	3587	6
17	3573	6
18	3534	4
19	3553	8
20	3555	10

(Xbar) Mean:	3545.25	7.45
Calculated Chi-Sqr Value:	17.93	24.29

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SW REG 1 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 12:45
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3865	2
2	3693	5
3	3808	6
4	3875	4
5	3755	2
6	3823	5
7	3856	3
8	3839	6
9	3754	1
10	3768	5
11	3889	4
12	3766	3
13	3711	6
14	3857	4
15	3776	6
16	3742	7
17	3757	3
18	3817	6
19	3794	4
20	3895	5

(Xbar) Mean:	3802.00	4.35
Calculated Chi-Sqr Value:	17.63	11.62

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREGI **Date:** 7/7/23

Changes Needed: Yes ~~No~~ (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 13:12
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3457	0
2	3620	2
3	3579	1
4	3541	1
5	3583	1
6	3614	2
7	3518	3
8	3498	1
9	3595	3
10	3548	2
11	3595	2
12	3586	3
13	3577	6
14	3453	0
15	3622	3
16	3538	4
17	3511	5
18	3514	2
19	3577	1
20	3554	2

(Xbar) Mean:	3554.00	2.20
Calculated Chi-Sqr Value:	13.35	20.55

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWRGL1 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: [signature] **Date:** 7/10/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 2
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1720
Conf Level: 95.0 %
Test Date: 07/07/2023 13:33
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3392	5
2	3358	3
3	3430	3
4	3488	2
5	3425	5
6	3518	2
7	3557	11
8	3415	3
9	3492	4
10	3487	9
11	3518	3
12	3400	4
13	3468	7
14	3496	2
15	3517	3
16	3451	5
17	3405	7
18	3411	5
19	3477	6
20	3463	3

(Xbar) Mean:	3458.40	4.60
Calculated Chi-Sqr Value:	14.98	24.09

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREGI **Date:** 7/7/23
Changes Needed: Yes (No) (Circle One)
Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:01
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	D	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3593	14
2	3523	11
3	3398	9
4	3426	11
5	3424	10
6	3573	11
7	3436	5
8	3505	3
9	3459	6
10	3612	13
11	3481	6
12	3554	9
13	3526	6
14	3397	10
15	3541	12
16	3585	10
17	3512	8
18	3485	11
19	3596	5
20	3577	8

(Xbar) Mean:	3510.15	8.90
Calculated Chi-Sqr Value:	26.05	18.63

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/11/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3758	2
2	3685	6
3	3742	5
4	3586	3
5	3662	4
6	3737	6
7	3756	3
8	3765	3
9	3479	3
10	3770	6
11	3701	4
12	3697	2
13	3797	3
14	3705	6
15	3652	6
16	3630	9
17	3718	8
18	3656	4
19	3659	5
20	3674	2

(Xbar) Mean:	3691.45	4.50
Calculated Chi-Sqr Value:	27.65	16.67

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3179	0
2	3177	1
3	3298	0
4	3254	0
5	3262	2
6	3321	0
7	3368	1
8	3382	0
9	3397	0
10	3463	0
11	3369	0
12	3378	1
13	3390	1
14	3340	1
15	3287	0
16	3384	1
17	3390	1
18	3371	4
19	3341	2
20	3343	1

(Xbar) Mean:	3334.70	0.00
Calculated Chi-Sqr Value:	30.43	0.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	C	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3437	2
2	3384	2
3	3352	1
4	3332	1
5	3354	4
6	3353	3
7	3367	3
8	3358	1
9	3316	6
10	3355	5
11	3396	2
12	3393	2
13	3404	6
14	3415	0
15	3347	4
16	3413	3
17	3377	5
18	3392	3
19	3481	6
20	3391	5

(Xbar) Mean:	3380.85	3.20
Calculated Chi-Sqr Value:	8.28	20.38

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes: rerun to verify 7/7/23

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	D	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3421	6
2	3439	3
3	3529	1
4	3451	8
5	3363	3
6	3408	6
7	3478	6
8	3514	5
9	3489	4
10	3538	0
11	3556	2
12	3579	7
13	3514	2
14	3509	3
15	3531	2
16	3403	2
17	3462	2
18	3510	6
19	3487	5
20	3436	4

(Xbar) Mean:	3480.85	3.85
Calculated Chi-Sqr Value:	17.58	23.52

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR661 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 15:13
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3427	4
2	3425	5
3	3312	4
4	3360	1
5	3385	1
6	3294	4
7	3296	6
8	3340	5
9	3450	5
10	3358	1
11	3313	2
12	3458	6
13	3321	2
14	3402	5
15	3485	4
16	3360	2
17	3431	5
18	3442	2
19	3357	6
20	3366	3

(Xbar) Mean:	3379.10	3.65
Calculated Chi-Sqr Value:	18.89	16.04

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREG1 (Circle One) **Date:** 7/12/23

Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 16:06
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	4	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3836	11
2	3838	10
3	3687	20
4	3756	9
5	3715	16
6	3719	6
7	3789	11
8	3796	10
9	3809	10
10	3740	15
11	3876	15
12	3857	7
13	3642	11
14	3697	11
15	3762	11
16	3778	16
17	3800	17
18	3812	9
19	3840	7
20	3826	11

(Xbar) Mean:	3778.75	11.65
Calculated Chi-Sqr Value:	19.84	22.19

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 16:28
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	4	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1760	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3491	6
2	3599	6
3	3661	6
4	3634	4
5	3546	8
6	3536	10
7	3527	1
8	3621	5
9	3646	6
10	3556	7
11	3604	3
12	3522	7
13	3668	2
14	3573	2
15	3540	2
16	3592	5
17	3567	4
18	3510	7
19	3467	1
20	3638	2

(Xbar) Mean:	3574.90	4.70
Calculated Chi-Sqr Value:	18.02	26.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR 6/1 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 16:55
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	4	**Detector:**	C	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1760	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3430	4
2	3358	6
3	3453	7
4	3514	5
5	3361	1
6	3389	4
7	3367	3
8	3260	2
9	3393	1
10	3461	3
11	3459	3
12	3382	5
13	3387	6
14	3361	4
15	3496	4
16	3376	4
17	3350	1
18	3362	2
19	3327	7
20	3419	6

(Xbar) Mean:	3395.25	3.90
Calculated Chi-Sqr Value:	20.33	17.90

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: D
Voltage: 1760
Conf Level: 95.0 %

Test Date: 07/07/2023 17:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3467	3
2	3487	1
3	3525	2
4	3423	10
5	3394	2
6	3464	4
7	3541	4
8	3513	7
9	3546	3
10	3530	6
11	3469	3
12	3472	9
13	3397	3
14	3446	2
15	3560	4
16	3463	6
17	3474	4
18	3457	6
19	3417	4
20	3338	5

(Xbar) Mean:	3469.15	4.40
Calculated Chi-Sqr Value:	17.89	23.82

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SAR 6/1 **Date:** 7/12/23
Changes Needed: Yes (Circle One)

Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2136

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	16100	dpm	805	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	7694.29	dpm	384.71	dpm

44-9 PROBE
CPM Acceptance Range

1693	**50**	
1354	**1304**	**Low**
2031	**2081**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

3511	**176**	
3160	**2984**	**Low**
3862	**4038**	**High**

Approval: _____ Date:_____

PDF created with pdfFactory trial version www.pdffactory.com

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2137

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	23800	dpm	1190	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11374.16	dpm	568.71	dpm

44-9 PROBE
CPM Acceptance Range

2502	**74**	
2002	**1928**	**Low**
3003	**3077**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5190	**260**	
4671	**4412**	**Low**
5709	**5969**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2139

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	20700	dpm	1040	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.41	years	30.41	years
dilution =	1.00		1.00	
A =	9907.77	dpm	497.78	dpm

44-9 PROBE
CPM Acceptance Range

2180	**65**	
1744	**1679**	**Low**
2616	**2680**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

4521	**227**	
4069	**3842**	**Low**
4973	**5200**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2138

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	25000	dpm	1250	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11947.65	dpm	597.38	dpm

44-9 PROBE
CPM Acceptance Range

2628	**78**	
2103	**2025**	**Low**
3154	**3232**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5452	**273**	
4907	**4634**	**Low**
5997	**6269**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION — Sr-90
124007
ACTIVITY FORMULA — A = Ao(e^^-NT) — **ESC51613**
22J11029

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	25-Aug-22
DATE OF CALIBRATION	01-Jan-23
PREP:	13-Sep-22

Ao	=	940.91	nCi		
N	=	0.02			
T(1/2)	=	28.60	years		
T	=	0.35	years		
dilution	=	1000.00			
A	=	932.92	nCi	SR90/Y90	
A	=	2071.08	dpm/ml	4142.1618	41421.62
A	=	932.92	pCi/ml	1865.8387	8284.324
A	=	932.92	+/-	16.806536	pCi/ml

Uncertainty	0.0173
Weight	0.05%
Volume (1000 ml)	0.50%
CSU	1.80%

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Th230 Source
124007
ESC51614
22I13361

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 25-Aug-22
DATE OF CALIBRATION 01-Jan-23

Ao	=	1011.73	nCi	
N	=	0.00		
T(1/2)	=	77000.00	years	28105000
T	=	0.35	years	
dilution	=	1000.00		
A	=	1011.73	nCi	
A	=	2246.04	dpm/ml	22460.399
A	**=**	1011.73	pCi/ml	

Uncertainty	3.16%
Weight	0.05%
Volume	0.03%
CSU	3.16%

					pCi/l
Activity	**1011.7**	**+/-**	**32.0**	**pCi/ml**	1011730

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RADIUM-228
METHOD: **EPA 904/9320**
SDG# WG2148168

Lab ID	Result	Error	SDWA DL	MDA	UNITS	PREP DATE	ANALYSIS DATE	ANALYST
BLANK WG2148168	0.150	0.238	0.427	0.429	pCi/l	10/12/2023	10/18/2023	DDD3903
LCS WG2148168	5.485	0.255	0.323	0.324	pCi/l	10/12/2023	10/18/2023	DDD3903
MS L1658999-15 WG2148168	11.526	0.662	0.908	0.921	pCi/l	10/12/2023	10/23/2023	DDD3903
MSD L1658999-15 WG2148168	15.554	0.757	0.975	0.988	pCi/l	10/12/2023	10/23/2023	DDD3903
DUP L1658484-02 WG2148168	8.154	0.466	0.601	0.607	pCi/l	10/12/2023	10/18/2023	DDD3903
0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/12/2023	1/0/1900	
0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/12/2023	1/0/1900	
0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/12/2023	1/0/1900	
L1658378-01 WG2148168	3.762	0.388	0.584	0.590	pCi/l	10/12/2023	10/18/2023	DDD3903
L1658379-01 WG2148168	24.619	0.638	0.568	0.573	pCi/l	10/12/2023	10/18/2023	DDD3903
L1658484-01 WG2148168	14.637	0.527	0.576	0.582	pCi/l	10/12/2023	10/18/2023	DDD3903
L1658484-02 WG2148168	9.646	0.519	0.635	0.640	pCi/l	10/12/2023	10/18/2023	DDD3903
L1658484-03 WG2148168	11.870	0.737	0.959	0.968	pCi/l	10/12/2023	10/18/2023	DDD3903
L1658999-15 WG2148168	0.966	0.413	0.714	0.724	pCi/l	10/12/2023	10/23/2023	DDD3903
L1659072-01 WG2148168	1.745	0.565	0.966	0.975	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659072-02 WG2148168	3.315	0.556	0.897	0.905	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659072-03 WG2148168	3.941	0.580	0.924	0.931	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659072-04 WG2148168	4.029	0.686	1.123	1.133	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659074-01 WG2148168	2.007	0.616	1.051	1.060	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659074-02 WG2148168	4.442	0.984	1.647	1.662	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659074-03 WG2148168	5.168	0.747	1.208	1.218	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659074-04 WG2148168	4.421	0.655	1.055	1.064	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659095-01 WG2148168	2.676	0.425	0.692	0.698	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659095-02 WG2148168	2.272	0.465	0.775	0.782	pCi/l	10/12/2023	10/18/2023	DDD3903
L1659095-03 WG2148168	1.729	0.471	0.798	0.805	pCi/l	10/12/2023	10/18/2023	DDD3903
DNRMS L1658999-15 WG2148168	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/12/2023	10/18/2023	DDD3903
DNRMSD L1658999-15 WG2148168	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/12/2023	10/18/2023	DDD3903
DNRL1658999-15 WG2148168	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/l	10/12/2023	10/18/2023	DDD3903

RADIUM-228
METHOD: EPA 904/9320
SDG# WG2148168
ANALYST: DDD3903
PREP DATE: 10/12/23 19:47

Matrix: NPW/DW

LAB ID	sample date	sample size (L)	ingrowth start	decay start	t3 min	count date/end time	counts	UNIT/DET no.	UNIT	DET no.	back CPM	COUNTER EFF	SAMPLE DECAY DAYS	SAMPLE DECAY FACTOR	t1 min	Count Time t2 min	λt_2 $(1-e^{-\lambda t}2)$	1 $(1-e^{-\lambda t}3)$	1 $e^{-\lambda t}1$	Ba % rec	Y %rec	Ra228 pCi/l
BLANK WG2148168	**10/12/23 19:47**	1.000	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:36	328	3A-1	3	1	1.57	44.24	0.02	1.00	126	200	1.200	1.000	1.268	87.9%	82.5%	0.150
LCS WG2148168	**10/12/23 19:47**	1.000	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:36	1013	3A-2	3	2	1.62	44.46	0.02	1.00	126	200	1.200	1.000	1.268	97.0%	100.0%	5.485
MSL1658999-15 WG2148168	9/19/2023 17:39	0.500	10/18/2023 15:11	10/23/2023 14:22	7151	10/23/23 19:47	957	4C-2	4	10	1.98	44.17	0.09	1.01	126	200	1.200	1.000	1.268	76.4%	100.0%	11.526
MSD L1658999-15 WG2148168	9/19/2023 17:39	0.500	10/18/2023 15:11	10/23/2023 14:22	7151	10/23/23 19:47	1015	4C-3	4	11	1.75	45.54	0.09	1.01	126	200	1.200	1.000	1.268	80.0%	81.3%	15.554
DUP L1658484-02 WG2148168	9/21/2023 9:50	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	714	3B-1	3	5	1.20	44.47	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	90.4%	8.154
					0							FALSE	0.00	1.00	-200	200	1.200	#DIV/0!	0.686	0.0%	0.0%	#DIV/0!
					0							FALSE	0.00	1.00	-200	200	1.200	#DIV/0!	0.686	0.0%	0.0%	#DIV/0!
					0							FALSE	0.00	1.00	-200	200	1.200	#DIV/0!	0.686	0.0%	0.0%	#DIV/0!
L1658378-01 WG2148168	9/20/2023 11:00	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	485	3C-1	3	9	1.27	44.92	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	94.6%	3.762
L1658379-01 WG2148168	9/20/2023 10:20	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	1738	3C-2	3	10	1.18	45.76	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	92.3%	24.619
L1658484-01 WG2148168	9/21/2023 12:00	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	1197	3C-3	3	11	1.33	44.83	0.07	1.01	126	200	1.200	1.000	1.268	100.0%	98.1%	14.637
L1658484-02 WG2148168	9/21/2023 9:50	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	670	3C-4	3	12	0.96	45.08	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	76.0%	9.646
L1658484-03 WG2148168	9/21/2023 10:55	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	612	3D-1	3	13	1.04	45.94	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	51.3%	11.870
L1658999-15 WG2148168	9/19/2023 17:39	0.700	10/18/2023 15:11	10/23/2023 14:22	7151	10/23/23 19:47	361	4C-4	4	12	1.54	45.91	0.09	1.01	126	200	1.200	1.000	1.268	85.7%	69.0%	0.966
L1659072-01 WG2148168	9/21/2023 11:00	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	330	3D-3	3	15	1.32	43.62	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	1.745
L1659072-02 WG2148168	9/21/2023 11:02	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	349	3D-4	3	16	1.12	43.48	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	3.315
L1659072-03 WG2148168	9/21/2023 11:03	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	407	4A-1	4	1	1.27	45.75	0.08	1.01	127	200	1.200	1.000	1.271	100.0%	98.1%	3.941
L1659072-04 WG2148168	9/21/2023 11:04	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	531	4A-2	4	2	1.88	44.47	0.08	1.01	127	200	1.200	1.000	1.271	100.0%	100.0%	4.029
L1659074-01 WG2148168	9/21/2023 13:00	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	412	4A-3	4	3	1.67	44.93	0.07	1.01	127	200	1.200	1.000	1.271	100.0%	100.0%	2.007
L1659074-02 WG2148168	9/21/2023 13:04	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	504	4A-4	4	4	1.93	47.52	0.07	1.01	127	200	1.200	1.000	1.271	100.0%	64.6%	4.442
L1659074-03 WG2148168	9/21/2023 13:09	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	632	4B-1	4	5	2.17	45.96	0.07	1.01	128	200	1.200	1.000	1.272	100.0%	96.4%	5.168
L1659074-04 WG2148168	9/21/2023 13:14	0.300	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	520	4B-2	4	6	1.73	45.50	0.07	1.01	128	200	1.200	1.000	1.272	100.0%	100.0%	4.421
L1659095-01 WG2148168	9/21/2023 9:28	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	589	4B-3	4	7	2.07	45.36	0.08	1.01	128	200	1.200	1.000	1.272	100.0%	100.0%	2.676
L1659095-02 WG2148168	9/21/2023 9:29	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	565	4B-4	4	8	2.15	45.25	0.08	1.01	128	200	1.200	1.000	1.272	91.1%	100.0%	2.272
L1659095-03 WG2148168	9/21/2023 9:31	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:38	532	4C-1	4	9	2.16	45.55	0.08	1.01	128	200	1.200	1.000	1.272	94.4%	93.3%	1.729
DNRMSL1658999-15 WG2148168	9/19/2023 17:39	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:36	713	3A-3	3	3	1.44	0.00	0.08	1.01	126	200	1.200	1.000	1.268	92.9%	100.0%	#DIV/0!
DNRMSD L1658999-15 WG2148168	9/19/2023 17:39	0.500	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:36	792	3A-4	3	4	1.50	0.00	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	100.0%	#DIV/0!
DNRL1658999-15 WG2148168	9/19/2023 17:39	0.700	10/13/2023 23:15	10/18/2023 15:11	6716	10/18/23 20:37	241	3D-2	3	14	0.96	0.00	0.08	1.01	126	200	1.200	1.000	1.268	100.0%	72.2%	#DIV/0!
					0								0.00	1.00	0		#DIV/0!	#DIV/0!	1.000	0.0%	0.0%	#DIV/0!

=Average Monthly backgrounds used

RADIUM 228 QC REPORT

METHOD: EPA 904/9320
SDG# WG2148168
ANALYST: DDD3903

QC SPIKE INFORMATION
VOLUME USED: **0.5**
QC ID: TH232-86778-WS1
ACTIVITY: 10.0 pCi/ml

Analyte **Ra228** units pCi/L
Matrix
Sample 658484-02 WG2148168

	RESULT	ERROR	MDA	known	%REC	LIMITS LOW	LIMITS HIGH	RPD		LIMITS	RER		LIMITS
BLANK WG2148168	0.150	0.238	0.429										
LCS WG2148168	5.485	0.255	0.324	5.0	**109.7%**	80%	120%						
L1658484-02 WG2148168	9.646	0.519	0.635										
DUP L1658484-02 WG2148168	8.154	0.466	0.601					**16.8%**		20%	**2.138**	*	2
L1658999-15 WG2148168	0.966	0.413	0.714										
MS L1658999-15 WG2148168	11.53	0.662	0.921	10.0	**105.6%**	70%	130%						
MSD L1658999-15 WG2148168	15.55	0.757	0.988	10.0	**145.9%**	70%	130%	**29.8%**	*	20%	**4.00**	*	2

*** - Outside Control Limits**

SAMPLES:

BLANK WG2148168	L1658484-02 WG21	L1659095-01 WG2148168
LCS WG2148168	L1658484-03 WG21	L1659095-02 WG2148168
MS L1658999-15 WG2148168	L1658999-15 WG21	L1659095-03 WG2148168
MSD L1658999-15 WG2148168	L1659072-01 WG2148168	
DUP L1658484-02 WG2148168	L1659072-02 WG2148168	
0	L1659072-03 WG2148168	
0	L1659072-04 WG2148168	
0	L1659074-01 WG2148168	
L1658378-01 WG2148168	L1659074-02 WG2148168	
L1658379-01 WG2148168	L1659074-03 WG2148168	
L1658484-01 WG2148168	L1659074-04 WG2148168	

10/24/2023

DECAY CALCUALTION

Th-232 Source
ORL# 867-78

ACTIVITY FORMULA A = Ao(e^^-NT)

TH232-86778-WS1

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	15-Feb-02
DATE OF CALIBRATION	12-Oct-23

Ao =	100.40	nCi
N =	0.00	
T(1/2) =	1.41E+10	years
T =	21.67	years
dilution =	1000.00	
A =	100.40	nCi
A =	222.89	dpm/ml
A =	100.40	pCi/ml
Stock =	100	pCi/ml
Stock	100	ml
DI	1000	pCi/ml
WS1 =	10.0	pCi/ml

Pace Analytical

View as PDF (CreatePDF?batchnum=WG2148168)

RA-228 Aqueous Radiochemistry Prep Benchsheet

Batch: WG2148168

Analyst: DDD3903 Prep Start Date/Time: 10/12/23 19:47-10/13/23 18:16 Prep End Date/Time: 10/19/23 18:16 Method: 904 SOP: RAD_02-10 Pipet ID: E-12E-21E-24 Balance ID: RADBAL3
Stirrer ID: ST-2ST-19ST-23ST-27 Hotplate ID: G-72 Centrifuge ID: C-5C-6

LCS/MS Spike: 22F12858 Amt. Used: 0.50 mL Exp. Date:06/03/24 16 mg/mL Barium Carrier: 23H30280 Amt. Used: 2 mL Exp. Date:08/30/24 1M Citric Acid: 23I29949 Amt. Used: 5 mL Exp. Date:01/25/24
Methyl Orange: 23I28767 Amt. Used: 0.20 mL Exp. Date:09/28/24 15 mg/mL Lead Carrier: 23J09234 Amt. Used: 10 mL Exp. Date:10/09/24 10 mg/mL Strontium Carrier: 23H30278 Amt. Used: 2 mL Exp. Date:08/30/24
18 mg/mL Yttrium Carrier: 23J10476 Amt. Used: 1 mL Exp. Date:10/01/24 Ammonium Hydroxide: 23E11487 Amt. Used: 10 mL Exp. Date:10/17/24 1:1 H2SO4: 23J10456 Amt. Used: 10 mL Exp. Date:10/10/24
200 mg/mL Ammonium Sulfate: 23J09231 Amt. Used: 16 mL Exp. Date:10/09/24 Nitric Acid: 23J02143 Amt. Used: 34 mL Exp. Date:10/01/24 0.25N Basic EDTA: 23I14597 Amt. Used: 85 mL Exp. Date:09/14/24
0.9mg/mL each Sr/Y Carrier: 23F16786 Amt. Used: 2 mL Exp. Date:06/01/24 Acetic Acid: 22L30146 Amt. Used: 20 mL Exp. Date:10/26/24 1.5mg/mL Lead Carrier: 23J10479 Amt. Used: 2 mL Exp. Date:10/09/24
2% NH4 Sulfide: 23I11894 Amt. Used: 0.50 mL Exp. Date:09/11/24 9 mg/mL Yttrium Carrier: 23J10477 Amt. Used: 1 mL Exp. Date:10/01/24 18N NaOH: 23J10448 Amt. Used: 5 mL Exp. Date:10/10/24
6N Nitric Acid: 23H30196 Amt. Used: 2 mL Exp. Date:08/30/24 10N NaOH: 23E10276 Amt. Used: 4 mL Exp. Date:05/10/24 1N Nitric Acid: 23H30283 Amt. Used: 3.50 mL Exp. Date:08/30/24
5% Ammonium Oxalate: 23J04596 Amt. Used: 3.50 mL Exp. Date:10/04/24

Sample Number	Collect Date	Sample Vol. (L or filt)	Ac-228 Ingrowth Time	Ac-228 Decay Time	Y Planchet Tare (g)	Y Planchet Gross (g)	Y Planchet Net (g)	Ba Planchet Tare (g)	Ba Planchet Gross (g)	Ba Planchet Net (g)	Review Analyst	Review Date
BLANK		1.000	10/13/23 23:15:00	10/18/23 15:11:00	7.61324	7.63906	0.02582	7.58560	7.63435	0.04875	DDD3903	10/24/23 17:42:55
LCS		1.000	10/13/23 23:15:00	10/18/23 15:11:00	7.60441	7.63908	0.03467	7.58067	7.63445	0.05378	DDD3903	10/24/23 17:42:55
MS(L1658999-15)		0.500	10/18/23 15:11:00	10/23/23 14:22:00	7.60769	7.64253	0.03484	7.61398	7.65632	0.04234	DDD3903	10/24/23 17:42:55
MSD(L1658999-15)		0.500	10/18/23 15:11:00	10/23/23 14:22:00	7.59878	7.62425	0.02547	7.56551	7.60985	0.04434	DDD3903	10/24/23 17:42:55
DUP(L1658484-02)		0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.64387	7.67218	0.02831	7.62290	7.68571	0.06281	DDD3903	10/24/23 17:42:55
1. L1658378-01	09/20/23 11:00	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.59635	7.62597	0.02962	7.61556	7.72702	0.11146	DDD3903	10/24/23 17:42:55
2. L1658379-01	09/20/23 10:20	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.59736	7.62625	0.02889	7.58955	7.65286	0.06331	DDD3903	10/24/23 17:42:55
3. L1658484-01	09/21/23 12:00	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.60125	7.63198	0.03073	7.58508	7.64448	0.0594	DDD3903	10/24/23 17:42:55
4. L1658484-02	09/21/23 09:50	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.61369	7.63750	0.02381	7.59053	7.64914	0.05861	DDD3903	10/24/23 17:42:55
5. L1658484-03	09/21/23 10:55	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.60427	7.62032	0.01605	7.58646	7.65918	0.07272	DDD3903	10/24/23 17:42:55
6. L1658999-15	09/19/23 17:39	0.700	10/18/23 15:11:00	10/23/23 14:22:00	7.60195	7.62356	0.02161	7.62038	7.66791	0.04753	DDD3903	10/24/23 17:42:55
7. L1659072-01	09/21/23 11:00	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.61007	7.64678	0.03671	7.58782	7.65660	0.06878	DDD3903	10/24/23 17:42:55
8. L1659072-02	09/21/23 11:02	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.60404	7.64268	0.03864	7.63801	7.69428	0.05627	DDD3903	10/24/23 17:42:55
9. L1659072-03	09/21/23 11:03	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.63150	7.66222	0.03072	7.60598	7.66994	0.06396	DDD3903	10/24/23 17:42:55
10. L1659072-04	09/21/23 11:04	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.57012	7.60738	0.03726	7.60716	7.67320	0.06604	DDD3903	10/24/23 17:42:55
11. L1659074-01	09/21/23 13:00	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.58708	7.62902	0.04194	7.60651	7.67878	0.07227	DDD3903	10/24/23 17:42:55
12. L1659074-02	09/21/23 13:04	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.59936	7.61959	0.02023	7.64432	7.72256	0.07824	DDD3903	10/24/23 17:42:55
13. L1659074-03	09/21/23 13:09	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.60071	7.63089	0.03018	7.62293	7.69545	0.07252	DDD3903	10/24/23 17:42:55
14. L1659074-04	09/21/23 13:14	0.300	10/13/23 23:15:00	10/18/23 15:11:00	7.63314	7.66983	0.03669	7.63973	7.71456	0.07483	DDD3903	10/24/23 17:42:55
15. L1659095-01	09/21/23 09:28	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.65250	7.69202	0.03952	7.62002	7.68267	0.06265	DDD3903	10/24/23 17:42:55
16. L1659095-02	09/21/23 09:29	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.61182	7.64383	0.03201	7.60495	7.65544	0.05049	DDD3903	10/24/23 17:42:55
17. L1659095-03	09/21/23 09:31	0.500	10/13/23 23:15:00	10/18/23 15:11:00	7.59372	7.62294	0.02922	7.62626	7.67858	0.05232	DDD3903	10/24/23 17:42:55

Comments:
Tubes: 920104 1mL tips: 2243 2mL tips: 2215 10mL tips: 2312 10 mL manaul: P7565750 transfer Pips: 23090149 Q5: 17808280 MS/MSD Failed. Reran to verify.

Reviewed By:DDD3903 on 10/24/23 17:42:55

Yttrium Recovery

9 mg/ml(Y)

Known $Y_2(C_2O_4)_3 \bullet 9H_2O$

Standardized Value	9.22	mg/ml	Y_2	177.8 g/mol
Volume Added	1.00	mL	$Y_2(C_2O_4)_3.9H_2O$	603.8 g/mol
Mass Added	31.31	mg		

LAB ID	TARE(g)	GROSS(g)	NET(g)	Y %rec
BLANK WG2148168	7.61324	7.63906	0.0258	**82%**
LCS WG2148168	7.60441	7.63908	0.0347	**110.7%**
MS L1658999-15 WG2148168	7.60769	7.64253	0.0348	**111.3%**
MSD L1658999-15 WG2148168	7.59878	7.62425	0.0255	**81.3%**
DUP L1658484-02 WG2148168	7.64387	7.67218	0.0283	**90%**
	0		0.0000	**0.0%**
	0		0.0000	**0.0%**
	0		0.0000	**0.0%**
L1658378-01 WG2148168	7.59635	7.62597	0.0296	**94.6%**
L1658379-01 WG2148168	7.59736	7.62625	0.0289	**92.3%**
L1658484-01 WG2148168	7.60125	7.63198	0.0307	**98.1%**
L1658484-02 WG2148168	7.61369	7.6375	0.0238	**76%**
L1658484-03 WG2148168	7.60427	7.62032	0.0161	**51.3%**
L1658999-15 WG2148168	7.60195	7.62356	0.0216	**69.0%**
L1659072-01 WG2148168	7.61007	7.64678	0.0367	**117.2%**
L1659072-02 WG2148168	7.60404	7.64268	0.0386	**123.4%**
L1659072-03 WG2148168	7.6315	7.66222	0.0307	**98.1%**
L1659072-04 WG2148168	7.57012	7.60738	0.0373	**119.0%**
L1659074-01 WG2148168	7.58708	7.62902	0.0419	**134.0%**
L1659074-02 WG2148168	7.59936	7.61959	0.0202	**64.6%**
L1659074-03 WG2148168	7.60071	7.63089	0.0302	**96.4%**
L1659074-04 WG2148168	7.63314	7.66983	0.0367	**117.2%**
L1659095-01 WG2148168	7.6525	7.69202	0.0395	**126.2%**
L1659095-02 WG2148168	7.61182	7.64383	0.0320	**102.2%**
L1659095-03 WG2148168	7.59372	7.62294	0.0292	**93.3%**
DNRMS L1658999-15 WG2148168	7.57771	7.61301	0.0353	**112.7%**
DNRMSD L1658999-15 WG2148168	7.60334	7.63786	0.0345	**110.3%**
DNRL1658999-15 WG2148168	7.60599	7.62859	0.0226	**72.2%**

23J10477 Standardization Date: 10/13/23				
		Y2(C2O4)3.9H2O	Y g/mL	Y mg/mL
Tare (g)	Gross (g)	Net (g)		
7.59263	7.62544	0.03281	0.00966	9.6615
7.60033	7.63026	0.02993	0.00881	8.8134
7.58013	7.61132	0.03119	0.00918	9.1845
			Avg. Y mg/mL	
			9.2198	± 4.61%

Barium Recovery

16 mg/ml(Ba)

Known $BaSO_4$

Standardized Value	16.30	mg/ml	Ba	137	g/mol
volume added	2.00	ml			
	55.43	mg	$BaSO_4$	233	g/mol

23H02773 Standardization Date: 09/06/23				
T	G	N		
7.68681	7.74200	0.05519	0.02759	0.0162
7.68632	7.74218	0.05586	0.02793	0.0164
7.69373	7.74898	0.05525	0.02763	0.0162

16.30 +/- 0.7%

LAB ID		TARE(g)	GROSS(g)	NET(g)	%rec
BLANK WG2148168		7.5856	7.63435	0.0488	**88%**
LCS WG2148168		7.58067	7.63445	0.0538	**97%**
MS L1658999-15 WG2148168		7.61398	7.65632	0.0423	**76%**
MSD L1658999-15 WG2148168		7.56551	7.60985	0.0443	**80%**
DUP L1658484-02 WG2148168		7.6229	7.68571	0.0628	**113%**
	0			0.0000	**0%**
	0			0.0000	**0%**
	0			0.0000	**0%**
L1658378-01 WG2148168		7.61556	7.72702	0.1115	**201%**
L1658379-01 WG2148168		7.58955	7.65286	0.0633	**114%**
L1658484-01 WG2148168		7.58508	7.64448	0.0594	**107%**
L1658484-02 WG2148168		7.59053	7.64914	0.0586	**106%**
L1658484-03 WG2148168		7.58646	7.65918	0.0727	**131%**
L1658999-15 WG2148168		7.62038	7.66791	0.0475	**86%**
L1659072-01 WG2148168		7.58782	7.6566	0.0688	**124%**
L1659072-02 WG2148168		7.63801	7.69428	0.0563	**102%**
L1659072-03 WG2148168		7.60598	7.66994	0.0640	**115%**
L1659072-04 WG2148168		7.60716	7.6732	0.0660	**119%**
L1659074-01 WG2148168		7.60651	7.67878	0.0723	**130%**
L1659074-02 WG2148168		7.64432	7.72256	0.0782	**141%**
L1659074-03 WG2148168		7.62293	7.69545	0.0725	**131%**
L1659074-04 WG2148168		7.63973	7.71456	0.0748	**135%**
L1659095-01 WG2148168		7.62002	7.68267	0.0626	**113%**
L1659095-02 WG2148168		7.60495	7.65544	0.0505	**91%**
L1659095-03 WG2148168		7.62626	7.67858	0.0523	**94%**
DNRM SL1658999-15 WG2148168		7.57686	7.62834	0.0515	**93%**
DNRM SD L1658999-15 WG2148168		7.60561	7.66551	0.0599	**108%**
DNRL1658999-15 WG2148168		7.59397	7.65167	0.0577	**104%**

G542 Runlog Ra-228 Waters WG2148168
Sample order verified by DDD3903

Sample ID	Beta	LT	Det	Analyst	Start	End	
BLANK WG2148168	328	200	3A-1	ALG3788	10/18/2023 17:16	10/18/2023 20:36	
LCS WG2148168	1013	200	3A-2	ALG3788	10/18/2023 17:16	10/18/2023 20:36	
MS L1658999-15 WG2148168	713	200	3A-3	ALG3788	10/18/2023 17:16	10/18/2023 20:36	
MSD L1658999-15 WG2148168	792	200	3A-4	ALG3788	10/18/2023 17:16	10/18/2023 20:36	
DUP L1658484-02 WG2148168	714	200	3B-1	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1658378-01 WG2148168	485	200	3C-1	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1658379-01 WG2148168	1738	200	3C-2	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1658484-01 WG2148168	1197	200	3C-3	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1658484-02 WG2148168	670	200	3C-4	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1658484-03 WG2148168	612	200	3D-1	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1658999-15 WG2148168	241	200	3D-2	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1659072-01 WG2148168	330	200	3D-3	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1659072-02 WG2148168	349	200	3D-4	ALG3788	10/18/2023 17:17	10/18/2023 20:37	
L1659072-03 WG2148168	407	200	4A-1	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659072-04 WG2148168	531	200	4A-2	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659074-01 WG2148168	412	200	4A-3	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659074-02 WG2148168	504	200	4A-4	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659074-03 WG2148168	632	200	4B-1	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659074-04 WG2148168	520	200	4B-2	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659095-01 WG2148168	589	200	4B-3	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659095-02 WG2148168	565	200	4B-4	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
L1659095-03 WG2148168	532	200	4C-1	ALG3788	10/18/2023 17:18	10/18/2023 20:38	
MS L1658999-15 WG2148168	957	200	4C-2	ALG3788	10/23/2023 16:27	10/23/2023 19:47	
MSD L1658999-15 WG2148168	1015	200	4C-3	ALG3788	10/23/2023 16:27	10/23/2023 19:47	rerun to verify
L1658999-15 WG2148168	361	200	4C-4	ALG3788	10/23/2023 16:27	10/23/2023 19:47	

		DET1	DET2	DET3	DET 4	DET 5	DET 6	DET 7	DET 8
	R=	-1	-1	-1	-1	-1	-1	-1	-1
0.06-9.96	B=	-0.114436331	-0.101176383	-0.06638501	-0.146797424	-0.047650538	-0.19393206	-0.159844189	-0.143130686
	A=	43.06076851	45.10758593	43.58466775	45.85913075	37.72861987	37.8330449	43.89967549	44.51114155
	R=	-1	-1	-1	1	-1	1	-1	1
9.96-25.53	B=	-0.034483799	-0.013419403	-0.038523175	0.007211235	-0.012345851	0.019860716	-0.022067463	0.007129905
	A=	42.26444129	44.2335264	43.30716387	44.32520451	37.37698519	35.70366884	42.5274193	43.01454606
	R=	1	1	1	1	1	1	1	1
25.53-43.06	B=	0.090319548	0.094412943	0.102190392	0.090030602	0.105708304	0.071461038	0.077943049	0.087165226
	A=	39.07821184	41.48056662	39.7147465	42.21082605	34.36306262	34.38631262	39.97415094	40.97124431
	R=	-1	-1	-1	-1	-1	-1	-1	-1
43.06-52.25	B=	-0.100312194	-0.087497587	-0.097051129	-0.153637495	-0.149600205	-0.051382441	-0.040326972	-0.048732252
	A=	47.28681466	49.31363402	48.29408642	52.70317433	45.35664701	39.67595285	45.06685803	46.82298972
	R=	-1	-1	-1	-1	-1	-1	-1	-1
52.25-76.72	B=	-0.153522716	-0.167322511	-0.153695213	-0.153298469	-0.195306769	-0.125954176	-0.165908032	-0.162285585
	A=	50.06706441	53.48448628	51.25373981	52.68546023	47.74481499	43.57232599	51.6284684	52.7561514
	R=	1	1	1	1	1	-1	1	1
76.72-103.8	B=	0.03455681	0.040059089	0.019951609	0.04088521	0.023712799	-0.035972127	0.029007768	0.021120648
	A=	35.63760322	37.57416995	37.93155563	37.78768832	30.94163375	36.66890318	36.67452822	38.68522515
	R=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
na	B=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	A=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	R=	-0.78380753	-0.719774123	-0.758364498	-0.754798126	-0.756303896	-0.801950918	-0.783603833	-0.714725114
full	B=	-0.039008477	-0.035525476	-0.037084594	-0.039190514	-0.047974565	-0.039916216	-0.039973077	-0.034221936
	A=	43.00452719	45.26027373	43.88260445	45.81127638	38.51409964	37.66592545	43.89967549	44.51788157

	y = 0.0006x2 - 0.1108x + 46.69(	y = 0.0007x2 - 0.1255x + 48	y = 0.0005x2 - 0.1065x + 46	y = 0.0006x2 - 0.1109x + 47	y = 0.0005x2 - 0.1040x + 47	y = 0.0007x2 - 0.1282x + 47	y = 0.0005x2 - 0.1057x + 46	y = 0.0006x2 - 0.1131x + 47.273
A		0.0006	0.0005	0.0005	0.0006	0.0005	0.0007	0.0005	0.0006
B		-0.1108	-0.1255	-0.1065	-0.1109	-0.104	-0.1282	-0.1057	-0.1131
C		46.696	48.209	46.332	47.722	47.015	47.574	46.302	47.273

SAMPLE ID	NET WT. mg	3A-1 BETA EFF	3A-2 BETA EFF	3A-3 BETA EFF	3A-4 BETA EFF	3B-1 BETA EFF	3B-2 BETA EFF	3B-3 BETA EFF	3B-4 BETA EFF
BLANK WG2148168	25.82	44.2	45.3	43.9	45.3	44.7	44.7	43.9	44.8
LCS WG2148168	34.67	43.6	44.5	43.2	44.6	44.0	44.0	43.2	44.1
MS L1658999-15 WG2148168	34.84	43.6	44.4	43.2	44.6	44.0	44.0	43.2	44.1
MSD L1658999-15 WG2148168	25.47	44.3	45.3	43.9	45.3	44.7	44.8	43.9	44.8
DUP L1658484-02 WG2148168	28.31	44.0	45.1	43.7	45.1	44.5	44.5	43.7	44.6
0	0	46.7	48.2	46.3	47.7	47.0	47.6	46.3	47.3
0	0	46.7	48.2	46.3	47.7	47.0	47.6	46.3	47.3
0	0	46.7	48.2	46.3	47.7	47.0	47.6	46.3	47.3
L1658378-01 WG2148168	29.62	43.9	44.9	43.6	45.0	44.4	44.4	43.6	44.4
L1658379-01 WG2148168	28.89	44.0	45.0	43.7	45.0	44.4	44.5	43.7	44.5
L1658484-01 WG2148168	30.73	43.9	44.8	43.5	44.9	44.3	44.3	43.5	44.4
L1658484-02 WG2148168	23.81	44.4	45.5	44.1	45.4	44.8	44.9	44.1	44.9
L1658484-03 WG2148168	16.05	45.1	46.3	44.8	46.1	45.5	45.7	44.7	45.6
L1658999-15 WG2148168	21.61	44.6	45.7	44.3	45.6	45.0	45.1	44.3	45.1
L1659072-01 WG2148168	36.71	43.4	44.3	43.1	44.5	43.9	43.8	43.1	43.9
L1659072-02 WG2148168	38.64	43.3	44.1	43.0	44.3	43.7	43.7	43.0	43.8
L1659072-03 WG2148168	30.72	43.9	44.8	43.5	44.9	44.3	44.3	43.5	44.4
L1659072-04 WG2148168	37.26	43.4	44.2	43.1	44.4	43.8	43.8	43.1	43.9
L1659074-01 WG2148168	41.94	43.1	43.8	42.7	44.1	43.5	43.4	42.7	43.6
L1659074-02 WG2148168	20.23	44.7	45.9	44.4	45.7	45.1	45.3	44.4	45.2
L1659074-03 WG2148168	30.18	43.9	44.9	43.6	44.9	44.3	44.3	43.6	44.4
L1659074-04 WG2148168	36.69	43.4	44.3	43.1	44.5	43.9	43.8	43.1	43.9
L1659095-01 WG2148168	39.52	43.3	44.0	42.9	44.3	43.7	43.6	42.9	43.7
L1659095-02 WG2148168	32.01	43.8	44.7	43.4	44.8	44.2	44.2	43.4	44.3
L1659095-03 WG2148168	29.22	44.0	45.0	43.6	45.0	44.4	44.4	43.6	44.5
0									
0									
0									

		DET9	DET10	DET11	DET 12	DET 13	DET 14	DET 15	DET 16
	R=	-1	-1	-1	-1	-1	-1	-1	-1
0.06-9.96	B=	-0.079815503	-0.148971885	-0.136564667	-0.158394549	-0.163510927	-0.146882697	-0.167433484	-0.12100235
	A=	41.56107613	42.4621906	42.70246597	38.4616585	42.99913149	42.71321548	42.81912963	41.78050737
	R=	-1	-1	-1	-1	-1	-1	-1	-1
9.96-25.53	B=	-0.045897069	-0.021525265	-0.043186079	-0.022338562	-0.027164125	-0.035351316	-0.043186079	-0.051644369
	A=	41.22324852	41.19282226	41.77241522	37.10654087	41.64111734	41.60236292	41.58162547	41.08970188
	R=	1	1	1	1	1	1	1	1
25.53-43.06	B=	0.095737276	0.11817871	0.120249486	0.090993754	0.077798576	0.090825203	0.089934287	0.076618715
	A=	37.60732369	37.62617979	37.59990525	34.21316685	38.96141959	38.3810764	38.18306253	37.81514533
	R=	-1	-1	-1	-1	-1	-1	1	-1
43.06-52.25	B=	-0.056356713	-0.046573519	-0.045517117	-0.061822442	-0.070549235	-0.050753193	0.010931457	-0.041015929
	A=	44.15649088	44.72041076	44.7378152	41.79343225	45.34927636	44.47744213	41.5849244	42.88049313
	R=	-1	-1	-1	-1	-1	-1	-1	-1
52.25-76.72	B=	-0.168115999	-0.172980426	-0.17946633	-0.143224619	-0.149934769	-0.157214161	-0.181381051	-0.170358465
	A=	49.99591354	51.32517169	51.73666155	45.046696	49.4971705	50.04002768	51.63325297	49.63864065
	R=	1	1	1	1	1	1	1	1
76.72-103.8	B=	0.035040013	0.027324351	0.02205588	0.016927693	0.016460077	0.031252324	0.02560976	0.0267788
	A=	34.40978434	35.95778913	36.27587763	32.75981063	36.73135789	35.58087893	35.75291791	34.51426967
	R=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
na	B=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	A=	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	R=	-0.746899575	-0.678490183	-0.725010271	-0.769086808	-0.823877171	-0.764360142	-0.760439437	-0.821642963
full	B=	-0.036712733	-0.033803466	-0.038671018	-0.035737697	-0.042438665	-0.036897915	-0.040225217	-0.044359558
	A=	41.69887474	42.3501083	42.63121239	38.1814887	42.70437803	42.43782966	42.47223206	41.66383969

	y = 0.0001x2 - 0.0928x + 47.58	y = 0.0003x2 - 0.0468x + 46	y = 0.0006x2 - 0.1179x + 4	y = 0.0007x2 - 0.1244x + 47	y = 0.0006x2 - 0.115x + 47.!	y = 0.0005x2 - 0.0937x + 4(	y = 0.0005x2 - 0.0971x + 46	y = 0.0006x2 - 0.1126x + 46.939
A	0.0001	0.0003	0.0006	0.0007	0.0006	0.0005	0.0005	0.0006
B	-0.0928	-0.0468	-0.1179	-0.1244	-0.1115	-0.0937	-0.0971	-0.1126
C	47.582	46.861	47.891	47.649	47.576	46.135	46.514	46.939

SAMPLE ID	NET WT. mg	3C-1 BETA EFF	3C-2 BETA EFF	3C-3 BETA EFF	3C-4 BETA EFF	3D-1 BETA EFF	3D-2 BETA EFF	3D-3 BETA EFF	3D-4 BETA EFF
BLANK WG2148168	25.82	45.3	45.9	45.2	44.9	45.1	44.0	44.3	44.4
LCS WG2148168	34.67	44.5	45.6	44.5	44.2	44.4	43.5	43.7	43.8
MS L1658999-15 WG2148168	34.84	44.5	45.6	44.5	44.2	44.4	43.5	43.7	43.7
MSD L1658999-15 WG2148168	25.47	45.3	45.9	45.3	44.9	45.1	44.1	44.4	44.5
DUP L1658484-02 WG2148168	28.31	45.0	45.8	45.0	44.7	44.9	43.9	44.2	44.2
0	0	47.6	46.9	47.9	47.6	47.6	46.1	46.5	46.9
0	0	47.6	46.9	47.9	47.6	47.6	46.1	46.5	46.9
0	0	47.6	46.9	47.9	47.6	47.6	46.1	46.5	46.9
L1658378-01 WG2148168	29.62	44.9	45.7	44.9	44.6	44.8	43.8	44.1	44.1
L1658379-01 WG2148168	28.89	45.0	45.8	45.0	44.6	44.9	43.8	44.1	44.2
L1658484-01 WG2148168	30.73	44.8	45.7	44.8	44.5	44.7	43.7	44.0	44.0
L1658484-02 WG2148168	23.81	45.4	45.9	45.4	45.1	45.3	44.2	44.5	44.6
L1658484-03 WG2148168	16.05	46.1	46.2	46.2	45.8	45.9	44.8	45.1	45.3
L1658999-15 WG2148168	21.61	45.6	46.0	45.6	45.3	45.4	44.3	44.6	44.8
L1659072-01 WG2148168	36.71	44.3	45.5	44.4	44.0	44.3	43.4	43.6	43.6
L1659072-02 WG2148168	38.64	44.1	45.5	44.2	43.9	44.2	43.3	43.5	43.5
L1659072-03 WG2148168	30.72	44.8	45.7	44.8	44.5	44.7	43.7	44.0	44.0
L1659072-04 WG2148168	37.26	44.3	45.5	44.3	44.0	44.3	43.3	43.6	43.6
L1659074-01 WG2148168	41.94	43.9	45.4	44.0	43.7	44.0	43.1	43.3	43.3
L1659074-02 WG2148168	20.23	45.7	46.0	45.8	45.4	45.6	44.4	44.8	44.9
L1659074-03 WG2148168	30.18	44.9	45.7	44.9	44.5	44.8	43.8	44.0	44.1
L1659074-04 WG2148168	36.69	44.3	45.5	44.4	44.0	44.3	43.4	43.6	43.6
L1659095-01 WG2148168	39.52	44.1	45.5	44.2	43.8	44.1	43.2	43.5	43.4
L1659095-02 WG2148168	32.01	44.7	45.7	44.7	44.4	44.6	43.6	43.9	43.9
L1659095-03 WG2148168	29.22	45.0	45.7	45.0	44.6	44.8	43.8	44.1	44.2
DNRMS L1658999-15 WG2148168	0.035	47.6	46.9	47.9	47.6	47.6	46.1	46.5	46.9

		DET1	DET2	DET3	DET 4	DET 5	DET 6	DET 7	DET 8
	R=	-1	-1	-1	-1	-1	-1	-1	-1
0-9.33	B=	-0.30128	-0.202656887	-0.197764281	-0.221025618	-0.157250071	-0.193215016	-0.061715503	-0.184631497
	A=	98.27777	96.76738121	95.74790892	99.32366995	98.15203761	99.22516634	97.86934027	96.92915136
	R=	-1	-1	-1	-1	-1	-1	-1	-1
9.33-20	B=	-0.06567	-0.103426499	-0.074229904	-0.162420133	-0.171126572	-0.170976461	-0.116411103	-0.098698001
	A=	96.07955	95.84156169	94.59533317	98.77688077	98.28150537	99.01768063	98.37965021	96.12739185
	R=	-1	-1	-1	-1	-1	-1	-1	-1
20-29.94	B=	-0.79271	-0.871983562	-0.830732931	-0.943849897	-0.852244491	-0.843784888	-0.886566305	-0.922660607
	A=	110.6202	111.212703	109.7253937	114.4054761	111.9038637	112.4738492	113.7827543	112.606644
	R=	-1	-1	-1	1	-1	-1	-1	1
29.94-40.62	B=	-0.08796	-0.0695863	-0.071760872	0.005848849	-0.053014563	-0.083008658	-0.087432787	0.027444597
	A=	89.52004	87.18892894	87.00177029	85.97149562	87.9749197	89.69620883	89.85669673	84.16049415
	R=	1	1	1	1	1	1	1	1
40.62-54.51	B=	0.219439	0.299061857	0.28332176	0.288164867	0.289433299	0.299811386	0.295948432	0.25801076
	A=	77.03359	72.21444077	72.57831378	74.50381896	74.06468753	74.14605865	74.28375164	74.79489661
	R=	-1	-1	-1	-1	-1	-1	-1	-1
54.51-65.39	B=	-0.36126	-0.479106872	-0.45430137	-0.486025914	-0.41897009	-0.491914461	-0.500379247	-0.449148891
	A=	108.6876	114.6324182	112.7861506	116.7049584	112.6797563	117.3030346	117.6915734	113.3421692
	R=	1	1	1	1	1	1	1	1
65.39-76.46	B=	0.356509	0.204732052	0.114809105	0.221588083	0.179918238	0.219924183	0.240252701	0.191059134
	A=	61.75257	69.91619099	75.57201664	70.43407916	73.51844854	70.75590565	69.26165032	71.47896644
	R=	-1	1	1	1	1	1	1	1
76.46-86.61	B=	-0.3818	0.040633872	0.263922918	0.153540807	0.197172906	0.168531944	0.078348418	0.225892769
	A=	118.2037	82.46313779	64.17077449	75.6369739	72.19915658	74.68535623	81.64085181	68.81558666
	R=	-1	-1	-1	-1	-1	-1	-1	-1
86.61-97.4	B=	-0.24515	-0.410960521	-0.010762015	-0.496388651	-0.641044973	-0.546413464	-0.445547409	-0.61825919
	A=	106.3685	121.5757282	87.96123649	131.9273642	144.7972071	136.6067781	127.0154694	141.9275879
	R=	1	1	1	-1	1	1	1	1
97.4-109.7	B=	0.574849	0.536303929	0.049092286	-0.025457671	0.615411526	0.563194001	0.531160307	0.520612628
	A=	26.50052	29.31217077	82.13142757	86.05868677	22.41834414	28.53101092	31.88413778	31.0014728

		y = 0.0011x2 - 0.168x +	y = 0.0012x2 - 0.1750x +	y = 0.0012x2 - 0.1708x +	y = 0.0008x2 - 0.1447x +	y = 0.0012x2 - 0.1706x +	y = 0.0012x2 - 0.1813x +	y = 0.0011x2 - 0.1701x +	y = 0.0011x2 - 0.1627x + 48.566
	A	0.0011	0.0012	0.0013	0.0008	0.0012	0.0012	0.0012	0.0011
	B	-0.1718	-0.1781	-0.1738	-0.1473	-0.1736	-0.1844	-0.1731	-0.1655
	C	49.988	49.44	49.928	50.176	50.102	50.653	50.33	49.422
SAMPLE ID	NET WT. mg	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF
=======	=====	=====	=====	=====	=====	=====	=====	=====	=====
BLANK WG2148168	25.82	46.3	45.6	46.3	46.9	46.4	46.7	46.7	45.9
LCS WG2148168	34.67	45.4	44.7	45.5	46.0	45.5	45.7	45.8	45.0
MS L1658999-15 WG2148168	34.84	45.3	44.7	45.5	46.0	45.5	45.7	45.8	45.0
MSD L1658999-15 WG2148168	25.47	46.3	45.7	46.3	46.9	46.5	46.7	46.7	45.9
DUP L1658484-02 WG2148168	28.31	46.0	45.4	46.0	46.6	46.1	46.4	46.4	45.6
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
L1658378-01 WG2148168	29.62	45.9	45.2	45.9	46.5	46.0	46.2	46.3	45.5
L1658379-01 WG2148168	28.89	45.9	45.3	46.0	46.6	46.1	46.3	46.3	45.6
L1658484-01 WG2148168	30.73	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.4
L1658484-02 WG2148168	23.81	46.5	45.9	46.5	47.1	46.6	46.9	46.9	46.1
L1658484-03 WG2148168	16.05	47.5	46.9	47.5	48.0	47.6	48.0	47.9	47.0
L1658999-15 WG2148168	21.61	46.8	46.2	46.8	47.4	46.9	47.2	47.1	46.4
L1659072-01 WG2148168	36.71	45.2	44.5	45.3	45.8	45.3	45.5	45.6	44.8
L1659072-02 WG2148168	38.64	45.0	44.3	45.2	45.7	45.2	45.3	45.4	44.7
L1659072-03 WG2148168	30.72	45.7	45.1	45.8	46.4	45.9	46.1	46.1	45.4
L1659072-04 WG2148168	37.26	45.1	44.5	45.3	45.8	45.3	45.4	45.5	44.8
L1659074-01 WG2148168	41.94	44.7	44.1	44.9	45.4	44.9	45.0	45.2	44.4
L1659074-02 WG2148168	20.23	47.0	46.3	46.9	47.5	47.1	47.4	47.3	46.5
L1659074-03 WG2148168	30.18	45.8	45.2	45.9	46.5	46.0	46.2	46.2	45.4
L1659074-04 WG2148168	36.69	45.2	44.5	45.3	45.8	45.3	45.5	45.6	44.8
L1659095-01 WG2148168	39.52	44.9	44.3	45.1	45.6	45.1	45.2	45.4	44.6
L1659095-02 WG2148168	32.01	45.6	45.0	45.7	46.3	45.8	46.0	46.0	45.3
L1659095-03 WG2148168	29.22	45.9	45.3	46.0	46.6	46.1	46.3	46.3	45.5
DNRMS L1658999-15 WG21481	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
DNRMSD L1658999-15 WG2148	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
DNRL1658999-15 WG2148168	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4
0	0	50.0	49.4	49.9	50.2	50.1	50.7	50.3	49.4

		DET9	DET10	DET11	DET 12	DET 13	DET 14	DET 15	DET 16
	R=	-1	-1	-1	1	-1	-1	-1	-1
0-9.33	B=	-0.56325	-0.090813633	-0.059655458	0.02017127	-0.039140847	-0.018282896	-0.046179333	-0.000515011
	A=	46.72034	47.82390181	47.04548306	46.65066779	47.95924417	48.77690419	48.52063465	47.63089881
	R=	1	1	-1	-1	-1	-1	-1	-1
9.33-20	B=	0.046685	0.024993486	-0.001951443	-0.023267209	-0.098247668	-0.067549963	-0.119863656	-0.068075351
	A=	41.02965	46.74342139	46.5071046	47.0559488	48.51071081	49.23656593	49.20810938	48.26123678
	R=	1	-1	-1	-1	-1	-1	-1	-1
20-29.94	B=	0.062279	-0.43482355	-0.385838426	-0.369886033	-0.358928834	-0.469387068	-0.343620982	-0.416292993
	A=	40.71776	55.93976213	54.18484425	53.98832527	53.72433412	57.27330803	53.68325591	55.22558962
	R=	1	-1	-1	-1	-1	1	-1	-1
29.94-40.62	B=	0.119077	-0.084583348	-0.027369612	-0.074685297	-0.03321846	0.006973627	-0.011472741	-0.005248967
	A=	39.01724	45.45357046	43.45228796	45.15001523	43.97256553	43.01106882	43.73873757	42.91893146
	R=	1	1	1	1	1	1	1	1
40.62-54.51	B=	0.038572	0.17146905	0.0974387	0.104242113	0.116292224	0.154287552	0.113870671	0.133127787
	A=	42.28734	35.05272205	38.38257432	37.88198386	37.89944154	37.02717721	38.64728817	37.29806775
	R=	-1	-1	1	1	1	-1	1	-1
54.51-65.39	B=	-0.1799	-0.05019986	0.001987384	0.026572066	0.039085228	-0.04158786	0.026645673	-0.000588855
	A=	54.19597	47.13589433	43.58562556	42.11577808	42.10799489	47.70434592	43.40192278	44.58696186
	R=	1	-1	-1	-1	-1	-1	-1	-1
65.39-76.46	B=	0.063662	-0.139622919	-0.195689117	-0.216379352	-0.27743725	-0.173913729	-0.187876021	-0.22817134
	A=	38.26976	52.98326816	56.51169196	58.00237135	62.80539975	56.35713445	57.42949634	59.46858055
	R=	1	1	1	1	1	1	1	1
76.46-86.61	B=	0.069117	0.123242929	0.158511552	0.117483176	0.142573606	0.068012423	0.071010651	0.092392746
	A=	37.85268	32.88454544	29.42950883	32.47524242	30.69136967	37.85946088	37.63502147	34.95825054
	R=	-1	1	1	1	1	1	1	1
86.61-97.4	B=	-0.06531	0.022043575	0.011504223	0.055591373	0.062790789	0.061454815	0.044829358	0.083349948
	A=	49.49578	41.6494215	42.16181364	37.83569154	37.60135943	38.42741531	39.90258323	35.74144727
	R=	1	-1	-1	-1	-1	-1	-1	-1
97.4-109.7	B=	0.250996	-0.230291004	-0.213232411	-0.183933301	-0.219092233	-0.256985748	-0.212841756	-0.236020607
	A=	18.68719	66.22680945	64.05116173	61.16539473	65.05676578	69.44352617	64.99974971	66.8481394

y = 0.0011x2 - 0.171x + y = 0.0011x2 - 0.1655x + y = 0.0012x2 - 0.1704x + y = 0.0011x2 - 0.1600x + y = 0.0011x2 - 0.1617x + y = 0.0009x2 - 0.1458x + y = 0.0010x2 - 0.1544x + y = 0.0011x2 - 0.1663x + 48.087

A	0.0012	0.0011	0.0012	0.001	0.0011	0.001	0.001	0.0011
B	-0.1741	-0.1684	-0.1734	-0.1628	-0.1645	-0.1484	-0.1572	-0.1693
C	49.608	48.701	49.179	48.958	49.436	49.967	49.054	48.936

SAMPLE ID	WT. mg	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF	BETA EFF
BLANK WG2148168	25.82	45.9	45.1	45.5	45.4	45.9	46.8	45.7	45.3
LCS WG2148168	34.67	45.0	44.2	44.6	44.5	45.1	46.0	44.8	44.4
MS L1658999-15 WG2148168	34.84	45.0	44.2	44.6	44.5	45.0	46.0	44.8	44.4
MSD L1658999-15 WG2148168	25.47	46.0	45.1	45.5	45.5	46.0	46.8	45.7	45.3
DUP L1658484-02 WG2148168	28.31	45.6	44.8	45.2	45.2	45.7	46.6	45.4	45.0
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
L1658378-01 WG2148168	29.62	45.5	44.7	45.1	45.0	45.5	46.4	45.3	44.9
L1658379-01 WG2148168	28.89	45.6	44.8	45.2	45.1	45.6	46.5	45.3	45.0
L1658484-01 WG2148168	30.73	45.4	44.6	45.0	44.9	45.4	46.4	45.2	44.8
L1658484-02 WG2148168	23.81	46.1	45.3	45.7	45.6	46.1	47.0	45.9	45.5
L1658484-03 WG2148168	16.05	47.1	46.3	46.7	46.6	47.1	47.8	46.8	46.5
L1658999-15 WG2148168	21.61	46.4	45.6	46.0	45.9	46.4	47.2	46.1	45.8
L1659072-01 WG2148168	36.71	44.8	44.0	44.4	44.3	44.9	45.9	44.6	44.2
L1659072-02 WG2148168	38.64	44.7	43.8	44.3	44.2	44.7	45.7	44.5	44.0
L1659072-03 WG2148168	30.72	45.4	44.6	45.0	44.9	45.4	46.4	45.2	44.8
L1659072-04 WG2148168	37.26	44.8	44.0	44.4	44.3	44.8	45.8	44.6	44.2
L1659074-01 WG2148168	41.94	44.4	43.6	44.0	43.9	44.5	45.5	44.2	43.8
L1659074-02 WG2148168	20.23	46.6	45.7	46.2	46.1	46.6	47.4	46.3	46.0
L1659074-03 WG2148168	30.18	45.4	44.6	45.0	45.0	45.5	46.4	45.2	44.8
L1659074-04 WG2148168	36.69	44.8	44.0	44.4	44.3	44.9	45.9	44.6	44.2
L1659095-01 WG2148168	39.52	44.6	43.8	44.2	44.1	44.7	45.7	44.4	44.0
L1659095-02 WG2148168	32.01	45.3	44.4	44.9	44.8	45.3	46.2	45.0	44.6
L1659095-03 WG2148168	29.22	45.5	44.7	45.1	45.1	45.6	46.5	45.3	44.9
DNRMS L1658999-15 WG21481	35.3	45.0	44.1	44.6	44.5	45.0	46.0	44.8	44.3
DNRMSD L1658999-15 WG2148	34.52	45.0	44.2	44.6	44.5	45.1	46.0	44.8	44.4
DNRL1658999-15 WG2148168	22.6	46.3	45.5	45.9	45.8	46.3	47.1	46.0	45.7
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9
0	0	49.6	48.7	49.2	49.0	49.4	50.0	49.1	48.9

GAS COUNTER G542 Unit: 3 MONTH: October-23
Beta Source Check
23F05880

BETA Activity: **8135.54** **dpm** Count Time: **5** **min**

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4		
DATE	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF	COUNTS	EFF
1																																
2	18243	44.8%	17032	41.9%	17120	42.1%	14990	36.9%	16827	41.4%	18450	45.4%	16860	41.4%	18593	45.7%	18772	46.1%	17178	42.2%	18699	46.0%	17918	44.0%	18988	46.7%	18282	44.9%	16150	39.7%	16135	39.7%
3	16402	40.3%	17809	43.8%	14597	35.9%	18367	45.2%	18287	45.0%	17329	42.6%	18092	44.5%	16915	41.6%	17517	43.1%	18509	45.5%	18293	45.0%	18215	44.8%	18654	45.9%	16475	40.5%	16084	39.5%	18490	45.5%
4	15884	39.0%	17173	42.2%	16143	39.7%	15305	37.6%	18347	45.1%	18106	44.5%	16789	41.3%	18822	46.3%	18854	46.3%	17335	42.6%	17688	43.5%	18199	44.7%	18551	45.6%	18152	44.6%	17860	43.9%	16337	40.2%
5	16936	41.6%	18719	46.0%	18346	45.1%	18617	45.8%	16380	40.3%	18678	45.9%	17952	44.1%	17453	42.9%	18921	46.5%	17487	43.0%	16960	41.7%	16159	39.7%	18853	46.3%	18309	45.0%	14940	36.7%	16799	41.3%
6	17971	44.2%	15049	37.0%	16701	41.1%	19165	47.1%	18514	45.5%	18724	46.0%	15848	39.0%	17946	44.1%	16651	40.9%	18674	45.9%	18444	45.3%	16888	41.5%	17221	42.3%	16524	40.6%	18007	44.3%	18248	44.9%
7																																
8																																
9	16370	40.2%	18775	46.2%	18250	44.9%	18008	44.3%	16824	41.4%	17418	42.8%	14565	35.8%	18681	45.9%	18692	46.0%	16949	41.7%	16581	40.8%	18574	45.7%	16636	40.9%	18054	44.4%	18747	46.1%	18801	46.2%
10	15981	39.3%	18796	46.2%	18332	45.1%	19133	47.0%	18112	44.5%	14851	36.5%	16607	40.8%	18650	45.8%	18433	45.3%	17119	42.1%	19160	47.1%	16548	40.7%	18729	46.0%	16751	41.2%	17196	42.3%	17997	44.2%
11	18251	44.9%	17387	42.7%	16346	40.2%	16472	40.5%	18519	45.5%	18481	45.4%	17866	43.9%	18783	46.2%	18679	45.9%	16812	41.3%	18638	45.8%	17104	42.0%	18536	45.6%	17516	43.1%	16634	40.9%	14977	36.8%
12	16754	41.2%	17966	44.2%	18371	45.2%	18533	45.6%	18712	46.0%	18187	44.7%	18345	45.1%	18596	45.7%	18842	46.3%	16852	41.4%	15185	37.3%	16083	39.5%	18894	46.4%	16408	40.3%	16494	40.5%	16902	41.6%
13	16699	41.1%	17444	42.9%	15621	38.4%	18601	45.7%	18677	45.9%	17482	43.0%	18308	45.0%	16594	40.8%	16628	40.9%	18383	45.2%	18797	46.2%	18287	45.0%	15321	37.7%	18333	45.1%	18072	44.4%	17777	43.7%
14																																
15																																
16	17514	43.1%	19111	47.0%	14483	35.6%	19044	46.8%	17182	42.2%	17115	42.1%	15887	39.1%	18871	46.4%	17151	42.2%	18600	45.7%	16645	40.9%	16276	40.0%	18574	45.7%	18038	44.3%	18330	45.1%	18370	45.2%
17	15778	38.8%	18640	45.8%	17606	43.3%	18888	46.4%	18702	46.0%	17622	43.3%	18847	46.3%	16461	40.5%	18389	45.2%	17234	42.4%	15127	37.2%	18600	45.7%	17477	43.0%	16469	40.5%	17909	44.0%	16098	39.6%
18	18038	44.3%	18640	45.8%	18153	44.6%	17449	42.9%	16561	40.7%	16182	39.8%	16219	39.9%	16724	41.1%	18583	45.7%	18757	46.1%	18742	46.1%	17236	42.4%	18472	45.4%	18235	44.8%	16639	40.9%	15038	37.0%
19	15711	38.6%	17276	42.5%	14587	35.9%	18260	44.9%	17980	44.2%	18254	44.9%	18738	46.1%	18281	44.9%	15164	37.3%	18151	44.6%	16417	40.4%	17963	44.2%	18711	46.0%	15967	39.3%	18480	45.4%	16001	39.3%
20	17299	42.5%	18644	45.8%	15936	39.2%	17372	42.7%	18399	45.2%	16502	40.6%	16279	40.0%	16318	40.1%	18548	45.6%	14982	36.8%	18651	45.9%	16717	41.1%	17094	42.0%	18038	44.3%	18442	45.3%	17848	43.9%
21																																
22																																
23	15770	38.8%	18827	46.3%	15371	37.8%	16329	40.1%	17865	43.9%	18560	45.6%	14850	36.5%	16401	40.3%	18856	46.4%	18965	46.6%	18148	44.6%	16937	41.6%	16487	40.5%	18236	44.8%	16020	39.4%	18126	44.6%
24	15241	37.5%	18728	46.0%	15734	38.7%	14483	35.6%	16281	40.0%	18382	45.2%	16440	40.4%	18215	44.8%	17910	44.0%	18284	44.9%	18512	45.5%	16959	41.7%	18844	46.3%	16810	41.3%	18663	45.9%	16005	39.3%
25																																
26																																
27																																
28																																
29																																
30																																
31																																
average	**16755**	**41.2%**	**18001**	**44.3%**	**16570**	**40.7%**	**17589.2**	**43.2%**	**17774.6**	**43.7%**	**17666.1**	**43.4%**	**16970.1**	**41.7%**	**17783**	**43.7%**	**18035**	**44.3%**	**17663**	**43.4%**	**17687**	**43.5%**	**17333**	**42.6%**	**18002**	**44.3%**	**17447**	**42.9%**	**17333**	**42.6%**	**17056**	**41.9%**
std dev	982	2.41%	1031	0.03	1416	0.03	1529	0.04	887	0.02	1047	0.03	1313	0.03	994	0.02	1067	2.62%	1018	0.03	1286	0.03	864	0.02	1085	2.67%	864	0.02	1146	0.028	1235	0.030
UCL	**19701**	**48.4%**	**21094**	**51.9%**	**20818**	**51.2%**	**22176**	**54.5%**	**20437**	**50.2%**	**20807**	**51.2%**	**20908**	**51.4%**	**20764**	**51.0%**	**21236**	**52.2%**	**20717**	**50.9%**	**21546**	**53.0%**	**19924**	**49.0%**	**21259**	**52.3%**	**20040**	**49.3%**	**20772**	**51.1%**	**20761**	**51.0%**
UWL	**18719**	**46.0%**	**20063**	**49.3%**	**19402**	**47.7%**	**20647**	**50.8%**	**19549**	**48.1%**	**19760**	**48.6%**	**19595**	**48.2%**	**19770**	**48.6%**	**20169**	**49.6%**	**19699**	**48.4%**	**20260**	**49.8%**	**19060**	**46.9%**	**20173**	**49.6%**	**19175**	**47.1%**	**19626**	**48.2%**	**19526**	**48.0%**
LWL	**14792**	**36.4%**	**15939**	**39.2%**	**13739**	**33.8%**	**14532**	**35.7%**	**16000**	**39.3%**	**15572**	**38.3%**	**14345**	**35.3%**	**15795**	**38.8%**	**15900**	**39.1%**	**15627**	**38.4%**	**15115**	**37.2%**	**15606**	**38.4%**	**15832**	**38.9%**	**15718**	**38.6%**	**15041**	**37.0%**	**14585**	**35.9%**
LCL	**13810**	**33.9%**	**14908**	**36.6%**	**12323**	**30.3%**	**13003**	**32.0%**	**15112**	**37.2%**	**14525**	**35.7%**	**13032**	**32.0%**	**14801**	**36.4%**	**14833**	**36.5%**	**14609**	**35.9%**	**13829**	**34.0%**	**14742**	**36.2%**	**14746**	**36.3%**	**14854**	**36.5%**	**13895**	**34.2%**	**13350**	**32.8%**

	AVG
1	41.2%
2	41.2%
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9	41.2%
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18	41.2%
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28	41.2%
29	41.2%
30	41.2%
31	41.2%
	#VALUE!
	#VALUE!

