Naval Facilities Engineering Systems Command Southwest
BRAC PMO West
San Diego, CA

AIR MONITORING SUMMARY REPORT FOR PARCEL B REMOVAL SITE EVALUATION

HUNTERS POINT NAVAL SHIPYARD

SAN FRANCISCO, CALIFORNIA

July 7th, 2022 through September 15th, 2022

Approved for public release; distribution is unlimited

DCN: GLBN-0005-5305-0058

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Prepared for:

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BRAC PMO West
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Contract Number: N62473-17-D-0005; Task Order No. N6247317F5305

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Acronyms and Abbreviations

AMSR ..... *Air Monitoring Summary Report*
cfm ..... *cubic feet per minute*
CFR ..... *Code of Federal Regulations*
CTO ..... *Contract Task Order*
DMAMP ..... *Dust Management and Air Monitoring Plan*
EPA ..... *United States Environmental Protection Agency*
Gilbane ..... *Gilbane Federal*
HPNS ..... *Hunters Point Naval Shipyard*
L/min ..... *liters per minute*
MDC ..... *minimum detectable concentrations*
Navy ..... *U.S. Department of the Navy*
NIOSH ..... *National Institute for Occupational Safety and Health*
PM10 ..... *particulate matter less than 10 microns in diameter*
ROC ..... *Radionuclide of concern*
TSP ..... *total suspended particulates*
$\mu g/m^3$ ..... *micrograms per cubic meter*
WP ..... *work plan*

1.0 Introduction

This Air Monitoring Summary Report (AMSR) was prepared by Gilbane Federal (Gilbane) as requested by the United States Department of the Navy (Navy) under Radiological Environmental Multiple Award Contract N62473-17-D-0005, Contract Task Order (CTO) N6247317F5305. Gilbane is performing air monitoring at Hunters Point Naval Shipyard (HPNS) in accordance with the Final Dust Management and Air Monitoring Plan (DMAMP), included as Appendix E to *Final Parcel B Removal Site Evaluation Work Plan, Hunters Point Naval Shipyard, San Francisco, California* (WP; Gilbane, 2022). The DMAMP describes the procedures that minimize dust during work activities and requires air monitoring to ensure these procedures are effective. The methods and procedures detailed in the DMAMP help to prevent exposure of residents and construction crews to potential airborne chemicals of concern, and dust from the work area.

This summary report describes the following:

- Where and how air monitoring samples were collected.
- What test methods were used to analyze air monitoring samples.
- How air monitoring data were evaluated.

This AMSR summarizes the air monitoring activities conducted by Gilbane at HPNS Parcel B from July 7th, 2022 through September 15th, 2022 and compares the results with the established action levels presented in the DMAMP (Appendix E of the WP [Gilbane, 2022]).

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2.0 Monitoring Site Locations

Air monitoring stations were deployed at the minimum of one upwind and one downwind location whenever active soil handling operations were in progress. In addition, a southernmost air monitoring station (near Building 113A) was operated as a supplemental air monitoring location during earthmoving activities. Additional radiological air monitors may be placed within the daily work areas to monitor for worker health and safety. Based on past meteorological data, the prevalent wind direction at HPNS was from the west or west-southwest. The locations of Parcel B air monitoring stations are presented on **Figure 2-1**.

Air monitoring was performed to estimate and assess the impact of field activities. The locations of air monitoring stations were determined based on the prevailing wind direction and were modified as needed for accessibility and worker safety considerations. Wind direction was monitored daily using a windsock and confirmed with the prevalent wind direction recorded for the APTIM – KCASANFR1504 published at Weather Underground (www.wundergroun.com). If the APTIM station did not have available data, the Bayview Manor - KCASANFR1775 was used.

Upwind/downwind station designations were assigned based on the prevalent wind direction. Atmospheric parameters were checked daily at www.wunderground.com (see **Attachment 1**). Monitoring stations remained stationary while sampling was conducted. Each monitoring station included four different monitoring systems:

1. Asbestos
2. Particulate matter less than 10 microns in diameter (PM10) and Metals (Lead and Manganese)
3. Total suspended particulates (TSP)
4. Radionuclides

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3.0 Analytical Methods

3.1 Asbestos

Air samples were sampled and analyzed in accordance with National Institute for Occupational Safety and Health (NIOSH) Method 7400, from the NIOSH Manual of Analytical Methods (NIOSH, 1994). Method 7400 requires that samples be collected on three-piece cellulose ester filters fitted with conductive cowlings at a sampling rate of between 0.5 liters per minute (L/min) and 16 L/min. Each sample was collected over the course of a period not to exceed 25 hours and submitted to A&B Laboratories of Houston, TX for analysis. Asbestos results were reviewed for anomalies and compliance with the action levels listed below.

3.2 PM10, Lead and Manganese

Filter-based PM10 data are collected to ensure the protection of public health and safety during construction operations. Filter-based PM10 data are generated by sampling with calibrated air monitoring equipment that are operated continuously over the course of a period not to exceed 25 hours in accordance with the U.S. Environmental Protection Agency (EPA) reference sampling method for PM10 as described in Title 40 Code of Federal Regulations (CFR), Part 50, Subpart J (EPA, 1999a). During the sampling, measurements are taken to precisely calculate the volume of air that has passed through the filter media sample. The period sampled is dependent on the duration of the work activity. The sample is then shipped to Eurofins, West Sacramento, CA for analysis. The concentration is gravimetrically determined. The sample results are reviewed for field and laboratory anomalies to provide confidence in the data and compared to air quality criteria to ensure compliance with the action levels listed below. In this way the precise amount of PM10 present in each cubic meter of air is determined.

Once the PM10 concentration was gravimetrically determined, the filter was analyzed for manganese and lead in accordance with EPA Method 6020 (equivalent to IO-3.5 in the Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air [EPA, 1999b])

3.3 TSP

TSP samples were collected with a high-volume (39 to 60 cubic feet per minute [cfm]) air sampler in accordance with EPA's reference sampling method for TSP (EPA 1999a), described in 40 CFR 50, Subpart B. Each sample was collected on a filter over the course of a period not to exceed 25 hours (depending on the duration of the work activity). The filter was then weighed to determine the amount of TSP collected. The resulting concentration was compared to the HPNS Basewide level listed below to minimize permissible dust releases from the site.

3.4 Radionuclides of Concern

Radiological air samples were collected on filter media with a LV-1 low-volume air sampler. The air filter concentration is counted onsite following a decay period and are compared with public air concentration limits published in 10 CFR Part 20. Radiological air sampling methods and procedures are detailed in Gilbane Radiological Procedure PR-RP-150 *Radiological Survey and Sampling* (Gilbane, 2019).

Perimeter samples for radionuclides of concern (ROC)s were analyzed at ARS Aleut Analytical, of Port Allen, LA by the radiological methods listed below.

- Gamma Spectroscopy by EPA Method 901.1
- Alpha Spectroscopy/Eichrom Resin Separation by HASL 300 Pu-02RC
- Alpha Emitting Isotopes by EPA Method 9315
- Gas Flow Proportional Counting/Eichrom Resin Separation by EPA 905.0

The calculated airborne concentration in microcuries per filter was then compared to the effluent concentration limit specified in Table 2 of Appendix B to 10 CFR 20. The effluent concentration of a given radionuclide is the minimum concentration in air which, if inhaled continuously over the course of a year, results in an exposure equal to the annual regulatory limit specified in 10 CFR 20.1302. The threshold for radiological effluent concentration in air samples is 10 percent of the effluent concentration, which ensures work practices are evaluated and modified as necessary to ensure the limit is not reached.

The equipment specifications and sampling procedures have complied with the specifications provided in the regulations for the sampler, filter media, accuracy, calibration, and quality assurance.

4.0 Air Monitoring Data Interpretation and Action Levels

To facilitate the comparison to project action levels, the delta between the upwind and downwind PM10 and TSP analytical results was calculated for detected values. Calculated negative values indicating that the upwind concentration was greater than the downwind concentration and non-detected values where no delta was calculated, are interpreted as acceptable.

The resulting deltas for PM10 and TSP and analytical data from air monitoring metals and radiological samples were compared with the threshold criteria listed in **Table 4-1** reproduced from Table 1; and radionuclide activities were compared to the airborne concentration action levels listed in Table 2 of the approved DMAMP (Appendix E of the WP [Gilbane, 2022]. The PM10 delta was additionally compared to the criterion taken from the *Final Basewide Dust Control Plan, Revision 1, Hunters Point Shipyard, San Francisco, California* (Tetra Tech EC, 2010) of 50 micrograms per cubic meter (ug/m^3).

Table 4-1: Air Monitoring Threshold Criteria

Test Parameter	Threshold Criteria	Threshold Criteria Reference
Asbestos	0.1 fiber/cm^3	Cal/OSHA PEL (on-site workers)
PM10[a]	50 µg/m^3	DTSC HERO developed action level (residents and public receptors)[a]
	5,000 µg/m^3	Cal/OSHA PEL (on-site workers)[b]
TSP	0.5 mg/m^3	Basewide HPNS Level selected to minimize overall permissible dust release from sites
Lead	0.050 mg/m^3	Cal/OSHA PEL (on-site workers)
Manganese	0.200 mg/m^3	Cal/OSHA PEL (on-site workers) 10 CFR, Part 20, Appendix B, Table 2 Column 1 adjusted from 50 mrem per year to maximum annual exposure of 10 mrem per year at the receptor (public receptor)[c]
Cesium-137	4.00E-11 µCi/mL	
Plutonium-239	4.00E-15 µCi/mL	
Radium-226	1.80E-13 µCi/mL	
Strontium-90	1.20E-12 µCi/mL	
Cobalt-60	1.00E-11 µCi/mL	

Notes:

[a] = The DTSC HERO action level is based on the CSAAQS. The CSAAQS is designed to protect the general public from airborne particulates generated in the urban, suburban, and rural environments. The CSAAQS is not meant to be applied to general project-specific construction actions and related air quality. Rather, the standard is used to attain city- or regional-wide ambient air quality goals for the benefit of the general public. The current CSAAQS for PM10 is 50 µg/m3 average per 24-hour day. The City and County of San Francisco is currently a nonattainment area for the CSAAQS for PM10.

[b] = The Cal/OSHA PEL for particulates not otherwise regulated (respiratory) is used for PM10 comparison.

[c] = Results may be evaluated using 40 CFR Appendix E to Part 61 to demonstrate compliance with the National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).

µCi/mL microcurie per milliliter

µg/m^3 = micrograms per cubic meter

Cal/OSHA = California Division of Occupational Safety and Health Administration

DTSC HERO = California Department of Toxic Substances Control, Human and Ecological Risk Office

fiber/cm^3 = fibers per cubic centimeter
HPNS = Hunters Point Naval Shipyard
mg/m^3 = milligrams per cubic meter
PEL = permissible exposure limit
PM10 = particulate matter less than 10 microns in diameter
TSP = total suspended particulates

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5.0 Air Monitoring Results

Weather information (including ambient pressure and temperature data) is presented in the table included as **Attachment 1**. Meteorological data for Stations 1, 2, and Building 113A were sourced from the Weather Underground (wunderground.com) station APTIM - KCASANFR1504. If the APTIM station did not have available data, the Bayview Manor - KCASANFR1775 was used.

Air Monitoring Data was collected from upwind/downwind stations MSB01, MSB01, and MSB113A in Parcel B from July 7th, 2022 through September 15th, 2022, during which time Gilbane was scoring asphalt, removing asphalt, excavating trenches, and managing lay down pads. Samples were not collected during periods of site inactivity, rain events, and/or while site work was limited to non-earth moving tasks.

Construction and remediation activities conducted from July 7th, 2022 through September 15th, 2022 did not result in the exceedance of the established threshold criteria, as described in detail below.

Asbestos results from July 7th, 2022 through September 15th, 2022 did not exceed the threshold criteria presented in **Table 4-1**. The results are presented as **Attachment 2**.

PM10, lead and manganese results from July 7th, 2022 through September 15th, 2022 did not exceed the threshold criteria presented in **Table 4-1.** The results are presented as **Attachment 3** and **Attachment 4**.

TSP results from July 7th, 2022 through September 15th, 2022, did not exceed the threshold criteria presented in **Table 4-1**. The results are presented as **Attachment 5**.

Radiological air sampling results from July 7th, 2022 through September 15th, 2022 did not exceed the threshold criteria presented in **Table 4-1**. The results are presented as **Attachment 6**.

Laboratory reports are included as **Attachment 7** and were subjected to cursory review by the Project Chemist. Data were qualified for low-level contamination below the reporting limit in the field filter blanks or for minimum detectable concentrations (MDCs) above the required detection level. Data, as qualified are considered usable for their intended purposes.

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6.0 References

California Department of Toxic Substances Control, 2021, *Human and Ecological Risk Office Memorandum, Dust Action Levels for Parcel B, Hunters Point Naval Shipyard, San Francisco, California*, March 24.

National Institute for Occupational Safety and Health, 1994, *NIOSH Manual of Analytical Methods, Method 7400*, August.

United States Environmental Protection Agency (EPA), 1999a. Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Ambient Air Specific Methods.

EPA, 1999b. Compendium of Methods for the Determination of Inorganic Compounds in Ambient Air.

Gilbane Federal (Gilbane), 2019. *PR-RP-150* “Radiological Survey and Sampling”. November.

Gilbane, 2022. *Final Parcel B Removal Site Evaluation Work Plan, Former Hunters Point Naval Shipyard, San Francisco, California*. January.

Tetra Tech EC, 2010, *Final Basewide Dust Control Plan, Revision 1, Hunters Point Shipyard, San Francisco, California*, November 29.

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FIGURES

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San Francisco Bay

Wind Compass

N NW NE W E SW SE S

Inset

Parcel B

1 inch = 1,250 feet

Berth 64
DRY DOCK 7
DRY DOCK 6
DRY DOCK 5
Berth 61

146
130
103
113
114
113A
157
142
140

MSB01 (Upwind) Air Monitoring Station
Real-time Dust Monitoring
Windsock
MSB113A (Downwind) Air Monitoring Station
Real-time Dust Monitoring
Real-time Dust Monitoring (Co-located)
MSB02 (Downwind) Air Monitoring Station

Donahue St.
Lockwood St.
Galvez Ave.
Fischer Ave.
Robinson St.
Hone Ave.
DRY DOCK 3
DRY DOCK 2

Air Sampling Station
Real-time Dust Monitoring
Windsock
Phase 1
Phase 2
Parcel B Boundary
Buildings
Impacted Existing
Impacted Demolished
Surface Soil Investigation

Note:
Prevailing wind direction is from west to northwest.

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

NAVFAC Naval Facilities Engineering Command

Removal Site Evaluation Work Plan
Radiological Investigation, Survey, and Reporting, Parcel B
Hunters Point Naval Shipyard
San Francisco, California

200 0 200
Feet

Figure 2-1
Air Sampling and Dust Monitoring Locations

G:\ArcGIS\Navy\HPS\PROJECTS\Parcel_B_rework\AirDust\ParcelBairDustLoc.mxd 9/29/2022

ATTACHMENT 1

AMBIENT PRESSURE, TEMPERATURE, AND PREVALENT WIND DIRECTION MONITORING RESULTS

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Attachment 1: Ambient Pressure, Temperature, and Prevalent Wind Direction Monitoring Results

Start Date	Ambient Pressure (in Hg)	Ambient Temperature (°F)	Prevalent Wind Direction
7/7/2022[1]	30.01	58.95	WSW
7/11/2022[1]	29.89	58.88	WSW
7/12/2022[1]	29.90	61.20	W
7/13/2022[1]	29.95	59.13	WSW
7/14/2022[1]	29.96	57.43	WSW
7/18/2022[2]	30.04	59.79	W
7/19/2022[2]	30.10	56.27	W
7/20/2022[2]	30.12	55.63	W
7/21/2022[2]	30.07	55.85	W
7/25/2022[2]	29.99	59.20	W
7/26/2022[2]	30.04	60.27	W
7/27/2022[2]	30.05	58.27	W
7/28/2022[2]	29.99	58.28	W
8/1/2022[2]	30.06	63.50	WNW
8/2/2022[2]	30.07	62.18	W
8/3/2022[2]	29.97	61.20	W
8/4/2022[2]	29.98	63.57	W
8/8/2022[2]	30.06	64.64	W
8/9/2022[2]	30.08	65.58	W
8/10/2022[2]	30.13	66.09	W
8/11/2022[2]	30.11	63.63	W
8/15/2022[2]	29.90	63.70	W
8/16/2022[2]	29.87	64.82	WNW
8/17/2022[2]	29.97	60.52	WNW
8/18/2022[2]	30.00	59.94	W
8/22/2022[2]	30.04	62.66	W
8/23/2022[2]	29.89	60.89	WSW
8/24/2022[2]	29.94	60.73	W
8/25/2022[2]	30.04	65.88	WSW
8/29/2022[2]	30.00	62.42	W
8/30/2022[2]	30.07	62.44	WSW
8/31/2022[2]	30.01	61.79	WSW
9/1/2022[2]	29.97	65.10	W
9/6/2022[2]	29.89	75.08	W
9/7/2022[2]	29.98	71.58	NW
9/8/2022[2]	29.87	74.28	WNW
9/12/2022[2]	30.00	61.63	WSW
9/13/2022[2]	29.98	61.93	W

Attachment 1: Ambient Pressure, Temperature, and Prevalent Wind Direction Monitoring Results

Start Date	Ambient Pressure (in Hg)	Ambient Temperature (°F)	Prevalent Wind Direction
9/14/2022[2]	30.04	63.16	W
9/15/2022[2]	30.11	62.63	W

Notes:

[1]Data collected using wunderground.com from Bayview Manor - KCASANFR1775

[2]Data collected using wunderground.com from APTIM HPNS - KCASANFR1504

°F = degree Fareheit

in Hg = inches of mercury

E = East

N = North

S = South

W = West

ATTACHMENT 2
ASBESTOS MONITORING RESULTS

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Attachment 2: Asbestos Monitoring Results

Sample, Date and Station Information			Sampler Run Information			Asbestos Fibers		
Sample ID	Sample End Date[1]	Monitoring Station	Ave Flow Rate (l/min)	Duration of Run (min)	Total Air Volume Monitored (L)	Asbestos (fibers)	Conc Asbestos (fibers/cm^3)	Exceedance (Yes/No)
MSB01-070722	07/08/22	1	3.0	1,431	4293	13.0	0.001	No
MSB02-070722	07/08/22	2	3.0	1,437	4311	7.5	0.001	No
MSB113A-070722	07/08/22	113A	3.0	1,429	4287	12.5	0.001	No
MSB01-071122	07/11/22	1	2.4	443	1063	5.5	0.003	No
MSB02-071122	07/11/22	2	3.1	448	1388	6.0	0.002	No
MSB113A-071122	07/11/22	113A	2.3	436	1002	2.0	< 0.003	No
MSB01-071222	07/12/22	1	3.3	448	1478	5.5	0.002	No
MSB02-071222	07/12/22	2	2.8	440	1232	5.0	< 0.002	No
MSB113A-071222	07/12/22	113A	1.9	424	805.6	4.0	< 0.003	No
MSB01-071322	07/13/22	1	2.0	524	1048	9.5	0.004	No
MSB02-071322	07/13/22	2	3.0	417	1251	8.5	0.003	No
MSB113A-071322	07/13/22	113A	3.0	420	1260	2.5	< 0.002	No
MSB01-071422	07/15/22	1	2.3	1,466	3371	1.5	< 0.001	No
MSB02-071422	07/15/22	2	3.0	1,443	4329	3.0	< 0.001	No
MSB113A-071422	07/15/22	113A	2.1	1,472	3091	2.0	< 0.001	No
MSB01-071822	07/19/22	1	2.5	1,378	3445	1.0	< 0.001	No
MSB02-071822	07/19/22	2	2.6	1,419	3689	1.0	< 0.001	No
MSB113A-071822	07/19/22	113A	3.6	1,422	5119	1.0	< 0.001	No
MSB01-071922	07/20/22	1	3.2	1,429	4572	0.5	< 0.001	No
MSB02-071922	07/20/22	2	2.5	1,422	3555	2.0	< 0.001	No
MSB113A-071922	07/20/22	113A	2.3	1,424	3275	2.0	< 0.001	No
MSB01-072022	07/21/22	1	2.7	1,473	3387	0.5	< 0.001	No
MSB02-072022	07/21/22	2	2.3	1,462	3947	3.0	< 0.001	No
MSB113A-072022	07/21/22	113A	2.3	1,468	3376	0.0	< 0.001	No
MSB01-072122	07/22/22	1	2.7	1,433	3869	0.5	< 0.001	No
MSB02-072122	07/22/22	2	2.9	1,456	4222	2.0	< 0.001	No
MSB113A-072122	07/22/22	113A	2.3	1,441	3314	1.0	< 0.001	No
MSB01-072522	07/26/22	1	2.4	1,454	3490	3.5	< 0.002	No
MSB02-072522	07/26/22	2	2.9	1,443	4185	2.0	< 0.002	No
MSB113A-072522	07/26/22	113A	2.2	1,454	3199	4.0	< 0.002	No
MSB01-072622	07/27/22	1	3.7	1,431	5295	4.0	< 0.002	No
MSB02-072622	07/27/22	2	3.0	1,432	4296	0.5	< 0.002	No
MSB113A-072622	07/27/22	113A	3.4	1,422	4835	1.5	< 0.002	No
MSB01-072722	07/28/22	1	3.4	1,464	4978	0.5	< 0.002	No
MSB02-072722	07/28/22	2	3.0	1,475	4425	1.5	< 0.002	No
MSB113A-072722	07/28/22	113A	3.4	1,469	4995	7.0	0.002	No
MSB01-072822	07/29/22	1	3.3	1,455	4802	8.0	0.003	No
MSB02-072822	07/29/22	2	2.9	1,466	4251	4.5	< 0.002	No
MSB113A-072822	07/29/22	113A	3.4	1,462	4971	13.0	0.004	No
MSB01-080122	08/02/22	1	3.5	1,450	5075	3.5	< 0.001	No
MSB02-080122	08/02/22	2	3.1	1,439	4460	0.0	< 0.001	No
MSB113A-080122	08/02/22	113A	3.5	1,449	5071	5.0	< 0.001	No
MSB01-080222	08/03/22	1	3.5	1,421	4973	3.5	< 0.001	No
MSB02-080222	08/03/22	2	3.4	1,426	4848	2.0	< 0.001	No
MSB113A-080222	08/03/22	113A	3.6	1,424	5126	2.5	< 0.001	No
MSB01-080322	08/04/22	1	3.4	1,430	4862	3.0	< 0.001	No
MSB02-080322	08/04/22	2	3.6	1,429	5144	8.0	0.001	No
MSB113A-080322	08/04/22	113A	3.4	1,429	4858	1.5	< 0.001	No
MSB01-080422	08/05/22	1	3.4	1,480	5032	3.5	< 0.001	No
MSB02-080422	08/05/22	2	3.4	1,466	4984	11.0	0.001	No
MSB113A-080422	08/05/22	113A	3.5	1,468	5138	28.0	0.003	No
MSB01-080822	08/09/22	1	3.7	1,443	5339	9.0	0.001	No
MSB02-080822	08/09/22	2	3.0	1,438	4314	11.0	0.001	No
MSB113A-080822	08/09/22	113A	3.6	1,442	5191	1.0	<0.001	No
MSB01-080922	08/10/22	1	3.6	1,448	5213	4.5	<0.001	No
MSB02-080922	08/10/22	2	3.8	1,444	5487	8.5	0.001	No
MSB113A-080922	08/10/22	113A	3.3	1,441	4755	4.5	<0.001	No
MSB01-081022	08/11/22	1	3.2	1,446	4627	5.5	0.001	No
MSB02-081022	08/11/22	2	3.4	1,449	4927	3.5	<0.001	No
MSB113A-081022	08/11/22	113A	3.2	1,448	4634	3.0	<0.001	No
MSB01-081122	08/12/22	1	3.0	1,418	4254	2.5	<0.001	No
MSB02-081122	08/12/22	2	3.4	1,414	4808	2.0	<0.001	No
MSB113A-081122	08/12/22	113A	3.0	1,415	4245	1.5	<0.001	No
MSB01-081522	08/16/22	1	3.6	1,444	5198	3.0	<0.001	No
MSB02-081522	08/16/22	2	3.3	1,431	4722	2.0	<0.001	No
MSB113A-081522	08/16/22	113A	3.1	1,444	4476	2.0	<0.001	No

Attachment 2: Asbestos Monitoring Results

Sample, Date and Station Information			Sampler Run Information			Asbestos Fibers		
Sample ID	Sample End Date[1]	Monitoring Station	Ave Flow Rate (l/min)	Duration of Run (min)	Total Air Volume Monitored (L)	Asbestos (fibers)	Conc Asbestos (fibers/cm^3)	Exceedance (Yes/No)
MSB01-081622	08/17/22	1	3.2	1,434	4589	4.5	<0.001	No
MSB02-081622	08/17/22	2	3.3	1,440	4752	4.0	<0.001	No
MSB113A-081622	08/17/22	113A	3.2	1,433	4586	4.5	<0.001	No
MSB01-081722	08/18/22	1	3.7	1,429	5287	0.0	<0.001	No
MSB02-081722	08/18/22	2	3.1	1,428	4427	3.5	<0.001	No
MSB113A-081722	08/18/22	113A	3.2	1,431	4579	3.0	<0.001	No
MSB01-081822	08/19/22	1	3.4	1,457	4954	1.5	<0.001	No
MSB02-081822	08/19/22	2	3.1	1,471	4560	1.0	<0.001	No
MSB113A-081822	08/19/22	113A	3.2	1,462	4678	1.5	<0.001	No
MSB01-082222	08/23/22	1	3.5	1,460	5110	4.0	<0.001	No
MSB02-082222	08/23/22	2	3.2	1,444	4621	10.0	0.001	No
MSB113A-082222	08/23/22	113A	3.0	1,452	4356	4.0	<0.001	No
MSB01-082322	08/22/22	1	3.3	1,413	4663	1.5	<0.001	No
MSB02-082322	08/22/22	2	3.1	1,421	4405	1.5	<0.001	No
MSB113A-082322	08/22/22	113A	2.9	1,417	4109	0.5	<0.001	No
MSB01-082422	08/25/22	1	3.2	1,418	4538	2.5	<0.001	No
MSB02-082422	08/25/22	2	3.3	1,442	4759	3.5	<0.001	No
MSB113A-082422	08/25/22	113A	3.3	1,418	4679	1.0	<0.001	No
MSB01-082522	08/25/22[2]	1	3.0	459	1377	1.0	<0.002	No
MSB02-082522	08/25/22[2]	2	3.1	473	1466	6.0	0.002	No
MSB113A-082522	08/25/22[2]	113A	3.3	462	1525	5.5	0.002	No
MSB01-082922	08/30/22	1	3.1	1,441	4467	7.0	0.001	No
MSB02-082922	08/30/22	2	3.3	1,453	4795	7.5	0.001	No
MSB113A-082922	08/30/22	113A	3.4	1,450	4930	7.0	0.001	No
MSB01-083022	08/31/22	1	3.2	1,438	4602	5.0	<0.001	No
MSB02-083022	08/31/22	2	3.3	1,444	4765	5.0	<0.001	No
MSB113A-083022	08/31/22	113A	3.1	1,438	4458	5.5	0.001	No
MSB01-083122	09/01/22	1	3.5	1,434	5019	6.5	0.001	No
MSB02-083122	09/01/22	2	3.3	1,438	4745	7.0	0.001	No
MSB113A-083122	09/01/22	113A	3.0	1,437	4311	5.5	0.001	No
MSB01-090122	09/01/22[2]	1	3.5	389	1362	6.5	0.002	No
MSB02-090122	09/01/22[2]	2	3.1	397	1231	4.0	<0.002	No
MSB113A-090122	09/01/22[2]	113A	3.1	393	1218	4.5	<0.002	No
MSB01-090622	09/07/22	1	3.5	1,423	4980	6.5	0.001	No
MSB02-090622	09/07/22	2	3.2	1,423	4553	5.0	<0.001	No
MSB113A-090622	09/07/22	113A	3.4	1,424	4841	4.0	<0.001	No
MSB01-090722	09/08/22	1	3.5	1,459	5106	1.0	<0.001	No
MSB02-090722	09/08/22	2	3.6	1,457	5245	4.5	<0.001	No
MSB113A-090722	09/08/22	113A	3.4	1,458	4957	2.5	<0.001	No
MSB01-090822	09/08/22[2]	1	3.3	421	1389	3.5	<0.002	No
MSB02-090822	09/08/22[2]	2	3.5	455	1592	2.5	<0.002	No
MSB113A-090822	09/08/22[2]	113A	3.5	441	1543	2.0	<0.002	No
MSB01-091222	09/13/22	1	3.5	1,429	5001	2.0	<0.001	No
MSB02-091222	09/13/22	2	3.1	1,425	4417	3.0	<0.001	No
MSB113A-091222	09/13/22	113A	3.6	1,426	5133	2.5	<0.001	No
MSB01-091322	09/14/22	1	3.1	1,456	4513	1.5	<0.001	No
MSB02-091322	09/14/22	2	3.5	1,453	5085	5.0	<0.001	No
MSB113A-091322	09/14/22	113A	3.3	1,457	4808	2.5	<0.001	No
MSB01-091422	09/15/22	1	3.3	1,456	4804	4.5	<0.001	No
MSB02-091422	09/15/22	2	3.2	1,456	4659	2.5	<0.001	No
MSB113A-091422	09/15/22	113A	3.4	1,453	4940	7.5	0.001	No
MSB01-091522	09/15/22[2]	1	3.2	407	1302	3.0	<0.002	No
MSB02-091522	09/15/22[2]	2	3.5	451	1578	2.5	<0.002	No
MSB113A-091522	09/15/22[2]	113A	3.2	424	1356	2.0	<0.002	No