GAS COUNTER G542 Unit: 3 MONTH: Oct-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	3A-1		3A-2		3A-3		3A-4		3B-1		3B-2		3B-3		3B-4		3C-1		3C-2		3C-3		3C-4		3D-1		3D-2		3D-3		3D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	156.3	**1.56**	155.2	**1.55**	123.8	**1.24**	152.3	**1.52**	128.9	**1.29**	103.8	**1.04**	104.2	**1.04**	169.6	**1.70**	98.5	**0.99**	135.4	**1.35**	120.3	**1.20**	94.7	**0.95**	98.1	**0.98**	105.8	**1.06**	91.2	**0.91**	102.6	**1.03**
2	145	**1.45**	162	**1.62**	150	**1.50**	141	**1.41**	155	**1.55**	113	**1.13**	104	**1.04**	168	**1.68**	119	**1.19**	148	**1.48**	118	**1.18**	104	**1.04**	101	**1.01**	94	**0.94**	99	**0.99**	106	**1.06**
3	148	**1.48**	170	**1.70**	117	**1.17**	128	**1.28**	128	**1.28**	96	**0.96**	115	**1.15**	170	**1.70**	99	**0.99**	151	**1.51**	137	**1.37**	127	**1.27**	99	**0.99**	91	**0.91**	91	**0.91**	124	**1.24**
4	149	**1.49**	158	**1.58**	118	**1.18**	150	**1.50**	119	**1.19**	119	**1.19**	102	**1.02**	181	**1.81**	109	**1.09**	128	**1.28**	123	**1.23**	114	**1.14**	112	**1.12**	92	**0.92**	97	**0.97**	121	**1.21**
5	170	**1.70**	160	**1.60**	119	**1.19**	136	**1.36**	118	**1.18**	109	**1.09**	105	**1.05**	157	**1.57**	106	**1.06**	127	**1.27**	108	**1.08**	85	**0.85**	102	**1.02**	99	**0.99**	96	**0.96**	95	**0.95**
6	185	**1.85**	151	**1.51**	132	**1.32**	130	**1.30**	132	**1.32**	97	**0.97**	99	**0.99**	178	**1.78**	108	**1.08**	131	**1.31**	132	**1.32**	103	**1.03**	113	**1.13**	96	**0.96**	105	**1.05**	92	**0.92**
7																																
8																																
9	152	**1.52**	163	**1.63**	132	**1.32**	146	**1.46**	121	**1.21**	99	**0.99**	110	**1.10**	176	**1.76**	114	**1.14**	138	**1.38**	125	**1.25**	104	**1.04**	100	**1.00**	92	**0.92**	109	**1.09**	106	**1.06**
10	170	**1.70**	162	**1.62**	130	**1.30**	141	**1.41**	149	**1.49**	92	**0.92**	257	**2.57**	158	**1.58**	89	**0.89**	146	**1.46**	131	**1.31**	86	**0.86**	87	**0.87**	89	**0.89**	218	**2.18**	97	**0.97**
11	149	**1.49**	156	**1.56**	153	**1.53**	158	**1.58**	126	**1.26**	87	**0.87**	114	**1.14**	197	**1.97**	104	**1.04**	139	**1.39**	125	**1.25**	111	**1.11**	121	**1.21**	111	**1.11**	101	**1.01**	98	**0.98**
12	191	**1.91**	189	**1.89**	135	**1.35**	147	**1.47**	124	**1.24**	111	**1.11**	152	**1.52**	176	**1.76**	99	**0.99**	141	**1.41**	138	**1.38**	111	**1.11**	112	**1.12**	86	**0.86**	145	**1.45**	108	**1.08**
13	173	**1.73**	175	**1.75**	139	**1.39**	143	**1.43**	134	**1.34**	104	**1.04**	119	**1.19**	194	**1.94**	107	**1.07**	150	**1.50**	135	**1.35**	89	**0.89**	97	**0.97**	104	**1.04**	88	**0.88**	77	**0.77**
14																																
15																																
16	157	**1.57**	167	**1.67**	129	**1.29**	128	**1.28**	136	**1.36**	102	**1.02**	118	**1.18**	165	**1.65**	133	**1.33**	126	**1.26**	140	**1.40**	107	**1.07**	97	**0.97**	108	**1.08**	98	**0.98**	71	**0.71**
17	166	**1.66**	150	**1.50**	105	**1.05**	128	**1.28**	151	**1.51**	96	**0.96**	103	**1.03**	191	**1.91**	120	**1.20**	143	**1.43**	178	**1.78**	107	**1.07**	112	**1.12**	97	**0.97**	96	**0.96**	98	**0.98**
18	157	**1.57**	162	**1.62**	144	**1.44**	150	**1.50**	120	**1.20**	103	**1.03**	93	**0.93**	196	**1.96**	127	**1.27**	118	**1.18**	133	**1.33**	96	**0.96**	104	**1.04**	96	**0.96**	132	**1.32**	112	**1.12**
19	133	**1.33**	194	**1.94**	144	**1.44**	136	**1.36**	122	**1.22**	103	**1.03**	117	**1.17**	202	**2.02**	126	**1.26**	168	**1.68**	120	**1.20**	100	**1.00**	87	**0.87**	78	**0.78**	106	**1.06**	84	**0.84**
20	159	**1.59**	167	**1.67**	131	**1.31**	147	**1.47**	133	**1.33**	103	**1.03**	118	**1.18**	168	**1.68**	123	**1.23**	150	**1.50**	139	**1.39**	92	**0.92**	89	**0.89**	90	**0.90**	79	**0.79**	95	**0.95**
21																																
22																																
23	139	**1.39**	155	**1.55**	122	**1.22**	138	**1.38**	130	**1.30**	95	**0.95**	113	**1.13**	171	**1.71**	85	**0.85**	140	**1.40**	149	**1.49**	89	**0.89**	105	**1.05**	88	**0.88**	91	**0.91**	98	**0.98**
24	181	**1.81**	171	**1.71**	136	**1.36**	146	**1.46**	139	**1.39**	95	**0.95**	103	**1.03**	185	**1.85**	111	**1.11**	157	**1.57**	162	**1.62**	97	**0.97**	103	**1.03**	88	**0.88**	98	**0.98**	80	**0.80**
25																																
26																																
27																																
28																																
29																																
30																																
31																																
average	**160**	**1.60**	**165**	**1.65**	**131**	**1.31**	**141**	**1.41**	**131**	**1.31**	**102**	**1.02**	**119**	**1.19**	**178**	**1.78**	**110**	**1.10**	**141**	**1.41**	**134**	**1.34**	**101**	**1.01**	**102**	**1.02**	**95**	**0.95**	**108**	**1.08**	**98**	**0.98**
std dev	16	0.16	12	0.12	12	0.12	9	0.09	11	0.11	8	0.08	37	0.37	14	0.14	13	0.13	12	0.12	17	0.17	11	0.11	9	0.09	8	0.08	32	0.32	14	0.14
UCL	**208**	**2.08**	**200**	**2.00**	**168**	**1.68**	**169**	**1.69**	**165**	**1.65**	**125**	**1.25**	**229**	**2.29**	**219**	**2.19**	**149**	**1.49**	**178**	**1.78**	**184**	**1.84**	**134**	**1.34**	**130**	**1.30**	**120**	**1.20**	**202**	**2.02**	**140**	**1.40**
UWL	**192**	**1.92**	**189**	**1.89**	**156**	**1.56**	**159**	**1.59**	**154**	**1.54**	**117**	**1.17**	**192**	**1.92**	**205**	**2.05**	**136**	**1.36**	**166**	**1.66**	**167**	**1.67**	**123**	**1.23**	**121**	**1.21**	**112**	**1.12**	**171**	**1.71**	**126**	**1.26**
LWL	**128**	**1.28**	**141**	**1.41**	**106**	**1.06**	**123**	**1.23**	**109**	**1.09**	**86**	**0.86**	**46**	**0.46**	**151**	**1.51**	**84**	**0.84**	**116**	**1.16**	**101**	**1.01**	**79**	**0.79**	**83**	**0.83**	**78**	**0.78**	**45**	**0.45**	**70**	**0.70**
LCL	**112**	**1.12**	**129**	**1.29**	**94**	**0.94**	**114**	**1.14**	**98**	**0.98**	**78**	**0.78**	**9**	**0.09**	**137**	**1.37**	**70**	**0.70**	**104**	**1.04**	**84**	**0.84**	**68**	**0.68**	**74**	**0.74**	**69**	**0.69**	**13**	**0.13**	**56**	**0.56**

GAS COUNTER G542 Unit: 4 MONTH: October-23
Beta Source Check
23F05880

BETA Activity: **8135.54** **dpm** Count Time: **5** **min**

DATE	4A-1 COUNTS	4A-1 EFF	4A-2 COUNTS	4A-2 EFF	4A-3 COUNTS	4A-3 EFF	4A-4 COUNTS	4A-4 EFF	4B-1 COUNTS	4B-1 EFF	4B-2 COUNTS	4B-2 EFF	4B-3 COUNTS	4B-3 EFF	4B-4 COUNTS	4B-4 EFF	4C-1 COUNTS	4C-1 EFF	4C-2 COUNTS	4C-2 EFF	4C-3 COUNTS	4C-3 EFF	4C-4 COUNTS	4C-4 EFF	4D-1 COUNTS	4D-1 EFF	4D-2 COUNTS	4D-2 EFF	4D-3 COUNTS	4D-3 EFF	4D-4 COUNTS	4D-4 EFF	AVG
1																																		43.9%
2	16991	41.8%	17856	43.9%	15343	37.7%	19136	47.0%	18944	46.6%	17975	44.2%	18780	46.2%	17246	42.4%	17836	43.8%	17885	44.0%	18518	45.5%	19030	46.8%	19130	47.0%	17033	41.9%	16470	40.5%	18830	46.3%		43.9%
3	16992	41.8%	18029	44.3%	14971	36.8%	18892	46.4%	18907	46.5%	17659	43.4%	18624	45.8%	16931	41.6%	17582	43.2%	17674	43.4%	18336	45.1%	18996	46.7%	19314	47.5%	16938	41.6%	16624	40.9%	18837	46.3%		43.9%
4	17477	43.0%	18721	46.0%	16348	40.2%	19093	46.9%	17717	43.6%	15622	38.4%	17191	42.3%	17111	42.1%	16124	39.6%	18448	45.4%	18570	45.7%	17844	43.9%	18590	45.7%	18632	45.8%	18834	46.3%	18939	46.6%		43.9%
5	15462	38.0%	19184	47.2%	17081	42.0%	17568	43.2%	18069	44.4%	19278	47.4%	19245	47.3%	19121	47.0%	16198	39.8%	17763	43.7%	19057	46.8%	18775	46.2%	19086	46.9%	18355	45.1%	16213	39.9%	17124	42.1%		43.9%
6	19024	46.8%	16357	40.2%	16379	40.3%	15246	37.5%	18460	45.4%	18660	45.9%	19141	47.1%	18068	44.4%	18748	46.1%	16723	41.1%	18609	45.7%	18445	45.3%	16609	40.8%	19169	47.1%	17031	41.9%	17232	42.4%		43.9%
7																																		43.9%
8																																		43.9%
9	18665	45.9%	18865	46.4%	16882	41.5%	19163	47.1%	17526	43.1%	16954	41.7%	19453	47.8%	15448	38.0%	16423	40.4%	17447	42.9%	16346	40.2%	16712	41.1%	19055	46.8%	19207	47.2%	18121	44.5%	18712	46.0%		43.9%
10	18280	44.9%	18375	45.2%	18370	45.2%	15399	37.9%	17612	43.3%	19643	48.3%	17467	42.9%	18752	46.1%	19344	47.6%	18382	45.2%	18451	45.4%	18824	46.3%	17700	43.5%	16790	41.3%	16514	40.6%	16939	41.6%		43.9%
11	18901	46.5%	19063	46.9%	18883	46.4%	17686	43.5%	19222	47.3%	15733	38.7%	19727	48.5%	18603	45.7%	18306	45.0%	16958	41.7%	16507	40.6%	17607	43.3%	17166	42.2%	19048	46.8%	16278	40.0%	16733	41.1%		43.9%
12	16823	41.4%	18177	44.7%	16659	41.0%	18100	44.5%	19231	47.3%	17602	43.3%	19262	47.4%	18763	46.1%	16886	41.5%	17778	43.7%	16383	40.3%	17775	43.7%	18680	45.9%	15678	38.5%	18904	46.5%	18577	45.7%		43.9%
13	16777	41.2%	18908	46.5%	18287	45.0%	19140	47.1%	17385	42.7%	15716	38.6%	18186	44.7%	19032	46.8%	16365	40.2%	15811	38.9%	17673	43.4%	18857	46.4%	17151	42.2%	19503	47.9%	18369	45.2%	18226	44.8%		43.9%
14																																		43.9%
15																																		43.9%
16	19272	47.4%	16384	40.3%	17052	41.9%	18954	46.6%	16879	41.5%	17801	43.8%	19095	46.9%	18390	45.2%	16109	39.6%	18161	44.6%	18653	45.9%	18698	46.0%	19354	47.6%	15629	38.4%	17353	42.7%	19004	46.7%		43.9%
17	19053	46.8%	18958	46.6%	18443	45.3%	16910	41.6%	17903	44.0%	19694	48.4%	16965	41.7%	18553	45.6%	18471	45.4%	16424	40.4%	18857	46.4%	15148	37.2%	17375	42.7%	18455	45.4%	18661	45.9%	16759	41.2%		43.9%
18	19118	47.0%	18521	45.5%	18872	46.4%	18801	46.2%	17332	42.6%	17181	42.2%	17869	43.9%	18819	46.3%	19044	46.8%	16084	39.5%	18653	45.9%	18292	45.0%	17412	42.8%	18350	45.1%	16559	40.7%	15170	37.3%		43.9%
19	16654	40.9%	18583	45.7%	16073	39.5%	19695	48.4%	15613	38.4%	19173	47.1%	17023	41.8%	18602	45.7%	17807	43.8%	18230	44.8%	18597	45.7%	18571	45.7%	17410	42.8%	17584	43.2%	17403	42.8%	18922	46.5%		43.9%
20	19304	47.5%	14872	36.6%	18427	45.3%	18239	44.8%	17298	42.5%	17758	43.7%	18853	46.3%	18841	46.3%	16538	40.7%	15973	39.3%	18402	45.2%	16525	40.6%	17548	43.1%	19225	47.3%	19069	46.9%	18272	44.9%		43.9%
21																																		43.9%
22																																		43.9%
23	17686	43.5%	17363	42.7%	18299	45.0%	16513	40.6%	19254	47.3%	17814	43.8%	18904	46.5%	15037	37.0%	18402	45.2%	16110	39.6%	18759	46.1%	17730	43.6%	18566	45.6%	18250	44.9%	18812	46.2%	16352	40.2%		43.9%
24	16882	41.5%	18041	44.4%	18043	44.4%	19322	47.5%	19135	47.0%	15575	38.3%	17614	43.3%	17336	42.6%	19544	48.0%	18380	45.2%	16342	40.2%	18764	46.1%	16563	40.7%	19233	47.3%	17251	42.4%	18626	45.8%		43.9%
25																																		43.9%
26																																		
27																																		
28																																		
29																																		#VALUE!
30																																		
31																																		#VALUE!
average	**17845**	**43.9%**	**18015**	**44.3%**	**17318**	**42.6%**	**18109.2**	**44.5%**	**18028.6**	**44.3%**	**17637.5**	**43.4%**	**18435.2**	**45.3%**	**17921**	**44.1%**	**17631**	**43.3%**	**17308**	**42.5%**	**18042**	**44.4%**	**18035**	**44.3%**	**18042**	**44.4%**	**18063**	**44.4%**	**17557**	**43.2%**	**17838**	**43.9%**	
std dev	1184	2.91%	1168	0.03	1236	0.03	1369	0.03	1016	0.02	1388	0.03	909	0.02	1229	0.03	1202	2.96%	945	0.02	984	0.02	1061	0.03	969	2.38%	1244	0.03	1046	0.026	1156	0.028		
UCL	**21397**	**52.6%**	**21521**	**52.9%**	**21025**	**51.7%**	**22217**	**54.6%**	**21077**	**51.8%**	**21803**	**53.6%**	**21163**	**52.0%**	**21608**	**53.1%**	**21237**	**52.2%**	**20144**	**49.5%**	**20993**	**51.6%**	**21217**	**52.2%**	**20949**	**51.5%**	**21796**	**53.6%**	**20696**	**50.9%**	**21308**	**52.4%**		
UWL	**20213**	**49.7%**	**20352**	**50.0%**	**19790**	**48.6%**	**20848**	**51.3%**	**20061**	**49.3%**	**20414**	**50.2%**	**20254**	**49.8%**	**20379**	**50.1%**	**20035**	**49.3%**	**19198**	**47.2%**	**20009**	**49.2%**	**20156**	**49.6%**	**19980**	**49.1%**	**20552**	**50.5%**	**19649**	**48.3%**	**20151**	**49.5%**		
LWL	**15476**	**38.0%**	**15678**	**38.5%**	**14847**	**36.5%**	**15370**	**37.8%**	**15996**	**39.3%**	**14861**	**36.5%**	**16617**	**40.9%**	**15463**	**38.0%**	**15227**	**37.4%**	**15417**	**37.9%**	**16074**	**39.5%**	**15914**	**39.1%**	**16104**	**39.6%**	**15575**	**38.3%**	**15464**	**38.0%**	**15526**	**38.2%**		
LCL	**14292**	**35.1%**	**14510**	**35.7%**	**13612**	**33.5%**	**14001**	**34.4%**	**14980**	**36.8%**	**13472**	**33.1%**	**15708**	**38.6%**	**14234**	**35.0%**	**14025**	**34.5%**	**14472**	**35.6%**	**15091**	**37.1%**	**14853**	**36.5%**	**15135**	**37.2%**	**14331**	**35.2%**	**14418**	**35.4%**	**14369**	**35.3%**		

GAS COUNTER G542 Unit: 4 MONTH: Oct-23 BETA BACKGROUND
Beta Background

1 Count Time: 100 min

	4A-1		4A-2		4A-3		4A-4		4B-1		4B-2		4B-3		4B-4		4C-1		4C-2		4C-3		4C-4		4D-1		4D-2		4D-3		4D-4	
DATE	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM	COUNTS	CPM
1	108.5	**1.09**	183.4	**1.83**	136.1	**1.36**	173.4	**1.73**	185.2	**1.85**	178.7	**1.79**	232.4	**2.32**	230.8	**2.31**	252.5	**2.53**	348.9	**3.49**	162.9	**1.63**	139.4	**1.39**	91.7	**0.92**	212.1	**2.12**	116.9	**1.17**	155.1	**1.55**
2	121	**1.21**	175	**1.75**	137	**1.37**	168	**1.68**	174	**1.74**	186	**1.86**	209	**2.09**	246	**2.46**	264	**2.64**	349	**3.49**	167	**1.67**	133	**1.33**	86	**0.86**	243	**2.43**	109	**1.09**	156	**1.56**
3	116	**1.16**	181	**1.81**	130	**1.30**	195	**1.95**	185	**1.85**	181	**1.81**	240	**2.40**	254	**2.54**	209	**2.09**	201	**2.01**	189	**1.89**	155	**1.55**	106	**1.06**	212	**2.12**	115	**1.15**	155	**1.55**
4	145	**1.45**	180	**1.80**	137	**1.37**	184	**1.84**	176	**1.76**	188	**1.88**	235	**2.35**	253	**2.53**	189	**1.89**	147	**1.47**	171	**1.71**	136	**1.36**	104	**1.04**	199	**1.99**	127	**1.27**	152	**1.52**
5	109	**1.09**	190	**1.90**	149	**1.49**	197	**1.97**	191	**1.91**	191	**1.91**	203	**2.03**	206	**2.06**	194	**1.94**	185	**1.85**	160	**1.60**	147	**1.47**	111	**1.11**	196	**1.96**	119	**1.19**	180	**1.80**
6	120	**1.20**	171	**1.71**	137	**1.37**	183	**1.83**	187	**1.87**	172	**1.72**	220	**2.20**	230	**2.30**	190	**1.90**	165	**1.65**	158	**1.58**	130	**1.30**	118	**1.18**	214	**2.14**	90	**0.90**	167	**1.67**
7																																
8																																
9	125	**1.25**	186	**1.86**	137	**1.37**	185	**1.85**	177	**1.77**	169	**1.69**	235	**2.35**	253	**2.53**	215	**2.15**	168	**1.68**	180	**1.80**	162	**1.62**	90	**0.90**	208	**2.08**	116	**1.16**	173	**1.73**
10	131	**1.31**	228	**2.28**	146	**1.46**	170	**1.70**	175	**1.75**	176	**1.76**	214	**2.14**	249	**2.49**	212	**2.12**	181	**1.81**	237	**2.37**	140	**1.40**	112	**1.12**	221	**2.21**	137	**1.37**	195	**1.95**
11	97	**0.97**	196	**1.96**	129	**1.29**	171	**1.71**	190	**1.90**	193	**1.93**	249	**2.49**	239	**2.39**	217	**2.17**	190	**1.90**	177	**1.77**	159	**1.59**	119	**1.19**	217	**2.17**	135	**1.35**	172	**1.72**
12	189	**1.89**	188	**1.88**	125	**1.25**	172	**1.72**	184	**1.84**	184	**1.84**	231	**2.31**	228	**2.28**	230	**2.30**	185	**1.85**	169	**1.69**	163	**1.63**	112	**1.12**	234	**2.34**	85	**0.85**	159	**1.59**
13	138	**1.38**	187	**1.87**	144	**1.44**	189	**1.89**	155	**1.55**	181	**1.81**	240	**2.40**	239	**2.39**	191	**1.91**	180	**1.80**	195	**1.95**	132	**1.32**	103	**1.03**	210	**2.10**	123	**1.23**	147	**1.47**
14																																
15																																
16	96	**0.96**	198	**1.98**	160	**1.60**	197	**1.97**	304	**3.04**	158	**1.58**	271	**2.71**	227	**2.27**	220	**2.20**	190	**1.90**	189	**1.89**	128	**1.28**	111	**1.11**	193	**1.93**	104	**1.04**	142	**1.42**
17	122	**1.22**	169	**1.69**	150	**1.50**	183	**1.83**	218	**2.18**	166	**1.66**	229	**2.29**	234	**2.34**	225	**2.25**	178	**1.78**	173	**1.73**	147	**1.47**	113	**1.13**	210	**2.10**	125	**1.25**	173	**1.73**
18	127	**1.27**	188	**1.88**	167	**1.67**	193	**1.93**	217	**2.17**	173	**1.73**	207	**2.07**	215	**2.15**	216	**2.16**	182	**1.82**	189	**1.89**	129	**1.29**	103	**1.03**	217	**2.17**	122	**1.22**	184	**1.84**
19	129	**1.29**	177	**1.77**	177	**1.77**	172	**1.72**	190	**1.90**	172	**1.72**	216	**2.16**	251	**2.51**	207	**2.07**	200	**2.00**	195	**1.95**	130	**1.30**	84	**0.84**	202	**2.02**	117	**1.17**	155	**1.55**
20	110	**1.10**	162	**1.62**	108	**1.08**	194	**1.94**	209	**2.09**	170	**1.70**	229	**2.29**	253	**2.53**	209	**2.09**	176	**1.76**	165	**1.65**	159	**1.59**	124	**1.24**	237	**2.37**	129	**1.29**	160	**1.60**
21																																
22																																
23	149	**1.49**	198	**1.98**	141	**1.41**	189	**1.89**	187	**1.87**	192	**1.92**	228	**2.28**	237	**2.37**	208	**2.08**	198	**1.98**	165	**1.65**	154	**1.54**	114	**1.14**	227	**2.27**	109	**1.09**	159	**1.59**
24	139	**1.39**	170	**1.70**	144	**1.44**	234	**2.34**	200	**2.00**	205	**2.05**	195	**1.95**	257	**2.57**	199	**1.99**	231	**2.31**	156	**1.56**	152	**1.52**	90	**0.90**	218	**2.18**	108	**1.08**	173	**1.73**
25																																
26																																
27																																
28																																
29																																
30																																
31																																
average	**126**	**1.26**	**185**	**1.85**	**142**	**1.42**	**186**	**1.86**	**195**	**1.95**	**180**	**1.80**	**227**	**2.27**	**239**	**2.39**	**214**	**2.14**	**203**	**2.03**	**178**	**1.78**	**144**	**1.44**	**105**	**1.05**	**215**	**2.15**	**116**	**1.16**	**164**	**1.64**
std dev	22	0.22	15	0.15	16	0.16	16	0.16	31	0.31	12	0.12	18	0.18	14	0.14	20	0.20	56	0.56	20	0.20	13	0.13	12	0.12	14	0.14	14	0.14	14	0.14
UCL	**191**	**1.91**	**230**	**2.30**	**189**	**1.89**	**233**	**2.33**	**289**	**2.89**	**214**	**2.14**	**281**	**2.81**	**282**	**2.82**	**274**	**2.74**	**371**	**3.71**	**236**	**2.36**	**182**	**1.82**	**141**	**1.41**	**256**	**2.56**	**157**	**1.57**	**206**	**2.06**
UWL	**170**	**1.70**	**215**	**2.15**	**173**	**1.73**	**217**	**2.17**	**257**	**2.57**	**203**	**2.03**	**263**	**2.63**	**268**	**2.68**	**254**	**2.54**	**315**	**3.15**	**217**	**2.17**	**169**	**1.69**	**129**	**1.29**	**243**	**2.43**	**143**	**1.43**	**192**	**1.92**
LWL	**83**	**0.83**	**155**	**1.55**	**110**	**1.10**	**155**	**1.55**	**132**	**1.32**	**157**	**1.57**	**191**	**1.91**	**210**	**2.10**	**173**	**1.73**	**91**	**0.91**	**139**	**1.39**	**119**	**1.19**	**81**	**0.81**	**188**	**1.88**	**88**	**0.88**	**137**	**1.37**
LCL	**61**	**0.61**	**140**	**1.40**	**95**	**0.95**	**139**	**1.39**	**101**	**1.01**	**145**	**1.45**	**172**	**1.72**	**196**	**1.96**	**153**	**1.53**	**36**	**0.36**	**119**	**1.19**	**107**	**1.07**	**69**	**0.69**	**174**	**1.74**	**75**	**0.75**	**123**	**1.23**

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16260
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	12004	5166	0
1520	13863	6708	0
1540	14843	7804	0
1560	16319	9266	0
1580	17131	10894	0
1600	17920	12109	0
1620	18305	13681	0
1640	18603	14986	0
1660	18780	16226	0
1680	19052	17211	3
1700	19181	17604	21
1720	19311	18081	72
1740	19737	18651	190
1760	19703	18537	418
1780	19896	18394	837
1800	20150	18236	1361

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16260
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	7167	4783	0
1520	8392	5913	0
1540	9892	7058	0
1560	11301	8437	0
1580	12687	9768	0
1600	13982	10961	0
1620	15217	12507	0
1640	16198	13866	0
1660	16925	15031	0
1680	17426	16071	0
1700	17834	16751	1
1720	18200	17448	3
1740	18310	17693	16
1760	18779	18331	58
1780	18666	18148	123
1800	18983	18353	331

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16261
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	11091	5372	0
1520	13054	6670	0
1540	14491	8024	0
1560	15748	9570	0
1580	16869	11099	0
1600	17413	12116	0
1620	18298	13770	0
1640	18536	15165	0
1660	18978	16493	0
1680	18998	17197	10
1700	19243	17806	31
1720	19299	18210	101
1740	19495	18444	257
1760	19625	18492	519
1780	19861	18467	862
1800	19735	17890	1386

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16261
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	12831	8384	0
1520	14278	9774	0
1540	15606	11358	0
1560	16751	12970	0
1580	17783	14640	0
1600	18319	15529	0
1620	18731	16697	0
1640	19048	17597	0
1660	19377	18400	0
1680	19595	18822	1
1700	19982	19364	1
1720	19800	19268	19
1740	20006	19517	73
1760	19902	19355	181
1780	20357	19607	447
1800	20497	19407	796

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16263
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	13170	5704	0
1520	14574	6942	0
1540	16282	8407	0
1560	17721	10169	0
1580	18402	11555	1
1600	18994	12858	0
1620	19217	14204	0
1640	19993	16240	1
1660	20143	17467	0
1680	20358	18405	4
1700	20575	19020	17
1720	20689	19531	58
1740	20922	19889	193
1760	20833	19675	479
1780	20619	19329	745
1800	21166	19323	1387

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16263
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	8531	6111	0
1520	9916	7285	0
1540	11709	8926	0
1560	13432	10505	0
1580	14810	11971	0
1600	15761	13165	0
1620	16899	14651	0
1640	18148	16327	0
1660	18748	17444	0
1680	18973	18075	0
1700	19584	18859	1
1720	19501	19001	10
1740	20052	19612	68
1760	19773	19328	184
1780	20021	19376	410
1800	20131	19194	744

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:32
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16264
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9016	4240	0
1520	10777	5362	0
1540	12032	6577	0
1560	13683	7883	0
1580	15217	9387	0
1600	15865	10415	0
1620	16805	11733	0
1640	17773	13594	0
1660	18234	14835	0
1680	18603	16112	0
1700	19085	17113	4
1720	18989	17578	35
1740	19342	18239	99
1760	19399	18360	268
1780	19647	18485	539
1800	19596	18229	891

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 13:40
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16264
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	12591	8260	0
1520	13941	9525	0
1540	15299	11065	0
1560	16781	12816	0
1580	17824	14399	0
1600	18251	15394	0
1620	19040	16788	0
1640	19424	17961	1
1660	19635	18547	0
1680	19799	19020	2
1700	20076	19436	1
1720	19999	19561	6
1740	20103	19696	36
1760	20131	19675	140
1780	20809	20201	319
1800	20534	19687	611

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16265
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9557	4464	0
1520	11016	5510	0
1540	12618	6737	0
1560	14432	8206	0
1580	15365	9452	0
1600	16378	10682	0
1620	17519	12377	0
1640	18113	13978	0
1660	18439	15258	0
1680	18625	16286	3
1700	18812	16976	8
1720	19371	18022	35
1740	19459	18394	125
1760	19545	18510	317
1780	19701	18458	637
1800	19761	18167	1073

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16265
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	10547	7481	0
1520	12132	8704	0
1540	13556	10315	0
1560	15256	12161	0
1580	16767	13873	0
1600	17157	14615	0
1620	18293	16292	0
1640	18909	17391	0
1660	19298	18222	0
1680	19738	19032	3
1700	19766	19185	6
1720	19875	19395	36
1740	19889	19426	135
1760	20052	19471	293
1780	20443	19604	606
1800	20365	19146	1022

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16266
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	7834	3800	0
1520	9401	4786	0
1540	10875	5771	0
1560	12514	7041	0
1580	14025	8501	0
1600	15250	9759	0
1620	16200	11113	1
1640	17212	12618	0
1660	18040	14335	0
1680	18478	15699	1
1700	18752	16532	2
1720	19179	17547	16
1740	19252	18024	75
1760	19710	18574	211
1780	19790	18725	426
1800	19847	18527	788

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16266
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	13667	9323	0
1520	14913	10815	0
1540	16216	12356	0
1560	17544	14115	0
1580	18532	15769	0
1600	18910	16652	0
1620	19151	17496	0
1640	19543	18418	0
1660	19571	18776	0
1680	20105	19547	0
1700	20315	19839	2
1720	20253	19831	22
1740	20542	20099	104
1760	20258	19773	220
1780	20707	19986	490
1800	20559	19451	897

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16267
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	9948	5280	1
1520	11630	6461	0
1540	13300	7799	0
1560	14790	9442	0
1580	16094	10823	0
1600	16925	12018	0
1620	17805	13686	0
1640	18406	15144	2
1660	18937	16524	3
1680	19127	17327	24
1700	19582	18217	54
1720	19527	18450	183
1740	19572	18439	399
1760	19777	18491	698
1780	19782	18182	1151
1800	19885	17672	1801

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16267
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	10636	6551	0
1520	12071	7767	0
1540	13936	9389	0
1560	15457	10969	0
1580	16641	12489	0
1600	17353	13492	0
1620	18228	15111	0
1640	18704	16263	0
1660	19343	17607	0
1680	19636	18316	0
1700	19463	18504	0
1720	19930	19200	3
1740	20641	20041	6
1760	20553	20057	37
1780	20267	19793	117
1800	20357	19732	308

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: Yes No (CIrcle One) **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:50
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16268
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 15 - 849	Alpha ROI Counts Chn 850 - 1023
1500	7993	3915	0
1520	9574	4956	0
1540	11254	6165	0
1560	12797	7381	0
1580	14445	8809	0
1600	15455	9892	0
1620	16835	11471	0
1640	17798	13221	0
1660	18752	15008	0
1680	19386	16412	0
1700	19477	17203	6
1720	19818	18175	29
1740	20124	18944	88
1760	20321	19195	299
1780	20253	19068	584
1800	20603	19158	969

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL
User ID: rutter_S
Run Date: 01/16/2023 14:05
System Serial #: 072001

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 23A16268
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 10 - 879	Alpha ROI Counts Chn 880 - 1023
1500	11725	7888	1
1520	13399	9467	0
1540	15176	11175	0
1560	16210	12701	0
1580	17472	14482	0
1600	17736	15146	0
1620	18468	16566	0
1640	18714	17430	0
1660	18977	18046	0
1680	19368	18699	1
1700	19472	18872	9
1720	19878	19363	33
1740	19861	19387	68
1760	19773	19218	245
1780	20181	19437	493
1800	20083	19004	850

Special Notes:

Report Generated: 04/19/2023 **G542HV.RPT ver 2.0**

Collected By: _____ **Date:** _____

Changes Needed: **Yes** **No** **(CIrcle One)** **New Voltage:** _____

Approved By: _____ **Date:** _____

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 11:03
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800

Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2570	2567	3
1520	3092	3088	4
1540	3543	3540	3
1560	4138	4135	3
1580	4479	4476	3
1600	4707	4704	3
1620	5160	5153	7
1640	5503	5496	7
1660	5585	5579	6
1680	5660	5653	7
1700	5732	5726	6
1720	5848	5842	6
1740	5971	5957	14
1760	5928	5900	28
1780	6072	5981	91
1800	6064	5899	165

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR661 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 11:40
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** B **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2137
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2380	2375	5
1520	2900	2898	2
1540	3417	3410	7
1560	3835	3834	1
1580	4344	4342	2
1600	4574	4567	7
1620	4901	4898	3
1640	5109	5099	10
1660	5317	5311	6
1680	5601	5596	5
1700	5630	5621	9
1720	5555	5550	5
1740	5628	5610	18
1760	5727	5695	32
1780	5535	5474	61
1800	5742	5575	167

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (CIrcle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 12:17
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1966	1964	2
1520	2595	2594	1
1540	3063	3059	4
1560	3467	3463	4
1580	3907	3904	3
1600	4132	4130	2
1620	4401	4397	4
1640	4566	4561	5
1660	4747	4742	5
1680	4725	4721	4
1700	4871	4863	8
1720	4902	4896	6
1740	4941	4933	8
1760	4972	4941	31
1780	5070	4999	71
1800	5033	4913	120

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SVR961 **Date:** 7/5/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 12:42
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 1 **Detector:** D **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2136
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2468	2467	1
1520	2875	2874	1
1540	3240	3240	0
1560	3408	3407	1
1580	3768	3766	2
1600	3893	3890	3
1620	3869	3868	1
1640	4051	4051	0
1660	3935	3934	1
1680	3966	3963	3
1700	4142	4140	2
1720	4231	4226	5
1740	4087	4078	9
1760	4110	4090	20
1780	4122	4063	59
1800	4173	4039	134

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 13:05
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** A **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2138
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2327	2327	0
1520	2766	2763	3
1540	3167	3165	2
1560	3615	3612	3
1580	4057	4053	4
1600	4110	4105	5
1620	4285	4285	0
1640	4794	4789	5
1660	4641	4638	3
1680	4807	4800	7
1700	4961	4955	6
1720	4831	4827	4
1740	5084	5069	15
1760	5029	4995	33
1780	4908	4826	82
1800	4979	4823	155

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 13:24
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** B **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2137
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3793	3791	2
1520	4451	4445	6
1540	4940	4935	5
1560	5309	5307	2
1580	5566	5562	4
1600	5515	5510	5
1620	5944	5936	8
1640	6120	6112	8
1660	6128	6122	6
1680	6100	6097	3
1700	6199	6195	4
1720	6176	6162	14
1740	6319	6296	23
1760	6301	6243	58
1780	6268	6147	121
1800	6227	6020	207

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/6/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 14:04
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** C **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2139
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3144	3141	3
1520	3666	3662	4
1540	4055	4050	5
1560	4519	4515	4
1580	4731	4722	9
1600	4884	4883	1
1620	4978	4970	8
1640	5260	5254	6
1660	5321	5315	6
1680	5333	5324	9
1700	5305	5298	7
1720	5351	5339	12
1740	5397	5369	28
1760	5398	5342	55
1780	5439	5338	101
1800	5455	5258	197

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1720
Approved By: [signature] **Date:** 7/6/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 14:27
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 2 **Detector:** D
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2136
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2060	2060	0
1520	2359	2359	0
1540	2784	2783	1
1560	3039	3038	1
1580	3296	3295	1
1600	3523	3522	1
1620	3576	3573	3
1640	3805	3804	1
1660	3929	3924	5
1680	3999	3996	3
1700	3935	3934	1
1720	4089	4086	3
1740	4035	4029	6
1760	4116	4095	21
1780	4013	3943	69
1800	4031	3907	124

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR 961 **Date:** 7/5/23

Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/05/2023 15:39
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** A
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2138
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2004	2001	3
1520	2409	2408	1
1540	2788	2785	3
1560	3232	3231	1
1580	3451	3449	2
1600	3743	3741	2
1620	4050	4045	5
1640	4315	4313	2
1660	4381	4374	7
1680	4500	4492	8
1700	4730	4723	7
1720	4800	4793	7
1740	4815	4812	3
1760	4879	4867	12
1780	4953	4918	35
1800	4846	4783	63

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 16:00
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** B **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2137
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1221	1219	2
1520	1882	1879	3
1540	2557	2556	1
1560	3222	3220	2
1580	3897	3893	4
1600	4250	4249	1
1620	4620	4617	3
1640	5151	5148	3
1660	5505	5499	6
1680	5778	5776	2
1700	5659	5655	4
1720	5967	5962	5
1740	5948	5943	5
1760	5965	5959	6
1780	6101	6082	19
1800	5979	5918	61

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/5/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/11/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 16:18
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** C **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2139
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2183	2181	2
1520	2677	2676	1
1540	3085	3080	5
1560	3555	3552	3
1580	3947	3943	4
1600	4199	4195	4
1620	4528	4523	5
1640	4715	4711	4
1660	4988	4982	6
1680	5256	5243	13
1700	5328	5322	6
1720	5316	5307	9
1740	5270	5264	6
1760	5343	5321	22
1780	5432	5376	56
1800	5405	5283	122

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 715123
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1740
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/05/2023 16:40
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 3 **Detector:** D **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2136
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1503	1503	0
1520	1776	1776	0
1540	2098	2097	1
1560	2484	2484	0
1580	2790	2790	0
1600	3152	3152	0
1620	3355	3354	1
1640	3439	3436	3
1660	3709	3705	4
1680	3731	3729	2
1700	3946	3945	1
1720	3819	3819	0
1740	4000	3996	4
1760	3956	3945	11
1780	4117	4083	34
1800	4110	4021	89

Special Notes:

Report Generated: 07/05/2023 **G542HV.RPT ver 2.0**

Collected By: SNK961 **Date:** 7/5/23

Changes Needed: Yes No (Circle One) **New Voltage:** 1740

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/06/2023 10:08
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** A **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2138
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2299	2296	3
1520	2729	2728	1
1540	3114	3112	2
1560	3595	3594	1
1580	3880	3880	0
1600	4055	4053	2
1620	4394	4390	4
1640	4647	4646	1
1660	4862	4861	1
1680	4793	4789	4
1700	4885	4882	3
1720	4990	4981	9
1740	4920	4910	10
1760	5029	4989	40
1780	4970	4893	77
1800	5172	5044	128

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SNR461 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1740
Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:28
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** B
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2137
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	3319	3318	1
1520	3872	3868	4
1540	4425	4421	4
1560	4759	4755	4
1580	5125	5120	5
1600	5482	5477	5
1620	5755	5751	4
1640	5641	5636	5
1660	5943	5938	5
1680	6001	5997	4
1700	6153	6140	13
1720	6059	6051	8
1740	6227	6218	9
1760	6184	6172	12
1780	6312	6285	27
1800	6267	6201	66

Special Notes:

Report Generated: 07/06/2023 G542HV.RPT ver 2.0

Collected By: SWR 661 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2
User ID: Meier
Run Date: 07/06/2023 10:45
System Serial #: 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** C
Starting Voltage: 1500
Voltage Step: 20
Ending Voltage: 1800
Plot Mode: Gross/Alpha/Beta
Source Certificate: 92SR470-2139
Isotope: Sr-90
Emission Type: Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	2164	2164	0
1520	2616	2615	1
1540	3174	3171	3
1560	3445	3443	2
1580	4012	4012	0
1600	4422	4415	7
1620	4652	4646	6
1640	4799	4798	1
1660	4929	4923	6
1680	5251	5248	3
1700	5147	5141	6
1720	5188	5183	5
1740	5244	5240	4
1760	5235	5228	7
1780	5387	5370	17
1800	5426	5374	52

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SWR 961 **Date:** 7/6/23
Changes Needed: Yes No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/11/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W High Voltage Plateau

Machine Name: PEPPER MILL 2 **Run Date:** 07/06/2023 11:37
User ID: Meier **System Serial #:** 062201

Counting Time: 1 min 0 sec
Drawer Number: 4 **Detector:** D **Plot Mode:** Gross/Alpha/Beta
Starting Voltage: 1500 **Source Certificate:** 92SR470-2136
Voltage Step: 20 **Isotope:** Sr-90
Ending Voltage: 1800 **Emission Type:** Beta

Voltage	Gross ROI Counts Chn 1 - 1024	Beta ROI Counts Chn 1 - 899	Alpha ROI Counts Chn 900 - 1023
1500	1075	1075	0
1520	1388	1388	0
1540	1709	1708	1
1560	2025	2023	2
1580	2402	2402	0
1600	2465	2463	2
1620	2869	2867	2
1640	3177	3173	4
1660	3334	3333	1
1680	3628	3624	4
1700	3690	3689	1
1720	3789	3787	2
1740	3794	3789	5
1760	3929	3925	4
1780	3949	3940	9
1800	3943	3914	29

Special Notes:

Report Generated: 07/06/2023 **G542HV.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/6/23
Changes Needed: (Yes) No (Circle One) **New Voltage:** 1760
Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 11:14
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3909	4
2	3913	4
3	3845	4
4	3765	2
5	3934	2
6	3831	2
7	3736	4
8	3855	2
9	3842	1
10	3773	5
11	3711	1
12	3880	2
13	3734	2
14	3840	6
15	3786	4
16	3833	6
17	3894	8
18	3809	4
19	3813	6
20	3811	1

(Xbar) Mean:	3825.70	3.50
Calculated Chi-Sqr Value:	19.34	21.43

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR661 **Date:** 7/7/23

Changes Needed: **Yes** **No** **(Circle One)**

Approved By: _____ **Date:** 7/12/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 11:35
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3333	2
2	3371	2
3	3361	3
4	3399	5
5	3425	1
6	3439	5
7	3412	2
8	3279	2
9	3298	1
10	3432	1
11	3423	1
12	3520	0
13	3366	2
14	3339	3
15	3372	4
16	3334	7
17	3342	1
18	3456	4
19	3441	2
20	3390	1

(Xbar) Mean:	3386.60	2.45
Calculated Chi-Sqr Value:	19.15	24.06

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREC1 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 1
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 11:57
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3387	6
2	3412	4
3	3269	2
4	3357	12
5	3431	12
6	3472	7
7	3386	6
8	3354	6
9	3455	10
10	3463	10
11	3500	4
12	3436	6
13	3386	16
14	3426	9
15	3415	5
16	3292	11
17	3493	9
18	3367	5
19	3362	3
20	3438	5

(Xbar) Mean:	3405.05	7.40
Calculated Chi-Sqr Value:	20.84	33.08

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNREGI **Date:** 7/7/23
Changes Needed: Yes No (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 12:22
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	1	**Detector:**	D	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3494	8
2	3512	8
3	3492	4
4	3554	7
5	3544	15
6	3528	10
7	3544	4
8	3608	6
9	3644	4
10	3697	11
11	3468	8
12	3530	2
13	3536	10
14	3451	10
15	3501	8
16	3587	6
17	3573	6
18	3534	4
19	3553	8
20	3555	10

(Xbar) Mean:	3545.25	7.45
Calculated Chi-Sqr Value:	17.93	24.29

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SW REG 1 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 12:45
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3865	2
2	3693	5
3	3808	6
4	3875	4
5	3755	2
6	3823	5
7	3856	3
8	3839	6
9	3754	1
10	3768	5
11	3889	4
12	3766	3
13	3711	6
14	3857	4
15	3776	6
16	3742	7
17	3757	3
18	3817	6
19	3794	4
20	3895	5

(Xbar) Mean:	3802.00	4.35
Calculated Chi-Sqr Value:	17.63	11.62

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREGI **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 13:12
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3457	0
2	3620	2
3	3579	1
4	3541	1
5	3583	1
6	3614	2
7	3518	3
8	3498	1
9	3595	3
10	3548	2
11	3595	2
12	3586	3
13	3577	6
14	3453	0
15	3622	3
16	3538	4
17	3511	5
18	3514	2
19	3577	1
20	3554	2

(Xbar) Mean:	3554.00	2.20
Calculated Chi-Sqr Value:	13.35	20.55

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWRGLI **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: [signature] **Date:** 7/10/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 13:33
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	C	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1720	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3392	5
2	3358	3
3	3430	3
4	3488	2
5	3425	5
6	3518	2
7	3557	11
8	3415	3
9	3492	4
10	3487	9
11	3518	3
12	3400	4
13	3468	7
14	3496	2
15	3517	3
16	3451	5
17	3405	7
18	3411	5
19	3477	6
20	3463	3

(Xbar) Mean:	3458.40	4.60
Calculated Chi-Sqr Value:	14.98	24.09

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWREGI **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:01
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	2	**Detector:**	D	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3593	14
2	3523	11
3	3398	9
4	3426	11
5	3424	10
6	3573	11
7	3436	5
8	3505	3
9	3459	6
10	3612	13
11	3481	6
12	3554	9
13	3526	6
14	3397	10
15	3541	12
16	3585	10
17	3512	8
18	3485	11
19	3596	5
20	3577	8

(Xbar) Mean:	3510.15	8.90
Calculated Chi-Sqr Value:	26.05	18.63

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/11/23

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3758	2
2	3685	6
3	3742	5
4	3586	3
5	3662	4
6	3737	6
7	3756	3
8	3765	3
9	3479	3
10	3770	6
11	3701	4
12	3697	2
13	3797	3
14	3705	6
15	3652	6
16	3630	9
17	3718	8
18	3656	4
19	3659	5
20	3674	2

(Xbar) Mean:	3691.45	4.50
Calculated Chi-Sqr Value:	27.65	16.67

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/7/23

Changes Needed: Yes No (Circle One)

Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3179	0
2	3177	1
3	3298	0
4	3254	0
5	3262	2
6	3321	0
7	3368	1
8	3382	0
9	3397	0
10	3463	0
11	3369	0
12	3378	1
13	3390	1
14	3340	1
15	3287	0
16	3384	1
17	3390	1
18	3371	4
19	3341	2
20	3343	1

(Xbar) Mean:	3334.70	0.00
Calculated Chi-Sqr Value:	30.43	0.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR961 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	C	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3437	2
2	3384	2
3	3352	1
4	3332	1
5	3354	4
6	3353	3
7	3367	3
8	3358	1
9	3316	6
10	3355	5
11	3396	2
12	3393	2
13	3404	6
14	3415	0
15	3347	4
16	3413	3
17	3377	5
18	3392	3
19	3481	6
20	3391	5

(Xbar) Mean:	3380.85	3.20
Calculated Chi-Sqr Value:	8.28	20.38

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes: rerun to verify 7/7/23

Report Generated: 07/07/2023 G542CHISQR.RPT ver 2.0

Collected By: SNR461 **Date:** 7/7/23

~~Changes Needed:~~ Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 14:23
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	3	**Detector:**	D	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3421	6
2	3439	3
3	3529	1
4	3451	8
5	3363	3
6	3408	6
7	3478	6
8	3514	5
9	3489	4
10	3538	0
11	3556	2
12	3579	7
13	3514	2
14	3509	3
15	3531	2
16	3403	2
17	3462	2
18	3510	6
19	3487	5
20	3436	4

(Xbar) Mean:	3480.85	3.85
Calculated Chi-Sqr Value:	17.58	23.52

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR661 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 3
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: C
Voltage: 1740
Conf Level: 95.0 %

Test Date: 07/07/2023 15:13
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3427	4
2	3425	5
3	3312	4
4	3360	1
5	3385	1
6	3294	4
7	3296	6
8	3340	5
9	3450	5
10	3358	1
11	3313	2
12	3458	6
13	3321	2
14	3402	5
15	3485	4
16	3360	2
17	3431	5
18	3442	2
19	3357	6
20	3366	3

(Xbar) Mean:	3379.10	3.65
Calculated Chi-Sqr Value:	18.89	16.04

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR&G (Circle One) **Date:** 7/12/23

Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 16:06
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	4	**Detector:**	A	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1740	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3836	11
2	3838	10
3	3687	20
4	3756	9
5	3715	16
6	3719	6
7	3789	11
8	3796	10
9	3809	10
10	3740	15
11	3876	15
12	3857	7
13	3642	11
14	3697	11
15	3762	11
16	3778	16
17	3800	17
18	3812	9
19	3840	7
20	3826	11

(Xbar) Mean:	3778.75	11.65
Calculated Chi-Sqr Value:	19.84	22.19

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR961 **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 16:28
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	4	**Detector:**	B	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1760	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3491	6
2	3599	6
3	3661	6
4	3634	4
5	3546	8
6	3536	10
7	3527	1
8	3621	5
9	3646	6
10	3556	7
11	3604	3
12	3522	7
13	3668	2
14	3573	2
15	3540	2
16	3592	5
17	3567	4
18	3510	7
19	3467	1
20	3638	2

(Xbar) Mean:	3574.90	4.70
Calculated Chi-Sqr Value:	18.02	26.00

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SNR261 **Date:** 7/7/23

Changes Needed: Yes (Circle One)

Approved By: [signature] **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name:	PEPPER MILL 2			**Test Date:**	07/07/2023 16:55
USER ID:	Meier			**System Serial #:**	062201
Acq. Mode:	Alpha/Beta			**Number of Counts Performed:**	20
Drawer Number:	4	**Detector:**	C	**Source Certificate:**	23F04839
Counting Time:	1 min 0 sec	**Voltage:**	1760	**Isotope:**	Sr-90
Degrees of Freedom:	N - 1	**Conf Level:**	95.0 %	**Emission Type:**	Beta

Count	Beta ROI Counts	Alpha ROI Counts
#	Chn 1- 899	Chn 900 - 1023
1	3430	4
2	3358	6
3	3453	7
4	3514	5
5	3361	1
6	3389	4
7	3367	3
8	3260	2
9	3393	1
10	3461	3
11	3459	3
12	3382	5
13	3387	6
14	3361	4
15	3496	4
16	3376	4
17	3350	1
18	3362	2
19	3327	7
20	3419	6

(Xbar) Mean:	3395.25	3.90
Calculated Chi-Sqr Value:	20.33	17.90

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SWR&G **Date:** 7/7/23

Changes Needed: Yes (No) (Circle One)

Approved By: _____ **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

Pace Analytical
G-542W Chi-Square Calculation Report

Machine Name: PEPPER MILL 2
USER ID: Meier
Acq. Mode: Alpha/Beta
Drawer Number: 4
Counting Time: 1 min 0 sec
Degrees of Freedom: N - 1
Detector: D
Voltage: 1760
Conf Level: 95.0 %

Test Date: 07/07/2023 17:23
System Serial #: 062201
Number of Counts Performed: 20
Source Certificate: 23F04839
Isotope: Sr-90
Emission Type: Beta

Count #	Beta ROI Counts Chn 1- 899	Alpha ROI Counts Chn 900 - 1023
1	3467	3
2	3487	1
3	3525	2
4	3423	10
5	3394	2
6	3464	4
7	3541	4
8	3513	7
9	3546	3
10	3530	6
11	3469	3
12	3472	9
13	3397	3
14	3446	2
15	3560	4
16	3463	6
17	3474	4
18	3457	6
19	3417	4
20	3338	5

(Xbar) Mean:	3469.15	4.40
Calculated Chi-Sqr Value:	17.89	23.82

Chi-Sqr Table Limits: **Max:** 32.90 **Min:** 8.91

Special Notes:

Report Generated: 07/07/2023 **G542CHISQR.RPT ver 2.0**

Collected By: SAIREG I **Date:** 7/7/23
Changes Needed: Yes (Circle One)

Approved By: **Date:** 7/12/23

Gamma Products Inc 7730 w 114 Pl Palos Hills IL 60465 Phone 708-974-4100 Website www.gammaproducts.com

DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2136

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	16100	dpm	805	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	7694.29	dpm	384.71	dpm

44-9 PROBE
CPM Acceptance Range

1693	**50**	
1354	**1304**	**Low**
2031	**2081**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

3511	**176**	
3160	**2984**	**Low**
3862	**4038**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2137

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	23800	dpm	1190	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11374.16	dpm	568.71	dpm

44-9 PROBE
CPM Acceptance Range

2502	**74**	
2002	**1928**	**Low**
3003	**3077**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5190	**260**	
4671	**4412**	**Low**
5709	**5969**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2139

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	20700	dpm	1040	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.41	years	30.41	years
dilution =	1.00		1.00	
A =	9907.77	dpm	497.78	dpm

44-9 PROBE
CPM Acceptance Range

2180	**65**	
1744	**1679**	**Low**
2616	**2680**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

4521	**227**	
4069	**3842**	**Low**
4973	**5200**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION

Sr-90/Y90
No. 92SR470-2138

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 11-May-92
DATE OF CALIBRATION 23-Oct-22

			uncert	
Ao =	25000	dpm	1250	dpm
N =	0.02		0.02	
T(1/2) =	28.60	years	28.60	years
T =	30.47	years	30.47	years
dilution =	1.00		1.00	
A =	11947.65	dpm	597.38	dpm

44-9 PROBE
CPM Acceptance Range

2628	**78**	
2103	**2025**	**Low**
3154	**3232**	**High**

Gamma Products G5020-400
Efficienc 0.4563
CPM Acceptance Range

5452	**273**	
4907	**4634**	**Low**
5997	**6269**	**High**

Approval: _____ Date:_____

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DECAY CALCUALTION — Sr-90
124007
ACTIVITY FORMULA — A = Ao(e^^-NT) — **ESC51613**
22J11029

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	25-Aug-22
DATE OF CALIBRATION	01-Jan-23
PREP:	13-Sep-22

Ao	=	940.91	nCi		
N	=	0.02			
T(1/2)	=	28.60	years		
T	=	0.35	years		
dilution	=	1000.00			
A	=	932.92	nCi	SR90/Y90	
A	=	2071.08	dpm/ml	4142.1618	41421.62
A	=	932.92	pCi/ml	1865.8387	8284.324
A	=	932.92	+/-	16.806536	pCi/ml

Uncertainty	0.0173
Weight	0.05%
Volume (1000 ml)	0.50%
CSU	1.80%

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DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Th230 Source
124007
ESC51614
22I13361

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 25-Aug-22
DATE OF CALIBRATION 01-Jan-23

Ao	=	1011.73	nCi	
N	=	0.00		
T(1/2)	=	77000.00	years	28105000
T	=	0.35	years	
dilution	=	1000.00		
A	=	1011.73	nCi	
A	=	2246.04	dpm/ml	22460.399
A	**=**	1011.73	pCi/ml	

Uncertainty	3.16%
Weight	0.05%
Volume	0.03%
CSU	3.16%

					pCi/l
Activity	**1011.7**	**+/-**	**32.0**	**pCi/ml**	1011730

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LANL ER200M Radiochemistry

Radiochemistry Raw Data

THORIUM-ISOTOPIC
METHOD: LANL ER200M
WG# WG2143393

	Th232				Th230				Th228						PREP	DATE	
LAB ID	**Result**	**2 σ Error**	**MDA**	**CSU**	**Result**	**2 σ Error**	**MDA**	**CSU**	**Result**	**2 σ Error**	**MDA**	**CSU**	**Units**	**Q**	**DATE**	**COUNTED**	**ANALYST**
BLANK WG2143393	0.071	0.049	0.073	0.015	0.089	0.082	0.132	0.027	0.060	0.049	0.077	0.015	pCi/l		10/03/23	10/04/23	RGT870
LCS WG2143393	1.671	0.152	0.041	0.099	1.598	0.158	0.101	0.105	1.665	0.153	0.051	0.100	pCi/l		10/03/23	10/04/23	RGT870
MS L1655833-06 WG2143393	8.521	0.742	0.181	0.520	8.553	0.779	0.441	0.562	7.799	0.718	0.250	0.487	pCi/l		10/03/23	10/04/23	RGT870
MSD L1655833-06 WG2143393	7.782	0.628	0.189	0.437	7.950	0.668	0.400	0.479	7.912	0.636	0.207	0.443	pCi/l		10/03/23	10/04/23	RGT870
DUP L1655833-07 WG2143393	0.086	0.119	0.248	0.035	0.426	0.336	0.524	0.111	-0.011	0.171	0.351	0.047	pCi/l		10/03/23	10/04/23	RGT870
L1655833-06 WG2143393	0.235	0.135	0.196	0.050	0.049	0.266	0.485	0.101	0.066	0.182	0.334	0.060	pCi/l		10/03/23	10/04/23	RGT870
L1655833-07 WG2143393	0.159	0.147	0.266	0.043	0.654	0.397	0.581	0.125	0.146	0.235	0.409	0.063	pCi/l		10/03/23	10/04/23	RGT870
L1655848-01 WG2143393	0.761	0.262	0.224	0.082	0.627	0.369	0.539	0.118	0.045	0.244	0.439	0.065	pCi/l		10/03/23	10/04/23	RGT870
L1655848-02 WG2143393	0.428	0.210	0.252	0.066	0.305	0.319	0.526	0.106	0.243	0.210	0.330	0.062	pCi/l		10/03/23	10/04/23	RGT870
L1655848-03 WG2143393	0.344	0.153	0.181	0.061	0.065	0.241	0.438	0.099	0.369	0.197	0.267	0.075	pCi/l		10/03/23	10/04/23	RGT870
L1656521-01 WG2143393	0.124	0.103	0.198	0.038	0.331	0.295	0.475	0.117	18.604	1.172	0.235	0.781	pCi/l		10/03/23	10/04/23	RGT870
L1657009-01 WG2143393	0.277	0.138	0.181	0.053	-0.069	0.222	0.438	0.088	0.160	0.107	0.181	0.041	pCi/l		10/03/23	10/04/23	RGT870
L1657009-02 WG2143393	0.386	0.186	0.219	0.061	0.981	0.397	0.521	0.140	0.066	0.130	0.274	0.038	pCi/l		10/03/23	10/04/23	RGT870
L1657009-03 WG2143393	0.181	0.105	0.164	0.043	0.019	0.221	0.409	0.094	0.102	0.110	0.206	0.042	pCi/l		10/03/23	10/04/23	RGT870
L1657009-04 WG2143393	0.352	0.156	0.184	0.061	0.198	0.263	0.447	0.106	0.249	0.183	0.278	0.066	pCi/l		10/03/23	10/04/23	RGT870
L1657009-05 WG2143393	0.312	0.152	0.194	0.061	-0.062	0.227	0.446	0.094	0.251	0.157	0.232	0.060	pCi/l		10/03/23	10/04/23	RGT870
L1657984-01 WG2143393	0.287	0.153	0.203	0.060	-0.172	0.238	0.496	0.095	0.248	0.188	0.289	0.070	pCi/l		10/03/23	10/04/23	RGT870
L1658999-06 WG2143393	0.207	0.125	0.190	0.054	-0.122	0.233	0.469	0.104	0.405	0.185	0.225	0.080	pCi/l		10/03/23	10/04/23	RGT870
L1658999-07 WG2143393	0.312	0.150	0.189	0.067	-0.469	0.158	0.453	0.070	0.383	0.173	0.207	0.076	pCi/l		10/03/23	10/04/23	RGT870
L1658999-08 WG2143393	4.071	0.554	0.257	0.258	1.588	0.425	0.480	0.183	10.735	0.885	0.207	0.529	pCi/l		10/03/23	10/12/23	RGT870
L1658999-09 WG2143393	4.071	0.534	0.242	0.254	1.784	0.427	0.463	0.191	9.922	0.827	0.255	0.481	pCi/l		10/03/23	10/12/23	RGT870
L1658999-10 WG2143393	3.378	0.451	0.172	0.235	1.868	0.403	0.423	0.203	9.439	0.757	0.219	0.488	pCi/l		10/03/23	10/12/23	RGT870
L1658999-11 WG2143393	0.458	0.223	0.258	0.062	0.315	0.336	0.556	0.097	0.165	0.154	0.272	0.041	pCi/l		10/03/23	10/04/23	RGT870
L1658999-12 WG2143393	0.026	0.072	0.203	0.029	0.806	0.333	0.451	0.162	0.113	0.094	0.186	0.040	pCi/l		10/03/23	10/04/23	RGT870
L1658999-13 WG2143393	0.108	0.091	0.176	0.041	0.539	0.278	0.406	0.139	-0.014	0.084	0.214	0.033	pCi/l		10/03/23	10/04/23	RGT870
	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	0			

CONC = (AREA-(BACK*T))/(T*TRACER REC*V*E*2.22)
ERROR = 1.96*(SQRT(((AREA/T)/T)+(BACK/T)))/(E*V*TRACER REC*2.22)
MDA = 3.29*(SQRT(BACK/T+BACK/1000)/(V*TRACERREC*E*2.22))+3/(T*V*TRACERREC*E*2.22)

QC REPORT
WG2143393

Analyte	Th232	Spike ID:	22F12858							
Matrix	NPW	Volume Spike Added:	0.2	ml						
Sample	355833-07 WG2143	Activity of Spike:	10.0	pCi/ml	LIMITS LOW	LIMITS HIGH		LIMITS		LIMITS
	RES	ERR	MDA	known	%REC			RPD		RER	
BLANK WG2143393	0.071	0.049	0.073								
LCS WG2143393	1.671	0.152	0.041	2.01	**83.2%**	80%	120%				
L1655833-07 WG2143393	0.159	0.147	0.266								
DUP L1655833-07 WG2143393	0.086	0.119	0.248					**NC**	20%	**0.388**	3
L1655833-06 WG2143393	0.235	0.135	0.196								
MS L1655833-06 WG2143393	8.521	0.742	0.181	8.03	**103.2%**	75%	125%				
MSD L1655833-06 WG2143393	7.782	0.628	0.189	8.03	**94.0%**	75%	125%	**9.1%**	20%		

Analyte	Th228									
Matrix	NPW	Volume Spike Added:	0.2	ml						
Sample	355833-07 WG2143	Activity of Spike:	10.0	pCi/ml	LIMITS LOW	LIMITS HIGH		LIMITS		LIMITS
	RES	ERR	MDA	known	%REC			RPD		RER	
BLANK WG2143393	0.060	0.049	0.077								
LCS WG2143393	1.665	0.153	0.051	2.01	**82.9%**	80%	120%				
L1655833-07 WG2143393	0.146	0.235	0.409								
DUP L1655833-07 WG2143393	-0.011	0.171	0.351					**NC**	20%	**0.539**	3
L1655833-06 WG2143393	0.066	0.182	0.334								
MS L1655833-06 WG2143393	7.799	0.718	0.250	8.03	**96.3%**	75%	125%				
MSD L1655833-06 WG2143393	7.912	0.636	0.207	8.03	**97.7%**	75%	125%	**1.4%**	20%		

Analyte	Th230	Spike ID:	18C29765							
Matrix	NPW	Volume Spike Added:	0.2	ml						
Sample	355833-07 WG2143	Activity of Spike:	9.96	pCi/ml	LIMITS LOW	LIMITS HIGH		LIMITS		LIMITS
	RES	ERR	MDA	known	%REC			RPD		RER	
BLANK WG2143393	0.089	0.082	0.132								
LCS WG2143393	1.598	0.158	0.101	1.99	**80.3%**	80%	120%				
L1655833-07 WG2143393	0.654	0.397	0.581								
DUP L1655833-07 WG2143393	0.426	0.336	0.524					**NC**	20%	**0.439**	3
L1655833-06 WG2143393	0.049	0.266	0.485								
MS L1655833-06 WG2143393	8.553	0.779	0.441	7.96	**106.8%**	75%	125%				
MSD L1655833-06 WG2143393	7.950	0.668	0.400	7.96	**99.2%**	75%	125%	**7.3%**	20%		

*** - Outside Control Limits**

RADIOCHEMISTRY Z REPORT

WG#	0					
Analyte	**Th232**	Spike ID:		18F01472		
Matrix	NPW	Volume Spike Added:		0.2	ml	UNCERT
		Activity of Spike:		10.0	pCi/ml	**0.301**

	RES		known		
BLANK WG2143393	0.071	0.049		Z_{BLANK}	**1.45**
LCS WG2143393	1.671	0.152	2.01	Z_{LCS}	**1.00**
L1655833-07 WG2143393	0.159	0.147			
DUP L1655833-07 WG2143393	0.086	0.119		Z_{REP}	**0.39**
L1655833-06 WG2143393	0.235	0.135			
MS L1655833-06 WG2143393	8.521	0.742	8.03	Z_{MS}	**0.31**

Analyte	**Th228**					
Matrix	NPW	Volume Spike Added:		0.2	ml	UNCERT
		Activity of Spike:		10.0	pCi/ml	**0.301**

	RES		known		
BLANK WG2143393	0.060	0.049		Z_{BLANK}	**1.22**
LCS WG2143393	1.665	0.153	2.01	Z_{LCS}	**1.01**
L1655833-07 WG2143393	0.146	0.235			
DUP L1655833-07 WG2143393	-0.011	0.171		Z_{REP}	**0.54**
L1655833-06 WG2143393	0.066	0.182			
MS L1655833-06 WG2143393	7.799	0.718	8.03	Z_{MS}	**0.37**

Analyte	**Th230**	Spike ID:		18C29765		
Matrix	NPW	Volume Spike Added:		0.2	ml	UNCERT
Sample	3-07 WC	Activity of Spike:		9.96	pCi/ml	**0.320**

	RES		known		
BLANK WG2143393	0.089	0.082		Z_{BLANK}	**1.08**
LCS WG2143393	1.598	0.158	1.99	Z_{LCS}	**1.10**
L1655833-07 WG2143393	0.654	0.397			
DUP L1655833-07 WG2143393	0.426	0.336		Z_{REP}	**0.44**
L1655833-06 WG2143393	0.049	0.266			
MS L1655833-06 WG2143393	8.553	0.779	7.96	Z_{MS}	**0.61**

THORIUM-ISOTOPIC

METHOD: LANL ER200M
WG# WG2143393
ANALYST: RGT870
TRACER(TH229) 10.2 pCi/ml ID: 22F12860

LAB ID	SUB	PREP DATE	DATE COUNTED	TRACER ADDED(ML)	VOL (L/g)	MATRIX	TIME	Th232 area	bck cpm	0.112 Th230 area	bck cpm	Th228 area	bck cpm	Th229 area	DET	EFF	uE	TRACER REC	Flags
BLANK WG2143393		10/03/2023	10/4/2023	0.2	1.0000	NPW	500	17	0.008	56	0.005	16	0.010	373	2	26.7%	0.9%	61.7%	
LCS WG2143393		10/03/2023	10/4/2023	0.2	1.0000	NPW	500	464	0.001	501	0.002	466	0.008	566	3	27.0%	0.8%	92.5%	
MS L1655833-06 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	508	0.001	559	0.002	470	0.011	486	4	24.7%	1.1%	87.0%	
MSD L1655833-06 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	601	0.008	678	0.011	613	0.012	626	6	29.8%	0.9%	92.7%	
DUP L1655833-07 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	6	0.004	61	0.006	8	0.017	381	9	27.0%	0.9%	62.3%	
L1655833-06 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	13	0.001	49	0.006	14	0.021	434	10	26.5%	1.0%	72.4%	
L1655833-07 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	7	0.002	57	0.003	13	0.015	308	11	23.3%	0.9%	58.3%	
L1655848-01 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	34	0.001	66	0.005	16	0.028	359	12	26.7%	1.0%	59.4%	
L1655848-02 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	20	0.003	49	0.001	16	0.011	353	13	25.3%	1.1%	61.7%	
L1655848-03 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	21	0.001	53	0.001	29	0.014	486	14	27.9%	0.9%	77.0%	
L1656521-01 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	7	0.001	61	0.002	976	0.005	427	17	25.6%	0.9%	73.6%	
L1657009-01 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	17	0.001	45	0.001	10	0.001	486	19	28.8%	1.0%	74.6%	
L1657009-02 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	18	0.001	83	0.003	6	0.006	370	20	25.8%	1.0%	63.3%	
L1657009-03 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	13	0.001	59	0.003	11	0.008	562	21	31.2%	1.0%	79.6%	
L1657009-04 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	21	0.001	60	0.002	22	0.015	475	23	28.1%	1.0%	74.8%	
L1657009-05 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	19	0.002	44	0.001	18	0.007	471	24	26.8%	1.1%	77.5%	
L1657984-01 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	15	0.001	35	0.005	18	0.011	412	25	23.8%	0.9%	76.6%	
L1658999-06 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	12	0.001	41	0.005	25	0.005	453	26	23.5%	0.9%	85.1%	
L1658999-07 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	18	0.001	20	0.001	23	0.003	458	27	23.6%	0.9%	85.8%	
L1658999-08 WG2143393		10/03/2023	10/12/2023	0.2	0.2500	NPW	500	219	0.008	129	0.004	568	0.002	431	1	26.1%	1.1%	73.0%	
L1658999-09 WG2143393		10/03/2023	10/12/2023	0.2	0.2500	NPW	500	235	0.008	150	0.005	568	0.010	463	2	26.7%	0.9%	76.6%	
L1658999-10 WG2143393		10/03/2023	10/12/2023	0.2	0.2500	NPW	500	217	0.001	173	0.002	609	0.008	523	3	27.0%	0.8%	85.5%	
L1658999-11 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	19	0.002	45	0.001	8	0.003	321	28	26.3%	0.9%	54.0%	
L1658999-12 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	3	0.003	94	0.002	7	0.001	468	29	24.2%	1.0%	85.3%	
L1658999-13 WG2143393		10/03/2023	10/4/2023	0.2	0.2500	NPW	500	9	0.003	96	0.003	4	0.010	569	30	27.7%	0.9%	90.8%	

Th232 area	bck cpm	Th230 area	bck cpm	Th228 area	bck cpm	Th229 COUNTS	**OCT_2023** DET	EFF	ERR	
	0.008		0.004		0.002		1	26.1%	1.1%	
	0.008		0.005		0.010		2	26.7%	0.9%	
	0.001		0.002		0.008		3	27.0%	0.8%	
	0.001		0.002		0.011		4	24.7%	1.1%	
							5			
	0.008		0.011		0.012		6	29.8%	0.9%	
							7			
							8			
	0.004		0.006		0.017		9	27.0%	0.9%	
	0.001		0.006		0.021		10	26.5%	1.0%	
	0.002		0.003		0.015		11	23.3%	0.9%	
	0.001		0.005		0.028		12	26.7%	1.0%	
	0.003		0.001		0.011		13	25.3%	1.1%	
	0.001		0.001		0.014		14	27.9%	0.9%	
							15			
							16			
	0.001		0.002		0.005		17	25.6%	0.9%	
							18			
	0.001		0.001		0.001		19	28.8%	1.0%	
	0.001		0.003		0.006		20	25.8%	1.0%	
	0.001		0.003		0.008		21	31.2%	1.0%	
							22			
	0.001		0.002		0.015		23	28.1%	1.0%	
	0.002		0.001		0.007		24	26.8%	1.1%	
	0.001		0.005		0.011		25	23.8%	0.9%	
	0.001		0.005		0.005		26	23.5%	0.9%	
	0.001		0.001		0.003		27	23.6%	0.9%	
	0.002		0.001		0.003		28	26.3%	0.9%	
	0.003		0.002		0.001		29	24.2%	1.0%	
	0.003		0.003		0.010		30	27.7%	0.9%	
	0.001		0.002		0.001		31	31.2%	1.0%	
	0.001		0.002		0.007		32	28.0%	0.5%	
	0.002		0.006		0.002		33	23.2%	0.9%	**A-4-1A**
	0.002		0.004		0.043		34	24.0%	0.8%	**A-4-1B**
	0.001		0.003		0.010		35	23.1%	0.8%	**A-4-2A**
	0.003		0.002		0.005		36	23.6%	0.8%	**A-4-2B**
	0.004		0.004		0.014		37	23.2%	0.7%	**A-4-3A**
	0.001		0.006		0.011		38	23.3%	0.8%	**A-4-3B**
	0.003		0.007		0.004		39	23.6%	0.7%	**A-4-4A**
	0.001		0.002		0.002		40	23.3%	0.8%	**A-4-4B**
	0.001		0.005		0.008		41	23.2%	0.9%	**A-4-5A**
	0.001		0.004		0.006		42	23.6%	0.8%	**A-4-5B**
	0.002		0.004		0.002		43	23.8%	0.8%	**A-4-6A**
	0.003		0.002		0.003		44	23.2%	0.8%	**A-4-6B**

DECAY CALCUALTION

ACTIVITY FORMULA A = Ao(e^^-NT)

Th-232 Source
ORL# 867-78
TH232-86778-WS3
Pace No. 22F12858

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-22
DATE OF CALIBRATION 03-Oct-23

Ao =	100.40	nCi
N =	0.00	
T(1/2) =	1.41E+10	years
T =	1.33	years
dilution =	1000.00	
A =	100.40	nCi
A =	222.89	dpm/ml
A =	100.40	pCi/ml
Stock =	100.40	pCi/ml
Stock	100.00	ml
DI	1000.00	pCi/ml

A = 10.0 +/- 0.30 pCi/ml

Uncertainty	3.00%
Weight	0.05%
Volume (1000 ml)	0.03%

CSU 3.00%

ORL 867-78

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661-309-1010
Fax 661-257-8303

ESC37019

RAD
1x5mL

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-232	**Customer:**	OUTREACH TECH. INC.
Half-life:	(1.405 ± 0.006)E+10 years	**P.O. No.:**	011213
Catalog No.:	7232	**Reference Date:**	15-Feb-02 12:00 PST
Source No.:	867-78	**Contained Radioactivity:** (Th-232 only)	0.1003 µCi 3.711 kBq

Physical Description:

A. Mass of solution:	6.48779 g in 5 mL flame-sealed ampoule
B. Chemical form:	$Th(NO_3)_4$ in H_2O
C. Carrier content:	None
D. Density:	1.29 g/mL @ 20°C.

Radioimpurities:

Not determined

ENVIRONMENTAL SCIENCE CORP

Radionuclide Concentration: 0.01546 µCi/g, 0.5720 kBq/g

Method of Calibration:

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.0 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.0 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a 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).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This solution has a working life of 5 years.

Quality Control

15-Feb-02
Date Signed

IPL Ref. No.: 867-78

DECAY CALCUALTION

Th229 Source
No. 3653
TH229-3653-WS3
22F12860

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	03-Jun-22
DATE OF CALIBRATION	03-Oct-23

Ao =	1016.98	nCi
N =	0.00	
T(1/2) =	7340.00	years
T =	1.33	years
dilution =	100.00	
A =	1016.85	nCi
A =	22.57	dpm/ml

A = 10.2 +/- 0.3 pCi/ml

Uncertainty	3.10%
Weight	0.05%
Volume (1000 ml)	0.03%

CSU 3.10%

BLI # 3853
REC'D 8/13/00

NIST TRACEABLE CERTIFICATE
ALPHA STANDARD SOLUTION

ESC37020

Radionuclide:	Th-229	**Customer:**	BARRINGER LABS
Half-life:	7340 ± 160 years	**P.O. No.:**	26587R
Catalog No.:	7229	**Reference Date:**	1-Aug-00 12:00 PST
Source No.:	723-88	**Contained Radioactivity:**	1.019 µCi 37.70 kBq

Physical description:

A. Mass of solution:	5.01859 g in 5 mL flame-sealed ampoule
B. Chemical form:	$Th(NO_3)_4$ in 0.1M HNO_3
C. Carrier content:	10 µg Th/mL of solution
D. Density:	1.0016 g/mL @ 20°C

Radioimpurities: None detected other than daughters

Radionuclide concentration: 0.2030 µCi/g, 7.511 kBq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using gamma ray spectrometry.

Peak energy used for integration: 193.5 keV
Branching ratio used: 0.0441 gammas per decay

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.8 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.1 %

ENVIRONMENTAL SCIENCE CORP

Notes:

- See reverse side for leak tests performed on this source.
- 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).
- Nuclear data was taken from IAEA Technical Reports Series No. 261 (1986).
- This solution has a working life of 5 years.

Daniel James Van Dalsen
Quality Control

ISOTOPE PRODUCTS LABORATORIES
1800 N. KENSTON STREET
BURBANK, CALIFORNIA 91504
818•843•7000 FAX 818•843•6168

10-Jul-00
Date Signed

RECEIVED

IPL Reference Number: 723-88

DECAY CALCUALTION

Th230 Source
No. 3650
TH230-3650-WS3
18C29765

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	28-Mar-19
DATE OF CALIBRATION	03-Oct-23

Ao =	99.55	pCi/ml
N =	0.00	
T(1/2) =	77000	years
T =	4.52	years
Stock Volume	100	ml
Final Volume	1000	ml
dilution =	10	
A =	9.96	pCi/ml

Uncertainty	3.16%
Weight	0.05%
Volume (1000 ml)	0.03%
Volume (100 ml Aliquot)	0.40%
Volume (1000 ml)	0.03%
Volume (100 ml Aliquot)	0.40%
Volume (1000 ml)	0.03%
CSU	3.21%

Activity 9.96 +/- 0.320 pCi/ml

SL# 3650

RAD
1 x 5 mL

CERTIFICATE OF CALIBRATION

REC'D 1/18/00

MODEL CAL3000 STANDARDIZED SOLUTION ESC37021

Radionuclide:	Th-230[1]	**Activity:**	36.84 kBq (995.7 nCi)
Serial Number:	B1566	**Mass of Solution:**	4.9220 grams
Concentration:	7.485 kBq/g (202.3 nCi/g)	**Chemical Form:**	$Th(NO_3)_4$ in 0.1 M HNO_3
Half Life[2]:	$(7.54 \pm 0.03) \times 10^4$ years	**Reference Date:**	1200 PST February 1, 2000

PRINCIPAL EMISSIONS[2]

Type	Energy (keV)	Intensity (%)
alpha	4621.1	23.4
alpha	4687.6	76.3

SOURCE DESCRIPTION

Standardized solution in a 5 milliliter flame-seal ampoule.

ENVIRONMENTAL SCIENCE CORP.

METHOD OF CALIBRATION

Gravimetric aliquots of a master solution were calibrated by liquid scintillation using an efficiency established through ongoing intercomparisons with the National Institute of Standards and Technology. A gravimetric aliquot of this master solution was dispensed into a flame-seal ampoule. This standard is indirectly (implicitly) traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the Nuclear Energy Institute.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	3.16%
Weighing uncertainty	0.05%
Total uncertainty (quadratic sum)	± 3.16%

Jeff Wagner
Calibration Laboratory

January 17, 2000
Date

REFERENCES

(1) Radioactive impurities determined by alpha spectroscopy as of September 22, 1996: 0.29% R[illegible]

(2) Table of Radioactive Isotopes, 7th edition, 1986.

RECEIVED

• LEAK TEST CERTIFICATION ON REVERSE •

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 734-8600 Fax (818) 734-8606

Pace Analytical

View as PDF (CreatePDF?batchnum=WG2143393)

TH-ISO Aqueous Radiochemistry Prep Benchsheet

Batch: WG2143393

Analyst: IJM3838 Prep Start Date/Time: 10/03/23 16:49-16:50 Prep End Date/Time: 10/04/23 21:00-10/11/23 16:00 Method: LANL ER200M

SOP: RAD_16A-11 Pipet ID: E94,E52 Hot Plate ID: G70,G91 Stirrer ID: ST16,ST18,ST26,ST7 Filter Lot #: RF070123 Centrifuge ID: C7

Th-229 Tracer: 23F16844 Amt. Used: 0.20 mL Exp. Date:06/16/24 Th-230 spike: 22F12855 Amt. Used: 0.20 mL Exp. Date:06/03/24

Th-232 spike: 22F12858 Amt. Used: 0.20 mL Exp. Date:06/03/24 Ferric Nitrate Carrier: 23J02212 Amt. Used: 1 mL Exp. Date:04/30/27

Phenolphthalein Indicator: 23H10120 Amt. Used: 0.50 mL Exp. Date:06/05/25 HCl: 23I19292 Amt. Used: 15 mL Exp. Date:07/16/25

Ammonium Hydroxide: 23F28433 Amt. Used: 40 mL Exp. Date:10/17/24 Nitric Acid: 23I29813 Amt. Used: 40 mL Exp. Date:05/31/28

48% Hydrofluoric Acid: 23H09956 Amt. Used: 1 mL Exp. Date:05/31/25 30-35% Hydrogen Peroxide: 23D21494 Amt. Used: 10 mL Exp. Date:03/31/25

8M Nitric Acid: 23I29915 Amt. Used: 100 mL Exp. Date:10/29/24 AGI-X8 100-200mesh AER: 23F01503 Amt. Used: 7 mL Exp. Date:03/24/28

9M Hydrochloric Acid: 23I29914 Amt. Used: 50 mL Exp. Date:09/30/24 Neodymium Carrier: 23H10119 Amt. Used: 1 mL Exp. Date:07/26/27

0.1 µm filters (25 mm): 23I12119 Amt. Used: 25 Exp. Date:08/03/24

Sample Number	Collect Date	Volume Used (L or filt)	Review Analyst	Review Date
BLANK		1000	RGT870	10/11/23 22:35:49
LCS		1000	RGT870	10/11/23 22:35:49
MS(L1655833-06)		250	RGT870	10/11/23 22:35:49
MSD(L1655833-06)		250	RGT870	10/11/23 22:35:49
DUP(L1655833-07)		250	RGT870	10/11/23 22:35:49
1. L1655833-06	09/12/23 08:10	250	RGT870	10/11/23 22:35:49
2. L1655833-07	09/12/23 08:33	250	RGT870	10/11/23 22:35:49
3. L1655848-01	08/18/23 10:30	250	RGT870	10/11/23 22:35:49
4. L1655848-02	08/18/23 10:05	250	RGT870	10/11/23 22:35:49
5. L1655848-03	08/18/23 09:00	250	RGT870	10/11/23 22:35:49
6. L1656521-01	09/13/23 00:00	250	RGT870	10/11/23 22:35:49
7. L1657009-01	09/12/23 08:55	250	RGT870	10/11/23 22:35:49
8. L1657009-02	09/12/23 11:05	250	RGT870	10/11/23 22:35:49
9. L1657009-03	09/12/23 13:00	250	RGT870	10/11/23 22:35:49
10. L1657009-04	09/13/23 11:25	250	RGT870	10/11/23 22:35:49
11. L1657009-05	09/13/23 14:25	250	RGT870	10/11/23 22:35:49
12. L1657984-01	09/20/23 10:18	250	RGT870	10/11/23 22:35:49
13. L1658999-06	09/20/23 09:00	250	RGT870	10/11/23 22:35:49
14. L1658999-07	09/20/23 10:20	250	RGT870	10/11/23 22:35:49
15. L1658999-08	09/20/23 11:22	250	RGT870	10/11/23 22:35:49
16. L1658999-09	09/20/23 12:09	250	RGT870	10/11/23 22:35:49
17. L1658999-10	09/20/23 12:09	250	RGT870	10/11/23 22:35:49
18. L1658999-11	09/20/23 13:30	250	RGT870	10/11/23 22:35:49
19. L1658999-12	09/19/23 16:50	250	RGT870	10/11/23 22:35:49
20. L1658999-13	09/19/23 16:03	250	RGT870	10/11/23 22:35:49

Comments:
cylinder=C205,2ml tips=2215,10ml electric tips=2334,10ml manual tips=P7565750,centrifuge tubes=920128

Reviewed By:RGT870 on 10/11/23 22:35:49

Pace Analytical
National Center for Testing & Innovation

ALPHA SPEC RUN LOG

SDG: T2143393 Sample Order Verified ZRG3837 10/5/2023 8:10

SDG SUB ID	SAMPLE ID	COUNT DATE / TIME	DET #	ANALYTE	COUNT TIME MIN	FILENAME (DDGXXXYY)	ANALYST	COMMENTS
1	BLANK WG2143393	10/4/23 22:37	02	T	500	T 02 2118193 01	RGT870	
2	LCS WG2143393	10/4/23 22:37	03	T	500	T 03 2118193 02	RGT870	
3	MS L1655833-06 WG2143393	10/4/23 22:37	04	T	500	T 04 2118193 03	RGT870	
4	MSD L1655833-06 WG2143393	10/4/23 22:37	06	T	500	T 06 2118193 04	RGT870	
5	DUP L1655833-07 WG2143393	10/4/23 22:37	09	T	500	T 09 2118193 05	RGT870	
6	L1655833-06 WG2143393	10/4/23 22:37	10	T	500	T 10 2118193 06	RGT870	
7	L1655833-07 WG2143393	10/4/23 22:37	11	T	500	T 11 2118193 07	RGT870	
8	L1655848-01 WG2143393	10/4/23 22:37	12	T	500	T 12 2118193 08	RGT870	
9	L1655848-02 WG2143393	10/4/23 22:37	13	T	500	T 13 2118193 09	RGT870	
10	L1655848-03 WG2143393	10/4/23 22:37	14	T	500	T 14 2118193 10	RGT870	
11	L1656521-01 WG2143393	10/4/23 22:37	17	T	500	T 17 2118193 11	RGT870	
12	L1657009-01 WG2143393	10/4/23 22:37	19	T	500	T 19 2118193 12	RGT870	
13	L1657009-02 WG2143393	10/4/23 22:37	20	T	500	T 20 2118193 13	RGT870	
14	L1657009-03 WG2143393	10/4/23 22:37	21	T	500	T 21 2118193 14	RGT870	
15	L1657009-04 WG2143393	10/4/23 22:37	23	T	500	T 23 2118193 15	RGT870	
16	L1657009-05 WG2143393	10/4/23 22:37	24	T	500	T 24 2118193 16	RGT870	
17	L1657984-01 WG2143393	10/4/23 22:37	25	T	500	T 25 2118193 17	RGT870	
18	L1658999-06 WG2143393	10/4/23 22:37	26	T	500	T 26 2118193 18	RGT870	
19	L1658999-07 WG2143393	10/4/23 22:37	27	T	500	T 27 2118193 19	RGT870	
20	L1658999-08 WG2143393	10/12/23 0:19	01	T	500	T 01 2118193 20	RGT870	
21	L1658999-09 WG2143393	10/12/23 0:19	02	T	500	T 02 2118193 21	RGT870	
22	L1658999-10 WG2143393	10/12/23 0:19	03	T	500	T 03 2118193 22	RGT870	
23	L1658999-11 WG2143393	10/4/23 22:37	28	T	500	T 28 2118193 23	RGT870	
24	L1658999-12 WG2143393	10/4/23 22:37	29	T	500	T 29 2118193 24	RGT870	
25	L1658999-13 WG2143393	10/4/23 22:37	30	T	500	T 30 2118193 25	RGT870	
26				T		T 0 2118193 26	RGT870	

FILENAME EXAMPLE: R12126111116

R = ANALYSIS RADIUM 226 **1261111 = WG** **12 = DETECTOR** **16 = BATCH SUB**

T= THORIUM **R = RADIUM** **U = URANIUM**

P = PLUTONIUM **A = AMERICIUM**

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T02214339301.CNF

Report Generated On             : 10/11/2023  9:31:01 PM

Sample Title                    : BLANK WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:06 PM

Live Time                       :    30000.3 seconds
Real Time                       :    30016.4 seconds

Dead Time                       :   0.05 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET02
Sample Title: BLANK WG2143393
Peak Analysis Performed on: 10/11/2023 9:31:01 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

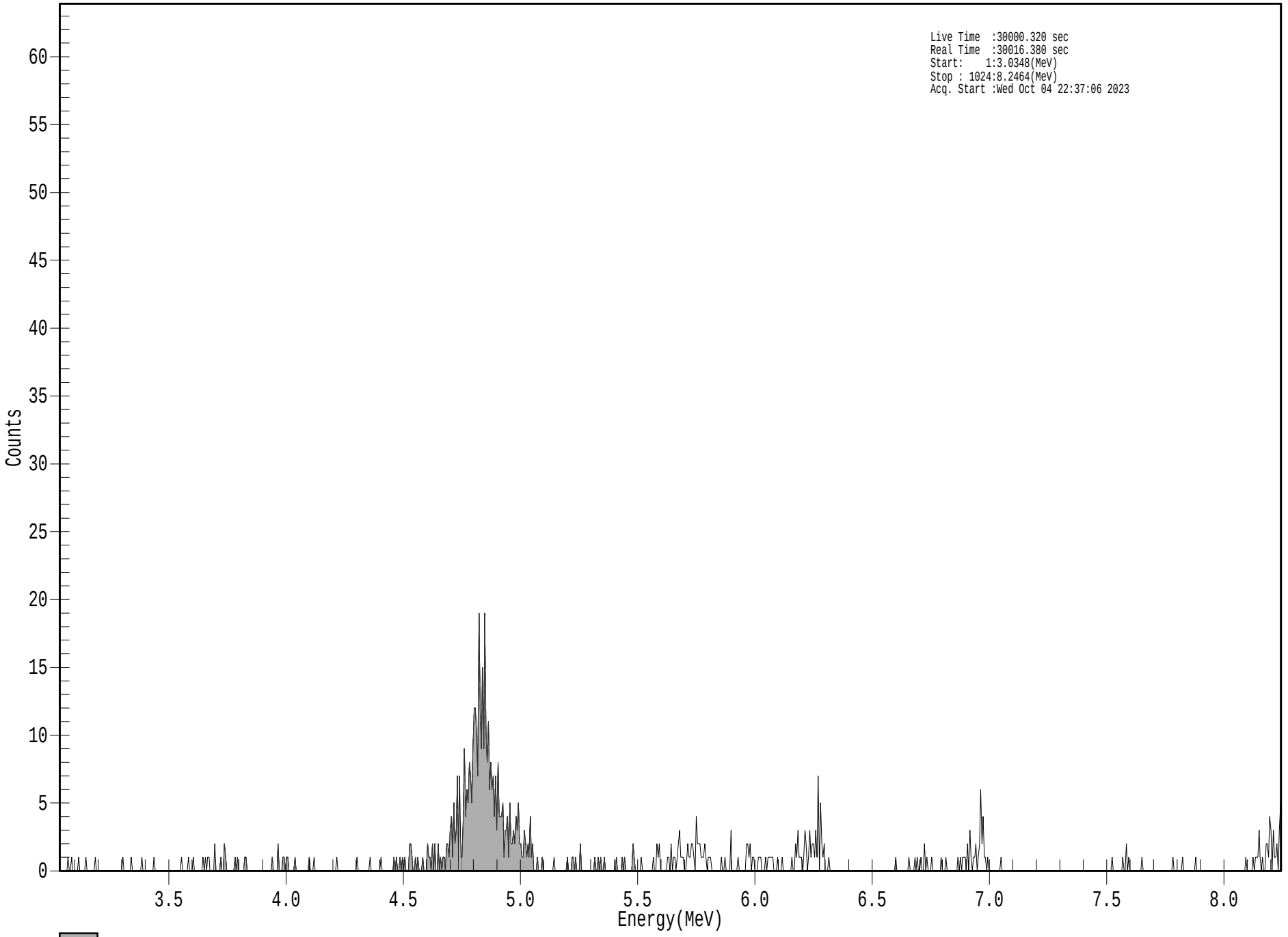
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	134-	211	169.41	3892.79	7.64	1.70E+001	4.12	0.00E+000
2	276-	335	318.18	4650.66	7.00	5.60E+001	7.48	0.00E+000
3	327-	413	357.55	4851.21	13.37	3.73E+002	19.31	0.00E+000
4	423-	483	453.94	5342.26	5.09	1.60E+001	4.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T02214339301.CNF



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```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T03214339302.CNF

Report Generated On             : 10/11/2023  9:56:47 PM

Sample Title                    : LCS WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:08 PM

Live Time                       :    30000.4 seconds
Real Time                       :    30016.5 seconds

Dead Time                       :   0.05 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET03
Sample Title: LCS WG2143393
Peak Analysis Performed on: 10/11/2023 9:56:47 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

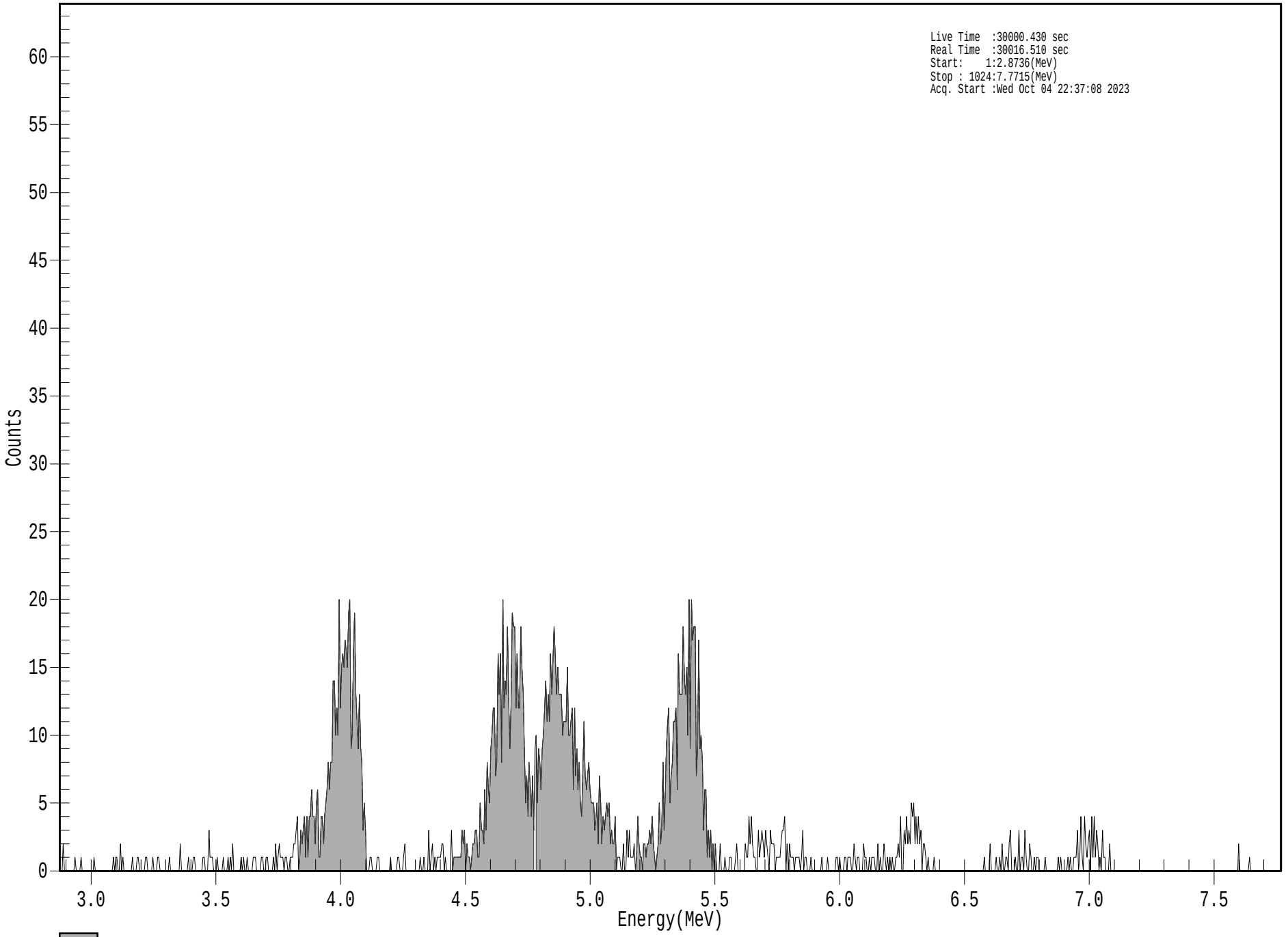
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	201-	258	236.30	4000.21	52.23	4.64E+002	21.54	0.00E+000
2	330-	398	374.48	4661.78	31.52	5.01E+002	22.38	0.00E+000
3	398-	467	425.24	4904.80	122.09	5.66E+002	23.79	0.00E+000
4	483-	551	522.52	5370.56	9.14	4.66E+002	21.59	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T03214339302.CNF



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****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2143393\T04214339303.CNF

Report Generated On	:	10/11/2023 9:34:19 PM
Sample Title	:	MS L1655833-06 WG2143393
Sample Description	:	
Sample Identification	:	
Sample Type	:	
Sample Geometry	:	
Peak Locate Threshold	:	10.00
Peak Locate Range (in channels)	:	1 - 1024
Peak Area Range (in channels)	:	1 - 1024
Identification Energy Tolerance	:	0.100 MeV
Sample Size	:	1.000E+000 Unit
Sample Taken On	:	
Acquisition Started	:	10/4/2023 10:37:09 PM
Live Time	:	30000.2 seconds
Real Time	:	30016.3 seconds
Dead Time	:	0.05 %

Energy Calibration Used Done On	:	1/17/2023
Efficiency Calibration Used Done On	:	10/2/2023
Efficiency ID	:	

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET04
Sample Title: MS L1655833-06 WG2143393
Peak Analysis Performed on: 10/11/2023 9:34:19 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

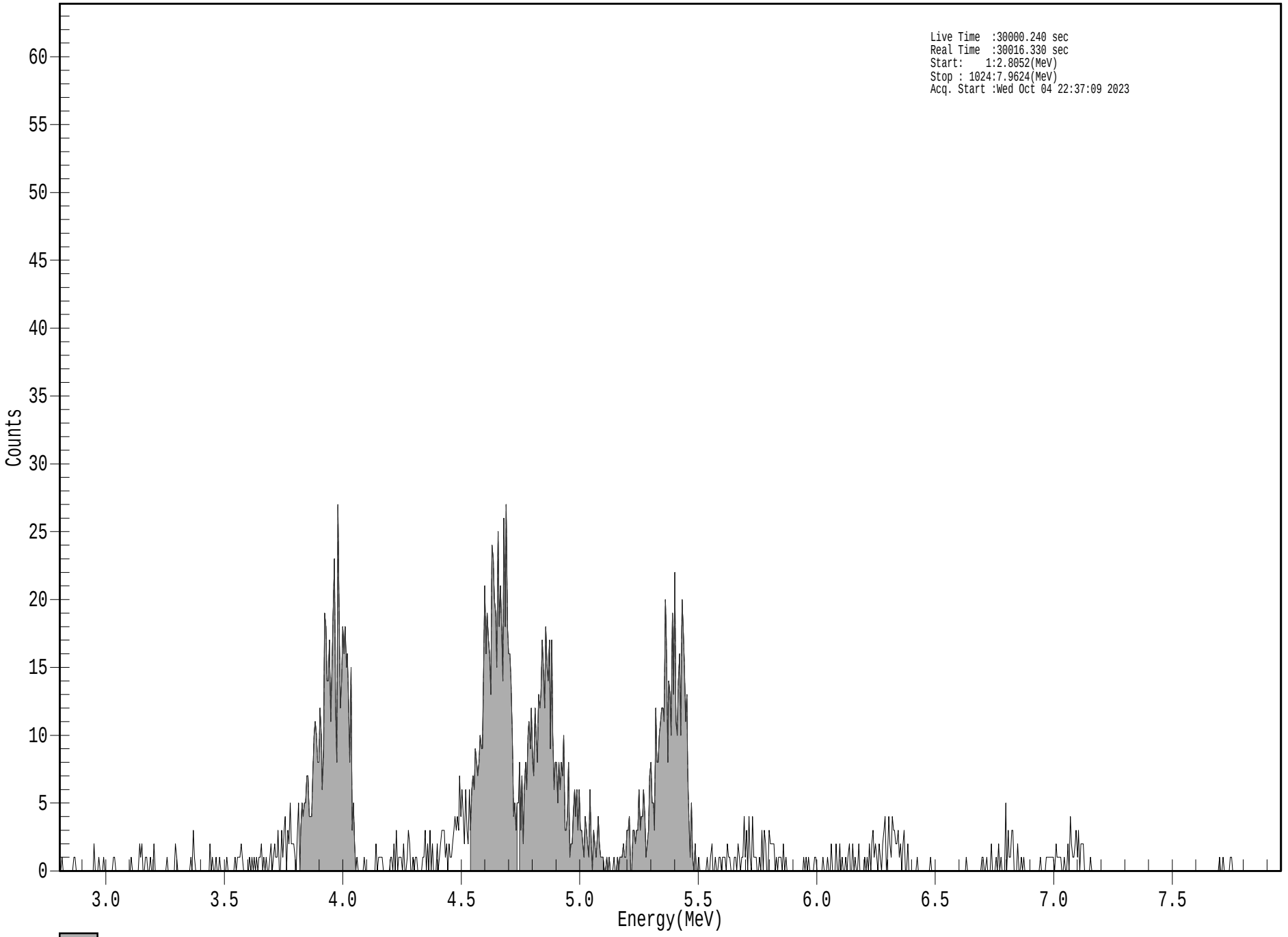
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	202-	249	228.53	3952.23	12.40	5.08E+002	22.54	0.00E+000
2	345-	384	365.74	4643.94	86.10	5.59E+002	23.64	0.00E+000
3	383-	463	411.33	4873.76	54.45	4.86E+002	22.05	0.00E+000
4	467-	534	509.27	5367.48	19.60	4.70E+002	21.68	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T04214339303.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2143393\T06214339304.CNF

Report Generated On : 10/11/2023 9:35:12 PM

Sample Title : MSD L1655833-06 WG2143393
Sample Description :
Sample Identification :
Sample Type :
Sample Geometry :

Peak Locate Threshold : 10.00
Peak Locate Range (in channels) : 1 - 1024
Peak Area Range (in channels) : 1 - 1024
Identification Energy Tolerance : 0.100 MeV

Sample Size : 1.000E+000 Unit

Sample Taken On :
Acquisition Started : 10/4/2023 10:37:11 PM

Live Time : 30000.4 seconds
Real Time : 30016.5 seconds

Dead Time : 0.05 %

Energy Calibration Used Done On : 1/17/2023
Efficiency Calibration Used Done On : 10/2/2023
Efficiency ID :

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET06
Sample Title: MSD L1655833-06 WG2143393
Peak Analysis Performed on: 10/11/2023 9:35:12 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

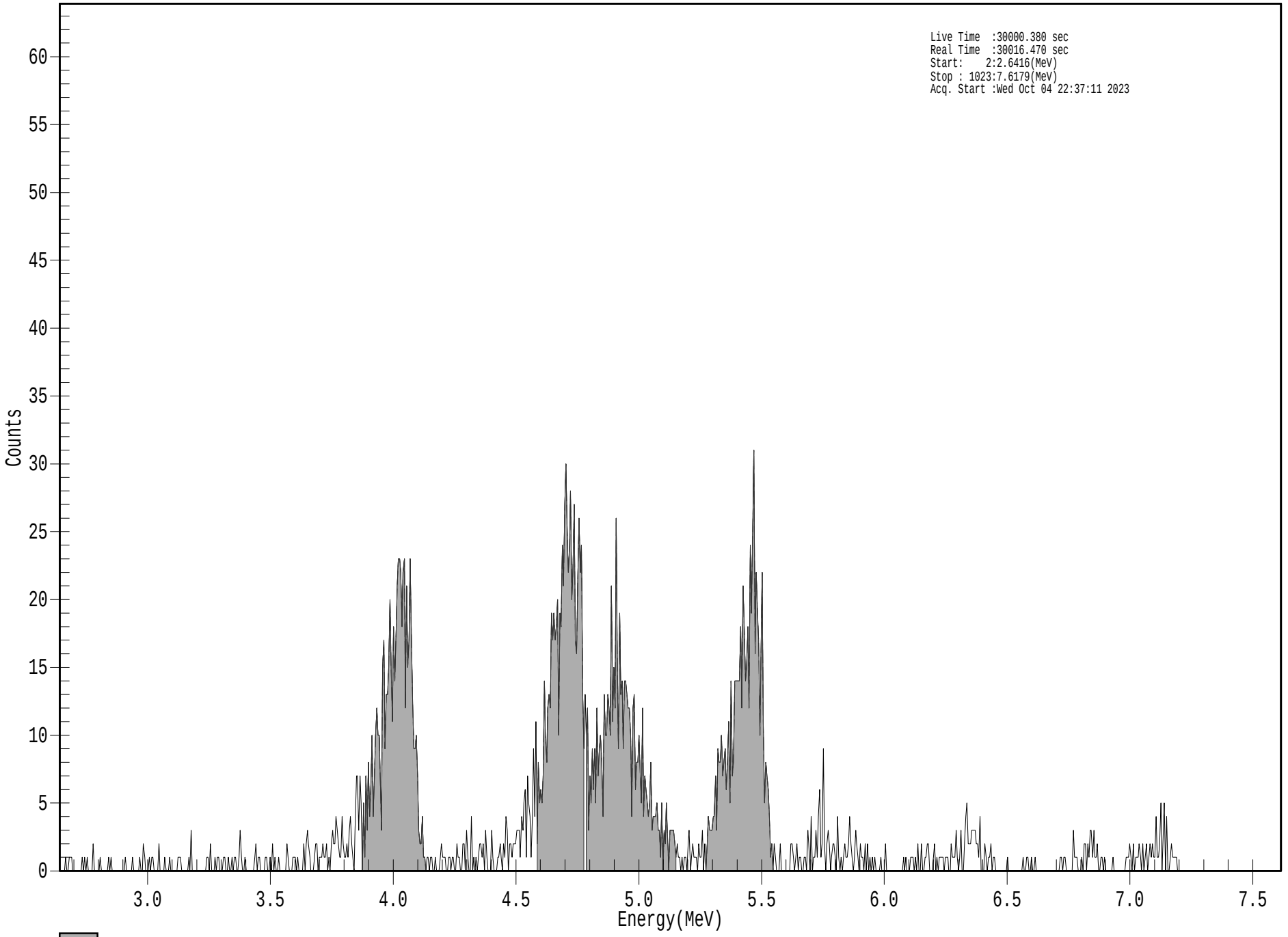
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	255-	308	282.69	4009.67	83.32	6.01E+002	24.52	0.00E+000
2	401-	440	423.78	4697.34	93.88	6.78E+002	26.04	0.00E+000
3	440-	517	470.85	4926.73	9.40	6.26E+002	25.02	0.00E+000
4	542-	598	573.74	5428.24	38.61	6.13E+002	24.76	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T06214339304.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T09214339305.CNF

Report Generated On             : 10/11/2023  9:35:45 PM

Sample Title                    : DUP L1655833-07 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:16 PM

Live Time                       :    30000.6 seconds
Real Time                       :    30016.7 seconds

Dead Time                       :   0.05 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET09
Sample Title: DUP L1655833-07 WG2143393
Peak Analysis Performed on: 10/11/2023 9:35:45 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

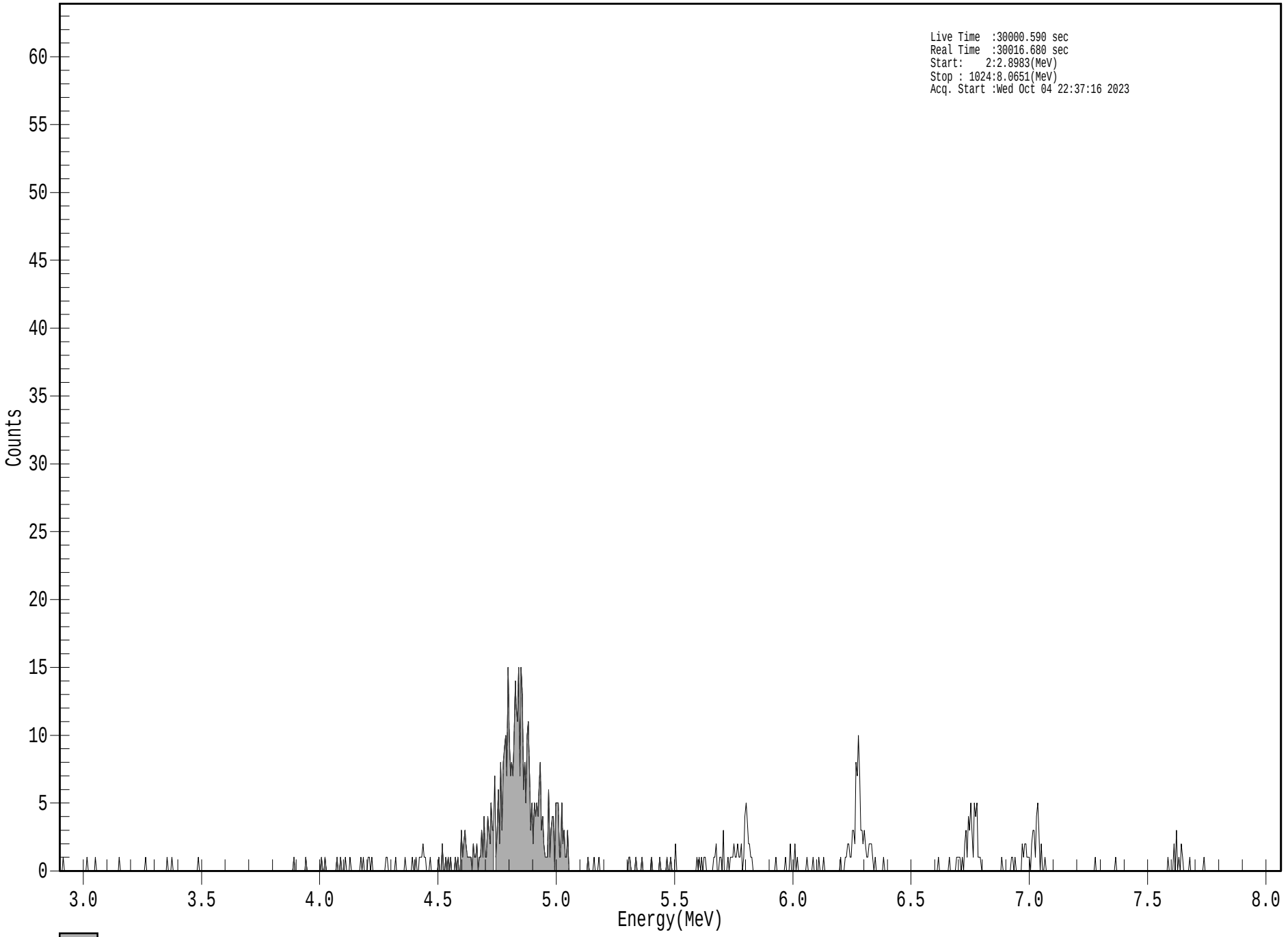
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	160-	240	220.33	4002.13	5.06	6.00E+000	2.45	0.00E+000
2	315-	365	349.98	4657.57	0.00	6.10E+001	7.81	0.00E+000
3	358-	445	388.70	4853.30	14.01	3.81E+002	19.52	0.00E+000
4	454-	515	494.25	5386.91	10.11	8.00E+000	2.83	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T09214339305.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2143393\T10214339306.CNF

Report Generated On	:	10/11/2023 9:36:15 PM
Sample Title	:	L1655833-06 WG2143393
Sample Description	:	
Sample Identification	:	
Sample Type	:	
Sample Geometry	:	
Peak Locate Threshold	:	10.00
Peak Locate Range (in channels)	:	1 - 1024
Peak Area Range (in channels)	:	1 - 1024
Identification Energy Tolerance	:	0.100 MeV
Sample Size	:	1.000E+000 Unit
Sample Taken On	:	
Acquisition Started	:	10/4/2023 10:37:18 PM
Live Time	:	30000.3 seconds
Real Time	:	30016.4 seconds
Dead Time	:	0.05 %

Energy Calibration Used Done On	:	1/17/2023
Efficiency Calibration Used Done On	:	10/2/2023
Efficiency ID	:	

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET10
Sample Title: L1655833-06 WG2143393
Peak Analysis Performed on: 10/11/2023 9:36:15 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

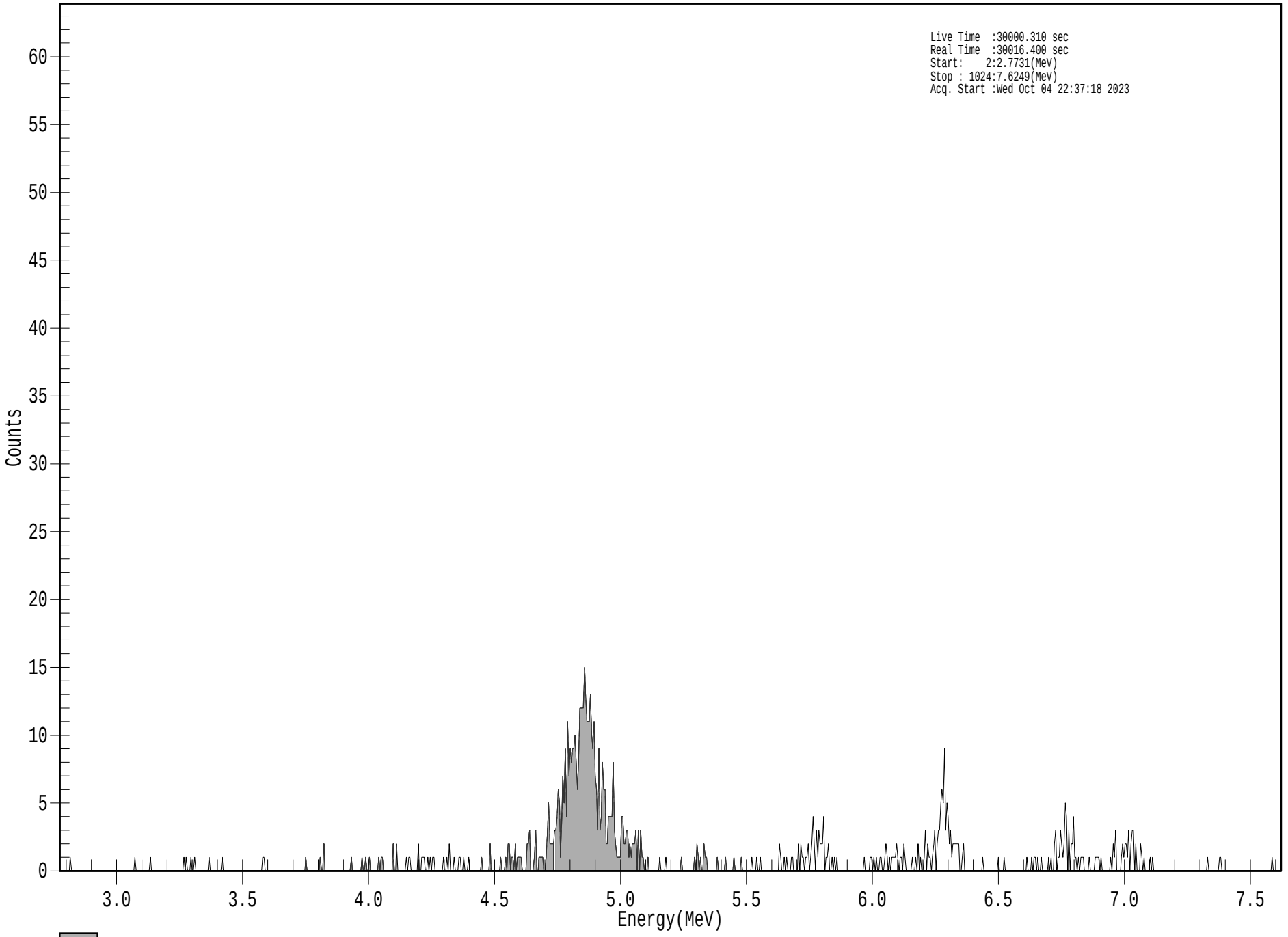
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	197-	282	251.38	3957.02	4.75	1.30E+001	3.61	0.00E+000
2	352-	415	395.63	4641.80	9.89	4.90E+001	7.00	0.00E+000
3	407-	500	443.40	4868.58	67.06	4.34E+002	20.83	0.00E+000
4	510-	575	543.93	5345.81	7.12	1.40E+001	3.74	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T10214339306.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T11214339307.CNF

Report Generated On             : 10/11/2023  9:36:48 PM

Sample Title                    : L1655833-07 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:19 PM

Live Time                       :    30000.2 seconds
Real Time                       :    30016.3 seconds

Dead Time                       :   0.05 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET11
Sample Title: L1655833-07 WG2143393
Peak Analysis Performed on: 10/11/2023 9:36:48 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

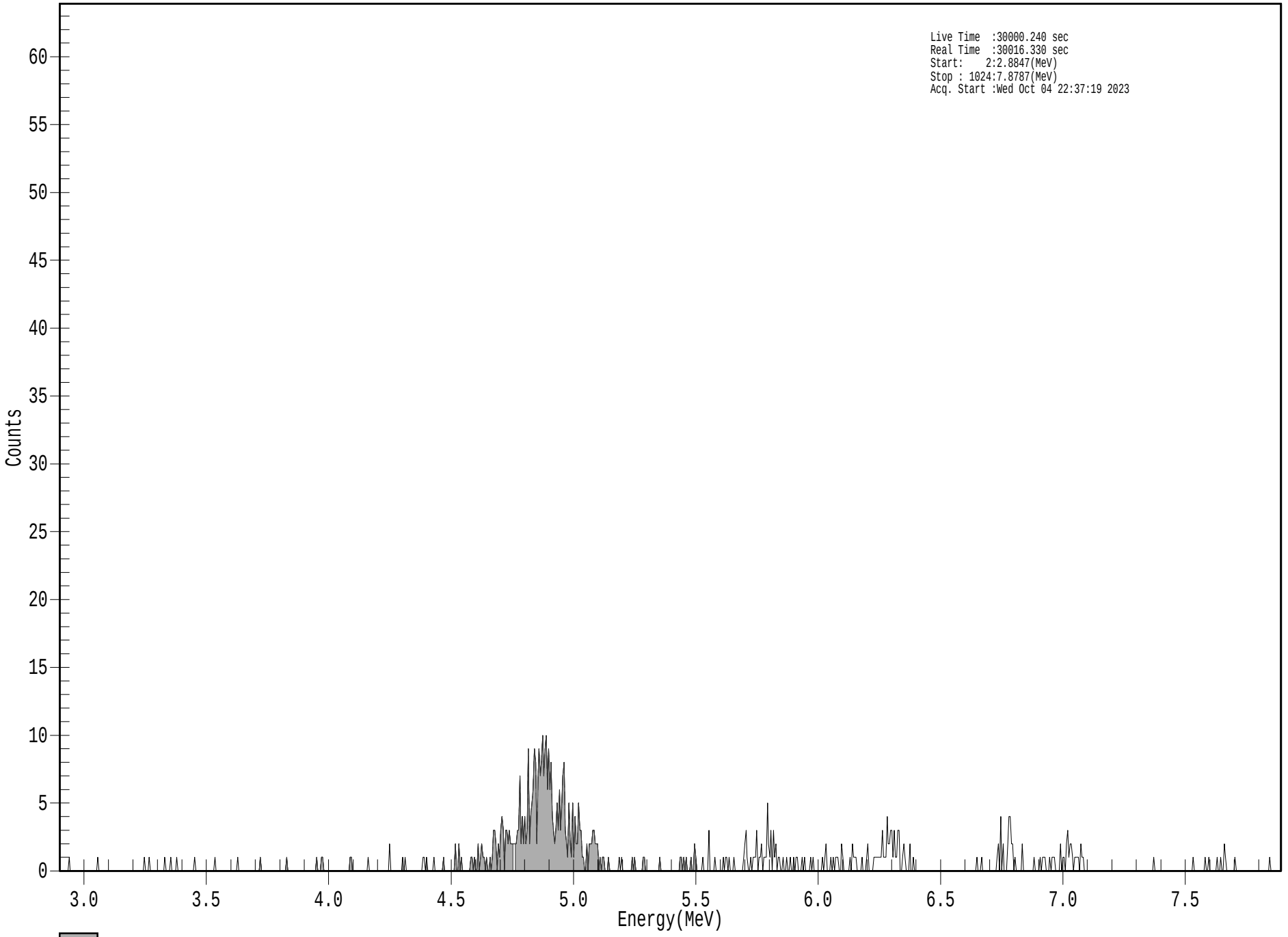
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	168-	251	216.14	3931.08	4.89	7.00E+000	2.65	0.00E+000
2	319-	381	364.61	4656.59	13.85	5.70E+001	7.55	0.00E+000
3	374-	463	410.61	4881.35	59.37	3.08E+002	17.55	0.00E+000
4	473-	536	513.23	5382.81	7.33	1.30E+001	3.61	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T11214339307.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T12214339308.CNF

Report Generated On             : 10/11/2023  9:37:20 PM

Sample Title                    : L1655848-01 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:21 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30016.2 seconds

Dead Time                       :   0.05 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET12
Sample Title: L1655848-01 WG2143393
Peak Analysis Performed on: 10/11/2023 9:37:20 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

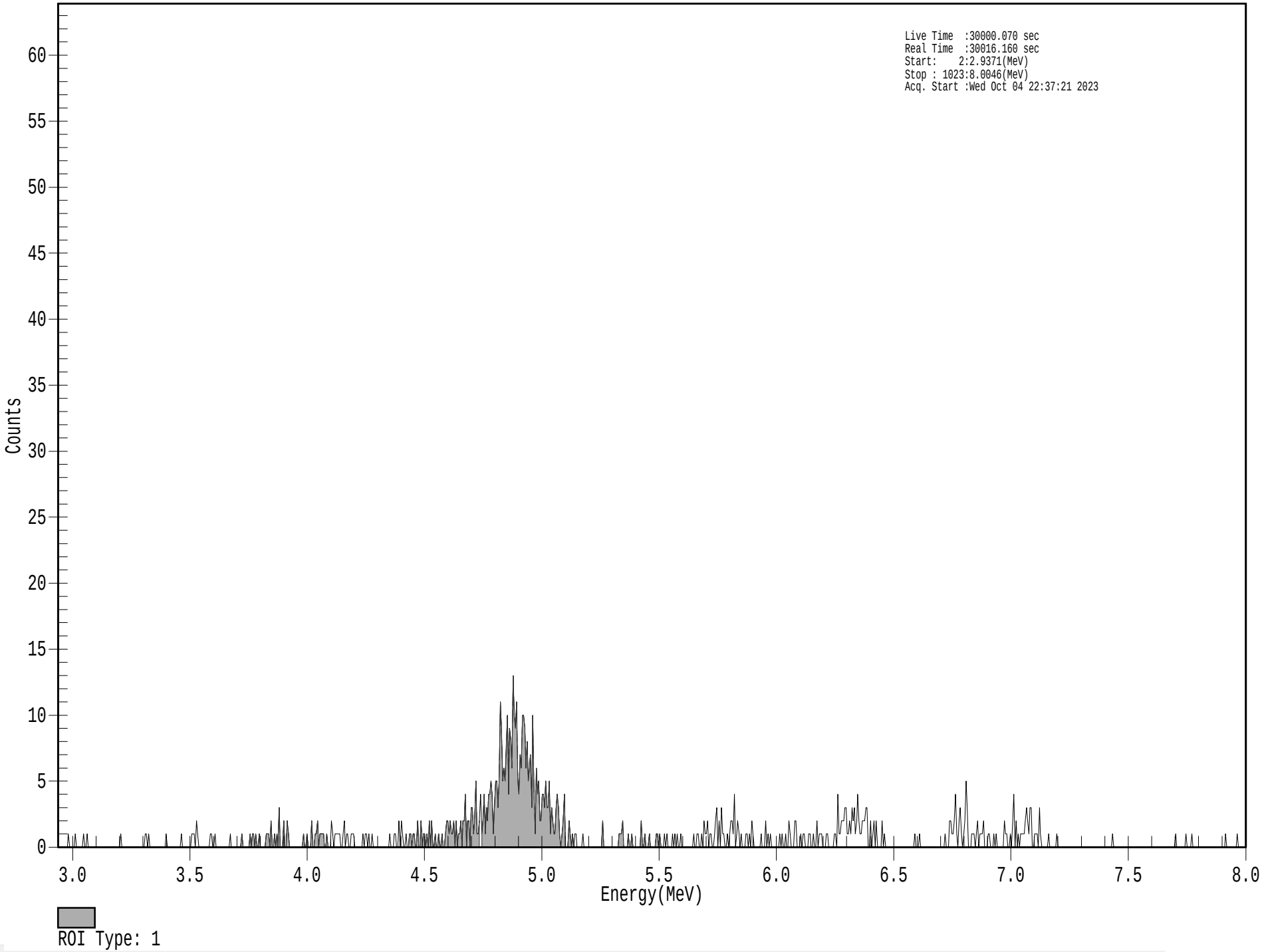
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	155-	235	199.59	3917.81	4.96	3.40E+001	5.83	0.00E+000
2	303-	364	341.67	4622.97	7.24	6.60E+001	8.12	0.00E+000
3	363-	445	398.22	4903.64	23.22	3.59E+002	18.95	0.00E+000
4	455-	520	495.63	5387.09	4.96	1.60E+001	4.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T12214339308.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T13214339309.CNF

Report Generated On             : 10/11/2023  9:37:54 PM

Sample Title                    : L1655848-02 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:22 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30016.1 seconds

Dead Time                       :   0.05 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET13
Sample Title: L1655848-02 WG2143393
Peak Analysis Performed on: 10/11/2023 9:37:54 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

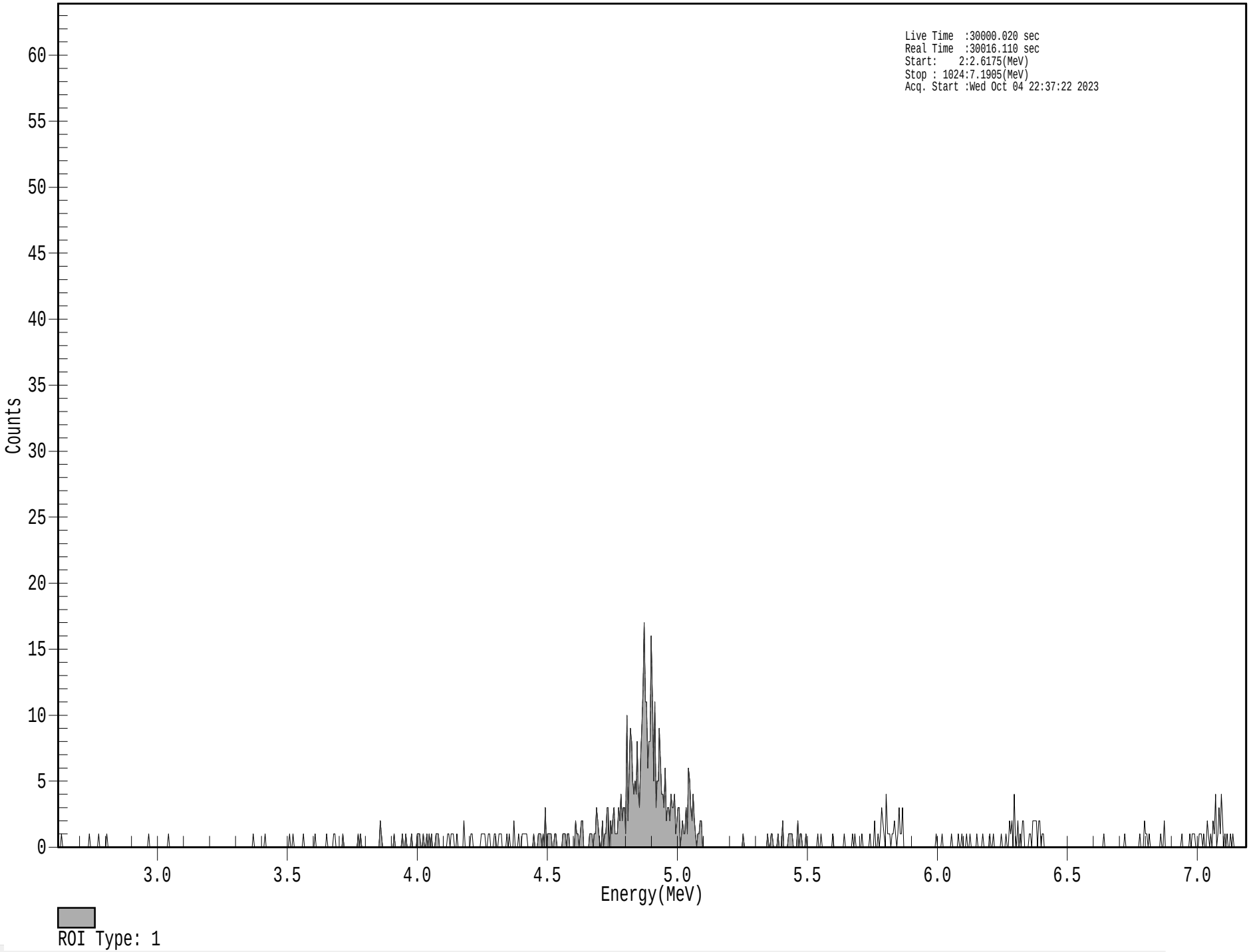
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	243-	334	300.10	3951.39	6.71	2.00E+001	4.47	0.00E+000
2	408-	475	448.47	4615.27	4.47	4.90E+001	7.00	0.00E+000
3	471-	565	511.00	4895.05	21.25	3.53E+002	18.79	0.00E+000
4	576-	648	627.06	5414.39	4.47	1.60E+001	4.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T13214339309.CNF



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***** A L P H A S P E C T R U M A N A L Y S I S *****
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Filename: O:\alpha_sp\2023\THORIUM\T2143393\T14214339310.CNF

Report Generated On	:	10/11/2023 9:38:34 PM
Sample Title	:	L1655848-03 WG2143393
Sample Description	:	
Sample Identification	:	
Sample Type	:	
Sample Geometry	:	
Peak Locate Threshold	:	10.00
Peak Locate Range (in channels)	:	1 - 1024
Peak Area Range (in channels)	:	1 - 1024
Identification Energy Tolerance	:	0.100 MeV
Sample Size	:	1.000E+000 Unit
Sample Taken On	:	
Acquisition Started	:	10/4/2023 10:37:24 PM
Live Time	:	30000.0 seconds
Real Time	:	30016.1 seconds
Dead Time	:	0.05 %

Energy Calibration Used Done On	:	1/17/2023
Efficiency Calibration Used Done On	:	10/2/2023
Efficiency ID	:	

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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET14
Sample Title: L1655848-03 WG2143393
Peak Analysis Performed on: 10/11/2023 9:38:34 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

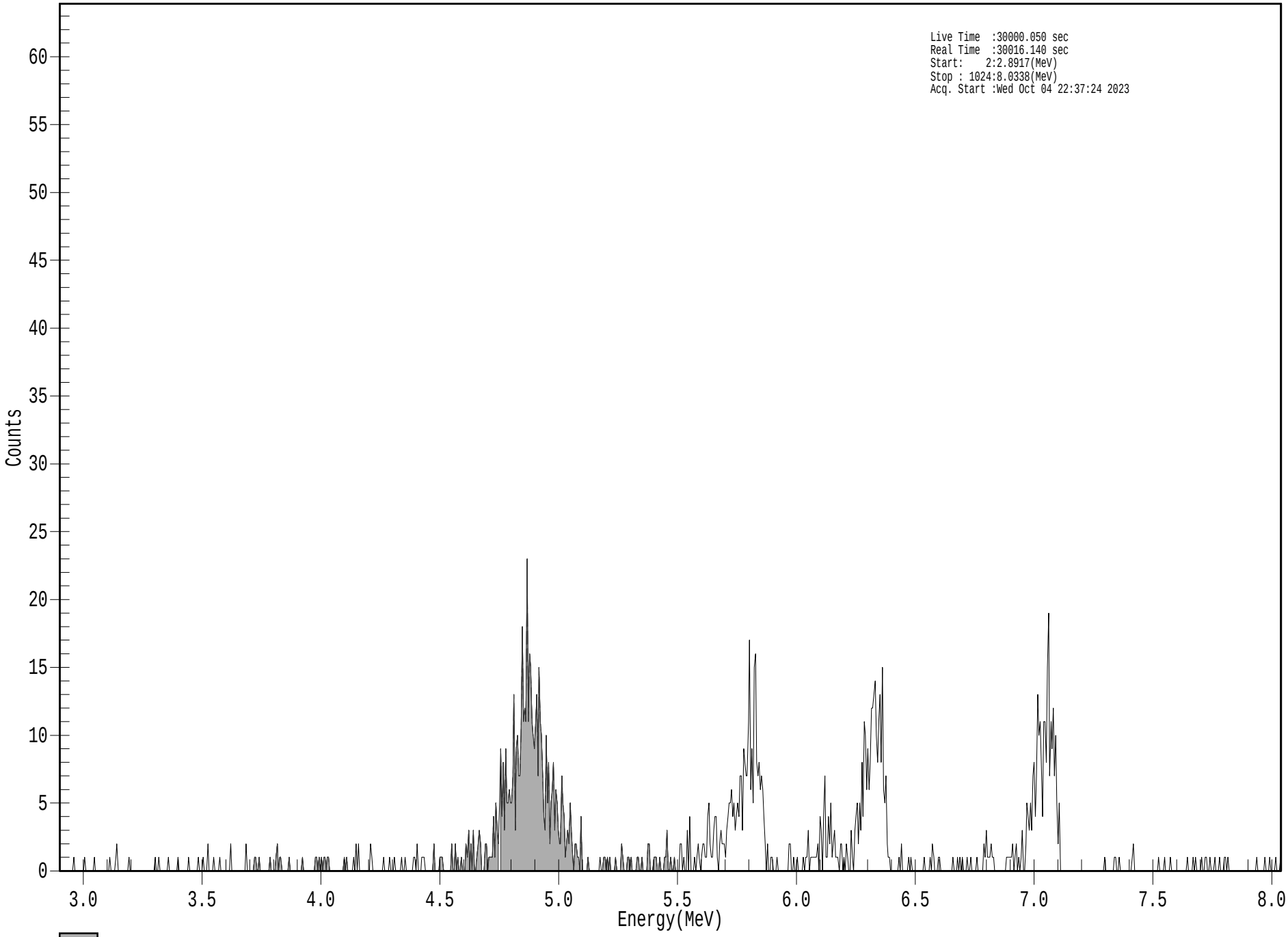
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	162-	243	202.67	3901.34	7.55	2.10E+001	4.58	0.00E+000
2	309-	369	350.87	4646.99	10.69	5.30E+001	7.28	0.00E+000
3	360-	448	396.28	4875.47	9.64	4.86E+002	22.05	0.00E+000
4	456-	517	488.76	5340.77	6.29	2.90E+001	5.39	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T14214339310.CNF



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***** A L P H A S P E C T R U M A N A L Y S I S *****
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Filename: O:\alpha_sp\2023\THORIUM\T2143393\T17214339311.CNF

Report Generated On	:	10/11/2023 9:39:11 PM
Sample Title	:	L1656521-01 WG2143393
Sample Description	:	
Sample Identification	:	
Sample Type	:	
Sample Geometry	:	
Peak Locate Threshold	:	10.00
Peak Locate Range (in channels)	:	1 - 1024
Peak Area Range (in channels)	:	1 - 1024
Identification Energy Tolerance	:	0.100 MeV
Sample Size	:	1.000E+000 Unit
Sample Taken On	:	
Acquisition Started	:	10/4/2023 10:37:27 PM
Live Time	:	30000.5 seconds
Real Time	:	30000.7 seconds
Dead Time	:	0.00 %

Energy Calibration Used Done On	:	1/17/2023
Efficiency Calibration Used Done On	:	10/2/2023
Efficiency ID	:	

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET17
Sample Title: L1656521-01 WG2143393
Peak Analysis Performed on: 10/11/2023 9:39:11 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

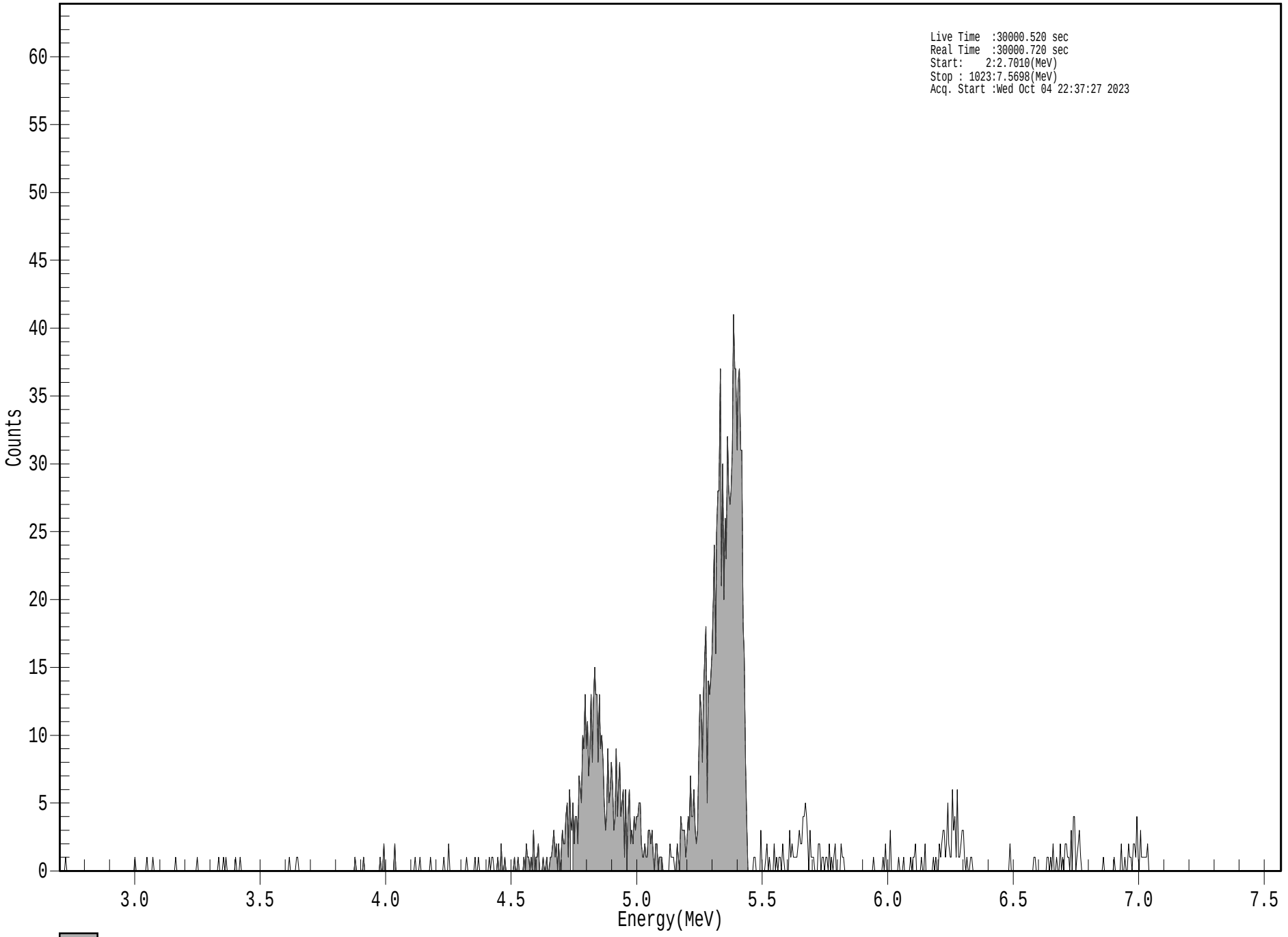
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	211-	296	269.29	3975.58	4.77	7.00E+000	2.65	0.00E+000
2	366-	429	411.97	4655.99	10.01	6.10E+001	7.81	0.00E+000
3	420-	511	455.78	4864.93	56.83	4.27E+002	20.66	0.00E+000
4	516-	579	556.81	5346.71	74.99	9.76E+002	31.24	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T17214339311.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T19214339312.CNF

Report Generated On             : 10/11/2023  9:39:46 PM

Sample Title                    : L1657009-01 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:28 PM

Live Time                       :    30000.7 seconds
Real Time                       :    30000.9 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET19
Sample Title: L1657009-01 WG2143393
Peak Analysis Performed on: 10/11/2023 9:39:46 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

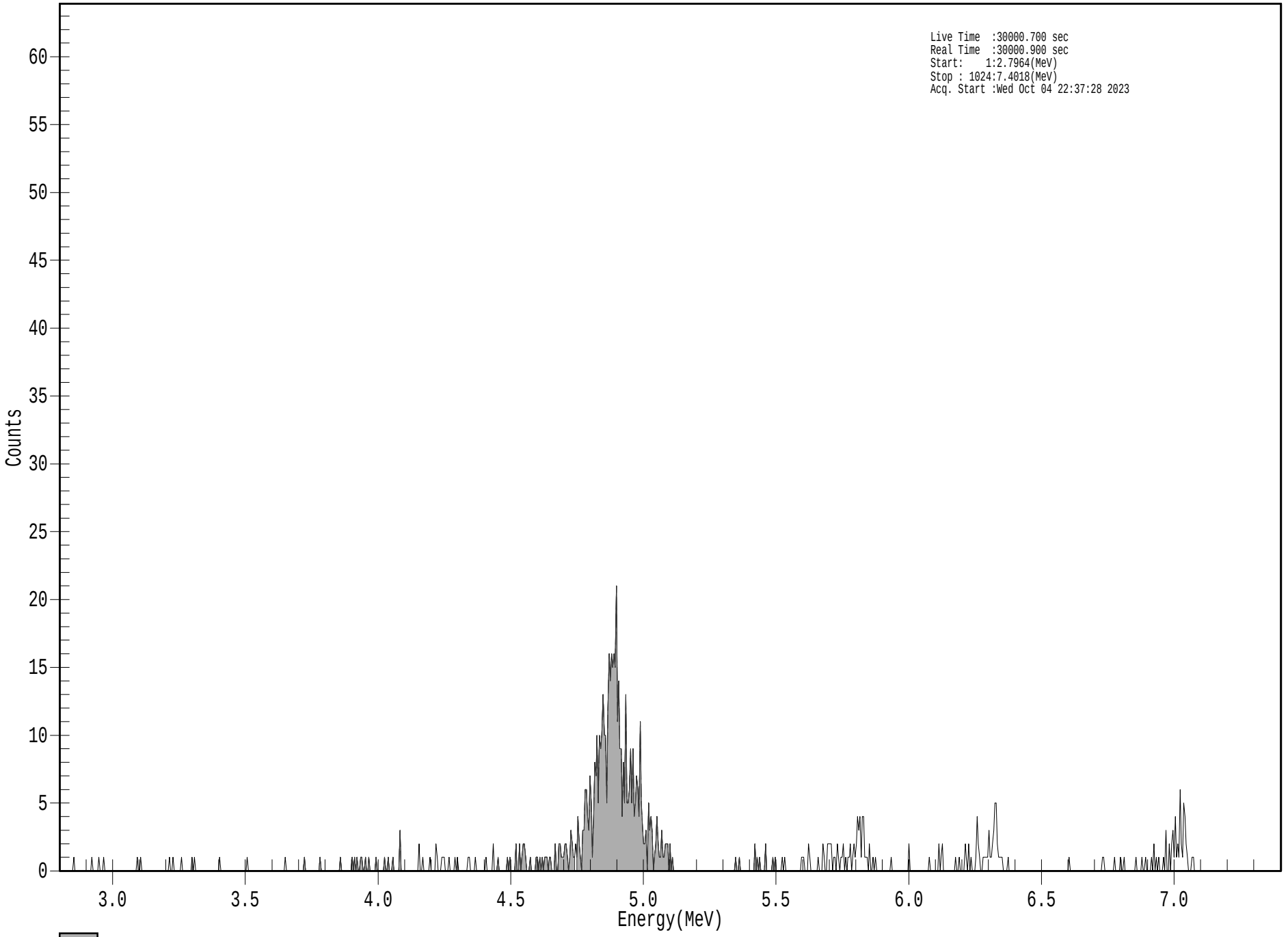
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	201-	291	257.76	3952.34	4.50	1.70E+001	4.12	0.00E+000
2	365-	432	408.58	4631.28	10.13	4.50E+001	6.71	0.00E+000
3	427-	521	466.78	4893.28	44.63	4.86E+002	22.05	0.00E+000
4	532-	601	585.70	5428.65	4.50	1.00E+001	3.16	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T19214339312.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T20214339313.CNF

Report Generated On             : 10/11/2023 10:09:04 PM

Sample Title                    : L1657009-02 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:30 PM

Live Time                       :    30000.7 seconds
Real Time                       :    30000.9 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET20
Sample Title: L1657009-02 WG2143393
Peak Analysis Performed on: 10/11/2023 10:09:04 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

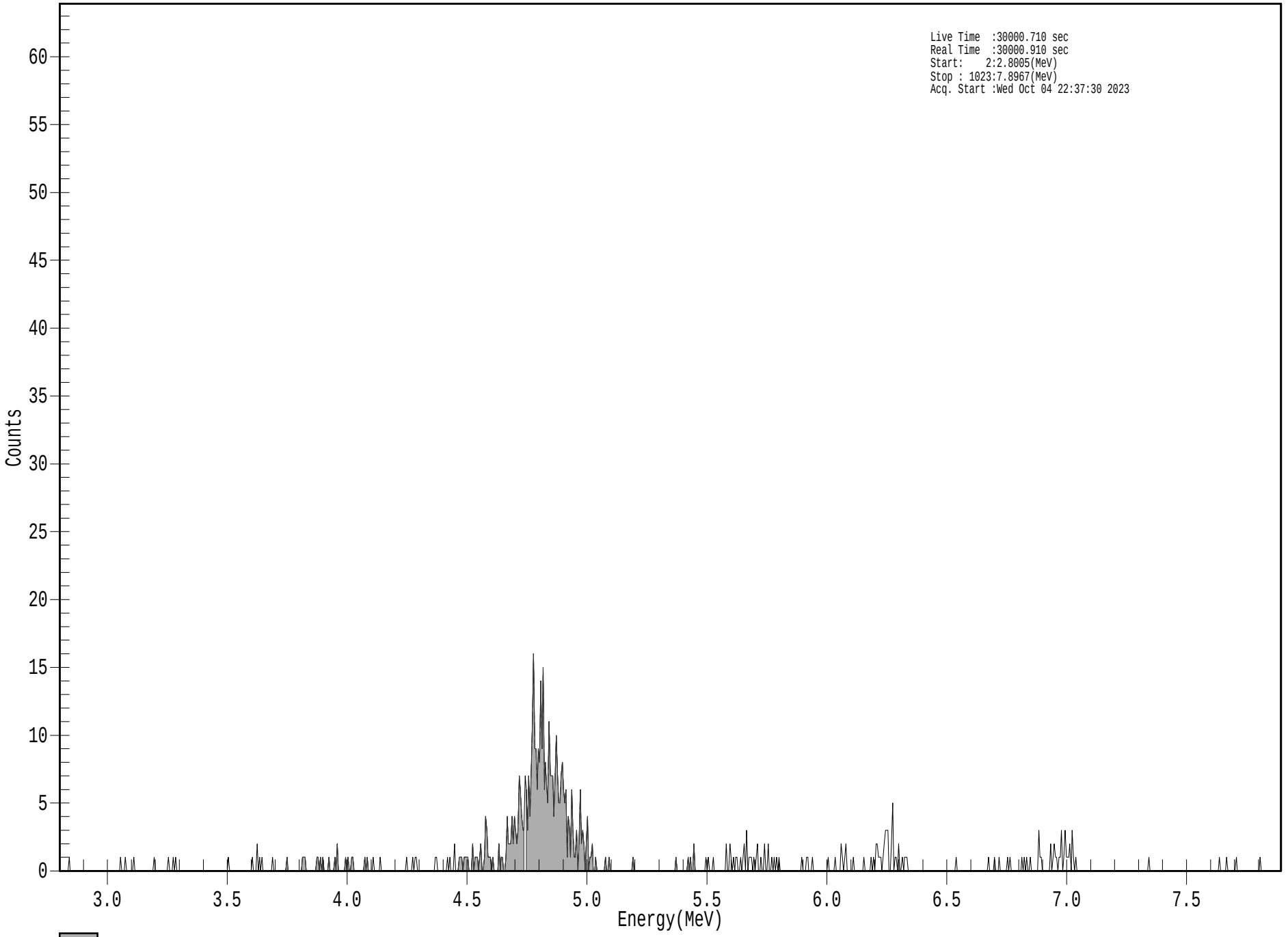
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	182-	263	228.17	3929.38	4.99	1.80E+001	4.24	0.00E+000
2	333-	390	372.51	4649.84	16.85	8.30E+001	9.11	0.00E+000
3	374-	470	407.96	4826.83	20.38	3.70E+002	19.24	0.00E+000
4	480-	541	519.67	5384.38	4.99	6.00E+000	2.45	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T20214339313.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**************************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S          *****
**************************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T21214339314.CNF

Report Generated On             : 10/11/2023  9:40:50 PM

Sample Title                    : L1657009-03 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:31 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30000.2 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/18/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET21
Sample Title: L1657009-03 WG2143393
Peak Analysis Performed on: 10/11/2023 9:40:50 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

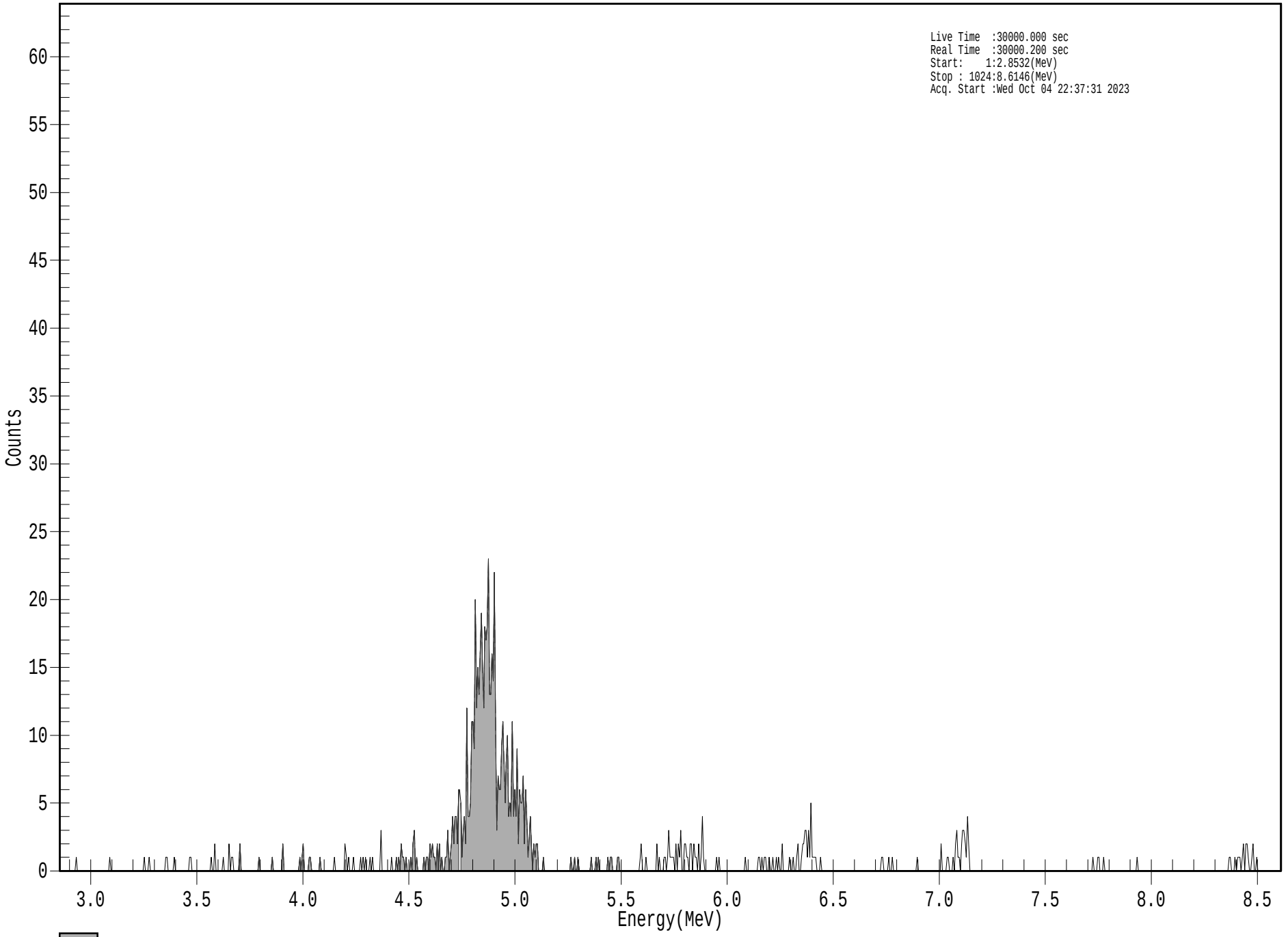
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	151-	223	191.00	3923.25	5.63	1.30E+001	3.61	0.00E+000
2	282-	335	317.47	4635.53	5.63	5.90E+001	7.68	0.00E+000
3	327-	406	361.50	4883.48	99.39	5.62E+002	23.71	0.00E+000
4	415-	470	451.45	5390.08	5.63	1.10E+001	3.32	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T21214339314.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T23214339315.CNF

Report Generated On             : 10/11/2023  9:41:22 PM

Sample Title                    : L1657009-04 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:33 PM

Live Time                       :    30000.5 seconds
Real Time                       :    30000.7 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET23
Sample Title: L1657009-04 WG2143393
Peak Analysis Performed on: 10/11/2023 9:41:22 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

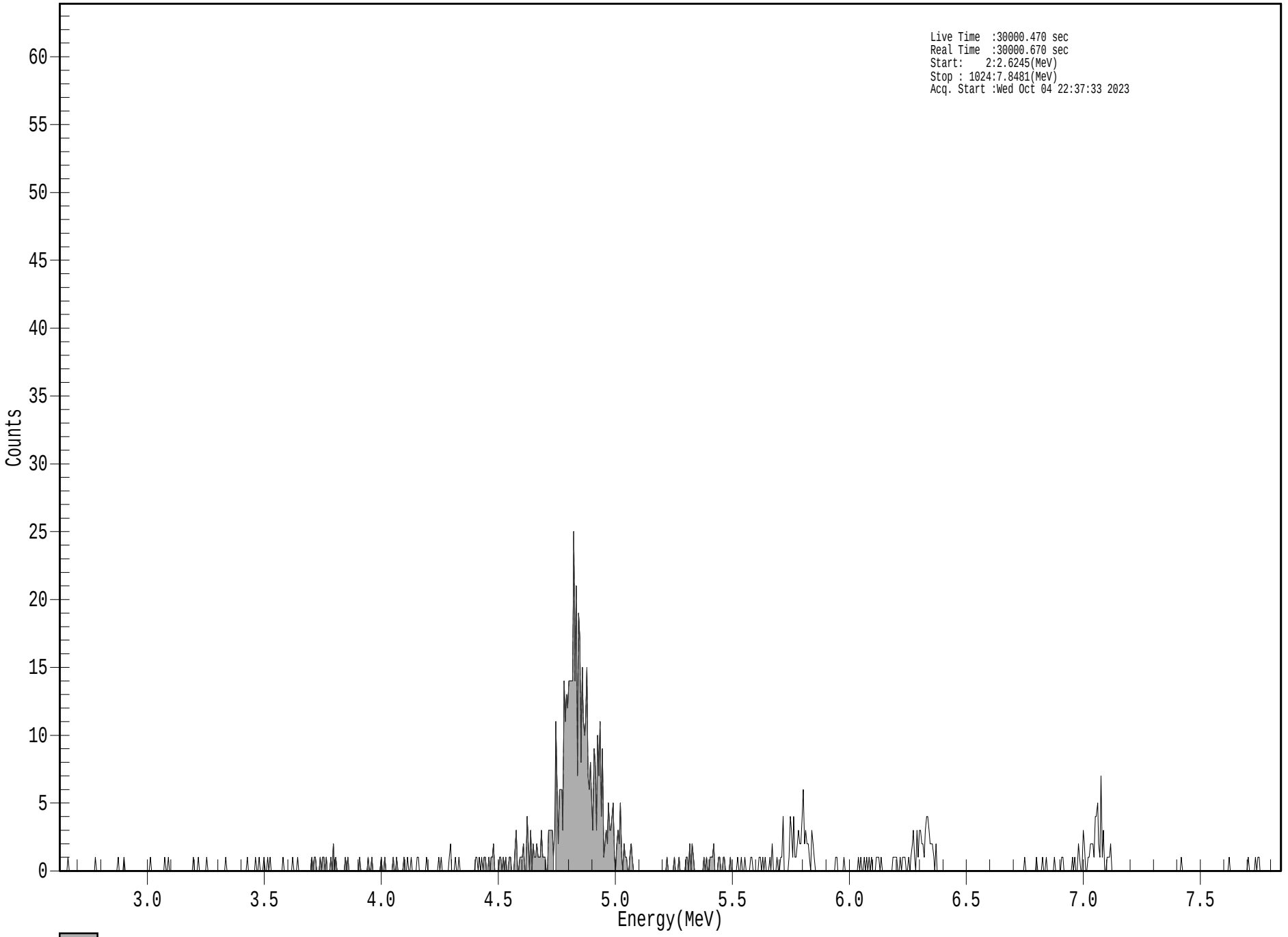
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	212-	291	243.71	3859.94	5.11	2.10E+001	4.58	0.00E+000
2	356-	415	393.27	4624.32	7.67	6.00E+001	7.75	0.00E+000
3	410-	493	438.21	4854.06	37.60	4.75E+002	21.79	0.00E+000
4	503-	565	539.05	5369.42	5.11	2.20E+001	4.69	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T23214339315.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T24214339316.CNF

Report Generated On             : 10/11/2023  9:41:59 PM

Sample Title                    : L1657009-05 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:34 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET24
Sample Title: L1657009-05 WG2143393
Peak Analysis Performed on: 10/11/2023 9:41:59 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

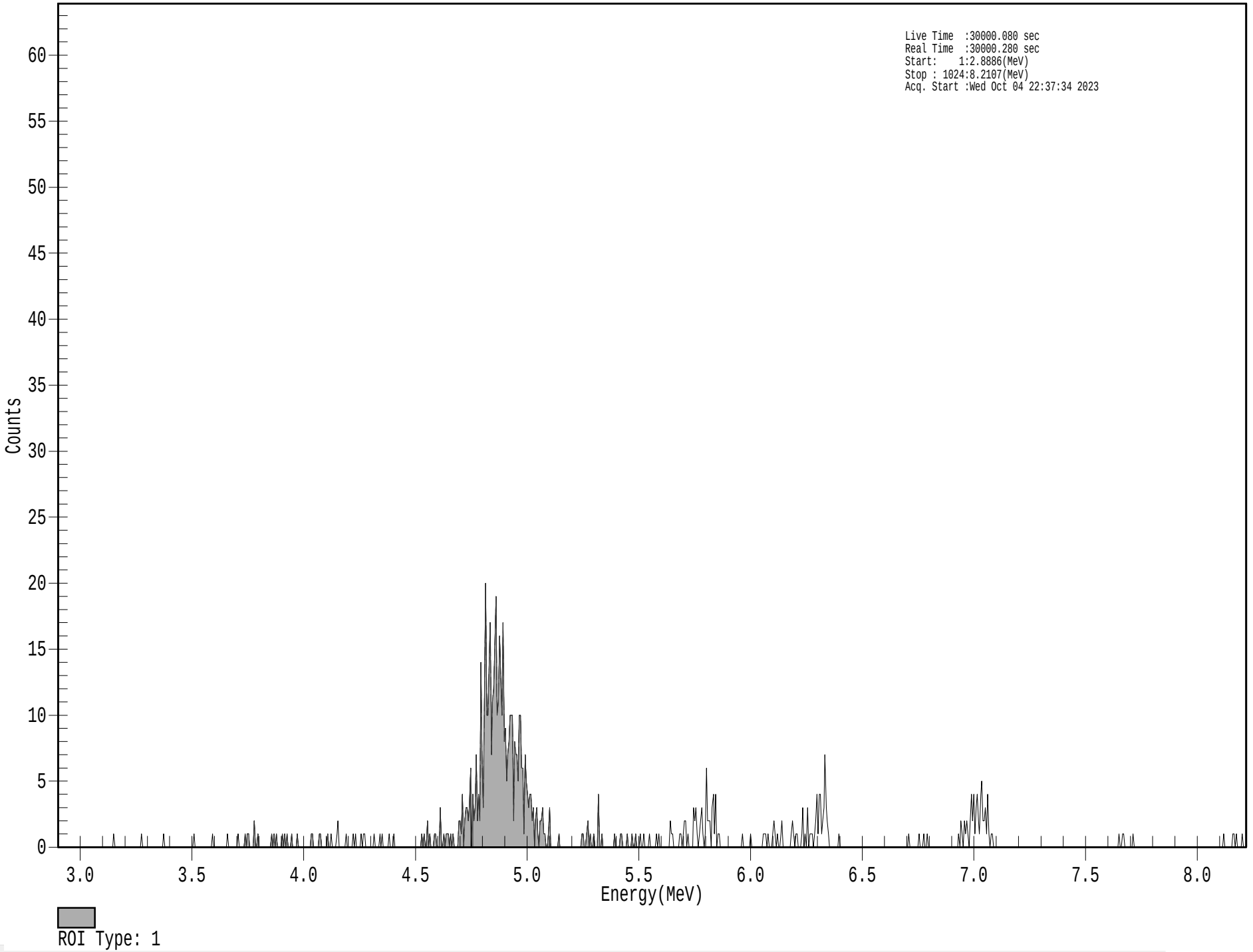
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	157-	234	194.05	3892.95	5.20	1.90E+001	4.36	0.00E+000
2	298-	356	343.34	4669.61	5.20	4.40E+001	6.63	0.00E+000
3	350-	433	382.31	4872.32	11.56	4.71E+002	21.70	0.00E+000
4	443-	501	470.22	5329.70	5.20	1.80E+001	4.24	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T24214339316.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T25214339317.CNF