Notes:

[1]Sample "end" date indicates the date upon which sample collection ended.
[2]Air sample was taken down during the afternoon after field activities ceased.
l/min = liters per minute
L = liter
min = minutes
fibers/cm^3 = fibers per cubic centimeter
< = below detection limit

ATTACHMENT 3

PARTICULATE MATTER, SMALLER THAN TEN MICRONS (PM10) MONITORING RESULTS

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Attachment 3: Particulate Matter, Smaller than Ten Microns (PM10) Monitoring Results

Sample, Date and Station Information			Sampler Run Information	PM10								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concentration in Air (mg/m^3)	PM10 Perimeter Concentration (Downwind - Upwind) (mg/m^3)	PM10 Perimeter Concentration (Downwind - Upwind) (ug/m^3)	PM10 MSB113A Concentration (Downwind - Upwind) (mg/m^3)	PM10 MSB113A Perimeter Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level[3] (ug/m^3)	Exceedance (Yes/No)[2]
GES_PM061322-38	MSB01	7/8/2022	1575.14	0.019	-0.0170	-17.000	-0.0060	-6.000	5,000	No	50	No
GES_PM061322-39	MSB02	7/8/2022	1626.27	0.0020								
GES_PM061322-40	MSB113A	7/8/2022	1587.75	0.013								
GES_PM061322-41	MSB01	7/12/2022	1586.87	0.0081	0.0013	1.300	-0.0006	-0.600	5,000	No	50	No
GES_PM061322-42	MSB02	7/12/2022	1593.10	0.0094								
GES_PM061322-43	MSB113A	7/12/2022	1578.52	0.0075								
GES_PM061322-44	MSB01	7/13/2022	1668.76	0.0052	-0.0030	-3.000	-0.0015	-1.500	5,000	No	50	No
GES_PM061322-45	MSB02	7/13/2022	1607.71	0.0022								
GES_PM061322-46	MSB113A	7/13/2022	1600.23	0.0037								
GES_PM061322-47	MSB01	7/14/2022	1571.88	0.015	-0.0020	-2.000	0.0000	0.000	5,000	No	50	No
GES_PM061322-48	MSB02	7/14/2022	1547.49	0.013								
GES_PM061322-49	MSB113A	7/14/2022	1586.39	0.015								
GES_PM061322-50	MSB01	7/15/2022	1671.83	0.021	-0.0020	-2.000	0.0040	4.000	5,000	No	50	No
GES_PM061322-51	MSB02	7/15/2022	1636.90	0.019								
GES_PM061322-52	MSB113A	7/15/2022	1626.56	0.025								
GES_PM061322-53	MSB01	7/19/2022	1604.22	0.025	0.0000	0.000	-0.0010	-1.000	5,000	No	50	No
GES_PM061322-54	MSB02	7/19/2022	1584.87	0.025								
GES_PM070522-73	MSB113A	7/19/2022	1584.48	0.024 J								
GES_PM070522-74	MSB01	7/20/2022	1649.08	0.0082	-0.0007	-0.700	0.0038	3.800	5,000	No	50	No
GES_PM070522-75	MSB02	7/20/2022	1593.23	0.0075								
GES_PM070522-76	MSB113A	7/20/2022	1543.80	0.012 J								
GES_PM070522-78	MSB01	7/21/2022	1681.99	0.0056	0.0040	4.000	0.0020	2.000	5,000	No	50	No
GES_PM070522-79	MSB02	7/21/2022	1631.55	0.0096								
GES_PM070522-80	MSB113A	7/21/2022	1577.49	0.0076 J								
GES_PM070522-81	MSB01	7/22/2022	1645.32	0.012	0.0020	2.000	0.0000	0.000	5,000	No	50	No
GES_PM070522-82	MSB02	7/22/2022	1624.79	0.014								
GES_PM070522-83	MSB113A	7/22/2022	1609.69	0.012 J								
GES_PM070522-84	MSB01	7/26/2022	1656.40	0.0062	0.0009	0.900	-0.0001	-0.100	5,000	No	50	No
GES_PM070522-85	MSB02	7/26/2022	1640.17	0.0071								
GES_PM070522-86	MSB113A	7/26/2022	1621.60	0.0061								
GES_PM070522-87	MSB01	7/27/2022	1630.68	0.0074	0.0000	0.000	-0.0015	-1.500	5,000	No	50	No
GES_PM070522-88	MSB02	7/27/2022	1601.47	0.0074								
GES_PM070522-89	MSB113A	7/27/2022	1585.40	0.0059								
GES_PM071122-91	MSB01	7/28/2022	1652.35	0.0057	-0.0010	-1.000	-0.0036	-3.600	5,000	No	50	No
GES_PM071122-92	MSB02	7/28/2022	1645.25	0.0047								
GES_PM071122-93	MSB113A	7/28/2022	1618.52	0.0021 J+								
GES_PM071122-94	MSB01	7/29/2022	1656.03	0.0053	0.0007	0.700	-0.0035	-3.500	5,000	No	50	No
GES_PM071122-95	MSB02	7/29/2022	1630.44	0.0060								
GES_PM071122-96	MSB113A	7/29/2022	1602.17	0.0018 J+								
GES_PM071122-97	MSB01	08/02/22	1664.38	0.0084	0.001	0.900	0.0016	1.600	5,000	No	50	No
GES_PM071122-98	MSB02	08/02/22	1621.19	0.0093								
GES_PM071122-99	MSB113A	08/02/22	1620.16	0.01								
GES_PM071122-101	MSB01	08/03/22	1633.03	0.0087	0.003	3.300	0.0011	1.100	5,000	No	50	No
GES_PM071122-102	MSB02	08/03/22	1606.01	0.012								
GES_PM071122-103	MSB113A	08/03/22	1586.91	0.0098								

Attachment 3: Particulate Matter, Smaller than Ten Microns (PM10) Monitoring Results

Sample, Date and Station Information			Sampler Run Information	PM10								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concentration in Air (mg/m^3)	PM10 Perimeter Concentration (Downwind - Upwind) (mg/m^3)	PM10 Perimeter Concentration (Downwind - Upwind) (ug/m^3)	PM10 MSB113A Concentration (Downwind - Upwind) (mg/m^3)	PM10 MSB113A Perimeter Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level[3] (ug/m^3)	Exceedance (Yes/No)[2]
GESPM072622-145	MSB01	08/04/22	1641.25	0.011	0.002	2.000	0.0020	2.000	5,000	No	50	No
GESPM072622-146	MSB02	08/04/22	1607.65	0.013								
GESPM072622-147	MSB113A	08/04/22	1592.35	0.013 J								
GESPM072622-148	MSB01	08/05/22	1703.92	0.013	0.002	2.000	0.0010	1.000	5,000	No	50	No
GESPM072622-149	MSB02	08/05/22	1653.18	0.015								
GESPM072622-150	MSB113A	08/05/22	1484.68	0.014								
GES_PM071122-105	MSB01	08/09/22	1663.70	0.01	0.002	2.000	0.0000	0.000	5,000	No	50	No
GES_PM071122-106	MSB02	08/09/22	1622.89	0.012								
GES_PM071122-107	MSB113A	08/09/22	1623.49	0.01								
GESPM072622-153	MSB01	08/10/22	1699.59	0.008	0.002	1.600	0.0008	0.800	5,000	No	50	No
GESPM072622-154	MSB02	08/10/22	1630.75	0.0096								
GESPM072622-155	MSB113A	08/10/22	1637.96	0.0088								
GES_PM072622-108	MSB01	08/11/22	1657.11	0.0097	0.000	-0.300	-0.0007	-0.700	5,000	No	50	No
GESPM072622-151	MSB02	08/11/22	1635.06	0.0094								
GESPM072622-152	MSB113A	08/11/22	1642.95	0.009								
GESPM072622-156	MSB01	08/12/22	1623.36	0.01	-0.001	-1.300	0.0040	4.000	5,000	No	50	No
GESPM072622-157	MSB02	08/12/22	1598.56	0.0087								
GESPM072622-158	MSB113A	08/12/22	1601.40	0.014								
GESPM072622-159	MSB01	08/16/22	1666.46	0.026	0.000	0.000	-0.0010	-1.000	5,000	No	50	No
GESPM072622-160	MSB02	08/16/22	1629.77	0.026								
GESPM072622-161	MSB113A	08/16/22	1641.67	0.025								
GESPM080822-163	MSB01	08/17/22	1669.85	0.0093	0.002	1.700	0.0047	4.700	5,000	No	50	No
GESPM080822-164	MSB02	08/17/22	1548.50	0.011								
GESPM080822-165	MSB113A	08/17/22	1532.16	0.014								
GESPM080822-166	MSB01	08/18/22	1638.74	0.0047	0.001	0.600	0.0006	0.600	5,000	No	50	No
GESPM080822-167	MSB02	08/18/22	1637.56	0.0053								
GESPM080822-168	MSB113A	08/18/22	1611.00	0.0053								
GESPM080822-169	MSB01	08/19/22	1668.62	0.0025	0.006	6.100	0.0013	1.300	5,000	No	50	No
GESPM080822-170	MSB02	08/19/22	1660.59	0.0086								
GESPM080822-171	MSB113A	08/19/22	1660.29	0.0038								
GESPM080822-172	MSB01	08/23/22	1674.26	0.0066	0.002	1.600	0.0006	0.600	5,000	No	50	No
GESPM080822-173	MSB02	08/23/22	1639.37	0.0082								
GESPM080822-174	MSB113A	08/23/22	1601.43	0.0072								
GESPM080822-176	MSB01	08/24/22	1639.29	0.0068	-0.001	-0.800	0.0010	1.000	5,000	No	50	No
GESPM080822-177	MSB02	08/24/22	1609.09	0.006								
GESPM080822-178	MSB113A	08/24/22	1571.14	0.0078								
GESPM080822-179	MSB01	08/25/22	1655.34	0.0048	-0.001	-0.900	0.0007	0.700	5,000	No	50	No
GESPM080822-180	MSB02	08/25/22	1633.41	0.0039								
GESPM080822-181	MSB113A	08/25/22	1584.08	0.0055								
GESPM080822-182	MSB01	08/25/22[3]	513.61	0.006	-0.005	-5.000	0.0020	2.000	5,000	No	50	No
GESPM080822-183	MSB02	08/25/22[3]	527.62	< 0.00095								
GESPM080822-184	MSB113A	08/25/22[3]	510.18	0.008								
GESPM080822-185	MSB01	08/30/22	1636.24	0.019	-0.001	-1.000	0.0020	2.000	5,000	No	50	No
GESPM080822-186	MSB02	08/30/22	1617.12	0.018								
GESPM080822-187	MSB113A	08/30/22	1582.23	0.021								

Attachment 3: Particulate Matter, Smaller than Ten Microns (PM10) Monitoring Results

Sample, Date and Station Information			Sampler Run Information	PM10								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concentration in Air (mg/m^3)	PM10 Perimeter Concentration (Downwind - Upwind) (mg/m^3)	PM10 Perimeter Concentration (Downwind - Upwind) (ug/m^3)	PM10 MSB113A Concentration (Downwind - Upwind) (mg/m^3)	PM10 MSB113A Perimeter Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level[3] (ug/m^3)	Exceedance (Yes/No)[2]
GESPM080822-189	MSB01	08/31/22	1648.08	0.018	-0.005	-5.000	-0.0020	-2.000	5,000	No	50	No
GESPM080822-190	MSB02	08/31/22	1637.85	0.013								
GESPM080822-191	MSB113A	08/31/22	1596.26	0.016								
GESPM080822-192	MSB01	09/01/22	1655.98	0.012	-0.001	-1.000	0.0030	3.000	5,000	No	50	No
GESPM080822-193	MSB02	09/01/22	1629.07	0.011								
GESPM080822-194	MSB113A	09/01/22	1588.04	0.015								
GESPM080822-195	MSB01	09/01/22[3]	439.21	0.008	0.002	2.000	0.0010	1.000	5,000	No	50	No
GESPM080822-196	MSB02	09/01/22[3]	450.62	0.01								
GESPM080822-197	MSB113A	09/01/22[3]	431.76	0.009								
GESPM080822-198	MSB01	09/07/22	1649.77	0.037	-0.009	-9.000	-0.0020	-2.000	5,000	No	50	No
GESPM082222-199	MSB02	09/07/22	1630.41	0.028								
GESPM082222-200	MSB113A	09/07/22	1611.43	0.035								
GESPM082222-202	MSB01	09/08/22	1685.89	0.028	-0.003	-3.000	-0.0070	-7.000	5,000	No	50	No
GESPM082222-203	MSB02	09/08/22	1668.92	0.025								
GESPM082222-204	MSB113A	09/08/22	1661.41	0.021								
GESPM082222-205	MSB01	09/08/22[3]	435.50	0.042	-0.016	-16.000	-0.0030	-3.000	5,000	No	50	No
GESPM082222-206	MSB02	09/08/22[3]	512.06	0.026								
GESPM082222-207	MSB113A	09/08/22[3]	491.77	0.039								
GESPM082222-208	MSB01	09/13/22	1589.23	0.024	-0.001	-1.000	0.0030	3.000	5,000	No	50	No
GESPM082222-209	MSB02	09/13/22	1614.36	0.023								
GESPM082222-210	MSB113A	09/13/22	1608.82	0.027								
GESPM082222-212	MSB01	09/14/22	1674.65	0.0094	-0.001	-0.900	0.0002	0.200	5,000	No	50	No
GESPM082222-213	MSB02	09/14/22	1649.19	0.0085								
GESPM082222-214	MSB113A	09/14/22	1643.13	0.0096								
GESPM082222-215	MSB01	09/15/22	1670.91	0.010	-0.002	-2.100	0.0040	4.000	5,000	No	50	No
GESPM082222-216	MSB02	09/15/22	1648.13	0.0079								
GESPM090622-235	MSB113A	09/15/22	1648.11	0.014								
GESPM090622-236	MSB01	09/15/22[3]	469.15	0.0045	-0.001	-0.900	-0.0034	-3.400	5,000	No	50	No
GESPM090622-237	MSB02	09/15/22[3]	495.02	0.0036								
GESPM090622-238	MSB113A	09/15/22[3]	472.73	< 0.0011								

Notes:

[1]Air sample was not collected on days with rain.

[2]PM10 data is additionally compared to the recommended dust action level of 50 ug/m3 for total PM10 in accordance with the DTSC Human and Ecological Risk Office (HERO) Parcel E Memorandum dated April 29, 2019 (DTSC, 2019) for informational purposes only.

[3]Air sample was taken down during the afternoon after field activities ceased.

Sample locations are shown on Figure 2-1

min = minutes

Cal/OSHA = California Division of Occupational Safety and Health

HERO = Human and Ecological Risk Office

J = estimated concentration. See data review report for details.

J+ = estimated concentration biased high. See data review report for details.

m^3 = cubic meters

mg/m^3 = milligrams per cubic meter

PEL = permissible exposure limit

PM10 = particulate matter smaller than 10 microns in diameter

ug/m^3 = micrograms per cubic meter

ATTACHMENT 4
LEAD AND MANGANESE MONITORING RESULTS

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Attachment 4: Copper, Lead, and Manganese Monitoring Results

Sample, Date and Station Information			Sampler Run Information	Lead		Manganese	
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concentration in Air (mg/m^3)	Exceedance (Yes/No)	Concentration in Air (mg/m^3)	Exceedance (Yes/No)
GES_PM061322-38	MSB01	7/8/2022	1575.14	0.0000029	No	0.0000075	No
GES_PM061322-39	MSB02	7/8/2022	1626.27	0.0000012	No	0.0000026	No
GES_PM061322-40	MSB113A	7/8/2022	1587.75	0.00000082	No	0.0000024	No
GES_PM061322-41	MSB01	7/12/2022	1586.87	0.0000012	No	0.0000030	No
GES_PM061322-42	MSB02	7/12/2022	1593.10	0.00000088	No	0.0000026	No
GES_PM061322-43	MSB113A	7/12/2022	1578.52	0.00000078	No	0.0000019	No
GES_PM061322-44	MSB01	7/13/2022	1668.76	0.00000063 J	No	0.0000024	No
GES_PM061322-45	MSB02	7/13/2022	1607.71	0.0000012	No	0.0000014	No
GES_PM061322-46	MSB113A	7/13/2022	1600.23	0.00000069 J	No	0.0000021	No
GES_PM061322-47	MSB01	7/14/2022	1571.88	0.00000076	No	0.0000029	No
GES_PM061322-48	MSB02	7/14/2022	1547.49	0.00000063 J	No	0.0000014	No
GES_PM061322-49	MSB113A	7/14/2022	1586.39	0.00000073 J	No	0.0000019	No
GES_PM061322-50	MSB01	7/15/2022	1671.83	0.00000090	No	0.0000020	No
GES_PM061322-51	MSB02	7/15/2022	1636.90	0.00000070 J	No	0.0000021	No
GES_PM061322-52	MSB113A	7/15/2022	1626.56	0.00000098	No	0.0000028	No
GES_PM061322-53	MSB01	7/19/2022	1604.22	0.0000013	No	0.0000029	No
GES_PM061322-54	MSB02	7/19/2022	1584.87	0.00000075 J	No	0.00000220	No
GES_PM070522-73	MSB113A	7/19/2022	1584.48	0.0000011	No	0.0000027	No
GES_PM070522-74	MSB01	7/20/2022	1649.08	0.00000076	No	0.0000020	No
GES_PM070522-75	MSB02	7/20/2022	1593.23	0.00000044 J	No	0.0000014	No
GES_PM070522-76	MSB113A	7/20/2022	1543.80	0.0000013	No	0.0000028	No
GES_PM070522-78	MSB01	7/21/2022	1681.99	0.0000010	No	0.0000028	No
GES_PM070522-79	MSB02	7/21/2022	1631.55	0.00000072 J	No	0.00000190	No
GES_PM070522-80	MSB113A	7/21/2022	1577.49	0.00000081	No	0.00000220	No
GES_PM070522-81	MSB01	7/22/2022	1645.32	0.0000010	No	0.0000031	No
GES_PM070522-82	MSB02	7/22/2022	1624.79	0.00000066 J	No	0.0000025	No
GES_PM070522-83	MSB113A	7/22/2022	1609.69	0.00000072 J	No	0.0000020	No
GES_PM070522-84	MSB01	7/26/2022	1656.40	0.00000090	No	0.0000025 J+	No
GES_PM070522-85	MSB02	7/26/2022	1640.17	0.00000055 J	No	0.0000015 J+	No
GES_PM070522-86	MSB113A	7/26/2022	1621.60	0.00000052 J	No	0.0000016 J+	No
GES_PM070522-87	MSB01	7/27/2022	1630.68	0.00000091	No	0.0000019 J+	No
GES_PM070522-88	MSB02	7/27/2022	1601.47	0.00000048 J	No	0.0000015 J+	No
GES_PM070522-89	MSB113A	7/27/2022	1585.40	0.00000075 J	No	0.0000018 J+	No
GES_PM071122-91	MSB01	7/28/2022	1652.35	0.0000011	No	0.0000028 J+	No
GES_PM071122-92	MSB02	7/28/2022	1645.25	0.00000064 J	No	0.0000014 J+	No
GES_PM071122-93	MSB113A	7/28/2022	1618.52	0.00000077	No	0.0000014 J+	No
GES_PM071122-94	MSB01	7/29/2022	1656.03	0.00000040 J	No	0.0000017 J+	No
GES_PM071122-95	MSB02	7/29/2022	1630.44	0.00000039 J	No	0.0000024 J+	No
GES_PM071122-96	MSB113A	7/29/2022	1602.17	0.00000058 J	No	0.0000012 J+	No
GES_PM071122-97	MSB01	08/02/22	1664.38	0.0000007 J	No	0.0000026	No
GES_PM071122-98	MSB02	08/02/22	1621.19	0.00000079	No	0.0000019	No
GES_PM071122-99	MSB113A	08/02/22	1620.16	0.00000093	No	0.0000028	No

Attachment 4: Copper, Lead, and Manganese Monitoring Results

Sample, Date and Station Information			Sampler Run Information	Lead		Manganese	
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concentration in Air (mg/m^3)	Exceedance (Yes/No)	Concentration in Air (mg/m^3)	Exceedance (Yes/No)
GES_PM071122-101	MSB01	08/03/22	1633.03	0.00000089	No	0.0000025	No
GES_PM071122-102	MSB02	08/03/22	1606.01	0.0000007 J	No	0.0000031	No
GES_PM071122-103	MSB113A	08/03/22	1586.91	0.00000076	No	0.0000026	No
GESPM072622-145	MSB01	08/04/22	1641.25	0.00000046 J	No	0.0000016	No
GESPM072622-146	MSB02	08/04/22	1607.65	0.00000059 J	No	0.0000025	No
GESPM072622-147	MSB113A	08/04/22	1592.35	0.00000044 J	No	0.0000017	No
GESPM072622-148	MSB01	08/05/22	1703.92	0.0000006 J	No	0.0000021	No
GESPM072622-149	MSB02	08/05/22	1653.18	0.0000012	No	0.0000031	No
GESPM072622-150	MSB113A	08/05/22	1484.68	0.00000069 J	No	0.0000021	No
GES_PM071122-105	MSB01	08/09/22	1663.70	< 0.00000072	No	0.000002	No
GES_PM071122-106	MSB02	08/09/22	1622.89	< 0.00000074	No	0.0000035	No
GES_PM071122-107	MSB113A	08/09/22	1623.49	< 0.00000074	No	0.0000018	No
GESPM072622-153	MSB01	08/10/22	1699.59	< 0.00000071	No	0.0000019	No
GESPM072622-154	MSB02	08/10/22	1630.75	< 0.00000074	No	0.0000026	No
GESPM072622-155	MSB113A	08/10/22	1637.96	< 0.00000073	No	0.000002	No
GES_PM072622-108	MSB01	08/11/22	1657.11	< 0.00000072	No	0.0000021	No
GESPM072622-151	MSB02	08/11/22	1635.06	< 0.00000073	No	0.0000016	No
GESPM072622-152	MSB113A	08/11/22	1642.95	< 0.00000073	No	0.0000018	No
GESPM072622-156	MSB01	08/12/22	1623.36	< 0.00000074	No	0.000002	No
GESPM072622-157	MSB02	08/12/22	1598.56	< 0.00000075	No	0.0000023	No
GESPM072622-158	MSB113A	08/12/22	1601.40	< 0.00000075	No	0.0000045	No
GESPM072622-159	MSB01	08/16/22	1666.46	< 0.00000072	No	0.0000034	No
GESPM072622-160	MSB02	08/16/22	1629.77	< 0.00000074	No	0.0000033	No
GESPM072622-161	MSB113A	08/16/22	1641.67	< 0.00000073	No	0.0000036	No
GESPM080822-163	MSB01	08/17/22	1669.85	< 0.00000072	No	0.0000025	No
GESPM080822-164	MSB02	08/17/22	1548.50	< 0.00000077	No	0.0000036	No
GESPM080822-165	MSB113A	08/17/22	1532.16	< 0.00000078	No	0.0000048	No
GESPM080822-166	MSB01	08/18/22	1638.74	< 0.00000073	No	0.0000022	No
GESPM080822-167	MSB02	08/18/22	1637.56	< 0.00000073	No	0.0000022	No
GESPM080822-168	MSB113A	08/18/22	1611.00	< 0.00000074	No	0.0000027	No
GESPM080822-169	MSB01	08/19/22	1668.62	< 0.00000072	No	0.0000019	No
GESPM080822-170	MSB02	08/19/22	1660.59	< 0.00000072	No	0.0000071	No
GESPM080822-171	MSB113A	08/19/22	1660.29	< 0.00000072	No	0.0000023	No
GESPM080822-172	MSB01	08/23/22	1674.26	0.00000075	No	0.0000028	No
GESPM080822-173	MSB02	08/23/22	1639.37	0.00000068 J	No	0.0000041	No
GESPM080822-174	MSB113A	08/23/22	1601.43	0.00000056 J	No	0.0000018	No
GESPM080822-176	MSB01	08/24/22	1639.29	0.0000006 J	No	0.0000015	No
GESPM080822-177	MSB02	08/24/22	1609.09	0.00000057 J	No	0.0000017	No
GESPM080822-178	MSB113A	08/24/22	1571.14	0.00000067 J	No	0.000002	No
GESPM080822-179	MSB01	08/25/22	1655.34	0.00000044 J	No	0.0000017	No
GESPM080822-180	MSB02	08/25/22	1633.41	0.00000061 J	No	0.0000025	No
GESPM080822-181	MSB113A	08/25/22	1584.08	0.00000051 J	No	0.0000019	No

Attachment 4: Copper, Lead, and Manganese Monitoring Results

Sample, Date and Station Information			Sampler Run Information	Lead		Manganese	
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concentration in Air (mg/m^3)	Exceedance (Yes/No)	Concentration in Air (mg/m^3)	Exceedance (Yes/No)
GESPM080822-182	MSB01	08/25/22[2]	513.61	0.0000014 J	No	0.0000044	No
GESPM080822-183	MSB02	08/25/22[2]	527.62	0.000001 J	No	0.0000034	No
GESPM080822-184	MSB113A	08/25/22[2]	510.18	0.0000011 J	No	0.0000036	No
GESPM080822-185	MSB01	08/30/22	1636.24	0.0000016	No	0.0000035	No
GESPM080822-186	MSB02	08/30/22	1617.12	0.00000071 J	No	0.0000048	No
GESPM080822-187	MSB113A	08/30/22	1582.23	0.00000073 J	No	0.0000028	No
GESPM080822-189	MSB01	08/31/22	1648.08	0.0000016	No	0.0000033	No
GESPM080822-190	MSB02	08/31/22	1637.85	0.00000055 J	No	0.0000035	No
GESPM080822-191	MSB113A	08/31/22	1596.26	0.00000059 J	No	0.0000021	No
GESPM080822-192	MSB01	09/01/22	1655.98	0.00000046 J	No	0.0000017	No
GESPM080822-193	MSB02	09/01/22	1629.07	0.00000048 J	No	0.0000021	No
GESPM080822-194	MSB113A	09/01/22	1588.04	0.00000069 J	No	0.0000024	No
GESPM080822-195	MSB01	09/01/22[2]	439.21	0.0000017 J	No	0.0000043	No
GESPM080822-196	MSB02	09/01/22[2]	450.62	0.0000012 J	No	0.0000068	No
GESPM080822-197	MSB113A	09/01/22[2]	431.76	0.0000019 J	No	0.0000054	No
GESPM080822-198	MSB01	09/07/22	1649.77	0.0000023	No	0.0000084	No
GESPM082222-199	MSB02	09/07/22	1630.41	0.0000012	No	0.0000076	No
GESPM082222-200	MSB113A	09/07/22	1611.43	0.0000019	No	0.0000068	No
GESPM082222-202	MSB01	09/08/22	1685.89	0.0000014	No	0.0000039	No
GESPM082222-203	MSB02	09/08/22	1668.92	0.0000013	No	0.0000043	No
GESPM082222-204	MSB113A	09/08/22	1661.41	0.0000012	No	0.0000033	No
GESPM082222-205	MSB01	09/08/22[2]	435.50	0.0000031	No	0.000021	No
GESPM082222-206	MSB02	09/08/22[2]	512.06	0.0000035	No	0.0000074	No
GESPM082222-207	MSB113A	09/08/22[2]	491.77	0.0000046	No	0.000012	No
GESPM082222-208	MSB01	09/13/22	1589.23	0.00000091	No	0.0000026	No
GESPM082222-209	MSB02	09/13/22	1614.36	0.00000081	No	0.0000068	No
GESPM082222-210	MSB113A	09/13/22	1608.82	0.000001	No	0.0000038	No
GESPM082222-212	MSB01	09/14/22	1674.65	0.00000059 J	No	0.0000016	No
GESPM082222-213	MSB02	09/14/22	1649.19	0.00000043 J	No	0.0000024	No
GESPM082222-214	MSB113A	09/14/22	1643.13	0.00000075	No	0.0000022	No
GESPM082222-215	MSB01	09/15/22	1670.91	0.00000042 J	No	0.0000022	No
GESPM082222-216	MSB02	09/15/22	1648.13	0.00000054 J	No	0.0000022	No
GESPM090622-235	MSB113A	09/15/22	1648.11	0.00000056 J	No	0.0000026	No
GESPM090622-236	MSB01	09/15/22[2]	469.15	0.00000072 J	No	0.0000046	No
GESPM090622-237	MSB02	09/15/22[2]	495.02	0.0000011 J	No	0.0000056	No
GESPM090622-238	MSB113A	09/15/22[2]	472.73	0.0000016 J	No	0.0000062	No

Notes:

[1]Air sample was not collected on days with rain.