Report Generated On             : 10/11/2023  9:42:29 PM

Sample Title                    : L1657984-01 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:39 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET25
Sample Title: L1657984-01 WG2143393
Peak Analysis Performed on: 10/11/2023 9:42:29 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

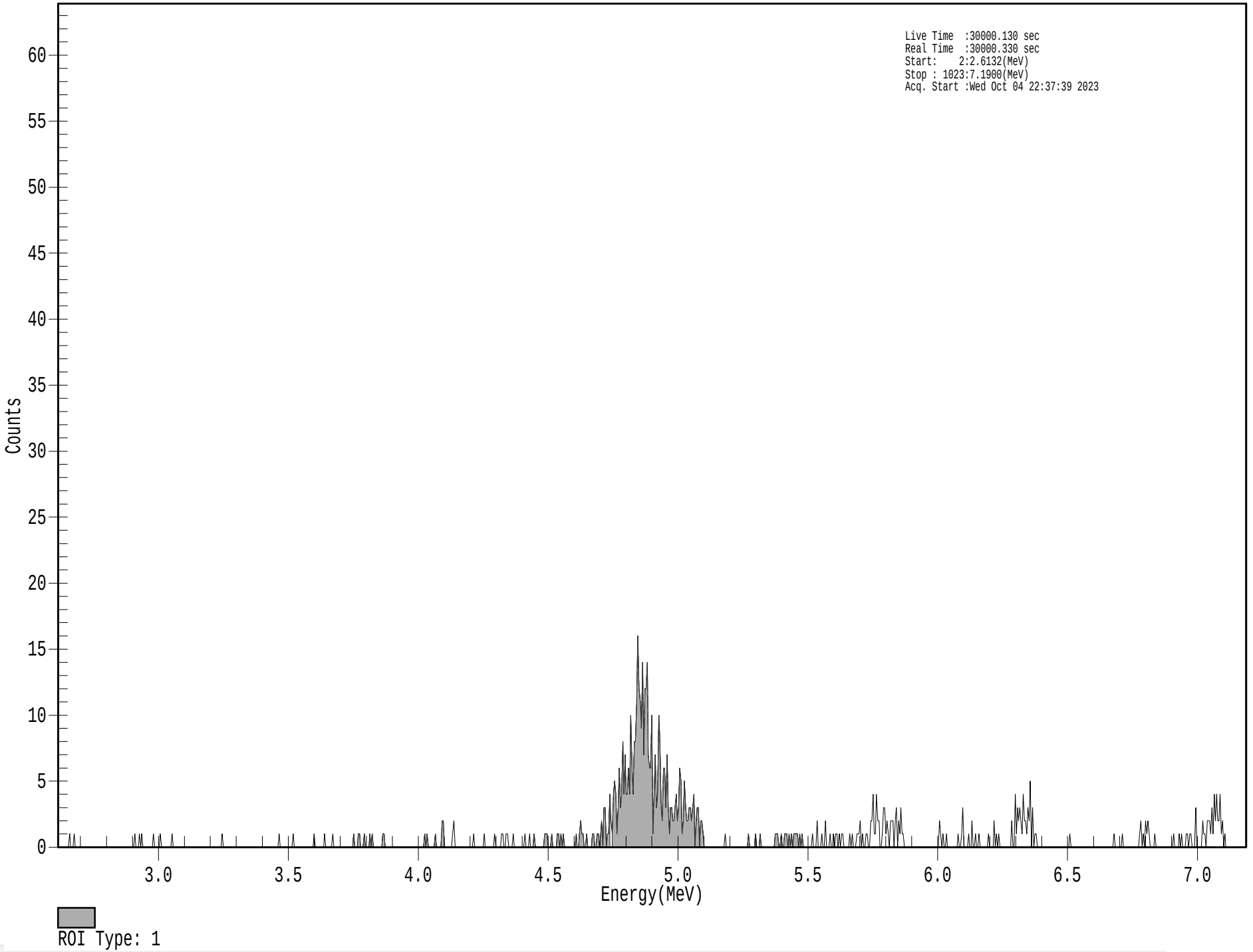
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	244-	334	295.93	3930.76	8.97	1.50E+001	3.87	0.00E+000
2	408-	476	455.29	4645.08	4.48	3.50E+001	5.92	0.00E+000
3	467-	565	508.76	4884.80	30.74	4.12E+002	20.30	0.00E+000
4	576-	644	624.78	5404.86	4.48	1.80E+001	4.24	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T25214339317.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2143393\T26214339318.CNF

Report Generated On : 10/11/2023 9:43:07 PM

Sample Title : L1658999-06 WG2143393
Sample Description :
Sample Identification :
Sample Type :
Sample Geometry :

Peak Locate Threshold : 10.00
Peak Locate Range (in channels) : 1 - 1024
Peak Area Range (in channels) : 1 - 1024
Identification Energy Tolerance : 0.100 MeV

Sample Size : 1.000E+000 Unit

Sample Taken On :
Acquisition Started : 10/4/2023 10:37:40 PM

Live Time : 30000.1 seconds
Real Time : 30000.3 seconds

Dead Time : 0.00 %

Energy Calibration Used Done On : 1/17/2023
Efficiency Calibration Used Done On : 10/2/2023
Efficiency ID :

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET26
Sample Title: L1658999-06 WG2143393
Peak Analysis Performed on: 10/11/2023 9:43:07 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

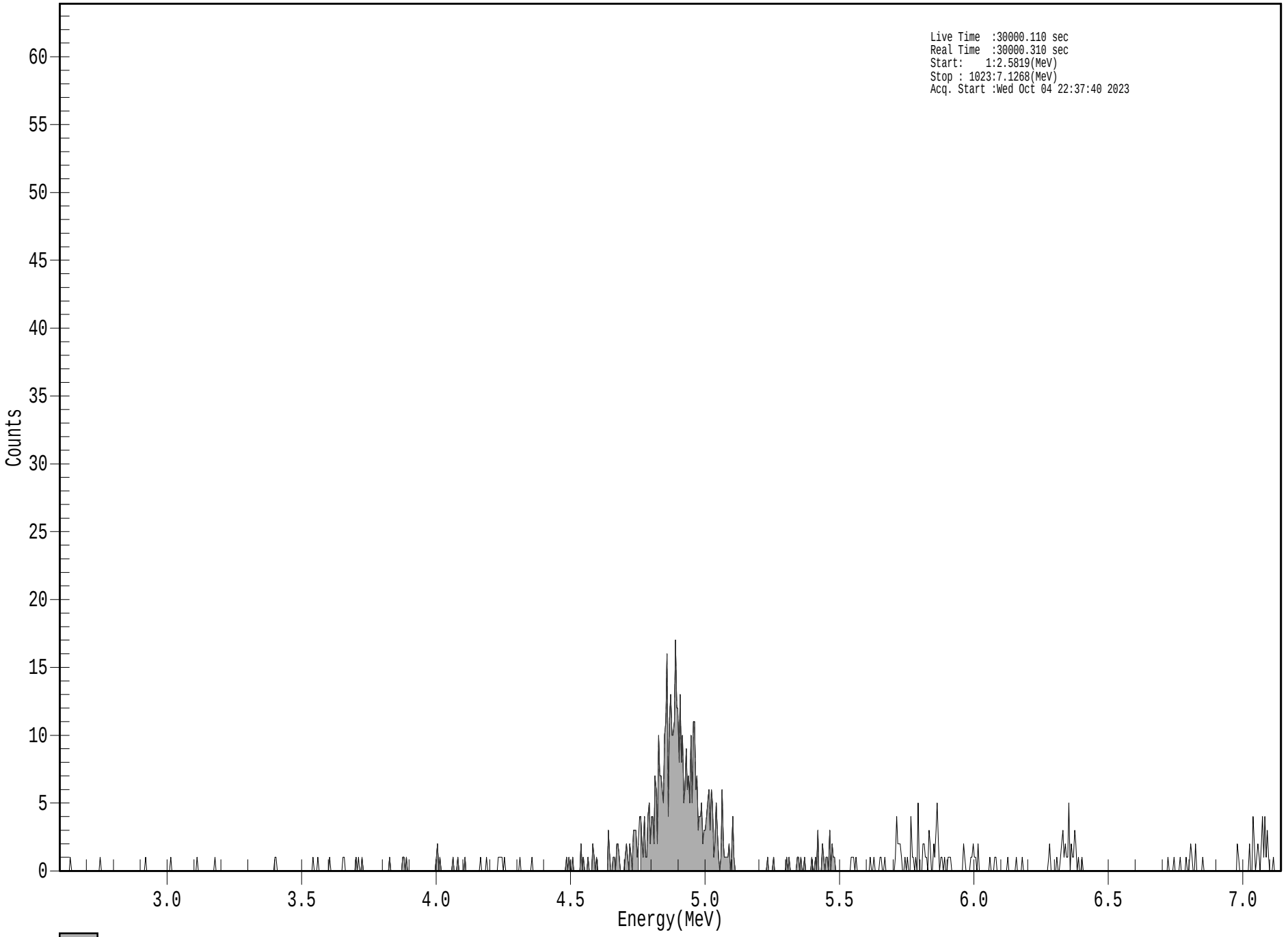
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	252-	343	306.00	3938.27	6.67	1.20E+001	3.46	0.00E+000
2	418-	485	465.02	4645.45	5.56	4.10E+001	6.40	0.00E+000
3	477-	575	519.15	4886.13	36.61	4.53E+002	21.28	0.00E+000
4	587-	656	631.60	5386.21	4.45	2.50E+001	5.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T26214339318.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T27214339319.CNF

Report Generated On             : 10/11/2023  9:43:53 PM

Sample Title                    : L1658999-07 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:42 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET27
Sample Title: L1658999-07 WG2143393
Peak Analysis Performed on: 10/11/2023 9:43:53 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

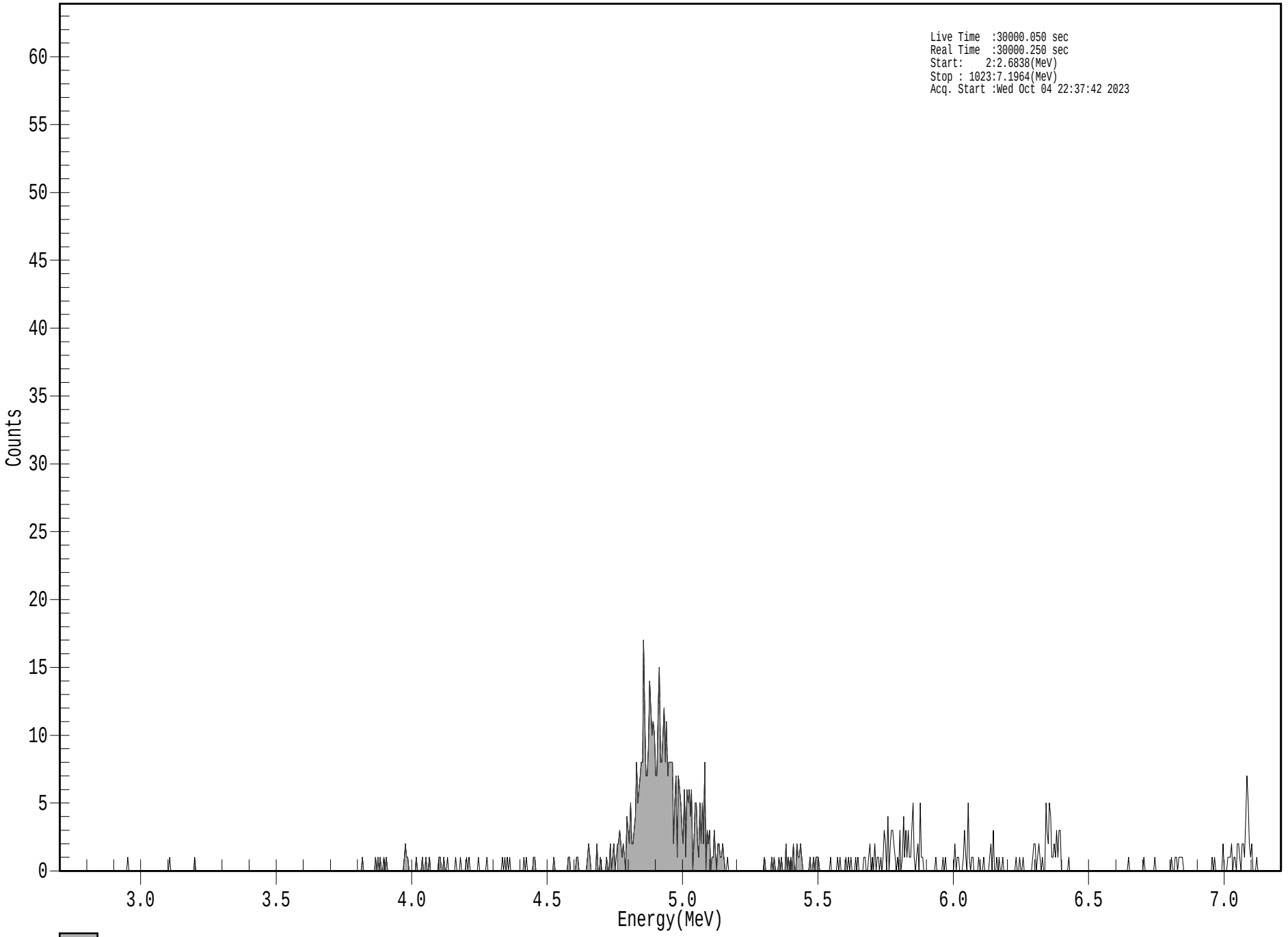
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	231-	324	291.67	3964.06	8.84	1.80E+001	4.24	0.00E+000
2	397-	466	442.25	4629.61	8.84	2.00E+001	4.47	0.00E+000
3	466-	559	506.48	4913.49	11.36	4.58E+002	21.40	0.00E+000
4	568-	637	616.17	5398.31	4.42	2.30E+001	4.80	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T27214339319.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T01214339320.CNF

Report Generated On             : 10/12/2023  5:04:34 PM

Sample Title                    : L1658999-08 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/12/2023 12:19:25 AM

Live Time                       :    30000.2 seconds
Real Time                       :    30008.4 seconds

Dead Time                       :   0.03 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET01
Sample Title: L1658999-08 WG2143393
Peak Analysis Performed on: 10/12/2023 5:04:34 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

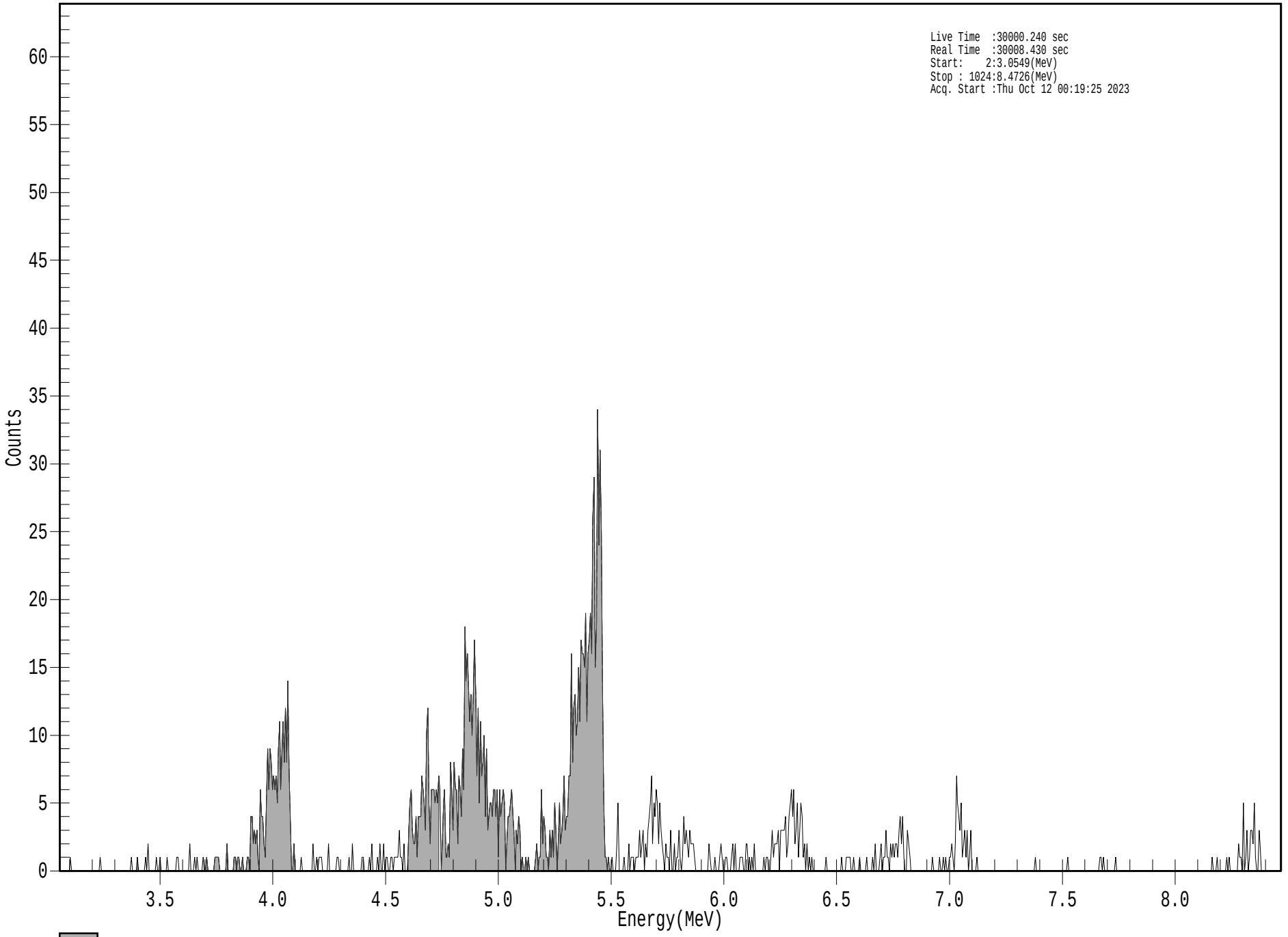
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	123-	200	180.07	3998.84	35.34	2.19E+002	14.80	0.00E+000
2	291-	319	307.99	4676.95	12.87	1.29E+002	11.36	0.00E+000
3	318-	395	350.39	4901.71	55.22	4.31E+002	20.76	0.00E+000
4	399-	462	441.07	5382.42	26.83	5.68E+002	23.83	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T01214339320.CNF



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****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2143393\T02214339321.CNF

Report Generated On : 10/12/2023 5:01:24 PM

Sample Title : L1658999-09 WG2143393
Sample Description :
Sample Identification :
Sample Type :
Sample Geometry :

Peak Locate Threshold : 10.00
Peak Locate Range (in channels) : 1 - 1024
Peak Area Range (in channels) : 1 - 1024
Identification Energy Tolerance : 0.100 MeV

Sample Size : 1.000E+000 Unit

Sample Taken On :
Acquisition Started : 10/12/2023 12:19:28 AM

Live Time : 30000.1 seconds
Real Time : 30008.3 seconds

Dead Time : 0.03 %

Energy Calibration Used Done On : 1/17/2023
Efficiency Calibration Used Done On : 10/2/2023
Efficiency ID :

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET02
Sample Title: L1658999-09 WG2143393
Peak Analysis Performed on: 10/12/2023 5:01:24 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

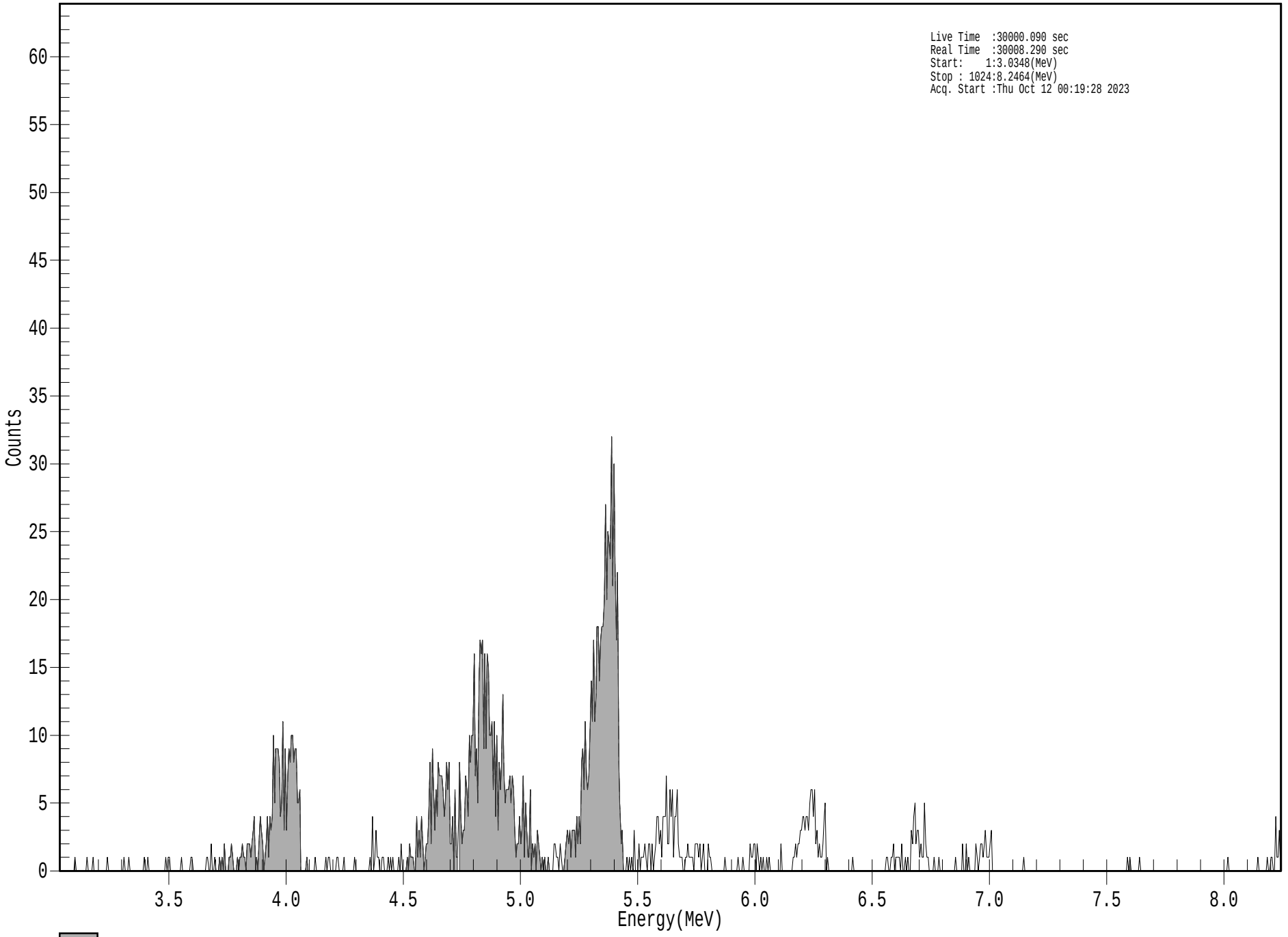
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	134-	211	183.64	3965.28	8.17	2.35E+002	15.33	0.00E+000
2	289-	334	317.20	4645.67	10.92	1.50E+002	12.25	0.00E+000
3	331-	413	361.68	4872.28	61.70	4.63E+002	21.52	0.00E+000
4	422-	473	455.14	5348.41	75.20	5.68E+002	23.83	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T02214339321.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T03214339322.CNF

Report Generated On             : 10/12/2023  5:03:08 PM

Sample Title                    : L1658999-10 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/12/2023 12:19:29 AM

Live Time                       :    30000.3 seconds
Real Time                       :    30008.5 seconds

Dead Time                       :   0.03 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET03
Sample Title: L1658999-10 WG2143393
Peak Analysis Performed on: 10/12/2023 5:03:08 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

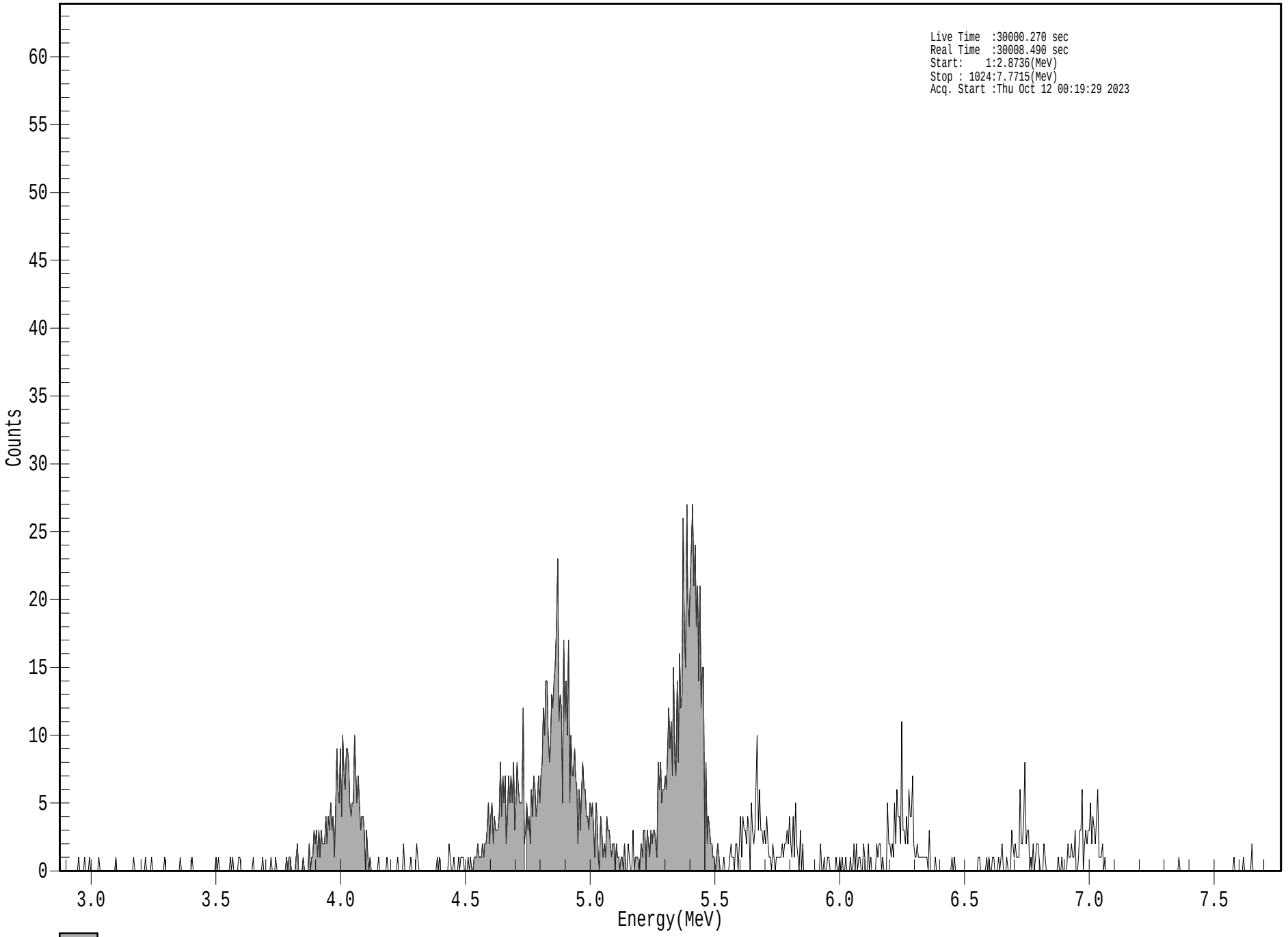
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	184-	262	236.91	4003.13	32.72	2.17E+002	14.73	0.00E+000
2	347-	390	374.24	4660.63	6.98	1.73E+002	13.15	0.00E+000
3	390-	476	422.32	4890.82	30.32	5.23E+002	22.87	0.00E+000
4	482-	554	524.00	5377.63	75.62	6.09E+002	24.68	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T03214339322.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T28214339323.CNF

Report Generated On             : 10/11/2023  9:44:26 PM

Sample Title                    : L1658999-11 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:43 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET28
Sample Title: L1658999-11 WG2143393
Peak Analysis Performed on: 10/11/2023 9:44:26 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

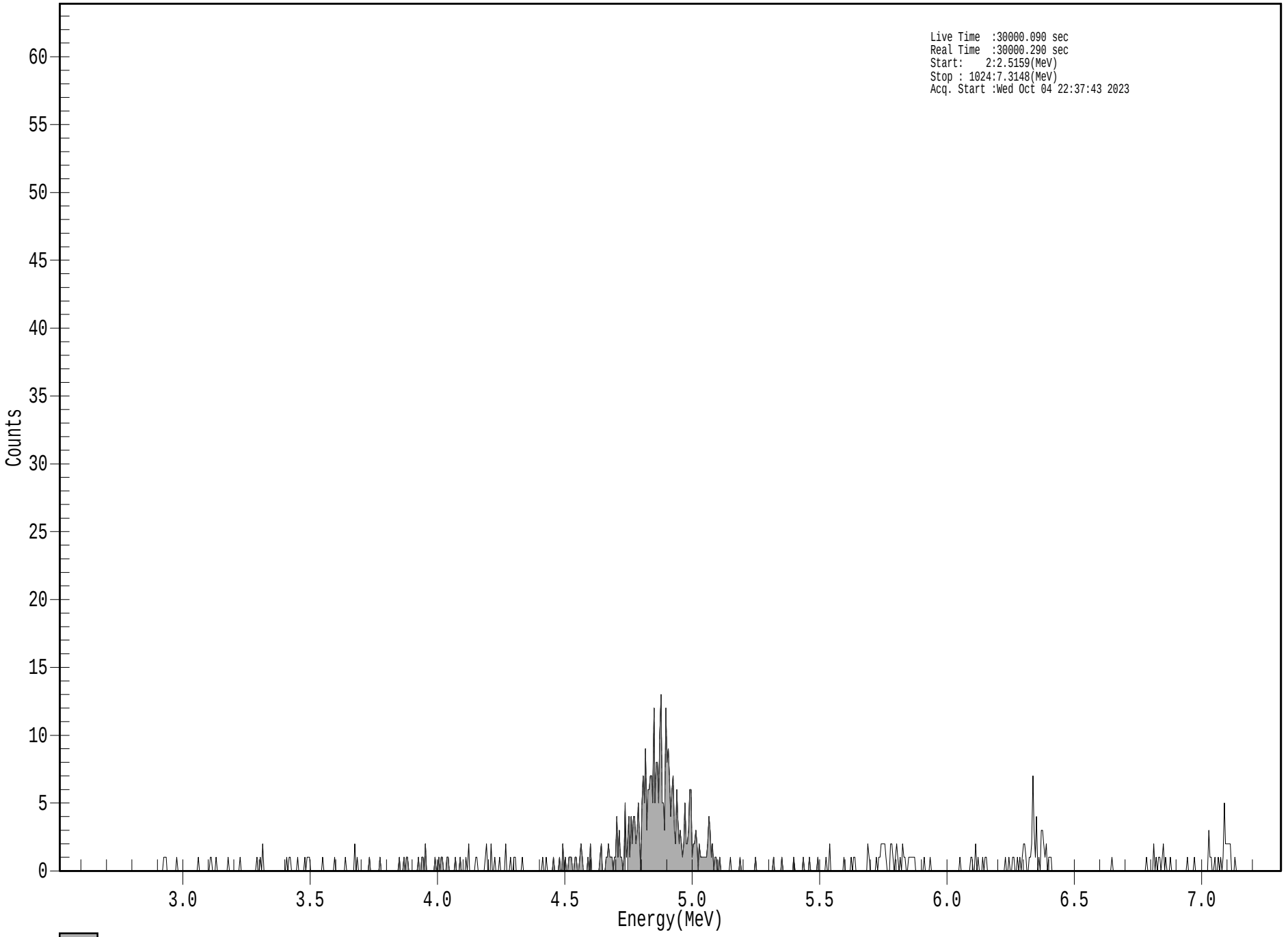
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	254-	340	306.42	3945.32	4.70	1.90E+001	4.36	0.00E+000
2	411-	475	453.73	4637.04	4.70	4.50E+001	6.71	0.00E+000
3	465-	560	505.66	4880.89	11.80	3.21E+002	17.92	0.00E+000
4	570-	637	608.13	5362.00	4.70	8.00E+000	2.83	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T28214339323.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T29214339324.CNF

Report Generated On             : 10/11/2023  9:45:00 PM

Sample Title                    : L1658999-12 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:45 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30000.2 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET29
Sample Title: L1658999-12 WG2143393
Peak Analysis Performed on: 10/11/2023 9:45:00 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

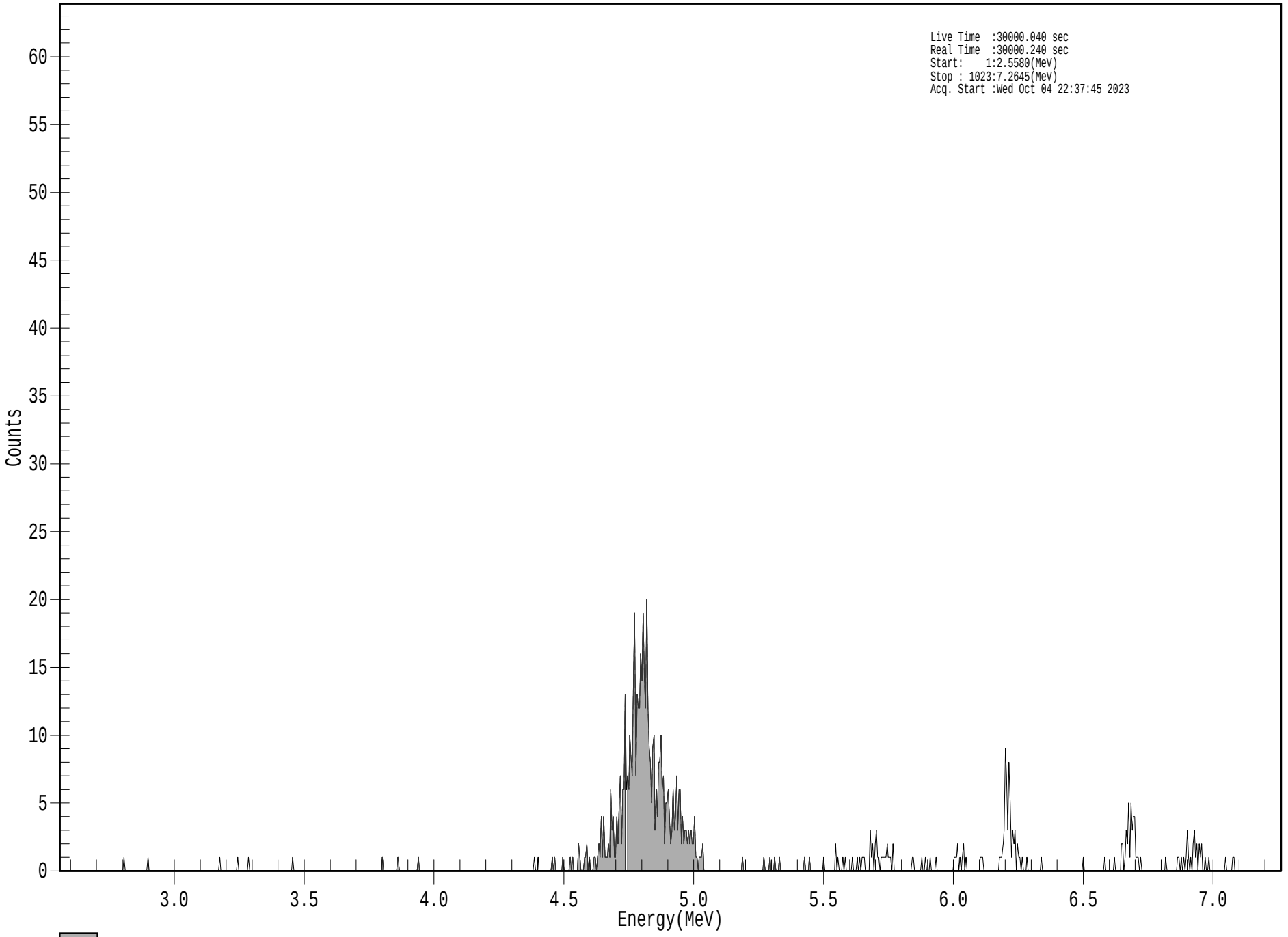
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	249-	337	285.33	3867.43	4.61	3.00E+000	1.73	0.00E+000
2	408-	474	461.05	4676.66	4.61	9.40E+001	9.70	0.00E+000
3	466-	561	494.23	4829.42	46.82	4.68E+002	21.63	0.00E+000
4	571-	638	601.57	5323.77	4.61	7.00E+000	2.65	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T29214339324.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2143393\T30214339325.CNF

Report Generated On             : 10/11/2023  9:45:32 PM

Sample Title                    : L1658999-13 WG2143393
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/4/2023  10:37:46 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30000.2 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET30
Sample Title: L1658999-13 WG2143393
Peak Analysis Performed on: 10/11/2023 9:45:32 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

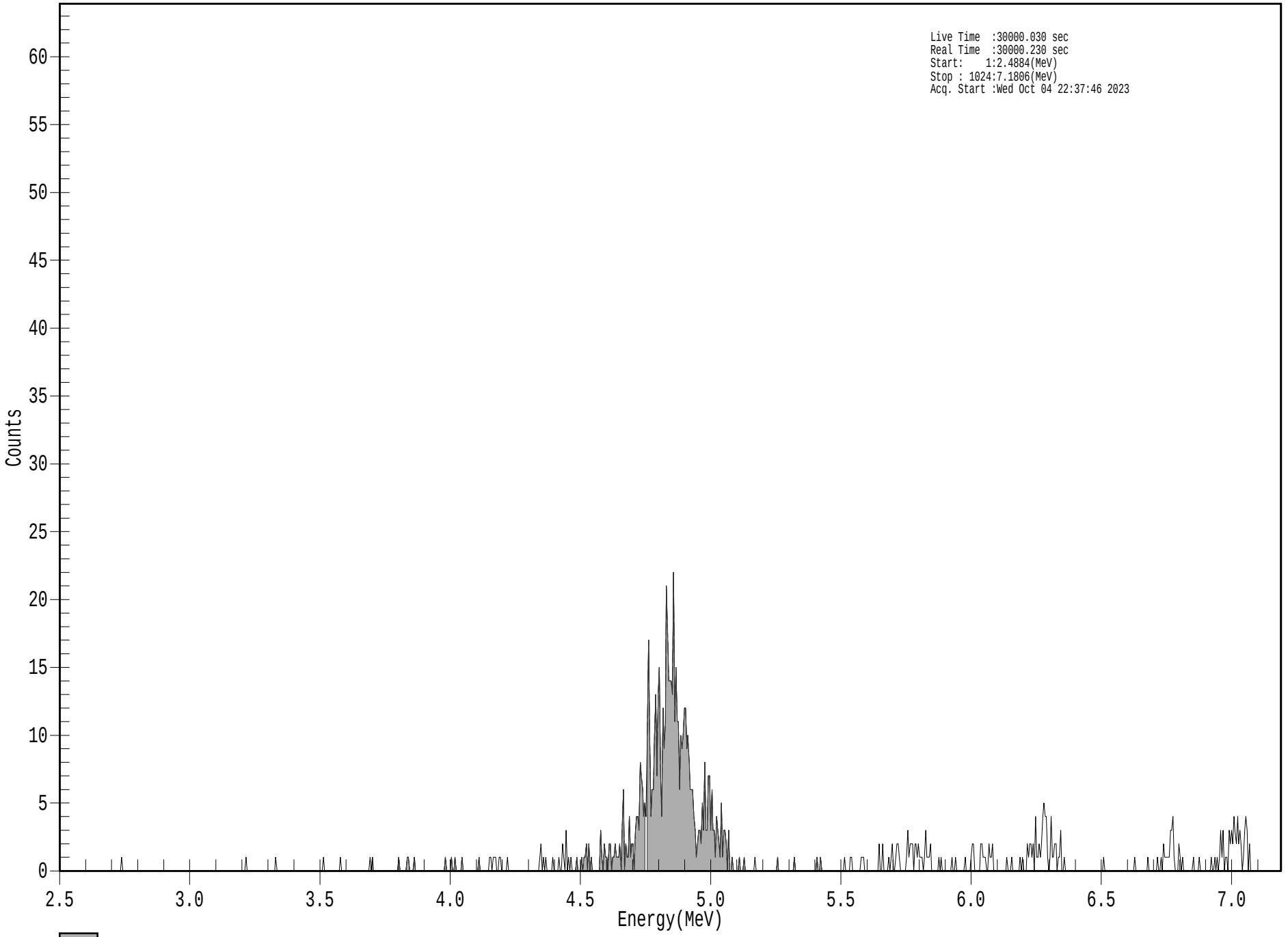
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	265-	353	315.89	3932.73	4.59	9.00E+000	3.00	0.00E+000
2	433-	491	474.83	4661.75	17.43	9.60E+001	9.80	0.00E+000
3	482-	578	515.68	4849.11	36.69	5.69E+002	23.85	0.00E+000
4	589-	656	622.75	5340.19	4.59	4.00E+000	2.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T30214339325.CNF



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THORIUM-ISOTOPIC
METHOD: LANL ER200M
WG# WG2152286

	Th232				Th230				Th228						PREP	DATE	
LAB ID	**Result**	**2 σ Error**	**MDA**	**CSU**	**Result**	**2 σ Error**	**MDA**	**CSU**	**Result**	**2 σ Error**	**MDA**	**CSU**	**Units**	**Q**	**DATE**	**COUNTED**	**ANALYST**
BLANK WG2152286	0.066	0.048	0.073	0.012	0.092	0.092	0.149	0.024	0.016	0.057	0.106	0.013	pCi/l		10/16/23	10/18/23	RGT870
LCS WG2152286	1.642	0.178	0.054	0.095	1.714	0.192	0.123	0.107	1.615	0.180	0.079	0.095	pCi/l		10/16/23	10/18/23	RGT870
MS L1663896-01 WG2152286	7.876	0.648	0.159	0.495	7.406	0.664	0.402	0.513	6.747	0.616	0.278	0.443	pCi/l		10/16/23	10/18/23	RGT870
MSD L1663896-01 WG2152286	7.798	0.749	0.213	0.429	8.636	0.822	0.464	0.498	7.649	0.749	0.273	0.424	pCi/l		10/16/23	10/18/23	RGT870
DUP L1664041-15 WG2152286	0.262	0.139	0.191	0.051	0.023	0.244	0.457	0.093	0.072	0.150	0.284	0.049	pCi/l		10/16/23	10/18/23	RGT870
L1658999-14 WG2152286	0.108	0.089	0.179	0.038	-0.154	0.210	0.438	0.094	0.141	0.119	0.210	0.050	pCi/l		10/16/23	10/18/23	RGT870
L1658999-15 WG2152286	0.113	0.086	0.169	0.036	0.008	0.221	0.413	0.099	0.083	0.076	0.169	0.031	pCi/l		10/16/23	10/18/23	RGT870
L1663445-01 WG2152286	0.380	0.195	0.236	0.057	0.348	0.341	0.554	0.104	0.196	0.180	0.299	0.050	pCi/l		10/16/23	10/18/23	RGT870
L1663896-01 WG2152286	0.333	0.166	0.206	0.054	0.376	0.309	0.491	0.106	0.151	0.188	0.320	0.056	pCi/l		10/16/23	10/18/23	RGT870
dnrL1664000-01 WG2152286	1.145	0.887	1.107	0.042	1.689	1.207	1.626	0.059	3.221	1.524	1.566	0.072	pCi/l	R	10/16/23	10/18/23	RGT870
L1664041-13 WG2152286	0.358	0.145	0.165	0.079	0.039	0.228	0.415	0.128	0.095	0.120	0.223	0.058	pCi/l		10/16/23	10/18/23	RGT870
L1664041-14 WG2152286	0.402	0.200	0.235	0.065	0.390	0.352	0.562	0.118	0.183	0.169	0.287	0.052	pCi/l		10/16/23	10/18/23	RGT870
L1664041-15 WG2152286	0.385	0.180	0.210	0.068	0.714	0.352	0.495	0.143	0.302	0.171	0.233	0.063	pCi/l		10/16/23	10/18/23	RGT870
L1665465-01 WG2152286	0.318	0.166	0.215	0.058	-0.090	0.239	0.483	0.087	0.169	0.132	0.225	0.045	pCi/l		10/16/23	10/18/23	RGT870
L1665465-02 WG2152286	0.792	0.284	0.263	0.091	1.717	0.492	0.547	0.174	0.353	0.188	0.235	0.059	pCi/l		10/16/23	10/18/23	RGT870
L1666616-01 WG2152286	1.794	0.437	0.281	0.116	2.041	0.548	0.582	0.150	0.292	0.239	0.364	0.056	pCi/l		10/16/23	10/18/23	RGT870
L1666616-02 WG2152286	2.097	0.376	0.186	0.142	1.916	0.430	0.450	0.167	0.287	0.143	0.186	0.049	pCi/l		10/16/23	10/18/23	RGT870
dnrL1664000-01 WG2152286	1.003	0.764	0.915	0.037	0.990	0.998	1.553	0.049	1.605	1.337	1.868	0.062	pCi/l	R	10/16/23	10/23/23	RGT870
L1664000-01 WG2152286	0.175	0.124	0.209	0.039	-0.074	0.249	0.496	0.082	0.093	0.178	0.326	0.051	pCi/l		10/25/23	10/25/23	RGT870
0	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	####	01/00/00	01/00/00	RGT870
0	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	####	01/00/00	01/00/00	RGT870
0	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	####	01/00/00	01/00/00	RGT870
0	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	####	01/00/00	01/00/00	RGT870
0	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	####	01/00/00	01/00/00	RGT870
0	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	####	01/00/00	01/00/00	RGT870
	#DIV/0!	#DIV/0!	######	#####	#####	#DIV/0!	#####	####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	pCi/g	0			

CONC = (AREA-(BACK*T))/(T*TRACER REC*V*E*2.22)
ERROR = 1.96*(SQRT(((AREA/T)/T)+(BACK/T)))/(E*V*TRACER REC*2.22)
MDA = 3.29*(SQRT(BACK/T+BACK/1000)/(V*TRACERREC*E*2.22))+3/(T*V*TRACERREC*E*2.22)

QC REPORT
WG2152286

Analyte	Th232	Spike ID:	22F12858							
Matrix	NPW	Volume Spike Added:	0.2	ml						
Sample	658999-15 WG2152	Activity of Spike:	10.0	pCi/ml	LIMITS LOW	LIMITS HIGH		LIMITS		LIMITS
	RES	ERR	MDA	known	%REC			RPD		RER	
BLANK WG2152286	0.066	0.048	0.073								
LCS WG2152286	1.642	0.178	0.054	2.01	**81.8%**	80%	120%				
L1658999-15 WG2152286	0.113	0.086	0.169								
DUP L1664041-15 WG2152286	0.262	0.139	0.191					**NC**	20%	**0.906**	3
L1663896-01 WG2152286	0.333	0.166	0.206								
MS L1663896-01 WG2152286	7.876	0.648	0.159	8.03	**93.9%**	75%	125%				
MSD L1663896-01 WG2152286	7.798	0.749	0.213	8.03	**92.9%**	75%	125%	**1.0%**	20%		

Analyte	Th228									
Matrix	NPW	Volume Spike Added:	0.2	ml						
Sample	658999-15 WG2152	Activity of Spike:	10.0	pCi/ml	LIMITS LOW	LIMITS HIGH		LIMITS		LIMITS
	RES	ERR	MDA	known	%REC			RPD		RER	
BLANK WG2152286	0.016	0.057	0.106								
LCS WG2152286	1.615	0.180	0.079	2.01	**80.4%**	80%	120%				
L1658999-15 WG2152286	0.083	0.076	0.169								
DUP L1664041-15 WG2152286	0.072	0.150	0.284					**NC**	20%	**0.065**	3
L1663896-01 WG2152286	0.151	0.188	0.320								
MS L1663896-01 WG2152286	6.747	0.616	0.278	8.03	**82.1%**	75%	125%				
MSD L1663896-01 WG2152286	7.649	0.749	0.273	8.03	**93.3%**	75%	125%	**12.5%**	20%		

Analyte	Th230	Spike ID:	18C29765							
Matrix	NPW	Volume Spike Added:	0.2	ml						
Sample	658999-15 WG2152	Activity of Spike:	9.96	pCi/ml	LIMITS LOW	LIMITS HIGH		LIMITS		LIMITS
	RES	ERR	MDA	known	%REC			RPD		RER	
BLANK WG2152286	0.092	0.092	0.149								
LCS WG2152286	1.714	0.192	0.123	1.99	**86.1%**	80%	120%				
L1658999-15 WG2152286	0.008	0.221	0.413								
DUP L1664041-15 WG2152286	0.023	0.244	0.457					**NC**	20%	**0.048**	3
L1663896-01 WG2152286	0.376	0.309	0.491								
MS L1663896-01 WG2152286	7.406	0.664	0.402	7.96	**88.3%**	75%	125%				
MSD L1663896-01 WG2152286	8.636	0.822	0.464	7.96	**103.7%**	75%	125%	**15.3%**	20%		

*** - Outside Control Limits**

RADIOCHEMISTRY Z REPORT

WG#	0					
Analyte	**Th232**	Spike ID:		18F01472		
Matrix	NPW	Volume Spike Added:		0.2	ml	UNCERT
		Activity of Spike:		10.0	pCi/ml	**0.301**

	RES		known		
BLANK WG2152286	0.066	0.048		Z_{BLANK}	**1.36**
LCS WG2152286	1.642	0.178	2.01	Z_{LCS}	**1.05**
L1658999-15 WG2152286	0.113	0.086			
DUP L1664041-15 WG2152286	0.262	0.139		Z_{REP}	**0.91**
L1663896-01 WG2152286	0.333	0.166			
MS L1663896-01 WG2152286	7.876	0.648	8.03	Z_{MS}	**0.67**

Analyte	**Th228**					
Matrix	NPW	Volume Spike Added:		0.2	ml	UNCERT
		Activity of Spike:		10.0	pCi/ml	**0.301**

	RES		known		
BLANK WG2152286	0.016	0.057		Z_{BLANK}	**0.29**
LCS WG2152286	1.615	0.180	2.01	Z_{LCS}	**1.12**
L1658999-15 WG2152286	0.083	0.076			
DUP L1664041-15 WG2152286	0.072	0.150		Z_{REP}	**0.06**
L1663896-01 WG2152286	0.151	0.188			
MS L1663896-01 WG2152286	6.747	0.616	8.03	Z_{MS}	**2.02**

Analyte	**Th230**	Spike ID:		18C29765		
Matrix	NPW	Volume Spike Added:		0.2	ml	UNCERT
Sample	9-15 WC	Activity of Spike:		9.96	pCi/ml	**0.320**

	RES		known		
BLANK WG2152286	0.092	0.092		Z_{BLANK}	**1.00**
LCS WG2152286	1.714	0.192	1.99	Z_{LCS}	**0.74**
L1658999-15 WG2152286	0.008	0.221			
DUP L1664041-15 WG2152286	0.023	0.244		Z_{REP}	**0.05**
L1663896-01 WG2152286	0.376	0.309			
MS L1663896-01 WG2152286	7.406	0.664	7.96	Z_{MS}	**1.17**

THORIUM-ISOTOPIC

METHOD:	**LANL ER200M**	
WG#	**WG2152286**	
ANALYST:	**RGT870**	
TRACER(TH229)	**10.2 pCi/ml**	ID: 22F12860

LAB ID	SUB	PREP DATE	DATE COUNTED	TRACER ADDED(ML)	VOL (L/g)	MATRIX	TIME	Th232 area	bck cpm	0.096 Th230 area	bck cpm	Th228 area	bck cpm	Th229 area	DET	EFF	uE	TRACER REC	Flags
BLANK WG2152286		10/16/2023	10/18/2023	0.2	1.0000	NPW	500	12	0.004	48	0.006	11	0.017	310	9	27.0%	0.9%	50.7%	
LCS WG2152286		10/16/2023	10/18/2023	0.2	1.0000	NPW	500	331	0.002	387	0.003	332	0.015	410	11	23.3%	0.9%	77.6%	
MS L1663896-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	569	0.001	596	0.005	501	0.028	589	12	26.7%	1.0%	97.4%	
MSD L1663896-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	421	0.003	509	0.001	417	0.011	439	13	25.3%	1.1%	76.7%	
DUP L1664041-15 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	15	0.001	47	0.001	11	0.014	452	14	27.9%	0.9%	71.6%	
L1658999-14 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	7	0.001	41	0.002	11	0.005	493	17	25.6%	0.9%	85.0%	
L1658999-15 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	8	0.001	55	0.001	6	0.001	540	19	28.8%	1.0%	82.9%	
L1663445-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	16	0.001	49	0.003	11	0.006	333	20	25.8%	1.0%	56.9%	
L1663896-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	17	0.001	60	0.002	15	0.015	404	23	28.1%	1.0%	63.6%	
dnrL1664000-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	9	0.002	18	0.001	26	0.007	57	24	26.8%	1.1%	9.4%	R
L1664041-13 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	25	0.001	61	0.005	12	0.011	558	25	23.8%	0.9%	103.7%	
L1664041-14 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	17	0.001	52	0.005	10	0.005	335	26	23.5%	0.9%	62.9%	
L1664041-15 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	19	0.001	74	0.001	16	0.003	392	27	23.6%	0.9%	73.4%	
L1665465-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	17	0.002	37	0.001	10	0.003	410	28	26.3%	0.9%	68.9%	
L1665465-02 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	34	0.003	105	0.002	15	0.001	335	29	24.2%	1.0%	61.1%	
L1666616-01 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	69	0.003	109	0.003	16	0.010	307	30	27.7%	0.9%	49.0%	
L1666616-02 WG2152286		10/16/2023	10/18/2023	0.2	0.2500	NPW	500	121	0.001	158	0.002	17	0.001	469	31	31.2%	1.0%	66.4%	
dnrL1664000-01 WG2152286	RC	10/16/2023	10/23/2023	0.2	0.2500	NPW	500	8	0.001	14	0.001	19	0.014	61	14	27.9%	0.9%	9.7%	R
L1664000-01 WG2152286	RD	10/25/2023	10/25/2023	0.2	0.2500	NPW	500	9	0.001	37	0.002	12	0.015	396	23	28.1%	1.0%	62.3%	
																		#DIV/0!	#####
																		#DIV/0!	#####
																		#DIV/0!	#####
																		#DIV/0!	#####
	RD - REDO																	#DIV/0!	#####
	RC - Recount																	#DIV/0!	#####

Th232 area	bck cpm	Th230 area	bck cpm	Th228 area	bck cpm	Th229 COUNTS	OCT_2023 DET	EFF	ERR	
	0.008		0.004		0.002		1	26.1%	1.1%	
	0.008		0.005		0.010		2	26.7%	0.9%	
	0.001		0.002		0.008		3	27.0%	0.8%	
	0.001		0.002		0.011		4	24.7%	1.1%	
							5			
	0.008		0.011		0.012		6	29.8%	0.9%	
							7			
							8			
	0.004		0.006		0.017		9	27.0%	0.9%	
	0.001		0.006		0.021		10	26.5%	1.0%	
	0.002		0.003		0.015		11	23.3%	0.9%	
	0.001		0.005		0.028		12	26.7%	1.0%	
	0.003		0.001		0.011		13	25.3%	1.1%	
	0.001		0.001		0.014		14	27.9%	0.9%	
							15			
							16			
	0.001		0.002		0.005		17	25.6%	0.9%	
							18			
	0.001		0.001		0.001		19	28.8%	1.0%	
	0.001		0.003		0.006		20	25.8%	1.0%	
	0.001		0.003		0.008		21	31.2%	1.0%	
							22			
	0.001		0.002		0.015		23	28.1%	1.0%	
	0.002		0.001		0.007		24	26.8%	1.1%	
	0.001		0.005		0.011		25	23.8%	0.9%	
	0.001		0.005		0.005		26	23.5%	0.9%	
	0.001		0.001		0.003		27	23.6%	0.9%	
	0.002		0.001		0.003		28	26.3%	0.9%	
	0.003		0.002		0.001		29	24.2%	1.0%	
	0.003		0.003		0.010		30	27.7%	0.9%	
	0.001		0.002		0.001		31	31.2%	1.0%	
	0.001		0.002		0.007		32	28.0%	0.5%	
	0.002		0.006		0.002		33	23.2%	0.9%	**A-4-1A**
	0.002		0.004		0.043		34	24.0%	0.8%	**A-4-1B**
	0.001		0.003		0.010		35	23.1%	0.8%	**A-4-2A**
	0.003		0.002		0.005		36	23.6%	0.8%	**A-4-2B**
	0.004		0.004		0.014		37	23.2%	0.7%	**A-4-3A**
	0.001		0.006		0.011		38	23.3%	0.8%	**A-4-3B**
	0.003		0.007		0.004		39	23.6%	0.7%	**A-4-4A**
	0.001		0.002		0.002		40	23.3%	0.8%	**A-4-4B**
	0.001		0.005		0.008		41	23.2%	0.9%	**A-4-5A**
	0.001		0.004		0.006		42	23.6%	0.8%	**A-4-5B**
	0.002		0.004		0.002		43	23.8%	0.8%	**A-4-6A**
	0.003		0.002		0.003		44	23.2%	0.8%	**A-4-6B**

DECAY CALCUALTION

Th-232 Source
ORL# 867-78
TH232-86778-WS3
Pace No. 22F12858

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	03-Jun-22
DATE OF CALIBRATION	16-Oct-23

Ao =	100.40	nCi
N =	0.00	
T(1/2) =	1.41E+10	years
T =	1.37	years
dilution =	1000.00	
A =	100.40	nCi
A =	222.89	dpm/ml
A =	100.40	pCi/ml
Stock =	100.40	pCi/ml
Stock	100.00	ml
DI	1000.00	pCi/ml

A = 10.0 +/- 0.30 pCi/ml

Uncertainty	3.00%
Weight	0.05%
Volume (1000 ml)	0.03%

CSU 3.00%

ORL 867-78

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661-309-1010
Fax 661-257-8303

ESC37019

RAD
1x5mL

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-232	**Customer:**	OUTREACH TECH. INC.
Half-life:	(1.405 ± 0.006)E+10 years	**P.O. No.:**	011213
Catalog No.:	7232	**Reference Date:**	15-Feb-02 12:00 PST
Source No.:	867-78	**Contained Radioactivity: (Th-232 only)**	0.1003 µCi 3.711 kBq

Physical Description:

A. Mass of solution:	6.48779 g in 5 mL flame-sealed ampoule
B. Chemical form:	$Th(NO_3)_4$ in H_2O
C. Carrier content:	None
D. Density:	1.29 g/mL @ 20°C.

Radioimpurities:

Not determined

ENVIRONMENTAL SCIENCE CORP

Radionuclide Concentration: 0.01546 µCi/g, 0.5720 kBq/g

Method of Calibration:

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.0 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.0 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a 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).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This solution has a working life of 5 years.

Quality Control

15-Feb-02
Date Signed

IPL Ref. No.: 867-78

DECAY CALCUALTION

Th229 Source
No. 3653
TH229-3653-WS3
22F12860

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION 03-Jun-22
DATE OF CALIBRATION 16-Oct-23

Ao =	1016.98	nCi
N =	0.00	
T(1/2) =	7340.00	years
T =	1.37	years
dilution =	100.00	
A =	1016.85	nCi
A =	22.57	dpm/ml

A = 10.2 +/- 0.3 pCi/ml

Uncertainty	3.10%
Weight	0.05%
Volume (1000 ml)	0.03%

CSU 3.10%

BLI # 3853
REC'D 7/13/00

NIST TRACEABLE CERTIFICATE
ALPHA STANDARD SOLUTION

ESC37020

Radionuclide:	Th-229	**Customer:**	BARRINGER LABS
Half-life:	7340 ± 160 years	**P.O. No.:**	26587R
Catalog No.:	7229	**Reference Date:**	1-Aug-00 12:00 PST
Source No.:	723-88	**Contained Radioactivity:**	1.019 µCi 37.70 kBq

Physical description:

A. Mass of solution:	5.01859 g in 5 mL flame-sealed ampoule
B. Chemical form:	$Th(NO_3)_4$ in 0.1M HNO_3
C. Carrier content:	10 µg Th/mL of solution
D. Density:	1.0016 g/mL @ 20°C

Radioimpurities: None detected other than daughters

Radionuclide concentration: 0.2030 µCi/g, 7.511 kBq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using gamma ray spectrometry.

Peak energy used for integration: 193.5 keV
Branching ratio used: 0.0441 gammas per decay

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.8 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.1 %

ENVIRONMENTAL SCIENCE CORP

Notes:

- See reverse side for leak tests performed on this source.
- 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).
- Nuclear data was taken from IAEA Technical Reports Series No. 261 (1986).
- This solution has a working life of 5 years.

Daniel James Van Dalsen
Quality Control

ISOTOPE PRODUCTS LABORATORIES
1800 N. KENSTON STREET
BURBANK, CALIFORNIA 91504
818•843•7000 FAX 818•843•6168

10-Jul-00
Date Signed

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IPL Reference Number: 723-88

DECAY CALCUALTION

Th230 Source
No. 3650
TH230-3650-WS3
18C29765

ACTIVITY FORMULA A = Ao(e^^-NT)

A= ACTIVITY OF SOURCE
Ao= INITIAL ACTIVITY
N= DECAY CONSTANT
T(1/2)= SOURCES HALF LIFE
T = NUMBER OF YEARS SINCE ORIGINATION

DATE OF ORIGINATION	28-Mar-19
DATE OF CALIBRATION	16-Oct-23

Ao =	99.55	pCi/ml
N =	0.00	
T(1/2) =	77000	years
T =	4.56	years
Stock Volume	100	ml
Final Volume	1000	ml
dilution =	10	
A =	9.96	pCi/ml

Uncertainty	3.16%
Weight	0.05%
Volume (1000 ml)	0.03%
Volume (100 ml Aliquot)	0.40%
Volume (1000 ml)	0.03%
Volume (100 ml Aliquot)	0.40%
Volume (1000 ml)	0.03%
CSU	3.21%

Activity 9.96 +/- 0.320 pCi/ml

SL# 3650

RAD
1 x 5 mL

CERTIFICATE OF CALIBRATION

REC'D 1/18/00

MODEL CAL3000 STANDARDIZED SOLUTION ESC37021

Radionuclide:	Th-230[1]	**Activity:**	36.84 kBq (995.7 nCi)
Serial Number:	B1566	**Mass of Solution:**	4.9220 grams
Concentration:	7.485 kBq/g (202.3 nCi/g)	**Chemical Form:**	$Th(NO_3)_4$ in 0.1 M HNO_3
Half Life[2]:	$(7.54 \pm 0.03) \times 10^4$ years	**Reference Date:**	1200 PST February 1, 2000

PRINCIPAL EMISSIONS[2]

Type	Energy (keV)	Intensity (%)
alpha	4621.1	23.4
alpha	4687.6	76.3

SOURCE DESCRIPTION

Standardized solution in a 5 milliliter flame-seal ampoule.

ENVIRONMENTAL SCIENCE CORP.

METHOD OF CALIBRATION

Gravimetric aliquots of a master solution were calibrated by liquid scintillation using an efficiency established through ongoing intercomparisons with the National Institute of Standards and Technology. A gravimetric aliquot of this master solution was dispensed into a flame-seal ampoule. This standard is indirectly (implicitly) traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the Nuclear Energy Institute.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	3.16%
Weighing uncertainty	0.05%
Total uncertainty (quadratic sum)	± 3.16%

Jeff Wagner
Calibration Laboratory

January 17, 2000
Date

REFERENCES

(1) Radioactive impurities determined by alpha spectroscopy as of September 22, 1996: 0.29% R225

(2) Table of Radioactive Isotopes, 7th edition, 1986.

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• LEAK TEST CERTIFICATION ON REVERSE •

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 734-8600 Fax (818) 734-8606

View as PDF (CreatePDF?batchnum=WG2152286)

TH-ISO Aqueous Radiochemistry Prep Benchsheet

Batch: WG2152286

Analyst: IJM3838 Prep Start Date/Time: 10/16/23 22:26-10/25/23 14:00 Prep End Date/Time: 10/18/23 22:53-10/25/23 22:00 Method: LANL ER200M

SOP: RAD_16A-11 Pipet ID: E94,E52 Hot Plate ID: G90 Stirrer ID: NA Filter Lot #: RF070123 Centrifuge ID: C7

Th-229 Tracer: 23F16844 Amt. Used: 0.20 mL Exp. Date:06/16/24 Th-230 spike: 22F12855 Amt. Used: 0.20 mL Exp. Date:06/03/24

Th-232 spike: 22F12858 Amt. Used: 0.20 mL Exp. Date:06/03/24 Ferric Nitrate Carrier: 23J02212 Amt. Used: 1 mL Exp. Date:04/30/27

Phenolphthalein Indicator: 23H10120 Amt. Used: 0.50 mL Exp. Date:06/05/25 HCl: 23J17386 Amt. Used: 15 mL Exp. Date:10/17/24

Ammonium Hydroxide: 23F28433 Amt. Used: 40 mL Exp. Date:10/17/24 Nitric Acid: 23J02139 Amt. Used: 40 mL Exp. Date:10/01/24

48% Hydrofluoric Acid: 23H09956 Amt. Used: 1 mL Exp. Date:05/31/25 30-35% Hydrogen Peroxide: 23D21495 Amt. Used: 10 mL Exp. Date:03/31/25

8M Nitric Acid: 23J12881 Amt. Used: 100 mL Exp. Date:10/01/24 AGI-X8 100-200mesh AER: 23F01503 Amt. Used: 7 mL Exp. Date:03/24/28

9M Hydrochloric Acid: 23J18768 Amt. Used: 50 mL Exp. Date:04/17/24 Neodymium Carrier: 23J04618 Amt. Used: 1 mL Exp. Date:07/26/27

80% Ethanol: 23F05958 Amt. Used: 10 mL Exp. Date:06/05/25 0.1 µm filters (25 mm): 23J02126 Amt. Used: 17 Exp. Date:04/02/24

Sample Number	Collect Date	Volume Used (L or filt)	Review Analyst	Review Date
BLANK		1000	RGT870	10/23/23 23:05:04
LCS		1000	RGT870	10/23/23 23:05:04
MS(L1663896-01)		250	RGT870	10/23/23 23:05:04
MSD(L1663896-01)		250	RGT870	10/23/23 23:05:04
DUP(L1664041-15)		250	RGT870	10/23/23 23:05:04
1. L1658999-14	09/19/23 18:33	250	RGT870	10/23/23 23:05:04
2. L1658999-15	09/19/23 17:39	250	RGT870	10/23/23 23:05:04
3. L1663445-01	10/05/23 12:25	250	RGT870	10/23/23 23:05:04
4. L1663896-01	10/02/23 08:00	250	RGT870	10/23/23 23:05:04
5. L1664000-01	10/06/23 11:30	250	RGT870	10/23/23 23:05:04
6. L1664041-13	10/03/23 12:05	250	RGT870	10/23/23 23:05:04
7. L1664041-14	10/03/23 10:45	250	RGT870	10/23/23 23:05:04
8. L1664041-15	10/03/23 10:45	250	RGT870	10/23/23 23:05:04
9. L1665465-01	10/11/23 09:40	250	RGT870	10/23/23 23:05:04
10. L1665465-02	10/11/23 14:00	250	RGT870	10/23/23 23:05:04
11. L1666616-01	10/13/23 15:15	250	RGT870	10/23/23 23:05:04
12. L1666616-02	10/13/23 15:15	250	RGT870	10/23/23 23:05:04

Comments:
cylinder=C203,2ml tips=2215,10ml electric tips=2334,10ml manual tips=P7565750,centrifuge tubes=920128

Reviewed By:RGT870 on 10/23/23 23:05:04

Pace Analytical
National Center for Testing & Innovation

ALPHA SPEC RUN LOG

SDG: T2152286 | Sample Order Verified | ZRG3837 | 10/19/2023 8:10

SDG SUB ID	SAMPLE ID	COUNT DATE / TIME	DET #	ANALYTE	COUNT TIME MIN	FILENAME (DDGXXXYY)	ANALYST	COMMENTS
1	BLANK WG2152286	10/18/24 23:27	09	T	500	T 09 2152286 01	IJM3838	
2	LCS WG2152286	10/18/24 23:27	11	T	500	T 11 2152286 02	IJM3838	
3	MS L1663896-01 WG2152286	10/18/24 23:27	12	T	500	T 12 2152286 03	IJM3838	
4	MSD L1663896-01 WG2152286	10/18/24 23:27	13	T	500	T 13 2152286 04	IJM3838	
5	DUP L1664041-15 WG2152286	10/18/24 23:27	14	T	500	T 14 2152286 05	IJM3838	
6	L1658999-14 WG2152286	10/18/24 23:27	17	T	500	T 17 2152286 06	IJM3838	
7	L1658999-15 WG2152286	10/18/24 23:27	19	T	500	T 19 2152286 07	IJM3838	
8	L1663445-01 WG2152286	10/18/23 23:29	20	T	500	T 20 2152286 08	IJM3838	
9	L1663896-01 WG2152286	10/18/23 23:28	23	T	500	T 23 2152286 09	IJM3838	Low tracer, recount
10	L1664000-01 WG2152286	10/18/23 23:28	24	T	500	T 24 2152286 10	IJM3838	
11	L1664041-13 WG2152286	10/18/23 23:28	25	T	500	T 25 2152286 11	IJM3838	
12	L1664041-14 WG2152286	10/18/23 23:28	26	T	500	T 26 2152286 12	IJM3838	
13	L1664041-15 WG2152286	10/18/23 23:28	27	T	500	T 27 2152286 13	IJM3838	
14	L1665465-01 WG2152286	10/18/23 23:28	28	T	500	T 28 2152286 14	IJM3838	
15	L1665465-02 WG2152286	10/18/23 23:28	29	T	500	T 29 2152286 15	IJM3838	
16	L1666616-01 WG2152286	10/18/23 23:28	30	T	500	T 30 2152286 16	IJM3838	U-iso carry over
17	L1666616-02 WG2152286	10/18/23 23:28	31	T	500	T 31 2152286 17	IJM3838	U-iso carry over
18	L1664000-01 WG2152286	10/23/23 21:15	14	T	500	T 14 2152286 18	IJM3838	the recount; redo
19	L1664000-01 WG2152286	10/25/23 23:50	23	T	200	T 23 2152286 19	IJM3838	the redo
20				T		T 0 2152286 20	IJM3838	
21				T		T 0 2152286 21	IJM3838	
22				T		T 0 2152286 22	IJM3838	
23				T		T 0 2152286 23	IJM3838	
24				T		T 0 2152286 24	IJM3838	
25				T		T 0 2152286 25	IJM3838	
26				T		T 0 2152286 26	IJM3838	