[2]Air sample was taken down during the afternoon after field activities ceased.

Sample locations are shown on Figure 2-1

m^3 = cubic meters

mg/m^3 = milligrams per cubic meter

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

J+ = estimated concentration biased high. See data review report for details.

< = below detection limit

ATTACHMENT 5

TOTAL SUSPENDED PARTICULATES MONITORING RESULTS

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Attachment 5: Total Suspended Particulates Monitoring Results

Sample, Date and Station Information			Sampler Run Information	TSP								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concen-tration in Air (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (ug/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (mg/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level (ug/m^3)	Exceedance (Yes/No)
GES_TSP061322-38	MSB01	7/8/2022	1752.44	0.0180891	0.002305	2.305	0.0056	5.594	5,000	No	50	No
GES_TSP061322-39	MSB02	7/8/2022	1740.72	0.0203939								
GES_TSP061322-40	MSB113A	7/8/2022	1567.65	0.0236828								
GES_TSP061322-41	MSB01	7/12/2022	1764.96	0.0162610	0.0064	6.373	0.0026	2.590	5,000	No	50	No
GES_TSP061322-42	MSB02	7/12/2022	1745.16	0.0226340								
GES_TSP061322-43	MSB113A	7/12/2022	1554.26	0.0188514								
GES_TSP061322-44	MSB01	7/13/2022	1767.79	0.0098461	-0.000592	-0.592	0.0046	4.600	5,000	No	50	No
GES_TSP061322-45	MSB02	7/13/2022	1739.85	0.0092537								
GES_TSP061322-46	MSB113A	7/13/2022	1578.31	0.0144458								
GES_TSP061322-47	MSB01	7/14/2022	1755.31	0.0225031	-0.0008	-0.843	0.0056	5.631	5,000	No	50	No
GES_TSP061322-48	MSB02	7/14/2022	1675.92	0.0216597								
GES_TSP061322-49	MSB113A	7/14/2022	1567.5	0.0281340								
GES_TSP061322-50	MSB01	7/15/2022	1816.52	0.0218550	0.0084	8.438	0.0199	19.915	5,000	No	50	No
GES_TSP061322-51	MSB02	7/15/2022	1792.47	0.0302934								
GES_TSP061322-52	MSB113A	7/15/2022	1601.64	0.0417697								
GES_TSP061322-53	MSB01	7/19/2022	1735.87	0.0288616	0.0048	4.821	-0.0179	-17.859	5,000	No	50	No
GES_TSP061322-54	MSB02	7/19/2022	1730.85	0.0336829								
GES_TSP070522-73	MSB113A	7/19/2022	1645.04	0.0110028 J								
GES_TSP070522-74	MSB01	7/20/2022	1761.31	0.0118662	0.0009	0.927	-0.0028	-2.797	5,000	No	50	No
GES_TSP070522-75	MSB02	7/20/2022	1750.99	0.0127928								
GES_TSP070522-76	MSB113A	7/20/2022	1742.11	0.0090695 J								
GES_TSP070522-78	MSB01	7/21/2022	1808.34	0.0068018	0.0048	4.765	-0.0011	-1.131	5,000	No	50	No
GES_TSP070522-79	MSB02	7/21/2022	1806.85	0.0115671								
GES_TSP070522-80	MSB113A	7/21/2022	1639.99	0.0056708 J								
GES_TSP070522-81	MSB01	7/22/2022	1747.17	0.0186015	0.0125	12.465	-0.0133	-13.257	5,000	No	50	No
GES_TSP070522-82	MSB02	7/22/2022	1757.52	0.0310665								
GES_TSP070522-83	MSB113A	7/22/2022	1627.68	0.005345 J								

Attachment 5: Total Suspended Particulates Monitoring Results

Sample, Date and Station Information			Sampler Run Information	TSP								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concen-tration in Air (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (ug/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (mg/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level (ug/m^3)	Exceedance (Yes/No)
GES_TSP070522-84	MSB01	7/26/2022	1771.32	0.0108958	-0.0013	-1.322	-0.0035	-3.488	5,000	No	50	No
GES_TSP070522-85	MSB02	7/26/2022	1754.87	0.0095734								
GES_TSP070522-86	MSB113A	7/26/2022	1647.00	0.0074074								
GES_TSP070522-87	MSB01	7/27/2022	1743.98	0.0115254	0.0015	1.493	-0.0034	-3.375	5,000	No	50	No
GES_TSP070522-88	MSB02	7/27/2022	1736.02	0.0130183								
GES_TSP070522-89	MSB113A	7/27/2022	1607.22	0.0081507								
GES_TSP071122-91	MSB01	7/28/2022	1795.60	0.0074070	0.0021	2.120	-0.0035	-3.532	5,000	No	50	No
GES_TSP071122-92	MSB02	7/28/2022	1815.93	0.0095268								
GES_TSP071122-93	MSB113A	7/28/2022	1651.72	0.0038747 J+								
GES_TSP071122-94	MSB01	7/29/2022	1767.63	0.0067322	0.0037	3.659	-0.0039	-3.945	5,000	No	50	No
GES_TSP071122-95	MSB02	7/29/2022	1790.03	0.0103909								
GES_TSP071122-96	MSB113A	7/29/2022	1650.33	0.0027873 J+								
GES_TSP071122-97	MSB01	08/02/22	1786.84	0.0169573	0.001	0.703	-0.0073	-7.250	5,000	No	50	No
GES_TSP071122-98	MSB02	08/02/22	1755.31	0.0176607								
GES_TSP071122-99	MSB113A	08/02/22	1637.99	0.009707								
GES_TSP071122-101	MSB01	08/03/22	1777.20	0.0108598	0.018	17.965	0.00013	0.131	5,000	No	50	No
GES_TSP071122-102	MSB02	08/03/22	1734.64	0.0288244								
GES_TSP071122-103	MSB113A	08/03/22	1610.42	0.0109909								
GES_TSP071122-104	MSB01	08/04/22	1767.28	0.0158436	0.010	9.656	-0.0054	-5.387	5,000	No	50	No
GES_TSP071122-105	MSB02	08/04/22	1745.16	0.0254991								
GES_TSP071122-106	MSB113A	08/04/22	1616.17	0.0104568 J								
GES_TSP071122-107	MSB01	08/05/22	1802.32	0.0221381	0.009	8.920	-0.0085	-8.539	5,000	No	50	No
GES_TSP071122-108	MSB02	08/05/22	1790.20	0.031058								
GESTSP072622-145	MSB113A	08/05/22	1500.13	0.0135988								
GESTSP072622-147	MSB01	08/09/22	1788.65	0.0134179	0.009	8.551	-0.0010	-1.011	5,000	No	50	No
GESTSP072622-148	MSB02	08/09/22	1761.55	0.0219693								
GESTSP072622-149	MSB113A	08/09/22	1636.18	0.0124069								

Attachment 5: Total Suspended Particulates Monitoring Results

Sample, Date and Station Information			Sampler Run Information	TSP								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concen-tration in Air (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (ug/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (mg/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level (ug/m^3)	Exceedance (Yes/No)
GESTSP072622-150	MSB01	08/10/22	1784.74	0.0141757	0.003	3.039	0.0025	2.526	5,000	No	50	No
GESTSP072622-151	MSB02	08/10/22	1777.57	0.0172145								
GESTSP072622-152	MSB113A	08/10/22	1628.55	0.016702								
GESTSP072622-153	MSB01	08/11/22	1781.62	0.0146496	-0.001	-1.096	-0.0029	-2.933	5,000	No	50	No
GESTSP072622-154	MSB02	08/11/22	1785.54	0.0135533								
GESTSP072622-155	MSB113A	08/11/22	1664.35	0.0117163								
GESTSP072622-156	MSB01	08/12/22	1746.69	0.0168891	0.006	6.443	0.0212	21.213	5,000	No	50	No
GESTSP072622-157	MSB02	08/12/22	1735.79	0.0233323								
GESTSP072622-158	MSB113A	08/12/22	1585.22	0.038102								
GESTSP072622-159	MSB01	08/16/22	1812.54	0.0263167	0.010	9.794	0.0185	18.510	5,000	No	50	No
GESTSP072622-160	MSB02	08/16/22	1747.40	0.0361108								
GESTSP072622-161	MSB113A	08/16/22	1621.82	0.0448262								
GESTSP080822-163	MSB01	08/17/22	1755.57	0.0213036	0.002	1.720	0.0022	2.176	5,000	No	50	No
GESTSP080822-164	MSB02	08/17/22	1763.42	0.0230234								
GESTSP080822-165	MSB113A	08/17/22	1605.64	0.0234797								
GESTSP080822-166	MSB01	08/18/22	1747.10	0.0170568	0.003	3.056	-0.0071	-7.127	5,000	No	50	No
GESTSP080822-167	MSB02	08/18/22	1740.22	0.0201124								
GESTSP080822-168	MSB113A	08/18/22	1631.46	0.0099298								
GESTSP080822-169	MSB01	08/19/22	1766.07	0.010362	0.019	19.342	-0.0025	-2.478	5,000	No	50	No
GESTSP080822-170	MSB02	08/19/22	1794.36	0.0297042								
GESTSP080822-171	MSB113A	08/19/22	1648.85	0.0078843								
GESTSP080822-172	MSB01	08/23/22	1781.10	0.0152153	0.016	16.216	-0.0043	-4.263	5,000	No	50	No
GESTSP080822-173	MSB02	08/23/22	1759.39	0.0314313								
GESTSP080822-174	MSB113A	08/23/22	1625.25	0.0109522								
GESTSP080822-176	MSB01	08/24/22	1735.43	0.013138	0.001	0.959	0.0021	2.075	5,000	No	50	No
GESTSP080822-177	MSB02	08/24/22	1745.01	0.0140973								
GESTSP080822-178	MSB113A	08/24/22	1564.48	0.0152127								

Attachment 5: Total Suspended Particulates Monitoring Results

Sample, Date and Station Information			Sampler Run Information	TSP								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concen-tration in Air (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (ug/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (mg/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level (ug/m^3)	Exceedance (Yes/No)
GESTSP080822-179	MSB01	08/25/22	1759.01	0.0128481	-0.001	-0.848	-0.0028	-2.833	5,000	No	50	No
GESTSP080822-180	MSB02	08/25/22	1783.36	0.0119998								
GESTSP080822-181	MSB113A	08/25/22	1607.64	0.0100147								
GESTSP080822-182	MSB01	08/25/22[2]	552.01	0.0217387	-0.009	-8.750	-0.0061	-6.078	5,000	No	50	No
GESTSP080822-183	MSB02	08/25/22[2]	577.41	0.012989								
GESTSP080822-184	MSB113A	08/25/22[2]	510.83	0.0156608								
GESTSP080822-185	MSB01	08/30/22	1755.42	0.0225017	0.008	8.500	0.0082	8.241	5,000	No	50	No
GESTSP080822-186	MSB02	08/30/22	1761.22	0.0310012								
GESTSP080822-187	MSB113A	08/30/22	1567.83	0.0307431								
GESTSP080822-189	MSB01	08/31/22	1716.69	0.0155532	0.015	15.187	0.0082	8.153	5,000	No	50	No
GESTSP080822-190	MSB02	08/31/22	1763.17	0.0307401								
GESTSP080822-191	MSB113A	08/31/22	1590.28	0.0237065								
GESTSP080822-192	MSB01	09/01/22	1799.18	0.0161185	0.004	4.276	0.0052	5.210	5,000	No	50	No
GESTSP080822-193	MSB02	09/01/22	1765.21	0.0203942								
GESTSP080822-194	MSB113A	09/01/22	1580.07	0.0213282								
GESTSP080822-195	MSB01	09/01/22[2]	467.94	0.0170962	0.007	7.326	0.0007	0.689	5,000	No	50	No
GESTSP080822-196	MSB02	09/01/22[2]	483.17	0.024422								
GESTSP080822-197	MSB113A	09/01/22[2]	432.94	0.0177854								
GESTSP080822-198	MSB01	09/07/22	1781.31	0.0407565	0.005	5.394	0.0046	4.573	5,000	No	50	No
GESTSP082222-199	MSB02	09/07/22	1776.78	0.0461509								
GESTSP082222-200	MSB113A	09/07/22	1590.59	0.0453291								
GESTSP082222-202	MSB01	09/08/22	1824.13	0.0323442	0.004	3.854	0.0066	6.556	5,000	No	50	No
GESTSP082222-203	MSB02	09/08/22	1806.72	0.0361982								
GESTSP082222-204	MSB113A	09/08/22	1616.98	0.0388997								
GESTSP082222-205	MSB01	09/08/22[2]	510.35	0.0656412	-0.028	-28.256	-0.0138	-13.755	5,000	No	50	No
GESTSP082222-206	MSB02	09/08/22[2]	553.69	0.0373855								
GESTSP082222-207	MSB113A	09/08/22[2]	481.82	0.0518866								

Attachment 5: Total Suspended Particulates Monitoring Results

Sample, Date and Station Information			Sampler Run Information	TSP								
Sample ID	Monitoring Station	Sample End Date[1]	Total Air Volume Monitored (m^3)	Concen-tration in Air (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (mg/m^3)	TSP Perimeter Concentration (Downwind - Upwind) (ug/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (mg/m^3)	TSP MSB113A Concentration (Downwind - Upwind) (ug/m^3)	Cal/OSHA PEL (ug/m^3)	Exceedance (Yes/No)	HERO Action Level (ug/m^3)	Exceedance (Yes/No)
GESTSP082222-208	MSB01	09/13/22	1736.06	0.0326602	0.032	31.865	0.0058	5.849	5,000	No	50	No
GESTSP082222-209	MSB02	09/13/22	1729.56	0.0645251								
GESTSP082222-210	MSB113A	09/13/22	1560.66	0.0385093								
GESTSP082222-212	MSB01	09/14/22	1770.83	0.0164894	0.004	4.374	0.0004	0.377	5,000	No	50	No
GESTSP082222-213	MSB02	09/14/22	1783.03	0.0208634								
GESTSP082222-214	MSB113A	09/14/22	1606.74	0.0168665								
GESTSP082222-215	MSB01	09/15/22	1769.49	0.0161628	0.003	3.408	0.0006	0.584	5,000	No	50	No
GESTSP082222-216	MSB02	09/15/22	1773.07	0.0195706								
GESTSP090622-235	MSB113A	09/15/22	1606.32	0.0167464								
GESTSP090622-236	MSB01	09/15/22[2]	493.50	0.0190476	0.004	3.986	0.0035	3.460	5,000	No	50	No
GESTSP090622-237	MSB02	09/15/22[2]	534.01	0.0230333								
GESTSP090622-238	MSB113A	09/15/22[2]	457.62	0.0225078								

Notes:

[1]Air sample was not collected on days with rain or when contaminated soil was not disturbed.

[2]Air sample was taken down during the afternoon after field activities ceased.

Sample locations are shown on Figure 2-1

HPNS = Hunters Point Naval Shipyard

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

J+ = estimated concentration biased high. See data review report for details.

m^3 = cubic meters

mg/m^3 = milligrams per cubic meter

ATTACHMENT 6
RADIONUCLIDES OF CONCERN AIR SAMPLING RESULTS

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Attachment 6: Radionuclides of Concern Air Sampling Results

Date	Sample Location	Duration of Run (min)	Cesium-137		Plutonium-239/240		Radium-226		Strontium-90		Cobalt-60		Exceedance (Yes/No)
Action Level			4.00E-15		4.00E-15		1.80E-13		2.00E-10		1.00E-09		
Units			µCi/mL		µCi/mL		µCi/mL		µCi/mL		µCi/mL		
7/7/22 -7/8/22	1	1335	9.14E-15	U	1.16E-14	U	3.21E-15	UJ	7.43E-15	J	3.37E-14	U	No
	2	1443	2.17E-14	U	1.58E-14	U	2.93E-15	UJ	1.05E-14	J	2.58E-14	U	No
	113A	1362	8.82E-15	U	1.19E-14	U	3.28E-15	UJ	1.05E-14	UJ	2.41E-14	U	No
7/11/22-7/15/22	1	5803	1.97E-15	U	2.4E-15	U	7.51E-16	UJ	3.9E-15	J	5.81E-15	U	No
	2	5789	2.41E-15	U	3.14E-15	U	7.71E-16	UJ	2.37E-15	J	5.53E-15	U	No
	113A	5791	2.66E-15	U	3.05E-15	U	9.18E-16	UJ	3.35E-15	J	5.44E-15	U	No
7/18/22-7/22/22	1	5966	4.82E-15	U	4.71E-15	U	6.57E-16	UJ	3.03E-15	J	5.59E-15	U	No
	2	5944	2.04E-15	U	2.31E-15	U	7.33E-16	UJ	1.26E-15	U	6.28E-15	U	No
	113A	5954	2.57E-15	U	2.87E-15	U	8.37E-16	UJ	1.15E-15	U	6.02E-15	U	No
7/25/22-7/29/22	1	5988	2.75E-15	U	2.94E-15	U	1.04E-15	UJ	2.47E-15	U	5.95E-15	U	No
	1*	5987	1.94E-15	U	2.8E-15	U	5.65E-16	UJ	2.98E-15	U	7.63E-15	U	No
	2	5945	2.36E-15	U	2.31E-15	U	7.47E-16	UJ	3.46E-15		5.71E-15	UJ	No
	113A	5965	2.49E-15	U	2.47E-15	U	7.49E-16	UJ	3.4E-15	U	5.82E-15	U	No
8/1/22-8/5/22	1	5962	4.8E-15	U	5.16E-15	U	4.6E-16	UJ	1.3E-15		1.32E-14	U	No
	2	5925	2.54E-15	U	2.05E-15	U	6.54E-16	UJ	1.74E-15		5.71E-15	U	No
	113A	5942	2.57E-15	U	3.06E-15	U	7.79E-16	UJ	1.84E-15		6.17E-15	U	No
8/8/22-8/12/22	1	5988	2.05E-15	U	2.58E-15	UJ	5.93E-16	UJ	1.07E-15	UJ	7.65E-15	U	No
	2	5945	2.17E-15	U	2.47E-15	UJ	8.48E-16	UJ	1.03E-15	UJ	5.97E-15	U	No
	113A	5976	2.72E-15	U	3.18E-15	UJ	4.01E-16	UJ	1.15E-15	UJ	5.47E-15	U	No
8/15/22-8/19/22	1	6002	2.16E-15	U	2.87E-15	U	5.92E-16	UJ	1.01E-15	UJ	5.61E-15	U	No
	2	5967	2.6E-15	U	2.34E-15	U	6.19E-16	UJ	9.58E-16	UJ	5.76E-15	U	No
	113A	5971	2.45E-15	U	2.82E-15	U	4.9E-16	UJ	9.74E-16	UJ	5.84E-15	U	No
8/22/22-8/25/22	1	4992	4.68E-15	U	6.06E-15	U	6.54E-16	U	2.49E-15	U	9.06E-15	U	No
	2	4999	3.25E-15	U	3.11E-15	U	5.12E-16	U	9.3E-15	J	1.07E-14	J	No
	2*	4999	2.43E-15	U	2.77E-15	U	7.22E-16	U	2.65E-15	U	1.25E-14	UJ	No
	113A	5002	2.87E-15	U	3.55E-15	U	8.04E-16	U	2.47E-15	U	6.36E-15	U	No
8/29/22-9/1/22	1	4932	2.35E-15	U	3.24E-15	U	4.39E-16	U	2.82E-15	U	5.94E-15	U	No
	2	4944	3.24E-15	U	3.73E-15	U	6.33E-16	U	2.74E-15	U	1.22E-14	U	No
	113A	4949	5.53E-15	U	5.68E-15	U	5.02E-16	U	2.16E-14	J	6.42E-15	U	No

Attachment 6: Radionuclides of Concern Air Sampling Results

Date	Sample Location	Duration of Run (min)	Cesium-137		Plutonium-239/240		Radium-226		Strontium-90		Cobalt-60		Exceedance (Yes/No)
Action Level			4.00E-15		4.00E-15		1.80E-13		2.00E-10		1.00E-09		
Units			µCi/mL		µCi/mL		µCi/mL		µCi/mL		µCi/mL		
9/5/22-9/8/22	1	3535	3.86E-15	U	4.1E-15	U	3.81E-16	U	2.51E-15	J	2.32E-14	U	No
	2	3562	4.23E-15	U	5.01E-15	U	5.16E-16	U	1.67E-15	U	1.86E-14	U	No
	113A	3558	3.4E-15	U	4.74E-15	U	5.87E-16	U	3.86E-15	J	1.94E-14	U	No
9/12/22-9/15/22	1	4967	2.89E-15	U	3.35E-15	U	1.87E-16	U	1.77E-15		1.25E-14	U	No
	2	4995	5.7E-15	U	6.32E-15	U	1.55E-16	U	2.22E-15		1.21E-14	U	No
	113A	4972	5.67E-15	U	4.84E-15	U	3.03E-16	U	1.71E-15		1.3E-14	U	No

Notes:

* = duplicate sample

J = Activity is an approximate value.

min = minutes

U = Activity is less than the MDC.

µCi/mL=microcuries per milliliter

ATTACHMENT 7
LABORATORY REPORTS

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Laboratory Analysis Report

Job ID : 22071888

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
HPNS Parcel B Rad Surveys J310000900

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	07/20/2022 15:55
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	[redacted]

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
MSB01-070722	7/8/2022 8:11	Cassette	22071888.01
MSB02-070722	7/8/2022 9:00	Cassette	22071888.02
MSB113A-070722	7/8/2022 8:30	Cassette	22071888.03
MSB01-071122	7/11/2022 15:22	Cassette	22071888.04
MSB02-071122	7/11/2022 15:07	Cassette	22071888.05
MSB113A-071122	7/11/2022 15:16	Cassette	22071888.06
MSB01-071222	7/12/2022 14:52	Cassette	22071888.07
MSB02-071222	7/12/2022 15:00	Cassette	22071888.08
MSB113A-071222	7/12/2022 15:08	Cassette	22071888.09
MSB02-071322	7/13/2022 14:31	Cassette	22071888.10
MSB113A-071322	7/13/2022 14:48	Cassette	22071888.11
MSB01-071422	7/15/2022 8:07	Cassette	22071888.12
MSB02-071422	7/15/2022 7:37	Cassette	22071888.13
MSB113A-071422	7/15/2022 8:27	Cassette	22071888.14
FB-070722	7/7/2022 8:00	Cassette	22071888.15

[redacted]

Analyst: [redacted]

This report cannot be reproduced, except in full, without prior written permission of A&B Labs. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Any TWA calculations are based on client supplied data not lab observation.

ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 7/27/2022

Job ID : 22071888
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: HPNS Parcel B Rad Surveys J310000900 Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22071888.01	MSB01-070722	07/08/2022	Area	3			1431	4293	100	13	16.561	0.001		07/27/22	[redacted]
22071888.02	MSB02-070722	07/08/2022	Area	3			1437	4311	100	7.5	9.554	0.001		07/27/22	[redacted]
22071888.03	MSB113A-070722	07/08/2022	Area	3			1429	4287	100	12.5	15.924	0.001		07/27/22	[redacted]
22071888.04	MSB01-071122	07/11/2022	Area	2.4			443	1063.	100	5.5	7.006	0.003		07/27/22	[redacted]
22071888.05	MSB02-071122	07/11/2022	Area	3.1			448	1388.	100	6.0	7.643	0.002		07/27/22	[redacted]
22071888.06	MSB113A-071122	07/11/2022	Area	2.3			436	1002.	100	2	2.548	< 0.003		07/27/22	[redacted]
22071888.07	MSB01-071222	07/12/2022	Area	3.3			448	1478.	100	5.5	7.006	0.002		07/27/22	[redacted]
22071888.08	MSB02-071222	07/12/2022	Area	2.8			440	1232	100	5.0	6.369	< 0.002		07/27/22	[redacted]
22071888.09	MSB113A-071222	07/12/2022	Area	1.9			424	805.6	100	4	5.096	< 0.003		07/27/22	[redacted]
22071888.10	MSB02-071322	07/13/2022	Area	3			417	1251	100	8.5	10.828	0.003		07/27/22	[redacted]
22071888.11	MSB113A-071322	07/13/2022	Area	3			420	1260	100	2.5	3.185	< 0.002		07/27/22	[redacted]
22071888.12	MSB01-071422	07/15/2022	Area	2.3			1466	3371.	100	1.5	1.911	< 0.001		07/27/22	[redacted]
22071888.13	MSB02-071422	07/15/2022	Area	3			1443	4329	100	3	3.822	< 0.001		07/27/22	[redacted]
22071888.14	MSB113A-071422	07/15/2022	Area	2.1			1472	3091.	100	2	2.548	< 0.001		07/27/22	[redacted]
22071888.15	FB-070722	07/07/2022	Area					0	100	2	2.548			07/27/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22071888**	Date Received : **07/20/2022**	Time Received : **3:55PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **21.1°C**	Sample pH : **NA**	
Thermometer ID : **IR3**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal. Received black cassettes. ~[redacted] 7/21/2022

Received by : [redacted]

Check in by/date : [redacted] 07/21/2022

ab-s005-0321

Event ID: Air Monitoring

Job ID:22071888

07/20/2022 GES - ASRC Industrial ACH

COC# KT071922ASBB

Chain-Of-Custody

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100, Houston TX 77029

Contact Name: [redacted]

7/19/2022

Page: 1 of 2

	Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Analysis: Asbestos	Preservative: None / Container Type: Filter	Special Instructions/Comments (Flow Rate; Total Time (mins)
01A	MSB01-070722	07/08/2022	0811	NA	NA	1	AA	X		Flow Rate = 3 L/min, 1431
02A	MSB02-070722	07/08/2022	0900	NA	NA	1	AA	X		Flow Rate = 3 L/min, 1437
03A	MSB113A-070722	07/08/2022	0830	NA	NA	1	AA	X		Flow Rate = 3 L/min, 1429
04A	MSB01-071122	07/11/2022	1522	NA	NA	1	AA	X		Flow Rate = 2.4 L/min, 443
05A	MSB02-071122	07/11/2022	1507	NA	NA	1	AA	X		Flow Rate = 3.1 L/min, 448
06A	MSB113A-071122	07/11/2022	1516	NA	NA	1	AA	X		Flow Rate = 2.3 L/min, 436
07A	MSB01-071222	07/12/2022	1452	NA	NA	1	AA	X		Flow Rate = 3.3 L/min, 448
08A	MSB02-071222	07/12/2022	1500	NA	NA	1	AA	X		Flow Rate = 2.8 L/min, 440
09A	MSB113A-071222	07/12/2022	1508	NA	NA	1	AA	X		Flow Rate = 1.9 L/min, 424
10A	MSB02-071322	07/13/2022	1431	NA	NA	1	AA	X		Flow Rate = 3 L/min, 417
11A	MSB113A-071322	07/13/2022	1448	NA	NA	1	AA	X		Flow Rate = 3 L/min, 420

Sampled By: [redacted]

Signature: [redacted]

Special Instructions: None

Send Results to: [redacted]

Turnaround Time: Standard

Sampler: [redacted]

Courier/Airbill No.: FEDEX/7774 1860 3649

Relinquished By/Affiliation:	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted] /QCS	7/9/22	1600	FedEx [redacted]	7/9/22	1600
FedEx	7/10/22	15:55		7/10/22	15:55

21.1°

Event ID: Air Monitoring

COC# KT071922ASBB

Chain-Of-Custody

GES

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100
Houston TX 77029

Contact Name: [redacted]

7/19/2022

Page: 2 of 2

	Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Asbestos	Analysis: Preservative: None; Container Type: Filter	Special Instructions/Comments (Flow Rate; Total Time (mins)
12A	MSB01-071422	07/15/2022	0807	NA	NA	1	AA	X		Flow Rate = 2.3 L/min, 1466
13A	MSB02-071422	07/15/2022	0737	NA	NA	1	AA	X		Flow Rate = 3 L/min, 1443
14A	MSB113A-071422	07/15/2022	0827	NA	NA	1	AA	X		Flow Rate = 2.1 L/min, 1472
15A	FB-070722	07/07/2022	0800	NA	NA	1	AA	X		

[redacted]

Sampled By: [redacted]

Signature:

Special Instructions: None

Send Results to: [redacted]

Turnaround Time: Standard

Sample [redacted]

Courier/Airbill No.: FEDEX/7774 1860 3649

Relinquished By/Affiliation:	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted] / AGS	7/19/22	1600	Fed Ex	7/19/22	1600
Fedex	7/20/22	15:55	[redacted]	7/20/22	15:55

21.1°C

[redacted]

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2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Laboratory Analysis Report

Job ID : 22072815

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
HPNS Parcel B Rad Surveys J310000900

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	07/28/2022 15:25
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	[redacted]

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
MSB01-071822	7/19/2022 7:28	Cassette	22072815.01
MSB02-071822	7/19/2022 7:11	Cassette	22072815.02
MSB113A-071822	7/19/2022 7:42	Cassette	22072815.03
MSB01-071922	7/20/2022 7:35	Cassette	22072815.04
MSB02-071922	7/20/2022 6:55	Cassette	22072815.05
MSB113A-071922	7/20/2022 7:14	Cassette	22072815.06
MSB01-072022	7/21/2022 8:09	Cassette	22072815.07
MSB02-072022	7/21/2022 7:17	Cassette	22072815.08
MSB113A-072022	7/21/2022 7:45	Cassette	22072815.09
MSB01-072122	7/22/2022 8:04	Cassette	22072815.10
MSB02-072122	7/22/2022 7:35	Cassette	22072815.11
MSB113A-072122	7/22/2022 7:50	Cassette	22072815.12
FB-071822	7/18/2022 8:00	Cassette	22072815.13

[redacted]

Released By: [redacted]

Title: [redacted]

Analyst: [redacted]

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ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 8/4/2022

Job ID : 22072815
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: HPNS Parcel B Rad Surveys J310000900 Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22072815.01	MSB01-071822	07/19/2022	Area	2.5			1378	3445	100	1	1.274	< 0.001		08/04/22	[redacted]
22072815.02	MSB02-071822	07/19/2022	Area	2.6			1419	3689.	100	1	1.274	< 0.001		08/04/22	[redacted]
22072815.03	MSB113A-071822	07/19/2022	Area	3.6			1422	5119.	100	1	1.274	< 0.001		08/04/22	[redacted]
22072815.04	MSB01-071922	07/20/2022	Area	3.2			1429	4572.	100	0.5	0.637	< 0.001		08/04/22	[redacted]
22072815.05	MSB02-071922	07/20/2022	Area	2.5			1422	3555	100	2.0	2.548	< 0.001		08/04/22	[redacted]
22072815.06	MSB113A-071922	07/20/2022	Area	2.3			1424	3275.	100	2	2.548	< 0.001		08/04/22	[redacted]
22072815.07	MSB01-072022	07/21/2022	Area	2.3			1473	3387.	100	0.5	0.637	< 0.001		08/04/22	[redacted]
22072815.08	MSB02-072022	07/21/2022	Area	2.7			1462	3947.	100	3	3.822	< 0.001		08/04/22	[redacted]
22072815.09	MSB113A-072022	07/21/2022	Area	2.3			1468	3376.	100	0	0.000	< 0.001		08/04/22	[redacted]
22072815.10	MSB01-072122	07/22/2022	Area	2.7			1433	3869.	100	0.5	0.637	< 0.001		08/04/22	[redacted]
22072815.11	MSB02-072122	07/22/2022	Area	2.9			1456	4222.	100	2	2.548	< 0.001		08/04/22	[redacted]
22072815.12	MSB113A-072122	07/22/2022	Area	2.3			1441	3314.	100	1	1.274	< 0.001		08/04/22	[redacted]
22072815.13	FB-071822	07/18/2022						0	100	0	0.000			08/04/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22072815**	Date Received : **07/28/2022**	Time Received : **3:25PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **25.6°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

Black Cassettes. No cooler was received; however samples are received in a box with custody seal. ~[redacted] 07/29/22

Received by : [redacted]

Check in by/date : [redacted] / 07/29/2022

ab-s005-0321

0

Event ID: Air Monitoring

COC# B-KT072722ASBB

Gilbane Chain-Of-Custody

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100 Houston TX 77029

Contact Name: [redacted]

7/27/2022

Page: 1 of 2

Job ID:22072815

07/28/2022 GES - ASRC Industrial ACH

	Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Analysis: Asbestos	Preservative: None / Container Type: Filter	Special Instructions/Comments Flow Rate; Total Time (mins)
01A	MSB01-071822	07/19/2022	0728	NA	NA	1	AA	X		Flow Rate = 2.5 L/min, 1378
02A	MSB02-071822	07/19/2022	0711	NA	NA	1	AA	X		Flow Rate = 2.6 L/min, 1419
03A	MSB113A-071822	07/19/2022	0742	NA	NA	1	AA	X		Flow Rate = 3.6 L/min, 1422
04A	MSB01-071922	07/20/2022	0735	NA	NA	1	AA	X		Flow Rate = 3.2 L/min, 1429
05A	MSB02-071922	07/20/2022	0655	NA	NA	1	AA	X		Flow Rate = 2.5 L/min, 1422
06A	MSB113A-071922	07/20/2022	0714	NA	NA	1	AA	X		Flow Rate = 2.3 L/min, 1424
07A	MSB01-072022	07/21/2022	0809	NA	NA	1	AA	X		Flow Rate = 2.3 L/min, 1473
08A	MSB02-072022	07/21/2022	0717	NA	NA	1	AA	X		Flow Rate = 2.7 L/min, 1462
09A	MSB113A-072022	07/21/2022	0745	NA	NA	1	AA	X		Flow Rate = 2.3 L/min, 1468
10A	MSB01-072122	07/22/2022	0804	NA	NA	1	AA	X		Flow Rate = 2.7 L/min, 1433
11A	MSB02-072122	07/22/2022	0735	NA	NA	1	AA	X		Flow Rate = 2.9 L/min, 1456

Sampled By: [redacted]

Signature: [redacted]

Special Instructions:

Send Results to: [redacted]

Turnaround Time: Standard

Sampler: [redacted]

Courier/Airbill No.: FEDEX/ 7774 8154 6364

Relinquished By/ Affiliation:	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted] GILBANE	7-27-22	1600	FEDEX [redacted]	7/28/22	1525
FEDEX					

25.6°C

[redacted]

0

Event ID: Air Monitoring

COC# KT072722ASBB

Gilbane Chain-Of-Custody

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100 Houston TX 77029

Contact Name: [redacted]

7/27/2022

Page: 2 of 2

Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Analysis: Asbestos	Preservative: None / Container Type: Filter	Special Instructions/Comments Flow Rate; Total Time (mins)
12A MSB113A-072122	07/22/2022	0750	NA	NA	1	AA	X		Flow Rate = 2.3 L/min, 1441
13A FB-071822	07/18/2022	0800	NA	NA	1	AA	X		

Sampled By: [redacted]

Signature:

Special Instruct

Send Results to [redacted]

Turnaround Time: Standard

Sampler: [redacted]

	Date:	Time:
GILBANE	7/21/22	1600

Courier/Airbill No.: FEDEX/ 7774 8154 6364

Received By/ Affiliation:	Date:	Time:

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1495337

7/27/22

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Laboratory Analysis Report

Job ID : 22080634

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
HPNS Parcel B Rad Surveys J310000900

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	7
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	08/04/2022 15:51
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	[redacted]

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
MSB01-072522	7/26/2022 7:49	Cassette	22080634.01
MSB02-072522	7/26/2022 7:04	Cassette	22080634.02
MSB113A-072522	7/26/2022 7:34	Cassette	22080634.03
MSB01-072622	7/27/2022 7:42	Cassette	22080634.04
MSB02-072622	7/27/2022 6:58	Cassette	22080634.05
MSB113A-072622	7/27/2022 7:17	Cassette	22080634.06
MSB01-072722	7/28/2022 8:07	Cassette	22080634.07
MSB02-072722	7/28/2022 7:33	Cassette	22080634.08
MSB113A-072722	7/28/2022 7:48	Cassette	22080634.09
MSB01-072822	7/29/2022 8:23	Cassette	22080634.10
MSB02-072822	7/29/2022 8:00	Cassette	22080634.11
MSB113A-072822	7/29/2022 8:10	Cassette	22080634.12
FB-072522	7/25/2022 8:00	Cassette	22080634.13

[redacted]

Analyst: [redacted]

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Laboratory Report: Case Narrative

A&B Job ID: 22080634

Date: 08/17/22

Client Name:	GES - ASRC Industrial	Attn:	[redacted]
Project Name:	HPNS Parcel B Rad Surveys J310000900		
Date Received:	08/04/22		
Collected By:	[redacted]		

The attached report is revised to update the total times per the coc.

[redacted]

ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 8/17/2022

Job ID : 22080634
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: HPNS Parcel B Rad Surveys J310000900 Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22080634.01	MSB01-072522	07/26/2022	Area	2.4			1454	3489.6	100	3.5	4.459	< 0.002		08/11/22	[redacted]
22080634.02	MSB02-072522	07/26/2022	Area	2.9			1443	4184.7	100	2	2.548	< 0.002		08/11/22	[redacted]
22080634.03	MSB113A-072522	07/26/2022	Area	2.2			1454	3198.8	100	4	5.096	< 0.002		08/11/22	[redacted]
22080634.04	MSB01-072622	07/27/2022	Area	3.7			1431	5294.7	100	4.0	5.096	< 0.002		08/11/22	[redacted]
22080634.05	MSB02-072622	07/27/2022	Area	3.0			1432	4296	100	0.5	0.637	< 0.002		08/11/22	[redacted]
22080634.06	MSB113A-072622	07/27/2022	Area	3.4			1422	4834.8	100	1.5	1.911	< 0.002		08/11/22	[redacted]
22080634.07	MSB01-072722	07/28/2022	Area	3.4			1464	4977.6	100	0.5	0.637	< 0.002		08/11/22	[redacted]
22080634.08	MSB02-072722	07/28/2022	Area	3.0			1475	4425	100	1.5	1.911	< 0.002		08/11/22	[redacted]
22080634.09	MSB113A-072722	07/28/2022	Area	3.4			1469	4994.6	100	7.0	8.917	0.002		08/12/22	[redacted]
22080634.10	MSB01-072822	07/29/2022	Area	3.3			1455	4801.5	100	8.0	10.191	0.003		08/12/22	[redacted]
22080634.11	MSB02-072822	07/29/2022	Area	2.9			1466	4251.4	100	4.5	5.732	< 0.002		08/12/22	[redacted]
22080634.12	MSB113A-072822	07/29/2022	Area	3.4			1462	4970.8	100	13.0	16.561	0.004		08/12/22	[redacted]
22080634.13	FB-072522	07/25/2022							100	2	2.548			08/12/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22080634**	Date Received : **08/04/2022**	Time Received : **3:51PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **20.0°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal. Black Cassettes. ~[redacted] 08/05/22

Received by : [redacted]

Check in by/date : [redacted] / 08/05/2022

ab-s005-0321

0

Event ID: Air Monitoring

COC# B-KT080322ASBB

Gilbane Chain-Of-Custody

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manage [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100 Houston TX 77029

Contact Name: [redacted]

8/3/2022

Page: 1 of 2

Job ID:22080634

08/04/2022 GES - ASRC Industrial ACH

	Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Asbestos	Analysis: Preservative: None / Container Type: Filter	Special Instructions/Comments Flow Rate; Total Time (mins)
01A	MSB01-072522	07/26/2022	0749	NA	NA	1	AA	X		Flow Rate = 2.4 L/min, 1454
02A	MSB02-072522	07/26/2022	0704	NA	NA	1	AA	X		Flow Rate = 2.9 L/min, 1443
03A	MSB113A-072522	07/26/2022	0734	NA	NA	1	AA	X		Flow Rate = 2.2 L/min, 1454
04A	MSB01-072622	07/27/2022	0742	NA	NA	1	AA	X		Flow Rate = 3.7 L/min, 1431
05A	MSB02-072622	07/27/2022	0658	NA	NA	1	AA	X		Flow Rate = 3.0 L/min, 1432
06A	MSB113A-072622	07/27/2022	0717	NA	NA	1	AA	X		Flow Rate = 3.4 L/min, 1422
07A	MSB01-072722	07/28/2022	0807	NA	NA	1	AA	X		Flow Rate = 3.4 L/min, 1464
08A	MSB02-072722	07/28/2022	0733	NA	NA	1	AA	X		Flow Rate = 3.0 L/min, 1475
09A	MSB113A-072722	07/28/2022	0748	NA	NA	1	AA	X		Flow Rate = 3.4 L/min, 1469
10A	MSB01-072822	07/29/2022	0823	NA	NA	1	AA	X		Flow Rate = 3.3 L/min, 1455
11A	MSB02-072822	07/29/2022	0800	NA	NA	1	AA	X		Flow Rate = 2.9 L/min, 1466

Sampled By: [redacted]

Signature: [redacted]

Special Instructions

Send Results to: [redacted]

Turnaround T...

Sampler: [redacted]

Courier/Airbill No.: FEDEX/ 7775 4199 9059

Relinquished By/Affiliation:	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted] / Gilbane	8/3/22	1400	Fed Ex [redacted]	8/3/22	1400
FEDEX				08/04/22	1554

20.0°C [redacted]

0

Event ID: Air Monitoring

COC# KT080322ASBB

Gilbane — Chain-Of-Custody

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100, Houston TX 77029

Contact Name: [redacted]

8/3/2022

Page: 2 of 2

	Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Asbestos	Analysis: Preservative: None; Container Type: Filter	Special Instructions/Comments Flow Rate; Total Time (mins)
12A	MSB113A-072822	07/29/2022	0810	NA	NA	1	AA	X		Flow Rate = 3.4 L/min, 1462
13A	FB-072522	07/25/2022	0800	NA	NA	1	AA	X		

[redacted] 8/3/22

A

N

Sampled By: [redacted]

Signature:

Special Instructions:

Send Results to: [redacted]

Turnaround Time: Standard

Sampler: [redacted]

Relinquished By/Affiliation:	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted] FEDEX	8/3/22	16:00	Fed Ex [redacted]	8/3/22 08/04/22	16:00 1551

Courier/Airbill No.: FEDEX/ 7775 4199 9059

20.0°C

[redacted]

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Laboratory Analysis Report

Job ID : 22081261

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
HPNS Parcel B Rad Surveys J310000900

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	5
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	07/15/2022 15:21
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	[redacted]

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
MSB01-071322	7/13/2022 15:41	Cassette	22081261.01

[redacted]

Analyst: [redacted]

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ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 8/12/2022

Job ID : 22081261
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: HPNS Parcel B Rad Surveys J310000900 Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22081261.01	MSB01-071322	07/13/2022	Area	2			524	1048	100	9.5	12.102	0.004		08/12/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22081261**	Date Received : **07/15/2022**	Time Received : **3:21PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **21.3°C**	Sample pH : **N/A**	
Thermometer ID : **IR3**	pH Paper ID : **N/A**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal.

Received by : [redacted]

Check in by/date : [redacted] / 08/11/2022

ab-s005-0321

Event ID: Air Monitoring 22081261

COC# KT071422 ASB-1

Gilbane

HPNS Parcel B Rad Surveys J310000900 KJ 08/05/2022 [redacted]

Chain-Of-Custody

Project Name and Number: HPNS Parcel B, Phase II J310000900

Project Manager: [redacted] 5)250-8027

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100, Houston TX 77029

Contact Name: [redacted]

Phone: 713-453-6060

Date: 7/14/22

Page: 1 of 1

Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Analysis: Asbestos	Preservative: None / Container Type: Filter	Special Instructions/Comments: Flow Rate Total Time (Min)
NSB01-071322	7/13/22	1541	NA	NA	1	AA	X		524

[redacted] 7/18/22

Sampled By: [redacted]

Signature:

Special Instructions: None

Send Results to: [redacted]

Turnaround Time: Standard

Sampler: [redacted]

Courier/Airbill No.: FedEX/

Relinquished By/Affiliation.	Date:	Time:	Received By/ Affiliation.	Date:	Time:
[redacted] / Gilbane	7/14/22	1600	Fed Ex	7/14/22	1600
FedEX	7/15/22	15:21	[redacted]	7/15/22	15:21

21.3°C

[redacted]

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Laboratory Analysis Report

Job ID : 22081275

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
HPNS Parcel B Rad Surveys J310000900

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	08/11/2022 17:49
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	[redacted]

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
MSB01-080122	8/2/2022 7:58	Cassette	22081275.01
MSB02-080122	8/2/2022 7:23	Cassette	22081275.02
MSB113A-080122	8/2/2022 7:44	Cassette	22081275.03
MSB01-080222	8/3/2022 7:46	Cassette	22081275.04
MSB02-080222	8/3/2022 7:11	Cassette	22081275.05
MSB113A-080222	8/3/2022 7:30	Cassette	22081275.06
MSB01-080322	8/4/2022 7:37	Cassette	22081275.07
MSB02-080322	8/4/2022 7:03	Cassette	22081275.08
MSB113A-080322	8/4/2022 7:20	Cassette	22081275.09
MSB01-080422	8/5/2022 8:19	Cassette	22081275.10
MSB02-080422	8/5/2022 7:30	Cassette	22081275.11
MSB113A-080422	8/5/2022 7:51	Cassette	22081275.12
FB-080122	8/1/2022 8:00	Cassette	22081275.13

[redacted]

Analyst: [redacted]

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ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 8/18/2022

Job ID : 22081275
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: HPNS Parcel B Rad Surveys J310000900 Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22081275.01	MSB01-080122	08/02/2022	Area	3.5			1450	5075	100	3.5	4.459	< 0.001		08/17/22	[redacted]
22081275.02	MSB02-080122	08/02/2022	Area	3.1			1439	4460.	100	0	0.000	< 0.001		08/17/22	[redacted]
22081275.03	MSB113A-080122	08/02/2022	Area	3.5			1449	5071.	100	5.0	6.369	< 0.001		08/18/22	[redacted]
22081275.04	MSB01-080222	08/03/2022	Area	3.5			1421	4973.	100	3.5	4.459	< 0.001		08/18/22	[redacted]
22081275.05	MSB02-080222	08/03/2022	Area	3.4			1426	4848.	100	2.0	2.548	< 0.001		08/18/22	[redacted]
22081275.06	MSB113A-080222	08/03/2022	Area	3.6			1424	5126.	100	2.5	3.185	< 0.001		08/18/22	[redacted]
22081275.07	MSB01-080322	08/04/2022	Area	3.4			1430	4862	100	3	3.822	< 0.001		08/18/22	[redacted]
22081275.08	MSB02-080322	08/04/2022	Area	3.6			1429	5144.	100	8.0	10.191	0.001		08/18/22	[redacted]
22081275.09	MSB113A-080322	08/04/2022	Area	3.4			1429	4858.	100	1.5	1.911	< 0.001		08/18/22	[redacted]
22081275.10	MSB01-080422	08/05/2022	Area	3.4			1480	5032	100	3.5	4.459	< 0.001		08/18/22	[redacted]
22081275.11	MSB02-080422	08/05/2022	Area	3.4			1466	4984.	100	11	14.013	0.001		08/18/22	[redacted]
22081275.12	MSB113A-080422	08/05/2022	Area	3.5			1468	5138	100	28.0	35.669	0.003		08/18/22	[redacted]
22081275.13	FB-080122	08/01/2022	Area					0	100	5	6.369			08/18/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22081275**	Date Received : **08/11/2022**	Time Received : **5:49PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **22.1°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal. Received samples in black cassettes. [redacted]8/12/2022

Received by : [redacted]z

Check in by/date : [redacted] / 08/12/2022

ab-s005-0321

0

Job ID:22081275

08/11/2022 GES - ASRC Industrial ACH

Event ID: Air Monitoring

COC# KT081022ASBB

Chain-Of-Custody

GES

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100
Houston TX 77029

Contact Name: [redacted]

8/10/2022

Page: 1 of 2

	Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Asbestos	Special Instructions/Comments
							Analysis:		
							Preservative: None		
							Container Type: Filter		
01A	MSB01-080122	08/02/2022	0758	NA	NA	1	AA	X	Flow Rate = 3.5 L/min, 1450
02A	MSB02-080122	08/02/2022	0723	NA	NA	1	AA	X	Flow Rate = 3.1 L/min, 1439
03A	MSB113A-080122	08/02/2022	0744	NA	NA	1	AA	X	Flow Rate = 3.5 L/min, 1449
04A	MSB01-080222	08/03/2022	0746	NA	NA	1	AA	X	Flow Rate = 3.5 L/min, 1421
05A	MSB02-080222	08/03/2022	0711	NA	NA	1	AA	X	Flow Rate = 3.4 L/min, 1426
06A	MSB113A-080222	08/03/2022	0730	NA	NA	1	AA	X	Flow Rate = 3.6 L/min, 1424
07A	MSB01-080322	08/04/2022	0737	NA	NA	1	AA	X	Flow Rate = 3.4 L/min, 1430
08A	MSB02-080322	08/04/2022	0703	NA	NA	1	AA	X	Flow Rate = 3.6 L/min, 1429
09A	MSB113A-080322	08/04/2022	0720	NA	NA	1	AA	X	Flow Rate = 3.4 L/min, 1429
10A	MSB01-080422	08/05/2022	0819	NA	NA	1	AA	X	Flow Rate = 3.4 L/min, 1480
11A	MSB02-080422	[redacted]							Flow Rate = 3.4 L/min, 1466

Sampled By: [redacted]

Signature: [redacted]

Special Instructions:

Send Results to: [redacted]

Turnaround T...

Courier/Airbill No.: FEDEX 7775 9156 2824

	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted]	8-10-22	1600	FEDEX	8-10-22	1600
Fedex	8/11/22	17:49	[redacted]	8/11/22	17:49

22.1°C [redacted]

0

Event ID: Air Monitoring

COC# KT081022ASBB

Chain-Of-Custody

GES

Project Name and Number: HPNS Parcel B Rad Surveys J310000900

Project Manager: [redacted]

Site Location: Hunters Point, San Francisco, CA 94124

Laboratory Name: A&B Labs

Address: 10100 East Fwy Ste. 100
Houston TX 77029

Contact Name: [redacted]

8/10/2022

Page: 2 of 2

Sample ID	Date	Time	Sample Depth (top)	Sample Depth (bottom)	No. of Containers	Sample Matrix	Analysis: Asbestos	Preservative: None / Container Type: Filter	Special Instructions/Comments Flow Rate; Total Time (mins)
MSB113A-080422	08/05/2022	0751	NA	NA	1	AA	X		Flow Rate = 3.5 L/min, 1468
FB-080122	08/01/2022	0800	NA	NA	1	AA	X		

[redacted]

Sampled By: [redacted]

Signature:

Special Instructions:

Send Results to: [redacted]

Turnaround Time: Standard

Sampl[redacted]

Courier/Airbill No.: FEDEX 7775 9156 2824

Relinquished By/Affiliation:	Date:	Time:	Received By/ Affiliation:	Date:	Time:
[redacted] GES	8-10-22	1600	FEDEX	8-10-22	1600
Fedex	8/11/22	17:49	[redacted]	8/11/22	17:49

22.1oc

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Laboratory Analysis Report

Job ID : 22081967

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	08/18/2022 15:23
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
FB-080822	8/8/2022 8:00	Cassette	22081967.01
MSB01-080822	8/9/2022 7:51	Cassette	22081967.02
MSB02-080822	8/9/2022 7:21	Cassette	22081967.03
MSB113A-080822	8/9/2022 7:37	Cassette	22081967.04
MSB01-080922	8/10/2022 8:01	Cassette	22081967.05
MSB02-080922	8/10/2022 7:29	Cassette	22081967.06
MSB113A-080922	8/10/2022 7:45	Cassette	22081967.07
MSB01-081022	8/11/2022 8:10	Cassette	22081967.08
MSB02-081022	8/11/2022 7:39	Cassette	22081967.09
MSB113A-081022	8/11/2022 7:55	Cassette	22081967.10
MSB01-081122	8/12/2022 7:50	Cassette	22081967.11
MSB02-081122	8/12/2022 7:14	Cassette	22081967.12
MSB113A-081122	8/12/2022 7:31	Cassette	22081967.13

[redacted]

Released By: [redacted]

Title: Vice President Operations

Analyst: [redacted]

This report cannot be reproduced, except in full, without prior written permission of A&B Labs. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Any TWA calculations are based on client supplied data not lab observation.

ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 8/25/2022

Job ID : 22081967
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22081967.01	FB-080822	08/08/2022	Area					0	100	5	6.369			08/25/22	[redacted]
22081967.02	MSB01-080822	08/09/2022	Area	3.7			1443	5339.	100	9.0	11.465	0.001		08/25/22	[redacted]
22081967.03	MSB02-080822	08/09/2022	Area	3			1438	4314	100	11.0	14.013	0.001		08/25/22	[redacted]
22081967.04	MSB113A-080822	08/09/2022	Area	3.6			1442	5191.	100	1	1.274	< 0.001		08/25/22	[redacted]
22081967.05	MSB01-080922	08/10/2022	Area	3.6			1448	5212.	100	4.5	5.732	< 0.001		08/25/22	[redacted]
22081967.06	MSB02-080922	08/10/2022	Area	3.8			1444	5487.	100	8.5	10.828	0.001		08/25/22	[redacted]
22081967.07	MSB113A-080922	08/10/2022	Area	3.3			1441	4755.	100	4.5	5.732	< 0.001		08/25/22	[redacted]
22081967.08	MSB01-081022	08/11/2022	Area	3.2			1446	4627.	100	5.5	7.006	0.001		08/25/22	[redacted]
22081967.09	MSB02-081022	08/11/2022	Area	3.4			1449	4926.	100	3.5	4.459	< 0.001		08/25/22	[redacted]
22081967.10	MSB113A-081022	08/11/2022	Area	3.2			1448	4633.	100	3	3.822	< 0.001		08/25/22	[redacted]
22081967.11	MSB01-081122	08/12/2022	Area	3			1418	4254	100	2.5	3.185	< 0.001		08/25/22	[redacted]
22081967.12	MSB02-081122	08/12/2022	Area	3.4			1414	4807.	100	2	2.548	< 0.001		08/25/22	[redacted]
22081967.13	MSB113A-081122	08/12/2022	Area	3			1415	4245	100	1.5	1.911	< 0.001		08/25/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22081967**	Date Received : **08/18/2022**	Time Received : **3:23PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **22.8°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

Black Cassettes. No cooler was received, however samples are received in a box with a custody seal. [redacted] 08/18/22

Received by : Jedralin

Check in by/date : Jedralin / 08/18/2022

ab-s005-0321

Job ID:22081967

08/18/2022 GES - ASRC Industrial ACH

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT081722ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	
Project Number: J310000900	POC: [redacted]	Event: **Parcel B Asbestos**
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Analytical Test Method: Asbestos

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

Event: Parcel B Asbestos

	Sample ID	Matrix	Date	Time	Samp Init.	Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min), Total Time (mins)
1	FB-080822	AQ	08/08/2022	0800	[redacted]	X	FIELDQC	FB1	0.00	0.00	1	
2	MSB01-080822	A	08/09/2022	0751		X	MSB01	N1	0.00	0.00	1	3.7, 1443
3	MSB02-080822	A	08/09/2022	0721		X	MSB02	N1	0.00	0.00	1	3, 1438
4	MSB113A-080822	A	08/09/2022	0737		X	MSB113A	N1	0.00	0.00	1	3.6, 1442
5	MSB01-080922	A	08/10/2022	0801		X	MSB01	N1	0.00	0.00	1	3.6, 1448
6	MSB02-080922	A	08/10/2022	0729		X	MSB02	N1	0.00	0.00	1	3.8, 1444
7	MSB113A-080922	A	08/10/2022	0745		X	MSB113A	N1	0.00	0.00	1	3.3, 1441
8	MSB01-081022	A	08/11/2022	0810		X	MSB01	N1	0.00	0.00	1	3.2, 1446
9	MSB02-081022	A	08/11/2022	0739		X	MSB02	N1	0.00	0.00	1	3.4, 1449
10	MSB113A-081022	A	08/11/2022	0755		X	MSB113A	N1	0.00	0.00	1	3.2, 1448
11	MSB01-081122	A	08/12/2022	0750		X	MSB01	N1	0.00	0.00	1	3, 1418

Turnaround Time: 7 days

[redacted]	Date	Time	Received by: *(Signature)*	Date	Time	**Shipping Date / Carrier / Airbill Number**
	8-17-22	1600	FEDEX	8-17-22	1600	Shipping Date: 8/17/2022/ FedEx 7776 4996 4183
Fedex			[redacted]	08/18/22	1523	**Received by Laboratory:** *(Signature, Date, Time)* **& condition**

22.8°C IRM

[redacted]