FILENAME EXAMPLE: R12126111116

R = ANALYSIS RADIUM 226 | **1261111 = WG** | **12 = DETECTOR** | **16 = BATCH SUB**

T= THORIUM | **R = RADIUM** | **U = URANIUM**

P = PLUTONIUM | **A = AMERICIUM**

```
**************************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S          *****
**************************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T09215228601.CNF

Report Generated On             : 10/23/2023  8:59:13 PM

Sample Title                    : BLANK WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:27:41 PM

Live Time                       :    30000.3 seconds
Real Time                       :    30000.5 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET09
Sample Title: BLANK WG2152286
Peak Analysis Performed on: 10/23/2023 8:59:13 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

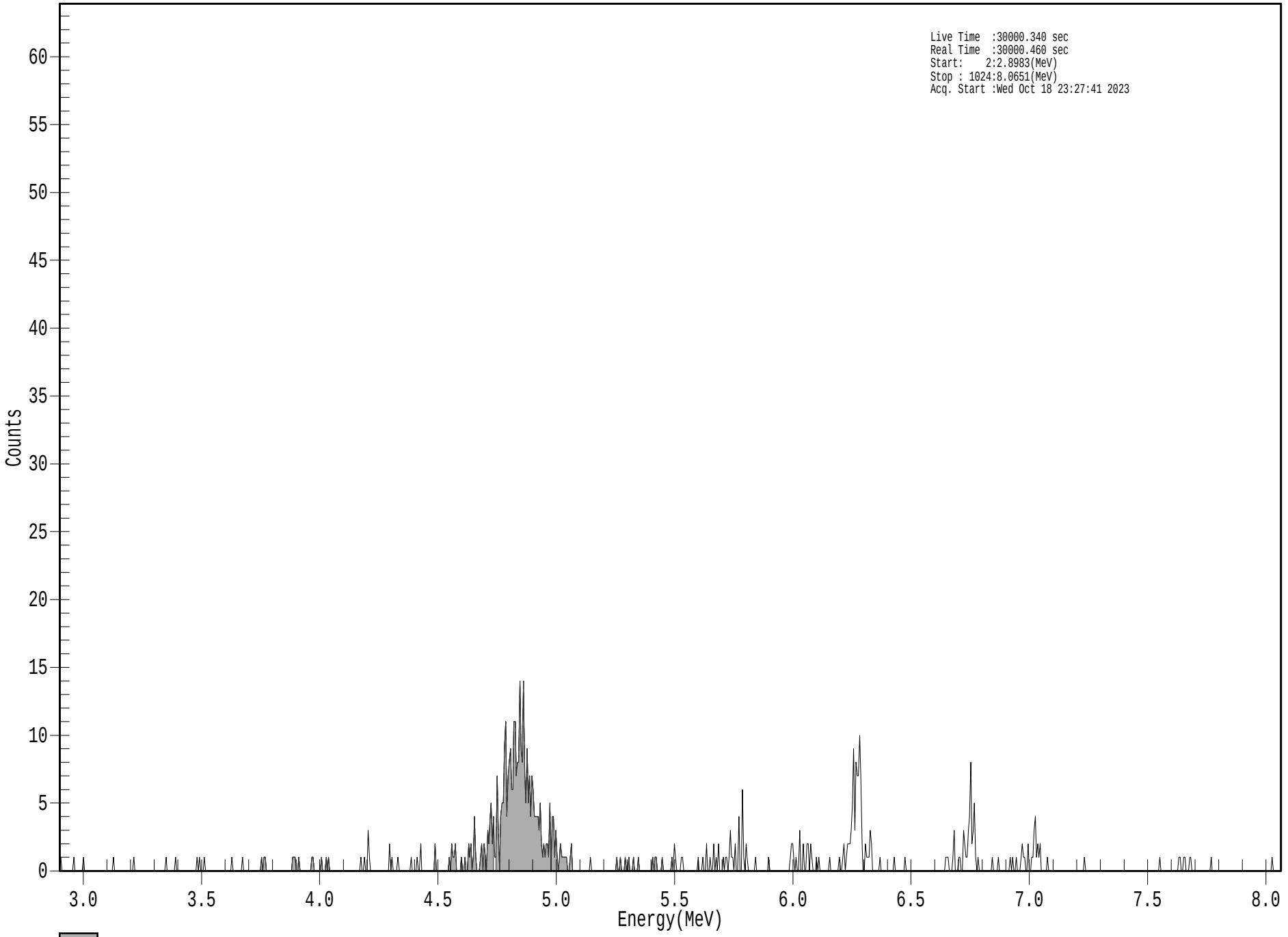
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	160-	240	201.17	3905.23	5.06	1.20E+001	3.46	0.00E+000
2	306-	365	350.75	4661.44	13.06	4.80E+001	6.93	0.00E+000
3	359-	445	387.88	4849.14	35.39	3.10E+002	17.61	0.00E+000
4	454-	515	489.00	5360.37	5.06	1.10E+001	3.32	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T09215228601.CNF



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****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2152286\T11215228602.CNF

Report Generated On : 10/23/2023 9:40:01 PM

Sample Title : LCS WG2152286
Sample Description :
Sample Identification :
Sample Type :
Sample Geometry :

Peak Locate Threshold : 10.00
Peak Locate Range (in channels) : 1 - 1024
Peak Area Range (in channels) : 1 - 1024
Identification Energy Tolerance : 0.100 MeV

Sample Size : 1.000E+000 Unit

Sample Taken On :
Acquisition Started : 10/18/2023 11:27:43 PM

Live Time : 30000.5 seconds
Real Time : 30000.6 seconds

Dead Time : 0.00 %

Energy Calibration Used Done On : 1/17/2023
Efficiency Calibration Used Done On : 10/2/2023
Efficiency ID :

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET11
Sample Title: LCS WG2152286
Peak Analysis Performed on: 10/23/2023 9:40:01 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

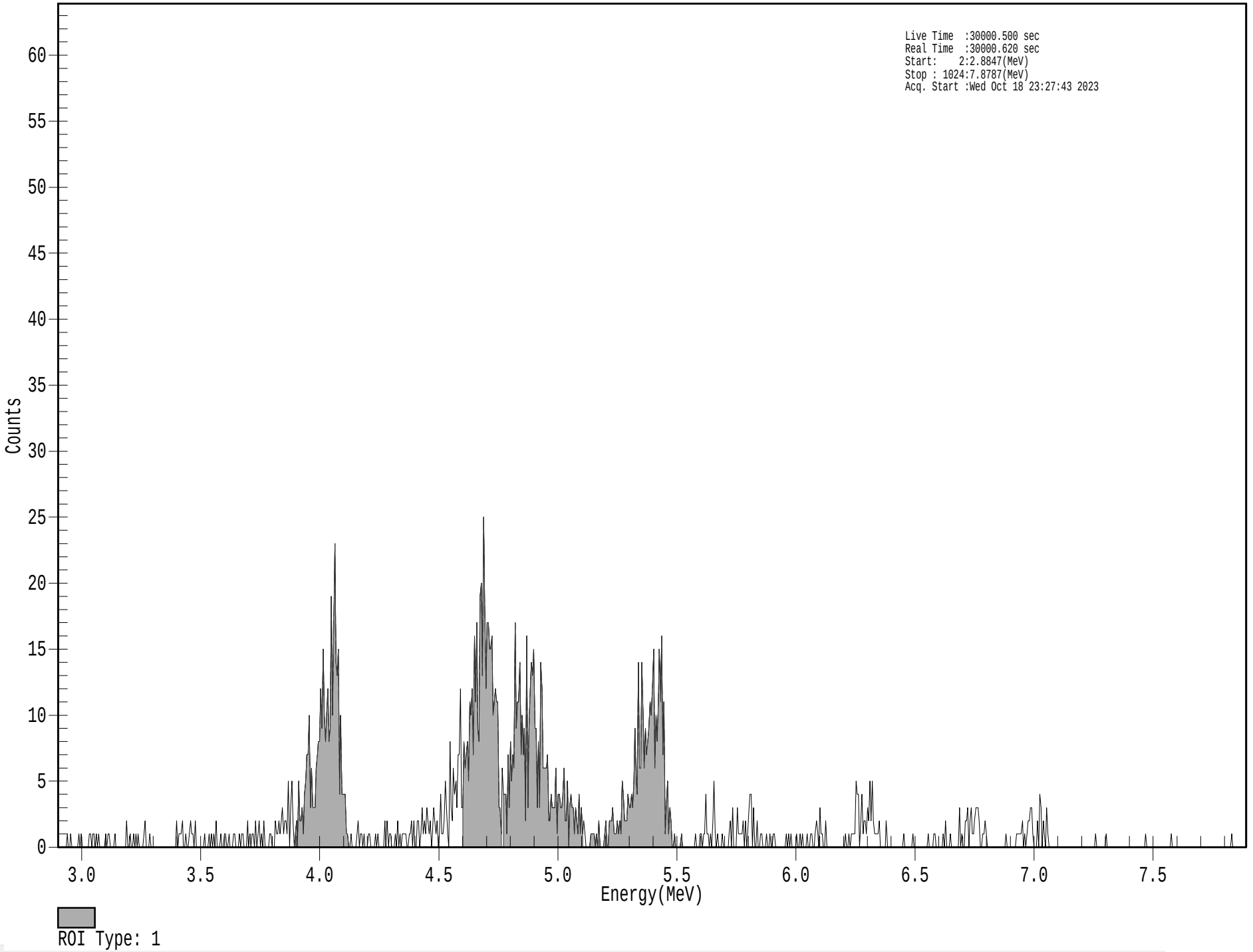
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	205-	252	232.18	4009.42	24.77	3.31E+002	18.19	0.00E+000
2	350-	383	366.96	4668.07	26.91	3.87E+002	19.67	0.00E+000
3	383-	453	411.47	4885.53	27.16	4.10E+002	20.25	0.00E+000
4	459-	539	507.14	5353.05	23.89	3.32E+002	18.22	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T11215228602.CNF



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```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T12215228603.CNF

Report Generated On             : 10/23/2023 10:07:49 PM

Sample Title                    : MS L1663896-01 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:27:45 PM

Live Time                       :    30000.6 seconds
Real Time                       :    30000.8 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET12
Sample Title: MS L1663896-01 WG2152286
Peak Analysis Performed on: 10/23/2023 10:07:49 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

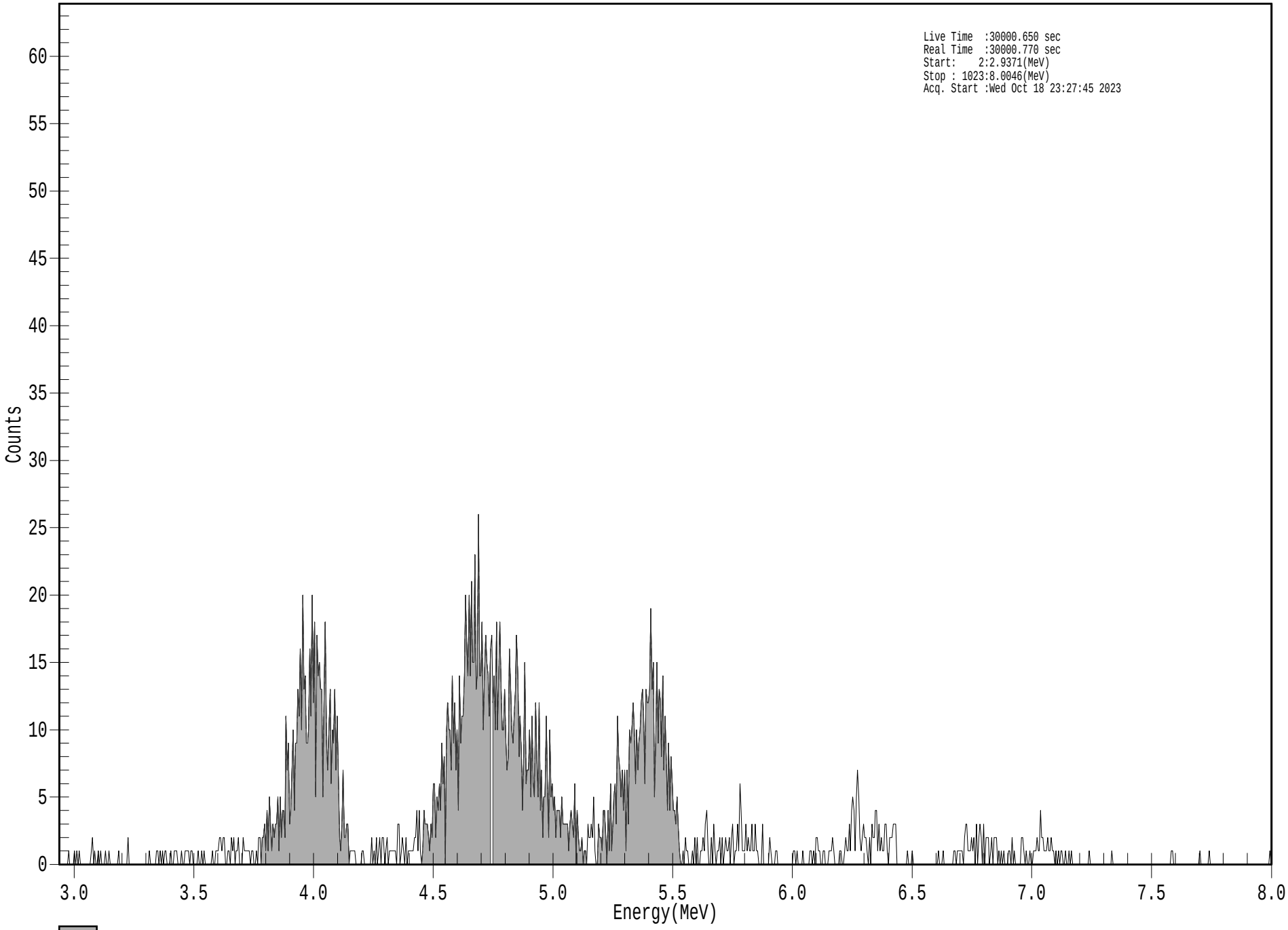
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	172-	246	213.47	3986.71	18.86	5.69E+002	23.85	0.00E+000
2	307-	365	344.39	4636.47	27.92	5.96E+002	24.41	0.00E+000
3	365-	446	392.16	4873.57	99.26	5.89E+002	24.27	0.00E+000
4	455-	526	494.11	5379.56	34.99	5.01E+002	22.38	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T12215228603.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T13215228604.CNF

Report Generated On             : 10/23/2023 10:10:21 PM

Sample Title                    : MSD L1663896-01 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:27:46 PM

Live Time                       :    30000.5 seconds
Real Time                       :    30000.6 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET13
Sample Title: MSD L1663896-01 WG2152286
Peak Analysis Performed on: 10/23/2023 10:10:21 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

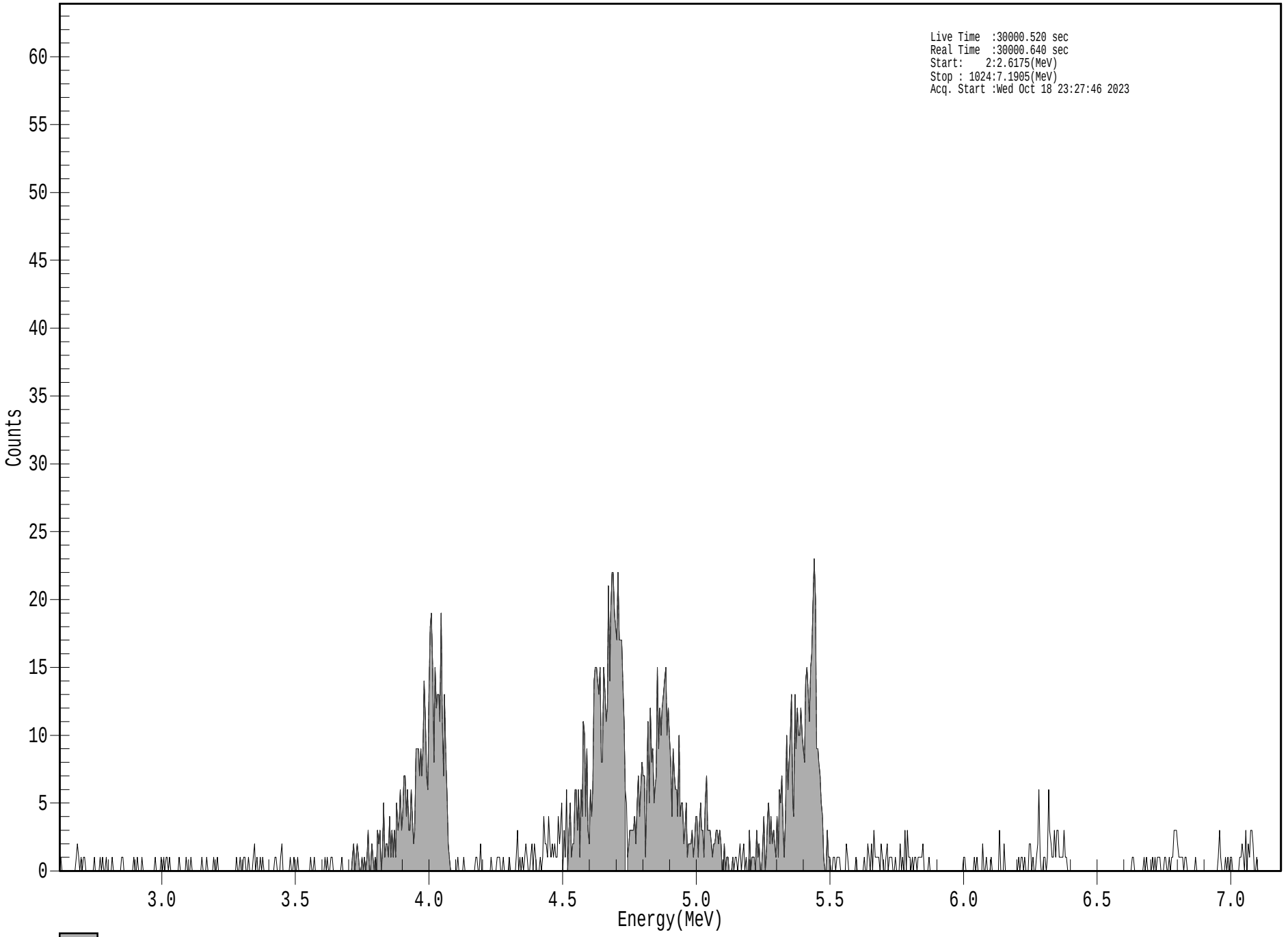
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	243-	330	304.58	3971.45	19.18	4.21E+002	20.52	0.00E+000
2	427-	475	457.81	4657.08	67.12	5.09E+002	22.56	0.00E+000
3	475-	566	510.21	4891.53	53.97	4.39E+002	20.95	0.00E+000
4	577-	648	621.03	5387.38	25.27	4.17E+002	20.42	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T13215228604.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2152286\T14215228605.CNF

Report Generated On	:	10/23/2023 9:05:25 PM
Sample Title	:	DUP L1664041-15 WG2152286
Sample Description	:	
Sample Identification	:	
Sample Type	:	
Sample Geometry	:	
Peak Locate Threshold	:	10.00
Peak Locate Range (in channels)	:	1 - 1024
Peak Area Range (in channels)	:	1 - 1024
Identification Energy Tolerance	:	0.100 MeV
Sample Size	:	1.000E+000 Unit
Sample Taken On	:	
Acquisition Started	:	10/18/2023 11:27:47 PM
Live Time	:	30000.3 seconds
Real Time	:	30000.4 seconds
Dead Time	:	0.00 %

Energy Calibration Used Done On	:	1/17/2023
Efficiency Calibration Used Done On	:	10/2/2023
Efficiency ID	:	

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET14
Sample Title: DUP L1664041-15 WG2152286
Peak Analysis Performed on: 10/23/2023 9:05:25 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

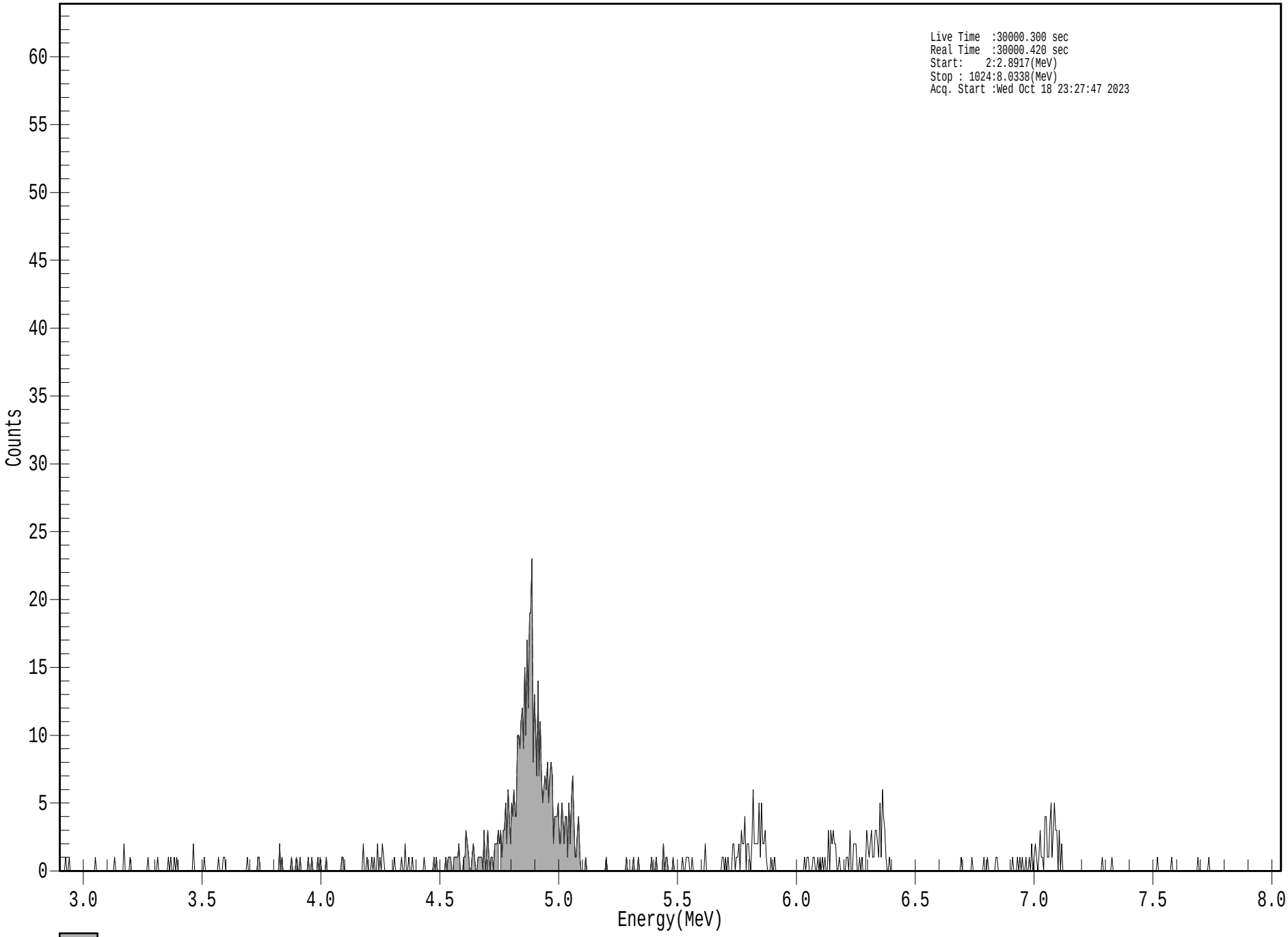
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	162-	243	203.93	3907.71	5.03	1.50E+001	3.87	0.00E+000
2	309-	369	348.87	4636.95	11.32	4.70E+001	6.86	0.00E+000
3	365-	448	399.56	4891.97	27.94	4.52E+002	21.26	0.00E+000
4	458-	519	495.36	5374.00	5.03	1.10E+001	3.32	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T14215228605.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2152286\T17215228606.CNF

Report Generated On : 10/23/2023 9:05:59 PM

Sample Title : L1658999-14 WG2152286
Sample Description :
Sample Identification :
Sample Type :
Sample Geometry :

Peak Locate Threshold : 10.00
Peak Locate Range (in channels) : 1 - 1024
Peak Area Range (in channels) : 1 - 1024
Identification Energy Tolerance : 0.100 MeV

Sample Size : 1.000E+000 Unit

Sample Taken On :
Acquisition Started : 10/18/2023 11:27:50 PM

Live Time : 30000.0 seconds
Real Time : 30000.4 seconds

Dead Time : 0.00 %

Energy Calibration Used Done On : 1/17/2023
Efficiency Calibration Used Done On : 10/2/2023
Efficiency ID :

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET17
Sample Title: L1658999-14 WG2152286
Peak Analysis Performed on: 10/23/2023 9:05:59 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

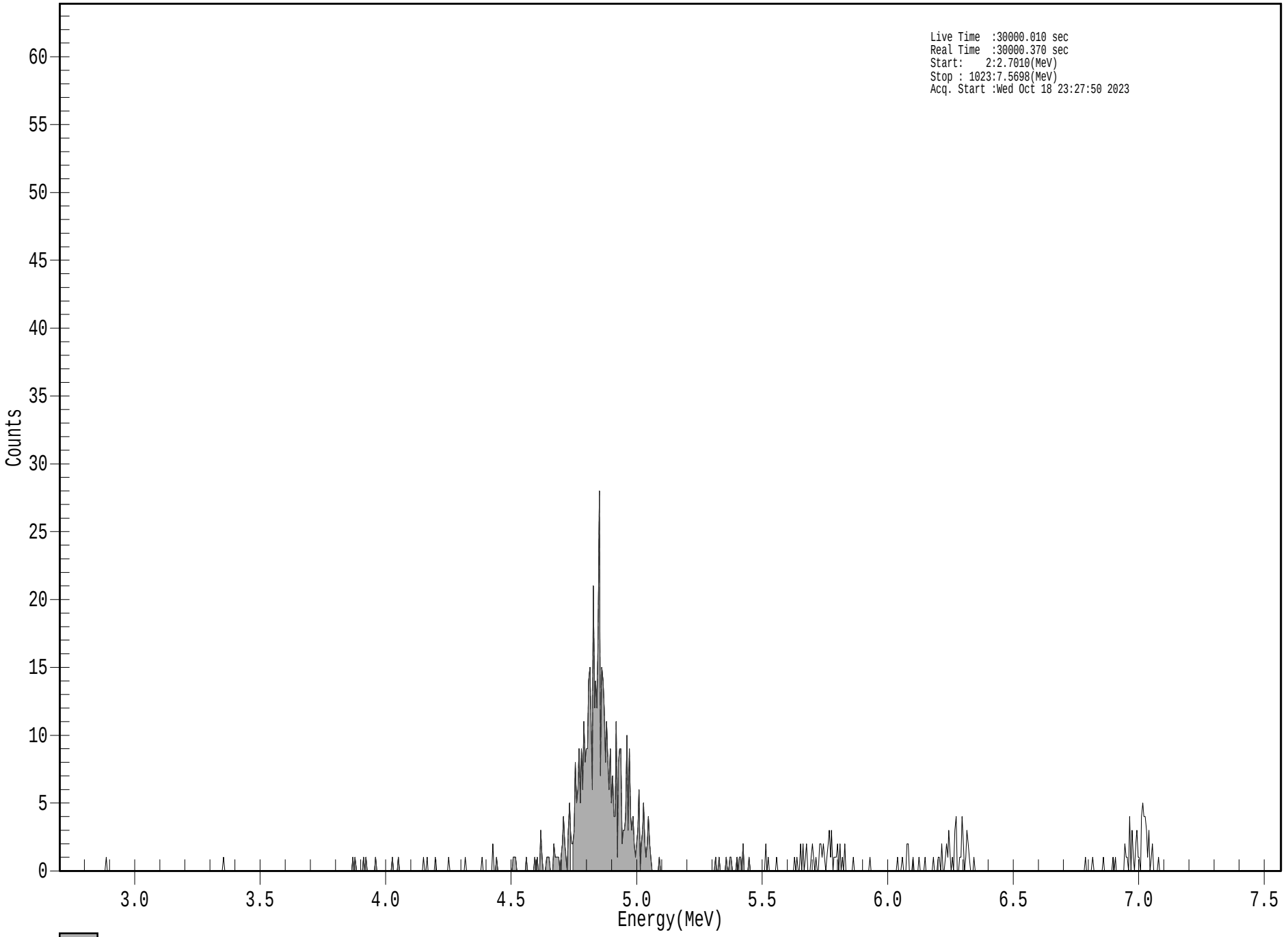
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	211-	296	263.00	3945.60	4.77	7.00E+000	2.65	0.00E+000
2	366-	429	414.39	4667.54	11.52	4.10E+001	6.40	0.00E+000
3	420-	513	455.25	4862.37	10.81	4.93E+002	22.20	0.00E+000
4	523-	587	565.45	5387.92	4.77	1.10E+001	3.32	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T17215228606.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T19215228607.CNF

Report Generated On             : 10/23/2023  9:06:32 PM

Sample Title                    : L1658999-15 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:27:52 PM

Live Time                       :    30000.3 seconds
Real Time                       :    30000.7 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET19
Sample Title: L1658999-15 WG2152286
Peak Analysis Performed on: 10/23/2023 9:06:32 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

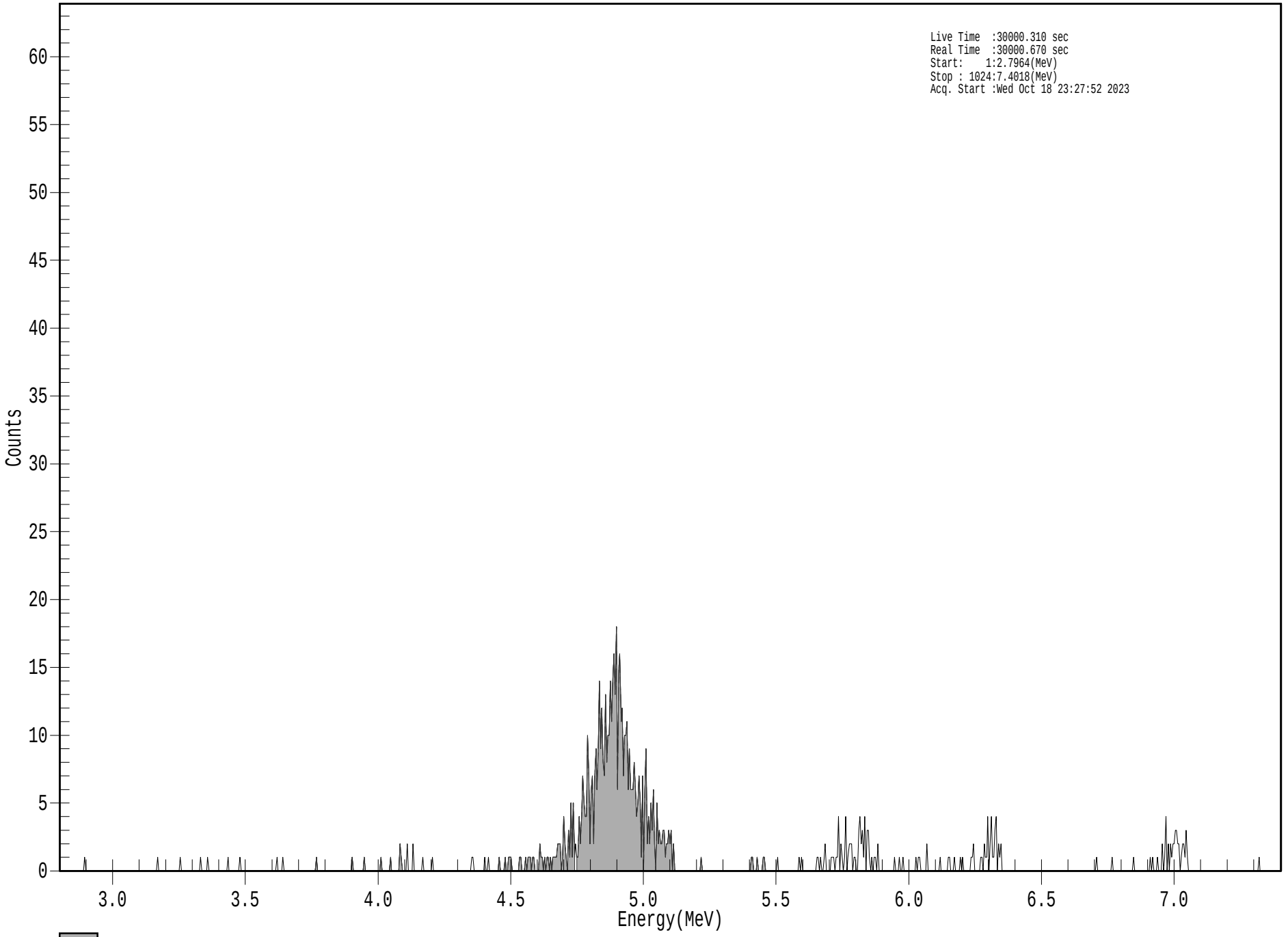
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	201-	291	265.63	3987.73	6.75	8.00E+000	2.83	0.00E+000
2	365-	432	412.82	4650.36	5.63	5.50E+001	7.42	0.00E+000
3	426-	521	467.32	4895.71	37.14	5.40E+002	23.24	0.00E+000
4	532-	600	577.50	5391.73	4.50	6.00E+000	2.45	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T19215228607.CNF



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****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2152286\T20215228608.CNF

Report Generated On : 10/23/2023 9:07:04 PM

Sample Title : L1663445-01 WG2152286
Sample Description :
Sample Identification :
Sample Type :
Sample Geometry :

Peak Locate Threshold : 10.00
Peak Locate Range (in channels) : 1 - 1024
Peak Area Range (in channels) : 1 - 1024
Identification Energy Tolerance : 0.100 MeV

Sample Size : 1.000E+000 Unit

Sample Taken On :
Acquisition Started : 10/18/2023 11:29:33 PM

Live Time : 30000.0 seconds
Real Time : 30000.2 seconds

Dead Time : 0.00 %

Energy Calibration Used Done On : 1/17/2023
Efficiency Calibration Used Done On : 10/2/2023
Efficiency ID :

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET20
Sample Title: L1663445-01 WG2152286
Peak Analysis Performed on: 10/23/2023 9:07:04 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

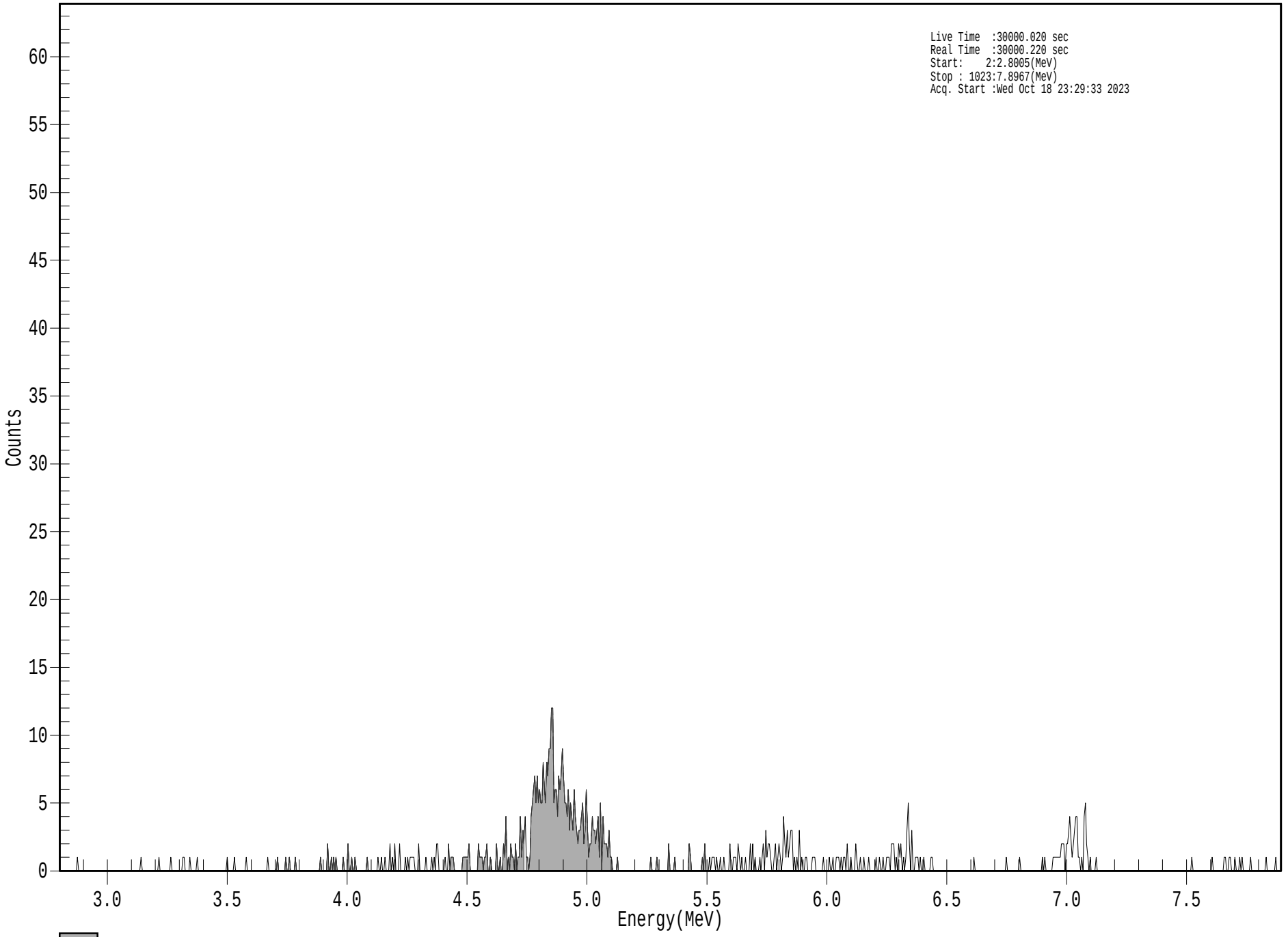
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	182-	263	225.75	3917.32	4.99	1.60E+001	4.00	0.00E+000
2	328-	390	367.02	4622.46	5.82	4.90E+001	7.00	0.00E+000
3	384-	470	420.51	4889.46	32.56	3.33E+002	18.25	0.00E+000
4	480-	542	521.91	5395.57	4.99	1.10E+001	3.32	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T20215228608.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T23215228609.CNF

Report Generated On             : 10/23/2023  9:07:34 PM

Sample Title                    : L1663896-01 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:07 PM

Live Time                       :    30000.3 seconds
Real Time                       :    30000.5 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET23
Sample Title: L1663896-01 WG2152286
Peak Analysis Performed on: 10/23/2023 9:07:34 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

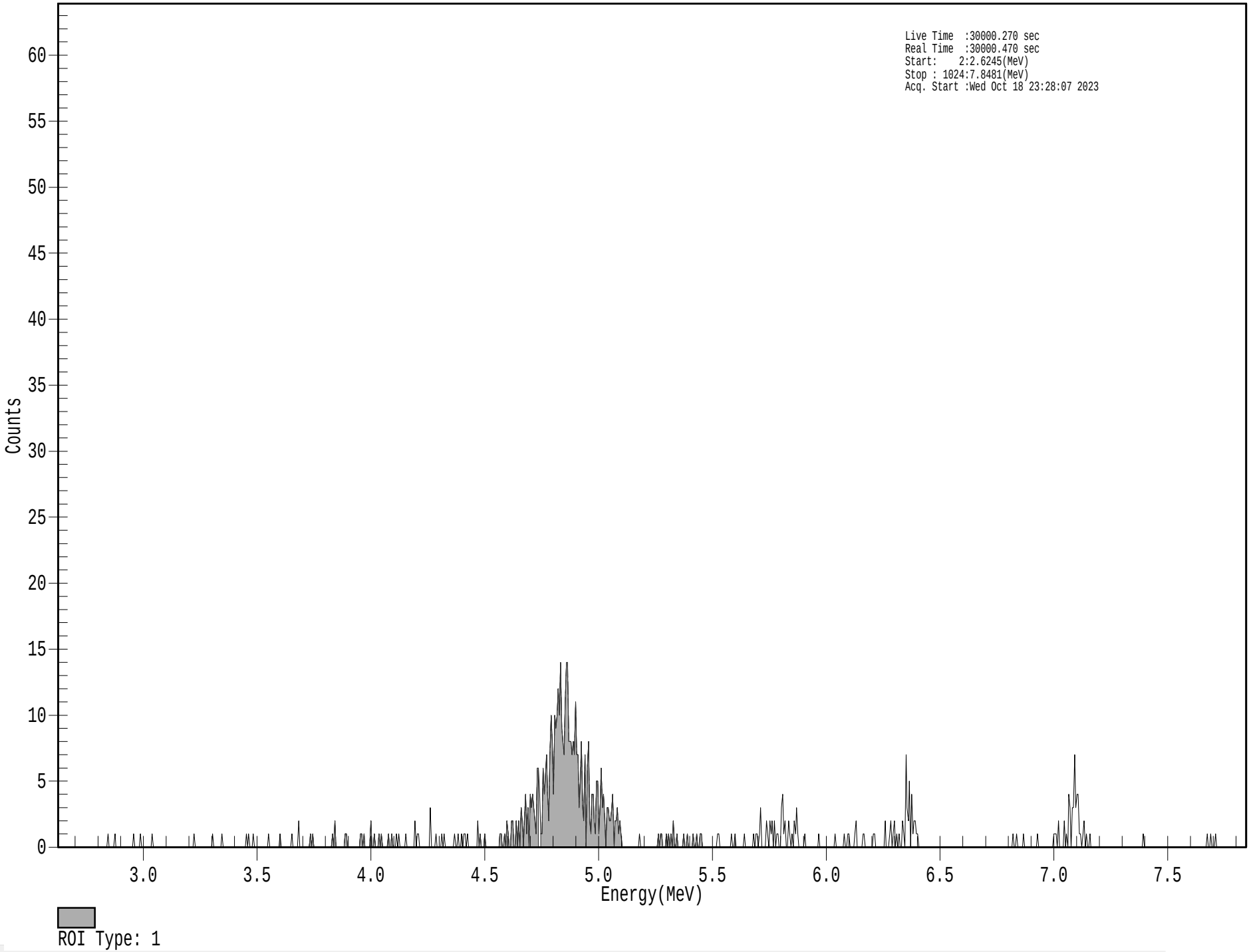
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	212-	291	258.59	3935.96	5.11	1.70E+001	4.12	0.00E+000
2	364-	415	403.30	4675.60	0.00	6.00E+001	7.75	0.00E+000
3	407-	493	441.52	4870.94	43.44	4.04E+002	20.10	0.00E+000
4	503-	563	535.13	5349.43	5.11	1.50E+001	3.87	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T23215228609.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T24215228610.CNF

Report Generated On             : 10/23/2023  9:08:06 PM

Sample Title                    : L1664000-01 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:08 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET24
Sample Title: L1664000-01 WG2152286
Peak Analysis Performed on: 10/23/2023 9:08:06 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

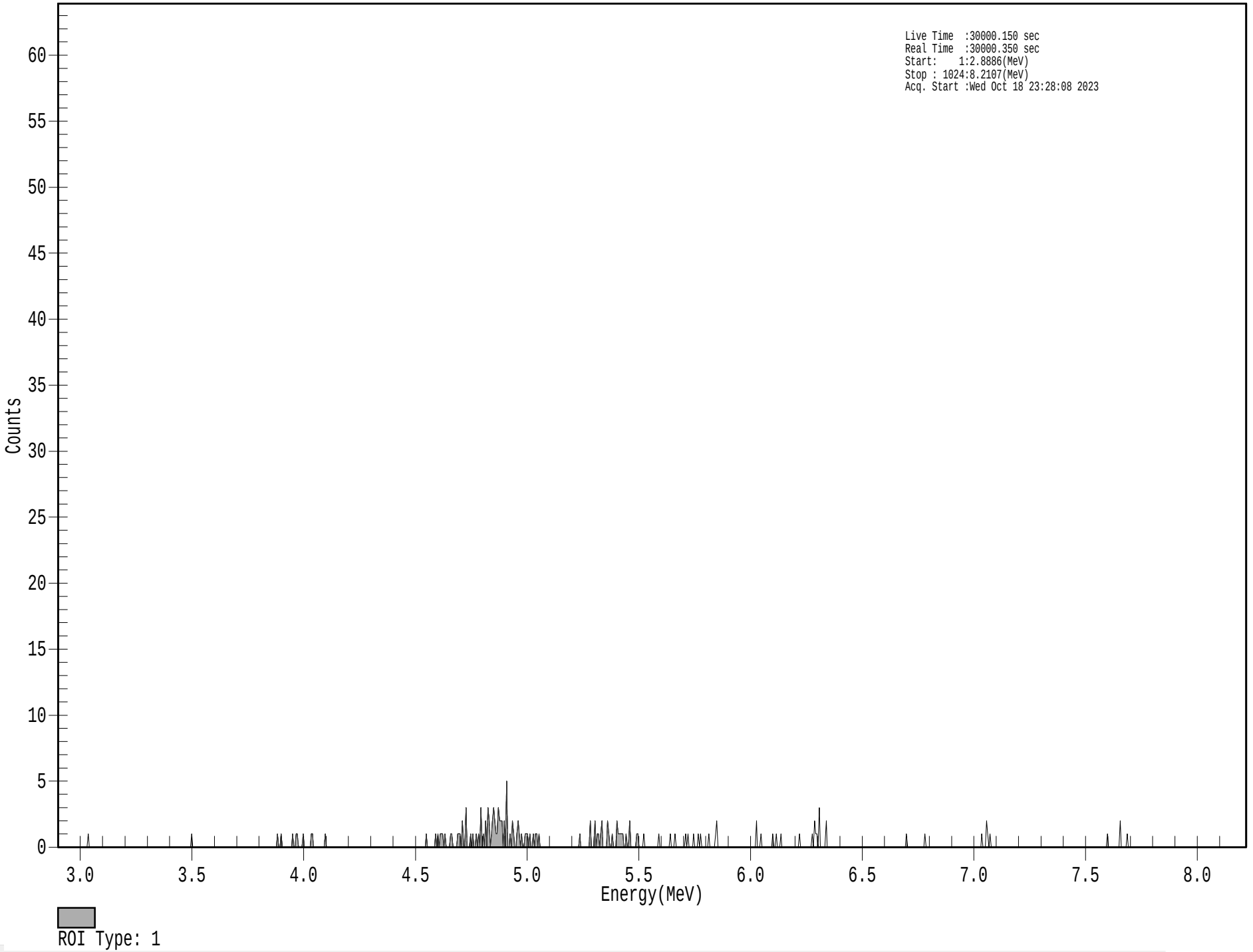
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	157-	234	209.00	3970.71	5.20	9.00E+000	3.00	0.00E+000
2	298-	356	340.33	4653.96	5.20	1.80E+001	4.24	0.00E+000
3	357-	433	383.56	4878.85	5.20	5.70E+001	7.55	0.00E+000
4	443-	501	476.77	5363.76	5.20	2.60E+001	5.10	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T24215228610.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T25215228611.CNF

Report Generated On             : 10/23/2023 10:01:33 PM

Sample Title                    : L1664041-13 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:15 PM

Live Time                       :    30000.3 seconds
Real Time                       :    30000.5 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET25
Sample Title: L1664041-13 WG2152286
Peak Analysis Performed on: 10/23/2023 10:01:33 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

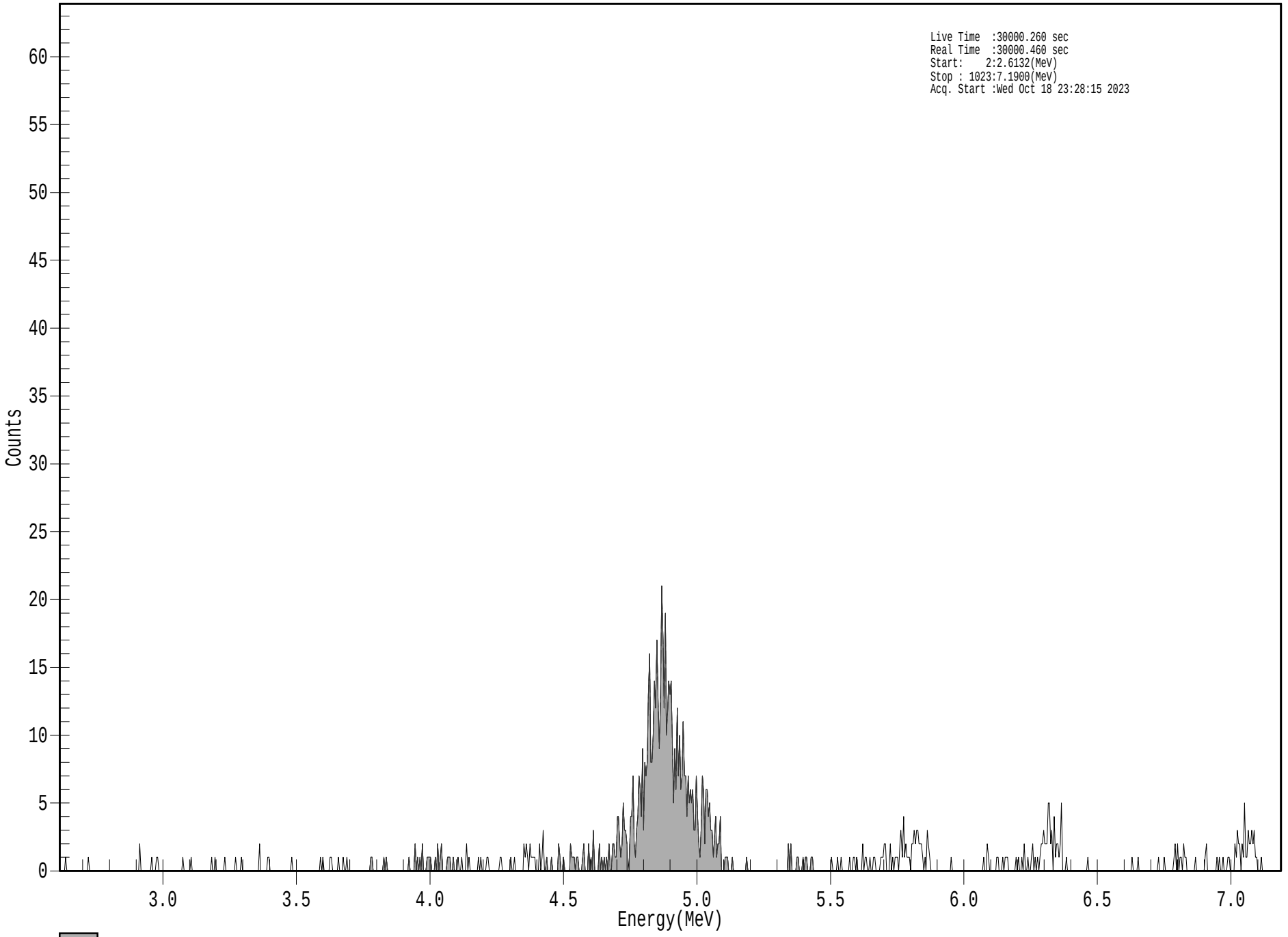
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	244-	334	305.88	3975.35	4.48	2.50E+001	5.00	0.00E+000
2	408-	476	455.36	4645.42	14.94	6.10E+001	7.81	0.00E+000
3	476-	565	511.49	4897.03	24.97	5.58E+002	23.62	0.00E+000
4	575-	644	616.33	5367.00	4.48	1.20E+001	3.46	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T25215228611.CNF



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**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T26215228612.CNF

Report Generated On             : 10/23/2023  9:12:19 PM

Sample Title                    : L1664041-14 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:16 PM

Live Time                       :    30000.2 seconds
Real Time                       :    30000.4 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET26
Sample Title: L1664041-14 WG2152286
Peak Analysis Performed on: 10/23/2023 9:12:19 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

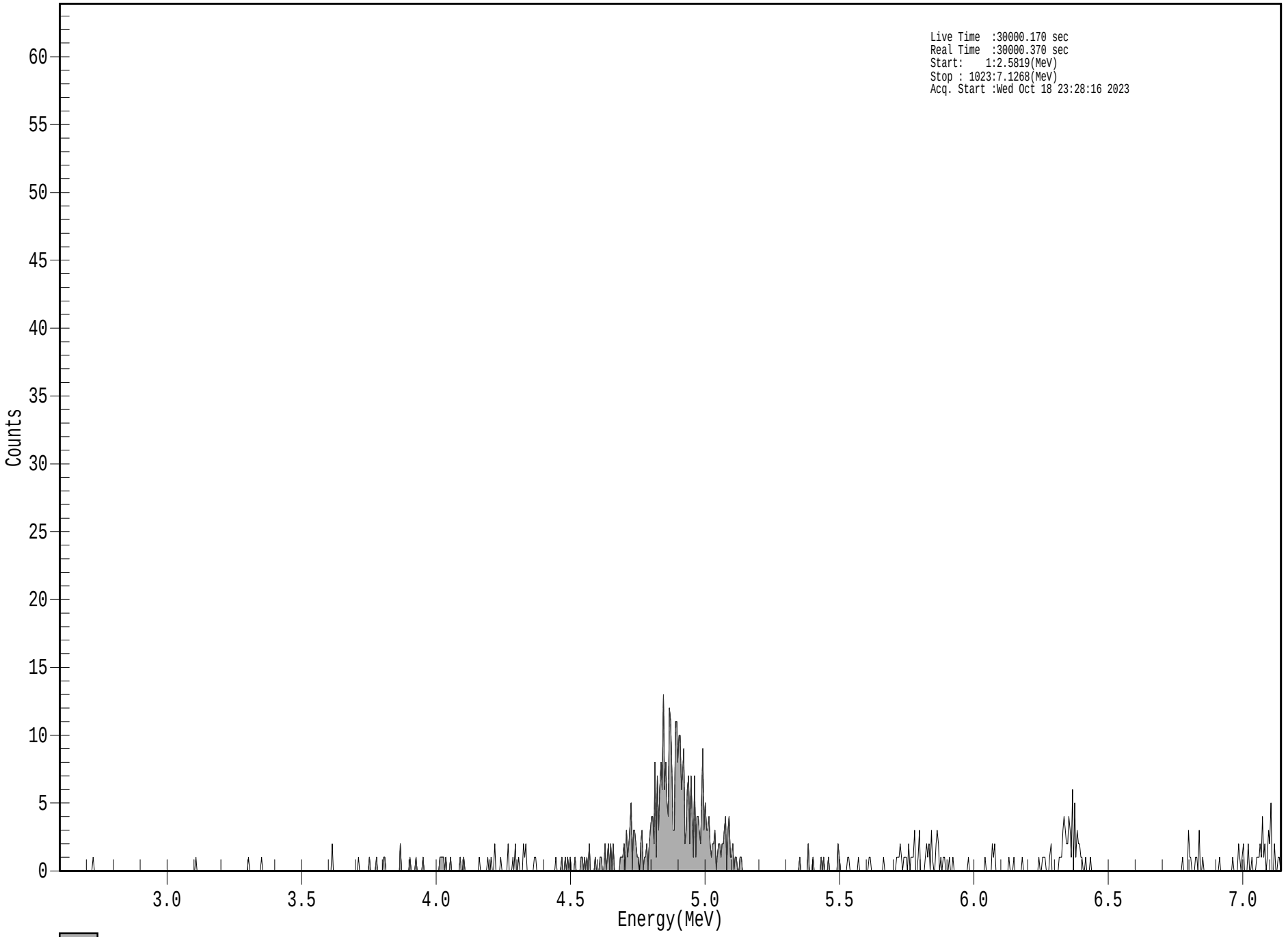
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	252-	343	302.94	3924.67	4.45	1.70E+001	4.12	0.00E+000
2	418-	485	464.31	4642.26	8.89	5.20E+001	7.21	0.00E+000
3	485-	575	521.68	4897.40	8.26	3.35E+002	18.30	0.00E+000
4	587-	656	638.40	5416.45	4.45	1.00E+001	3.16	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T26215228612.CNF



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```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T27215228613.CNF

Report Generated On             : 10/23/2023  9:12:56 PM

Sample Title                    : L1664041-15 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:18 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET27
Sample Title: L1664041-15 WG2152286
Peak Analysis Performed on: 10/23/2023 9:12:55 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

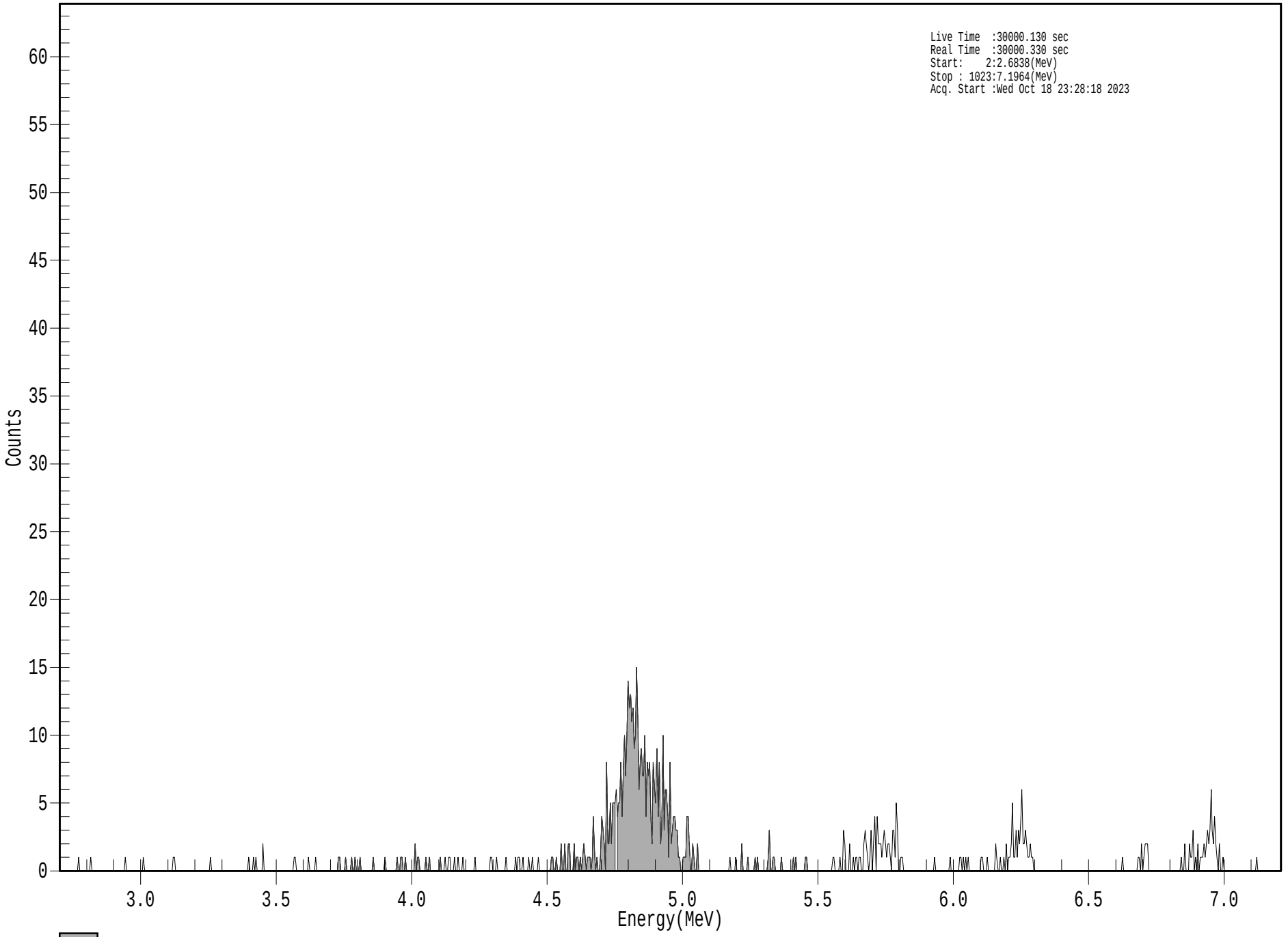
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	231-	323	278.32	3905.06	4.42	1.90E+001	4.36	0.00E+000
2	404-	466	450.35	4665.41	5.16	7.40E+001	8.60	0.00E+000
3	463-	557	489.81	4839.80	46.55	3.92E+002	19.80	0.00E+000
4	568-	637	597.06	5313.84	5.52	1.60E+001	4.00	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T27215228613.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T28215228614.CNF

Report Generated On             : 10/23/2023  9:13:26 PM

Sample Title                    : L1665465-01 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:19 PM

Live Time                       :    30000.2 seconds
Real Time                       :    30000.4 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET28
Sample Title: L1665465-01 WG2152286
Peak Analysis Performed on: 10/23/2023 9:13:26 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

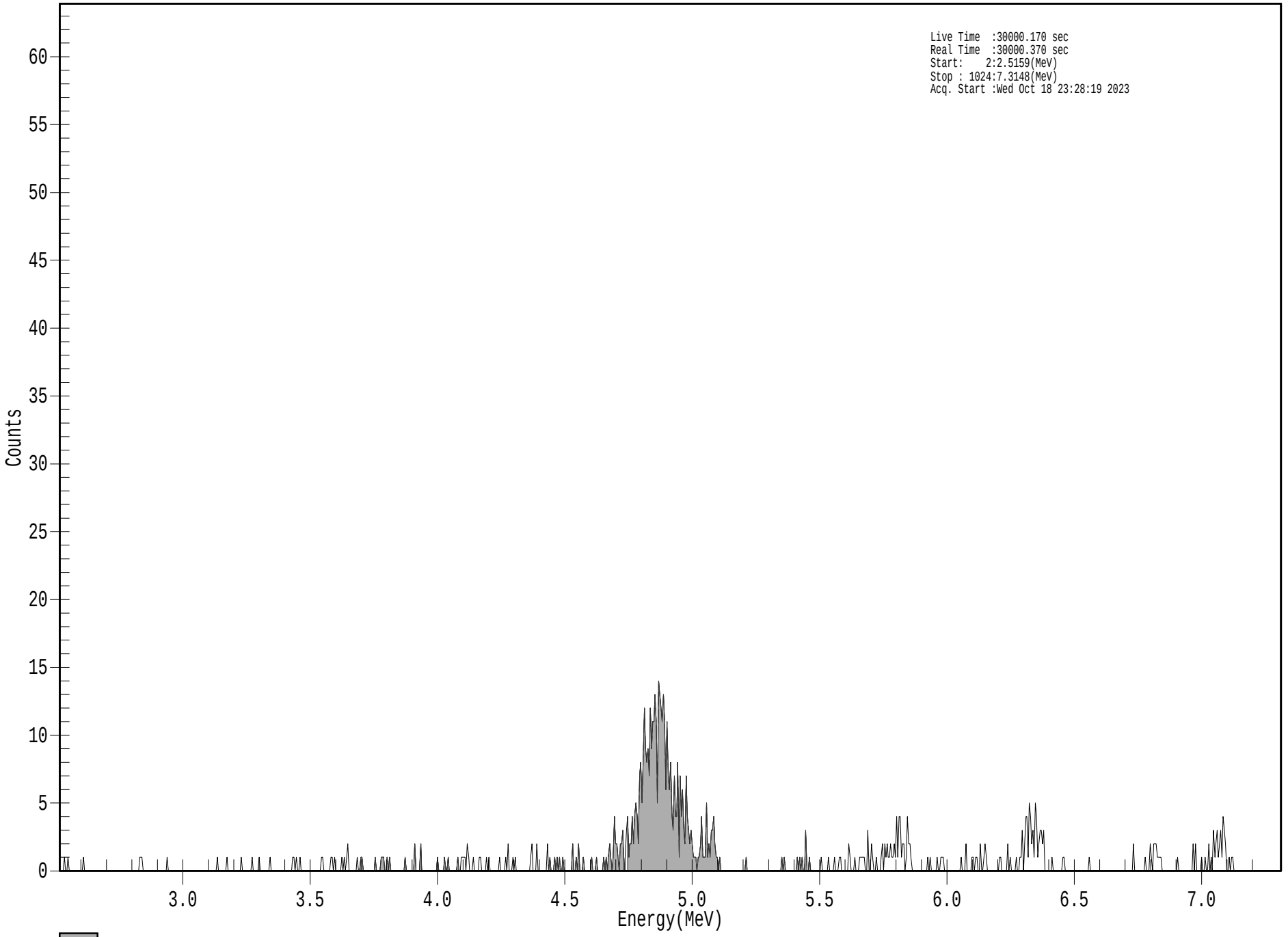
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	252-	336	290.94	3872.64	4.70	1.70E+001	4.12	0.00E+000
2	411-	475	454.24	4639.44	7.83	3.70E+001	6.08	0.00E+000
3	470-	560	506.12	4883.04	30.89	4.10E+002	20.25	0.00E+000
4	571-	636	616.00	5398.98	4.70	1.00E+001	3.16	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T28215228614.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Filename: O:\alpha_sp\2023\THORIUM\T2152286\T29215228615.CNF

Report Generated On	:	10/23/2023 9:14:01 PM
Sample Title	:	L1665465-02 WG2152286
Sample Description	:	
Sample Identification	:	
Sample Type	:	
Sample Geometry	:	
Peak Locate Threshold	:	10.00
Peak Locate Range (in channels)	:	1 - 1024
Peak Area Range (in channels)	:	1 - 1024
Identification Energy Tolerance	:	0.100 MeV
Sample Size	:	1.000E+000 Unit
Sample Taken On	:	
Acquisition Started	:	10/18/2023 11:28:20 PM
Live Time	:	30000.1 seconds
Real Time	:	30000.3 seconds
Dead Time	:	0.00 %

Energy Calibration Used Done On	:	1/17/2023
Efficiency Calibration Used Done On	:	10/2/2023
Efficiency ID	:	

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET29
Sample Title: L1665465-02 WG2152286
Peak Analysis Performed on: 10/23/2023 9:14:01 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

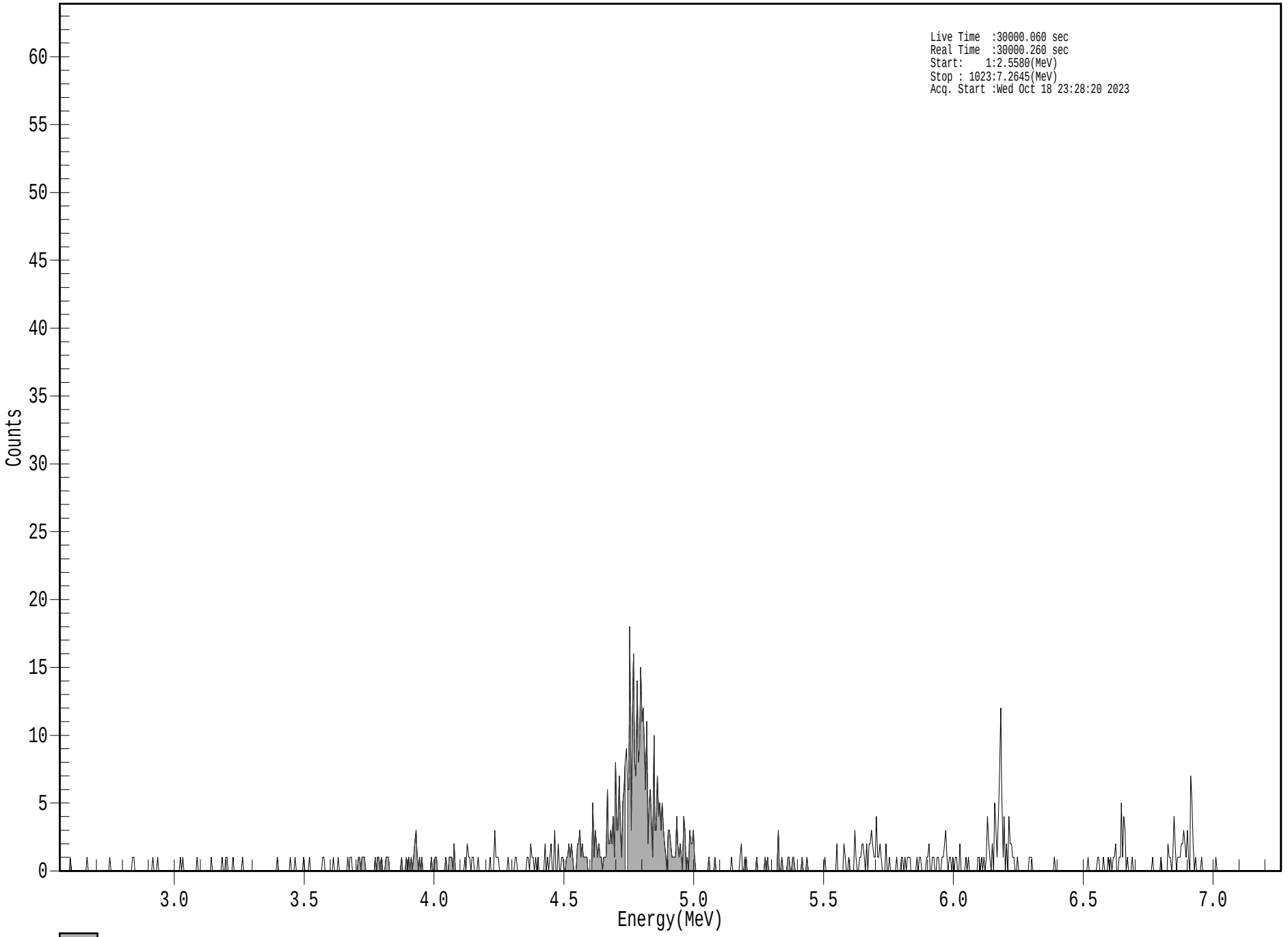
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	249-	337	292.29	3899.49	10.36	3.40E+001	5.83	0.00E+000
2	424-	474	457.34	4659.57	6.32	1.05E+002	10.25	0.00E+000
3	463-	561	489.47	4807.54	6.22	3.35E+002	18.30	0.00E+000
4	572-	638	601.73	5324.51	4.61	1.50E+001	3.87	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T29215228615.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T30215228616.CNF

Report Generated On             : 10/23/2023  9:14:31 PM

Sample Title                    : L1666616-01 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:23 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30000.2 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET30
Sample Title: L1666616-01 WG2152286
Peak Analysis Performed on: 10/23/2023 9:14:31 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

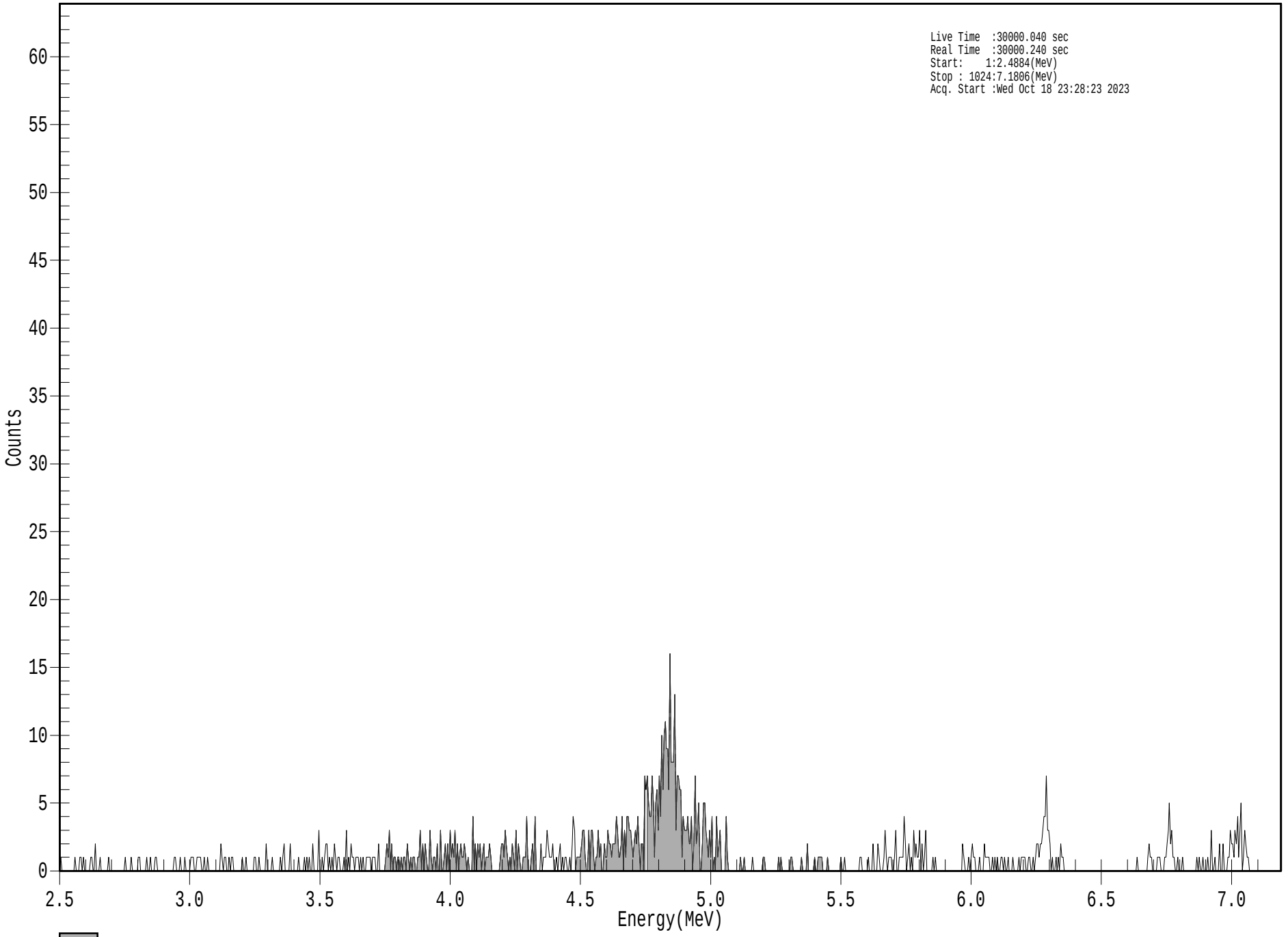
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Correction Continuum Counts	
1	269-	344	310.26	3906.91	5.73	6.90E+001	8.31	0.00E+000	
2	344-	403	373.20	4195.58	4.59	5.60E+001	7.48	0.00E+000	
3	433-	491	466.32	4622.71	4.59	1.09E+002	10.44	0.00E+000	
4	487-	578	516.19	4851.42	8.26	3.07E+002	17.52	0.00E+000	307 - 56
5	589-	656	623.38	5343.06	4.59	1.60E+001	4.00	0.00E+000	= 251

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T30215228616.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T31215228617.CNF

Report Generated On             : 10/23/2023  9:15:04 PM

Sample Title                    : L1666616-02 WG2152286
Sample Description              :
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/18/2023 11:28:24 PM

Live Time                       :    30000.1 seconds
Real Time                       :    30000.3 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

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****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET31
Sample Title: L1666616-02 WG2152286
Peak Analysis Performed on: 10/23/2023 9:15:04 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

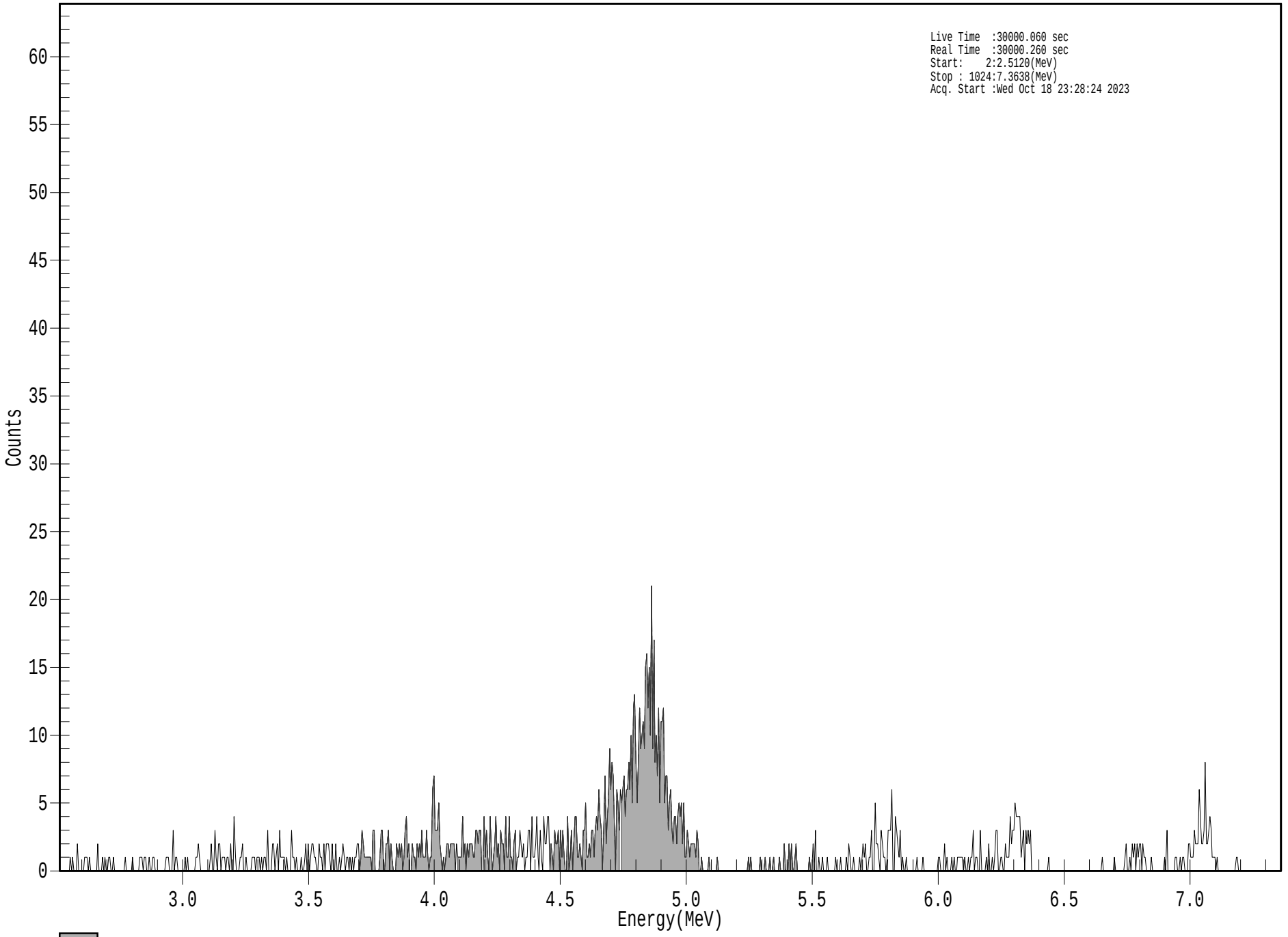
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts	Correction
1	253-	333	297.29	3913.84	11.27	1.21E+002	11.00	0.00E+000	
2	333-	384	358.98	4206.69	6.33	8.70E+001	9.33	0.00E+000	
3	412-	470	448.47	4631.53	24.33	1.58E+002	12.57	0.00E+000	
4	467-	555	496.40	4859.09	8.69	4.69E+002	21.66	0.00E+000	469 - 87
5	565-	630	605.12	5375.19	4.75	1.70E+001	4.12	0.00E+000	= 382

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

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T31215228617.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

```
**********************************************************************
*****       A L P H A   S P E C T R U M   A N A L Y S I S        *****
**********************************************************************


Filename: O:\alpha_sp\2023\THORIUM\T2152286\T23215228619.CNF

Report Generated On             : 10/26/2023  4:14:53 PM

Sample Title                    : L1664000-01 WG2152286
Sample Description              : REDO
Sample Identification           :
Sample Type                     :
Sample Geometry                 :

Peak Locate Threshold           : 10.00
Peak Locate Range (in channels) :     1 -  1024
Peak Area Range (in channels)   :     1 -  1024
Identification Energy Tolerance :    0.100 MeV

Sample Size                     :  1.000E+000 Unit

Sample Taken On                 :
Acquisition Started             : 10/25/2023 11:50:19 PM

Live Time                       :    30000.0 seconds
Real Time                       :    30000.1 seconds