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco,com

COC ID # KT081722ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	
Project Number: J310000900	POC: [redacted]	Event: **Parcel B Asbestos**
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Analytical Test Method: Asbestos

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

Event: Parcel B Asbestos — 1

	Sample ID	Matrix	Date	Time	Samp Init.	Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min); Total Time (mins)
12	MSB02-081122	A	08/12/2022	0714	[redacted]	X	MSB02	N1	0.00	0.00	1	3.4; 1414
13	MSB113A-081122	A	08/12/2022	0731	[redacted]	X	MSB113A	N1	0.00	0.00	1	3; 1415
14												
15												
16												
17												
18												
19												
20												
21												
22												

N/A [redacted]

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	8-17-22	1600	FEDEX	8-17-22	1600	Shipping Date: 8/17/2022/ FedEx 7776 4996 4183
						Received by Laboratory: *(Signature, Date, Time)* **& condition**

ORIGIN ID:JCCA (925) 250-6097
[redacted]
200 FISCHER AVE
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 17AUG22
ACTWGT: 1.00 LB
CAD: 254128867/INET4490

BILL SENDER

TO [redacted]
A&B LABS
10100 EAST FREEWAY, SUITE 100
HOUSTON TX 77029
(713) 453-6060

REF: J31000900 00.03.14
INV
PO
DEPT

581J2/F39D/FE20

J222022041201uv

FedEx Express

TRK# 0201 7776 4996 4183

THU - 18 AUG 4:30P
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Laboratory Analysis Report

Job ID : 22082882

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	08/29/2022 10:25
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
FB-081522	8/15/2022 8:00	Cassette	22082882.01
MSB01-081522	8/16/2022 7:47	Cassette	22082882.02
MSB02-081522	8/16/2022 7:02	Cassette	22082882.03
MSB113A-081522	8/16/2022 7:29	Cassette	22082882.04
MSB01-081622	8/17/2022 7:44	Cassette	22082882.05
MSB02-081622	8/17/2022 7:04	Cassette	22082882.06
MSB113A-081622	8/17/2022 7:24	Cassette	22082882.07
MSB01-081722	8/18/2022 7:34	Cassette	22082882.08
MSB02-081722	8/18/2022 6:54	Cassette	22082882.09
MSB113A-081722	8/18/2022 7:16	Cassette	22082882.10
MSB01-081822	8/19/2022 7:53	Cassette	22082882.11
MSB02-081822	8/19/2022 7:27	Cassette	22082882.12
MSB113A-081822	8/19/2022 7:38	Cassette	22082882.13

[redacted]

Released By: [redacted]

Title: [redacted]

Analyst: [redacted]

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ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 9/6/2022

Job ID : 22082882
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22082882.01	FB-081522	08/15/2022						0	100	2.5	3.185			09/06/22	[redacted]
22082882.02	MSB01-081522	08/16/2022	Area	3.6			1444	5198.	100	3.0	3.822	< 0.001		09/06/22	[redacted]
22082882.03	MSB02-081522	08/16/2022	Area	3.3			1431	4722.	100	2.0	2.548	< 0.001		09/06/22	[redacted]
22082882.04	MSB113A-081522	08/16/2022	Area	3.1			1444	4476.	100	2	2.548	< 0.001		09/06/22	[redacted]
22082882.05	MSB01-081622	08/17/2022	Area	3.2			1434	4588.	100	4.5	5.732	< 0.001		09/06/22	[redacted]
22082882.06	MSB02-081622	08/17/2022	Area	3.3			1440	4752	100	4.0	5.096	< 0.001		09/06/22	[redacted]
22082882.07	MSB113A-081622	08/17/2022	Area	3.2			1433	4585.	100	4.5	5.732	< 0.001		09/06/22	[redacted]
22082882.08	MSB01-081722	08/18/2022	Area	3.7			1429	5287.	100	0	0.000	< 0.001		09/06/22	[redacted]
22082882.09	MSB02-081722	08/18/2022	Area	3.1			1428	4426.	100	3.5	4.459	< 0.001		09/06/22	[redacted]
22082882.10	MSB113A-081722	08/18/2022	Area	3.2			1431	4579.	100	3.0	3.822	< 0.001		09/06/22	[redacted]
22082882.11	MSB01-081822	08/19/2022	Area	3.4			1457	4953.	100	1.5	1.911	< 0.001		09/06/22	[redacted]
22082882.12	MSB02-081822	08/19/2022	Area	3.1			1471	4560.	100	1	1.274	< 0.001		09/06/22	[redacted]
22082882.13	MSB113A-081822	08/19/2022	Area	3.2			1462	4678.	100	1.5	1.911	< 0.001		09/06/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22082882**	Date Received : **08/29/2022**	Time Received : **10:25AM**
Client Name : **GES - ASRC Industrial**		
Temperature : **24.7°C**	Sample pH : **n/a**	
Thermometer ID : **IR4**	pH Paper ID : **n/a**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal. [redacted] 8-29-22

Received by : [redacted]

Check in by/date : [redacted] / 08/29/2022

ab-s005-0321

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT082422ASBB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Event: Parcel B Asbestos

Code	Matrix
A	Air
~~A~~	~~Air Quality Control Matrix~~

Code	Container/Preservative
1	Filter/No Preservatives

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min), Total Time (mins)
1	FB-081522	AQ	08/15/2022	0800	[redacted]	X	FB	FB1	0.00	0.00	1	
2	MSB01-081522	A	08/16/2022	0747		X	MSB01	N1	0.00	0.00	1	3.6, 1444
3	MSB02-081522	A	08/16/2022	0702		X	MSB02	N1	0.00	0.00	1	3.3, 1431
4	MSB113A-081522	A	08/16/2022	0729		X	MSB113A	N1	0.00	0.00	1	3.1, 1444
5	MSB01-081622	A	08/17/2022	0744		X	MSB01	N1	0.00	0.00	1	3.2, 1434
6	MSB02-081622	A	08/17/2022	0704		X	MSB02	N1	0.00	0.00	1	3.3, 1440
7	MSB113A-081622	A	08/17/2022	0724		X	MSB113A	N1	0.00	0.00	1	3.2, 1433
8	MSB01-081722	A	08/18/2022	0734		X	MSB01	N1	0.00	0.00	1	3.7, 1429
9	MSB02-081722	A	08/18/2022	0654		X	MSB02	N1	0.00	0.00	1	3, 1428
10	MSB113A-081722	A	08/18/2022	0716		X	MSB113A	N1	0.00	0.00	1	3.2, 1431
11	MSB01-081822	A	08/19/2022	0753		X	MSB01	N1	0.00	0.00	1	3.4, 1457

0154 0228 0350 0418 0538 0648 0758 0858 0958 1058 1158

Turnaround Time: 7 days

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	8/24/22	1520	Fedex	8/24/22	1500	Shipping Date: 8/24/2022/ FEDEX/ 7776 9807 8231
FEDEX	8-29-22	1625	[redacted] 8-29-22		1025	**Received by Laboratory:** *(Signature, Date, Time)* **& condition**

24.7°C [redacted]

Job ID:22082882

08/29/2022 GES - ASRC Industrial ACH

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT082422ASBB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: Parcel B Asbestos
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Event: Parcel B Asbestos

Analytical Test Method: Asbestos

Code	Matrix
C	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

	Sample ID	Matrix	Date	Time	Samp Init	Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min); Total Time (mins)
12	MSB02-081822	A	08/19/2022	0727	[redacted]	X	MSB02	N1	0.00	0.00	1	3.1; 1471
13	MSB113A-081822	A	08/19/2022	0738		X	MSB113A	N1	0.00	0.00	1	3.2; 1462
14												
15												
16												
17												
18												
19												
20												
21												
22												

[redacted]

Turnaround Time: 7 days

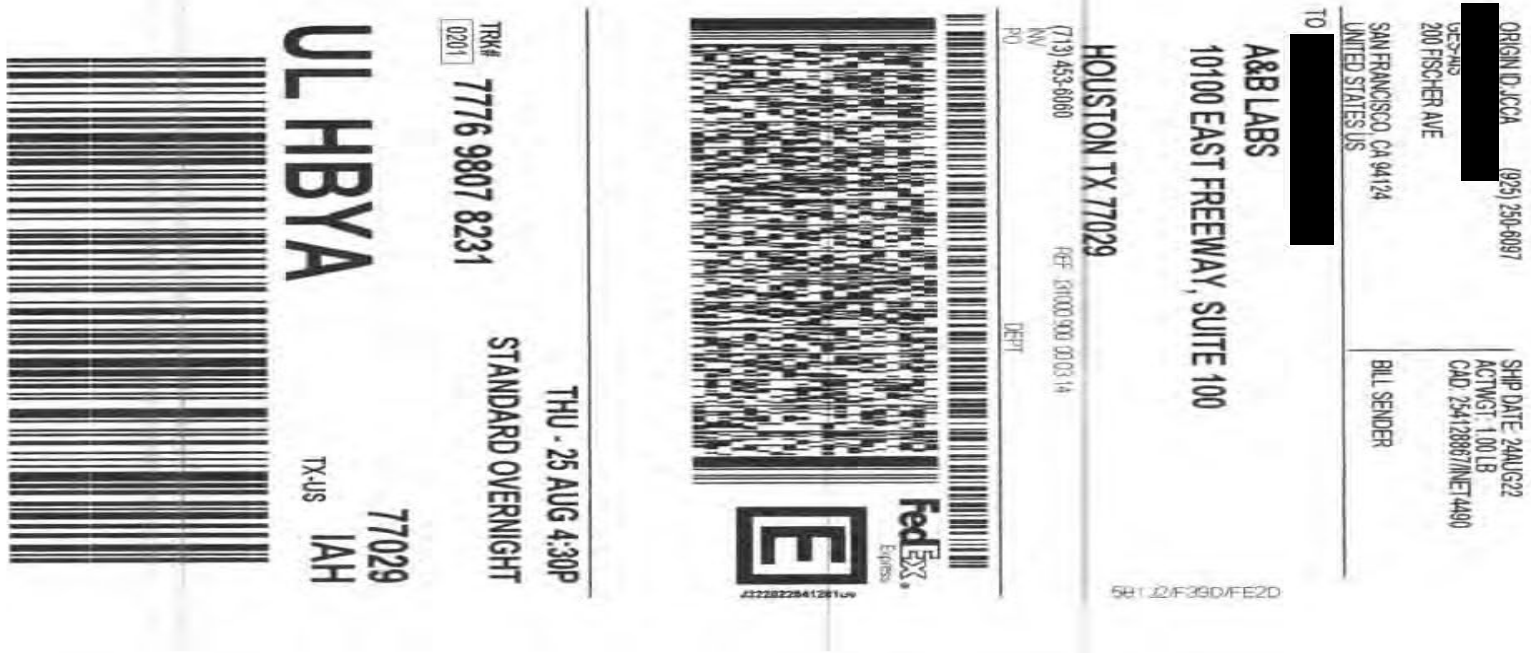
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	8/24/22	1500	FedEx	8/24/22	1500	Shipping Date: 8/24/2022/ FEDEX/ 7776 9807 8231
FEDEX	8-29-22	1025	[redacted]	8-29-22	1025	Received by Laboratory: (Signature, Date, Time) & condition

Job ID:22082882

08/29/2022 GES - ASRC Industrial ACH

24.7°C IRM

[redacted]



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Laboratory Analysis Report

Job ID : 22090284

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	09/01/2022 14:54
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
FB-082222	8/22/2022 8:00	Cassette	22090284.01
MSB01-082222	8/23/2022 8:05	Cassette	22090284.02
MSB02-082222	8/23/2022 7:16	Cassette	22090284.03
MSB113A-082222	8/23/2022 7:40	Cassette	22090284.04
MSB01-082322	8/24/2022 7:41	Cassette	22090284.05
MSB02-082322	8/24/2022 6:59	Cassette	22090284.06
MSB113A-082322	8/24/2022 7:20	Cassette	22090284.07
MSB01-082422	8/25/2022 7:41	Cassette	22090284.08
MSB02-082422	8/25/2022 7:02	Cassette	22090284.09
MSB113A-082422	8/25/2022 7:20	Cassette	22090284.10
MSB01-082522	8/25/2022 15:12	Cassette	22090284.11
MSB02-082522	8/25/2014 14:56	Cassette	22090284.12
MSB113A-082522	8/25/2022 15:03	Cassette	22090284.13

[redacted]

Released By: [redacted] Analyst: [redacted]

Title: [redacted]

This report cannot be reproduced, except in full, without prior written permission of A&B Labs. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Any TWA calculations are based on client supplied data not lab observation.

ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 9/9/2022

Job ID : 22090284
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: J310000900 / Hunters Point Shlpyard, Parcel B Removal Site Evaluation Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22090284.01	FB-082222	08/22/2022						0	100	1	1.274			09/09/22	[redacted]
22090284.02	MSB01-082222	08/23/2022	Area	3.5			1460	5110	100	4	5.096	< 0.001		09/09/22	[redacted]
22090284.03	MSB02-082222	08/23/2022	Area	3.2			1444	4620.	100	10	12.739	0.001		09/09/22	[redacted]
22090284.04	MSB113A-082222	08/23/2022	Area	3			1452	4356	100	4.0	5.096	< 0.001		09/09/22	[redacted]
22090284.05	MSB01-082322	08/24/2022	Area	3.3			1413	4662.	100	1.5	1.911	< 0.001		09/09/22	[redacted]
22090284.06	MSB02-082322	08/24/2022	Area	3.1			1421	4405.	100	1.5	1.911	< 0.001		09/09/22	[redacted]
22090284.07	MSB113A-082322	08/24/2022	Area	2.9			1417	4109.	100	0.5	0.637	< 0.001		09/09/22	[redacted]
22090284.08	MSB01-082422	08/25/2022	Area	3.2			1418	4537.	100	2.5	3.185	< 0.001		09/09/22	[redacted]
22090284.09	MSB02-082422	08/25/2022	Area	3.3			1442	4758.	100	3.5	4.459	< 0.001		09/09/22	[redacted]
22090284.10	MSB113A-082422	08/25/2022	Area	3.3			1418	4679.	100	1.0	1.274	< 0.001		09/09/22	[redacted]
22090284.11	MSB01-082522	08/25/2022	Area	3			459	1377	100	1	1.274	< 0.002		09/09/22	[redacted]
22090284.12	MSB02-082522	08/25/2014	Area	3.1			473	1466.	100	6	7.643	0.002		09/09/22	[redacted]
22090284.13	MSB113A-082522	08/25/2022	Area	3.3			462	1524.	100	5.5	7.006	0.002		09/09/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22090284**	Date Received : **09/01/2022**	Time Received : **2:54PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **21.0°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

Black Cassettes. No cooler was received, however samples are received in a box with a custody seal. [redacted] 09/02/22

Received by : [redacted]

Check in by/date : [redacted] / 09/02/2022

ab-s005-0321

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT083122ASBB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Job ID:22090284

09/01/2022 GES - ASRC Industrial ACH

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

Equipment:

Event: Parcel B Asbestos

Analytical Test Method

	Sample ID	Matrix	Date	Time	Samp Init.	Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min), Total Time (mins)
1	FB-082222	AQ	08/22/2022	0800	[redacted]	X	FB	FB1	0.00	0.00	1	
2	MSB01-082222	A	08/23/2022	0805		X	MSB01	N1	0.00	0.00	1	3.5, 1460
3	MSB02-082222	A	08/23/2022	0716		X	MSB02	N1	0.00	0.00	1	3.2, 1444
4	MSB113A-082222	A	08/23/2022	0740		X	MSB113A	N1	0.00	0.00	1	3, 1452
5	MSB01-082322	A	08/24/2022	0741		X	MSB01	N1	0.00	0.00	1	3.3, 1413
6	MSB02-082322	A	08/24/2022	0659		X	MSB02	N1	0.00	0.00	1	3.1, 1421
7	MSB113A-082322	A	08/24/2022	0720		X	MSB113A	N1	0.00	0.00	1	2.9, 1417
8	MSB01-082422	A	08/25/2022	0741		X	MSB01	N1	0.00	0.00	1	3.2, 1438
9	MSB02-082422	A	08/25/2022	0702		X	MSB02	N1	0.00	0.00	1	3.3, 1442
10	MSB113A-082422	A	08/25/2022	0720		X	MSB113A	N1	0.00	0.00	1	3.3, 1438
11	MSB01-082522	A	08/25/2022	1512		X	MSB01	N1	0.00	0.00	1	3, 450

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	8-31-22	1600	FEDEX	8-31-22	1600	Shipping Date: / FEDEX/ 7777 4319 3220
FEDEX			[redacted]	09/01/22	1454	**Received by Laboratory:** *(Signature, Date, Time)* **& condition**

21.0°C [redacted]

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT083122ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min); Total Time (mins)
	Event: Parcel B Asbestos					1						
12	MSB02-082522	A	08/25/2022	1456	[redacted]	X	MSB02	N1	0.00	0.00	1	3.1; 473
13	MSB113A-082522	A	08/25/2022	1503		X	MSB113A	N1	0.00	0.00	1	3.3; 462
14												
15												
16												
17												
18												
19												
20												
21												
22												

N/A [redacted]

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	8-31-22	1600	FEDEX	8-31-22	1600	Shipping Date: / FEDEX/ 7777 4319 3220
FEDEX			[redacted]	09/01/22	1554	**Received by Laboratory:** *(Signature, Date, Time)* **& condition**

21.0°C [redacted]

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Laboratory Analysis Report

Job ID : 22090804

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
Hunters Point Shipyard, Parcel B Removal Site Evaluation / J310000900

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	J310000900-005
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	09/08/2022 15:57
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
FB-082922	8/29/2022 8:00	Cassette	22090804.01
MSB01-082922	8/30/2022 7:53	Cassette	22090804.02
MSB02-082922	8/30/2022 7:11	Cassette	22090804.03
MSB113A-082922	8/30/2022 7:37	Cassette	22090804.04
MSB01-083022	8/31/2022 7:53	Cassette	22090804.05
MSB02-083022	8/31/2022 7:19	Cassette	22090804.06
MSB113A-083022	8/31/2022 7:38	Cassette	22090804.07
MSB01-083122	9/1/2022 7:49	Cassette	22090804.08
MSB02-083122	9/1/2022 7:19	Cassette	22090804.09
MSB113A-083122	9/1/2022 7:36	Cassette	22090804.10
MSB01-090122	9/1/2022 14:19	Cassette	22090804.11
MSB02-090122	9/1/2022 13:58	Cassette	22090804.12
MSB113A-090122	9/1/2022 14:09	Cassette	22090804.13

[redacted]

Released By: [redacted]

Title: [redacted]

Analyst: [redacted]

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ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 9/15/2022

Job ID : 22090804
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: Hunters Point Shipyard, Parcel B Removal Site Evaluation / J310000900 Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22090804.01	FB-082922	08/29/2022						0	100	0	0.000			09/15/22	[redacted]
22090804.02	MSB01-082922	08/30/2022		3.1			1441	4467.	100	7.0	8.917	0.001		09/15/22	[redacted]
22090804.03	MSB02-082922	08/30/2022		3.3			1453	4794.	100	7.5	9.554	0.001		09/15/22	[redacted]
22090804.04	MSB113A-082922	08/30/2022		3.4			1450	4930	100	7	8.917	0.001		09/15/22	[redacted]
22090804.05	MSB01-083022	08/31/2022		3.2			1438	4601.	100	5.0	6.369	< 0.001		09/15/22	[redacted]
22090804.06	MSB02-083022	08/31/2022		3.3			1444	4765.	100	5.0	6.369	< 0.001		09/15/22	[redacted]
22090804.07	MSB113A-083022	08/31/2022		3.1			1438	4457.	100	5.5	7.006	0.001		09/15/22	[redacted]
22090804.08	MSB01-083122	09/01/2022		3.5			1434	5019	100	6.5	8.280	0.001		09/15/22	[redacted]
22090804.09	MSB02-083122	09/01/2022		3.3			1438	4745.	100	7.0	8.917	0.001		09/15/22	[redacted]
22090804.10	MSB113A-083122	09/01/2022		3.0			1437	4311	100	5.5	7.006	0.001		09/15/22	[redacted]
22090804.11	MSB01-090122	09/01/2022		3.5			389	1361.	100	6.5	8.280	0.002		09/15/22	[redacted]
22090804.12	MSB02-090122	09/01/2022		3.1			397	1230.	100	4.0	5.096	< 0.002		09/15/22	[redacted]
22090804.13	MSB113A-090122	09/01/2022		3.1			393	1218.	100	4.5	5.732	< 0.002		09/15/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22090804**	Date Received : **09/08/2022**	Time Received : **3:57PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **27.0°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

Black Cassettes. No cooler was received, however samples are received in a box with a custody seal. [redacted] 09/08/22

Received by : [redacted]

Check in by/date : [redacted] / 09/08/2022

ab-s005-0321

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT090722ASBB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Job ID:22090804

09/08/2022 GES - ASRC Industrial ACH

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

Analytical Test Method: Asbestos

Event: Parcel B Asbestos — 1

	Sample ID	Matrix	Date	Time	Samp Int.		Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min), Total Time (mins)
01A	1 FB-082922	AQ	08/29/2022	0800	[redacted]	X	FB	FB1	0.00	0.00	1	
02A	2 MSB01-082922	A	08/30/2022	0753		X	MSB01	N1	0.00	0.00	1	3.1, 1441
03A	3 MSB02-082922	A	08/30/2022	0711		X	MSB02	N1	0.00	0.00	1	3.3, 1453
04A	4 MSB113A-082922	A	08/30/2022	0737		X	MSB113A	N1	0.00	0.00	1	3.4, 1450
05A	5 MSB01-083022	A	08/31/2022	0753		X	MSB01	N1	0.00	0.00	1	3.2, 1438
06A	6 MSB02-083022	A	08/31/2022	0719		X	MSB02	N1	0.00	0.00	1	3.3, 1444
07A	7 MSB113A-083022	A	08/31/2022	0738		X	MSB113A	N1	0.00	0.00	1	3.1, 1438
08A	8 MSB01-083122	A	09/01/2022	0749		X	MSB01	N1	0.00	0.00	1	3.5, 1434
09A	9 MSB02-083122	A	09/01/2022	0719		X	MSB02	N1	0.00	0.00	1	3.3, 1438
10A	10 MSB113A 083122	A	09/01/2022	0736		X	MSB113A	N1	0.00	0.00	1	3, 1437
11A	11 MSB01-090122	A	09/01/2022	1419		X	MSB01	N1	0.00	0.00	1	3.5, 389

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	9-7-22	1600	FEDEX	9-7-22	1600	Shipping Date: / FEDEX/ 7778 3010 6863
						Received by Laboratory: *(Signature, Date, Time)* & condition: [redacted] 9/8/22 Room temp.

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT090722ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Event: Parcel B Asbestos

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min); Total Time (mins)
12A	12 MSB02-090122	A	09/01/2022	1358	[redacted]	X	MSB02	N1	0.00	0.00	1	3.1; 397
13A	13 MSB113A-090122	A	09/01/2022	1409		X	MSB113A	N1	0.00	0.00	1	3.1; 393
1	14											
	15											
	16											
	17											
	18											
	19											
	20											
	21											
	22											

N/A [redacted] 9-7-22

Turnaround Time: 7 days

Relinquished by: (Signature)	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	9-7-22	1600	FEDEX	9-7-22	1600	Shi [redacted]
						Rec

CUSTODY SEAL

[redacted] (925) 250-6097
200 FISCHER AVE
SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 07
ACTWGT: 1.00
CAD: 25412834

BILL SENDER

TO [redacted]
A&B LABS
10100 EAST FREEWAY, SUITE 100
HOUSTON TX 77029
(713) 453-6060
REF: JG1000.900.00.03.14
INV:
PO:
DEPT:

FedEx Express

THU - 08 SEP 4:30P
STANDARD OVERNIGHT

TRK# 0201 7778 3010 6863

77029
TX-US IAH

UL HBYA

FedEx Ship Manager - Print Your Label(s)

9/1/22, 3:08 PM

Laboratory Analysis Report

Job ID : 22091561

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	5
	Attn:	[redacted]	P.O.#. :	J310000900-005
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	09/15/2022 03:36
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
FB-090622	9/6/2022 8:00	Cassette	22091561.01
MSB01 - 090622	9/7/2022 7:28	Cassette	22091561.02
MSB02 - 090622	9/7/2022 7:00	Cassette	22091561.03
MSB113A - 090622	9/7/2022 7:13	Cassette	22091561.04
MSB01 - 090722	9/8/2022 7:49	Cassette	22091561.05
MSB02 - 090722	9/8/2022 7:19	Cassette	22091561.06
MSB113A - 090722	9/8/2022 7:35	Cassette	22091561.07
MSB01 - 090822	9/8/2022 14:51	Cassette	22091561.08
MSB02 - 090822	9/8/2022 14:55	Cassette	22091561.09
MSB113A - 090822	9/8/2022 14:58	Cassette	22091561.10

[redacted]

Released By: [redacted]

Title: [redacted]s

Analyst: [redacted]

This report cannot be reproduced, except in full, without prior written permission of A&B Labs. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Any TWA calculations are based on client supplied data not lab observation.

ab-q210-0321

9/22/2022

ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 9/22/2022

Job ID : 22091561
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22091561.01	FB-090622	09/06/2022	Area					0	100	1.5	1.911			09/21/22	[redacted]
22091561.02	MSB01 - 090622	09/07/2022	Area	3.5			1423	4980.	100	6.5	8.280	0.001		09/21/22	[redacted]
22091561.03	MSB02 - 090622	09/07/2022	Area	3.2			1423	4553.	100	5.0	6.369	< 0.001		09/21/22	[redacted]
22091561.04	MSB113A - 090622	09/07/2022	Area	3.4			1424	4841.	100	4.0	5.096	< 0.001		09/21/22	[redacted]
22091561.05	MSB01 - 090722	09/08/2022	Area	3.5			1459	5106.	100	1	1.274	< 0.001		09/21/22	[redacted]
22091561.06	MSB02 - 090722	09/08/2022	Area	3.6			1457	5245.	100	4.5	5.732	< 0.001		09/21/22	[redacted]
22091561.07	MSB113A - 090722	09/08/2022	Area	3.4			1458	4957.	100	2.5	3.185	< 0.001		09/21/22	[redacted]
22091561.08	MSB01 - 090822	09/08/2022	Area	3.3			421	1389.	100	3.5	4.459	< 0.002		09/21/22	[redacted]
22091561.09	MSB02 - 090822	09/08/2022	Area	3.5			455	1592.	100	2.5	3.185	< 0.002		09/21/22	[redacted]
22091561.10	MSB113A - 090822	09/08/2022	Area	3.5			441	1543.	100	2	2.548	< 0.002		09/21/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22091561**	Date Received : **09/15/2022**	Time Received : **3:36AM**
Client Name : **GES - ASRC Industrial**		
Temperature : **20.9°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal. Samples received in black cassettes. ~[redacted]9/16/2022

Received by : [redacted]

Check in by/date : [redacted]/ 09/16/2022

ab-s005-0321

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT091422ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Job ID:22091561

09/15/2022 GES - ASRC Industrial ACH

Equipment:

Event: Parcel B Asbestos

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min), Total Time (mins)
1	FB-090622	AQ	09/06/2022	0800	[redacted]	X	FB	FB1	0.00	0.00	1	
2	MSB01-090622	A	09/07/2022	0728		X	MSB01	N1	0.00	0.00	1	3.5; 1423
3	MSB02-090622	A	09/07/2022	0700		X	MSB02	N1	0.00	0.00	1	3.2; 1423
4	MSB113A-090622	A	09/07/2022	0713		X	MSB113A	N1	0.00	0.00	1	3.4; 1424
5	MSB01-090722	A	09/08/2022	0749		X	MSB01	N1	0.00	0.00	1	3.5; 1459
6	MSB02-090722	A	09/08/2022	0719		X	MSB02	N1	0.00	0.00	1	3.6; 1457
7	MSB113A-090722	A	09/08/2022	0735		X	MSB113A	N1	0.00	0.00	1	3.4; 1458
8	MSB01-090822	A	09/08/2022	1451		X	MSB01	N1	0.00	0.00	1	3.3; 421
9	MSB02-090822	A	09/08/2022	1455		X	MSB02	N1	0.00	0.00	1	3.5; 455
10	MSB113A-090822	A	09/08/2022	1458		X	MSB113A	N1	0.00	0.00	1	3.5; 441
11												

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	9/14/22	1430	Fedex	9/14/22	1430	Shipping Date: 09/14/22/ FEDEX/ 7778 7097 1212
FEDEX	9/15/22	15:30	[redacted]	9/15/22	15:3	[redacted]

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Laboratory Analysis Report

Job ID : 22092119

10100 East Freeway, Suite 100, Houston, TX 77029 tel: 713-453-6060, fax: 713-453-6091, http://www.ablabs.com

Client Project Name :
J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation

Report To :	Client Name:	GES - ASRC Industrial	Total Number of Pages:	6
	Attn:	[redacted]	P.O.#. :	J310000900-005
	Client Address:	1501 West Fountainhead Parkway, Ste. #550	Date Received :	09/21/2022 15:19
	City, State, Zip:	Tempe, Arizona, 85282	Sample Collected By :	

A&B Labs has analyzed the following samples...