Dead Time                       :   0.00 %


              Energy Calibration Used Done On       : 1/17/2023
              Efficiency Calibration Used Done On   : 10/2/2023
              Efficiency ID                         :
```

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

****
***** P E A K A N A L Y S I S R E P O R T *****
****

Detector Name: DET23
Sample Title: L1664000-01 WG2152286
Peak Analysis Performed on: 10/26/2023 4:14:53 PM
Peak Analysis From Channel: 1
Peak Analysis To Channel: 1024

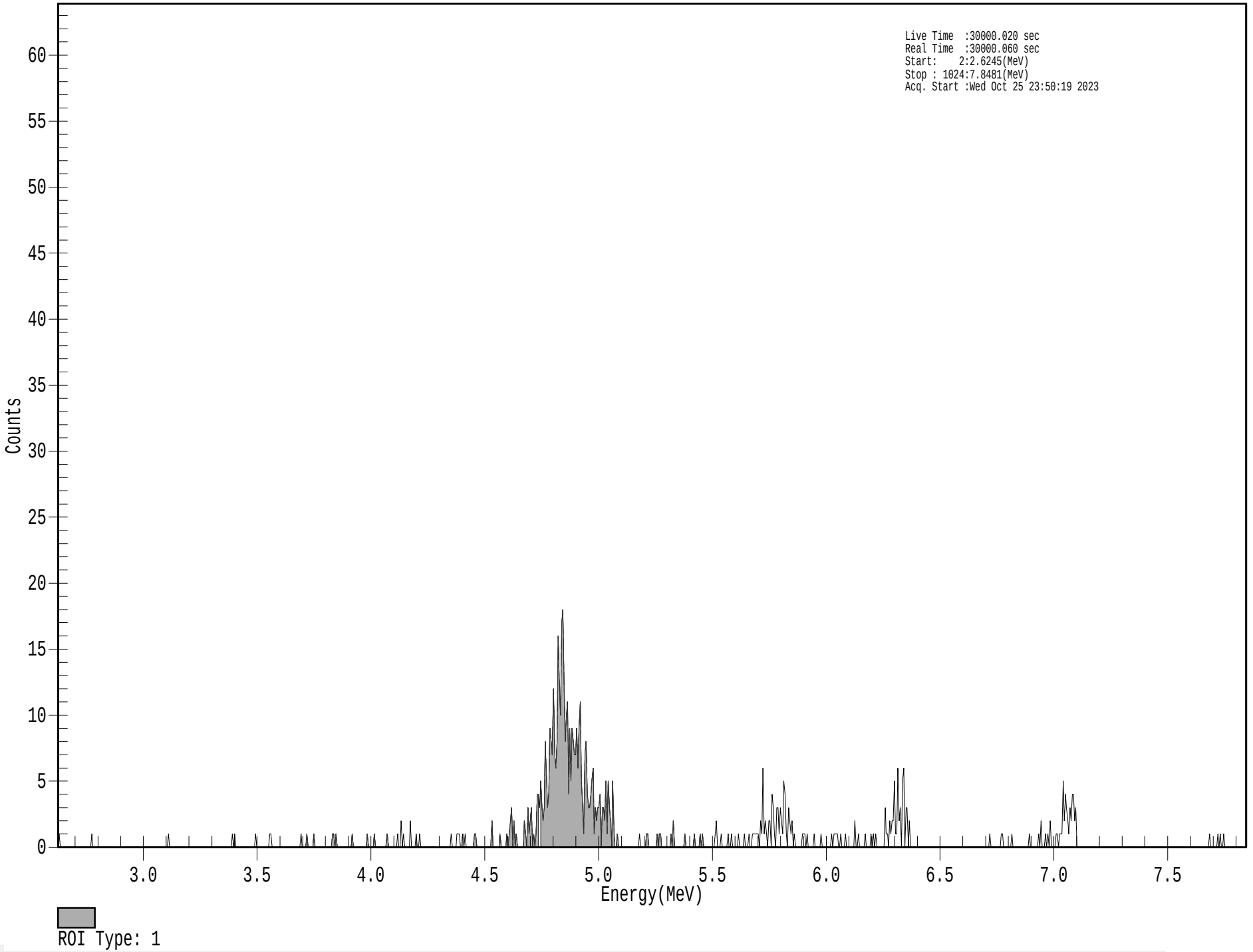
Peak No.	ROI start	ROI end	Peak centroid	Energy (keV)	FWHM (keV)	Net Peak Area	Net Area Uncert.	Continuum Counts
1	212-	291	248.67	3885.25	5.11	9.00E+000	3.00	0.00E+000
2	356-	415	399.76	4657.49	0.00	3.70E+001	6.08	0.00E+000
3	412-	493	441.91	4872.93	33.86	3.96E+002	19.90	0.00E+000
4	503-	563	530.33	5324.89	5.11	1.20E+001	3.46	0.00E+000

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

PDF created with FinePrint pdfFactory trial version www.pdffactory.com

T23215228619.CNF



PDF created with FinePrint pdfFactory trial version www.pdffactory.com

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.
NI	Manual Integration Code to indicate that the peak was not integrated at all by the computer software.
LT	Manual Integration Code to indicate that the peak in question was inappropriately integrated to an area less than what it should be (i.e., peak area was cut).
GT	Manual Integration Code to indicate that the peak in question was inappropriately integrated to an area greater than it should be (i.e., peak tailing).
BA	Manual Integration Code to indicate that the baseline had to be adjusted correctly by the analyst.
WP	Manual Integration Code to indicate that the wrong peak was chosen.
CO	Manual Integration Code to indicate that the analyst had to split two co-eluting peaks apart that were not (or could not be) separated by the computer system.
RT	Manual Integration Code to indicate that the retention time for the peak in question has shifted from the expected retention time.
INT	Manual Integration Code to indicate that there was electronic interference (i.e., noise).

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
U	Below Detectable Limits: Indicates that the analyte was not detected.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

D227

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1747

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

LIL58999

pH<2

PH-10BDH4321 TRC-23623 62
CR6-20221V
PH-10BDH4321 TRC-23623 62
CR6-20221V

Work Order Comments: If Gross Alpha is >5, Run Radium 226.

Laboratory ID: 23I1747-01 **Matrix:** Water -01
Sampled: 09/21/2023 09:30

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres. Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RA Screen <0.5 mR/hr:	Y N		

Released By	Date	Received By	Date
	09/21/23	8:50	9/22/23
PNSLCVT			
17:00	9/22/23		9/23/23 800

Released By / Date / Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

D227

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1747

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

LIL658999

pH<2

PH-10BDH4321 TRC-23623
CR6-20221V
PH-10BDH4321 TRC-23623
CR6-20221V

Work Order Comments: If Gross Alpha is >5, Run Radium 226.

Laboratory ID: 23I1747-01 **Matrix:** Water -01
Sampled: 09/21/2023 09:30

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres. Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RA Screen <0.5 mR/hr:	Y N		

Released By	09/21/23 Date	Received By	8:50 9/22/23 Date
Released By PNSLCVT	17:00 9/22/23 Date	Received By	9/23/23 800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1592

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha >5, run Radium-226

L1658999

Laboratory ID: 23I1592-01 **Matrix:** Water -02
Sampled: 09/20/2023 10:46

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
	9.20.23		8:50 9/22/23
PVSALVT	17:00 9/22/23		9/23/23 800

Released By Date Received By Date

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1567

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5, Run Radium 226

L1658999

Laboratory ID: 23I1567-01 -03
Matrix: Water
Sampled: 09/18/2023 09:45

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Denisa Brun 9/18/23 — Released By / Date
Jacob Bair 8:50 9/22/23 — Received By / Date
PVSLCUT
Jacob Bair 17:00 9/22/23 — Released By / Date
Kaycie T @ 9/23/23 800 — Received By / Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

Chemtech-Ford Laboratories

23I1562

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If gross alpha is >5 run radium 226

L16 58999

Laboratory ID: 23I1562-01 -04
Matrix: Water
Sampled: 09/19/2023 13:20

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
	9/20/23		8:50 9/22/23
PM SLCUT 17:00	9/22/23		9/23/23 800

Released By / Date / Received By / Date

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1235

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments:

L1658999

Laboratory ID: 23I1235-01 -05
Matrix: Water
Sampled: 09/14/2023 00:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0

Released By	Date	Received By	Date
	9.15.23		9/22/23 8:50
PNSLCUT	9/22/23 17:00		9/23/23 800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1780

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: QC 4 on sample #1, Report to MDL

L1658999

Laboratory ID: 23I1780-01
Matrix: Water -06
Sampled: 09/20/2023 09:00

Requested Test	Suggested Analytical Method *
Thorium-230	D3972-90M
Gross Alpha	EPA 900.0
Thorium-232 Variance	D3972-90M
Thorium-232 LLD	D3972-90M
Thorium-232	D3972-90M
Thorium-230 LLD	D3972-90M
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Alpha Variance	EPA 900.0
Thorium-230 Variance	D3972-90M
Gross Alpha LLD	EPA 900.0
Radium-226 Variance	EPA 903.0
Gross Beta	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta Variance	EPA 900.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0

Released By	PW SLCUT	09/21/23 Date	Received By	8:50	9/22/23 Date
Released By		17:00 9/22/23 Date	Received By		9/23/23 800 Date

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1780

L1658999

Laboratory ID: 23I1780-02 -07

Matrix: Water

Sampled: 09/20/2023 10:20

Requested Test	Suggested Analytical Method *
Radium-228	EPA 904.0
Radium-226 Variance	EPA 903.0
Thorium-232 LLD	D3972-90M
Thorium-232	D3972-90M
Thorium-230 Variance	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-230	D3972-90M
Radium-228 Variance	EPA 904.0
Thorium-232 Variance	D3972-90M
Gross Alpha Variance	EPA 900.0
Radium-228 LLD	EPA 904.0
Gross Alpha LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta Variance	EPA 900.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
09/21/23		8:50 9/22/23	
PNSLCUT			
Released By	Date	Received By	Date
17:00 9/22/23		9/23/23 800	

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1780

4658992

Laboratory ID: 23I1780-03 **Matrix:** Water -08
Sampled: 09/20/2023 11:22

Requested Test	Suggested Analytical Method *
Gross Beta	EPA 900.0
Radium-228	EPA 904.0
Thorium-230 Variance	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-230	D3972-90M
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Thorium-232	D3972-90M
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Beta LLD	EPA 900.0
Thorium-232 Variance	D3972-90M
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0
Thorium-232 LLD	D3972-90M
Gross Beta Variance	EPA 900.0

Released By	Date	Received By	Date
	09/21/23		8:50 9/22/23
PNSLCUT			
	1700 9/22/23		9/23/23 800

Released By Date Received By Date

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1780

LL858997-09

Laboratory ID: 23I1780-04 **Matrix:** Water
Sampled: 09/20/2023 12:09

Requested Test	Suggested Analytical Method *
Thorium-230	D3972-90M
Gross Alpha	EPA 900.0
Thorium-232 Variance	D3972-90M
Thorium-232 LLD	D3972-90M
Thorium-232	D3972-90M
Thorium-230 LLD	D3972-90M
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Alpha Variance	EPA 900.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Alpha LLD	EPA 900.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Radium-226 Variance	EPA 903.0
Thorium-230 Variance	D3972-90M

Released By	Date	Received By	Date
PW Select	09/21/23	Jason Burr	8:50 9/22/23
Jason Burr	17:00 9/22/23	Kayla J	9/23/23 800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1780

L1658991

Laboratory ID: 23I1780-05		**Matrix:** Water -10
Requested Test	**Suggested Analytical Method ***	**Sampled:** 09/20/2023 12:09
Radium-228 Variance	EPA 904.0	
Thorium-230	D3972-90M	
Thorium-230 LLD	D3972-90M	
Thorium-230 Variance	D3972-90M	
Thorium-232	D3972-90M	
Thorium-232 Variance	D3972-90M	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Thorium-232 LLD	D3972-90M	
Gross Alpha	EPA 900.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	
Gross Beta Variance	EPA 900.0	
Gross Beta LLD	EPA 900.0	
Gross Beta	EPA 900.0	
Gross Alpha Variance	EPA 900.0	
Gross Alpha LLD	EPA 900.0	
Radium-228 LLD	EPA 904.0	

Released By	PNSLVT	09/21/23 Date	Received By	8:50	9/22/23 Date
Released By	17:00	9/22/23 Date	Received By		9/23/23 800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1780

L1655999

Laboratory ID: 23I1780-06 **Matrix:** Water -11
Sampled: 09/20/2023 13:30

Requested Test	Suggested Analytical Method *
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Thorium-230	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-230 Variance	D3972-90M
Radium-228	EPA 904.0
Thorium-232 LLD	D3972-90M
Gross Beta	EPA 900.0
Thorium-232	D3972-90M
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Beta LLD	EPA 900.0
Thorium-232 Variance	D3972-90M
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0
Gross Beta Variance	EPA 900.0

Released By PNSLCUT 09/21/23 Date — Received By 8:50 9/22/23 Date

Released By 17:00 9/22/23 Date — Received By 9 9/23/23 800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1627

SENDING LABORATORY:

Chemtech-Ford Laboratories
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: Sample 04 QC 4 Report to MDL.

LIMS 8999

Laboratory ID: 23I1627-01 **Matrix:** Water -12
Sampled: 09/19/2023 16:50

Requested Test	Suggested Analytical Method *
Thorium-230	D3972-90M
Gross Alpha	EPA 900.0
Thorium-232 LLD	D3972-90M
Thorium-232	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-232 Variance	D3972-90M
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Alpha Variance	EPA 900.0
Thorium-230 Variance	D3972-90M
Gross Alpha LLD	EPA 900.0
Radium-226 Variance	EPA 903.0
Gross Beta	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta Variance	EPA 900.0
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0

Released By	9.20.23 Date	Received By	8:50 9/22/23 Date
Released By PNSLCUT	17:00 9/22/23 Date	Received By	9/23/23 800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1627

LL658991 ~13

Laboratory ID: 23I1627-02 **Matrix:** Water
Sampled: 09/19/2023 16:03

Requested Test	Suggested Analytical Method *
Radium-226 Variance	EPA 903.0
Thorium-230 Variance	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-230	D3972-90M
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Thorium-232	D3972-90M
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Thorium-232 LLD	D3972-90M
Gross Alpha	EPA 900.0
Thorium-232 Variance	D3972-90M
Gross Alpha LLD	EPA 900.0

Released By — Date 9.20.23 — Received By — Date 9/22/23 8:50

Released By PNSECUT — Date 9/22/23 17:00 — Received By — Date 9/23/23 800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1627

U165899-14

Laboratory ID: 23I1627-03 **Matrix:** Water

Sampled: 09/19/2023 18:33

Requested Test	Suggested Analytical Method *
Thorium-230	D3972-90M
Gross Alpha	EPA 900.0
Thorium-232 LLD	D3972-90M
Thorium-232	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-232 Variance	D3972-90M
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Alpha Variance	EPA 900.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Radium-226 Variance	EPA 903.0
Thorium-230 Variance	D3972-90M
Gross Alpha LLD	EPA 900.0

Released By PVSLLVT 9.20.23 Date

Received By 8:50 9/22/23 Date

Released By 17:00 9/22/23 Date

Received By 9/23/23 800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford Laboratories

Work Order Number
23I1627

L1658994

Laboratory ID: 23I1627-04 **Matrix:** Water - 15

Sampled: 09/19/2023 17:39

Requested Test	Suggested Analytical Method *
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Thorium-230	D3972-90M
Thorium-230 LLD	D3972-90M
Thorium-230 Variance	D3972-90M
Thorium-232 LLD	D3972-90M
Radium-228	EPA 904.0
Thorium-232	D3972-90M
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha	EPA 900.0
Thorium-232 Variance	D3972-90M
Gross Alpha LLD	EPA 900.0

Released By	Date	Received By	Date
9.20.23		8:50	9/22/23
PNSLUT 17:00	9/22/23		9/23/23 800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

L1658999

Tracking Numbers		CCA8 Tempature
SWA		1.7+0=1.7
↓		1.6+0=1.6
		0.4+0=0.4
		3.4+0=3.4
		2.7+0=2.7

CHEMTECH-FORD
LABORATORIES

10/30/2023

Work Order: 23J1774
Project: FA-DG5/BA-DG4

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 10/30/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23J1774-01**
Date Sampled: **10/16/23 11:11**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1810	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	0.981	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	8910	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	12100	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Antimony, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Arsenic, Total	0.0127	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Barium, Total	0.012	mg/L	0.010	EPA 200.7/200.2	10/20/23	10/25/23	
Beryllium, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Boron, Total	62.2	mg/L	0.10	EPA 200.7/200.2	10/20/23	10/25/23	
Cadmium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	10/20/23	10/23/23	
Calcium, Total	536	mg/L	0.4	EPA 200.7/200.2	10/20/23	10/25/23	
Chromium, Total	0.0031	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Cobalt, Total	0.0249	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Lead, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Lithium, Total	0.713	mg/L	0.010	EPA 200.7/200.2	10/20/23	10/25/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	10/24/23	10/24/23	
Molybdenum, Total	ND	mg/L	0.10	EPA 200.7/200.2	10/20/23	10/23/23	
Selenium, Total	0.0427	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Thallium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	10/20/23	10/23/23	

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 10/30/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **BA-DG4**

Matrix: **Water**
Lab ID: **23J1774-02**
Date Sampled: **10/16/23 14:25**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	616	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	2.87	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	6620	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	15600	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Antimony, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Arsenic, Total	0.0118	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Barium, Total	0.018	mg/L	0.010	EPA 200.7/200.2	10/20/23	10/25/23	
Beryllium, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Boron, Total	27.0	mg/L	0.10	EPA 200.7/200.2	10/20/23	10/25/23	
Cadmium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	10/20/23	10/23/23	
Calcium, Total	238	mg/L	0.4	EPA 200.7/200.2	10/20/23	10/25/23	
Chromium, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Cobalt, Total	0.0026	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Lead, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Lithium, Total	0.182	mg/L	0.010	EPA 200.7/200.2	10/20/23	10/25/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	10/24/23	10/24/23	
Molybdenum, Total	ND	mg/L	0.10	EPA 200.7/200.2	10/20/23	10/23/23	
Selenium, Total	0.0402	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Thallium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	10/20/23	10/23/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 10/30/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **Duplicate - FA-DG5/BA-DG4**

Matrix: **Water**
Lab ID: **23J1774-03**
Date Sampled: **10/16/23 12:15**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1940	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	1.03	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	9460	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	19000	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Antimony, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Arsenic, Total	0.0115	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Barium, Total	ND	mg/L	0.025	EPA 200.7/200.2	10/20/23	10/25/23	
Beryllium, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Boron, Total	62.1	mg/L	0.25	EPA 200.7/200.2	10/20/23	10/25/23	
Cadmium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	10/20/23	10/23/23	
Calcium, Total	548	mg/L	1.0	EPA 200.7/200.2	10/20/23	10/25/23	
Chromium, Total	0.0027	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Cobalt, Total	0.0253	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Lead, Total	ND	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Lithium, Total	0.705	mg/L	0.025	EPA 200.7/200.2	10/20/23	10/25/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	10/24/23	10/24/23	
Molybdenum, Total	ND	mg/L	0.10	EPA 200.7/200.2	10/20/23	10/23/23	
Selenium, Total	0.0417	mg/L	0.0025	EPA 200.8/200.2	10/20/23	10/23/23	
Thallium, Total	ND	mg/L	0.0010	EPA 200.8/200.2	10/20/23	10/23/23	

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Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 10/30/2023
Project Name: **FA-DG5/BA-DG4**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

2301774

UPS 1Z 849 747 01 6543 8552

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228								Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5	10-16-23	11:11	Water		X	X	X	X	X	X	X	X	X											
02	2. BA-DG4	10-16-23	14:25	Water		X	X	X	X	X	X	X	X	X											
03	3. Duplicate (FA-DG5/BA-DG4)	10-16-23	12:15	Water		X	X	X	X	X	X	X	X	X											
	4.										* Per History														
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AW

AQ 1272
M 1325

Sampled by: [print] Trenton Keller
Sampled by: [signature]

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

ON ICE NOT ON ICE Temp (C°): 2.1

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	10-19-23 10:35	Ryan Hastings	10/19/23 10:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			10/20/23 12:10
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXJ1096-BLK1	Batch: BXJ1096								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					0.05			0.05	1.00
QB-01 - The method blank contains analyte at a concentration above the MRL; however, concentration is less than 10% of the sample result, which is negligible according to method criteria.									
Calcium, Total					ND			0.2	1.00
Lithium, Total					ND			0.005	1.00
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXJ1096-BS1	Batch: BXJ1096								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Barium, Total	99.3		85 - 115		0.248		0.250	0.005	1.00
Boron, Total	109		85 - 115		0.55		0.500	0.05	1.00
Calcium, Total	103		85 - 115		10.5		10.2	0.2	1.00
Lithium, Total	111		85 - 115		0.222		0.200	0.005	1.00
Molybdenum, Total	127		85 - 115		0.25		0.200	0.01	1.00
QM-11 - The Laboratory Control Sample recovery was outside acceptance limits. The analytical batch was accepted based on the recovery of the Method Spike.									
Matrix Spike - EPA 200.7									
QC Sample ID: BXJ1096-MS1	Batch: BXJ1096				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Barium, Total	96.9		70 - 130		0.525	0.283	0.250	0.005	1.00
Boron, Total	100		70 - 130		0.62	0.12	0.500	0.05	1.00
Calcium, Total	89.5		70 - 130		116	107	10.2	0.2	1.00
Lithium, Total	102		70 - 130		0.255	0.051	0.200	0.005	1.00
Molybdenum, Total	121		70 - 130		0.24	ND	0.200	0.01	1.00
QC Sample ID: BXJ1096-MS2	Batch: BXJ1096				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Barium, Total	100		70 - 130		0.272	0.022	0.250	0.005	1.00
Boron, Total	105		70 - 130		0.88	0.35	0.500	0.05	1.00
Calcium, Total	132		70 - 130		204	190	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
Lithium, Total	90.8		70 - 130		0.222	0.041	0.200	0.005	1.00
Molybdenum, Total	106		70 - 130		0.21	ND	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXJ1096-MSD1	Batch: BXJ1096				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Barium, Total	101	2.02	70 - 130	20	0.536	0.283	0.250	0.005	1.00
Boron, Total	102	1.62	70 - 130	20	0.64	0.12	0.500	0.05	1.00
Calcium, Total	108	1.64	70 - 130	20	118	107	10.2	0.2	1.00
Lithium, Total	99.2	2.38	70 - 130	20	0.249	0.051	0.200	0.005	1.00
Molybdenum, Total	126	4.13	70 - 130	20	0.25	ND	0.200	0.01	1.00
QC Sample ID: BXJ1096-MSD2	Batch: BXJ1096				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Barium, Total	98.8	1.03	70 - 130	20	0.270	0.022	0.250	0.005	1.00
Boron, Total	102	1.82	70 - 130	20	0.86	0.35	0.500	0.05	1.00
Calcium, Total	102	1.54	70 - 130	20	201	190	10.2	0.2	1.00
Lithium, Total	102	9.67	70 - 130	20	0.245	0.041	0.200	0.005	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike Dup - EPA 200.7 (cont.)									
QC Sample ID: BXJ1096-MSD2	Batch: BXJ1096		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Molybdenum, Total	115	8.07	70 - 130	20	0.23	ND	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXJ1098-BLK1	Batch: BXJ1098								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXJ1098-BS1	Batch: BXJ1098								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Antimony, Total	108		85 - 115		0.043		0.0400	0.0005	1.00
Arsenic, Total	99.5		85 - 115		0.040		0.0400	0.0005	1.00
Beryllium, Total	109		85 - 115		0.043		0.0400	0.0005	1.00
Cadmium, Total	102		85 - 115		0.041		0.0400	0.0002	1.00
Chromium, Total	98.7		85 - 115		0.039		0.0400	0.0005	1.00
Cobalt, Total	95.7		85 - 115		0.038		0.0400	0.0005	1.00
Lead, Total	103		85 - 115		0.041		0.0400	0.0005	1.00
Selenium, Total	103		85 - 115		0.041		0.0400	0.0005	1.00
Thallium, Total	107		85 - 115		0.043		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXJ1098-MS1	Batch: BXJ1098		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Antimony, Total	107		70 - 130		0.043	0.0002	0.0400	0.0005	1.00
Arsenic, Total	98.8		70 - 130		0.040	0.0007	0.0400	0.0005	1.00
Beryllium, Total	112		70 - 130		0.045	ND	0.0400	0.0005	1.00
Cadmium, Total	100		70 - 130		0.040	0.0004	0.0400	0.0002	1.00
Chromium, Total	94.0		70 - 130		0.039	0.002	0.0400	0.0005	1.00
Cobalt, Total	91.8		70 - 130		0.037	ND	0.0400	0.0005	1.00
Lead, Total	94.9		70 - 130		0.040	0.002	0.0400	0.0005	1.00
Selenium, Total	102		70 - 130		0.044	0.003	0.0400	0.0005	1.00
Thallium, Total	99.0		70 - 130		0.040	ND	0.0400	0.0002	1.00
QC Sample ID: BXJ1098-MS2	Batch: BXJ1098		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Antimony, Total	109		70 - 130		0.044	0.0002	0.0400	0.0005	1.00
Arsenic, Total	99.8		70 - 130		0.041	0.0009	0.0400	0.0005	1.00
Beryllium, Total	115		70 - 130		0.046	ND	0.0400	0.0005	1.00
Cadmium, Total	103		70 - 130		0.042	0.0007	0.0400	0.0002	1.00
Chromium, Total	95.4		70 - 130		0.041	0.003	0.0400	0.0005	1.00
Cobalt, Total	91.9		70 - 130		0.037	0.0001	0.0400	0.0005	1.00
Lead, Total	98.1		70 - 130		0.052	0.013	0.0400	0.0005	1.00
Selenium, Total	103		70 - 130		0.044	0.003	0.0400	0.0005	1.00
Thallium, Total	100		70 - 130		0.040	0.00003	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23J1774

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXJ1106-BLK1	Batch: BXJ1106								
Date Prepared: 10/24/2023	Date Analyzed: 10/24/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXJ1106-BS1	Batch: BXJ1106								
Date Prepared: 10/24/2023	Date Analyzed: 10/24/2023								
Mercury, Total	112		85 - 115		0.00561		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXJ1106-MS1	Batch: BXJ1106				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/24/2023	Date Analyzed: 10/24/2023								
Mercury, Total	103		75 - 125		0.00515	ND	0.00500	0.00015	1.00
QC Sample ID: BXJ1106-MS2	Batch: BXJ1106				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/24/2023	Date Analyzed: 10/24/2023								
Mercury, Total	100		75 - 125		0.00500	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXJ1106-MSD1	Batch: BXJ1106				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/24/2023	Date Analyzed: 10/24/2023								
Mercury, Total	107	4.16	75 - 125	20	0.00537	ND	0.00500	0.00015	1.00
QC Sample ID: BXJ1106-MSD2	Batch: BXJ1106				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/24/2023	Date Analyzed: 10/24/2023								
Mercury, Total	94.0	6.26	75 - 125	20	0.00470	ND	0.00500	0.00015	1.00

QC Report for Work Order (WO) - 23J1774

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXJ1347-BLK1	Batch: BXJ1347								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXJ1347-BS1	Batch: BXJ1347								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	97.0		90 - 110		48.5		50.0	1.00	1.00
Fluoride	102		90 - 110		5.09		5.00	0.100	1.00
Sulfate	99.4		90 - 110		49.7		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXJ1347-MS1	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	96.0		80 - 120		30.1	19.5	11.1	1.11	1.00
Fluoride	99.8		80 - 120		2.56	1.45	1.11	0.111	1.00
Sulfate	87.6		80 - 120		17.5	7.81	11.1	1.11	1.00
QC Sample ID: BXJ1347-MS2	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	87.2		80 - 120		225	181	50.0	5.50	1.00
Fluoride	93.0		80 - 120		4.65	ND	5.00	0.550	1.00
Sulfate	96.2		80 - 120		194	146	50.0	5.50	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXJ1347-MSD1	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	96.2	0.0682	80 - 120	20	30.1	19.5	11.1	1.11	1.00
Fluoride	98.2	0.692	80 - 120	20	2.54	1.45	1.11	0.111	1.00
Sulfate	86.4	0.747	80 - 120	20	17.4	7.81	11.1	1.11	1.00
QC Sample ID: BXJ1347-MSD2	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	85.9	0.271	80 - 120	20	224	181	50.0	5.50	1.00
Fluoride	91.0	2.25	80 - 120	20	4.55	ND	5.00	0.550	1.00
Sulfate	93.8	0.633	80 - 120	20	193	146	50.0	5.50	1.00

QC Report for Work Order (WO) - 23J1774

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXJ1055-BLK1	Batch: BXJ1055								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
QC Sample ID: BXJ1056-BLK1	Batch: BXJ1056								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXJ1055-DUP1	Batch: BXJ1055		QC Source Sample: 23J1774-01						
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)		2		10	12300	12100		500	1.00
QC Sample ID: BXJ1055-DUP2	Batch: BXJ1055		QC Source Sample: 23J1774-02						
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)		1		10	15400	15600		500	1.00
QC Sample ID: BXJ1056-DUP1	Batch: BXJ1056		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)		2		10	3560	3480		20	1.00
QC Sample ID: BXJ1056-DUP2	Batch: BXJ1056		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)		0		10	11900	11900		500	1.00
LCS - SM 2540 C									
QC Sample ID: BXJ1055-BS1	Batch: BXJ1055								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)	100		90 - 110		400		400	20	1.00
QC Sample ID: BXJ1056-BS1	Batch: BXJ1056								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)	101		90 - 110		404		400	20	1.00

CHEMTECH-FORD
LABORATORIES

11/2/2023

Work Order: 23J1775
Project: 2023 CCR Fall Sampling

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **FA-UG1**

Matrix: **Water**
Lab ID: **23J1775-01**
Date Sampled: **10/18/23 14:13**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	616	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	1.95	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	329	mg/L	10.0	EPA 300.0	10/27/23	10/27/23	
Total Dissolved Solids (TDS)	1720	mg/L	20	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	0.76	mg/L	0.05	EPA 200.7/200.2	10/25/23	10/25/23	
Calcium, Total	7.4	mg/L	0.2	EPA 200.7/200.2	10/25/23	10/25/23	

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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **FA-UG2**

Matrix: **Water**
Lab ID: **23J1775-02**
Date Sampled: **10/18/23 15:24**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1530	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	0.740	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	7910	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	16800	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	46.8	mg/L	0.50	EPA 200.7/200.2	10/20/23	10/23/23	
Calcium, Total	536	mg/L	2.0	EPA 200.7/200.2	10/20/23	10/23/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **BA-UG1**

Matrix: **Water**
Lab ID: **23J1775-03**
Date Sampled: **10/18/23 11:56**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	1450	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	7.57	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	9940	mg/L	500	EPA 300.0	10/27/23	10/27/23	
Total Dissolved Solids (TDS)	17600	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	138	mg/L	5.00	EPA 200.7/200.2	10/20/23	10/23/23	
Calcium, Total	444	mg/L	20.0	EPA 200.7/200.2	10/20/23	10/23/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **BA-DG1**

Matrix: **Water**
Lab ID: **23J1775-04**
Date Sampled: **10/17/23 15:28**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	748	mg/L	50.0	EPA 300.0	10/26/23	10/26/23	
Fluoride	ND	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	4800	mg/L	100	EPA 300.0	10/27/23	10/27/23	
Total Dissolved Solids (TDS)	10600	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	10.8	mg/L	0.05	EPA 200.7/200.2	10/26/23	10/26/23	
Calcium, Total	187	mg/L	0.2	EPA 200.7/200.2	10/26/23	10/26/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **BA-DG2**

Matrix: **Water**
Lab ID: **23J1775-05**
Date Sampled: **10/17/23 12:40**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	709	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	3.33	mg/L	0.100	EPA 300.0	10/26/23	10/26/23	
Sulfate	7770	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	13100	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	37.0	mg/L	0.05	EPA 200.7/200.2	10/26/23	10/26/23	
Calcium, Total	392	mg/L	0.2	EPA 200.7/200.2	10/26/23	10/26/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **BA-DG3**

Matrix: **Water**
Lab ID: **23J1775-06**
Date Sampled: **10/17/23 10:27**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	399	mg/L	50.0	EPA 300.0	10/26/23	10/26/23	
Fluoride	9.77	mg/L	5.00	EPA 300.0	10/26/23	10/26/23	
Sulfate	2460	mg/L	50.0	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	5000	mg/L	20	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	8.96	mg/L	0.25	EPA 200.7/200.2	10/20/23	10/25/23	
Calcium, Total	32.4	mg/L	1.0	EPA 200.7/200.2	10/20/23	10/25/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **Duplicate-CCR**

Matrix: **Water**
Lab ID: **23J1775-07**
Date Sampled: **10/17/23 11:08**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	532	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	7.95	mg/L	1.00	EPA 300.0	10/27/23	10/27/23	
Sulfate	2150	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Total Dissolved Solids (TDS)	5130	mg/L	20	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	7.66	mg/L	0.05	EPA 200.7/200.2	10/26/23	10/26/23	
Calcium, Total	27.1	mg/L	0.2	EPA 200.7/200.2	10/26/23	10/26/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **NEP**

Matrix: **Water**
Lab ID: **23J1775-08**
Date Sampled: **10/17/23 15:55**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Alkalinity - Bicarbonate (as CaCO3)	858	mg/L	1.0	SM 2320 B	10/20/23	10/20/23	
Alkalinity - Carbonate (as CaCO3)	21.0	mg/L	1.0	SM 2320 B	10/20/23	10/20/23	
Alkalinity - Hydroxide (as CaCO3)	ND	mg/L	1.0	SM 2320 B	10/20/23	10/20/23	
Alkalinity - Total (as CaCO3)	879	mg/L	1.0	SM 2320 B	10/20/23	10/20/23	
Chloride	4750	mg/L	100	EPA 300.0	10/26/23	10/26/23	
Fluoride	51.5	mg/L	10.0	EPA 300.0	10/26/23	10/26/23	
Sulfate	24200	mg/L	500	EPA 300.0	10/27/23	10/27/23	
Total Dissolved Solids (TDS)	45100	mg/L	500	SM 2540 C	10/20/23	10/20/23	
Metals							
Boron, Total	167	mg/L	5.00	EPA 200.7/200.2	10/20/23	10/23/23	
Calcium, Total	337	mg/L	20.0	EPA 200.7/200.2	10/20/23	10/23/23	
Magnesium, Total	3530	mg/L	20.0	EPA 200.7/200.2	10/20/23	10/23/23	
Potassium, Total	137	mg/L	50.0	EPA 200.7/200.2	10/20/23	10/23/23	
Sodium, Total	7410	mg/L	50.0	EPA 200.7/200.2	10/20/23	10/23/23	

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PO#: **185318**
Receipt: **10/20/23 12:10 @ 2.6** °C
Date Reported: 11/2/2023
Project Name: **2023 CCR Fall Sampling**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Fall Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Page 1/2

Please fill out the fields highlighted in light blue.

23J1775

UPS 1Z8497470160543855 2

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
( ) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AK

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																		Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		TDS	Anions: Cl, F, SO4	ICP Metals: B,Ca															Total Coliform + E. Coli	Total Coliform + E. Coli	HPC (Plate Count)	E. Coli Only
01	1. FA-UG1	10-18-23	14:13	Water			X	X	X																		
02	2. FA-UG2	10-18-23	15:24	Water			X	X	X																		
~~03~~	3. FA-DG2			Water			X	X	X																		
~~04~~	4. FA-DG3			Water			X	X	X																		
~~05~~	5. FA-DG4			Water			X	X	X																		
03 ~~06~~	6. BA-UG1	10-18-23	11:56	Water			X	X	X																		
04 ~~07~~	7. BA-DG1	10-17-23	15:28	Water			X	X	X																		
05 ~~08~~	8. BA-DG2	10-17-23	12:40	Water			X	X	X																		
010 09	9. BA-DG3	10-17-23	10:27	Water			X	X	X																		
07 ~~10~~	10. Duplicate - CCR	10-17-23	11:08	Water			X	X	X																		

AQ 1272
M 1325

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 2.0

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 10-19-23 10:35	Received by: [signature]	Date/Time 10/19/23 10:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 10/20/23 12:10
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Fall Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

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TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Page 2/2

Please fill out the fields highlighted in light blue.

23J1775

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	TDS	Anions: Cl, F, SO4	ICP Metals: B, Ca, Mg, K, Na													Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
08 H	11. NEP ✓	10-17-23	15:55	Water		X	X	X	X																
	12.																								
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 2.0

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	10-19-23 10:35	Ryan Hardaway	10/19/23 10:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			10/20/23 12:10
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXJ1086-BLK1	Batch: BXJ1086								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
QC Sample ID: BXJ1095-BLK1	Batch: BXJ1095								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Magnesium, Total					ND			0.2	1.00
Potassium, Total					ND			0.5	1.00
Sodium, Total					ND			0.5	1.00
QC Sample ID: BXJ1096-BLK1	Batch: BXJ1096								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total					0.05			0.05	1.00
QB-01 - The method blank contains analyte at a concentration above the MRL; however, concentration is less than 10% of the sample result, which is negligible according to method criteria.									
Calcium, Total					ND			0.2	1.00
QC Sample ID: BXJ1264-BLK1	Batch: BXJ1264								
Date Prepared: 10/25/2023	Date Analyzed: 10/25/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
QC Sample ID: BXJ1331-BLK1	Batch: BXJ1331								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
LCS - EPA 200.7									
QC Sample ID: BXJ1086-BS1	Batch: BXJ1086								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	102		85 - 115		0.51		0.500	0.05	1.00
Calcium, Total	99.5		85 - 115		10.1		10.2	0.2	1.00
QC Sample ID: BXJ1095-BS1	Batch: BXJ1095								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	103		85 - 115		0.51		0.500	0.05	1.00
Calcium, Total	102		85 - 115		10.4		10.2	0.2	1.00
Magnesium, Total	100		85 - 115		10.2		10.2	0.2	1.00
Potassium, Total	99.1		85 - 115		9.9		10.0	0.5	1.00
Sodium, Total	97.0		85 - 115		9.7		10.0	0.5	1.00
QC Sample ID: BXJ1096-BS1	Batch: BXJ1096								
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	109		85 - 115		0.55		0.500	0.05	1.00
Calcium, Total	103		85 - 115		10.5		10.2	0.2	1.00
QC Sample ID: BXJ1264-BS1	Batch: BXJ1264								
Date Prepared: 10/25/2023	Date Analyzed: 10/25/2023								
Boron, Total	96.7		85 - 115		0.48		0.500	0.05	1.00
Calcium, Total	89.9		85 - 115		9.2		10.2	0.2	1.00
QC Sample ID: BXJ1331-BS1	Batch: BXJ1331								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Boron, Total	93.5		85 - 115		0.47		0.500	0.05	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
LCS - EPA 200.7 (cont.)									
QC Sample ID: BXJ1331-BS1	Batch: BXJ1331								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Calcium, Total	94.9		85 - 115		9.7		10.2	0.2	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXJ1086-MS1	Batch: BXJ1086			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	101		70 - 130		0.54	0.03	0.500	0.05	1.00
Calcium, Total	102		70 - 130		104	93.4	10.2	0.2	1.00
QC Sample ID: BXJ1086-MS2	Batch: BXJ1086			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	105		70 - 130		0.52	ND	0.500	0.05	1.00
Calcium, Total	124		70 - 130		217	204	10.2	0.2	1.00
QC Sample ID: BXJ1095-MS1	Batch: BXJ1095			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	102		70 - 130		0.70	0.18	0.500	0.05	1.00
Calcium, Total	111		70 - 130		63.3	51.9	10.2	0.2	1.00
Magnesium, Total	104		70 - 130		26.5	16.0	10.2	0.2	1.00
Potassium, Total	101		70 - 130		22.4	12.3	10.0	0.5	1.00
Sodium, Total	102		70 - 130		52.2	42.0	10.0	0.5	1.00
QC Sample ID: BXJ1095-MS2	Batch: BXJ1095			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	103		70 - 130		0.68	0.17	0.500	0.05	1.00
Calcium, Total	120		70 - 130		83.5	71.2	10.2	0.2	1.00
Magnesium, Total	105		70 - 130		32.4	21.7	10.2	0.2	1.00
Potassium, Total	101		70 - 130		37.8	27.7	10.0	0.5	1.00
Sodium, Total	125		70 - 130		131	119	10.0	0.5	1.00
QC Sample ID: BXJ1096-MS1	Batch: BXJ1096			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	100		70 - 130		0.62	0.12	0.500	0.05	1.00
Calcium, Total	89.5		70 - 130		116	107	10.2	0.2	1.00
QC Sample ID: BXJ1096-MS2	Batch: BXJ1096			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	105		70 - 130		0.88	0.35	0.500	0.05	1.00
Calcium, Total	132		70 - 130		204	190	10.2	0.2	1.00
QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.									
QC Sample ID: BXJ1264-MS1	Batch: BXJ1264			QC Source Sample: 23J1775-01					
Date Prepared: 10/25/2023	Date Analyzed: 10/25/2023								
Boron, Total	97.3		70 - 130		1.25	0.76	0.500	0.05	1.00
Calcium, Total	91.3		70 - 130		16.7	7.4	10.2	0.2	1.00
QC Sample ID: BXJ1264-MS2	Batch: BXJ1264			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/25/2023	Date Analyzed: 10/25/2023								
Boron, Total	103		70 - 130		0.51	ND	0.500	0.05	1.00
Calcium, Total	72.1		70 - 130		83.4	76.1	10.2	0.2	1.00
QC Sample ID: BXJ1331-MS1	Batch: BXJ1331			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Boron, Total	99.8		70 - 130		1.56	1.06	0.500	0.05	1.00
Calcium, Total	75.8		70 - 130		198	191	10.2	0.2	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike - EPA 200.7 (cont.)									
QC Sample ID: BXJ1331-MS2	Batch: BXJ1331		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Boron, Total	97.6		70 - 130		0.75	0.26	0.500	0.05	1.00
Calcium, Total	92.1		70 - 130		54.3	44.9	10.2	0.2	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXJ1086-MSD1	Batch: BXJ1086		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	99.1	2.09	70 - 130	20	0.53	0.03	0.500	0.05	1.00
Calcium, Total	112	0.987	70 - 130	20	105	93.4	10.2	0.2	1.00
QC Sample ID: BXJ1086-MSD2	Batch: BXJ1086		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	106	0.722	70 - 130	20	0.53	ND	0.500	0.05	1.00
Calcium, Total	121	0.135	70 - 130	20	216	204	10.2	0.2	1.00
QC Sample ID: BXJ1095-MSD1	Batch: BXJ1095		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	101	0.911	70 - 130	20	0.69	0.18	0.500	0.05	1.00
Calcium, Total	104	1.25	70 - 130	20	62.5	51.9	10.2	0.2	1.00
Magnesium, Total	101	1.17	70 - 130	20	26.2	16.0	10.2	0.2	1.00
Potassium, Total	98.0	1.50	70 - 130	20	22.1	12.3	10.0	0.5	1.00
Sodium, Total	94.5	1.53	70 - 130	20	51.4	42.0	10.0	0.5	1.00
QC Sample ID: BXJ1095-MSD2	Batch: BXJ1095		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	101	1.00	70 - 130	20	0.68	0.17	0.500	0.05	1.00
Calcium, Total	103	2.09	70 - 130	20	81.7	71.2	10.2	0.2	1.00
Magnesium, Total	99.8	1.60	70 - 130	20	31.9	21.7	10.2	0.2	1.00
Potassium, Total	94.0	1.89	70 - 130	20	37.1	27.7	10.0	0.5	1.00
Sodium, Total	96.3	2.23	70 - 130	20	128	119	10.0	0.5	1.00
QC Sample ID: BXJ1096-MSD1	Batch: BXJ1096		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	102	1.62	70 - 130	20	0.64	0.12	0.500	0.05	1.00
Calcium, Total	108	1.64	70 - 130	20	118	107	10.2	0.2	1.00
QC Sample ID: BXJ1096-MSD2	Batch: BXJ1096		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/23/2023								
Boron, Total	102	1.82	70 - 130	20	0.86	0.35	0.500	0.05	1.00
Calcium, Total	102	1.54	70 - 130	20	201	190	10.2	0.2	1.00
QC Sample ID: BXJ1264-MSD1	Batch: BXJ1264		QC Source Sample: 23J1775-01						
Date Prepared: 10/25/2023	Date Analyzed: 10/25/2023								
Boron, Total	94.6	1.09	70 - 130	20	1.24	0.76	0.500	0.05	1.00
Calcium, Total	89.5	1.13	70 - 130	20	16.5	7.4	10.2	0.2	1.00
QC Sample ID: BXJ1264-MSD2	Batch: BXJ1264		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/25/2023	Date Analyzed: 10/25/2023								
Boron, Total	102	0.469	70 - 130	20	0.51	ND	0.500	0.05	1.00
Calcium, Total	73.4	0.161	70 - 130	20	83.6	76.1	10.2	0.2	1.00
QC Sample ID: BXJ1331-MSD1	Batch: BXJ1331		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Boron, Total	98.9	0.296	70 - 130	20	1.55	1.06	0.500	0.05	1.00
Calcium, Total	84.0	0.419	70 - 130	20	199	191	10.2	0.2	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike Dup - EPA 200.7 (cont.)									
QC Sample ID: BXJ1331-MSD2	Batch: BXJ1331		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Boron, Total	103	3.62	70 - 130	20	0.77	0.26	0.500	0.05	1.00
Calcium, Total	90.9	0.226	70 - 130	20	54.2	44.9	10.2	0.2	1.00

QC Report for Work Order (WO) - 23J1775

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXJ1347-BLK1	Batch: BXJ1347								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
QC Sample ID: BXJ1441-BLK1	Batch: BXJ1441								
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXJ1347-BS1	Batch: BXJ1347								
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	97.0		90 - 110		48.5		50.0	1.00	1.00
Fluoride	102		90 - 110		5.09		5.00	0.100	1.00
Sulfate	99.4		90 - 110		49.7		50.0	1.00	1.00
QC Sample ID: BXJ1441-BS1	Batch: BXJ1441								
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Fluoride	96.9		90 - 110		4.85		5.00	0.100	1.00
Sulfate	100		90 - 110		50.0		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXJ1347-MS1	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	96.0		80 - 120		30.1	19.5	11.1	1.11	1.00
Fluoride	99.8		80 - 120		2.56	1.45	1.11	0.111	1.00
Sulfate	87.6		80 - 120		17.5	7.81	11.1	1.11	1.00
QC Sample ID: BXJ1347-MS2	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	87.2		80 - 120		225	181	50.0	5.50	1.00
Fluoride	93.0		80 - 120		4.65	ND	5.00	0.550	1.00
Sulfate	96.2		80 - 120		194	146	50.0	5.50	1.00
QC Sample ID: BXJ1441-MS1	Batch: BXJ1441			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Fluoride	86.8		80 - 120		17.4	ND	20.0	2.20	1.00
Sulfate	82.8		80 - 120		207	41.7	200	22.0	1.00
QC Sample ID: BXJ1441-MS2	Batch: BXJ1441			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Fluoride	87.4		80 - 120		43.7	ND	50.0	5.50	1.00
Sulfate	167		80 - 120		3320	2490	500	55.0	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXJ1347-MSD1	Batch: BXJ1347			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	96.2	0.0682	80 - 120	20	30.1	19.5	11.1	1.11	1.00
Fluoride	98.2	0.692	80 - 120	20	2.54	1.45	1.11	0.111	1.00
Sulfate	86.4	0.747	80 - 120	20	17.4	7.81	11.1	1.11	1.00

Matrix Spike Dup - EPA 300.0 (cont.)

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
QC Sample ID: BXJ1347-MSD2	Batch: BXJ1347		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/26/2023	Date Analyzed: 10/26/2023								
Chloride	85.9	0.271	80 - 120	20	224	181	50.0	5.50	1.00
Fluoride	91.0	2.25	80 - 120	20	4.55	ND	5.00	0.550	1.00
Sulfate	93.8	0.633	80 - 120	20	193	146	50.0	5.50	1.00
QC Sample ID: BXJ1441-MSD1	Batch: BXJ1441		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Fluoride	86.4	0.419	80 - 120	20	17.3	ND	20.0	2.20	1.00
Sulfate	82.8	0.0180	80 - 120	20	207	41.7	200	22.0	1.00
QC Sample ID: BXJ1441-MSD2	Batch: BXJ1441		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Fluoride	88.4	1.16	80 - 120	20	44.2	ND	50.0	5.50	1.00
Sulfate	167	0.0343	80 - 120	20	3320	2490	500	55.0	1.00

QM-4X - The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

QC Report for Work Order (WO) - 23J1775

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2320 B									
QC Sample ID: BXJ1074-BLK1	Batch: BXJ1074								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Alkalinity - Bicarbonate (as CaCO3)					ND			1.0	1.00
Alkalinity - Carbonate (as CaCO3)					ND			1.0	1.00
Alkalinity - Hydroxide (as CaCO3)					ND			1.0	1.00
Alkalinity - Total (as CaCO3)					ND			1.0	1.00
Duplicate - SM 2320 B									
QC Sample ID: BXJ1074-DUP1	Batch: BXJ1074				QC Source Sample: XXXXXXX-XX				
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Alkalinity - Bicarbonate (as CaCO3)		0.146		20	342	342		1.0	1.00
Alkalinity - Carbonate (as CaCO3)				20	ND	ND		1.0	1.00
Alkalinity - Hydroxide (as CaCO3)				20	ND	ND		1.0	1.00
Alkalinity - Total (as CaCO3)		0.146		20	342	342		1.0	1.00
LCS - SM 2320 B									
QC Sample ID: BXJ1074-BS1	Batch: BXJ1074								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Alkalinity - Total (as CaCO3)	95.8		90 - 110		226		236	1.0	1.00

QC Report for Work Order (WO) - 23J1775

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXJ1056-BLK1	Batch: BXJ1056								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXJ1056-DUP1	Batch: BXJ1056		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)		2		10	3560	3480		20	1.00
QC Sample ID: BXJ1056-DUP2	Batch: BXJ1056		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)		0		10	11900	11900		500	1.00
LCS - SM 2540 C									
QC Sample ID: BXJ1056-BS1	Batch: BXJ1056								
Date Prepared: 10/20/2023	Date Analyzed: 10/20/2023								
Total Dissolved Solids (TDS)	101		90 - 110		404		400	20	1.00

CHEMTECH-FORD
LABORATORIES

12/14/2023

Work Order: 23J1798
Project: FA-DG5/BA-DG4

Deseret Power Electric Cooperative
Attn: Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Project Manager

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Sandy, UT 84070
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www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 11:48 @ 13.7** °C
Date Reported: 12/14/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **FA-DG5**

Matrix: **Water**
Lab ID: **23J1798-01**
Date Sampled: **10/16/23 11:11**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Radiochemistry							
Radium-226	0.19	pCi/L	0.27	SM 7500 Ra B	11/13/23	11/21/23	SL-62
Radium-228	-0.22	pCi/L	0.57	EPA 904.0	11/21/23	12/4/23	SL-62

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Trenton Keller
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Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 11:48 @ 13.7** °C
Date Reported: 12/14/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **BA-DG4**

Matrix: **Water**
Lab ID: **23J1798-02**
Date Sampled: **10/16/23 14:25**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Radiochemistry							
Radium-226	0.31	pCi/L	0.17	SM 7500 Ra B	11/13/23	11/21/23	SL-62
Radium-228	0.62	pCi/L	0.47	EPA 904.0	11/21/23	12/4/23	SL-62

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Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 11:48 @ 13.7** °C
Date Reported: 12/14/2023
Project Name: **FA-DG5/BA-DG4**

Sample ID: **Duplicate (FA-DG5/BA-DG4)**

Matrix: **Water**
Lab ID: **23J1798-03**
Date Sampled: **10/16/23 12:15**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Radiochemistry							
Radium-226	0.21	pCi/L	0.20	SM 7500 Ra B	11/13/23	11/21/23	SL-62
Radium-228	-0.12	pCi/L	0.47	EPA 904.0	11/21/23	12/4/23	SL-62

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Certificate of Analysis

Deseret Power Electric Cooperative
Trenton Keller
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/20/23 11:48 @ 13.7** °C
Date Reported: 12/14/2023
Project Name: **FA-DG5/BA-DG4**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

CHEMTECH - FORD ANALYTICAL LABORATORY

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
( ) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: CF

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 **FAX:**
CONTACT: Tyler Esplin **PROJECT:** FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
** Expedited turnaround subject to additional charge*

Please fill out the fields highlighted in light blue.

23J1798

Lab Use Only	CLIENT SAMPLE INFORMATION				TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. FA-DG5	10-16-23	11:11	Water		X	X	X	X	X	X	X	X	X										
02	2. BA-DG4	10-16-23	14:25	Water		X	X	X	X	X	X	X	X	X										
03	3. Duplicate (FA-DG5/BA-DG4)	10-16-23	12:15	Water		X	X	X	X	X	X	X	X	X										
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

(2) AG 1298 - ALL

UPS

1Z849747036611 0348
YBGBKNJ UTSLC302UDC OCT 20 05:32:43 2023
US 8413 HIP 23.6.0 ZT411R

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE **NOT ON ICE** Temp (C°): 13.7

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	10-19-23 10:35		10/19/23 16:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			10.20.23 1148
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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Sandy, UT 84070

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866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

ANALYTICAL REPORT

December 12, 2023

Chemtech-Ford Laboratories

Sample Delivery Group:	L1670483
Samples Received:	10/26/2023
Project Number:	
Description:	

Report To: Dave Gayer
9632 S 500 S
Sandy, UT 84070

Entire Report Reviewed By:

Donna Eidson
Project Manager

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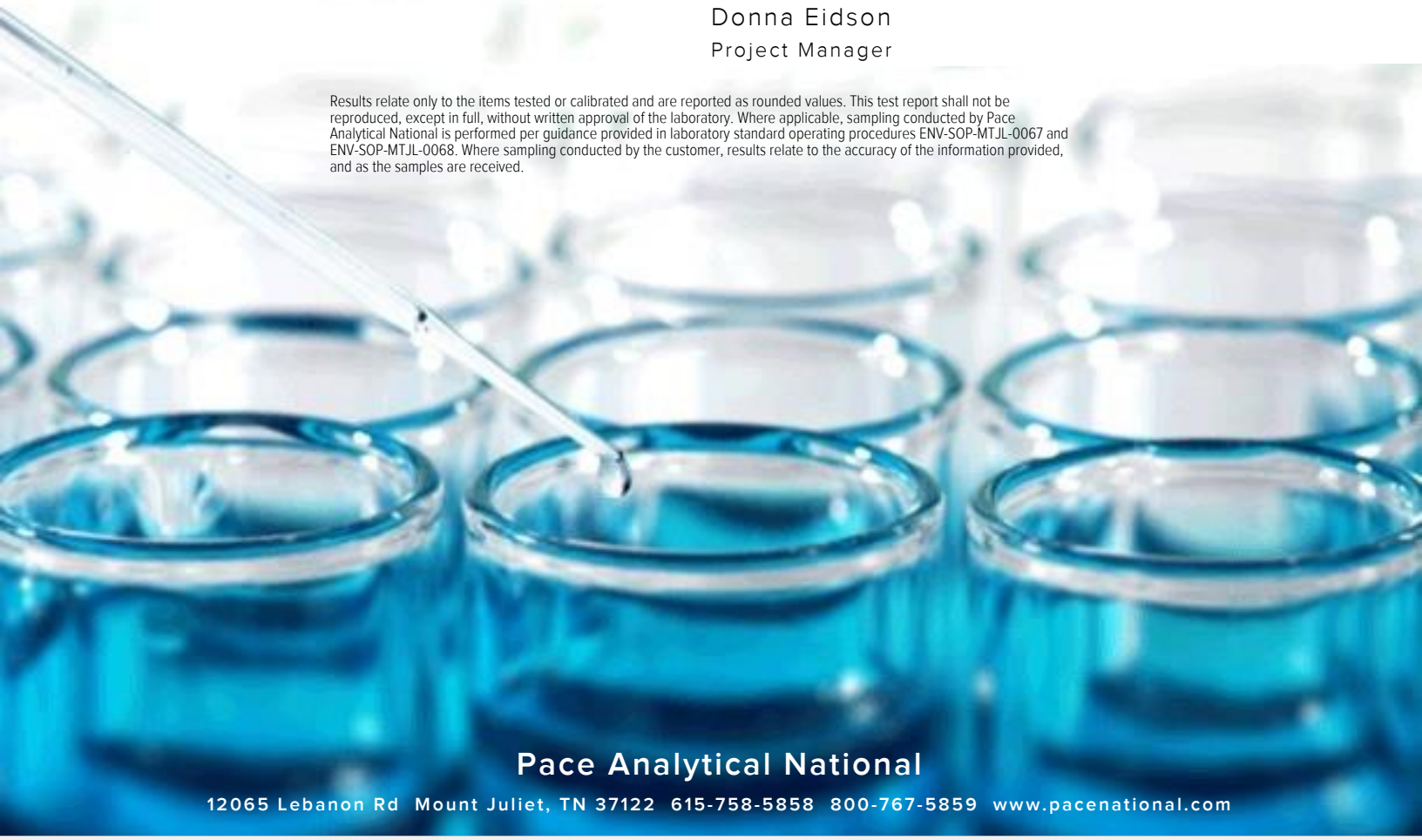


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23J1798-01 L1670483-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/16/23 11:11	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 20:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1798-02 L1670483-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/16/23 14:25	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 20:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1798-03 L1670483-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/16/23 12:15	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 20:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1662-01 L1670483-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 08:00	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2170804	1	11/14/23 11:04	11/17/23 22:22	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J2032-01 L1670483-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/24/23 11:00	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2170804	1	11/14/23 11:04	11/17/23 22:22	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J2032-02 L1670483-06 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/24/23 09:00	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2170804	1	11/14/23 11:04	11/17/23 22:22	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1810-01 L1670483-07 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 13:50	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 900	WG2170804	1	11/14/23 11:04	11/17/23 22:22	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-01 L1670483-08 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 16:05	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 20:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-02 L1670483-09 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 15:25	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 21:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-03 L1670483-10 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 13:25	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 21:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-04 L1670483-11 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 12:30	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2168720	1	11/13/23 16:09	11/21/23 21:32	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-05 L1670483-12 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 11:40	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 15:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-06 L1670483-13 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 10:55	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 15:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-07 L1670483-14 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 14:40	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 15:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/07/23 18:34	DDD	Mt. Juliet, TN

23J1808-08 L1670483-15 Non-Potable Water

Collected by | Collected date/time 10/19/23 09:55 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 16:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2175573	1	11/21/23 18:09	12/04/23 13:50	DDD	Mt. Juliet, TN

23J1808-09 L1670483-16 Non-Potable Water

Collected by | Collected date/time 10/19/23 00:00 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 16:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1808-10 L1670483-17 Non-Potable Water

Collected by | Collected date/time 10/19/23 17:10 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 16:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1808-11 L1670483-18 Non-Potable Water

Collected by | Collected date/time 10/18/23 14:30 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 16:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1808-12 L1670483-19 Non-Potable Water

Collected by | Collected date/time 10/18/23 17:35 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 17:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1808-13 L1670483-20 Non-Potable Water

Collected by | Collected date/time 10/18/23 15:25 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 17:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1808-14 L1670483-21 Non-Potable Water

Collected by | Collected date/time 10/18/23 16:35 | Received date/time 10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 17:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1808-15 L1670483-22 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 17:10	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 17:06	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-01 L1670483-23 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 09:45	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 18:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-02 L1670483-24 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 09:10	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 18:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-03 L1670483-25 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 08:40	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 18:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-04 L1670483-26 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 10:00	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 18:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-05 L1670483-27 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 13:20	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 19:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-06 L1670483-28 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 13:00	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 19:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-07 L1670483-29 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 10:45	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171129	1	11/15/23 16:52	11/18/23 19:07	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-08 L1670483-30 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 10:15	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 19:16	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-09 L1670483-31 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 14:10	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 19:16	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-10 L1670483-32 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 13:47	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 19:16	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176208	1	11/22/23 13:36	12/09/23 11:48	DDD	Mt. Juliet, TN

23J1777-11 L1670483-33 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 10:35	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 20:17	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176321	1	11/22/23 14:02	12/01/23 17:38	DDD	Mt. Juliet, TN

23J1777-12 L1670483-34 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/18/23 11:00	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 20:17	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176321	1	11/22/23 14:02	12/01/23 17:38	DDD	Mt. Juliet, TN

23J1777-13 L1670483-35 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/19/23 12:45	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 20:17	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176321	1	11/22/23 14:02	12/01/23 17:38	DDD	Mt. Juliet, TN

SAMPLE SUMMARY

	Collected by	Collected date/time	Received date/time
23J1777-14 L1670483-36 Non-Potable Water		10/19/23 13:05	10/26/23 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 903.0/9315	WG2171865	1	11/16/23 12:30	11/22/23 20:17	SNR	Mt. Juliet, TN
Radiochemistry by Method 904/9320	WG2176321	1	11/22/23 14:02	12/01/23 17:38	DDD	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Donna Eidson
Project Manager

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.187	J	0.202		0.267		11/21/2023 20:32	WG2168720
(T) Barium	*114*					*30.0-143*	*11/21/2023 20:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.222	U	0.306		0.571		12/04/2023 13:50	WG2175573
(T) Barium	*92.8*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*108*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.313		0.191		0.166		11/21/2023 20:32	WG2168720
(T) Barium	*105*					*30.0-143*	*11/21/2023 20:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.619		0.265		0.473		12/04/2023 13:50	WG2175573
(T) Barium	*118*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*95.3*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.209		0.177		0.198		11/21/2023 20:32	WG2168720
(T) Barium	*116*					*30.0-143*	*11/21/2023 20:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	-0.120	U	0.253		0.472		12/04/2023 13:50	WG2175573
(T) Barium	*125*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*103*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	5.95		1.71	1.12	1.58	0.916	11/17/2023 22:22	WG2170804
GROSS BETA	5.55		1.41	0.247	1.55	0.818	11/17/2023 22:22	WG2170804

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.655		0.243		0.431		12/04/2023 13:50	WG2175573
(T) Barium	*108*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*106*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	0.282	U	0.652	0.399	0.945	0.552	11/17/2023 22:22	WG2170804
GROSS BETA	1.88		1.40	0.751	1.80	0.938	11/17/2023 22:22	WG2170804

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.254	J	0.194		0.355		12/04/2023 13:50	WG2175573
(T) Barium	*98.0*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*110*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	6.86		3.01	1.86	3.36	1.92	11/17/2023 22:22	WG2170804
GROSS BETA	4.38		2.57	0.849	3.16	1.67	11/17/2023 22:22	WG2170804

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	-0.418	U	0.281		0.530		12/04/2023 13:50	WG2175573
(T) Barium	*99.6*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*128*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 900

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
GROSS ALPHA	15.8		5.53	3.43	5.14	3.08	11/17/2023 22:22	WG2170804
GROSS BETA	6.76		3.42	1.08	4.21	2.20	11/17/2023 22:22	WG2170804

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	-0.207	U	0.216		0.411		12/04/2023 13:50	WG2175573
(T) Barium	*107*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*116*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.156	J	0.191		0.285		11/21/2023 20:32	WG2168720
(T) Barium	*103*					*30.0-143*	*11/21/2023 20:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.0332	U	0.263		0.488		12/04/2023 13:50	WG2175573
(T) Barium	*114*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*124*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.213	J J3 J6	0.209		0.294		11/21/2023 21:32	WG2168720
(T) Barium	*101*					*30.0-143*	*11/21/2023 21:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.438	J	0.259		0.468		12/04/2023 13:50	WG2175573
(T) Barium	*102*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*121*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.364		0.204		0.167		11/21/2023 21:32	WG2168720
(T) Barium	*103*					*30.0-143*	*11/21/2023 21:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.309	J	0.244		0.445		12/04/2023 13:50	WG2175573
(T) Barium	*101*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*120*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.471		0.241		0.222		11/21/2023 21:32	WG2168720
(T) Barium	*99.3*					*30.0-143*	*11/21/2023 21:32*	WG2168720

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.532		0.201		0.357		12/04/2023 13:50	WG2175573
(T) Barium	*103*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*118*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.601	J	0.606		0.733		11/18/2023 15:06	WG2171129
(T) Barium	*101*					*30.0-143*	*11/18/2023 15:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.578		0.240		0.428		12/04/2023 13:50	WG2175573
(T) Barium	*96.2*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*107*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	2.22		0.609		0.245		11/18/2023 15:06	WG2171129
(T) Barium	*100*					*30.0-143*	*11/18/2023 15:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	2.25		0.332		0.541		12/04/2023 13:50	WG2175573
(T) Barium	*103*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*114*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.461		0.339		0.375		11/18/2023 15:06	WG2171129
(T) Barium	*104*					*30.0-143*	*11/18/2023 15:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.619		0.200		0.350		12/07/2023 18:34	WG2175573
(T) Barium	*114*					*30.0-143*	*12/07/2023 18:34*	WG2175573
(T) Yttrium	*109*					*30.0-136*	*12/07/2023 18:34*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.332		0.282		0.314		11/18/2023 16:06	WG2171129
(T) Barium	*103*					*30.0-143*	*11/18/2023 16:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.0896	U	0.195		0.364		12/04/2023 13:50	WG2175573
(T) Barium	*103*					*30.0-143*	*12/04/2023 13:50*	WG2175573
(T) Yttrium	*131*					*30.0-136*	*12/04/2023 13:50*	WG2175573

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.383	J	0.323		0.388		11/18/2023 16:06	WG2171129
(T) Barium	*101*					*30.0-143*	*11/18/2023 16:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.435	J	0.401		0.713		12/09/2023 11:48	WG2176208
(T) Barium	*104*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*109*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.582		0.326		0.240		11/18/2023 16:06	WG2171129
(T) Barium	*102*					*30.0-143*	*11/18/2023 16:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	-0.523	U	0.299		0.555		12/09/2023 11:48	WG2176208
(T) Barium	*105*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*89.6*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	1.58		0.541		0.372		11/18/2023 16:06	WG2171129
(T) Barium	*104*					*30.0-143*	*11/18/2023 16:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	1.92		0.306		0.501		12/09/2023 11:48	WG2176208
(T) Barium	*107*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*110*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	1.12		0.452		0.322		11/18/2023 17:06	WG2171129
(T) Barium	*99.4*					*30.0-143*	*11/18/2023 17:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.987		0.242		0.409		12/09/2023 11:48	WG2176208
(T) Barium	*105*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*107*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.253	J	0.287		0.380		11/18/2023 17:06	WG2171129
(T) Barium	*103*					*30.0-143*	*11/18/2023 17:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.705		0.284		0.494		12/09/2023 11:48	WG2176208
(T) Barium	*110*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*108*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.701		0.352		0.240		11/18/2023 17:06	WG2171129
(T) Barium	*101*					*30.0-143*	*11/18/2023 17:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.450		0.217		0.381		12/09/2023 11:48	WG2176208
(T) Barium	*105*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*125*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	3.86		0.809		0.384		11/18/2023 17:06	WG2171129
(T) Barium	*99.4*					*30.0-143*	*11/18/2023 17:06*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	1.55		0.279		0.461		12/09/2023 11:48	WG2176208
(T) Barium	*108*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*108*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.408		0.299		0.307		11/18/2023 18:07	WG2171129
(T) Barium	*105*					*30.0-143*	*11/18/2023 18:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	2.06		0.353		0.577		12/09/2023 11:48	WG2176208
(T) Barium	*107*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*101*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.211	J	0.274		0.390		11/18/2023 18:07	WG2171129
(T) Barium	*99.3*					*30.0-143*	*11/18/2023 18:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.647		0.222		0.383		12/09/2023 11:48	WG2176208
(T) Barium	*110*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*111*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.409		0.278		0.237		11/18/2023 18:07	WG2171129
(T) Barium	*102*					*30.0-143*	*11/18/2023 18:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.229	J	0.248		0.444		12/09/2023 11:48	WG2176208
(T) Barium	*98.4*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*118*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.164	J	0.254		0.341		11/18/2023 18:07	WG2171129
(T) Barium	*113*					*30.0-143*	*11/18/2023 18:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.435		0.204		0.358		12/09/2023 11:48	WG2176208
(T) Barium	*103*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*125*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.0810	U	0.194		0.306		11/18/2023 19:07	WG2171129
(T) Barium	*104*					*30.0-143*	*11/18/2023 19:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.460		0.223		0.391		12/09/2023 11:48	WG2176208
(T) Barium	*110*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*100*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.291	J	0.294		0.356		11/18/2023 19:07	WG2171129
(T) Barium	*109*					*30.0-143*	*11/18/2023 19:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.0566	U	0.271		0.489		12/09/2023 11:48	WG2176208
(T) Barium	*115*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*107*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.244		0.225		0.236		11/18/2023 19:07	WG2171129
(T) Barium	*101*					*30.0-143*	*11/18/2023 19:07*	WG2171129

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.225	J	0.216		0.386		12/09/2023 11:48	WG2176208
(T) Barium	*111*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*117*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.598	J	0.525		0.672		11/22/2023 19:16	WG2171865
(T) Barium	*98.3*					*30.0-143*	*11/22/2023 19:16*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.110	U	0.237		0.434		12/09/2023 11:48	WG2176208
(T) Barium	*116*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*114*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.407		0.255		0.284		11/22/2023 19:16	WG2171865
(T) Barium	*98.9*					*30.0-143*	*11/22/2023 19:16*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.339	J	0.227		0.403		12/09/2023 11:48	WG2176208
(T) Barium	*104*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*123*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.319		0.205		0.185		11/22/2023 19:16	WG2171865
(T) Barium	*99.1*					*30.0-143*	*11/22/2023 19:16*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.192	U	0.273		0.495		12/09/2023 11:48	WG2176208
(T) Barium	*103*					*30.0-143*	*12/09/2023 11:48*	WG2176208
(T) Yttrium	*128*					*30.0-136*	*12/09/2023 11:48*	WG2176208

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.457		0.263		0.278		11/22/2023 20:17	WG2171865
(T) Barium	*101*					*30.0-143*	*11/22/2023 20:17*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.501	J	0.360		0.638		12/01/2023 17:38	WG2176321
(T) Barium	*103*					*30.0-143*	*12/01/2023 17:38*	WG2176321
(T) Yttrium	*102*					*30.0-136*	*12/01/2023 17:38*	WG2176321

Radiochemistry by Method 903.0/9315

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
Radium-226	0.354	J	0.271		0.357		11/22/2023 20:17	WG2171865
(T) Barium	*99.3*					*30.0-143*	*11/22/2023 20:17*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE + / -	TPU + / -	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.963		0.297		0.510		12/01/2023 17:38	WG2176321
(T) Barium	*108*					*30.0-143*	*12/01/2023 17:38*	WG2176321
(T) Yttrium	*101*					*30.0-136*	*12/01/2023 17:38*	WG2176321

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.401		0.251		0.278		11/22/2023 20:17	WG2171865
(T) Barium	*101*					*30.0-143*	*11/22/2023 20:17*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.595		0.292		0.511		12/01/2023 17:38	WG2176321
(T) Barium	*109*					*30.0-143*	*12/01/2023 17:38*	WG2176321
(T) Yttrium	*102*					*30.0-136*	*12/01/2023 17:38*	WG2176321

Radiochemistry by Method 903.0/9315

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
Radium-226	0.437		0.236		0.186		11/22/2023 20:17	WG2171865
(T) Barium	*98.3*					*30.0-143*	*11/22/2023 20:17*	WG2171865

Radiochemistry by Method 904/9320

Analyte	Result	Qualifier	2 sigma CE	TPU	MDA	Lc	Analysis Date	Batch
	pCi/l		+ / -	+ / -	pCi/l	pCi/l	date / time	
RADIUM-228	0.439	J	0.291		0.514		12/01/2023 17:38	WG2176321
(T) Barium	*111*					*30.0-143*	*12/01/2023 17:38*	WG2176321
(T) Yttrium	*94.8*					*30.0-136*	*12/01/2023 17:38*	WG2176321

Method Blank (MB)

(MB) R4003856-1 11/17/23 22:22

Analyte	MB Result	MB Qualifier	MB 2 sigma CE	MB MDA	MB Lc
	pCi/l		+ / -	pCi/l	pCi/l
GROSS ALPHA	0.340	J	0.793	1.11	0.617
GROSS BETA	-0.293	U	1.00	1.36	0.716

L1670483-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1670483-07 11/17/23 22:22 • (DUP) R4003856-3 11/17/23 22:22

Analyte	Original Result	Original 2 sigma CE	Original MDA	Original Lc	DUP Result	DUP 2 sigma CE	DUP MDA	DUP Lc	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	pCi/l	+ / -	pCi/l	pCi/l	%			%	
GROSS ALPHA	15.8	5.53	5.14	3.08	12.1	4.76	4.89	2.87	26.4	0.504		20	3
GROSS BETA	6.76	3.42	4.21	2.20	6.22	3.56	4.45	2.32	8.38	0.110		20	3

Laboratory Control Sample (LCS)

(LCS) R4003856-2 11/17/23 22:22

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
GROSS ALPHA	15.0	17.7	118	80.0-120	
GROSS BETA	40.8	37.7	92.5	80.0-120	

L1669912-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1669912-01 11/17/23 22:22 • (MS) R4003856-6 11/21/23 14:33 • (MSD) R4003856-7 11/21/23 14:33

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
GROSS ALPHA	75.0	22.5	109	114	115	122	1	70.0-130			4.58		20
GROSS BETA	204	11.5	195	216	89.8	100	1	70.0-130			10.6		20

Method Blank (MB)

(MB) R4004688-2 11/21/23 17:31

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-226	0.197		0.123	0.172	
(T) Barium	*99.7*		*99.7*		

L1668234-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1668234-13 11/21/23 18:31 • (DUP) R4004688-3 11/21/23 17:31

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.524	0.251	0.221		1.15	0.562	0.534		75.0	1.02		20	3
(T) Barium	*101*				*101*	*101*							

Laboratory Control Sample (LCS)

(LCS) R4004688-1 11/21/23 14:56

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.00	5.82	116	80.0-120	
(T) Barium			*98.3*		

L1670483-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1670483-09 11/21/23 21:32 • (MS) R4004688-6 11/26/23 11:45 • (MSD) R4004688-7 11/26/23 11:45

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.213	23.0	14.8	114	72.7	1	75.0-125		J3 J6	43.8		20
(T) Barium		*101*			*104*	*103*							

Method Blank (MB)

(MB) R4002643-1 11/18/23 14:05

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-226	0.128	J	0.133	0.191	
(T) Barium	*98.5*		*98.5*		

L1670483-29 Original Sample (OS) • Duplicate (DUP)

(OS) L1670483-29 11/18/23 19:07 • (DUP) R4002643-5 11/18/23 15:06

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.244	0.225	0.236		0.922	0.636	0.601		116	1.01		20	3
(T) Barium	*101*				*99.8*	*99.8*							

Laboratory Control Sample (LCS)

(LCS) R4002643-2 11/18/23 14:05

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.00	5.47	109	80.0-120	
(T) Barium			*96.9*		

L1670483-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1670483-12 11/18/23 15:06 • (MS) R4002643-3 11/18/23 14:05 • (MSD) R4002643-4 11/18/23 14:05

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.601	20.5	21.4	99.3	104	1	75.0-125			4.44		20
(T) Barium		*101*			*101*	*100*							

Method Blank (MB)

(MB) R4003871-1 11/22/23 18:16

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-226	0.161	J	0.118	0.168	
(T) Barium	*98.2*		*98.2*		

L1670483-30 Original Sample (OS) • Duplicate (DUP)

(OS) L1670483-30 11/22/23 19:16 • (DUP) R4003871-5 11/22/23 19:16

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.598	0.525	0.672		0.229	0.355	0.510		89.2	0.582	J	20	3
(T) Barium	*98.3*				*100*	*100*							

Laboratory Control Sample (LCS)

(LCS) R4003871-2 11/22/23 18:16

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.00	4.88	97.7	80.0-120	
(T) Barium			*101*		

L1671399-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1671399-01 11/22/23 21:17 • (MS) R4003871-3 11/22/23 18:16 • (MSD) R4003871-4 11/22/23 18:16

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	3.26	21.6	22.1	91.6	94.2	1	75.0-125			2.38		20
(T) Barium		*105*			*106*	*106*							

QUALITY CONTROL SUMMARY

L1670483-01,02,03,04,05,06,07,08,09,10,11,12,13,14,15

Method Blank (MB)

(MB) R4009656-4 12/07/23 18:34

Analyte	MB Result	MB Qualifier	MB 2 sigma CE	MB MDA	MB Lc
	pCi/l		+ / -	pCi/l	pCi/l
Radium-228	0.504		0.148	0.257	
(T) Barium	*105*		*105*		
(T) Yttrium	*104*		*104*		

L1670483-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1670483-14 12/07/23 18:34 • (DUP) R4009656-5 12/07/23 18:34

Analyte	Original Result	Original 2 sigma CE	Original MDA	Original Lc	DUP Result	DUP 2 sigma CE	DUP MDA	DUP Lc	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	pCi/l	+ / -	pCi/l	pCi/l	%			%	
Radium-228	0.619	0.200	0.350		1.35	0.277	0.465		74.3	2.14		20	3
(T) Barium	*114*				*109*	*109*							
(T) Yttrium	*109*				*124*	*124*							

Laboratory Control Sample (LCS)

(LCS) R4009656-1 12/04/23 13:50

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	5.31	106	80.0-120	
(T) Barium			*83.5*		
(T) Yttrium			*76.7*		

L1670483-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1670483-08 12/04/23 13:50 • (MS) R4009656-2 12/04/23 13:50 • (MSD) R4009656-3 12/04/23 13:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-228	10.0	-0.0332	7.66	8.25	76.6	82.5	1	70.0-130			7.45		20
(T) Barium		*114*			*88.3*	*85.5*							
(T) Yttrium		*124*			*89.8*	*84.0*							

Method Blank (MB)

(MB) R4010114-6 12/09/23 11:48

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-228	0.184		0.186	0.161	
(T) Barium	*111*		*111*		
(T) Yttrium	*110*		*110*		

L1670483-32 Original Sample (OS) • Duplicate (DUP)

(OS) L1670483-32 12/09/23 11:48 • (DUP) R4010114-10 12/09/23 11:48

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.192	0.273	0.495		0.539	0.371	0.656		95.1	0.755	J	20	3
(T) Barium	*103*				*105*	*105*							
(T) Yttrium	*128*				*114*	*114*							

Laboratory Control Sample (LCS)

(LCS) R4010114-7 12/09/23 11:48

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.21	84.2	80.0-120	
(T) Barium			*110*		
(T) Yttrium			*107*		

L1670483-16 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1670483-16 12/09/23 11:48 • (MS) R4010114-8 12/09/23 11:48 • (MSD) R4010114-9 12/09/23 11:48

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	16.7	0.435	14.1	16.4	81.6	95.7	1	70.0-130			15.5		20
(T) Barium		*104*			*105*	*102*							
(T) Yttrium		*109*			*108*	*110*							

Method Blank (MB)

(MB) R4009589-1 12/01/23 17:38

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE + / -	MB MDA pCi/l	MB Lc pCi/l
Radium-228	0.329		0.147	0.257	
(T) Barium	*104*		*104*		
(T) Yttrium	*96.3*		*96.3*		

L1670483-33 Original Sample (OS) • Duplicate (DUP)

(OS) L1670483-33 12/01/23 17:38 • (DUP) R4009589-5 12/01/23 17:38

Analyte	Original Result pCi/l	Original 2 sigma CE + / -	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE + / -	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.501	0.360	0.638		0.902	0.373	0.650		57.2	0.774		20	3
(T) Barium	*103*				*104*	*104*							
(T) Yttrium	*102*				*106*	*106*							

Laboratory Control Sample (LCS)

(LCS) R4009589-2 12/01/23 17:38

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.29	85.8	80.0-120	
(T) Barium			*107*		
(T) Yttrium			*101*		

L1672385-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1672385-10 11/28/23 20:05 • (MS) R4009589-3 12/01/23 17:38 • (MSD) R4009589-4 12/01/23 17:38

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	16.7	2.91	14.0	15.1	66.5	73.1	1	70.0-130	J6		7.62		20
(T) Barium		*123*			*109*	*112*							
(T) Yttrium		*118*			*99.4*	*107*							

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
U	Below Detectable Limits: Indicates that the analyte was not detected.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1798

SENDING LABORATORY:

Chemtech-Ford, Inc
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

K114

L1670483

Work Order Comments:

Laboratory ID: 23J1798-01		**Matrix:** Water -01
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/16/2023 11:11
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	

Laboratory ID: 23J1798-02		**Matrix:** Water -02
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/16/2023 14:25
Radium-228	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	

Laboratory ID: 23J1798-03		**Matrix:** Water -03
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/16/2023 12:15
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres. Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RA Screen <0.5 mR/hr:	Y N		

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
Released By	Date	Received By	Date
PNSLCUT 1700 10/25/23			10/26/230800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1662

SENDING LABORATORY:

Chemtech-Ford, Inc
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

L1670483

Work Order Comments: If gross alpha is >5, run radium 226

Laboratory ID: 23J1662-01 **Matrix:** Water -04
Sampled: 10/18/2023 08:00

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
[signature]	10/19/23	[signature]	8:57 10/25/23
[signature] PNSLCUT	1700 10/25/23	Hayley Robitza	10/26/23 0800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J2032

SENDING LABORATORY:

Chemtech-Ford, Inc
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

L1670483

Work Order Comments: -If gross Alpha is >5, Run Radium 226

Laboratory ID: 23J2032-01		**Matrix:** Water -05
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/24/2023 11:00
Radium-228 Variance	EPA 904.0	
Gross Alpha LLD	EPA 900.0	
Gross Alpha Variance	EPA 900.0	
Gross Beta	EPA 900.0	
Gross Beta LLD	EPA 900.0	
Gross Beta Variance	EPA 900.0	
Radium-228	EPA 904.0	
Gross Alpha	EPA 900.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23J2032-02		**Matrix:** Water -06
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/24/2023 09:00
Radium-228 Variance	EPA 904.0	
Gross Alpha LLD	EPA 900.0	
Gross Alpha Variance	EPA 900.0	
Gross Beta	EPA 900.0	
Gross Beta LLD	EPA 900.0	
Gross Beta Variance	EPA 900.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Gross Alpha	EPA 900.0	

Released By	Date	Received By	Date
	10/24/23	8:57	10/25/23
PNSLCUT	1700 10/25/23		10/26/23 0800

* *NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1810

SENDING LABORATORY:

Chemtech-Ford, Inc
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: If Gross Alpha is >5, Run Radium 226

L1670483

Laboratory ID: 23J1810-01 -07
Matrix: Water
Sampled: 10/18/2023 13:50

Requested Test	Suggested Analytical Method *
Radium-228 Variance	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228	EPA 904.0
Gross Beta Variance	EPA 900.0
Gross Beta LLD	EPA 900.0
Gross Beta	EPA 900.0
Gross Alpha Variance	EPA 900.0
Gross Alpha LLD	EPA 900.0
Gross Alpha	EPA 900.0

Released By	Date	Received By	Date
[signature]	10.20.23	[signature]	8:57 10/25/23
[signature] PNSLCMT	1700 10/25/23	[signature]	10/26/23 0800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1808

SENDING LABORATORY:

Chemtech-Ford, Inc
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: Please include QC3 data with report.

L1670483

Laboratory ID: 23J1808-01 QC3 — **Matrix:** Water -08 — **Sampled:** 10/19/2023 16:05

Requested Test	Suggested Analytical Method *
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0

Laboratory ID: 23J1808-02 — **Matrix:** Water -09 — **Sampled:** 10/19/2023 15:25

Requested Test	Suggested Analytical Method *
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Radium-228 Variance	EPA 904.0

Laboratory ID: 23J1808-03 — **Matrix:** Water -10 — **Sampled:** 10/19/2023 13:25

Requested Test	Suggested Analytical Method *
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
PWSLCUT	1700 10/25/23		10/26/23 0800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number

23J1808

L1670483

Laboratory ID: 23J1808-04		**Matrix:** Water -11
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 12:30
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1808-05		**Matrix:** Water -12
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 11:40
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1808-06		**Matrix:** Water -13
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 10:55
Radium-226 LLD	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226	EPA 903.0	
Radium-228	EPA 904.0	

Laboratory ID: 23J1808-07		**Matrix:** Water -14
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 14:40
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
PNSLCUT	1700 10/25/23		10/26/23 0800

Released By Date Received By Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number:
23J1808

L1670483

Laboratory ID: 23J1808-08		**Matrix:** Water -15
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 09:55
Radium-226 Variance	EPA 903.0	
Radium-226	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	

Laboratory ID: 23J1808-09		**Matrix:** Water -16
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 00:00
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1808-10		**Matrix:** Water -17
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 17:10
Radium-226 Variance	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23J1808-11		**Matrix:** Water -18
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 14:30
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Released By	Date	Received By	Date
	10.20.22		8:57 10/25/23
FEDEX 1700 10/25/23			10/26/23 0800

* NOTE - If you are not certified for our suggested analytical method, please use your certified method.

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1808

L1670483

Laboratory ID: 23J1808-12		**Matrix:** Water -19
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 17:35
Radium-226	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-228	EPA 904.0	
Radium-226 Variance	EPA 903.0	

Laboratory ID: 23J1808-13		**Matrix:** Water -20
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 15:25
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1808-14		**Matrix:** Water -21
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 16:35
Radium-226	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	

Laboratory ID: 23J1808-15		**Matrix:** Water -22
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 17:10
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
PNSLCUT 1700	10/25/23	Hailey Robertson	10/26/23 0800

Released By | Date | Received By | Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1777

SENDING LABORATORY:

Chemtech-Ford, Inc
9632 South 500 West
Sandy, UT 84070
Phone: 801.262.7299
Fax: 866.792.0093

RECEIVING LABORATORY:

Pace Analytical Services
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-6356
Fax: -

Work Order Comments: Please include QC3 data with report.

L1670463

Laboratory ID: 23J1777-01 — **Matrix:** Water -23 — **Sampled:** 10/18/2023 09:45

Requested Test	Suggested Analytical Method *
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0
Radium-226	EPA 903.0

Laboratory ID: 23J1777-02 — **Matrix:** Water -24 — **Sampled:** 10/18/2023 09:10

Requested Test	Suggested Analytical Method *
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-226 Variance	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226	EPA 903.0
Radium-228 Variance	EPA 904.0

Laboratory ID: 23J1777-03 — **Matrix:** Water -25 — **Sampled:** 10/18/2023 08:40

Requested Test	Suggested Analytical Method *
Radium-226	EPA 903.0
Radium-226 LLD	EPA 903.0
Radium-226 Variance	EPA 903.0
Radium-228	EPA 904.0
Radium-228 LLD	EPA 904.0
Radium-228 Variance	EPA 904.0

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
Released By	Date	Received By	Date
PVSLCUT 1700	10/25/23		10/26/23 0800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1777

U1670483

Laboratory ID: 23J1777-04		**Matrix:** Water -26
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 10:00
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-228 LLD	EPA 904.0	

Laboratory ID: 23J1777-05		**Matrix:** Water -27
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 13:20
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1777-06		**Matrix:** Water -28
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 13:00
Radium-226	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	

Laboratory ID: 23J1777-07		**Matrix:** Water -29
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 10:45
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
Released By	Date	Received By	Date
PNSLCWT	1700 10/25/23		10/26/23 0800

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1777

L1670483

Laboratory ID: 23J1777-08		**Matrix:** Water -30
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 10:15
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	

Laboratory ID: 23J1777-09		**Matrix:** Water -31
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 14:10
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-226 Variance	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1777-10		**Matrix:** Water -32
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 13:47
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1777-11		**Matrix:** Water -33
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 10:35
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 Variance	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226	EPA 903.0	
Radium-228 LLD	EPA 904.0	

Released By 10.20.23 Date | Received By 8:57 10/25/23 Date

Released By PNSLCUT 1700 10/25/23 Date | Received By 10/26/23 0800 Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

CHEMTECH-FORD
LABORATORIES

SUBCONTRACT ORDER

Chemtech-Ford, Inc

Work Order Number
23J1777

4670483

Laboratory ID: 23J1777-12		**Matrix:** Water -34
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/18/2023 11:00
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228 Variance	EPA 904.0	

Laboratory ID: 23J1777-13		**Matrix:** Water -35
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 12:45
Radium-226	EPA 903.0	
Radium-228 Variance	EPA 904.0	
Radium-228 LLD	EPA 904.0	
Radium-228	EPA 904.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	

Laboratory ID: 23J1777-14		**Matrix:** Water -36
Requested Test	**Suggested Analytical Method ***	**Sampled:** 10/19/2023 13:05
Radium-228 Variance	EPA 904.0	
Radium-226	EPA 903.0	
Radium-226 LLD	EPA 903.0	
Radium-226 Variance	EPA 903.0	
Radium-228	EPA 904.0	
Radium-228 LLD	EPA 904.0	

Released By	Date	Received By	Date
	10.20.23		8:57 10/25/23
PWSLCUT 1700 10/25/23			10/26/23 0800
Released By	Date	Received By	Date

** NOTE - If you are not certified for our suggested analytical method, please use your certified method.*

L1670483

Tracking Numbers		Temperature	
SWA		0.6±0=0.6	cc A8
		2.9±0=2.9	cc A8
		0.6±0=0.6	cc A8
		0.1±0=0.1	cc A8
		1.8±0=1.8	cc A8
		4.3±0=4.3	cc A8
		0.1±0=0.1	cc A8
		0.1±0=0.1	cc A8
		2.1±0=2.1	cc A8
		0.1±0=0.1	cc A8
		1.1±0=1.1	cc A8

Name

Date

CHEMTECH-FORD
LABORATORIES

11/8/2023

Work Order: 23J2213
Project: 2023 CCR Fall Sampling

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/26/23 10:41** @ **1.3** °C
Date Reported: 11/8/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **FA - DG2**

Matrix: **Water**
Lab ID: **23J2213-01**
Date Sampled: **10/24/23 10:05**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	730	mg/L	10.0	EPA 300.0	10/30/23	10/30/23	
Fluoride	47.8	mg/L	1.00	EPA 300.0	10/30/23	10/30/23	
Sulfate	5130	mg/L	100	EPA 300.0	10/30/23	10/30/23	
Total Dissolved Solids (TDS)	12600	mg/L	500	SM 2540 C	10/27/23	10/27/23	
Metals							
Boron, Total	7.71	mg/L	0.50	EPA 200.7/200.2	10/27/23	10/30/23	
Calcium, Total	ND	mg/L	2.0	EPA 200.7/200.2	10/27/23	10/30/23	

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Tyler Esplin
12500 East 25500 South
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PO#: **185318**
Receipt: **10/26/23 10:41** @ **1.3** °C
Date Reported: 11/8/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **FA - DG3**

Matrix: **Water**
Lab ID: **23J2213-02**
Date Sampled: **10/24/23 13:22**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	220	mg/L	20.0	EPA 300.0	10/30/23	10/30/23	
Fluoride	7.67	mg/L	2.00	EPA 300.0	10/30/23	10/30/23	
Sulfate	1630	mg/L	20.0	EPA 300.0	10/30/23	10/30/23	
Total Dissolved Solids (TDS)	3550	mg/L	20	SM 2540 C	10/27/23	10/27/23	
Metals							
Boron, Total	2.29	mg/L	0.50	EPA 200.7/200.2	11/3/23	11/3/23	
Calcium, Total	3.1	mg/L	2.0	EPA 200.7/200.2	11/3/23	11/3/23	

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Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/26/23 10:41** @ **1.3** °C
Date Reported: 11/8/2023
Project Name: **2023 CCR Fall Sampling**

Sample ID: **FA - DG4**

Matrix: **Water**
Lab ID: **23J2213-03**
Date Sampled: **10/24/23 11:48**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	837	mg/L	50.0	EPA 300.0	10/30/23	10/30/23	
Fluoride	5.02	mg/L	5.00	EPA 300.0	10/30/23	10/30/23	
Sulfate	4140	mg/L	50.0	EPA 300.0	10/30/23	10/30/23	
Total Dissolved Solids (TDS)	8000	mg/L	500	SM 2540 C	10/27/23	10/27/23	
Metals							
Boron, Total	11.3	mg/L	0.50	EPA 200.7/200.2	11/3/23	11/3/23	
Calcium, Total	53.5	mg/L	2.0	EPA 200.7/200.2	11/3/23	11/3/23	

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12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **10/26/23 10:41 @ 1.3** °C
Date Reported: 11/8/2023
Project Name: **2023 CCR Fall Sampling**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX:
CONTACT: Tyler Esplin PROJECT: 2023 CCR Fall Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23J2213

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED														Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		TDS	Anions: Cl, F, SO4	ICP Metals: B, Ca											Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA - DG2	10-24-23	10:05	Water			X	X	X														
02	2. FA - DG3	10-24-23	13:22	Water			X	X	X														
03	3. FA - DG4	10-24-23	11:48	Water			X	X	X														
	4.						X	X	X														
	5.						X	X	X														
	6.						X	X	X														
	7.						X	X	X														
	8.						X	X	X														
	9.						X	X	X														
	10.						X	X	X														

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
( ) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: LO

01-03 A9 1272 M 1325

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.3

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	10-25-23 10:30	Ryan Stadler	10/25/23 10:45 am.
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			10-26-23 1041
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS
1Z8497470165241166
6 00:53:36 20

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXJ1468-BLK1	Batch: BXJ1468								
Date Prepared: 10/27/2023	Date Analyzed: 10/30/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
QC Sample ID: BXK0167-BLK1	Batch: BXK0167								
Date Prepared: 11/03/2023	Date Analyzed: 11/03/2023								
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
LCS - EPA 200.7									
QC Sample ID: BXJ1468-BS1	Batch: BXJ1468								
Date Prepared: 10/27/2023	Date Analyzed: 10/30/2023								
Boron, Total	95.6		85 - 115		0.48		0.500	0.05	1.00
Calcium, Total	92.6		85 - 115		9.4		10.2	0.2	1.00
QC Sample ID: BXK0167-BS1	Batch: BXK0167								
Date Prepared: 11/03/2023	Date Analyzed: 11/03/2023								
Boron, Total	103		85 - 115		0.51		0.500	0.05	1.00
Calcium, Total	96.4		85 - 115		9.8		10.2	0.2	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXJ1468-MS1	Batch: BXJ1468		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/27/2023	Date Analyzed: 10/30/2023								
Boron, Total	104		70 - 130		0.52	ND	0.500	0.05	1.00
Calcium, Total	111		70 - 130		51.0	39.6	10.2	0.2	1.00
QC Sample ID: BXJ1468-MS2	Batch: BXJ1468		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/27/2023	Date Analyzed: 10/30/2023								
Boron, Total	106		70 - 130		0.53	0.03	0.500	0.05	1.00
Calcium, Total	98.3		70 - 130		63.1	53.1	10.2	0.2	1.00
QC Sample ID: BXK0167-MS1	Batch: BXK0167		QC Source Sample: XXXXXXX-XX						
Date Prepared: 11/03/2023	Date Analyzed: 11/03/2023								
Boron, Total	113		70 - 130		0.56	ND	0.500	0.05	1.00
Calcium, Total	102		70 - 130		46.1	35.7	10.2	0.2	1.00
QC Sample ID: BXK0167-MS2	Batch: BXK0167		QC Source Sample: XXXXXXX-XX						
Date Prepared: 11/03/2023	Date Analyzed: 11/03/2023								
Boron, Total	113		70 - 130		0.61	0.05	0.500	0.05	1.00
Calcium, Total	80.5		70 - 130		169	161	10.2	0.2	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXJ1468-MSD1	Batch: BXJ1468		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/27/2023	Date Analyzed: 10/30/2023								
Boron, Total	105	0.979	70 - 130	20	0.52	ND	0.500	0.05	1.00
Calcium, Total	109	0.570	70 - 130	20	50.7	39.6	10.2	0.2	1.00
QC Sample ID: BXJ1468-MSD2	Batch: BXJ1468		QC Source Sample: XXXXXXX-XX						
Date Prepared: 10/27/2023	Date Analyzed: 10/30/2023								
Boron, Total	107	1.37	70 - 130	20	0.54	0.03	0.500	0.05	1.00
Calcium, Total	106	1.25	70 - 130	20	63.9	53.1	10.2	0.2	1.00
QC Sample ID: BXK0167-MSD1	Batch: BXK0167		QC Source Sample: XXXXXXX-XX						
Date Prepared: 11/03/2023	Date Analyzed: 11/03/2023								
Boron, Total	112	0.640	70 - 130	20	0.56	ND	0.500	0.05	1.00
Calcium, Total	102	0.0219	70 - 130	20	46.1	35.7	10.2	0.2	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike Dup - EPA 200.7 (cont.)									
QC Sample ID: BXK0167-MSD2	Batch: BXK0167		QC Source Sample: XXXXXXX-XX						
Date Prepared: 11/03/2023	Date Analyzed: 11/03/2023								
Boron, Total	113	0.163	70 - 130	20	0.61	0.05	0.500	0.05	1.00
Calcium, Total	78.9	0.0995	70 - 130	20	169	161	10.2	0.2	1.00

QC Report for Work Order (WO) - 23J2213

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXJ1533-BLK1	Batch: BXJ1533								
Date Prepared: 10/30/2023	Date Analyzed: 10/30/2023								
Chloride					ND			1.00	1.00
Fluoride					ND			0.100	1.00
Sulfate					ND			1.00	1.00
LCS - EPA 300.0									
QC Sample ID: BXJ1533-BS1	Batch: BXJ1533								
Date Prepared: 10/30/2023	Date Analyzed: 10/30/2023								
Chloride	103		90 - 110		51.4		50.0	1.00	1.00
Fluoride	103		90 - 110		5.13		5.00	0.100	1.00
Sulfate	104		90 - 110		52.2		50.0	1.00	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXJ1533-MS1	Batch: BXJ1533			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/30/2023	Date Analyzed: 10/31/2023								
Chloride	90.2		80 - 120		65.8	55.7	11.1	1.11	1.00
Fluoride	89.6		80 - 120		1.32	0.323	1.11	0.111	1.00
Sulfate	89.1		80 - 120		89.3	79.4	11.1	1.11	1.00
QC Sample ID: BXJ1533-MS2	Batch: BXJ1533			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/30/2023	Date Analyzed: 10/31/2023								
Chloride	102		80 - 120		24.9	13.6	11.1	1.11	1.00
Fluoride	88.7		80 - 120		1.21	0.221	1.11	0.111	1.00
Sulfate	99.3		80 - 120		58.7	47.7	11.1	1.11	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXJ1533-MSD1	Batch: BXJ1533			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/30/2023	Date Analyzed: 10/31/2023								
Chloride	84.6	0.956	80 - 120	20	65.1	55.7	11.1	1.11	1.00
Fluoride	91.7	1.77	80 - 120	20	1.34	0.323	1.11	0.111	1.00
Sulfate	80.0	1.14	80 - 120	20	88.3	79.4	11.1	1.11	1.00
QC Sample ID: BXJ1533-MSD2	Batch: BXJ1533			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/30/2023	Date Analyzed: 10/31/2023								
Chloride	103	0.406	80 - 120	20	25.0	13.6	11.1	1.11	1.00
Fluoride	90.5	1.63	80 - 120	20	1.23	0.221	1.11	0.111	1.00
Sulfate	101	0.421	80 - 120	20	58.9	47.7	11.1	1.11	1.00

QC Report for Work Order (WO) - 23J2213

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXJ1423-BLK1	Batch: BXJ1423								
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXJ1423-DUP1	Batch: BXJ1423			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Total Dissolved Solids (TDS)		0		10	1850	1850		20	1.00
QC Sample ID: BXJ1423-DUP2	Batch: BXJ1423			QC Source Sample: XXXXXXX-XX					
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Total Dissolved Solids (TDS)		2		10	5200	5100		100	1.00
LCS - SM 2540 C									
QC Sample ID: BXJ1423-BS1	Batch: BXJ1423								
Date Prepared: 10/27/2023	Date Analyzed: 10/27/2023								
Total Dissolved Solids (TDS)	99		90 - 110		396		400	20	1.00

CHEMTECH-FORD
LABORATORIES

1/4/2024

Work Order: 23K2287
Project: BA-DG4-Round 5

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

NELAP ACCREDITED TNI LABORATORY

Approved By:

Dave Gayer, Project Manager

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 23K2287-01

Name:	**Deseret Power Electric Cooperative**	***Sample Date:***	11/28/2023 1:15 PM
Sample Site:	BA-DG4	***Receipt Date:***	11/30/2023 10:50 AM
Comments:		***Sampler:***	Trenton Keller
Sample Matrix:	Water	***Project:***	BA-DG4-Round 5
PO Number:	185318	***System No.:***	
Source Code:		***Sample Point:***	***Report to State:***

Parameter	Sample Result	EPA Max Contaminant Level (MCL)	Minimum Reporting Limit	Units	Analytical Method	Preparation Date/Time	Analysis Date/Time	Flag
Radiochemistry								
Radium-226	0.38 ± 0.337	5	0.41	pCi/L	EPA 903.0	12/11/2023	12/14/2023	SL-62
Radium-228	0.37 ± 0.313	5	0.57	pCi/L	EPA 904.0	12/18/2023	12/29/2023	SL-62

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter or 1 mg/Kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/Kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/Kg = one nanogram per kilogram = 1 part per trillion.

Data Comparisons

Values reported in **RED** exceed Primary Drinking Water standards.
Values reported in **BLUE** exceed Secondary Drinking Water standards.
BLANK values in the MCL column indicate no standard.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

Flag Descriptions

SL-62 = Analysis performed by Pace Analytical National, Mount Juliet, TN 37122

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: BA-DG4 - Round 5
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

WBS 1284974763163921 0631

Sample Receipt Conditions:
(✓) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AV

23K2287

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. BA-DG4	11-28-23	13:15	Water		X	X	X	X	X	X	X	X	X										
	2.																							
	3.																							
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

FYSRadium Rec
AG(x2) M AG
1298 1325 1272

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.1

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 11-29-23 09:03	Received by: [signature]	Date/Time 11/29/23
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 11/30/23 10:50
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

AG(x2) 1298
AQ 1272
M 1325

12/11/2023

Work Order: 23K2289
Project: BA-DG4 - Round 5

Deseret Power Electric Cooperative
Attn: Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

Client Service Contact: 801.262.7299

The analyses presented on this report were performed in accordance with the National Environmental Laboratory Accreditation Program (NELAP) unless noted in the comments, flags, or case narrative. If the report is to be used for regulatory compliance, it should be presented in its entirety, and not be altered.

Approved By:

Dave Gayer, Project Manager

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
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O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **11/30/23 10:50 @ 1.1** °C
Date Reported: 12/11/2023
Project Name: **BA-DG4 - Round 5**

Sample ID: **BA-DG4**

Matrix: **Water**
Lab ID: **23K2289-01**
Date Sampled: **11/28/23 13:15**
Sampled By: **Trenton Keller**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Chloride	678	mg/L	10.0	EPA 300.0	12/1/23	12/1/23	
Fluoride	1.22	mg/L	0.100	EPA 300.0	12/4/23	12/5/23	
Sulfate	6830	mg/L	100	EPA 300.0	12/1/23	12/1/23	
Total Dissolved Solids (TDS)	10600	mg/L	1000	SM 2540 C	11/30/23	11/30/23	
Metals							
Antimony, Total	ND	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Arsenic, Total	0.0113	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Barium, Total	0.016	mg/L	0.005	EPA 200.7/200.2	12/5/23	12/5/23	
Beryllium, Total	ND	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Boron, Total	30.2	mg/L	0.05	EPA 200.7/200.2	12/5/23	12/5/23	
Cadmium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	12/1/23	12/1/23	
Calcium, Total	237	mg/L	0.2	EPA 200.7/200.2	12/5/23	12/5/23	
Chromium, Total	0.0044	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Cobalt, Total	0.0025	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Lead, Total	ND	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Lithium, Total	0.169	mg/L	0.005	EPA 200.7/200.2	12/5/23	12/5/23	
Mercury, Total	ND	mg/L	0.00015	EPA 245.1	12/4/23	12/5/23	
Molybdenum, Total	0.06	mg/L	0.01	EPA 200.7/200.2	12/5/23	12/5/23	
Selenium, Total	0.0434	mg/L	0.0005	EPA 200.8/200.2	12/1/23	12/1/23	
Thallium, Total	ND	mg/L	0.0002	EPA 200.8/200.2	12/1/23	12/1/23	

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Certificate of Analysis

Deseret Power Electric Cooperative
Tyler Esplin
12500 East 25500 South
Vernal, UT 84078-8525

PO#: **185318**
Receipt: **11/30/23 10:50 @ 1.1** °C
Date Reported: 12/11/2023
Project Name: **BA-DG4 - Round 5**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.
On calculated parameters, there may be a slight difference between summing the rounded values shown on the report vs the unrounded values used in the calculation.

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: BA-DG4 - Round 5
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

1Z8S178497470360392660631

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AK

23K2289

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED														Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. BA-DG4	11-28-23	13:15	Water		X	X	X	X	X	X	X	X	X										
	2.																							
	3.																							
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

AG(2) M AG
1298 1325 1272

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.1

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 11-29-23 09:03	Received by: [signature]	Date/Time 11/29/23
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 11/30/23 10:50
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

AG(x2) 1298
AQ 1272
M 1325

QC Report for Work Order (WO) - 23K2289

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.7									
QC Sample ID: BXL0124-BLK1	Batch: BXL0124								
Date Prepared: 12/05/2023	Date Analyzed: 12/05/2023								
Barium, Total					ND			0.005	1.00
Boron, Total					ND			0.05	1.00
Calcium, Total					ND			0.2	1.00
Lithium, Total					0.012			0.005	1.00
QB-01 - The method blank contains analyte at a concentration above the MRL; however, concentration is less than 10% of the sample result, which is negligible according to method criteria.									
Molybdenum, Total					ND			0.01	1.00
LCS - EPA 200.7									
QC Sample ID: BXL0124-BS1	Batch: BXL0124								
Date Prepared: 12/05/2023	Date Analyzed: 12/05/2023								
Barium, Total	114		85 - 115		0.285		0.250	0.005	1.00
Boron, Total	110		85 - 115		0.55		0.500	0.05	1.00
Calcium, Total	110		85 - 115		11.2		10.2	0.2	1.00
Lithium, Total	117		85 - 115		0.233		0.200	0.005	1.00
QM-11 - The Laboratory Control Sample recovery was outside acceptance limits. The analytical batch was accepted based on the recovery of the Method Spike.									
Molybdenum, Total	114		85 - 115		0.23		0.200	0.01	1.00
Matrix Spike - EPA 200.7									
QC Sample ID: BXL0124-MS1	Batch: BXL0124			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/05/2023	Date Analyzed: 12/05/2023								
Barium, Total	108		70 - 130		0.481	0.210	0.250	0.005	1.00
Boron, Total	108		70 - 130		0.58	0.04	0.500	0.05	1.00
Calcium, Total	83.5		70 - 130		89.3	80.7	10.2	0.2	1.00
Lithium, Total	109		70 - 130		0.231	0.014	0.200	0.005	1.00
Molybdenum, Total	111		70 - 130		0.22	ND	0.200	0.01	1.00
Matrix Spike Dup - EPA 200.7									
QC Sample ID: BXL0124-MSD1	Batch: BXL0124			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/05/2023	Date Analyzed: 12/05/2023								
Barium, Total	111	1.32	70 - 130	20	0.488	0.210	0.250	0.005	1.00
Boron, Total	109	0.772	70 - 130	20	0.58	0.04	0.500	0.05	1.00
Calcium, Total	99.6	1.83	70 - 130	20	90.9	80.7	10.2	0.2	1.00
Lithium, Total	109	0.0865	70 - 130	20	0.231	0.014	0.200	0.005	1.00
Molybdenum, Total	112	0.493	70 - 130	20	0.22	ND	0.200	0.01	1.00

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 200.8									
QC Sample ID: BXL0002-BLK1	Batch: BXL0002								
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Antimony, Total					ND			0.0005	1.00
Arsenic, Total					ND			0.0005	1.00
Beryllium, Total					ND			0.0005	1.00
Cadmium, Total					ND			0.0002	1.00
Chromium, Total					ND			0.0005	1.00
Cobalt, Total					ND			0.0005	1.00
Lead, Total					ND			0.0005	1.00
Selenium, Total					ND			0.0005	1.00
Thallium, Total					ND			0.0002	1.00
LCS - EPA 200.8									
QC Sample ID: BXL0002-BS1	Batch: BXL0002								
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Antimony, Total	102		85 - 115		0.041		0.0400	0.0005	1.00
Arsenic, Total	98.4		85 - 115		0.039		0.0400	0.0005	1.00
Beryllium, Total	98.2		85 - 115		0.039		0.0400	0.0005	1.00
Cadmium, Total	100		85 - 115		0.040		0.0400	0.0002	1.00
Chromium, Total	100		85 - 115		0.040		0.0400	0.0005	1.00
Cobalt, Total	100		85 - 115		0.040		0.0400	0.0005	1.00
Lead, Total	98.3		85 - 115		0.039		0.0400	0.0005	1.00
Selenium, Total	100		85 - 115		0.040		0.0400	0.0005	1.00
Thallium, Total	102		85 - 115		0.041		0.0400	0.0002	1.00
Matrix Spike - EPA 200.8									
QC Sample ID: BXL0002-MS1	Batch: BXL0002		QC Source Sample: XXXXXXX-XX						
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Antimony, Total	108		70 - 130		0.043	0.0002	0.0400	0.0005	1.00
Arsenic, Total	104		70 - 130		0.042	0.0004	0.0400	0.0005	1.00
Beryllium, Total	104		70 - 130		0.041	ND	0.0400	0.0005	1.00
Cadmium, Total	103		70 - 130		0.041	0.00003	0.0400	0.0002	1.00
Chromium, Total	102		70 - 130		0.043	0.002	0.0400	0.0005	1.00
Cobalt, Total	99.2		70 - 130		0.040	0.00008	0.0400	0.0005	1.00
Lead, Total	98.5		70 - 130		0.039	ND	0.0400	0.0005	1.00
Selenium, Total	108		70 - 130		0.044	0.0009	0.0400	0.0005	1.00
Thallium, Total	104		70 - 130		0.042	0.00003	0.0400	0.0002	1.00
QC Sample ID: BXL0002-MS2	Batch: BXL0002		QC Source Sample: XXXXXXX-XX						
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Antimony, Total	105		70 - 130		0.042	0.0001	0.0400	0.0005	1.00
Arsenic, Total	105		70 - 130		0.043	0.001	0.0400	0.0005	1.00
Beryllium, Total	104		70 - 130		0.042	ND	0.0400	0.0005	1.00
Cadmium, Total	102		70 - 130		0.041	ND	0.0400	0.0002	1.00
Chromium, Total	103		70 - 130		0.043	0.002	0.0400	0.0005	1.00
Cobalt, Total	97.8		70 - 130		0.039	0.00009	0.0400	0.0005	1.00
Lead, Total	102		70 - 130		0.041	0.0003	0.0400	0.0005	1.00
Selenium, Total	107		70 - 130		0.044	0.0008	0.0400	0.0005	1.00
Thallium, Total	106		70 - 130		0.042	ND	0.0400	0.0002	1.00

QC Report for Work Order (WO) - 23K2289

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 245.1									
QC Sample ID: BXL0090-BLK1	Batch: BXL0090								
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Mercury, Total					ND			0.00015	1.00
LCS - EPA 245.1									
QC Sample ID: BXL0090-BS1	Batch: BXL0090								
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Mercury, Total	99.1		85 - 115		0.00495		0.00500	0.00015	1.00
Matrix Spike - EPA 245.1									
QC Sample ID: BXL0090-MS1	Batch: BXL0090				QC Source Sample: XXXXXXX-XX				
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Mercury, Total	99.0		75 - 125		0.00495	ND	0.00500	0.00015	1.00
Matrix Spike Dup - EPA 245.1									
QC Sample ID: BXL0090-MSD1	Batch: BXL0090				QC Source Sample: XXXXXXX-XX				
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Mercury, Total	101	1.57	75 - 125	20	0.00503	ND	0.00500	0.00015	1.00

QC Report for Work Order (WO) - 23K2289

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - EPA 300.0									
QC Sample ID: BXL0024-BLK1	Batch: BXL0024								
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Chloride					ND			1.00	1.00
Sulfate					ND			1.00	1.00
QC Sample ID: BXL0101-BLK1	Batch: BXL0101								
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Fluoride					ND			0.100	1.00
LCS - EPA 300.0									
QC Sample ID: BXL0024-BS1	Batch: BXL0024								
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Chloride	103		90 - 110		51.6		50.0	1.00	1.00
Sulfate	105		90 - 110		52.7		50.0	1.00	1.00
QC Sample ID: BXL0101-BS1	Batch: BXL0101								
Date Prepared: 12/04/2023	Date Analyzed: 12/04/2023								
Fluoride	93.1		90 - 110		4.65		5.00	0.100	1.00
Matrix Spike - EPA 300.0									
QC Sample ID: BXL0024-MS1	Batch: BXL0024			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Chloride	106		80 - 120		103	90.9	11.1	1.11	1.00
Sulfate	110		80 - 120		40.0	27.9	11.1	1.11	1.00
QC Sample ID: BXL0024-MS2	Batch: BXL0024			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Chloride	106		80 - 120		103	91.3	11.1	1.11	1.00
Sulfate	110		80 - 120		40.1	27.9	11.1	1.11	1.00
QC Sample ID: BXL0101-MS1	Batch: BXL0101			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Fluoride	41.9		80 - 120		0.465	ND	1.11	0.111	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									
QC Sample ID: BXL0101-MS2	Batch: BXL0101			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Fluoride	85.6		80 - 120		1.23	0.278	1.11	0.111	1.00
Matrix Spike Dup - EPA 300.0									
QC Sample ID: BXL0024-MSD1	Batch: BXL0024			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Chloride	106	0.000394	80 - 120	20	103	90.9	11.1	1.11	1.00
Sulfate	111	0.259	80 - 120	20	40.1	27.9	11.1	1.11	1.00
QC Sample ID: BXL0024-MSD2	Batch: BXL0024			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/01/2023	Date Analyzed: 12/01/2023								
Chloride	105	0.0450	80 - 120	20	103	91.3	11.1	1.11	1.00
Sulfate	110	0.0432	80 - 120	20	40.1	27.9	11.1	1.11	1.00
QC Sample ID: BXL0101-MSD1	Batch: BXL0101			QC Source Sample: XXXXXXX-XX					
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Fluoride	46.4	10.2	80 - 120	20	0.515	ND	1.11	0.111	1.00
QM-RPD - The recovery was outside acceptance limits for the MS and/or MSD. The RPD between the MS and MSD was acceptable and indicates the recovery is due to matrix interference. The batch was accepted based on the acceptable recovery of the LCS and the RPD.									

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Matrix Spike Dup - EPA 300.0 (cont.)									
QC Sample ID: BXL0101-MSD2	Batch: BXL0101		QC Source Sample: XXXXXXX-XX						
Date Prepared: 12/04/2023	Date Analyzed: 12/05/2023								
Fluoride	90.7	4.44	80 - 120	20	1.29	0.278	1.11	0.111	1.00

QC Report for Work Order (WO) - 23K2289

Analyte	% Rec	RPD	Limits	RPD Max	Result	Source Conc	Spk Value	MRL	DF
Blank - SM 2540 C									
QC Sample ID: BXK1388-BLK1	Batch: BXK1388								
Date Prepared: 11/30/2023	Date Analyzed: 11/30/2023								
Total Dissolved Solids (TDS)					ND			10	1.00
Duplicate - SM 2540 C									
QC Sample ID: BXK1388-DUP1	Batch: BXK1388		QC Source Sample: XXXXXXX-XX						
Date Prepared: 11/30/2023	Date Analyzed: 11/30/2023								
Total Dissolved Solids (TDS)		0.3		10	1540	1530		20	1.00
QC Sample ID: BXK1388-DUP2	Batch: BXK1388		QC Source Sample: XXXXXXX-XX						
Date Prepared: 11/30/2023	Date Analyzed: 11/30/2023								
Total Dissolved Solids (TDS)		0.7		10	29800	29600		1000	1.00
LCS - SM 2540 C									
QC Sample ID: BXK1388-BS1	Batch: BXK1388								
Date Prepared: 11/30/2023	Date Analyzed: 11/30/2023								
Total Dissolved Solids (TDS)	104		90 - 110		416		400	20	1.00

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: 212
Field Personnel: TK, JB
Sampling date: 1-31-23 (outside temp -10°F)
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.80
Clock time of sample: 09:23
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: PZ-212
Was a blind sample obtained at this well (circle): Yes (No)
Note: If yes, label the blind sample "CCR-QA".
Additional Notes: line was frozen, pulled pump to defrost line,

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.06		30.23							
8:45	↓		30.22	49.9	7.4	15813	80.3	20.0	-98.4	640.4
8:50			30.21	51.4	7.2	15917	114	19.6	-122.5	640.4
8:55			30.21	49.1	7.01	15554	190	12.2	-142.9	640.4
9:00			30.22	50.7	7.0	15778	260	11.2	-153.9	640.5
9:05			30.23	51.5	7.0	15996	263	13.6	-159.9	640.5
9:10			30.24	52.2	7.0	16216	267	12.7	-165.3	640.6

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 183244

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23B0145 Racks on 23B1048

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. PZ-212	1-31-23	09:23	Water		X	X	X	X	X	X	X	X	X	X										
	2.																								
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

UPS

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
( ) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: DB

Aq-1233, M-1264

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.6

Special Instructions: * Ba,B,Ca,Co,Li,Mo,Mg,K,Na,P ** Sb,As,Be,Cd,Cr,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	2-1-23 11:55		2-1-23 11:55 am
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	2-1-23 3:00 pm		2/2/23 10:30
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS TRACKING #: 1Z 849 747 01 6512 4293

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: PZ-212 (CFA-1DG5)
Field Personnel: TK, JB
Sampling date: 3-7-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): ~~Yes~~ No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 2.0
Clock time of sample: 15:08
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: PZ-212
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.10		30.20							
14:26			30.21	48.4	7.0	13883	58.2	36.3	-89.7	633.8
14:31			30.23	48.4	7.0	13886	65.3	7.8	-95.2	633.7
14:36			30.23	48.8	7.0	13954	52.3	6.7	-96.7	633.9
14:41			30.22	48.8	7.0	13896	53.1	7.0	-96.5	633.9
14:46			30.22	49.0	7.0	13989	47.2	6.7	-96.5	633.9

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG4
Field Personnel: TK, JB
Sampling date: 3-7-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.8
Clock time of sample: 10:15
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used:
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.09		19.06							
9:12	↓		19.09	44.9	7.3	9061	2.81	41.3	121.5	635.9
9:17			19.11	44.8	7.3	9049	1.18	41.1	122.5	635.9
9:22			19.15	45.7	7.4	9150	.93	42.6	123.5	635.9
9:27			19.17	46.2	7.4	9239	.99	43.2	124.2	635.8
9:32	↓		19.19	46.3	7.4	9246	.885	41.9	123.4	635.8

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: PZ-212/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 183244

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Sample Receipt Conditions: UPS
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: NB

Aq-1296, M-1264

23C0713 Radson 23C0715

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED														Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. PZ-212 (FA-DG5)	3-7-23	15:08	Water			X	X	X	X	X	X	X	X	X										
-02	2. BA-DG4	3-7-23	10:15	Water			X	X	X	X	X	X	X	X	X										
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 3.1

Special Instructions: * Ba,B,Ca,Co,Li,Mo,Mg,K,Na ** Sb,As,Be,Cd,Cr,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 3/8/23 11:00	Received by: [signature]	Date/Time 3/8/23 11:00am
Relinquished by: [signature]	Date/Time 3/8/23 3:00pm	Received by: [signature]	Date/Time 3/9/23 11:00
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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UPS NEXT DAY AIR
TRACKING #: 1Z 849 747 01 636

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: (PZ-212) FA-DG5
Field Personnel: T Keller, J Besel
Sampling date: 4-11-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.50
Clock time of sample: 13:36
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: DG5 (PZ-212)
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.075		30.08							
12:58	↓		30.02	61.6	7.2	16140	38.0	12.0	-135.8	635.1
13:03			30.03	61.6	7.1	16223	41.3	9.3	-137.4	635.0
13:08			30.07	62.4	7.1	16350	43.1	9.0	-140.5	635.0
13:13			30.08	62.5	7.1	16369	47.4	8.2	-141.2	634.9

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG1
Field Personnel: TK, JB
Sampling date: 5-1-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 0.75
Clock time of sample: 09:00
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: ~~FA-UG1~~ Plastic
Sample bottle(s) identification number used: FA-UG1
Was a blind sample obtained at this well (circle): (Yes) ~~No~~

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.05		35.12							
8:42	↓		35.12	57.9	7.90	1422	1.31	48.9	85.1	629.5
8:47			35.12	59.2	7.9	1460	0.66	39.9	83.4	629.5
8:52			35.12	59.6	7.9	1480	0.62	37.6	81.2	629.5

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG2
Field Personnel: TK, SB
Sampling date: 5-1-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.88
Clock time of sample: 13:15
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-UG2
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.125		24.31							
12:58			24.31	58.0	6.8	13623	1.92	13.0	60.7	628.6
13:03			24.31	57.8	6.8	13601	~~3.70~~ 2.17	8.6	54.7	628.5
13:08			24.31	58.0	6.8	13653	1.39	7.1	49.6	628.4

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA - DG2
Field Personnel: TK, SB
Sampling date: 5-1-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 0.90
Clock time of sample: 15:05
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA - DG2
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.06		30.76							
13:58			30.86	68.4	9.0	16539	0.54	31.4	27.8	628.1
14:03			30.88	65.1	9.0	15431	0.79	19.2	23.0	628.0
14:08			30.89	70.4	9.0	16498	0.72	19.1	22.5	627.9

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG3
Field Personnel: TK, JB
Sampling date: 5-2-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.05
Clock time of sample: 13:45
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG3
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.07		29.18							
13:22	↓		29.13	62.1	8.6	4624	0.90	60.3	63.8	630.4
13:27			29.10	64.8	8.6	4815	0.53	42.2	61.7	630.3
13:32			29.09	68.0	8.6	4993	0.71	40.4	60.3	630.3

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG4
Field Personnel: TK, JB
Sampling date: 5-2-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.40
Clock time of sample: 15:05
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG4
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.07		30.34							
14:30	↓		30.33	67.1	7.4	10443	0.74	18.1	73.7	630.1
14:35			30.31	69.1	7.5	10694	0.53	16.4	67.0	630.1
14:40			30.31	70.2	7.5	10815	0.40	15.6	60.8	630.0
14:45	↓		30.31	69.2	7.5	10764	0.35	15.5	54.6	630.0

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: "QA" took from FA-UG1
Field Personnel: TK, JB
Sampling date: 5-1-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): -
Clock time of sample: 10:00
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: CCR-QA DUP
Was a blind sample obtained at this well (circle): *Yes* *No*

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

- See FA-UG1 for info -

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Spring Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*

~~Page 1/2~~
LO 5/4/23

Please fill out the fields highlighted in light blue.

01-06 AQ 1296 M 1279

Sample Receipt Conditions:

- ( ) Custody Seals Present
- (✓) Containers Intact
- ( ) COC and Labels Match
- (✓) Received on Ice
- (✓) Correct Containers
- (✓) COC Included
- (✓) COC Complete
- ( ) Sufficient Sample Volume
- ( ) Headspace Present (VOC)
- ( ) Temperature Blank
- (✓) Received within Hold

Checked by: LO

23E0458

Lab Use Only	CLIENT SAMPLE INFORMATION					TDS	Anions: Cl, F, SO4	ICP Metals: B,Ca	Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine				Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-UG1	5-1-23	09:00	Water		X	X	X				
02	2. FA-UG2	5-1-23	13:15	Water		X	X	X				
03	3. FA-DG2	5-1-23	15:05	Water		X	X	X				
04	4. FA-DG3	5-2-23	13:45	Water		X	X	X				
05	5. FA-DG4	5-2-23	15:05	Water		X	X	X				
	6. BA-UG1			Water		X	X	X				
	7. BA-DG1			Water		X	X	X				
	8. BA-DG2			Water		X	X	X				
	9. BA-DG3			Water		X	X	X				
06	10. CCR - QA Dup	5-1-23	10:00	Water		X	X	X				

Sampled by: [print] Trenton Keller Sampled by: [signature] Trenton Keller

ON ICE NOT ON ICE Temp (C°): 6.6

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Trenton Keller	5-3-23 12:45		5/3/23 12:45 pm
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			5/4/23 1215
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agrees to pay collection costs and attorney's fees.

UPS 1Z849747016589

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-UG1
Field Personnel: TK JB
Sampling date: 5-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.40
Clock time of sample: 09:10
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-UG1
Was a blind sample obtained at this well (circle): Yes (~~No~~)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.07		34.79				1.73			
8:28	"		34.81	55.3	7.0	15269	~~2.44~~	32.3	177.8	634.7
8:33	"		34.82	55.5	6.9	15299	1.80	23.0	177.8	634.7
8:38	"		34.82	55.8	6.9	15311	1.75	20.4	176.6	634.7
8:43	"		34.83	56.4	6.9	15455	1.63	18.9	175.0	634.7

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA - DG 1
Field Personnel: TK, SB
Sampling date: 5-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 2.25
Clock time of sample: 13:31
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG 1
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.09		14.51							
12:57	↓		14.51	60.4	7.3	9903	0.75	33.0	101.4	633.2
13:02			14.50	60.6	7.2	10126	0.58	14.5	91.0	633.1
13:07			14.50	61.0	7.1	10228	0.44	9.3	84.3	633.0
13:12			14.50	61.3	7.1	10287	0.31	7.3	80.0	632.9
13:17	↓		14.50	61.9	7.1	10350	0.46	6.2	74.8	632.8

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG2
Field Personnel: TK, JB
Sampling date: 5-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): .90
Clock time of sample: 10:57
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG2
Was a blind sample obtained at this well (circle): Yes (NO)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.06		15.92							
10:35	"		15.94	56.9	7.1	10453	0.51	25.1	109.3	634.7
10:40	"		15.95	56.9	7.1	10438	0.38	20.7	108.3	634.6
10:45	"		15.96	56.9	7.1	10445	0.34	18.5	108.7	634.6

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA - DG3
Field Personnel: TK, OB
Sampling date: 5-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 2.0
Clock time of sample: 10:17
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG3
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	.10		17.09							
9:40	↓		17.12	54.7	8.0	6340	.31	81.0	94.6	635.1
9:45			17.14	55.0	8.1	6475	.34	76.3	91.1	635.1
9:50			17.15	54.8	8.1	6172	.25	75.5	87.3	635.0
9:55			17.17	54.8	8.1	6207	.31	75.7	84.4	635.0

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: NEP
Field Personnel: TK, JB
Sampling date: 5-8-23
Well condition: N/A
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): N/A
Clock time of sample: 14:25
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: NEP
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
					8.5					

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Spring Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Ag 1296, MR279

Sample Receipt Conditions:

(X) Custody Seals Present
(X) Containers Intact
(X) COC and Labels Match
(X) Received on Ice
(X) Correct Containers
(X) COC Included
(X) COC Complete
(X) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(X) Received within Hold
Checked by: A

23E0859

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		TDS	Anions: Cl, F, SO4	ICP Metals: B,Ca												Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
	1. FA-UG1			Water			X	X	X															
	2. FA-UG2			Water			X	X	X															
	3. FA-DG2			Water			X	X	X															
	4. FA-DG3			Water			X	X	X															
	5. FA-DG4			Water			X	X	X															
01	6. BA-UG1	5/8/23	09:10	Water			X	X	X															
02	7. BA-DG1	5/8/23	13:31	Water			X	X	X															
03	8. BA-DG2	5/8/23	10:57	Water			X	X	X															
04	9. BA-DG3	5/8/23	10:17	Water			X	X	X															
05 5/8/23	10. CCR - QA Dup			Water			X	X	X															

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 0.5

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	5/9/23 13:01		5/9/23 13:01
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			5/10/23 1034
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
9632 South 500 West
Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

UPS: 1Z8497470164096905

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Spring Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Page 2/2

Sample Receipt Conditions: Ag 1296, M1279

- (Y) Custody Seals Present
- (Y) Containers Intact
- (Y) COC and Labels Match
- (Y) Received on Ice
- (Y) Correct Containers
- (Y) COC Included
- (Y) COC Complete
- (Y) Sufficient Sample Volume
- ( ) Headspace Present (VOC)
- ( ) Temperature Blank
- ( ) Received within Hold

Checked by: AV

23E08668

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	TDS	Anions: Cl, F, SO4	ICP Metals: B, Ca, Mg, K, Na													Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	11. NEP	5/8/23	14:25	Water		X	X	X	X																
	2.																								
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 0.5

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 5/9/23 13:01	Received by: [signature]	Date/Time 5/9/23 13:01
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 5/10/23 1030
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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UPS: 1Z 849 747 01 6409 6905

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: Duplicate (took from FA-DG5)
Field Personnel: TK, JB
Sampling date: 5-21-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 11:20
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: Duplicate
Was a blind sample obtained at this well (circle): *Yes* *No*

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

→ See FA-DG5

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG4
Field Personnel: TK, JB
Sampling date: 5-21-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 2.25
Clock time of sample: 14:57
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG4
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
13:03	.09		19.02							
13:08			19.08	61.7	7.6	11306	.79	34.4	40.4	636.1
13:13			19.10	64.1	7.6	11650	.68	27.5	37.7	636.0
13:18			19.12	67.6	7.5	12194	.74	23.1	38.1	635.9
13:23			19:14	69.6	7.5	12533	.46	16.6	37.4	635.9
13:28			19.16	69.4	7.5	12540	.64	13.3	35.3	635.9

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG5
Field Personnel: TK, SB
Sampling date: 5-21-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 2.55
Clock time of sample: 10:00
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG5
Was a blind sample obtained at this well (circle): (Yes) No
Note: If yes, label the blind sample "CCR-QA".
Additional Notes: "Duplicate"

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
8:35	.07		30.20							
8:40	↑		30.19	60.9	7.5	16326	28.1	29.9	-120.8	636.7
8:45			30.19	61.9	7.4	16595	35.0	25.3	-154.6	636.6
8:50	↓		30.19	62.4	7.3	16790	34.8	21.1	-161.8	636.7
8:55	0.05		30.16	62.7	7.2	16915	22.4	15.0	-171.1	636.6
9:00	0.05		30.10	62.8	7.2	16946	12.9	12.4	-184.3	636.6
9:05	0.05		30.10	63.2	7.1	17027	7.54	9.4	-187.7	636.6
9:10	0.05		30.10	63.5	7.0	17098	5.30	7.5	-196.0	636.6
9:15	0.05		30.09	63.9	7.0	17179	6.3	7.3	-198.5	636.6
9:20	0.05		30.08	63.9	7.0	17253	9.58	6.6	-200.4	636.5

(Shipping Rad. samples in another box)

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

UPS: 1Z8497470164843937

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AT

23E1866

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED															Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5	5-21-23	10:00	Water		X	X	X	X	X	X	X	X	X										
02	2. BA-DG4	5-21-23	14:57	Water		X	X	X	X	X	X	X	X	X										
03	3. Duplicate	5-21-23	11:20	Water		X	X	X	X	X	X	X	X	X										
	4.																							
	5.																							
	6.																							
	7.																							
	8.																							
	9.																							
	10.																							

Ag - 1296 M - 1303

Sampled by: [print] Trenton Keller Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 1.9

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 5/22/23 12:20	Received by: [signature] Ryan Dockery	Date/Time 5/22/23
Relinquished by: [signature]	Date/Time	Received by: [signature] AJ Wade Teel	Date/Time 5/23/23 1000
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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Sandy, UT 84070

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DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG 1
Field Personnel: TK, JB
Sampling date: 6-28-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.13
Clock time of sample: 14:28
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG1
Was a blind sample obtained at this well (circle): (Yes) No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
1:47	.075		14.64							
1:52	.075		14.66	71.0	7.4	11523	0.44	15.0	68.3	632.7
1:97	.075		14.66	76.2	7.4	12339	1.46	11.9	60.5	632.7
2:02	.075		14.65	80.0	7.3	12874	1.15	11.3	51.1	632.6

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA - PG3
Field Personnel: TK JB
Sampling date: 6-28-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): ~~Yes~~ No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.35
Clock time of sample: N/A
Lab's name sample(s) are being sent to: N/A
Type and size of sample bottles used: N/A
Sample bottle(s) identification number used: N/A
Was a blind sample obtained at this well (circle): Yes (No)
Note: If yes, label the blind sample "CCR-QA".
Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
1:19	.09		17.22							
1:24	.09		17.23	65.5	8.2	7147	0.91	57.8	23.7	632.8
1:29	.09		17.23	67.3	8.2	7345	1.76	57.3	25.1	632.8
1:34	.09		17.24	66.5	8.2	7212	1.12	56.4	25.1	632.8

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG5
Field Personnel: TK JB
Sampling date: 6-28-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 4.8
Clock time of sample: 10:47
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG5
Was a blind sample obtained at this well (circle): ~~Yes~~ No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
8:36	.09		30.31							
8:41	.09		30.30	62.6	7.5	16718	239	19.9	-37.8	633.0
8:46	.09		30.25	64.2	7.3	17084	132	15.4	-128.1	633.0
8:51	.09		30.12	65.3	7.2	17388	69.1	14.7	-160.6	633.0
8:56	.09		30.12	66.0	7.2	17575	49.5	14.6	-169.5	633.0
9:01	.09		30.13	65.6	7.2	17524	38.6	13.1	-186.1	633.0
9:06	.07		30.13	65.3	7.2	17448	24.2	12.2	-187.5	632.9
9:11	.07		30.12	64.9	7.2	17375	21.0	13.7	-190.9	633.0
9:16	.07		30.12	65.7	7.1	17514	18.7	10.9	-190.3	633.0
9:21	.07		30.11	66.0	7.2	17596	16.0	15.6	-191.7	633.0
9:26	.09		30.11	66.5	7.2	17679	12.4	12.8	-192.4	633.0
9:31	.07		30.11	67.4	7.2	17765	11.9	17.6	-189.7	632.9
9:36	.07		30.12	68.0	7.2	17969	12.9	17.1	-188.1	632.9

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG4
Field Personnel: TK JB
Sampling date: 6-28-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): ~~Yes~~ *No*
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.20
Clock time of sample: 16:07
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG4
Was a blind sample obtained at this well (circle): *Yes* (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
3:34	.08		30.49							
3:39	.08		30.49	72.1	7.6	12176	0.35	18.2	42.2	630.7
3:44	.08		30.48	71.9	7.6	12084	0.43	11.7	34.4	630.8
3:49	.08		30.48	71.0	7.6	11846	0.54	11.4	25.9	630.7

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: Duplicate (took from BA-DG1)
Field Personnel: TK, JB
Sampling date: 6-28-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): —
Clock time of sample: 14:58
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: Duplicate
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

See BA-DG1 6-28-23

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)

UPS 1Z 849 747 01 6509 6136

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: Round 6/Resamples
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Ap1282 M covered Ag covered Ag1238

Sample Receipt:

(X) Custody Seals
(X) Containers Intact
(X) COC/Labels Linked
(X) Received on Ice
(X) Correct Containers
(X) COC Included
(X) COC Complete
(X) Sample Volume OK
( ) Headspace Present (VOC)
( ) Temp Blank
(X) Within Hold Time

Checked by: JV

23F2445

Lab Use Only						TESTS REQUESTED																Bacteria			
					: Residual Chlorine		Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228							Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5	6-28-23	10:47	Water			X	X	X	X	X	X	X	X	X										
02	2. BA-DG1 Resample	6-28-23	14:28	Water				X																	
03	3. FA-DG4 Resample	6-28-23	16:07	Water				X																	
04	4. Duplicate	6-28-23	14:58	Water				X																	
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller Sampled by: [signature] Trenton Keller

ON ICE NOT ON ICE Temp (C°): 1.8

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Trenton Keller	6-29-23 12:52	Ryan Addamey	6/29/23 1:05pm
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			06/30/23 1202
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Sandy, UT 84070

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DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DGS
Field Personnel: TK SB
Sampling date: 8-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.35
Clock time of sample: 09:48
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DGS
Was a blind sample obtained at this well (circle): (Yes) No
Note: If yes, label the blind sample "CCR-QA".
Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
08:53	.09		30.40							
08:58	.09		30.41	66.1	7.2	17445	5.99	17.0	-144.4	634.1
09:03	.09		30.43	65.6	7.2	17419	6.43	9.1	-157.2	634.2
09:08	.09		30.44	65.9	7.2	17411	6.97	7.9	-161.0	634.2

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG4
Field Personnel: TK, JB
Sampling date: 8-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 1.50
Clock time of sample: 14:17
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG4
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
13:30	.10		19.08							
13:35	.10		19.13	65.4	7.6	11876	2.37	18.6	28.2	634.8
13:40	.10		19.17	68.7	7.6	12280	4.42	21.6	24.2	634.7
14:45	.10		19.21	73.4	7.6	12963	1.80	10.5	23.6	634.6

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: Duplicate (took from FA-DG5)
Field Personnel: TK, JB
Sampling date: 8-8-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): -
Clock time of sample: 10:34
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: Duplicate
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

See FA-DG5

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	X									

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

23H0944 Radium on 23H0938

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228								Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
-01	1. FA-DG5	8-8-23	09:48	Water		X	X	X	X	X	X	X	X	X											
-02	2. BA-DG4	8-8-23	14:17	Water		X	X	X	X	X	X	X	X	X											
-03	3. Duplicate	8-8-23	10:34	Water		X	X	X	X	X	X	X	X	X											
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: DB

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 3.3

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

M 1303
AQ 1296
AG 1240

	Date/Time		Date/Time
Relinquished by: [signature]	8-9-23 12:45	Received by: [signature] Hunter	8/9/23 12:49
Relinquished by: [signature]		Received by: [signature] Denise Brun	8/10/23 8:20
Relinquished by: [signature]		Received by: [signature]	

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UPS NEXT DAY AIR EARLY
TRACKING #: 1Z 849 747 15 6356 6865

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG2
Field Personnel: TK
Sampling date: 10-24-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 10:05
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG 2
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
09:43	.075		31.06							
09:48	.075		31.08	58.0	9.1	14487	.70	19.2	110.9	632.2
09:53	.075		31.11	58.4	9.1	14562	.59	14.7	100.3	632.2
09:58	.075		31.14	59.3	9.1	14766	.53	12.1	87.9	632.1

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG5
Field Personnel: TK, JB
Sampling date: 10-16-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 11:11
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG5
Was a blind sample obtained at this well (circle): (Yes) No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
09:14	.075		30.79							
09:19	.075		30.74	55.8	8.0	16002	13.9	34.7	-49.3	641.8
09:24	.075		30.72	57.4	7.8	16212	9.2	33.4	-48.0	641.8
09:29	.075		30.69	57.0	7.5	16109	9.02	17.4	-124.7	641.7
09:34	.075		30.65	57.2	7.4	16169	8.62	12.7	-136.7	641.7
09:39	.045		30.64	57.5	7.3	16222	9.25	12.0	-143.0	641.7
09:44	.045		30.63	57.6	7.3	16257	9.74	15.9	-142.3	641.7

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG4
Field Personnel: TK, JB
Sampling date: 10-16-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 14:25
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG4
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
13:22	.09		19.32							
13:27	.09		19.38	62.4	7.6	11905	.88	25.3	56.1	640.5
13:32	.07		19.41	63.2	7.5	12007	.74	15.9	48.5	640.4
13:37	.07		19.44	63.7	7.5	12101	.73	13.0	42.4	640.4

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: Duplicate (took from FA-DG5)
Field Personnel: TK, JB
Sampling date: 10-16-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): —
Clock time of sample: 12:15
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: Duplicate (FA-DG5/BA-DG4)
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: See FA-DG5

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
	X									

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: FA-DG5/BA-DG4
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #: 185318

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Please fill out the fields highlighted in light blue.

2301774

UPS 1Z 849 747 01 6543 8552

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Chloride	Fluoride	Sulfate	TDS	Mercury	Metals by EPA 200.7 *	Metals by EPA 200.8 **	Radium-226	Radium-228								Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
01	1. FA-DG5	10-16-23	11:11	Water		X	X	X	X	X	X	X	X	X											
02	2. BA-DG4	10-16-23	14:25	Water		X	X	X	X	X	X	X	X	X											
03	3. Duplicate (FA-DG5/BA-DG4)	10-16-23	12:15	Water		X	X	X	X	X	X	X	X	X											
	4.										* Per History														
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sample Receipt Conditions:

( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
(✓) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AW

AQ 1272
M 1325

Sampled by: [print] Trenton Keller
Sampled by: [signature]

Special Instructions: * Ba,B,Ca,Li,Mo ** Sb,As,Be,Cd,Cr,Co,Pb,Se,Tl

ON ICE NOT ON ICE Temp (C°): 2.1

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	10-19-23 10:35	Ryan Hastings	10/19/23 10:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			10/20/23 12:10
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: NEP
Field Personnel: TK, JB
Sampling date: 10-17-23
Well condition: N/A
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): N/A
Clock time of sample: 15:55
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: NEP
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes: _____

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
					8.5					

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA - UG1
Field Personnel: TK, JB
Sampling date: 10-18-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 11:56
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-UG1
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