Client Sample ID	Sample Collection Date & Time	Matrix	A&B Job Sample ID
FB-091222	9/12/2022 8:00	Cassette	22092119.01
MSB01-091222	9/13/2022 7:29	Cassette	22092119.02
MSB02-091222	9/13/2022 7:00	Cassette	22092119.03
MSB113A-091222	9/13/2022 7:14	Cassette	22092119.04
MSB01-091322	9/14/2022 7:45	Cassette	22092119.05
MSB02-091322	9/14/2022 7:15	Cassette	22092119.06
MSB113A-091322	9/14/2022 7:32	Cassette	22092119.07
MSB01-091422	9/15/2022 8:02	Cassette	22092119.08
MSB02-091422	9/15/2022 7:31	Cassette	22092119.09
MSB113A-091422	9/15/2022 7:46	Cassette	22092119.10
MSB01-091522	9/15/2022 14:50	Cassette	22092119.11
MSB02-091522	9/15/2022 15:04	Cassette	22092119.12
MSB113A-091522	9/15/2022 14:50	Cassette	22092119.13

[redacted]

Released By: [redacted]

Title: [redacted]

Analyst: [redacted]

This report cannot be reproduced, except in full, without prior written permission of A&B Labs. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Any TWA calculations are based on client supplied data not lab observation.

ab-q210-0321

9/28/2022

ANALYSIS OF AIRBORNE FIBER SAMPLING
SAMPLING PERFORMED BY CLIENT
ANALYSIS CONDUCTED BY A & B ENVIRONMENTAL SERVICES, INC.
AIHA Lab Accreditation # 101470 TDH PLM/PCM Lab License # 300080

Date 9/28/2022

Job ID : 22092119
Analytical Method: NIOSH 7400-I2-Aug1994

Client: GES - ASRC Industrial Project: J310000900 / Hunters Point Shipyard, Parcel B Removal Site Evaluation Attn: [redacted]

A&B Sample ID	Client Sample ID	Collected Date	Area/Person	Flow Rate L/m	Time On	Time Off	Total Time (min)	Volume (Liters)	Total Fields	Total Fibers	F/mm2	Fiber/cc	8 Hour TWA	Analysis Date	Analyzed By
22092119.01	FB-091222	09/12/2022	Area					0	100	1	1.274			09/28/22	[redacted]
22092119.02	MSB01-091222	09/13/2022	Area	3.5			1429	5001.	100	2.0	2.548	< 0.001		09/28/22	[redacted]
22092119.03	MSB02-091222	09/13/2022	Area	3.1			1425	4417.	100	3	3.822	< 0.001		09/28/22	[redacted]
22092119.04	MSB113A-091222	09/13/2022	Area	3.6			1426	5133.	100	2.5	3.185	< 0.001		09/28/22	[redacted]
22092119.05	MSB01-091322	09/14/2022	Area	3.1			1456	4513.	100	1.5	1.911	< 0.001		09/28/22	[redacted]
22092119.06	MSB02-091322	09/14/2022	Area	3.5			1453	5085.	100	5	6.369	< 0.001		09/28/22	[redacted]
22092119.07	MSB113A-091322	09/14/2022	Area	3.3			1457	4808.	100	2.5	3.185	< 0.001		09/28/22	[redacted]
22092119.08	MSB01-091422	09/15/2022	Area	3.3			1456	4804.	100	4.5	5.732	< 0.001		09/28/22	[redacted]
22092119.09	MSB02-091422	09/15/2022	Area	3.2			1456	4659.	100	2.5	3.185	< 0.001		09/28/22	[redacted]
22092119.10	MSB113A-091422	09/15/2022	Area	3.4			1453	4940.	100	7.5	9.554	0.001		09/28/22	[redacted]
22092119.11	MSB01-091522	09/15/2022	Area	3.2			407	1302.	100	3	3.822	< 0.002		09/28/22	[redacted]
22092119.12	MSB02-091522	09/15/2022	Area	3.5			451	1578.	100	2.5	3.185	< 0.002		09/28/22	[redacted]
22092119.13	MSB113A-091522	09/15/2022	Area	3.2			424	1356.	100	2.0	2.548	< 0.002		09/28/22	[redacted]

Detection limit of this method is estimated at 7 f/mm2 (5.5 fibers per 100 fields)

Sr Value

(Fiber Range*; Sr Value): (5-20; Sr = 0.06), (20-50; Sr = 0.05), (50-100; Sr = 0.04), (>100; Sr = 0.04)

*Fiber Range = # of Fibers / 100 Counts

Intralaboratory Sr 5-20:0.06 20-50:0.04 50-100:0.02

Sample Condition Checklist

A&B JobID : **22092119**	Date Received : **09/21/2022**	Time Received : **3:19PM**
Client Name : **GES - ASRC Industrial**		
Temperature : **22.1°C**	Sample pH : **NA**	
Thermometer ID : **IR4**	pH Paper ID : **NA**	
Perservative :		

	Check Points	Yes	No	N/A
1.	**Cooler Seal present and signed.**	X		
2.	**Sample(s) in a cooler.**		X	
3.	**If yes, ice in cooler.**			X
4.	**Sample(s) received with chain-of-custody.**	X		
5.	**C-O-C signed and dated.**	X		
6.	**Sample(s) received with signed sample custody seal.**		X	
7.	**Sample containers arrived intact. (If No comment)**	X		
8.	**Matrix:** Water ☐ Soil ☐ Liquid ☐ Sludge ☐ Solid ☐ Cassette ☑ Tube ☐ Bulk ☐ Badge ☐ Food ☐ Other ☐			
9.	**Samples were received in appropriate container(s)**	X		
10.	**Sample(s) were received with Proper preservative**			X
11.	**All samples were tagged or labeled.**	X		
12.	**Sample ID labels match C-O-C ID's.**	X		
13.	**Bottle count on C-O-C matches bottles found.**	X		
14.	**Sample volume is sufficient for analyses requested.**	X		
15.	**Samples were received with in the hold time.**	X		
16.	**VOA vials completely filled.**			X
17.	**Sample accepted.**	X		
18.	**Has client been contacted about sub-out**			X

Comments : Include actions taken to resolve discrepancies/problem:

No cooler was received, however samples are received in a box with a custody seal. Cassette=Black Cassette

Received by : [redacted]

Check in by/date : [redacted] / 09/22/2022

ab-s005-0321

Job ID:22092119

09/21/2022 GES - ASRC Industrial ACH

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT092122ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

Event: Parcel B Asbestos

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: Asbestos (1)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min), Total Time (mins)
1	FB-091222	AQ	09/12/2022	0800	[redacted]	X	FB	FB1	0.00	0.00	1	
2	MSB01-091222	A	09/13/2022	0729		X	MSB01	N1	0.00	0.00	1	3.5; 1429
3	MSB02-091222	A	09/13/2022	0700		X	MSB02	N1	0.00	0.00	1	3.1; 1425
4	MSB113A-091222	A	09/13/2022	0714		X	MSB113A	N1	0.00	0.00	1	3.6; 1426
5	MSB01-091322	A	09/14/2022	0745		X	MSB01	N1	0.00	0.00	1	3.1; 1456
6	MSB02-091322	A	09/14/2022	0715		X	MSB02	N1	0.00	0.00	1	3.5; 1453
7	MSB113A-091322	A	09/14/2022	0732		X	MSB113A	N1	0.00	0.00	1	3.3; 1457
8	MSB01-091422	A	09/15/2022	0802		X	MSB01	N1	0.00	0.00	1	3.3; 1456
9	MSB02-091422	A	09/15/2022	0731		X	MSB02	N1	0.00	0.00	1	3.2; 1456
10	MSB113A-091422	A	09/15/2022	0746		X	MSB113A	N1	0.00	0.00	1	3.4; 1453
11	MSB01-091522	A	09/15/2022	1450		X	MSB01	N1	0.00	0.00	1	3.2; 407

01A 02A 03A 04A 05A 06A 07A 08A 09A 10A 11A

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	9/20/22	1430	FedEx	9/20/22	1430	Shipping Date: 09/21/22/ FEDEX/ 7779 2188 9710
FedEx	9/20/22	1519	[redacted]	9/20/22	1519	**Received by Laboratory:** *(Signature, Date, Time)* **& condition**

22.1°C

[redacted]

CHAIN-OF-CUSTODY RECORD

Gilbane Federal Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC ID # KT092122ASBB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: A&B Labs	Event: **Parcel B Asbestos**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 10100 East Fwy Ste. 100 Houston TX 77029	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	Filter/No Preservatives

Event: Parcel B Asbestos

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: Asbestos	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Flow Rate (L/min); Total Time (mins)
						1						
12A	12 MSB02-091522	A	09/15/2022	1504	[redacted]	X	MSB02	N1	0.00	0.00	1	3.5; 451
13A	13 MSB113A-091522	A	09/15/2022	1450		X	MSB113A	N1	0.00	0.00	1	3.2; 424
	14											
	15											
	16											
	17											
	18											
	19											
	20											
	21											
	22											

Turnaround Time: 7 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
[redacted]	9/20/22	1430	Fedex	9/21/22	1430	Shipping Date: 09/21/22/ FEDEX/ 7779 2188 9710
Fed ex	9/21/22		[redacted]	9/21/22		**Received by Laboratory:** *(Signature, Date, Time)* **& condition**

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-90174-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
7/27/2022 7:00:38 PM

[redacted], Project Manager I
(916)374-4414
[redacted]

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-90174-1

Comments
No additional comments.

Receipt
The samples were received on 7/20/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 21.3º C.

Metals
Method Filter to Air: No volume of air was passed through the filter for GES_TSP061322-37 (320-90174-2); true volume of air is 0m3. 1000m3 was entered and used for calculation.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_PM061322-37 — Lab Sample ID: 320-90174-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00039	J B	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GES_TSP061322-37 — Lab Sample ID: 320-90174-2

No Detections.

Client Sample ID: GES_PM061322-38 — Lab Sample ID: 320-90174-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0029		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0075	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	19		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-38 — Lab Sample ID: 320-90174-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	18.0891		0.2853	0.2853	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-39 — Lab Sample ID: 320-90174-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026	B	0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	2.0		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-39 — Lab Sample ID: 320-90174-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	20.3939		0.2872	0.2872	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-40 — Lab Sample ID: 320-90174-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00082		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0024	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	13		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-40 — Lab Sample ID: 320-90174-8

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	23.6828		0.3149	0.3149	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-41 — Lab Sample ID: 320-90174-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0030	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.1		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-41 — Lab Sample ID: 320-90174-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.2610		0.2833	0.2833	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_PM061322-42 — Lab Sample ID: 320-90174-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00088		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026	B	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.4		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-42 — Lab Sample ID: 320-90174-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	22.6340		0.2865	0.2865	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-43 — Lab Sample ID: 320-90174-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00078		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.5		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-43 — Lab Sample ID: 320-90174-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	18.8514		0.3217	0.3217	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-44 — Lab Sample ID: 320-90174-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00063	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0024	B	0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.2		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-44 — Lab Sample ID: 320-90174-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.8461		0.2829	0.2829	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-45 — Lab Sample ID: 320-90174-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0014	B	0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	2.2		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-45 — Lab Sample ID: 320-90174-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.2537		0.2874	0.2874	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-46 — Lab Sample ID: 320-90174-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00069	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021	B	0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	3.7		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_TSP061322-46 — Lab Sample ID: 320-90174-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	14.4458		0.3168	0.3168	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-47 — Lab Sample ID: 320-90174-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00076		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0029	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	15		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-47 — Lab Sample ID: 320-90174-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	22.5031		0.2848	0.2848	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-48 — Lab Sample ID: 320-90174-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00063	J	0.00078	0.00012	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0014	B	0.00078	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	13		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-48 — Lab Sample ID: 320-90174-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	21.6597		0.2983	0.2983	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-49 — Lab Sample ID: 320-90174-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00073	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	15		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-49 — Lab Sample ID: 320-90174-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	28.1340		0.3190	0.3190	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-50 — Lab Sample ID: 320-90174-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00090		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020	B	0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	21		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-50 — Lab Sample ID: 320-90174-28

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	21.8550		0.2753	0.2753	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-51 — Lab Sample ID: 320-90174-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00070	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021	B	0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample ID: GES_PM061322-51 (Continued) — Lab Sample ID: 320-90174-29

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Particulate Matter as PM 10	19		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-51 — Lab Sample ID: 320-90174-30

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	30.2934		0.2789	0.2789	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-52 — Lab Sample ID: 320-90174-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00098		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028	B	0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	25		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-52 — Lab Sample ID: 320-90174-32

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	41.7697		0.3122	0.3122	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM061322-37
Lab Sample ID: 320-90174-1
Date Collected: 07/12/22 08:00
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:29	1
Manganese	**0.00039**	**J B**	0.0012	0.00017	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:29	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-37
Lab Sample ID: 320-90174-2
Date Collected: 07/12/22 08:00
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-38
Lab Sample ID: 320-90174-3
Date Collected: 07/08/22 08:14
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.0029**		0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:38	1
Manganese	**0.0075**	**B**	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:38	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**19**		0.32	0.32	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-38
Lab Sample ID: 320-90174-4
Date Collected: 07/08/22 08:14
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	**18.0891**		0.2853	0.2853	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-39
Lab Sample ID: 320-90174-5
Date Collected: 07/08/22 09:20
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.0012**		0.00074	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:42	1
Manganese	**0.0026**	**B**	0.00074	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:42	1

Client Sample ID: GES_PM061322-39
Lab Sample ID: 320-90174-5
Date Collected: 07/08/22 09:20
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	2.0		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-39
Lab Sample ID: 320-90174-6
Date Collected: 07/08/22 09:20
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	20.3939		0.2872	0.2872	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-40
Lab Sample ID: 320-90174-7
Date Collected: 07/08/22 08:30
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00082		0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:45	1
Manganese	0.0024	B	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:45	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	13		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-40
Lab Sample ID: 320-90174-8
Date Collected: 07/08/22 08:30
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	23.6828		0.3149	0.3149	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-41
Lab Sample ID: 320-90174-9
Date Collected: 07/12/22 08:05
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:48	1
Manganese	0.0030	B	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:48	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.1		0.32	0.32	ug/m3			07/21/22 13:00	1

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP061322-41
Lab Sample ID: 320-90174-10
Date Collected: 07/12/22 08:05
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.2610		0.2833	0.2833	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-42
Lab Sample ID: 320-90174-11
Date Collected: 07/12/22 07:24
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00088		0.00075	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:58	1
Manganese	0.0026	B	0.00075	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:58	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.4		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-42
Lab Sample ID: 320-90174-12
Date Collected: 07/12/22 07:24
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	22.6340		0.2865	0.2865	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-43
Lab Sample ID: 320-90174-13
Date Collected: 07/12/22 07:42
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00078		0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:01	1
Manganese	0.0019	B	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:01	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.5		0.32	0.32	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-43
Lab Sample ID: 320-90174-14
Date Collected: 07/12/22 07:42
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	18.8514		0.3217	0.3217	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-44
Lab Sample ID: 320-90174-15
Date Collected: 07/13/22 08:12
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00063	J	0.00072	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:04	1
Manganese	0.0024	B	0.00072	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:04	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.2		0.30	0.30	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-44
Lab Sample ID: 320-90174-16
Date Collected: 07/13/22 08:12
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.8461		0.2829	0.2829	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-45
Lab Sample ID: 320-90174-17
Date Collected: 07/13/22 07:28
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00075	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:08	1
Manganese	0.0014	B	0.00075	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:08	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	2.2		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-45
Lab Sample ID: 320-90174-18
Date Collected: 07/13/22 07:28
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.2537		0.2874	0.2874	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-46
Lab Sample ID: 320-90174-19
Date Collected: 07/13/22 07:46
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00069	J	0.00075	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:11	1
Manganese	0.0021	B	0.00075	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:11	1

Client Sample ID: GES_PM061322-46
Lab Sample ID: 320-90174-19
Date Collected: 07/13/22 07:46
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	3.7		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-46
Lab Sample ID: 320-90174-20
Date Collected: 07/13/22 07:46
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	14.4458		0.3168	0.3168	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-47
Lab Sample ID: 320-90174-21
Date Collected: 07/14/22 07:53
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00076		0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:14	1
Manganese	0.0029	B	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:14	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	15		0.32	0.32	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-47
Lab Sample ID: 320-90174-22
Date Collected: 07/14/22 07:53
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	22.5031		0.2848	0.2848	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-48
Lab Sample ID: 320-90174-23
Date Collected: 07/14/22 07:22
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00063	J	0.00078	0.00012	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:18	1
Manganese	0.0014	B	0.00078	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:18	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	13		0.32	0.32	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-48
Lab Sample ID: 320-90174-24
Date Collected: 07/14/22 07:22
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	21.6597		0.2983	0.2983	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-49
Lab Sample ID: 320-90174-25
Date Collected: 07/14/22 07:39
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00073	J	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:21	1
Manganese	0.0019	B	0.00076	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:21	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	15		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-49
Lab Sample ID: 320-90174-26
Date Collected: 07/14/22 07:39
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	28.1340		0.3190	0.3190	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-50
Lab Sample ID: 320-90174-27
Date Collected: 07/15/22 08:21
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00090		0.00072	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:24	1
Manganese	0.0020	B	0.00072	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:24	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	21		0.30	0.30	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-50
Lab Sample ID: 320-90174-28
Date Collected: 07/15/22 08:21
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	21.8550		0.2753	0.2753	ug/m3 (Air)			07/21/22 13:00	1

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM061322-51
Lab Sample ID: 320-90174-29
Date Collected: 07/15/22 07:59
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00070	J	0.00073	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:34	1
Manganese	0.0021	B	0.00073	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:34	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	19		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-51
Lab Sample ID: 320-90174-30
Date Collected: 07/15/22 07:59
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	30.2934		0.2789	0.2789	ug/m3 (Air)			07/21/22 13:00	1

Client Sample ID: GES_PM061322-52
Lab Sample ID: 320-90174-31
Date Collected: 07/15/22 08:07
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00098		0.00074	0.00011	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:37	1
Manganese	0.0028	B	0.00074	0.00010	ug/m3 (Air)		07/26/22 07:00	07/26/22 17:37	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	25		0.31	0.31	ug/m3			07/21/22 13:00	1

Client Sample ID: GES_TSP061322-52
Lab Sample ID: 320-90174-32
Date Collected: 07/15/22 08:07
Matrix: Air
Date Received: 07/20/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	41.7697		0.3122	0.3122	ug/m3 (Air)			07/21/22 13:00	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-605369/1-B
Matrix: Air
Analysis Batch: 605588

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 605383

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:19	1
Manganese	0.000175	J	0.0012	0.00017	ug/m3 (Air)		07/26/22 07:00	07/26/22 16:19	1

Lab Sample ID: LCS 320-605369/2-B
Matrix: Air
Analysis Batch: 605588

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 605383

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.240	0.247		ug/m3 (Air)		103	86 - 111
Manganese	0.240	0.257		ug/m3 (Air)		107	88 - 110

Lab Sample ID: LCSD 320-605369/3-B
Matrix: Air
Analysis Batch: 605588

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 605383

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	0.240	0.246		ug/m3 (Air)		102	86 - 111	1	15
Manganese	0.240	0.251		ug/m3 (Air)		105	88 - 110	2	15

Metals

Pre Prep Batch: 605369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-1	GES_PM061322-37	Total/NA	Air	Filter to Air	
320-90174-3	GES_PM061322-38	Total/NA	Air	Filter to Air	
320-90174-5	GES_PM061322-39	Total/NA	Air	Filter to Air	
320-90174-7	GES_PM061322-40	Total/NA	Air	Filter to Air	
320-90174-9	GES_PM061322-41	Total/NA	Air	Filter to Air	
320-90174-11	GES_PM061322-42	Total/NA	Air	Filter to Air	
320-90174-13	GES_PM061322-43	Total/NA	Air	Filter to Air	
320-90174-15	GES_PM061322-44	Total/NA	Air	Filter to Air	
320-90174-17	GES_PM061322-45	Total/NA	Air	Filter to Air	
320-90174-19	GES_PM061322-46	Total/NA	Air	Filter to Air	
320-90174-21	GES_PM061322-47	Total/NA	Air	Filter to Air	
320-90174-23	GES_PM061322-48	Total/NA	Air	Filter to Air	
320-90174-25	GES_PM061322-49	Total/NA	Air	Filter to Air	
320-90174-27	GES_PM061322-50	Total/NA	Air	Filter to Air	
320-90174-29	GES_PM061322-51	Total/NA	Air	Filter to Air	
320-90174-31	GES_PM061322-52	Total/NA	Air	Filter to Air	
MB 320-605369/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-605369/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-605369/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 605383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-1	GES_PM061322-37	Total/NA	Air	3050B	605369
320-90174-3	GES_PM061322-38	Total/NA	Air	3050B	605369
320-90174-5	GES_PM061322-39	Total/NA	Air	3050B	605369
320-90174-7	GES_PM061322-40	Total/NA	Air	3050B	605369
320-90174-9	GES_PM061322-41	Total/NA	Air	3050B	605369
320-90174-11	GES_PM061322-42	Total/NA	Air	3050B	605369
320-90174-13	GES_PM061322-43	Total/NA	Air	3050B	605369
320-90174-15	GES_PM061322-44	Total/NA	Air	3050B	605369
320-90174-17	GES_PM061322-45	Total/NA	Air	3050B	605369
320-90174-19	GES_PM061322-46	Total/NA	Air	3050B	605369
320-90174-21	GES_PM061322-47	Total/NA	Air	3050B	605369
320-90174-23	GES_PM061322-48	Total/NA	Air	3050B	605369
320-90174-25	GES_PM061322-49	Total/NA	Air	3050B	605369
320-90174-27	GES_PM061322-50	Total/NA	Air	3050B	605369
320-90174-29	GES_PM061322-51	Total/NA	Air	3050B	605369
320-90174-31	GES_PM061322-52	Total/NA	Air	3050B	605369
MB 320-605369/1-B	Method Blank	Total/NA	Air	3050B	605369
LCS 320-605369/2-B	Lab Control Sample	Total/NA	Air	3050B	605369
LCSD 320-605369/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	605369

Analysis Batch: 605588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-1	GES_PM061322-37	Total/NA	Air	6020	605383
320-90174-3	GES_PM061322-38	Total/NA	Air	6020	605383
320-90174-5	GES_PM061322-39	Total/NA	Air	6020	605383
320-90174-7	GES_PM061322-40	Total/NA	Air	6020	605383
320-90174-9	GES_PM061322-41	Total/NA	Air	6020	605383
320-90174-11	GES_PM061322-42	Total/NA	Air	6020	605383
320-90174-13	GES_PM061322-43	Total/NA	Air	6020	605383

Metals (Continued)

Analysis Batch: 605588 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-15	GES_PM061322-44	Total/NA	Air	6020	605383
320-90174-17	GES_PM061322-45	Total/NA	Air	6020	605383
320-90174-19	GES_PM061322-46	Total/NA	Air	6020	605383
320-90174-21	GES_PM061322-47	Total/NA	Air	6020	605383
320-90174-23	GES_PM061322-48	Total/NA	Air	6020	605383
320-90174-25	GES_PM061322-49	Total/NA	Air	6020	605383
320-90174-27	GES_PM061322-50	Total/NA	Air	6020	605383
320-90174-29	GES_PM061322-51	Total/NA	Air	6020	605383
320-90174-31	GES_PM061322-52	Total/NA	Air	6020	605383
MB 320-605369/1-B	Method Blank	Total/NA	Air	6020	605383
LCS 320-605369/2-B	Lab Control Sample	Total/NA	Air	6020	605383
LCSD 320-605369/3-B	Lab Control Sample Dup	Total/NA	Air	6020	605383

General Chemistry

Pre Prep Batch: 605648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-2	GES_TSP061322-37	Total/NA	Air	Filter to Air	
320-90174-4	GES_TSP061322-38	Total/NA	Air	Filter to Air	
320-90174-6	GES_TSP061322-39	Total/NA	Air	Filter to Air	
320-90174-8	GES_TSP061322-40	Total/NA	Air	Filter to Air	
320-90174-10	GES_TSP061322-41	Total/NA	Air	Filter to Air	
320-90174-12	GES_TSP061322-42	Total/NA	Air	Filter to Air	
320-90174-14	GES_TSP061322-43	Total/NA	Air	Filter to Air	
320-90174-16	GES_TSP061322-44	Total/NA	Air	Filter to Air	
320-90174-18	GES_TSP061322-45	Total/NA	Air	Filter to Air	
320-90174-20	GES_TSP061322-46	Total/NA	Air	Filter to Air	
320-90174-22	GES_TSP061322-47	Total/NA	Air	Filter to Air	
320-90174-24	GES_TSP061322-48	Total/NA	Air	Filter to Air	
320-90174-26	GES_TSP061322-49	Total/NA	Air	Filter to Air	
320-90174-28	GES_TSP061322-50	Total/NA	Air	Filter to Air	
320-90174-30	GES_TSP061322-51	Total/NA	Air	Filter to Air	
320-90174-32	GES_TSP061322-52	Total/NA	Air	Filter to Air	

Analysis Batch: 605694

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-1	GES_PM061322-37	Total/NA	Air	PM10	
320-90174-3	GES_PM061322-38	Total/NA	Air	PM10	
320-90174-5	GES_PM061322-39	Total/NA	Air	PM10	
320-90174-7	GES_PM061322-40	Total/NA	Air	PM10	
320-90174-9	GES_PM061322-41	Total/NA	Air	PM10	
320-90174-11	GES_PM061322-42	Total/NA	Air	PM10	
320-90174-13	GES_PM061322-43	Total/NA	Air	PM10	
320-90174-15	GES_PM061322-44	Total/NA	Air	PM10	
320-90174-17	GES_PM061322-45	Total/NA	Air	PM10	
320-90174-19	GES_PM061322-46	Total/NA	Air	PM10	
320-90174-21	GES_PM061322-47	Total/NA	Air	PM10	
320-90174-23	GES_PM061322-48	Total/NA	Air	PM10	
320-90174-25	GES_PM061322-49	Total/NA	Air	PM10	
320-90174-27	GES_PM061322-50	Total/NA	Air	PM10	
320-90174-29	GES_PM061322-51	Total/NA	Air	PM10	

General Chemistry (Continued)

Analysis Batch: 605694 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-31	GES_PM061322-52	Total/NA	Air	PM10	

Analysis Batch: 605696

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90174-2	GES_TSP061322-37	Total/NA	Air	40CFR50 App B	605648
320-90174-4	GES_TSP061322-38	Total/NA	Air	40CFR50 App B	605648
320-90174-6	GES_TSP061322-39	Total/NA	Air	40CFR50 App B	605648
320-90174-8	GES_TSP061322-40	Total/NA	Air	40CFR50 App B	605648
320-90174-10	GES_TSP061322-41	Total/NA	Air	40CFR50 App B	605648
320-90174-12	GES_TSP061322-42	Total/NA	Air	40CFR50 App B	605648
320-90174-14	GES_TSP061322-43	Total/NA	Air	40CFR50 App B	605648
320-90174-16	GES_TSP061322-44	Total/NA	Air	40CFR50 App B	605648
320-90174-18	GES_TSP061322-45	Total/NA	Air	40CFR50 App B	605648
320-90174-20	GES_TSP061322-46	Total/NA	Air	40CFR50 App B	605648
320-90174-22	GES_TSP061322-47	Total/NA	Air	40CFR50 App B	605648
320-90174-24	GES_TSP061322-48	Total/NA	Air	40CFR50 App B	605648
320-90174-26	GES_TSP061322-49	Total/NA	Air	40CFR50 App B	605648
320-90174-28	GES_TSP061322-50	Total/NA	Air	40CFR50 App B	605648
320-90174-30	GES_TSP061322-51	Total/NA	Air	40CFR50 App B	605648
320-90174-32	GES_TSP061322-52	Total/NA	Air	40CFR50 App B	605648

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_PM061322-37
Lab Sample ID: 320-90174-1
Date Collected: 07/12/22 08:00
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 16:29	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	-0.0004 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-37
Lab Sample ID: 320-90174-2
Date Collected: 07/12/22 08:00
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-38
Lab Sample ID: 320-90174-3
Date Collected: 07/08/22 08:14
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 16:38	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0301 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-38
Lab Sample ID: 320-90174-4
Date Collected: 07/08/22 08:14
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-39
Lab Sample ID: 320-90174-5
Date Collected: 07/08/22 09:20
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 16:42	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0032 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_TSP061322-39
Lab Sample ID: 320-90174-6
Date Collected: 07/08/22 09:20
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-40
Lab Sample ID: 320-90174-7
Date Collected: 07/08/22 08:30
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 16:45	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0209 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-40
Lab Sample ID: 320-90174-8
Date Collected: 07/08/22 08:30
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-41
Lab Sample ID: 320-90174-9
Date Collected: 07/12/22 08:05
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 16:48	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0128 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-41
Lab Sample ID: 320-90174-10
Date Collected: 07/12/22 08:05
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_PM061322-42
Lab Sample ID: 320-90174-11
Date Collected: 07/12/22 07:24
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 16:58	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0149 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-42
Lab Sample ID: 320-90174-12
Date Collected: 07/12/22 07:24
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-43
Lab Sample ID: 320-90174-13
Date Collected: 07/12/22 07:42
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:01	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0118 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-43
Lab Sample ID: 320-90174-14
Date Collected: 07/12/22 07:42
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-44
Lab Sample ID: 320-90174-15
Date Collected: 07/13/22 08:12
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:04	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0087 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_TSP061322-44
Lab Sample ID: 320-90174-16
Date Collected: 07/13/22 08:12
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-45
Lab Sample ID: 320-90174-17
Date Collected: 07/13/22 07:28
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:08	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0036 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-45
Lab Sample ID: 320-90174-18
Date Collected: 07/13/22 07:28
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-46
Lab Sample ID: 320-90174-19
Date Collected: 07/13/22 07:46
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:11	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0059 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-46
Lab Sample ID: 320-90174-20
Date Collected: 07/13/22 07:46
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-47
Lab Sample ID: 320-90174-21
Date Collected: 07/14/22 07:53
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:14	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0242 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-47
Lab Sample ID: 320-90174-22
Date Collected: 07/14/22 07:53
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-48
Lab Sample ID: 320-90174-23
Date Collected: 07/14/22 07:22
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:18	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0199 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-48
Lab Sample ID: 320-90174-24
Date Collected: 07/14/22 07:22
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-49
Lab Sample ID: 320-90174-25
Date Collected: 07/14/22 07:39
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:21	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0245 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_TSP061322-49
Lab Sample ID: 320-90174-26
Date Collected: 07/14/22 07:39
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-50
Lab Sample ID: 320-90174-27
Date Collected: 07/15/22 08:21
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:24	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0346 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-50
Lab Sample ID: 320-90174-28
Date Collected: 07/15/22 08:21
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Client Sample ID: GES_PM061322-51
Lab Sample ID: 320-90174-29
Date Collected: 07/15/22 07:59
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:34	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0313 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-51
Lab Sample ID: 320-90174-30
Date Collected: 07/15/22 07:59
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90174-1

Client Sample ID: GES_PM061322-52

Lab Sample ID: 320-90174-31

Date Collected: 07/15/22 08:07
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					605369	07/26/22 06:13	[redacted]	TAL SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	605383	07/26/22 07:00	[redacted]	TAL SAC
Total/NA	Analysis	6020		1			605588	07/26/22 17:37	[redacted]	TAL SAC
Total/NA	Analysis	PM10		1	0 g	0.0409 g	605694	07/21/22 13:00	[redacted]	TAL SAC

Client Sample ID: GES_TSP061322-52

Lab Sample ID: 320-90174-32

Date Collected: 07/15/22 08:07
Matrix: Air
Date Received: 07/20/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			605696	07/21/22 13:00	[redacted]	TAL SAC
Total/NA	Pre Prep	Filter to Air					605648	07/27/22 12:33	[redacted]	TAL SAC

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	TAL SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	TAL SAC
PM10	Particulate Matter	40CFR50J	TAL SAC
3050B	Preparation, Metals	SW846	TAL SAC
Filter to Air	Filter to Air volume ratio	None	TAL SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-90174-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-90174-1	GES_PM061322-37	Air	07/12/22 08:00	07/20/22 09:30
320-90174-2	GES_TSP061322-37	Air	07/12/22 08:00	07/20/22 09:30
320-90174-3	GES_PM061322-38	Air	07/08/22 08:14	07/20/22 09:30
320-90174-4	GES_TSP061322-38	Air	07/08/22 08:14	07/20/22 09:30
320-90174-5	GES_PM061322-39	Air	07/08/22 09:20	07/20/22 09:30
320-90174-6	GES_TSP061322-39	Air	07/08/22 09:20	07/20/22 09:30
320-90174-7	GES_PM061322-40	Air	07/08/22 08:30	07/20/22 09:30
320-90174-8	GES_TSP061322-40	Air	07/08/22 08:30	07/20/22 09:30
320-90174-9	GES_PM061322-41	Air	07/12/22 08:05	07/20/22 09:30
320-90174-10	GES_TSP061322-41	Air	07/12/22 08:05	07/20/22 09:30
320-90174-11	GES_PM061322-42	Air	07/12/22 07:24	07/20/22 09:30
320-90174-12	GES_TSP061322-42	Air	07/12/22 07:24	07/20/22 09:30
320-90174-13	GES_PM061322-43	Air	07/12/22 07:42	07/20/22 09:30
320-90174-14	GES_TSP061322-43	Air	07/12/22 07:42	07/20/22 09:30
320-90174-15	GES_PM061322-44	Air	07/13/22 08:12	07/20/22 09:30
320-90174-16	GES_TSP061322-44	Air	07/13/22 08:12	07/20/22 09:30
320-90174-17	GES_PM061322-45	Air	07/13/22 07:28	07/20/22 09:30
320-90174-18	GES_TSP061322-45	Air	07/13/22 07:28	07/20/22 09:30
320-90174-19	GES_PM061322-46	Air	07/13/22 07:46	07/20/22 09:30
320-90174-20	GES_TSP061322-46	Air	07/13/22 07:46	07/20/22 09:30
320-90174-21	GES_PM061322-47	Air	07/14/22 07:53	07/20/22 09:30
320-90174-22	GES_TSP061322-47	Air	07/14/22 07:53	07/20/22 09:30
320-90174-23	GES_PM061322-48	Air	07/14/22 07:22	07/20/22 09:30
320-90174-24	GES_TSP061322-48	Air	07/14/22 07:22	07/20/22 09:30
320-90174-25	GES_PM061322-49	Air	07/14/22 07:39	07/20/22 09:30
320-90174-26	GES_TSP061322-49	Air	07/14/22 07:39	07/20/22 09:30
320-90174-27	GES_PM061322-50	Air	07/15/22 08:21	07/20/22 09:30
320-90174-28	GES_TSP061322-50	Air	07/15/22 08:21	07/20/22 09:30
320-90174-29	GES_PM061322-51	Air	07/15/22 07:59	07/20/22 09:30
320-90174-30	GES_TSP061322-51	Air	07/15/22 07:59	07/20/22 09:30
320-90174-31	GES_PM061322-52	Air	07/15/22 08:07	07/20/22 09:30
320-90174-32	GES_TSP061322-52	Air	07/15/22 08:07	07/20/22 09:30

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT071922AIRB

GES
AN ABM INDUSTRIAL COMPANY

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: Parcel B Air Monitoring
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-90174 Chain of Custody

						Analytical Test Method																
						CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn														
	Event: Parcel B Air Monitoring					1	1	1														
	Sample ID	Matrix	Date	Time	Samp Init.												Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	GES_PM061322-37	AQ	07/12/2022	0800	[redacted]	X		X									FIELDQC	TB1	0.00	0.00	1	
2	GES_TSP061322-37	AQ	07/12/2022	0800			X										FIELDQC	TB1	0.00	0.00	1	
3	GES_PM061322-38	A	07/08/2022	0814		X		X									MSB01	N1	0.00	0.00	1	VOLUME: 1575.14 (M3)
4	GES_TSP061322-38	A	07/08/2022	0814			X										MSB01	N1	0.00	0.00	1	VOLUME: 1752.44 (M3)
5	GES_PM061322-39	A	07/08/2022	0920		X		X									MSB02	N1	0.00	0.00	1	VOLUME: 1626.27 (M3)
6	GES_TSP061322-39	A	07/08/2022	0920			X										MSB02	N1	0.00	0.00	1	VOLUME: 1740.72 (M3)
7	GES_PM061322-40	A	07/08/2022	0830		X		X									MSB113A	N1	0.00	0.00	1	VOLUME: 1587.75 (M3)
8	GES_TSP061322-40	A	07/08/2022	0830			X										MSB113A	N1	0.00	0.00	1	VOLUME: 1567.65 (M3)
9	GES_PM061322-41	A	07/12/2022	0805		X		X									MSB01	N1	0.00	0.00	1	VOLUME: 1586.87 (M3)
10	GES_TSP061322-41	A	07/12/2022	0805			X										MSB01	N1	0.00	0.00	1	VOLUME: 1764.96 (M3)
11	GES_PM061322-42	A	07/12/2022	0724		X		X									MSB02	N1	0.00	0.00	1	VOLUME: 1593.10 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	7/19/22	1600	[redacted]	7/19/22	1600
				7-20-22	0930

Shipping Date / Carrier / Airbill Number

Shipping Date: 7/19/2022 FEDEX/ 7774 1862 4740

Received by Laboratory: *(Signature, Date, Time)* **& condition**

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT071922AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: Parcel B Air Monitoring
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

						Analytical Test Method	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn										
	Event: Parcel B Air Monitoring						1	1	1										
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
12	GES_TSP061322-42	A	07/12/2022	0724	[redacted]			X								MSB02	N1	0.00	0.00	1	VOLUME: 1745.16 (M3)
13	GES_PM061322-43	A	07/12/2022	0742			X		X							MSB113A	N1	0.00	0.00	1	VOLUME: 1578.52 (M3)
14	GES_TSP061322-43	A	07/12/2022	0742				X								MSB113A	N1	0.00	0.00	1	VOLUME: 1554.26 (M3)
15	GES_PM061322-44	A	07/13/2022	0812			X		X							MSB01	N1	0.00	0.00	1	VOLUME: 1668.76 (M3)
16	GES_TSP061322-44	A	07/13/2022	0812				X								MSB01	N1	0.00	0.00	1	VOLUME: 1767.79 (M3)
17	GES_PM061322-45	A	07/13/2022	0728			X		X							MSB02	N1	0.00	0.00	1	VOLUME: 1607.71 (M3)
18	GES_TSP061322-45	A	07/13/2022	0728				X								MSB02	N1	0.00	0.00	1	VOLUME: 1739.85 (M3)
19	GES_PM061322-46	A	07/13/2022	0746			X		X							MSB113A	N1	0.00	0.00	1	VOLUME: 1600.23 (M3)
20	GES_TSP061322-46	A	07/13/2022	0746				X								MSB113A	N1	0.00	0.00	1	VOLUME: 1578.31 (M3)
21	GES_PM061322-47	A	07/14/2022	0753			X		X							MSB01	N1	0.00	0.00	1	VOLUME: 1571.88 (M3)
22	GES_TSP061322-47	A	07/14/2022	0753				X								MSB01	N1	0.00	0.00	1	VOLUME: 1755.31 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	7/19/22	1610	FedEx	7/19/22	1610
			[redacted]	7-20-22	0930

Shipping Date / Carrier / Airbill Number

Shipping Date: 7/19/2022 FEDEX/ 7774 1862 4740

Received by Laboratory: *(Signature, Date, Time)* **& condition**

21.3

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT071922AIRB

GES
AN AECOM INDUSTRIAL COMPANY

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: Parcel B Air Monitoring
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

						Analytical Test Method																	
						CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn															
	Event: Parcel B Air Monitoring					1	1	1															
	Sample ID	Matrix	Date	Time	Samp Init.																		
23	GES_PM061322-48	A	07/14/2022	0722	[redacted]	X		X															
24	GES_TSP061322-48	A	07/14/2022	0722			X																
25	GES_PM061322-49	A	07/14/2022	0739		X		X															
26	GES_TSP061322-49	A	07/14/2022	0739			X																
27	GES_PM061322-50	A	07/15/2022	0821		X		X															
28	GES_TSP061322-50	A	07/15/2022	0821			X																
29	GES_PM061322-51	A	07/15/2022	0759		X		X															
30	GES_TSP061322-51	A	07/15/2022	0759			X																
31	GES_PM061322-52	A	07/15/2022	0807		X		X															
32	GES_TSP061322-52	A	07/15/2022	0807			X																
33																							

Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
MSB02	N1	0.00	0.00	1	VOLUME: 1547.49 (M3)
MSB02	N1	0.00	0.00	1	VOLUME: 1675.92 (M3)
MSB113A	N1	0.00	0.00	1	VOLUME: 1586.39 (M3)
MSB113A	N1	0.00	0.00	1	VOLUME: 1567.50 (M3)
MSB01	N1	0.00	0.00	1	VOLUME: 1671.83 (M3)
MSB01	N1	0.00	0.00	1	VOLUME: 1816.52 (M3)
MSB02	N1	0.00	0.00	1	VOLUME: 1636.90 (M3)
MSB02	N1	0.00	0.00	1	VOLUME: 1792.47 (M3)
MSB113A	N1	0.00	0.00	1	VOLUME: 1626.56 (M3)
MSB113A	N1	0.00	0.00	1	VOLUME: 1601.64 (M3)

Relinquished by: *(Signature)*	Date	Time
[redacted]	7/19/22	1600

Received by: *(Signature)*	Date	Time
FedEx	7/19/22	1600
[redacted]	7-20-22	0930

Shipping Date / Carrier / Airbill Number

Shipping Date: 7/19/2022 FEDEX/ 7774 1862 4740

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
July 18, 2022

21.3

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-90174-1

Login Number: 90174
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	SEAL
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-90417-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
8/5/2022 6:03:05 PM

[redacted] Project Manager I
(916)374-4414
[redacted]

[redacted] test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-90417-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-90417-1

Comments
No additional comments.

Receipt
The samples were received on 7/28/2022 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.3º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM061322-53 — Lab Sample ID: 320-90417-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0013		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0029		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	25		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-53 — Lab Sample ID: 320-90417-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	28.8616		0.2880	0.2880	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM061322-54 — Lab Sample ID: 320-90417-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00075	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	25		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP061322-54 — Lab Sample ID: 320-90417-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	33.6829		0.2889	0.2889	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-73 — Lab Sample ID: 320-90417-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0011		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0027		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	24		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-73 — Lab Sample ID: 320-90417-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	11.0028		0.3039	0.3039	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-74 — Lab Sample ID: 320-90417-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00076		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.2		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-74 — Lab Sample ID: 320-90417-8

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	11.8662		0.2839	0.2839	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-75 — Lab Sample ID: 320-90417-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00044	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0014		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.5		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP070522-75 — Lab Sample ID: 320-90417-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	12.7928		0.2856	0.2856	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-76 — Lab Sample ID: 320-90417-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0013		0.00078	0.00012	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028		0.00078	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	12		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-76 — Lab Sample ID: 320-90417-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.0695		0.2870	0.2870	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-77 — Lab Sample ID: 320-90417-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00024	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GES_TSP070522-77 — Lab Sample ID: 320-90417-14

No Detections.

Client Sample ID: GES_PM070522-78 — Lab Sample ID: 320-90417-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0010		0.00071	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028		0.00071	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.6		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-78 — Lab Sample ID: 320-90417-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	6.8018		0.2765	0.2765	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-79 — Lab Sample ID: 320-90417-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00072	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.6		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-79 — Lab Sample ID: 320-90417-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	11.5671		0.2767	0.2767	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-80 — Lab Sample ID: 320-90417-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00081		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.6		0.32	0.32	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP070522-80 — Lab Sample ID: 320-90417-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	5.6708		0.3049	0.3049	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-81 — Lab Sample ID: 320-90417-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0010		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0031		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	12		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-81 — Lab Sample ID: 320-90417-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	18.6015		0.2862	0.2862	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-82 — Lab Sample ID: 320-90417-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00066	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0025		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	14		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-82 — Lab Sample ID: 320-90417-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	31.0665		0.2845	0.2845	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-83 — Lab Sample ID: 320-90417-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00072	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	12		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-83 — Lab Sample ID: 320-90417-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	5.3450		0.3072	0.3072	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM061322-53
Lab Sample ID: 320-90417-1
Date Collected: 07/19/22 07:40
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0013		0.00075	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:20	1
Manganese	0.0029		0.00075	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:20	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	25		0.31	0.31	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP061322-53
Lab Sample ID: 320-90417-2
Date Collected: 07/19/22 07:40
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	28.8616		0.2880	0.2880	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM061322-54
Lab Sample ID: 320-90417-3
Date Collected: 07/19/22 07:08
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00075	J	0.00076	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:29	1
Manganese	0.0022		0.00076	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:29	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	25		0.32	0.32	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP061322-54
Lab Sample ID: 320-90417-4
Date Collected: 07/19/22 07:08
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	33.6829		0.2889	0.2889	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-73
Lab Sample ID: 320-90417-5
Date Collected: 07/19/22 07:26
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0011		0.00076	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:33	1
Manganese	0.0027		0.00076	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:33	1

Client Sample ID: GES_PM070522-73
Lab Sample ID: 320-90417-5
Date Collected: 07/19/22 07:26
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	24		0.32	0.32	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-73
Lab Sample ID: 320-90417-6
Date Collected: 07/19/22 07:26
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	11.0028		0.3039	0.3039	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-74
Lab Sample ID: 320-90417-7
Date Collected: 07/20/22 07:32
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00076		0.00073	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:36	1
Manganese	0.0020		0.00073	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:36	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.2		0.30	0.30	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-74
Lab Sample ID: 320-90417-8
Date Collected: 07/20/22 07:32
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	11.8662		0.2839	0.2839	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-75
Lab Sample ID: 320-90417-9
Date Collected: 07/20/22 06:55
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00044	J	0.00075	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:39	1
Manganese	0.0014		0.00075	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:39	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.5		0.31	0.31	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-75
Lab Sample ID: 320-90417-10
Date Collected: 07/20/22 06:55
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	12.7928		0.2856	0.2856	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-76
Lab Sample ID: 320-90417-11
Date Collected: 07/20/22 07:20
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0013		0.00078	0.00012	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:49	1
Manganese	0.0028		0.00078	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:49	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	12		0.32	0.32	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-76
Lab Sample ID: 320-90417-12
Date Collected: 07/20/22 07:20
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.0695		0.2870	0.2870	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-77
Lab Sample ID: 320-90417-13
Date Collected: 07/18/22 08:00
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:52	1
Manganese	0.00024	J	0.0012	0.00017	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:52	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-77
Lab Sample ID: 320-90417-14
Date Collected: 07/18/22 08:00
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			08/03/22 09:00	1

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM070522-78
Lab Sample ID: 320-90417-15
Date Collected: 07/21/22 07:56
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0010		0.00071	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:55	1
Manganese	0.0028		0.00071	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:55	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.6		0.30	0.30	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-78
Lab Sample ID: 320-90417-16
Date Collected: 07/21/22 07:56
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	6.8018		0.2765	0.2765	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-79
Lab Sample ID: 320-90417-17
Date Collected: 07/21/22 07:18
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00072	J	0.00074	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:59	1
Manganese	0.0019		0.00074	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:59	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.6		0.31	0.31	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-79
Lab Sample ID: 320-90417-18
Date Collected: 07/21/22 07:18
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	11.5671		0.2767	0.2767	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-80
Lab Sample ID: 320-90417-19
Date Collected: 07/21/22 07:34
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00081		0.00076	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:02	1
Manganese	0.0022		0.00076	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:02	1

Client Sample ID: GES_PM070522-80
Lab Sample ID: 320-90417-19
Date Collected: 07/21/22 07:34
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.6		0.32	0.32	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-80
Lab Sample ID: 320-90417-20
Date Collected: 07/21/22 07:34
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	5.6708		0.3049	0.3049	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-81
Lab Sample ID: 320-90417-21
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0010		0.00073	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:05	1
Manganese	0.0031		0.00073	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:05	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	12		0.30	0.30	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-81
Lab Sample ID: 320-90417-22
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	18.6015		0.2862	0.2862	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-82
Lab Sample ID: 320-90417-23
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00066	J	0.00074	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:09	1
Manganese	0.0025		0.00074	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:09	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	14		0.31	0.31	ug/m3			08/03/22 09:00	1

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP070522-82
Lab Sample ID: 320-90417-24
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	31.0665		0.2845	0.2845	ug/m3 (Air)			08/03/22 09:00	1

Client Sample ID: GES_PM070522-83
Lab Sample ID: 320-90417-25
Date Collected: 07/22/22 07:48
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00072	J	0.00075	0.00011	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:12	1
Manganese	0.0020		0.00075	0.00010	ug/m3 (Air)		08/05/22 05:30	08/05/22 15:12	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	12		0.31	0.31	ug/m3			08/03/22 09:00	1

Client Sample ID: GES_TSP070522-83
Lab Sample ID: 320-90417-26
Date Collected: 07/22/22 07:48
Matrix: Air
Date Received: 07/28/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	5.3450		0.3072	0.3072	ug/m3 (Air)			08/03/22 09:00	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-607569/1-B
Matrix: Air
Analysis Batch: 607709

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607572

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:11	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		08/05/22 05:30	08/05/22 14:11	1

Lab Sample ID: LCS 320-607569/2-B
Matrix: Air
Analysis Batch: 607709

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607572

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.240	0.242		ug/m3 (Air)		101	86 - 111
Manganese	0.240	0.255		ug/m3 (Air)		106	88 - 110

Lab Sample ID: LCSD 320-607569/3-B
Matrix: Air
Analysis Batch: 607709

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607572

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	0.240	0.241		ug/m3 (Air)		100	86 - 111	1	15
Manganese	0.240	0.250		ug/m3 (Air)		104	88 - 110	2	15

Metals

Pre Prep Batch: 607569

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-1	GES_PM061322-53	Total/NA	Air	Filter to Air	
320-90417-3	GES_PM061322-54	Total/NA	Air	Filter to Air	
320-90417-5	GES_PM070522-73	Total/NA	Air	Filter to Air	
320-90417-7	GES_PM070522-74	Total/NA	Air	Filter to Air	
320-90417-9	GES_PM070522-75	Total/NA	Air	Filter to Air	
320-90417-11	GES_PM070522-76	Total/NA	Air	Filter to Air	
320-90417-13	GES_PM070522-77	Total/NA	Air	Filter to Air	
320-90417-15	GES_PM070522-78	Total/NA	Air	Filter to Air	
320-90417-17	GES_PM070522-79	Total/NA	Air	Filter to Air	
320-90417-19	GES_PM070522-80	Total/NA	Air	Filter to Air	
320-90417-21	GES_PM070522-81	Total/NA	Air	Filter to Air	
320-90417-23	GES_PM070522-82	Total/NA	Air	Filter to Air	
320-90417-25	GES_PM070522-83	Total/NA	Air	Filter to Air	
MB 320-607569/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-607569/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-607569/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 607572

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-1	GES_PM061322-53	Total/NA	Air	3050B	607569
320-90417-3	GES_PM061322-54	Total/NA	Air	3050B	607569
320-90417-5	GES_PM070522-73	Total/NA	Air	3050B	607569
320-90417-7	GES_PM070522-74	Total/NA	Air	3050B	607569
320-90417-9	GES_PM070522-75	Total/NA	Air	3050B	607569
320-90417-11	GES_PM070522-76	Total/NA	Air	3050B	607569
320-90417-13	GES_PM070522-77	Total/NA	Air	3050B	607569
320-90417-15	GES_PM070522-78	Total/NA	Air	3050B	607569
320-90417-17	GES_PM070522-79	Total/NA	Air	3050B	607569
320-90417-19	GES_PM070522-80	Total/NA	Air	3050B	607569
320-90417-21	GES_PM070522-81	Total/NA	Air	3050B	607569
320-90417-23	GES_PM070522-82	Total/NA	Air	3050B	607569
320-90417-25	GES_PM070522-83	Total/NA	Air	3050B	607569
MB 320-607569/1-B	Method Blank	Total/NA	Air	3050B	607569
LCS 320-607569/2-B	Lab Control Sample	Total/NA	Air	3050B	607569
LCSD 320-607569/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	607569

Analysis Batch: 607709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-1	GES_PM061322-53	Total/NA	Air	6020	607572
320-90417-3	GES_PM061322-54	Total/NA	Air	6020	607572
320-90417-5	GES_PM070522-73	Total/NA	Air	6020	607572
320-90417-7	GES_PM070522-74	Total/NA	Air	6020	607572
320-90417-9	GES_PM070522-75	Total/NA	Air	6020	607572
320-90417-11	GES_PM070522-76	Total/NA	Air	6020	607572
320-90417-13	GES_PM070522-77	Total/NA	Air	6020	607572
320-90417-15	GES_PM070522-78	Total/NA	Air	6020	607572
320-90417-17	GES_PM070522-79	Total/NA	Air	6020	607572
320-90417-19	GES_PM070522-80	Total/NA	Air	6020	607572
320-90417-21	GES_PM070522-81	Total/NA	Air	6020	607572
320-90417-23	GES_PM070522-82	Total/NA	Air	6020	607572
320-90417-25	GES_PM070522-83	Total/NA	Air	6020	607572

Metals (Continued)

Analysis Batch: 607709 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-607569/1-B	Method Blank	Total/NA	Air	6020	607572
LCS 320-607569/2-B	Lab Control Sample	Total/NA	Air	6020	607572
LCSD 320-607569/3-B	Lab Control Sample Dup	Total/NA	Air	6020	607572

General Chemistry

Pre Prep Batch: 606372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-2	GES_TSP061322-53	Total/NA	Air	Filter to Air	
320-90417-4	GES_TSP061322-54	Total/NA	Air	Filter to Air	
320-90417-6	GES_TSP070522-73	Total/NA	Air	Filter to Air	
320-90417-8	GES_TSP070522-74	Total/NA	Air	Filter to Air	
320-90417-10	GES_TSP070522-75	Total/NA	Air	Filter to Air	
320-90417-12	GES_TSP070522-76	Total/NA	Air	Filter to Air	
320-90417-14	GES_TSP070522-77	Total/NA	Air	Filter to Air	
320-90417-16	GES_TSP070522-78	Total/NA	Air	Filter to Air	
320-90417-18	GES_TSP070522-79	Total/NA	Air	Filter to Air	
320-90417-20	GES_TSP070522-80	Total/NA	Air	Filter to Air	
320-90417-22	GES_TSP070522-81	Total/NA	Air	Filter to Air	
320-90417-24	GES_TSP070522-82	Total/NA	Air	Filter to Air	
320-90417-26	GES_TSP070522-83	Total/NA	Air	Filter to Air	

Analysis Batch: 607712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-1	GES_PM061322-53	Total/NA	Air	PM10	
320-90417-3	GES_PM061322-54	Total/NA	Air	PM10	
320-90417-5	GES_PM070522-73	Total/NA	Air	PM10	
320-90417-7	GES_PM070522-74	Total/NA	Air	PM10	
320-90417-9	GES_PM070522-75	Total/NA	Air	PM10	
320-90417-11	GES_PM070522-76	Total/NA	Air	PM10	
320-90417-13	GES_PM070522-77	Total/NA	Air	PM10	
320-90417-15	GES_PM070522-78	Total/NA	Air	PM10	
320-90417-17	GES_PM070522-79	Total/NA	Air	PM10	
320-90417-19	GES_PM070522-80	Total/NA	Air	PM10	
320-90417-21	GES_PM070522-81	Total/NA	Air	PM10	
320-90417-23	GES_PM070522-82	Total/NA	Air	PM10	
320-90417-25	GES_PM070522-83	Total/NA	Air	PM10	

Analysis Batch: 607714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-2	GES_TSP061322-53	Total/NA	Air	40CFR50 App B	606372
320-90417-4	GES_TSP061322-54	Total/NA	Air	40CFR50 App B	606372
320-90417-6	GES_TSP070522-73	Total/NA	Air	40CFR50 App B	606372
320-90417-8	GES_TSP070522-74	Total/NA	Air	40CFR50 App B	606372
320-90417-10	GES_TSP070522-75	Total/NA	Air	40CFR50 App B	606372
320-90417-12	GES_TSP070522-76	Total/NA	Air	40CFR50 App B	606372
320-90417-14	GES_TSP070522-77	Total/NA	Air	40CFR50 App B	606372
320-90417-16	GES_TSP070522-78	Total/NA	Air	40CFR50 App B	606372
320-90417-18	GES_TSP070522-79	Total/NA	Air	40CFR50 App B	606372
320-90417-20	GES_TSP070522-80	Total/NA	Air	40CFR50 App B	606372
320-90417-22	GES_TSP070522-81	Total/NA	Air	40CFR50 App B	606372

General Chemistry (Continued)

Analysis Batch: 607714 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90417-24	GES_TSP070522-82	Total/NA	Air	40CFR50 App B	606372
320-90417-26	GES_TSP070522-83	Total/NA	Air	40CFR50 App B	606372