10:41	.065		34.92							
10:46	.065		34.93	63.9	7.2	17097	.89	28.6	170.5	638.7
10:51	.065		34.95	64.5	7.2	17308	.90	26.7	167.6	638.7
10:56	.065		34.96	64.2	7.1	17245	.87	22.2	163.1	638.6

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG1
Field Personnel: TK, JB
Sampling date: 10-17-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 15:28
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG1
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
13:56	.06		14.93							
14:01	.06		14.94	66.4	7.4	11396	.63	16.6	48.3	635.8
14:06	.06		14.94	67.9	7.4	11671	.63	20.2	42.6	635.8
14:11	.06		14.95	68.1	7.4	11742	.33	22.7	34.0	635.8

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG2
Field Personnel: TK, JB
Sampling date: 10-17-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 12:40
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG2
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
11:35	.075		16.29				~~50~~			
11:40	.075		16.29	62.6	7.3	11879	.50	17.9	64.8	637.7
11:45	.075		16.29	63.5	7.2	12077	.61	13.8	56.1	637.8
11:50	.075		16.29	63.6	7.2	12108	.32	13.1	51.0	637.8

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: BA-DG3
Field Personnel: TK, JB
Sampling date: 10-17-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): *Yes* *No*
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 10:27
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: BA-DG3
Was a blind sample obtained at this well (circle): *Yes* ~~No~~
Note: If yes, label the blind sample "CCR-QA".
Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
9:27	.07		17.55							
9:32	.07		17.54	57.2	8.1	6647	.27	47.7	78.9	638.5
9:37	.07		17.54	58.0	8.2	6730	.16	35.1	72.1	638.5
9:42	.07		17.54	58.9	8.1	6799	.21	32.8	66.3	638.5
9:47	.07		17.54	59.2	8.1	6668	.16	30.9	61.8	638.4

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG4
Field Personnel: TK
Sampling date: 10-24-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): *Yes* *No*
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 11:48
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG4
Was a blind sample obtained at this well (circle): *Yes* *No*

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
11:25	.10		30.90							
11:30	.10		30.90	59.3	7.7	10200	0.90	25.2	72.6	631.8
11:35	.10		30.89	58.6	7.6	10099	0.31	10.4	68.3	631.9
11:40	.10		30.89	58.8	7.6	10085	1.23	9.4	63.5	632.0

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG3
Field Personnel: TK
Sampling date: 10-24-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 13:22
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG3
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
13:02	.06		29.39							
13:07	.06		29.41	64.0	8.7	4849	1.02	68.4	59.2	630.9
13:12	.06		29.44	63.9	8.7	4970	0.84	62.4	56.7	630.8
13:17	.06		29.49	61.6	8.7	4958	0.57	63.4	55.0	630.8

DESERET POWER
ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG2
Field Personnel: TK, JB
Sampling date: 10-18-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): ~~Yes~~ No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 15:24
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-UG2
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters: Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
14:47	.120		24.54							
14:52	.120		24.54	60.9	7.0	14805	2.51	6.8	51.4	636.5
14:57	.120		24.53	60.7	7.0	14751	2.43	5.3	47.2	636.4
~~15:02~~	.120		24.53	60.4	7.0	14660	1.93	4.9	42.3	636.4
15:02										

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-UG1
Field Personnel: TK, JB
Sampling date: 10-18-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 14:13
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-UG1
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
13:01	.095		35.40							
13:06	.095		35.40	63.5	8.2	1685	1.09	28.8	60.4	636.9
13:11	.095		35.41	64.8	8.2	1730	.42	19.7	57.3	636.9
13:16	.095		35.41	65.5	8.2	1748	.24	16.4	54.7	636.9
13:21	.07		35.41	65.4	8.2	1752	.92	15.5	51.2	636.9

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: Duplicate (CCR) (took from BA-DG3)
Field Personnel: TK, JB
Sampling date: 10-17-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): Yes No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): ~
Clock time of sample: 11:08
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: Duplicate (CCR)
Was a blind sample obtained at this well (circle): Yes No

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

→ See BA-DG3

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Fall Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Page 1/2

Please fill out the fields highlighted in light blue.

23J1775

UPS 1Z8497470160543855 2

Sample Receipt Conditions:
( ) Custody Seals Present
(✓) Containers Intact
(✓) COC and Labels Match
(✓) Received on Ice
(✓) Correct Containers
(✓) COC Included
(✓) COC Complete
( ) Sufficient Sample Volume
( ) Headspace Present (VOC)
( ) Temperature Blank
(✓) Received within Hold
Checked by: AK

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																		Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine		TDS	Anions: Cl, F, SO4	ICP Metals: B,Ca															Total Coliform + E. Coli	Total Coliform + E. Coli	HPC (Plate Count)	E. Coli Only
01	1. FA-UG1	10-18-23	14:13	Water			X	X	X																		
02	2. FA-UG2	10-18-23	15:24	Water			X	X	X																		
~~03~~	3. FA-DG2			Water			X	X	X																		
~~04~~	4. FA-DG3			Water			X	X	X																		
~~05~~	5. FA-DG4			Water			X	X	X																		
03 ~~06~~	6. BA-UG1	10-18-23	11:56	Water			X	X	X																		
04 ~~07~~	7. BA-DG1	10-17-23	15:28	Water			X	X	X																		
05 ~~08~~	8. BA-DG2	10-17-23	12:40	Water			X	X	X																		
010 09	9. BA-DG3	10-17-23	10:27	Water			X	X	X																		
07 ~~10~~	10. Duplicate - CCR	10-17-23	11:08	Water			X	X	X																		

AQ 1272
M 1325

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 2.0

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time 10-19-23 10:35	Received by: [signature]	Date/Time 10/19/23 10:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time 10/20/23 12:10
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD
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Sandy, UT 84070

801.262.7299 PHONE
866.792.0093 FAX
www.chemtechford.com

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CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Deseret Power Electric Cooperative
ADDRESS: 12500 East 25500 South
CITY/STATE/ZIP: Vernal, UT 84078-8525
PHONE #: 435-781-5706 FAX
CONTACT: Tyler Esplin PROJECT: 2023 CCR Fall Sampling
EMAIL: tesplin@deseretpower.com

BILLING ADDRESS:
BILLING CITY/STATE/ZIP:
PURCHASE ORDER #:

CHEMTECH-FORD LABORATORIES

TURNAROUND REQUIRED:*
* Expedited turnaround subject to additional charge

Page 2/2

Please fill out the fields highlighted in light blue.

23J1775

Lab Use Only	CLIENT SAMPLE INFORMATION					TESTS REQUESTED																Bacteria			
	LOCATION / IDENTIFICATION	DATE	TIME	MATRIX	Field: Residual Chlorine	Alkalinity	TDS	Anions: Cl, F, SO4	ICP Metals: B, Ca, Mg, K, Na													Total Coliform + E. coli (Present/Absent)	Total Coliform + E. coli (Enumerated)	HPC (Plate Count)	E. Coli Only
08 H	11. NEP ✓	10-17-23	15:55	Water		X	X	X	X																
	12.																								
	3.																								
	4.																								
	5.																								
	6.																								
	7.																								
	8.																								
	9.																								
	10.																								

Sampled by: [print] Trenton Keller
Sampled by: [signature]

ON ICE NOT ON ICE Temp (C°): 2.0

Special Instructions:

Samples received outside the EPA recommended temperature range of 0-6 C° may be rejected.

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
	10-19-23 10:35	Ryan Hardaway	10/19/23 10:45
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
			10/20/23 12:10
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

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Sandy, UT 84070

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866.792.0093 FAX
www.chemtechford.com

Payment Terms are net 30 days OAC. 1.5% interest charge per month (18% per annum). Client agress to pay collection costs and attorney's fees.

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG5
Field Personnel: TK, JB
Sampling date: 9-12-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters): 3.25
Clock time of sample: 11:10
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG5
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
8:54	.09		30.60							
8:59	.09		30.56	60.7	7.3	17115	31.1	11.6	-152.0	636.0
9:04	.07		30.54	61.7	7.3	17324	44.6	10.4	-153.3	636.0
9:09	.07		30.51	61.9	7.2	17362	40.7	10.1	-152.6	636.1
9:14	.07		30.50	62.9	7.2	17554	36.1	11.4	-151.1	636.1
9:19	.07		30.50	64.2	7.2	17865	31.1	12.1	-148.5	636.1
9:24	.06		30.50	65.0	7.2	18015	22.3	10.9	-143.9	636.1
9:29	.06		30.50	66.0	7.3	18267	19.9	9.9	-141.0	636.2
9:34	.06		30.49	66.9	7.3	18473	17.1	9.3	-141.7	636.2
9:39	.05		30.49	67.6	7.3	18612	16.3	8.6	-142.8	636.1
9:44	.05		30.51	68.0	7.3	18688	16.0	8.6	-143.6	636.2

DESERET POWER ELECTRIC COOPERATIVE

BONANZA POWER PLANT
CCR GROUNDWATER MONITORING WELLS
SAMPLING & ANALYSIS PROGRAM

Well number: FA-DG2
Field Personnel: TK
Sampling date: 10-24-23
Well condition: Good
Was the meter(s) calibrated prior to sampling (circle): (Yes) No
Water level, pre-pump installation (ft): N/A
Water level, post-pump installation (ft): N/A
Rate & direction of groundwater flow: N/A
Total volume of water pumped (Liters):
Clock time of sample: 10:05
Lab's name sample(s) are being sent to: CTF
Type and size of sample bottles used: Plastic
Sample bottle(s) identification number used: FA-DG 2
Was a blind sample obtained at this well (circle): Yes (No)

Note: If yes, label the blind sample "CCR-QA".

Additional Notes:

Clock Time	Purge Rate (l/min)	Total Purged Volume (Liters)	Water Depth (ft)	Key Indicator Parameters						
				Temp. (°F)	pH ±0.1	Conductivity ±3% (µS/cm)	Turbidity ±10% (NTU)	DO (%/mg/L)	ORP (mV)	BP (mmHg)
09:43	.075		31.06							
09:48	.075		31.08	58.0	9.1	14487	.70	19.2	110.9	632.2
09:53	.075		31.11	58.4	9.1	14562	.59	14.7	100.3	632.2
09:58	.075		31.14	59.3	9.1	14766	.53	12.1	87.9	632.1

Appendix B

Alternative Source Demonstrations (ASD), Bottom Ash Area Landfill, Bonanza Power Plant

Fall 2022 Alternative Source Demonstration (ASD)

resourceful. naturally.
engineering and environmental consultants

BARR

Technical Memorandum

To: Tyler Esplin, Deseret Power Electric Cooperative
From: Dale Kolstad, P.E., Barr Engineering Co.
Subject: Fall 2022 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant
Date: April 29, 2023
Project: 44241001.07 Bonanza Power Plant CCR Groundwater

1.0 Introduction

Deseret Power Electric Cooperative, Bonanza Power near Vernal, UT, has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule (40 CFR Parts 257 and 261).

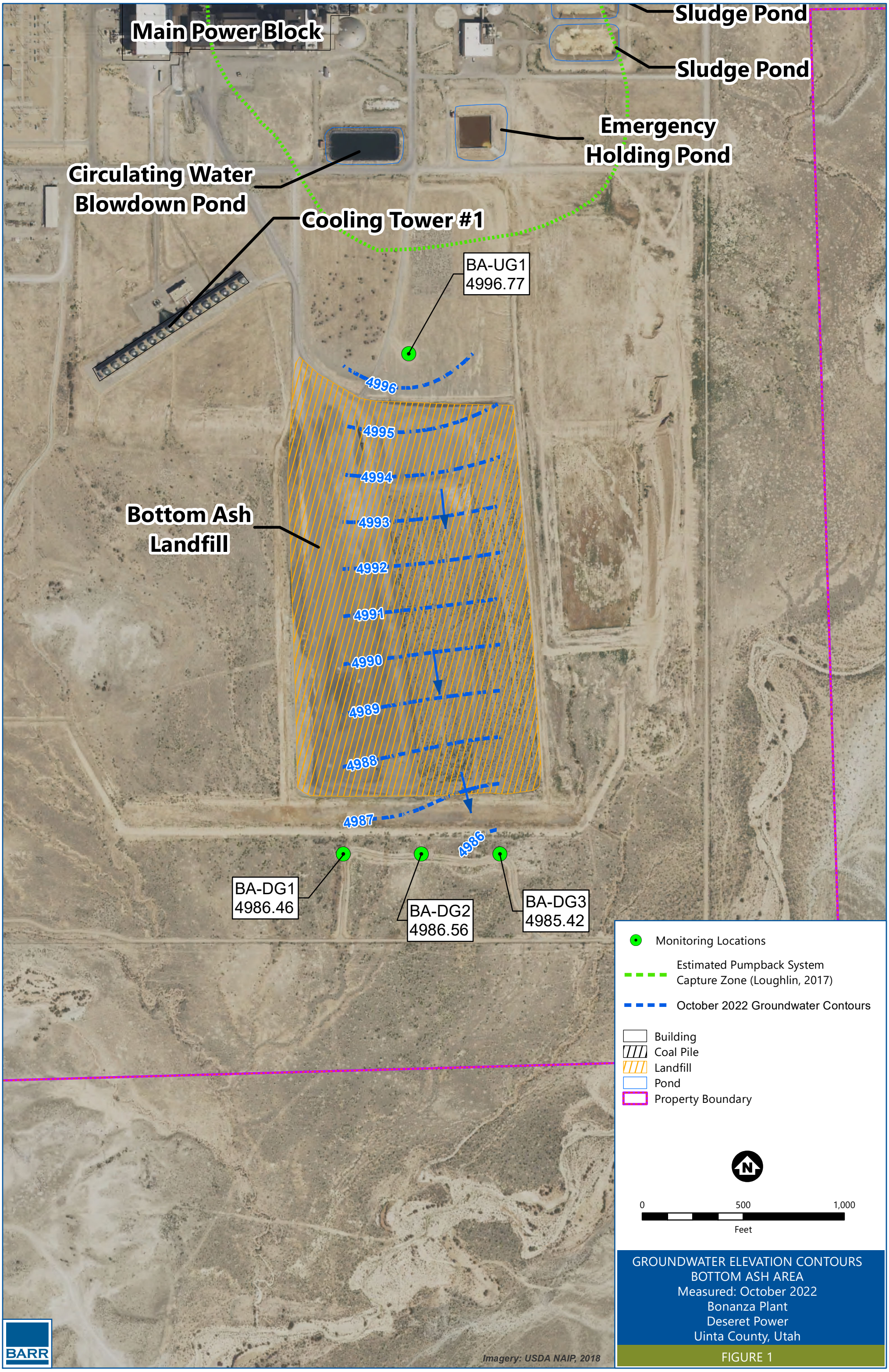
The fall 2022 detection monitoring event occurred on October 10-12 and 17, 2022. The final laboratory report was received on October 31, 2022. Potential statistically significant increases (SSIs) were identified for pH at wells BA-DG1 and BA-DG3 at the Bottom Ash (BA) Landfill Area. Verification resampling was conducted on December 7, 2022. SSIs were determined for pH at wells BA-DG1 and BA-DG3 on January 27, 2023 (Barr, 2023).

1.1 Purpose

This memorandum is intended to provide written documentation of a well-specific ASD for pH in wells BA-DG1 and BA-DG3. It also provides a certification of accuracy for this ASD as described in the CCR Rule (§257.94(e)(2)).

1.2 Background Information

Figure 1 shows the location of the monitoring well network and site features in the area around the BA Landfill (CCR Unit). The conceptual model for the site (Figure 1) consists of groundwater flowing from north to south under the BA Area. Details on the network and conceptual model of groundwater flow are included in the Groundwater Monitoring System Certification (Burns and McDonnell, 2017) and the Annual Review of Groundwater Levels (Loughlin, 2020).


Main Power Block
Sludge Pond
Sludge Pond
Emergency Holding Pond
Circulating Water Blowdown Pond
Cooling Tower #1
BA-UG1
4996.77
4996
4995
4994
4993
4992
4991
4990
4989
4988
4987
4986
Bottom Ash Landfill
BA-DG1
4986.46
BA-DG2
4986.56
BA-DG3
4985.42
Monitoring Locations
Estimated Pumpback System Capture Zone (Loughlin, 2017)
October 2022 Groundwater Contours
Building
Coal Pile
Landfill
Pond
Property Boundary
N
0
500
1,000
Feet
GROUNDWATER ELEVATION CONTOURS
BOTTOM ASH AREA
Measured: October 2022
Bonanza Plant
Deseret Power
Uinta County, Utah
FIGURE 1
BARR
Imagery: USDA NAIP, 2018

A comparison of the fall 2022 groundwater results with the prediction limits calculated using the baseline data is included in Table 1.

Table 1 Comparison of SSI Parameters with Prediction Limits

Well	Parameter (units)	Measured	Resample	Interwell PL	Intrawell PL
BA-DG1	pH	7.2	7.2	7.0 – 7.3	7.3 – 7.7
BA-DG3	pH	7.9	7.9	7.0 – 7.3	7.0 – 7.7

PL: Prediction Limit

The pH at BA-DG1 fell within the interwell prediction interval. Interwell limits are valid for the site because they are based on the background data from upgradient monitoring well BA-UG1, which is not directly downgradient of a CCR unit and is separated from other CCR units at the facility by a groundwater divide created by a pump-back system that maintains gradient control under the main power block in order to prevent subsidence (Figure 1; Loughlin Associates, 2017). Intrawell limits are also valid because there is no evidence of a previous release from the CCR Unit.

However, pH SSIs at the site have previously been evaluated using intrawell prediction limits due to the narrow range of pH values observed in the upgradient wells, which may yield interwell prediction limits that do not fully account for natural variability within the aquifer or for instrument uncertainty.

In addition, pH is subject to both upper and lower pH limits, as values on either side of the range may indicate changes to the groundwater. Because the two-sided intrawell prediction limits are applied, the lower than typical pH measurement at BA-DG1 is considered an SSI for the fall 2022 detection monitoring event.

Previous ASDs were completed for pH at BA-DG3 (Barr, 2021; Barr, 2022a; Barr, 2022b; Barr, 2023) that concluded that the elevated pH was due to a source other than the BA Landfill. This ASD reinforces the findings of those earlier ASDs.

1.3 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in §257.94(e) (2):

> *The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.*

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination (January 27, 2023).

1.4 Potential Alternative Sources Review

Based on the rule (above), there are five categories that we evaluated for this ASD. These include:

1. A source other than the CCR unit
2. Sampling (or sampling equipment) methods
3. Laboratory methods
4. Statistical methods
5. Natural variation in groundwater quality

The rule citation above pertaining to '*a source other than the CCR unit*' does not state that a specific source other than the CCR unit be identified. Therefore, this ASD does not identify the other source.

2.0 Lines of Evidence Supporting an ASD: pH at BA-DG1 and BA-DG3

As part of the ASD, site data was evaluated to identify potential causes for pH outside of the intrawell PL in monitoring wells BA-DG1 and BA-DG3. The following potential sources were selected for investigation:

- A source other than the CCR unit
- Natural variation in groundwater quality

A hypothesis was developed to evaluate the potential alternatives for the SSIs included in the rule and then tested against available data to determine if site data support the hypothesis as described in the following sections.

2.1 A source other than the CCR unit: BA-DG3

- Hypothesis: If the BA Landfill (the CCR Unit) is the source of a release to groundwater that caused the SSI for pH at BA-DG3, the expected concentrations of other parameters indicative of a CCR release should appear elevated in samples from BA-DG3 at about the same time.

- Analysis: While an increasing trend in pH is consistent with a release from a CCR Unit, the lack of a complementary suite of parameters is not consistent with a release. We evaluated the concentrations of other Appendix III parameters in BA-DG3 samples that correspond to the period when the increasing pH values were observed.

- Result: Concentrations of the other six Appendix III parameters indicated that other indicator parameters were present at concentrations that did not trigger SSIs and that were observed to have significantly decreasing trends. Decreasing trends for these parameters are the opposite of what would be expected if a pH increase were indicative of a release from the CCR Unit. Therefore, the hypothesis that the CCR Unit is the source of the elevated pH is rejected.

Discussion of Hypothesis

If the CCR Unit is the source of a release to groundwater that caused the SSI for pH at BA-DG3, increased concentrations of other parameters indicative of a CCR release should appear at about the same time. This is because the CCR Unit water would contain a mixture of the Appendix III parameters. Conversely, if concentrations in BA-DG3 are not elevated for the remaining Appendix III parameters, the hypothesis above would be rejected, leading to the conclusion that the SSI is not the result of a release from the CCR Unit.

Demonstration

Time-series plots of the Appendix III parameters are shown in Figure 2. Over the period of record, from 2016 to 2022, concentrations of all six parameters other than pH are significantly decreasing. These decreasing concentrations are not consistent with a release from the CCR Unit, which should show increasing trends. Therefore, a release is unlikely, and the cause for the SSI appears to be due to "a source other than" the CCR Unit. Since a specific source is not apparent at the site, the most likely cause is natural heterogeneity and variability of the aquifer, which is the expectation in most geologic environments (Freeze and Cherry, 1979).

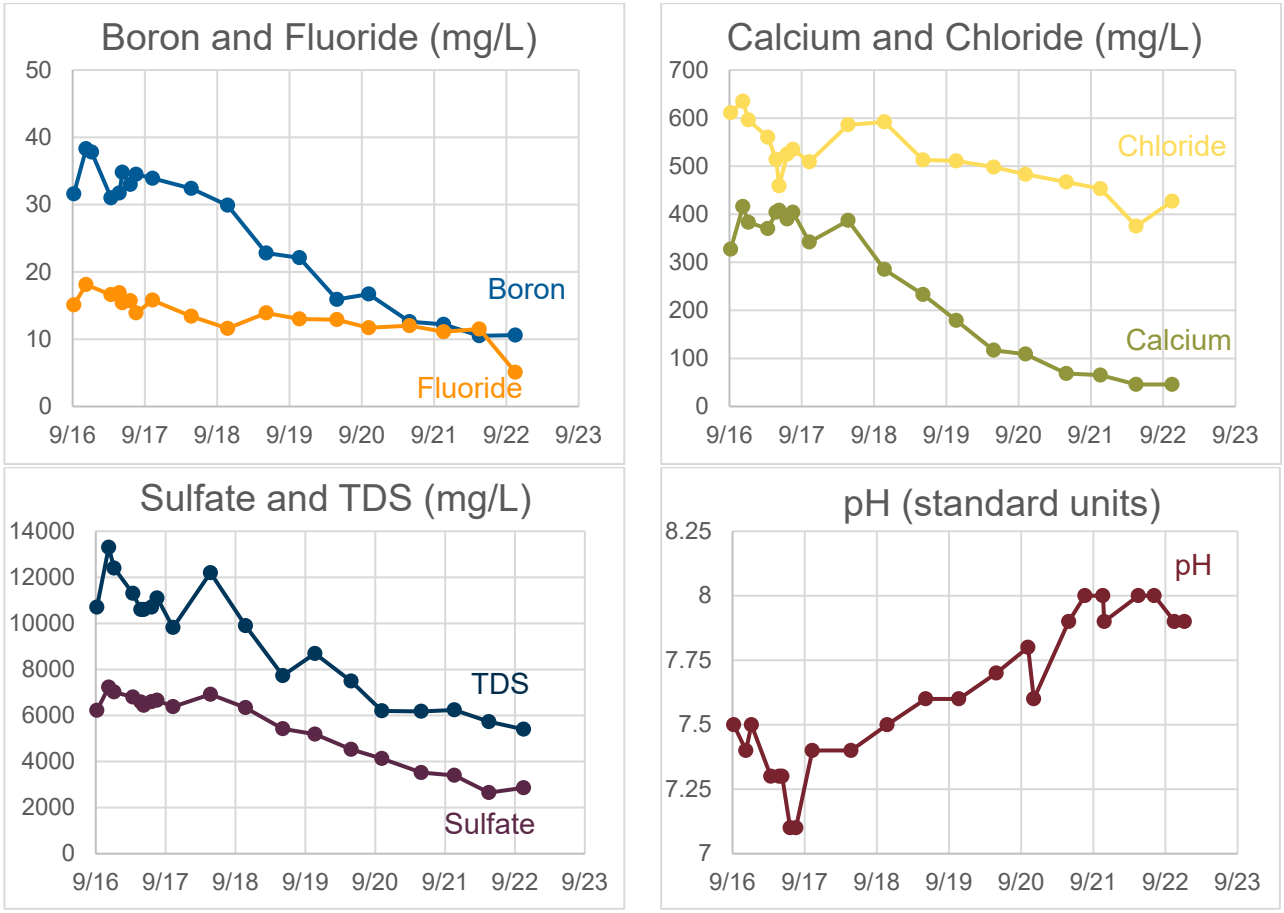


Figure 2 Time-series plots of Appendix III parameters at BA-DG3

2.2 A source other than the CCR unit: BA-DG1

- Hypothesis: If the BA Landfill (the CCR Unit) is the source of a release to groundwater that caused the SSI for pH at BA-DG1, the chemical evolution of BA-DG1 should be consistent with CCR influence.

- Analysis: Results from the Synthetic Precipitation Leaching Protocol (SPLP; EPA Method 1312) tests of CCR material were evaluated.

- Result: SPLP results show that CCR leads to an increase in pH, whereas pH at BA-DG1 (in contrast to BA-DG-3 above) has exhibited a decreasing trend and is significantly lower than background levels. A decreasing trend for pH is the opposite of what would be expected if a pH increase were indicative of a release from the CCR Unit. Therefore, the hypothesis that the CCR Unit is the source of the decreased pH is rejected.

Discussion of Hypothesis

CCR material is commonly alkaline, resulting in leachate with basic pH. A compilation of data from 42 CCR landfills found a median leachate pH of 10.5 (Kosson et al., 2009). Although direct leachate is not available from the CCR Units, a laboratory analysis was used to simulate potential leachate composition.

CCR samples were collected from the Fly Ash (FA) and BA landfills (the CCR Units) in 2019 (Barr, 2020). The samples were composites of material collected from two 90-foot borings at the FA Landfill and from the top 31 feet of a 40-foot boring at the BA Landfill. An additional sample from the bottom of the first FA Landfill boring was also collected. Because all of the coal burned at the facility has been mined from the same location historically (the Deserado Mine), variation in ash chemistry is not likely to be a significant concern. However, because there are likely to be minor changes in the coal seam over time and differences in annual precipitation and boiler operations over the span of years, the vertical composite samples allow for this variation to be accounted for in the analysis. The use of vertical rather than lateral composites is based on the assumption that variations in ash chemistry are most likely to be found over time rather than ash deposited laterally within the same year. The use of vertical composite samples allows for incorporation of a representative sample of ash from many different years of operation.

Demonstration

The samples were subjected to the SPLP test, in which the samples were mixed with a slightly acidic solution designed to simulate rainwater that might percolate through the ash. The liquid from this procedure was analyzed for the same parameters used to evaluate groundwater, including pH. The SPLP test uses a leaching solution at a pH of 5.0. The leachate from the four samples had pH values ranging from 8.59 to 9.56, with the bottom ash sample value being the highest. These results indicate that interaction between CCR from the BA Landfill and water percolating through the landfill is expected to increase the pH of the water.

The pH measured at BA-DG1 has exhibited a slight decreasing trend during the CCR monitoring program (Figure 3). As a result of this trend, the fall 2022 measurement was below the lower interwell prediction

limit calculated from data collected from 2016 through 2019. As noted above, a decreasing pH is not consistent with a release from the CCR Unit. Therefore, a release is unlikely, and the source of the pH SSI is not the CCR Unit.

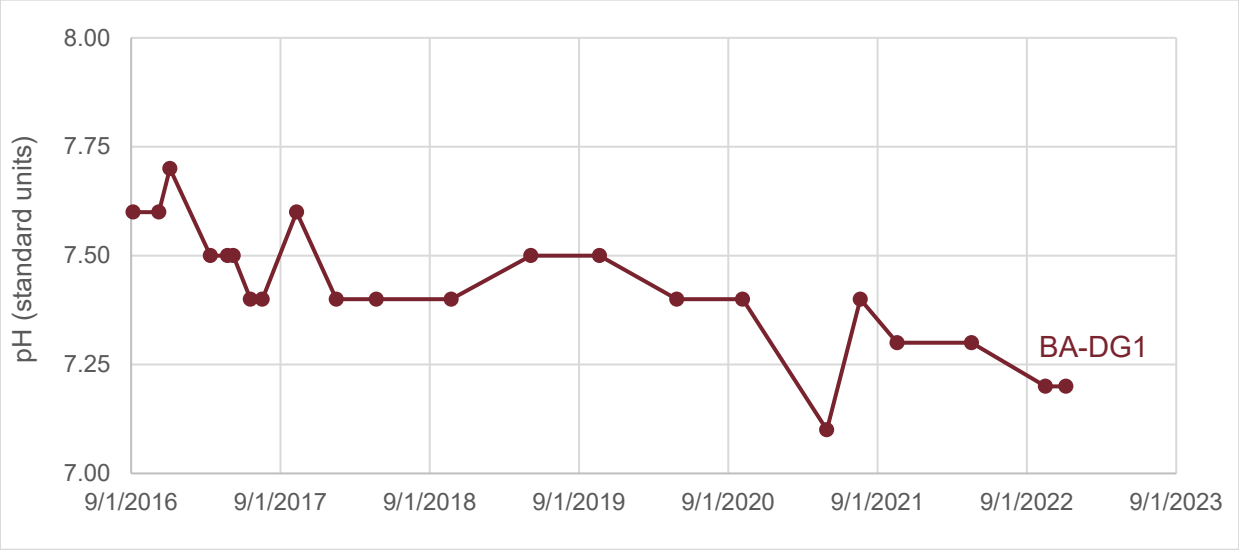


Figure 3 Time-series plot of pH at BA-DG1

2.3 Natural variation in groundwater quality: BA-DG1

- Hypothesis: The SSI for pH at BA-DG1 is consistent with background pH upgradient of the BA Landfill.
- Analysis: Monitoring data from upgradient well BA-UG1 were evaluated.
- Result: The pH at BA-DG1 is within the range observed at upgradient well BA-UG1 and other downgradient wells. Therefore, the hypothesis that the SSI is within background variability is accepted.

As noted in Section 1.2, the pH measured at BA-DG1 in fall 2022 fell within interwell prediction limits calculated from the upgradient well at the BA Landfill (BA-UG1) which are between 7.0 and 7.3. Although this statistical evaluation is not consistent with how pH has been evaluated statistically, it does indicate that lower pH values are consistent with background groundwater. Because the fall 2022 pH result at BA-DG1 is within the range of site background values, it is likely attributable to natural variability within the aquifer over time and not to a release from the CCR Unit.

3.0 Conclusion

The foregoing ASD establishes lines of evidence that meet the alternative source requirements of the CCR Rule §257.94(e)(2). The elevated pH in BA-DG3 is due to a source other than the CCR unit because all of the other parameters are decreasing in concentration, which is opposite of what would be expected if a presumed release from the CCR unit had occurred. The depressed pH in BA-DG1 is due to a source other than the CCR unit because it is decreasing in concentration, which is opposite of what would be expected

if a presumed release from the CCR unit had occurred, and because it is within the range of background variability observed at the site.

4.0 Certification

I certify that the written demonstration provided above are supported by the data that is accurate and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§257.94(e)(2)).

Dale Kolstad, P.E. (License #11117963-2202)
Barr Engineering Co.

5.0 References

Barr Engineering Co., 2020. Alternative Source Demonstration (ASD), Fly Ash Landfill Area, Bonanza Power Plant. Technical Memorandum from Jeff Davis to Tyler Esplin, May 19, 2021. Included as Appendix B in 2020 Annual Groundwater Monitoring and Corrective Action Report (January 2021).

Barr Engineering Co., 2021. Spring 2021 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant. Technical Memorandum from Jeff Davis to Tyler Esplin, November 30, 2021. Included as Appendix B in 2021 Annual Groundwater Monitoring and Corrective Action Report (January 2022).

Barr Engineering Co., 2022a. Fall 2021 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant. Technical Memorandum from Dale Kolstad to Tyler Esplin, May 4, 2022. Included as Appendix B in 2022 Annual Groundwater Monitoring and Corrective Action Report (January 2023).

Barr Engineering Co., 2022b. Spring 2022 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant. Technical Memorandum from Dale Kolstad to Tyler Esplin, November 4, 2022. Included as Appendix B in 2022 Annual Groundwater Monitoring and Corrective Action Report (January 2023).

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Burns & McDonnell, 2017. Groundwater Monitoring System Certification, Deseret Generation and Transmission Cooperative – Bonanza Power Plant, Vernal, Utah. Letter to Tyler Esplin from Block Andrews and Wayne Weber, October 12, 2017.

Freeze, R.A. and J.A. Cherry, 1979. Groundwater. Prentice Hall: Englewood Cliffs, NJ. 604 pp.

Kosson, D. S., F. Sanchez, P. Kariher, L. H. Turner, R. Delapp, and P. Seignette, 2009. Characterization of Coal Combustion Residues from Electric Utilities - Leaching and Characterization Data. U.S. Environmental Protection Agency, EPA/600/R-09/151, 2009.

Loughlin Water Associates, 2017. Bonanza Power Plant, Coal Combustion Residuals, Monitoring Well Installation Report. January 2017.

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Spring 2023 Alternative Source Demonstration (ASD)

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Technical Memorandum

To: Tyler Esplin, Deseret Power Electric Cooperative
From: Dale Kolstad, P.E., Barr Engineering Co.
Subject: Spring 2023 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant
Date: October 31, 2023
Project: 44241001.07 Bonanza Power Plant CCR Groundwater

1.0 Introduction

Deseret Power Electric Cooperative, Bonanza Power near Vernal, UT, has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule (40 CFR Parts 257 and 261).

The spring 2023 detection monitoring event occurred on May 1-2 and 8, 2023. The final laboratory report was received on May 23, 2023. Potential statistically significant increases (SSIs) were identified for pH at wells BA-DG1 and BA-DG3 and for fluoride at well BA-DG1 at the Bottom Ash (BA) Landfill Area. A potential SSI was identified for fluoride at well FA-DG4 at the Fly Ash (FA) Landfill Area. Verification resampling was conducted on June 28, 2023. SSIs were verified for pH at well BA-DG3 and fluoride at well FA-DG4 on August 21, 2023 (Barr, 2023).

1.1 Purpose

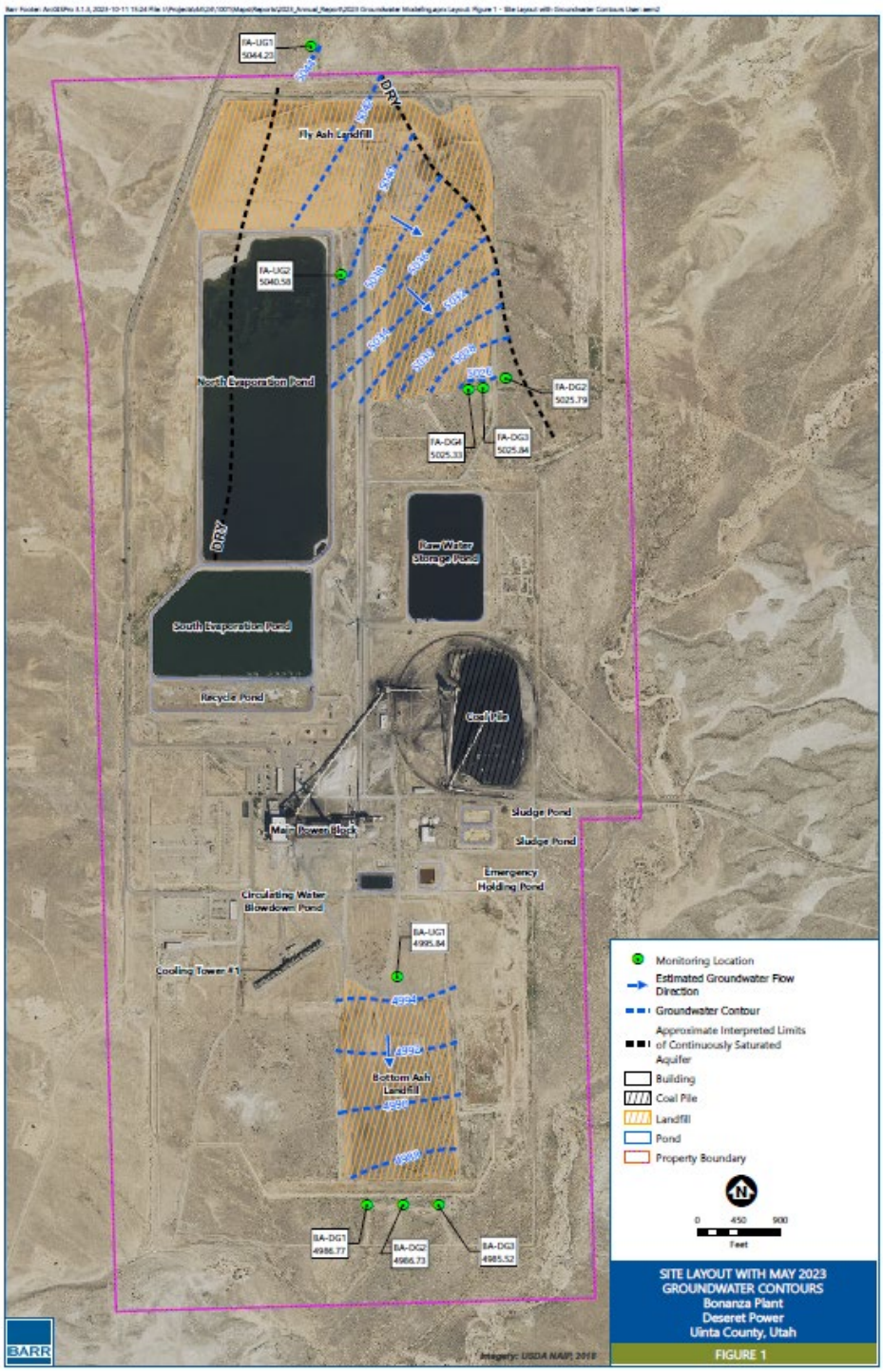
This memorandum is intended to provide written documentation of a well-specific Alternative Source Demonstration (ASD) for pH in well BA-DG3 and FA Landfill Area-wide ASD for fluoride (at all FA downgradient wells including at FA-DG4). It also provides a certification of accuracy for this ASD as described in the CCR Rule (§257.94(e)(2)).

1.2 Background Information

Figure 1 shows the location of the monitoring well networks and site features in the area around the two CCR Units, the BA Landfill and the FA Landfill. The conceptual model for the site in the FA Area consists of groundwater flowing from the northwest under the FA Area to the south-southeast. The North Evaporation Pond (NEP) is a non-CCR pond that receives process water from the plant. The NEP has an earthen liner that limits infiltration but allows seepage so that water in the pond combines with upgradient groundwater under the FA Landfill. The groundwater flow is controlled by a groundwater capture system that is located downgradient of the FA Landfill Area monitoring wells. Therefore, groundwater quality in the FA Landfill Area downgradient monitoring wells is influenced by the water quality in the NEP.

The conceptual site model in the BA Area consists of groundwater flowing from north to south under the BA Landfill. Details on the network and conceptual model of groundwater flow are included in the Groundwater Monitoring System Certification (Burns and McDonnell, 2017) and the Annual Review of Groundwater Levels (Loughlin, 2020).

Figure 1 Site Layout with May 2023 Groundwater Contours



A comparison of the spring 2023 groundwater results with the prediction limits calculated using the baseline data is included in Table 1. The EPA's Unified Guidance (USEPA, 2009) notes that parametric prediction limits can be computed using as few as three normally distributed background samples, though a minimum of eight is advised. Six samples have been collected from the NEP; two each in 2018, 2020, and 2021. The data were found to be normally distributed and were used to calculate a parametric prediction limit for fluoride. No prediction limit was calculated for pH from the NEP because the NEP is located adjacent to the FA Landfill but is spatially and hydraulically distant from the BA Landfill.

Table 1 Comparison of SSI Parameters with Prediction Limits

Well	Parameter (units)	Measured	Resample	Interwell PL	Intrawell PL	NEP PL
BA-DG3	pH (s.u.)	8.1	8.2	7.0 – 7.3	7.0 – 7.7*	n/a
FA-DG4	Fluoride (mg/L)	6.5	5.4	1.9	2.8	75.2

PL: Prediction Limit
*Intrawell prediction limit may not be appropriate due to trending data.

Interwell limits are valid for the site because they are based on the background data from upgradient monitoring well BA-UG1, which is not directly downgradient of a CCR unit and is separated from other CCR units at the facility by a groundwater divide created by a pump-back system that maintains gradient control under the main power block in order to prevent subsidence (Figure 1; Loughlin Associates, 2017). Intrawell limits are also valid because there is no evidence of a previous release from the CCR Unit.

However, pH SSIs at the site have previously been evaluated using intrawell prediction limits due to the narrow range of pH values observed in the upgradient wells, which may yield interwell prediction limits that do not fully account for natural variability within the aquifer or for instrument uncertainty. In addition, pH is subject to both upper and lower pH limits, as values on either side of the range may indicate changes to the groundwater.

Previous ASDs were completed for pH at BA-DG3 (Barr, 2021; Barr, 2022a; Barr, 2022b; Barr, 2023) concluded that the elevated pH was due to a source other than the BA Landfill. This ASD reinforces the findings of those earlier ASDs.

Previous ASDs were completed for FA-DG4 for fluoride (Barr, 2019; Barr, 2020a; Barr, 2020b, Barr 2021) concluded that the fluoride was due to a source other than the FA Landfill and identified the NEP as a potential source along with natural variability as shown by both regional and site geochemical data. This ASD reinforces the findings of those earlier ASDs and provides additional information that supports a FA Landfill area-wide ASD that will be included by reference to address potential future fluoride SSIs should they occur at FA-DG4 or other FA Landfill downgradient monitoring wells.

1.3 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in §257.94(e) (2):

The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination (August 2, 2023).

1.4 Potential Alternative Sources Review

Based on the rule (above), there are five categories that we evaluated for this ASD. These include:

1. A source other than the CCR unit
2. Sampling (or sampling equipment) methods
3. Laboratory methods
4. Statistical methods
5. Natural variation in groundwater quality

The rule citation above pertaining to '*a source other than the CCR unit*' does not state that a specific source other than the CCR unit be identified. Therefore, this ASD does not identify the other source.

2.0 Lines of Evidence Supporting an ASD: pH at BA-DG3

As part of the ASD, site data was evaluated to identify potential causes for pH outside of the intrawell PL in monitoring well BA-DG3. The following potential sources were selected for investigation:

- A source other than the CCR unit
- Natural variation in groundwater quality

A hypothesis was developed to evaluate the potential alternatives for the SSIs included in the rule and then tested against available data to determine if site data support the hypothesis as described in the following sections.

2.1 A source other than the CCR unit: BA-DG3

- Hypothesis: If the BA Landfill (the CCR Unit) is the source of a release to groundwater that caused the SSI for pH at BA-DG3, the expected concentrations of other parameters indicative of a CCR release should appear elevated in samples from BA-DG3 at about the same time.

- Analysis: While an increasing trend in pH is consistent with a release from a CCR Unit, the lack of a complementary suite of parameters is not consistent with a release. We evaluated the concentrations of other Appendix III parameters in BA-DG3 samples that correspond to the period when the increasing pH values were observed.

- Result: Concentrations of the other six Appendix III parameters indicated that other indicator parameters were present at concentrations that did not trigger SSIs and that were observed to have significantly decreasing trends. Decreasing trends for these parameters are the opposite of what would be expected if a pH increase were indicative of a release from the CCR Unit. Therefore, the hypothesis that the CCR Unit is the source of the elevated pH is rejected.

Discussion of Hypothesis

If the CCR Unit is the source of a release to groundwater that caused the SSI for pH at BA-DG3, increased concentrations of other parameters indicative of a CCR release should appear at about the same time. This is because the CCR Unit water would contain a mixture of the Appendix III parameters. Conversely, if concentrations in BA-DG3 are not elevated for the remaining Appendix III parameters, the hypothesis above would be rejected, leading to the conclusion that the SSI is not the result of a release from the CCR Unit.

Demonstration

Time-series plots of the Appendix III parameters are shown in Figure 2. Over the period of record, from 2016 to 2023, concentrations of all six parameters other than pH are decreasing. These decreasing concentrations are not consistent with a release from the CCR Unit, which should show increasing trends. Therefore, a release is unlikely, and the cause for the SSI appears to be due to "a source other than" the CCR Unit. Since a specific source is not apparent at the site, the most likely cause is natural heterogeneity and variability of the aquifer, which is the expectation in most geologic environments (Freeze and Cherry, 1979).

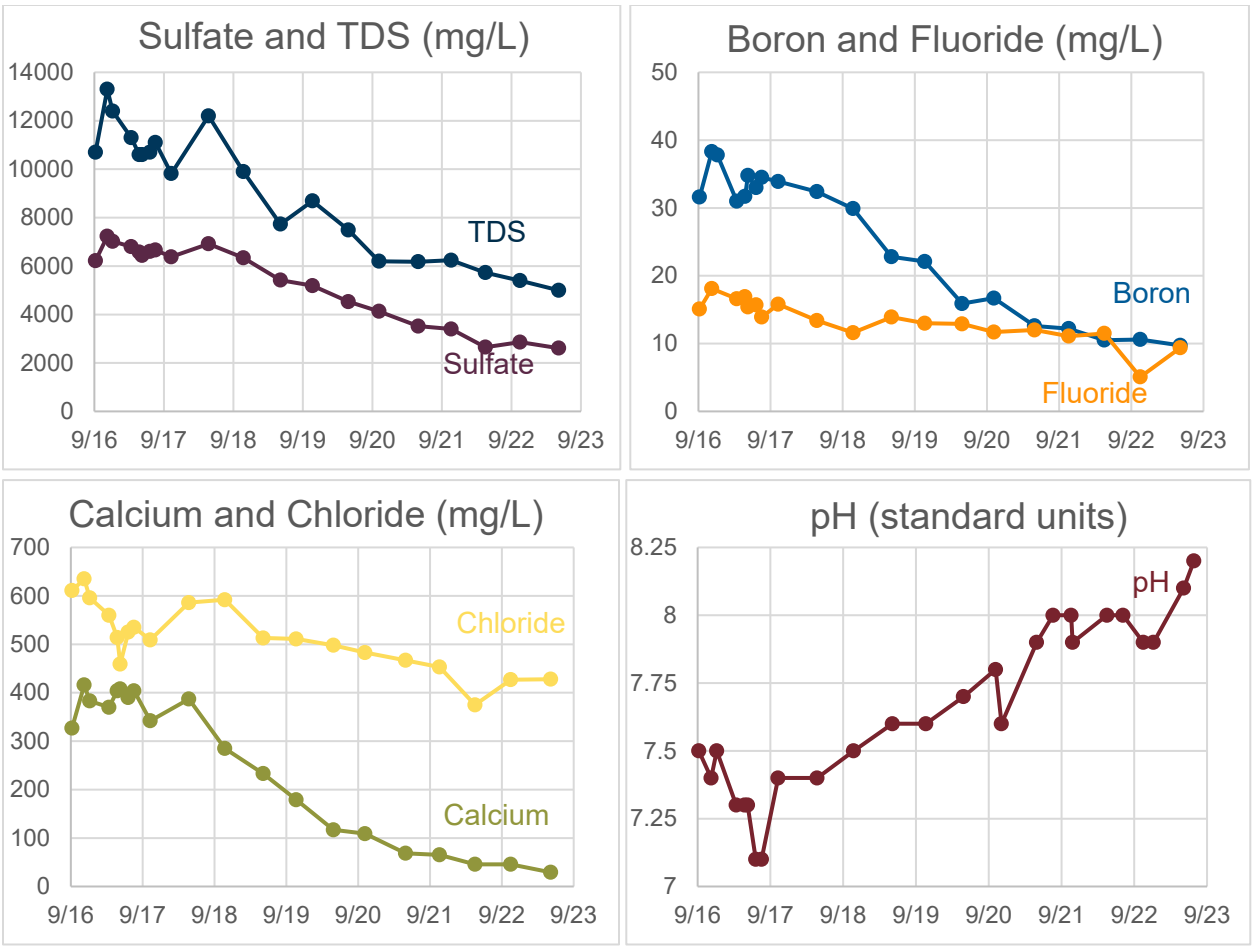


Figure 2 Time-series plots of Appendix III parameters at BA-DG3

3.0 Lines of Evidence Supporting an ASD: Fluoride at FA-DG4

As part of the ASD, site data was evaluated to identify potential causes for elevated fluoride concentrations in the FA-DG4 monitoring well. The following potential sources were selected for investigation:

- Surface water data from the NEP
- Natural variation
- Results of laboratory analysis on CCR material collected from the FA Landfill

A hypothesis was developed to evaluate each of the potential alternatives for the SSIs included in the rule and then tested against available data to determine if site data support the hypothesis as described in the following sections.

3.1 A "source other than the CCR unit" (North Evaporation Pond)

Groundwater flows from under the NEP toward the FA Landfill downgradient monitoring wells as shown on Figure 1.

- Hypothesis: The NEP, which is a non-CCR unit, is the source of elevated dissolved constituents contributing to the SSI for fluoride in the FA-DG4 monitoring well.
- Analysis: Data collected from the pond in 2018 (Barr, 2020a), 2020 (Barr, 2020b), and 2021 (Barr, 2022) were compared to the groundwater concentrations. A mixing model of concentrations from upgradient monitoring well FA-UG1 and the NEP was used to evaluate whether the NEP could be a source.
- Result: Concentrations in the NEP were much higher than in the downgradient monitoring well. The concentrations in FA-DG4 are similar to what would be expected if waters from the NEP and upgradient were mixing. The NEP is therefore a likely source of the SSIs.

Figure 3 shows a time-series plot of fluoride concentrations in FA-DG4 collected under the CCR Rule. Dashed lines on the plot indicate the intrawell prediction limit for FA-DG4, the interwell prediction limit calculated from concentrations in FA-UG1 and FA-UG2 (PZ-11), and the interwell prediction limit calculated from the concentrations in the NEP. The prediction limit from the NEP (75.2 mg/L) was higher than the concentration in FA-DG4 (5.4 mg/L). The higher concentrations in the NEP suggest that it is a source of fluoride to downgradient wells.

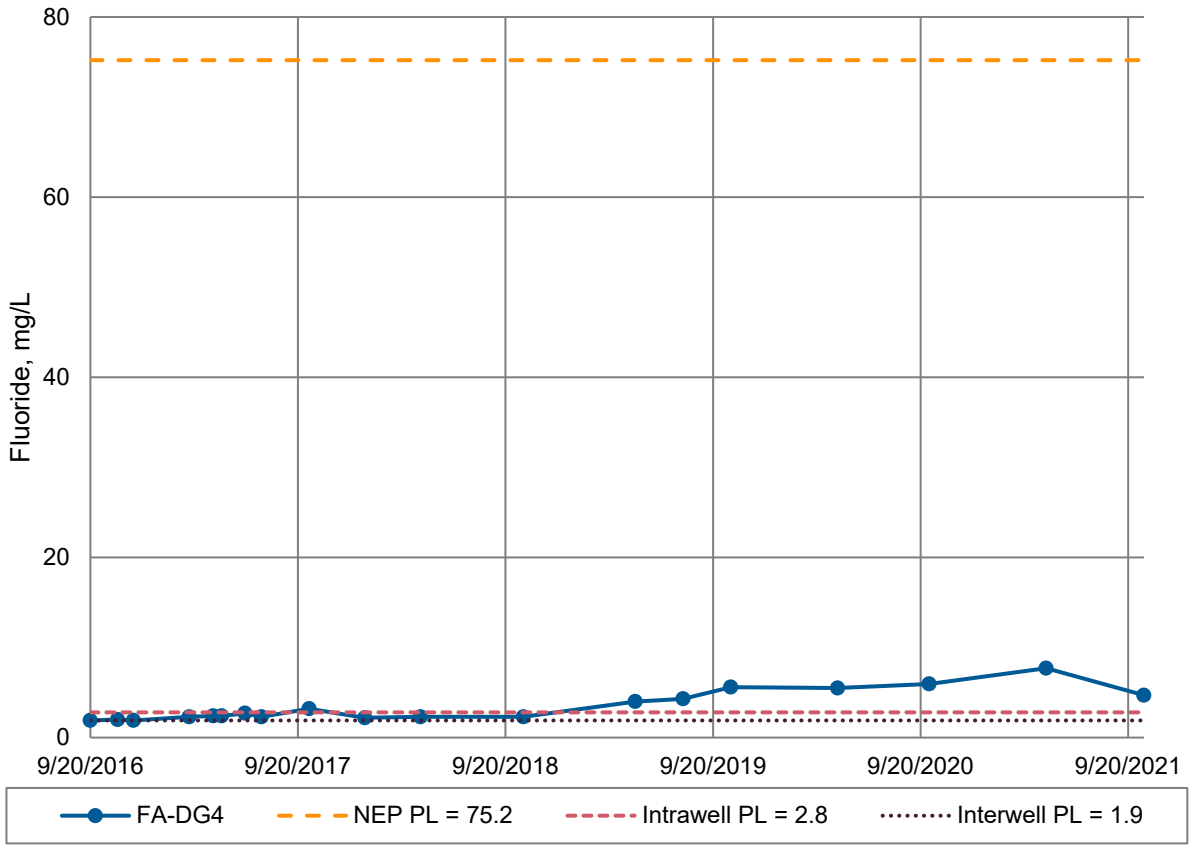


Figure 3 Time-series Plot of Fluoride Concentration in FA-DG4

To further test the hypothesis, the geochemical modeling software The Geochemist's Workbench (Aqueous Solutions LLC, Champaign, IL) was used to model what the composition of a water would be if it was the result of the mixing of waters from an upgradient well (represented by groundwater from FA-UG1) and the NEP. The model used groundwater concentrations measured in April 2018, the most recent available data that include the major ions bicarbonate (alkalinity), magnesium, potassium, and sodium. The model calculated incremental concentrations at every percentage combination (i.e., 100% FA-UG1 and 0% NEP through 100% NEP and 0% FA-UG1). The model accounted for formation of common minerals and predicted that calcite ($CaCO_3$), magnesite ($MgCO_3$), and fluorite (CaF_2) can be formed depending upon the mixing ratio.

Figure 4 shows the mixing model results on a Piper plot, along with the original 2018 compositions of the upgradient well, NEP samples, and FA-DG4 (Barr, 2019). The mixing model results indicate that a water similar in composition (i.e., values that are located near the predicted results on the Piper Plot) to the FA-DG4 sample could result from the mixing of waters from the NEP and upgradient wells. This is indicated by the position of the sample for FA-DG4, shown by the dark blue triangle, which plots close to the mixing path about halfway between the NEP samples and the upgradient groundwater sample on Figure 4. This indicates that values observed at FA-DG4 are consistent with the hypothesis that downgradient groundwater can be explained by the contribution of fluoride by the NEP.

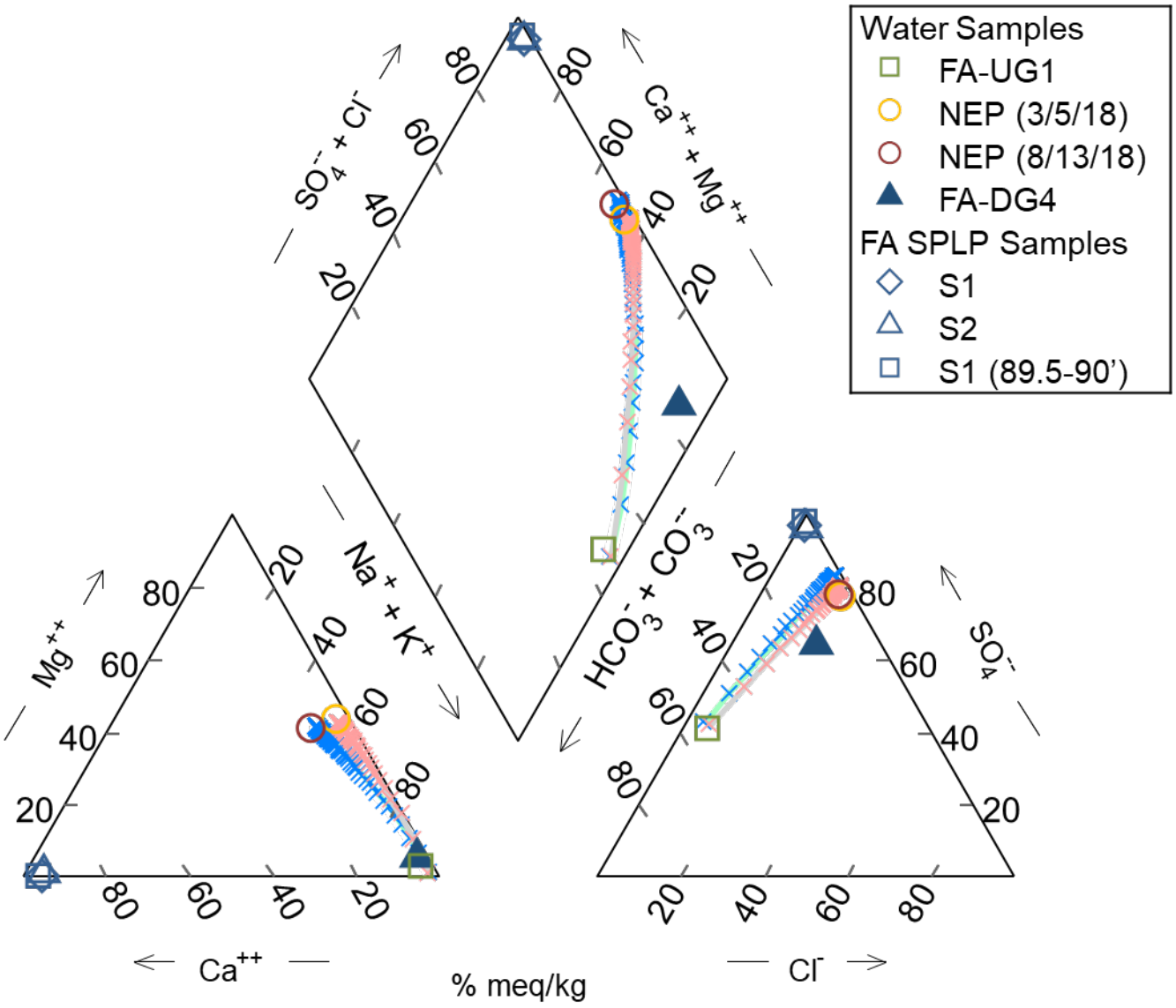


Figure 4 Piper Plot of Mixing Model Results

3.2 A "source other than the CCR unit" (inconsistent with CCR Unit)

- Hypothesis: Groundwater samples from FA-DG4 should have chemical signatures similar to fly ash leachate if the impacts were the result of leaching from the CCR unit.
- Analysis: Synthetic precipitation leaching procedure (SPLP) tests were performed on samples collected from borings advanced into the CCR unit, and the resulting samples were analyzed for major and CCR parameters.
- Result: The CCR material in the FA Landfill has a different composition than what would be expected if it were the source of a release affecting FA-DG4 based on the SPLP analysis designed to simulate leaching.

Borings were advanced within the Fly Ash Landfill in December 2019 at the locations shown on Figure 1. Composite samples from the CCR material were collected from several intervals between the surface and the bottom of the borings (90 feet below the surface) at locations S1 and S2. A grab sample from the bottom of boring S1 (89.5 to 90 feet below the surface) was also collected to represent ash from a previously closed non-CCR unit within the landfill footprint. These three samples were leached using the Synthetic Precipitation Leaching Procedure (SPLP), in which the samples were mixed with a slightly acidic solution designed to simulate rainwater that might percolate through the ash. The liquid from this procedure was analyzed for the same parameters used to evaluate groundwater. The results of the analysis were included in Table 2 and Attachment A of the Fall 2019 ASD (Barr, 2020a).

The major ion compositions of the SPLP leachate samples are shown on the Piper plot in Figure 3, which also shows samples from FA-UG1 and FA-DG4. The plot indicates that the SPLP samples from S1, S2, and S1 (89.5-90') have very similar compositions but are very different from the composition of the sample collected from downgradient monitoring well FA-DG4. In particular, the sample from FA-DG4 has sodium as the dominant cation (Na>>Mg>Ca), whereas the SPLP samples exhibit calcium as the dominant cation (Ca>>Na>Mg).

Fluoride concentrations in the SPLP samples were measured at less than 0.4 mg/L, whereas the fluoride concentrations that have been measured in FA-DG4 range from 0.96 to 7.7 mg/L. Although absolute concentrations may not be comparable between groundwater samples and SPLP leachate, fluoride makes up approximately 0.1% of the total anionic charge concentration in the FA-DG4 sample, whereas fluoride comprises only 0.03 to 0.06% of the anionic charge in the SPLP samples. The relative lack of fluoride in the SPLP samples means that the CCR unit is unlikely to be the source of fluoride to groundwater responsible for previous SSIs. These data refute the hypothesis that the release is due to the CCR unit.

3.3 Natural variation

- Hypothesis: Natural variation in fluoride concentrations within native geology at the site and in the region contributes to the elevated fluoride concentrations observed in FA-DG4.
- Analysis: Fluoride concentrations in all wells within the groundwater monitoring network were evaluated using publicly available data and published studies of regional geology and groundwater chemistry. A simple geochemical model for dissolution/precipitation of minerals helps explain the observed differences across the site in fluoride concentrations.
- Result: Fluoride concentrations in site wells and regionally vary widely due to the geology of the region and are likely to be affected by geochemical processes expected from interaction with the mineralogy of the subsurface. Therefore, natural variation is likely a significant cause of the SSI observed in FA-DG4.

Table 2 Synthetic Precipitation Leaching Procedure Results, Deseret Power Bonanza Plant

Location Depth Date	S1 89.5 - 90 ft 12/17/2019	S1 0 - 90 ft 12/17/2019	S2 0 - 90 ft 12/17/2019
Parameter [mg/l unless otherwise noted]			
SPLP General Parameters			
Alkalinity, Bicarbonate, as CaCO3 (reprep)	**26.0**	**25.0**	**20.0**
Alkalinity, Carbonate as CaCO3 (reprep)	< 10.0	**12.0**	**20.0**
Alkalinity, Hydroxide as CaCO3 (reprep)	< 10.0	< 10.0	< 10.0
Alkalinity, Total, as CaCO3 (reprep)	**30.0**	**37.0**	**40.0**
Chloride	**3.05**	**8.93**	**11.4**
Fluoride	**0.185**	**0.288**	**0.380**
pH (reprep) [pH units]	**8.59**	**8.65**	**9.19**
Sulfate	**1,500**	**1,500**	**1,580**
SPLP Metals			
Antimony	< 0.0300	< 0.0300	< 0.0300
Arsenic	< 0.0200	< 0.0200	< 0.0200
Beryllium	< 0.0100	< 0.0100	< 0.0100
Boron	**0.554**	**1.00**	**2.00**
Cadmium	< 0.00350	< 0.00350	< 0.00350
Calcium	**652**	**622**	**656**
Calcium (reprep)	**708**	**633**	**677**
Chromium	< 0.100	< 0.100	< 0.100
Cobalt	< 0.0200	< 0.0200	< 0.0200
Lead	< 0.0100	< 0.0100	< 0.0100
Lithium	< 0.100	< 0.100	< 0.100
Magnesium	< 1.00	**1.15**	**5.15**
Mercury	< 0.00100	< 0.00100	< 0.00100
Molybdenum	**0.322**	**0.0623**	**0.104**
Potassium	< 1.00	**1.24**	**1.45**
Selenium	**0.0137**	< 0.0100	**0.0306**
Sodium	**24.6**	**27.1**	**30.9**
Thallium	< 0.0100	< 0.0100	< 0.0100

As shown on Figure 5, the fluoride concentrations in site wells vary by approximately an order of magnitude. The concentration is lowest in the upgradient fly ash wells (averages of 1.8 and 0.6 mg/L in FA-UG1 and FA-UG2, respectively) and are the highest in FA-DG2 (average of 56 mg/L). Average concentrations in the other downgradient wells (FA-DG2 and FA-DG3) exceed the fluoride concentrations measured in FA-DG4 (Figure 5). Because other wells at the site had higher concentrations of fluoride that were not indicative of an SSI, it is concluded that there is high variability in fluoride concentrations in the area.

To test the hypothesis of natural variation as an explanation for the concentrations at FA-DG4, evidence of natural sources of fluoride and/or plausible explanations for the differences in concentrations between downgradient wells were evaluated as described below.

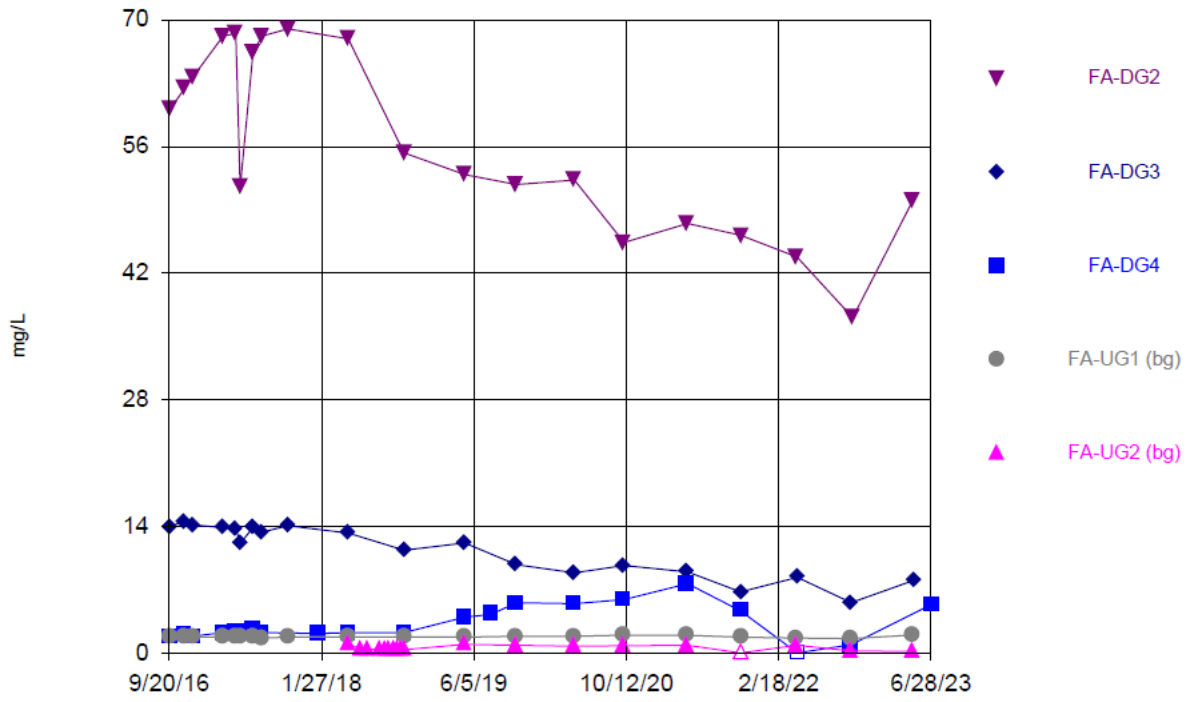


Figure 5 Time-Series Plot of Fluoride Concentrations in Monitoring Wells

The geology of the upper 20 feet of soil logged by Dames & Moore in 1991 consists primarily of very fine-grained sands and silt with occasional traces of clay. These sediments are geologically recent deposits, having been transported by alluvial and colluvial processes from the surrounding hills and cliffs of the Uinta Formation. The first and second hypersaline phases of the ancient Lake Uinta caused large depositions of Eocene-aged evaporites, particularly in the area of the Bonanza Power Plant (Vanden Berg and Birgenheier, 2017; Birdwell et al., 2019). Evaporites consist of readily soluble minerals, such as halite (NaCl) and nahcolite ($NaHCO_3$, a source of baking soda), which can rapidly dissolve into groundwater.

A search for fluoride concentrations in groundwater within 50 miles of the site yielded 965 records from the Water Quality Portal (NWQMC et al., 2019). Concentrations ranged from below detection to 450 mg/L, with a lowest detected value of 0.03 mg/L and a 95th percentile of approximately 18 mg/L. Because these concentrations indicate naturally occurring levels of fluoride are elevated well above the concentrations observed at FA-DG4, it appears to confirm the hypothesis that natural variability is a likely contributor to the SSI at this well.

In addition, the natural variation hypothesis is also supported by a number of studies that have noted the spatial variability of groundwater compositions in this area (Wallace, 2012; Naftz, 1996; Holmes and Kimball, 1987; Lindskov and Kimball, 1984). The studies describe mineralogical controls on groundwater composition in the region that seem to explain the differences observed between the samples from different wells at the site.

For instance, calcium concentrations can decrease in groundwater when calcium carbonate minerals precipitate out of solution, leaving the groundwater undersaturated with respect to calcium- and fluoride-bearing minerals (e.g., fluorite and apatite). In this condition, the fluoride-bearing minerals may dissolve, increasing groundwater fluoride concentrations. This geochemical relationship appears to explain changes in concentration along the flow path between upgradient and downgradient wells at the site.

For example, low calcium (<5 mg/L) and high fluoride (>10 mg/L) concentrations can occur in areas near where naturally occurring fluoride minerals are dissolving and calcium carbonate is precipitating. In groundwater with this composition, calcium is the limiting constituent in fluorite saturation. This is an explanation for calcium and fluoride concentrations observed in downgradient monitoring wells FA-DG2 and FA-DG3.

In contrast, where there are high calcium concentrations (>200 mg/L) and low fluoride (<2 mg/L) concentrations in groundwater (e.g., at FA-UG2), fluoride is the limiting constituent in fluorite saturation. This scenario is found where calcium minerals such as calcite are readily dissolving, increasing calcium concentrations in groundwater. Calculations made with The Geochemist's Workbench (Bethke, 2008; Table 3) indicate that calcite (calcium carbonate) is near saturation in the five fly ash monitoring wells, whereas the low-fluoride wells (FA-UG1, FA-UG2, and FA-DG4) are undersaturated with respect to fluorite. The calculations were made using data from April 2018, which is the most recent event where alkalinity (bicarbonate) was measured. When fluoride concentrations increase from 2018 concentrations to the concentration measured in spring 2023 (5.4 mg/L), FA-DG4 becomes slightly oversaturated with respect to fluorite. These observations indicate the low concentrations of fluoride are likely due to equilibration with fluorite in the subsurface as water from the NEP migrates toward the downgradient wells.

As groundwater is depleted in calcium due to mineral precipitation or mixes with more calcium-depleted water from upgradient of the landfill, the amount of calcium available to precipitate with fluoride into a mineral phase decreases. As a result, less fluoride is removed from groundwater, and concentrations can increase as groundwater contacts additional fluoride-bearing rocks. The results from FA-DG4 appear to match the conditions expected as part of this process.

The processes of mineral precipitation and dissolution are not necessarily instantaneous. As a result, they are more likely to occur in systems with lower flow and longer contact times with aquifer minerals, which also provide nucleation sites for mineral formation. Therefore, these processes are less likely to occur in surface waters like those sampled from the NEP because the pond is subjected to frequent disturbances such as wave action, pump circulation to misting machines, and discharges into the pond from operations which may prevent precipitation reactions from proceeding to equilibrium. In addition, nucleation sites for mineral formation are less prevalent in surface water than in groundwater.

The geochemical relationships described above also explain an apparent contradiction in that the NEP is a source of fluoride for FA-DG4 while samples from FA-UG2 (located next to the NEP) exhibit a lower concentration of fluoride. The geochemical conceptual model described above suggests that lower fluoride concentrations are expected where high concentrations of calcium from the NEP are resulting in

precipitation of fluorite within the geologic matrix and reducing the concentration in groundwater at this location.

Table 3 Calcite and Fluorite Saturation Indices for Monitoring Wells

Location	Calcium	Fluoride	Calcite	Fluorite
	mg/L	mg/L	log Q/K	log Q/K
FA-DG2	1.2	67.9	0.43	0.54
FA-DG3	1.8	13.3	0.15	-0.32
FA-DG4	54.1	2.3	0.14	-0.58
FA-UG1	11.5	1.8	-0.02	-1.0
FA-UG2	567	1.1	0.06	-0.56
FA-DG4 (2023 S)	56.2	5.4	0.14	0.16

Samples collected in April 2018
Thermodynamic data from The Geochemist's Workbench thermo.tdat
Values in the approximate range of -0.5 to 0.5 are assumed to be near equilibrium saturation.
Values <-0.5 are undersaturated, and values >0.5 are supersaturated.

4.0 Conclusion

The foregoing ASD establishes lines of evidence that meet the alternative source requirements of the CCR Rule §257.94(e)(2). Specifically, the SSI for fluoride from the spring 2023 monitoring event at FA-DG4 is due to a "source other than" the Fly Ash Landfill and/or to natural variation based on both site-specific and regional data. The elevated pH in BA-DG3 is due to a source other than the CCR unit because all of the other parameters are decreasing in concentration which is opposite of what would be expected if a presumed release from the CCR unit had occurred.

5.0 Certification

I certify that the written demonstration provided above are supported by the data that is accurate and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§257.94(e)(2)).



Dale Kolstad, P.E. (License #11117963-2202)
Barr Engineering Co.

6.0 References

Barr Engineering Co., 2020. Alternative Source Demonstration (ASD), Fly Ash Landfill Area, Bonanza Power Plant. Technical Memorandum from Jeff Davis to Tyler Esplin, May 19, 2021. Included as Appendix B in 2020 Annual Groundwater Monitoring and Corrective Action Report (January 2021).

Barr Engineering Co., 2021. Spring 2021 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant. Technical Memorandum from Jeff Davis to Tyler Esplin, November 30, 2021. Included as Appendix B in 2021 Annual Groundwater Monitoring and Corrective Action Report (January 2022).

Barr Engineering Co., 2022a. Fall 2021 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant. Technical Memorandum from Dale Kolstad to Tyler Esplin, May 4, 2022. Included as Appendix B in 2022 Annual Groundwater Monitoring and Corrective Action Report (January 2023).

Barr Engineering Co., 2022b. Spring 2022 Monitoring Event Alternative Source Demonstration (ASD), Bonanza Power Plant. Technical Memorandum from Dale Kolstad to Tyler Esplin, November 4, 2022. Included as Appendix B in 2022 Annual Groundwater Monitoring and Corrective Action Report (January 2023).

Barr Engineering Co., 2023. 2022 Annual Groundwater Monitoring and Corrective Action Report, Bonanza Power Plant. Prepared for Deseret Power Electric Cooperative. January 2023.

Burns & McDonnell, 2017. Groundwater Monitoring System Certification, Deseret Generation and Transmission Cooperative – Bonanza Power Plant, Vernal, Utah. Letter to Tyler Esplin from Block Andrews and Wayne Weber, October 12, 2017.

Freeze, R.A. and J.A. Cherry, 1979. Groundwater. Prentice Hall: Englewood Cliffs, NJ. 604 pp.

Kosson, D. S., F. Sanchez, P. Kariher, L. H. Turner, R. Delapp, and P. Seignette, 2009. Characterization of Coal Combustion Residues from Electric Utilities - Leaching and Characterization Data. U.S. Environmental Protection Agency, EPA/600/R-09/151, 2009.

Loughlin Water Associates, 2017. Bonanza Power Plant, Coal Combustion Residuals, Monitoring Well Installation Report. January 2017.

Loughlin Water Associates, LLC, 2020. Annual Review of Groundwater Levels, December 2018 through December 2019. Prepared for Deseret Generation and Transmission Co-operative, April 2020.

Appendix C

Groundwater Flow Direction and Flow Rates

Deseret Power Fly Ash Area Groundwater Velocity Calculation

Date	5/1/2023

Kh low (ft/d)	0.2	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
Kh high (ft/d)	8.8	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
porosity, n	0.4	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
gradient, i (ft/ft)	0.004	
V low (ft/d)	0.002	
V high (ft/d)	0.099	
V low (ft/yr)	**0.82**	
V high (ft/yr)	**36**	
Flow Direction	**Southeast**	

	Top of Casing Elevation	**Depth to Water**	**Water Level Elevation**	
	ft amsl	ft below TOC	ft amsl	
FA-UG1	5079.35	35.12	5044.23	
FA-UG2	5064.89	24.31	5040.58	
FA-DG2	5056.55	30.76	5025.79	
FA-DG3	5055.02	29.18	5025.84	
FA-DG4	5055.67	30.34	5025.33	
FA-DG5	-	-	-	*Previously PZ-212

Fly Ash Landfill horizontal distance, ft

	FA-UG1
FA-DG2	4178
FA-DG3	4152
FA-DG4	4096
FA-DG5	-

Fly Ash Landfill difference in WL elevation, ft

	FA-UG1
FA-DG2	18.44
FA-DG3	18.39
FA-DG4	18.90
FA-DG5	-

Fly Ash Landfill horizontal gradient, ft/ft

	FA-UG1
FA-DG2	0.004
FA-DG3	0.004
FA-DG4	0.005
FA-DG5	-
Average	0.004

Deseret Power Bottom Ash Area Groundwater Velocity Calculation

Date 5/1/2023

Kh low (ft/d)	0.6	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
Kh high (ft/d)	5.2	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
porosity, n	0.4	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
gradient, i (ft/ft)	0.004	
V low (ft/d)	0.006	
V high (ft/d)	0.049	
V low (ft/yr)	**2.1**	
V high (ft/yr)	**18**	
Flow Direction	**South**	

	Top of Casing Elevation	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
BA-UG1	5030.63	34.79	4995.84
BA-DG1	5001.28	14.51	4986.77
BA-DG2	5002.65	15.92	4986.73
BA-DG3	5002.61	17.09	4985.52
BA-DG4	-	-	-

Bottom Ash Landfill horizontal distance, ft

	BA-UG1
BA-DG1	2484
BA-DG2	2479
BA-DG3	2528
BA-DG4	-

Bottom Ash Landfill difference in WL elevation, ft

	BA-UG1
BA-DG1	9.07
BA-DG2	9.11
BA-DG3	10.32
BA-DG4	-

Bottom Ash Landfill horizontal gradient, ft/ft

	BA-UG1
BA-DG1	0.004
BA-DG2	0.004
BA-DG3	0.004
BA-DG4	-
Average	0.004

Deseret Power Fly Ash Area Groundwater Velocity Calculation

Date October 16-17, 2023

Kh low (ft/d)	0.2	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
Kh high (ft/d)	8.8	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
porosity, n	0.4	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
gradient, i (ft/ft)	0.004	
V low (ft/d)	0.002	
V high (ft/d)	0.099	
V low (ft/yr)	**0.82**	
V high (ft/yr)	**36**	
Flow Direction	**Southeast**	

	Top of Casing Elevation	**Depth to Water**	**Water Level Elevation**	
	ft amsl	ft below TOC	ft amsl	
FA-UG1	5079.35	35.40	5043.95	
FA-UG2	5064.89	24.54	5040.35	
FA-DG2	5056.55	31.06	5025.49	
FA-DG3	5055.02	29.39	5025.63	
FA-DG4	5055.67	30.90	5024.77	
FA-DG5	5056.87	30.79	5026.08	*Previously PZ-212

Fly Ash Landfill horizontal distance, ft

	FA-UG1	
FA-DG2	4178	
FA-DG3	4152	
FA-DG4	4096	
FA-DG5	3994	*Previously PZ-212

Fly Ash Landfill difference in WL elevation, ft

	FA-UG1	
FA-DG2	18.46	
FA-DG3	18.32	
FA-DG4	19.18	
FA-DG5	17.87	*Previously PZ-212

Fly Ash Landfill horizontal gradient, ft/ft

	FA-UG1	
FA-DG2	0.004	
FA-DG3	0.004	
FA-DG4	0.005	
FA-DG5	0.004	
Average	0.004	*Previously PZ-212

Deseret Power Bottom Ash Area Groundwater Velocity Calculation

Date October 16-17, 2023

Kh low (ft/d)	0.6	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
Kh high (ft/d)	5.2	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
porosity, n	0.4	*Groundwater Monitoring System Certification (Burns & McDonnell, 2017)*
gradient, i (ft/ft)	0.004	
V low (ft/d)	0.006	
V high (ft/d)	0.051	
V low (ft/yr)	**2.2**	
V high (ft/yr)	**19**	
Flow Direction	**South**	

	Top of Casing Elevation	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
BA-UG1	5030.63	34.92	4995.71
BA-DG1	5001.28	14.93	4986.35
BA-DG2	5002.65	16.29	4986.36
BA-DG3	5002.61	17.55	4985.06
BA-DG4	5004.69	19.32	4985.37

Bottom Ash Landfill horizontal distance, ft

	BA-UG1
BA-DG1	2484
BA-DG2	2479
BA-DG3	2528
BA-DG4	2597

Bottom Ash Landfill difference in WL elevation, ft

	BA-UG1
BA-DG1	9.36
BA-DG2	9.35
BA-DG3	10.65
BA-DG4	10.34

Bottom Ash Landfill horizontal gradient, ft/ft

	BA-UG1
BA-DG1	0.004
BA-DG2	0.004
BA-DG3	0.004
BA-DG4	0.004
Average	0.004

Appendix D

FA-DG5 (PZ-212) and BA-DG4 Information

Barr Engineering Co.
170 South Main Street Suite 500
Salt Lake City, UT 84101
Telephone: 801-333-8400

LOG OF BORING

BA-DG4

Project: Deseret Power
Project No.: 44241001
Location: Vernal, UT
Coordinates:
Datum:

Surface Elevation:
Drilling Method: Sonic
Sampling Method:
Completion Depth: 25.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			ML		SILTY SAND (ML): very fine to fine grained; brown/red; dry; loose; last 6" is slightly cemented.	
5.0			ML		SILTY SAND (ML): very fine to fine grained; brown/red; dry; loose; first 5-6" is slightly cemented.	
7.5			SM		SILTY SAND (SM): fine grained; brown/red; dry; few subrounded to subangular gravels 0.5-1" gravels; last 5" is a silty very fine grained sand.	
10.0			ML		SILTY SAND (ML): fine grained; brown/red; dry to moist; last 5.5" is moist.	
12.5			SM		SANDY SILT TO SILTY SAND (SM): fine to medium grained; brown/red; moist.	
15.0			CL-ML		SILTY CLAY (CL-ML): very fine to fine with trace medium grained; brown/red; saturated; first 2" is gray/brown fine to medium sand.	
17.5			CL-ML		SILTY CLAY (CL-ML): very fine to fine grained; brown/gray; saturated.	
20.0						

Date Boring Started: 2/2/23 3:45 pm
Date Boring Completed: 2/2/23 5:30 pm
Logged By: CLM2
Drilling Contractor: Cascade
Drill Rig: Mini Sonic

Remarks:

Additional data may have been collected in the field which is not included on this log.

P:\SALT LAKE CITY\44 UT\24\44241001 DESERET POWER BONANZA PLANT\WORKFILES\FIELD NOTES\2023 DRILLING\44241001_DESERET_JAN 2023 DRILLING.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Co.
170 South Main Street Suite 500
Salt Lake City, UT 84101
Telephone: 801-333-8400

LOG OF BORING

BA-DG4

Project: Deseret Power
Project No.: 44241001
Location: Vernal, UT
Coordinates:
Datum:

Surface Elevation:
Drilling Method: Sonic
Sampling Method:
Completion Depth: 25.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
20.0					SANDY SILTSTONE. Moderate; gray/greem/brown; moderately weathered; fine-grained.	
22.5						
25.0					End of boring 25.0 feet	
27.5						
30.0						
32.5						
35.0						
37.5						
40.0						

Date Boring Started: 2/2/23 3:45 pm
Date Boring Completed: 2/2/23 5:30 pm
Logged By: CLM2
Drilling Contractor: Cascade
Drill Rig: Mini Sonic

Remarks:

Additional data may have been collected in the field which is not included on this log.

P:\SALT LAKE CITY\44 UT\24\44241001 DESERET POWER BONANZA PLANT\WORKFILES\FIELD NOTES\2023 DRILLING\44241001_DESERET_JAN 2023 DRILLING.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

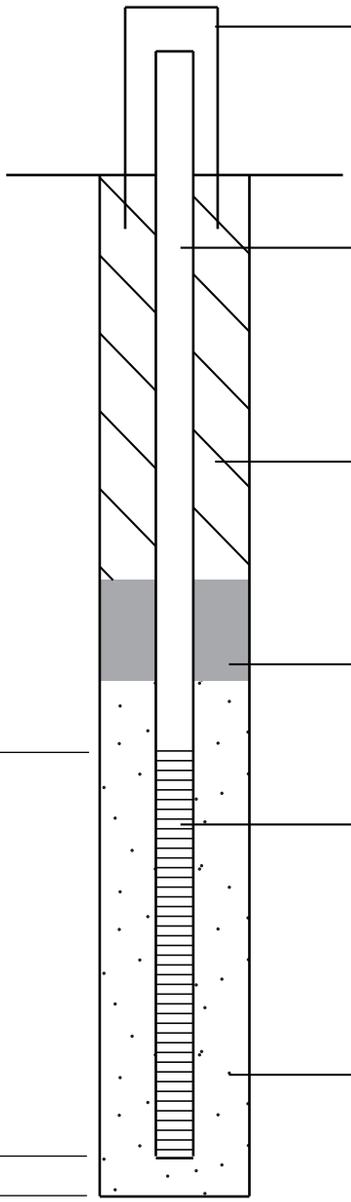
AS BUILT WELL RECORD

WELL NAME: BA-DG4

UNIQUE WELL No.:

Project: Deseret Power
Project No.: 44241001
Location: Deseret Power, Vernal, UT
Coordinates:
Coordinate System:

Surface Elevation:
Drilling Method: Mini-sonic
Drilling Fluid: Fluid Added:
Borehole Diameter: 2" Volume of Drilling:



Top of Screen: 15'

Bottom of Screen: 20'
Well Depth: 25"

Pro Top
Type:
Diameter:
Depth Set:

Riser
Material:
Diameter:
Length:

Grout
Material:
Grouting Method:
Bottom Depth:

Seal
Material: Bentonite Chips
Bottom Depth: 13'

Screen
Material: Schedule 80 2" PVC
Slot Size: 0.010"
Length: 5' section
Interval: 15-20'

Filter
Material: Silica sand (20-25')
Size: 20/40

Date: 02/03/23
Time: 8:00 am
Field Staff: Christy Miller
Drilling Contractor: Cascade
Drill Rig: Mini-sonic
Weather:

Remarks: Well was either completed or abandoned based on CRR requirements the following week without Barr oversight in field.

Suggested screen placement was from 15-25', but drillers only had 5' of screen remaining.

1" = 0.083'; 2"=0.167'; 3"=0.250'; 4"=0.333'; 5"=0.417'; 6"=0.500'; 7"=0.583'; 8"=0.667'; 9"=0.750'; 10"=0.833'; 11"=0.917'; 12"=1.000'; 13"=1.083'; 14"=1.167'; 15"=1.250'; 16"=1.333'; 17"=1.417'; 18"=1.500'

Appendix D
Baseline Analytical Data
2023 CCR Annual Report
Deseret Power Cooperative

		Location	BA - DG4	BA - DG4	BA - DG4	BA - DG4	BA - DG4	FA-DG5	FA-DG5	FA-DG5	FA-DG5	FA-DG5		FA-DG5
		Date	3/07/2023	5/21/2023	8/08/2023	10/16/2023	11/28/2023	12/13/2022	1/31/2023	3/07/2023	4/11/2023	5/21/2023		6/28/2023
		Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N
Parameter	Analysis Location	Units												
General Parameters														
Alkalinity, bicarbonate, as CaCO3	Lab	mg/l	--	--	--	--	--	**320**	**359**	--	--	--	--	--
Alkalinity, carbonate, as CaCO3	Lab	mg/l	--	--	--	--	--	< 1.0 U	< 1.0 U	--	--	--	--	--
Alkalinity, hydroxide, as CaCO3	Lab	mg/l	--	--	--	--	--	< 1.0 U	< 1.0 U	--	--	--	--	--
Alkalinity, total, as CaCO3	Lab	mg/l	--	--	--	--	--	**320**	**359**	--	--	--	--	--
Chloride	Lab	mg/l	**539**	**566**	**604**	**616**	**678**	**1750**	**1970**	**1750**	**1690**	**1770**	**1780**	**1760**
Fluoride	Lab	mg/l	**2.57**	**1.32**	**1.53**	**2.87**	**1.22**	**0.966**	**0.202**	**0.573**	**0.295**	< 0.100 U	< 0.100 U	< 0.100 U
Solids, total dissolved	Lab	mg/l	**11400**	**12600**	**10600**	**15600**	**10600**	**16400**	**32500**	**16800**	**16800 H**	**21600**	**17300**	**17000**
Sulfate, as SO4	Lab	mg/l	**6190**	**6570**	**6780**	**6620**	**6830**	**9150**	**8800**	**9050**	**8440 H**	**9170**	**9250**	**8800**
Field Parameters														
Barometric pressure	Field	mmHg	**635.8**	**635.9**	**634.6**	**640.4**	**643.6**	**628.6**	**640.6**	**633.9**	**634.9**	**636.5**	--	**632.9**
Dissolved oxygen	Field	mg/l	**41.9**	--	--	**13.0**	--	--	**12.7**	**6.7**	**8.2**	--	--	**17.1**
Dissolved oxygen saturation	Field	%	--	**13.3**	**10.5**	--	**30.1**	**2.8**	--	--	--	**6.6**	--	--
pH	Field	pH units	**7.4**	**7.5**	**7.6**	**7.5**	**7.5**	**7.1**	**7.0**	**7.0**	**7.1**	**7.0**	--	**7.2**
Redox (oxidation potential)	Field	mV	**123.4**	**35.3**	**23.6**	**42.4**	**64.1**	**-138.5**	**-165.3**	**-96.5**	**-141.2**	**-200.4**	--	**-188.1**
Specific conductance @ 25 ºC	Field	umhos/cm	**9246**	**12540**	**12963**	**12101**	**9491**	**15897**	**16216**	**13989**	**16369**	**17253**	--	**17969**
Temperature	Field	deg F	**46.3**	**69.4**	**73.4**	**63.7**	**55.3**	**56.2**	**52.2**	**49.0**	**62.5**	**63.9**	--	**68.0**
Turbidity	Field	NTU	**0.85**	**0.64**	**1.80**	**0.73**	**0.75**	**14.3**	**267**	**47.2**	**47.4**	**9.58**	--	**12.9**
Water Level Elevation	Field	ft asml	**4985.5**	**4985.53**	**4985.48**	**4985.25**	**4985.27**	**5026.56**	**5026.63**	**5026.65**	**5026.79**	**5026.79**	--	**5026.75**
Total Metals														
Antimony	Lab	mg/l	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Arsenic	Lab	mg/l	**0.0050**	**0.0077**	**0.0093**	**0.0118**	**0.0113**	**0.0119**	**0.0195**	**0.0080**	**0.0083**	**0.0068**	**0.0068**	**0.0071**
Barium	Lab	mg/l	**0.031**	**0.020**	< 0.050 U	**0.018**	**0.016**	< 0.100 U	**0.068**	**0.027**	**0.024**	**0.011**	**0.015**	**0.012**
Beryllium	Lab	mg/l	< 0.0025 U	< 0.0010 U	< 0.0010 U	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Boron	Lab	mg/l	**28.1**	**29.4**	**30.2**	**27.0**	**30.2**	**51.6**	**57.5**	**57.7**	**65.2**	**59.2**	**60.9**	**60.8**
Cadmium	Lab	mg/l	< 0.0010 U	< 0.0002 U	< 0.0002 U	< 0.0010 U	< 0.0002 U	**0.0002**	< 0.0004 U	< 0.0010 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U
Calcium	Lab	mg/l	**282**	**242**	**289**	**238**	**237**	**482**	**533**	**516**	**508**	**457**	**471**	**543**
Chromium	Lab	mg/l	**0.0033**	**0.0030**	**0.0033**	< 0.0025 U	**0.0044**	**0.0055**	**0.0069**	**0.0038**	**0.0024**	**0.0020**	**0.0023**	**0.0017**
Cobalt	Lab	mg/l	< 0.01 U	**0.0016**	**0.0025**	**0.0026**	**0.0025**	< 0.20 U	**0.03**	**0.03**	**0.0261**	**0.0238**	**0.0267**	**0.0235**
Lead	Lab	mg/l	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0025 U	< 0.0005 U	< 0.0005 U	**0.0026**	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Lithium	Lab	mg/l	**0.240**	**0.196**	**0.191**	**0.182**	**0.169**	**0.484**	**0.736**	**0.738**	**0.767**	**0.665**	**0.683**	**0.743**
Magnesium	Lab	mg/l	**500**	--	--	--	--	**748**	**856**	**913**	--	--	--	--
Mercury	Lab	mg/l	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U	< 0.00015 U
Molybdenum	Lab	mg/l	**0.09**	**0.07**	< 0.10 U	< 0.10 U	**0.06**	< 0.20 U	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**
Phosphorus, total, as P	Lab	mg/l	**0.04**	--	--	--	--	< 0.2 U	**0.2**	**0.1**	--	--	--	--
Potassium	Lab	mg/l	**8.1**	--	--	--	--	< 10.0 U	**5.6**	**4.6**	--	--	--	--
Selenium	Lab	mg/l	**0.0193**	**0.0305**	**0.0322**	**0.0402**	**0.0434**	**0.0833**	**0.0535**	**0.0154**	**0.0096**	**0.0100**	**0.0104**	**0.0120**
Sodium	Lab	mg/l	**2410**	--	--	--	--	**3240**	**3840**	**3540**	--	--	--	--
Thallium	Lab	mg/l	< 0.0010 U	< 0.0002 U	< 0.0002 U	< 0.0010 U	< 0.0002 U	< 0.0002 U	< 0.0004 U	< 0.0010 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U
Radiochemical Parameters														
Radium 226	Lab	pCi/l	**0.51 +/- 0.315**	**0.818 +/- 0.326**	**0.488 +/- 0.258 NDB**	**0.313 +/- 0.191 UB**	**0.38 +/- 0.337**	**0.26 +/- 0.31 ND**	**0.74 +/- 0.443**	**0.58 +/- 0.35**	**0.413 +/- 0.283**	**0.277 +/- 0.218**	**0.337 +/- 0.262**	**0.50 +/- 0.346**
Radium 228	Lab	pCi/l	**0.85 +/- 0.25**	**0.0778 +/- 0.267 ND**	**0.0980 +/- 0.369 ND**	**0.619 +/- 0.265 UB**	**0.37 +/- 0.313**	**-0.75 +/- 0.253 ND**	**0.45 +/- 0.36**	**0.44 +/- 0.172**	**0.0684 +/- 0.409 ND**	**0.791 +/- 0.212**	**0.525 +/- 0.256**	**0.23 +/- 0.28 ND**
Radium, combined (226+228)	Barr Calculation	pCi/l	**1.360 +/- 0.40**	**0.8958 +/- 0.42 q**	**0.586 +/- 0.45 q**	**0.932 +/- 0.33**	**0.75 +/- 0.46 ND**	**0.26 +/- 0.26 ND**	--	**1.020 +/- 0.39**	**0.481 +/- 0.50 q**	**1.068 +/- 0.30**	**0.862 +/- 0.37**	**0.730 +/- 0.45 q**

Appendix D
Baseline Analytical Data
2023 CCR Annual Report
Deseret Power Cooperative

		Location	FA-DG5		FA-DG5
		Date	8/08/2023		9/12/2023
		Sample Type	N	FD	N
Parameter	Analysis Location	Units			
General Parameters					
Alkalinity, bicarbonate, as CaCO3	Lab	mg/l	--	--	--
Alkalinity, carbonate, as CaCO3	Lab	mg/l	--	--	--
Alkalinity, hydroxide, as CaCO3	Lab	mg/l	--	--	--
Alkalinity, total, as CaCO3	Lab	mg/l	--	--	--
Chloride	Lab	mg/l	**1860**	**1870**	**1910**
Fluoride	Lab	mg/l	< 0.100 U	< 0.100 U	**0.354**
Solids, total dissolved	Lab	mg/l	**14400**	**17100**	**17000**
Sulfate, as SO4	Lab	mg/l	**9480**	**9540**	**8540**
Field Parameters					
Barometric pressure	Field	mmHg	**634.2**	--	--
Dissolved oxygen	Field	mg/l	--	--	--
Dissolved oxygen saturation	Field	%	**7.9**	--	--
pH	Field	pH units	**7.2**	--	--
Redox (oxidation potential)	Field	mV	**-161.0**	--	--
Specific conductance @ 25 ºC	Field	umhos/cm	**17411**	--	--
Temperature	Field	deg F	**65.9**	--	--
Turbidity	Field	NTU	**6.97**	--	--
Water Level Elevation	Field	ft asml	**5026.43**	**5056.87**	**5026.36**
Total Metals					
Antimony	Lab	mg/l	< 0.0005 U	< 0.0005 U	< 0.0005 U
Arsenic	Lab	mg/l	**0.0078**	**0.0058**	**0.0056**
Barium	Lab	mg/l	< 0.050 U	< 0.100 U	**0.012**
Beryllium	Lab	mg/l	< 0.0005 U	< 0.0005 U	< 0.0005 U
Boron	Lab	mg/l	**68.8**	**56.6**	**57.2**
Cadmium	Lab	mg/l	< 0.0002 U	< 0.0002 U	< 0.0002 U
Calcium	Lab	mg/l	**603**	**503**	**449**
Chromium	Lab	mg/l	**0.0063 J**	**0.0016 J**	**0.0018**
Cobalt	Lab	mg/l	**0.0242**	**0.0229**	**0.0256**
Lead	Lab	mg/l	< 0.0005 U	< 0.0005 U	< 0.0005 U
Lithium	Lab	mg/l	**0.721**	**0.714**	**0.725**
Magnesium	Lab	mg/l	--	--	--
Mercury	Lab	mg/l	< 0.00015 U	< 0.00015 U	< 0.00015 U
Molybdenum	Lab	mg/l	< 0.10 U	< 0.20 U	**0.22**
Phosphorus, total, as P	Lab	mg/l	--	--	--
Potassium	Lab	mg/l	--	--	--
Selenium	Lab	mg/l	**0.0123**	**0.0110**	**0.0103**
Sodium	Lab	mg/l	--	--	--
Thallium	Lab	mg/l	< 0.0002 U	< 0.0002 U	< 0.0002 U
Radiochemical Parameters					
Radium 226	Lab	pCi/l	**0.402 +/- 0.239 NDB**	**0.286 +/- 0.209 NDB**	**0.429 +/- 0.313 NDB**
Radium 228	Lab	pCi/l	**0.469 +/- 0.241**	**-0.393 +/- 0.245 ND**	**1.65 +/- 0.224**
Radium, combined (226+228)	Barr Calculation	pCi/l	**0.971 +/- 0.34**	**0.286 +/- 0.21 q**	**2.079 +/- 0.380**

Data Footnotes and Qualifiers

Barr Standard Footnotes and Qualifiers

--	Not analyzed/Not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
ND	Not detected.
B	The analyte was detected in the associated laboratory blank sample(s).
H	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Estimated detected value. Either certain QC criteria were not met or the concentration is between the laboratory's detection and quantitation limits.
q	The combined radium result includes both detected and not detected values.
U	The analyte was analyzed for, but was not detected.
UB	The analyte was detected in one of the associated laboratory, equipment, field or trip blank samples and is considered non-detect at the concentration reported by the laboratory.