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90417-1

Client Sample ID: GES_PM061322-53
Lab Sample ID: 320-90417-1
Date Collected: 07/19/22 07:40
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:20	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0408 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP061322-53
Lab Sample ID: 320-90417-2
Date Collected: 07/19/22 07:40
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM061322-54
Lab Sample ID: 320-90417-3
Date Collected: 07/19/22 07:08
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:29	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0404 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP061322-54
Lab Sample ID: 320-90417-4
Date Collected: 07/19/22 07:08
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-73
Lab Sample ID: 320-90417-5
Date Collected: 07/19/22 07:26
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:33	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0374 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90417-1

Client Sample ID: GES_TSP070522-73
Lab Sample ID: 320-90417-6
Date Collected: 07/19/22 07:26
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-74
Lab Sample ID: 320-90417-7
Date Collected: 07/20/22 07:32
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:36	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0135 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-74
Lab Sample ID: 320-90417-8
Date Collected: 07/20/22 07:32
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-75
Lab Sample ID: 320-90417-9
Date Collected: 07/20/22 06:55
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:39	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0120 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-75
Lab Sample ID: 320-90417-10
Date Collected: 07/20/22 06:55
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90417-1

Client Sample ID: GES_PM070522-76
Lab Sample ID: 320-90417-11
Date Collected: 07/20/22 07:20
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:49	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0183 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-76
Lab Sample ID: 320-90417-12
Date Collected: 07/20/22 07:20
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-77
Lab Sample ID: 320-90417-13
Date Collected: 07/18/22 08:00
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:52	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0004 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-77
Lab Sample ID: 320-90417-14
Date Collected: 07/18/22 08:00
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-78
Lab Sample ID: 320-90417-15
Date Collected: 07/21/22 07:56
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:55	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0094 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90417-1

Client Sample ID: GES_TSP070522-78
Lab Sample ID: 320-90417-16
Date Collected: 07/21/22 07:56
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-79
Lab Sample ID: 320-90417-17
Date Collected: 07/21/22 07:18
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 14:59	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0156 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-79
Lab Sample ID: 320-90417-18
Date Collected: 07/21/22 07:18
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-80
Lab Sample ID: 320-90417-19
Date Collected: 07/21/22 07:34
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 15:02	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0120 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-80
Lab Sample ID: 320-90417-20
Date Collected: 07/21/22 07:34
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90417-1

Client Sample ID: GES_PM070522-81
Lab Sample ID: 320-90417-21
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 15:05	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0196 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-81
Lab Sample ID: 320-90417-22
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-82
Lab Sample ID: 320-90417-23
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 15:09	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0223 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_TSP070522-82
Lab Sample ID: 320-90417-24
Date Collected: 07/22/22 07:35
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Client Sample ID: GES_PM070522-83
Lab Sample ID: 320-90417-25
Date Collected: 07/22/22 07:48
Matrix: Air
Date Received: 07/28/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					607569	08/05/22 04:32	[redacted]	EETNCA SA
Total/NA	Prep	3050B			0.08333 Sample	100 mL	607572	08/05/22 05:30	[redacted]	EETNCA S
Total/NA	Analysis	6020		1			607709	08/05/22 15:12	[redacted]	EETNCA S
Total/NA	Analysis	PM10		1	0 g	0.0194 g	607712	08/03/22 09:00	[redacted]	EETNCA S

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90417-1

Client Sample ID: GES_TSP070522-83

Date Collected: 07/22/22 07:48
Date Received: 07/28/22 09:25

Lab Sample ID: 320-90417-26

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					606372	07/29/22 15:34	[redacted]	EETNCA SA
Total/NA	Analysis	40CFR50 App B		1			607714	08/03/22 09:00	[redacted]	EETNCA S

Laboratory References:

EETNCA SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EETNCA SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EETNCA SAC
PM10	Particulate Matter	40CFR50J	EETNCA SAC
3050B	Preparation, Metals	SW846	EETNCA SAC
Filter to Air	Filter to Air volume ratio	None	EETNCA SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EETNCA SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-90417-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-90417-1	GES_PM061322-53	Air	07/19/22 07:40	07/28/22 09:25
320-90417-2	GES_TSP061322-53	Air	07/19/22 07:40	07/28/22 09:25
320-90417-3	GES_PM061322-54	Air	07/19/22 07:08	07/28/22 09:25
320-90417-4	GES_TSP061322-54	Air	07/19/22 07:08	07/28/22 09:25
320-90417-5	GES_PM070522-73	Air	07/19/22 07:26	07/28/22 09:25
320-90417-6	GES_TSP070522-73	Air	07/19/22 07:26	07/28/22 09:25
320-90417-7	GES_PM070522-74	Air	07/20/22 07:32	07/28/22 09:25
320-90417-8	GES_TSP070522-74	Air	07/20/22 07:32	07/28/22 09:25
320-90417-9	GES_PM070522-75	Air	07/20/22 06:55	07/28/22 09:25
320-90417-10	GES_TSP070522-75	Air	07/20/22 06:55	07/28/22 09:25
320-90417-11	GES_PM070522-76	Air	07/20/22 07:20	07/28/22 09:25
320-90417-12	GES_TSP070522-76	Air	07/20/22 07:20	07/28/22 09:25
320-90417-13	GES_PM070522-77	Air	07/18/22 08:00	07/28/22 09:25
320-90417-14	GES_TSP070522-77	Air	07/18/22 08:00	07/28/22 09:25
320-90417-15	GES_PM070522-78	Air	07/21/22 07:56	07/28/22 09:25
320-90417-16	GES_TSP070522-78	Air	07/21/22 07:56	07/28/22 09:25
320-90417-17	GES_PM070522-79	Air	07/21/22 07:18	07/28/22 09:25
320-90417-18	GES_TSP070522-79	Air	07/21/22 07:18	07/28/22 09:25
320-90417-19	GES_PM070522-80	Air	07/21/22 07:34	07/28/22 09:25
320-90417-20	GES_TSP070522-80	Air	07/21/22 07:34	07/28/22 09:25
320-90417-21	GES_PM070522-81	Air	07/22/22 07:35	07/28/22 09:25
320-90417-22	GES_TSP070522-81	Air	07/22/22 07:35	07/28/22 09:25
320-90417-23	GES_PM070522-82	Air	07/22/22 07:35	07/28/22 09:25
320-90417-24	GES_TSP070522-82	Air	07/22/22 07:35	07/28/22 09:25
320-90417-25	GES_PM070522-83	Air	07/22/22 07:48	07/28/22 09:25
320-90417-26	GES_TSP070522-83	Air	07/22/22 07:48	07/28/22 09:25

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT072722AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-90417 Chain of Custody

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: Parcel B Air Monitoring					1	1	1						
1	GES_PM061322-53	A	07/19/2022	0740	[redacted]	X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1604.22 (M3)
2	GES_TSP061322-53	A	07/19/2022	0740			X		MSB01	N1	0.00	0.00	1	VOLUME: 1735.87 (M3)
3	GES_PM061322-54	A	07/19/2022	0708		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1584.87 (M3)
4	GES_TSP061322-54	A	07/19/2022	0708			X		MSB02	N1	0.00	0.00	1	VOLUME: 1730.85 (M3)
5	GES_PM070522-73	A	07/19/2022	0726		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1584.48 (M3)
6	GES_TSP070522-73	A	07/19/2022	0726			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1645.04 (M3)
7	GES_PM070522-74	A	07/20/2022	0732		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1649.08 (M3)
8	GES_TSP070522-74	A	07/20/2022	0732			X		MSB01	N1	0.00	0.00	1	VOLUME: 1761.31 (M3)
9	GES_PM070522-75	A	07/20/2022	0655		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1593.23 (M3)
10	GES_TSP070522-75	A	07/20/2022	0655			X		MSB02	N1	0.00	0.00	1	VOLUME: 1750.99 (M3)
11	GES_PM070522-76	A	07/20/2022	0720		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1543.80 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	7-27-22	1600	FEDEX	7-27-22	1600
			[redacted]	7.28.22	0925

Shipping Date / Carrier / Airbill Number
Shipping Date: 7/27/2022/FedEx/ 7774 9173 8281

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
July 26, 2022

20.3

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT072722AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
12	GES_TSP070522-76	A	07/20/2022	0720	[redacted]		X		MSB113A	N1	0.00	0.00	1	VOLUME: 1742.11 (M3)
13	GES_PM070522-77	AQ	07/18/2022	0800		X		X	FIELDQC	TB1	0.00	0.00	1	
14	GES_TSP070522-77	AQ	07/18/2022	0800			X		FIELDQC	TB1	0.00	0.00	1	
15	GES_PM070522-78	A	07/21/2022	0756		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1681.99 (M3)
16	GES_TSP070522-78	A	07/21/2022	0756			X		MSB01	N1	0.00	0.00	1	VOLUME: 1808.34 (M3)
17	GES_PM070522-79	A	07/21/2022	0718		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1631.55 (M3)
18	GES_TSP070522-79	A	07/21/2022	0718			X		MSB02	N1	0.00	0.00	1	VOLUME: 1806.85 (M3)
19	GES_PM070522-80	A	07/21/2022	0734		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1577.49 (M3)
20	GES_TSP070522-80	A	07/21/2022	0734			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1639.99 (M3)
21	GES_PM070522-81	A	07/22/2022	0735		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1645.32 (M3)
22	GES_TSP070522-81	A	07/22/2022	0735			X		MSB01	N1	0.00	0.00	1	VOLUME: 1747.17 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	7-27-22	1600	FEDEX	7-27-22	1600
			[redacted]	7-28-22	0925

Shipping Date / Carrier / Airbill Number
Shipping Date: 7/27/2022/FedEx/ 7774 9173 8281

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
July 26, 2022

20.3

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT072722AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	PO[redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
23	GES_PM070522-82	A	07/22/2022	0735	[redacted]	X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1624.79 (M3)
24	GES_TSP070522-82	A	07/22/2022	0735			X		MSB02	N1	0.00	0.00	1	VOLUME: 1757.52 (M3)
25	GES_PM070522-83	A	07/22/2022	0748		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1609.69 (M3)
26	GES_TSP070522-83	A	07/22/2022	0748			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1627.68 (M3)

Turnaround Time: 5 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	7-27-22	1600	FED EX	7-27-22	1600
			[redacted]	7-28-22	0925

Shipping Date / Carrier / Airbill Number
Shipping Date: 7/27/2022/FedEx/ 7774 9173 8281

Received by Laboratory: *(Signature, Date, Time)* **& condition**

20.3

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-90417-1

Login Number: 90417

List Source: Eurofins Sacramento

List Number: 1

Creator: [redacted]

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1495336
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-90693-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
8/11/2022 10:33:46 PM
[redacted] Project Manager I
(916)374-4414
[redacted]

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-90693-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-90693-1

Comments
No additional comments.

Receipt
The samples were received on 8/4/2022 9:15 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.0º C.

Metals
Method 40CFR50 App B: Blank sample GES_TSP070522-90 (320-90693-14) recovered 0.0001g above the reporting limit. No particulate was observed on the filter.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Client Sample ID: GES_PM070522-84 — Lab Sample ID: 320-90693-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00090		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0025	B	0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.2		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-84 — Lab Sample ID: 320-90693-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.8958		0.2823	0.2823	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-85 — Lab Sample ID: 320-90693-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00055	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0015	B	0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.1		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-85 — Lab Sample ID: 320-90693-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.5734		0.2849	0.2849	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-86 — Lab Sample ID: 320-90693-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00052	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0016	B	0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.1		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-86 — Lab Sample ID: 320-90693-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	7.4074		0.3036	0.3036	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-87 — Lab Sample ID: 320-90693-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00091		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019	B	0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.4		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-87 — Lab Sample ID: 320-90693-8

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	11.5254		0.2867	0.2867	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-88 — Lab Sample ID: 320-90693-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00048	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0015	B	0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.4		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP070522-88 — Lab Sample ID: 320-90693-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	13.0183		0.2880	0.2880	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-89 — Lab Sample ID: 320-90693-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00075	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0018	B	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.9		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP070522-89 — Lab Sample ID: 320-90693-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	8.1507		0.3111	0.3111	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM070522-90 — Lab Sample ID: 320-90693-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00025	J B	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GES_TSP070522-90 — Lab Sample ID: 320-90693-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	0.6000		0.5000	0.5000	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-91 — Lab Sample ID: 320-90693-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0011		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028	B	0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.7		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-91 — Lab Sample ID: 320-90693-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	7.4070		0.2785	0.2785	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-92 — Lab Sample ID: 320-90693-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00064	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0014	B	0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	4.7		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-92 — Lab Sample ID: 320-90693-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.5268		0.2753	0.2753	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-93 — Lab Sample ID: 320-90693-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00077		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0014	B	0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	2.1		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP071122-93 — Lab Sample ID: 320-90693-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	3.8747		0.3027	0.3027	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-94 — Lab Sample ID: 320-90693-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00040	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0017	B	0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.3		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-94 — Lab Sample ID: 320-90693-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	6.7322		0.2829	0.2829	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-95 — Lab Sample ID: 320-90693-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00039	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0024	B	0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.0		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-95 — Lab Sample ID: 320-90693-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.3909		0.2793	0.2793	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-96 — Lab Sample ID: 320-90693-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00058	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0012	B	0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	1.8		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-96 — Lab Sample ID: 320-90693-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	2.7873		0.3030	0.3030	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM070522-84
Lab Sample ID: 320-90693-1
Date Collected: 07/26/22 07:47
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00090		0.00072	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 12:56	1
Manganese	0.0025	B	0.00072	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 12:56	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	6.2		0.30	0.30	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-84
Lab Sample ID: 320-90693-2
Date Collected: 07/26/22 07:47
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.8958		0.2823	0.2823	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM070522-85
Lab Sample ID: 320-90693-3
Date Collected: 07/26/22 07:03
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00055	J	0.00073	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:05	1
Manganese	0.0015	B	0.00073	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:05	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.1		0.30	0.30	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-85
Lab Sample ID: 320-90693-4
Date Collected: 07/26/22 07:03
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.5734		0.2849	0.2849	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM070522-86
Lab Sample ID: 320-90693-5
Date Collected: 07/26/22 07:34
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00052	J	0.00074	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:09	1
Manganese	0.0016	B	0.00074	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:09	1

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM070522-86
Lab Sample ID: 320-90693-5
Date Collected: 07/26/22 07:34
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	6.1		0.31	0.31	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-86
Lab Sample ID: 320-90693-6
Date Collected: 07/26/22 07:34
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	7.4074		0.3036	0.3036	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM070522-87
Lab Sample ID: 320-90693-7
Date Collected: 07/27/22 07:41
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00091		0.00074	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:12	1
Manganese	0.0019	B	0.00074	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:12	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.4		0.31	0.31	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-87
Lab Sample ID: 320-90693-8
Date Collected: 07/27/22 07:41
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	11.5254		0.2867	0.2867	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM070522-88
Lab Sample ID: 320-90693-9
Date Collected: 07/27/22 07:01
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00048	J	0.00075	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:15	1
Manganese	0.0015	B	0.00075	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:15	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.4		0.31	0.31	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-88
Lab Sample ID: 320-90693-10
Date Collected: 07/27/22 07:01
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	13.0183		0.2880	0.2880	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM070522-89
Lab Sample ID: 320-90693-11
Date Collected: 07/27/22 07:16
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00075	J	0.00076	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:19	1
Manganese	0.0018	B	0.00076	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:19	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.9		0.32	0.32	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-89
Lab Sample ID: 320-90693-12
Date Collected: 07/27/22 07:16
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	8.1507		0.3111	0.3111	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM070522-90
Lab Sample ID: 320-90693-13
Date Collected: 07/27/22 08:00
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:22	1
Manganese	0.00025	J B	0.0012	0.00017	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:22	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP070522-90
Lab Sample ID: 320-90693-14
Date Collected: 07/27/22 08:00
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	0.6000		0.5000	0.5000	ug/m3 (Air)			08/08/22 14:30	1

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM071122-91
Lab Sample ID: 320-90693-15
Date Collected: 07/28/22 07:50
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0011		0.00073	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:25	1
Manganese	0.0028	B	0.00073	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:25	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.7		0.30	0.30	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP071122-91
Lab Sample ID: 320-90693-16
Date Collected: 07/28/22 07:50
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	7.4070		0.2785	0.2785	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM071122-92
Lab Sample ID: 320-90693-17
Date Collected: 07/28/22 07:26
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00064	J	0.00073	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:35	1
Manganese	0.0014	B	0.00073	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:35	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	4.7		0.30	0.30	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP071122-92
Lab Sample ID: 320-90693-18
Date Collected: 07/28/22 07:26
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.5268		0.2753	0.2753	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM071122-93
Lab Sample ID: 320-90693-19
Date Collected: 07/28/22 07:40
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00077		0.00074	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:38	1
Manganese	0.0014	B	0.00074	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:38	1

Client Sample ID: GES_PM071122-93
Lab Sample ID: 320-90693-19
Date Collected: 07/28/22 07:40
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	2.1		0.31	0.31	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP071122-93
Lab Sample ID: 320-90693-20
Date Collected: 07/28/22 07:40
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	3.8747		0.3027	0.3027	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM071122-94
Lab Sample ID: 320-90693-21
Date Collected: 07/29/22 08:33
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00040	J	0.00072	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:41	1
Manganese	0.0017	B	0.00072	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:41	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.3		0.30	0.30	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP071122-94
Lab Sample ID: 320-90693-22
Date Collected: 07/29/22 08:33
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	6.7322		0.2829	0.2829	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM071122-95
Lab Sample ID: 320-90693-23
Date Collected: 07/29/22 07:57
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00039	J	0.00074	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:45	1
Manganese	0.0024	B	0.00074	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:45	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	6.0		0.31	0.31	ug/m3			08/08/22 14:40	1

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP071122-95
Lab Sample ID: 320-90693-24
Date Collected: 07/29/22 07:57
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.3909		0.2793	0.2793	ug/m3 (Air)			08/08/22 14:30	1

Client Sample ID: GES_PM071122-96
Lab Sample ID: 320-90693-25
Date Collected: 07/29/22 08:22
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00058	J	0.00075	0.00011	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:48	1
Manganese	0.0012	B	0.00075	0.00010	ug/m3 (Air)		08/11/22 06:15	08/11/22 13:48	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	1.8		0.31	0.31	ug/m3			08/08/22 14:40	1

Client Sample ID: GES_TSP071122-96
Lab Sample ID: 320-90693-26
Date Collected: 07/29/22 08:22
Matrix: Air
Date Received: 08/04/22 09:15
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	2.7873		0.3030	0.3030	ug/m3 (Air)			08/08/22 14:30	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-608782/1-B
Matrix: Air
Analysis Batch: 608956

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 608784

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/11/22 06:15	08/11/22 12:40	1
Manganese	0.000731	J	0.0012	0.00017	ug/m3 (Air)		08/11/22 06:15	08/11/22 12:40	1

Lab Sample ID: LCS 320-608782/2-B
Matrix: Air
Analysis Batch: 608956

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 608784

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.240	0.251		ug/m3 (Air)		105	86 - 111
Manganese	0.240	0.246		ug/m3 (Air)		102	88 - 110

Lab Sample ID: LCSD 320-608782/3-B
Matrix: Air
Analysis Batch: 608956

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 608784

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	0.240	0.254		ug/m3 (Air)		106	86 - 111	1	15
Manganese	0.240	0.250		ug/m3 (Air)		104	88 - 110	2	15

Metals

Pre Prep Batch: 608782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-1	GES_PM070522-84	Total/NA	Air	Filter to Air	
320-90693-3	GES_PM070522-85	Total/NA	Air	Filter to Air	
320-90693-5	GES_PM070522-86	Total/NA	Air	Filter to Air	
320-90693-7	GES_PM070522-87	Total/NA	Air	Filter to Air	
320-90693-9	GES_PM070522-88	Total/NA	Air	Filter to Air	
320-90693-11	GES_PM070522-89	Total/NA	Air	Filter to Air	
320-90693-13	GES_PM070522-90	Total/NA	Air	Filter to Air	
320-90693-15	GES_PM071122-91	Total/NA	Air	Filter to Air	
320-90693-17	GES_PM071122-92	Total/NA	Air	Filter to Air	
320-90693-19	GES_PM071122-93	Total/NA	Air	Filter to Air	
320-90693-21	GES_PM071122-94	Total/NA	Air	Filter to Air	
320-90693-23	GES_PM071122-95	Total/NA	Air	Filter to Air	
320-90693-25	GES_PM071122-96	Total/NA	Air	Filter to Air	
MB 320-608782/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-608782/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-608782/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 608784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-1	GES_PM070522-84	Total/NA	Air	3050B	608782
320-90693-3	GES_PM070522-85	Total/NA	Air	3050B	608782
320-90693-5	GES_PM070522-86	Total/NA	Air	3050B	608782
320-90693-7	GES_PM070522-87	Total/NA	Air	3050B	608782
320-90693-9	GES_PM070522-88	Total/NA	Air	3050B	608782
320-90693-11	GES_PM070522-89	Total/NA	Air	3050B	608782
320-90693-13	GES_PM070522-90	Total/NA	Air	3050B	608782
320-90693-15	GES_PM071122-91	Total/NA	Air	3050B	608782
320-90693-17	GES_PM071122-92	Total/NA	Air	3050B	608782
320-90693-19	GES_PM071122-93	Total/NA	Air	3050B	608782
320-90693-21	GES_PM071122-94	Total/NA	Air	3050B	608782
320-90693-23	GES_PM071122-95	Total/NA	Air	3050B	608782
320-90693-25	GES_PM071122-96	Total/NA	Air	3050B	608782
MB 320-608782/1-B	Method Blank	Total/NA	Air	3050B	608782
LCS 320-608782/2-B	Lab Control Sample	Total/NA	Air	3050B	608782
LCSD 320-608782/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	608782

Analysis Batch: 608956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-1	GES_PM070522-84	Total/NA	Air	6020	608784
320-90693-3	GES_PM070522-85	Total/NA	Air	6020	608784
320-90693-5	GES_PM070522-86	Total/NA	Air	6020	608784
320-90693-7	GES_PM070522-87	Total/NA	Air	6020	608784
320-90693-9	GES_PM070522-88	Total/NA	Air	6020	608784
320-90693-11	GES_PM070522-89	Total/NA	Air	6020	608784
320-90693-13	GES_PM070522-90	Total/NA	Air	6020	608784
320-90693-15	GES_PM071122-91	Total/NA	Air	6020	608784
320-90693-17	GES_PM071122-92	Total/NA	Air	6020	608784
320-90693-19	GES_PM071122-93	Total/NA	Air	6020	608784
320-90693-21	GES_PM071122-94	Total/NA	Air	6020	608784
320-90693-23	GES_PM071122-95	Total/NA	Air	6020	608784
320-90693-25	GES_PM071122-96	Total/NA	Air	6020	608784

Metals (Continued)

Analysis Batch: 608956 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-608782/1-B	Method Blank	Total/NA	Air	6020	608784
LCS 320-608782/2-B	Lab Control Sample	Total/NA	Air	6020	608784
LCSD 320-608782/3-B	Lab Control Sample Dup	Total/NA	Air	6020	608784

General Chemistry

Pre Prep Batch: 608684

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-2	GES_TSP070522-84	Total/NA	Air	Filter to Air	
320-90693-4	GES_TSP070522-85	Total/NA	Air	Filter to Air	
320-90693-6	GES_TSP070522-86	Total/NA	Air	Filter to Air	
320-90693-8	GES_TSP070522-87	Total/NA	Air	Filter to Air	
320-90693-10	GES_TSP070522-88	Total/NA	Air	Filter to Air	
320-90693-12	GES_TSP070522-89	Total/NA	Air	Filter to Air	
320-90693-14	GES_TSP070522-90	Total/NA	Air	Filter to Air	
320-90693-16	GES_TSP071122-91	Total/NA	Air	Filter to Air	
320-90693-18	GES_TSP071122-92	Total/NA	Air	Filter to Air	
320-90693-20	GES_TSP071122-93	Total/NA	Air	Filter to Air	
320-90693-22	GES_TSP071122-94	Total/NA	Air	Filter to Air	
320-90693-24	GES_TSP071122-95	Total/NA	Air	Filter to Air	
320-90693-26	GES_TSP071122-96	Total/NA	Air	Filter to Air	

Analysis Batch: 608968

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-1	GES_PM070522-84	Total/NA	Air	PM10	
320-90693-3	GES_PM070522-85	Total/NA	Air	PM10	
320-90693-5	GES_PM070522-86	Total/NA	Air	PM10	
320-90693-7	GES_PM070522-87	Total/NA	Air	PM10	
320-90693-9	GES_PM070522-88	Total/NA	Air	PM10	
320-90693-11	GES_PM070522-89	Total/NA	Air	PM10	
320-90693-13	GES_PM070522-90	Total/NA	Air	PM10	
320-90693-15	GES_PM071122-91	Total/NA	Air	PM10	
320-90693-17	GES_PM071122-92	Total/NA	Air	PM10	
320-90693-19	GES_PM071122-93	Total/NA	Air	PM10	
320-90693-21	GES_PM071122-94	Total/NA	Air	PM10	
320-90693-23	GES_PM071122-95	Total/NA	Air	PM10	
320-90693-25	GES_PM071122-96	Total/NA	Air	PM10	

Analysis Batch: 608970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-2	GES_TSP070522-84	Total/NA	Air	40CFR50 App B	608684
320-90693-4	GES_TSP070522-85	Total/NA	Air	40CFR50 App B	608684
320-90693-6	GES_TSP070522-86	Total/NA	Air	40CFR50 App B	608684
320-90693-8	GES_TSP070522-87	Total/NA	Air	40CFR50 App B	608684
320-90693-10	GES_TSP070522-88	Total/NA	Air	40CFR50 App B	608684
320-90693-12	GES_TSP070522-89	Total/NA	Air	40CFR50 App B	608684
320-90693-14	GES_TSP070522-90	Total/NA	Air	40CFR50 App B	608684
320-90693-16	GES_TSP071122-91	Total/NA	Air	40CFR50 App B	608684
320-90693-18	GES_TSP071122-92	Total/NA	Air	40CFR50 App B	608684
320-90693-20	GES_TSP071122-93	Total/NA	Air	40CFR50 App B	608684
320-90693-22	GES_TSP071122-94	Total/NA	Air	40CFR50 App B	608684

General Chemistry (Continued)

Analysis Batch: 608970 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90693-24	GES_TSP071122-95	Total/NA	Air	40CFR50 App B	608684
320-90693-26	GES_TSP071122-96	Total/NA	Air	40CFR50 App B	608684

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Client Sample ID: GES_PM070522-84
Date Collected: 07/26/22 07:47
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-1
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 12:56	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0103 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP070522-84
Date Collected: 07/26/22 07:47
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-2
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM070522-85
Date Collected: 07/26/22 07:03
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-3
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:05	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0116 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP070522-85
Date Collected: 07/26/22 07:03
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-4
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM070522-86
Date Collected: 07/26/22 07:34
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-5
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:09	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0099 g	608968	08/08/22 14:40	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Client Sample ID: GES_TSP070522-86
Lab Sample ID: 320-90693-6
Date Collected: 07/26/22 07:34
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM070522-87
Lab Sample ID: 320-90693-7
Date Collected: 07/27/22 07:41
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:12	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0120 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP070522-87
Lab Sample ID: 320-90693-8
Date Collected: 07/27/22 07:41
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM070522-88
Lab Sample ID: 320-90693-9
Date Collected: 07/27/22 07:01
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:15	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0118 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP070522-88
Lab Sample ID: 320-90693-10
Date Collected: 07/27/22 07:01
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Client Sample ID: GES_PM070522-89
Date Collected: 07/27/22 07:16
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-11
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:19	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0093 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP070522-89
Date Collected: 07/27/22 07:16
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-12
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM070522-90
Date Collected: 07/27/22 08:00
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-13
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:22	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0002 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP070522-90
Date Collected: 07/27/22 08:00
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-14
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM071122-91
Date Collected: 07/28/22 07:50
Date Received: 08/04/22 09:15

Lab Sample ID: 320-90693-15
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:25	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0095 g	608968	08/08/22 14:40	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Client Sample ID: GES_TSP071122-91
Lab Sample ID: 320-90693-16
Date Collected: 07/28/22 07:50
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM071122-92
Lab Sample ID: 320-90693-17
Date Collected: 07/28/22 07:26
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:35	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0078 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-92
Lab Sample ID: 320-90693-18
Date Collected: 07/28/22 07:26
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM071122-93
Lab Sample ID: 320-90693-19
Date Collected: 07/28/22 07:40
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:38	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0034 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-93
Lab Sample ID: 320-90693-20
Date Collected: 07/28/22 07:40
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Client Sample ID: GES_PM071122-94
Lab Sample ID: 320-90693-21
Date Collected: 07/29/22 08:33
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:41	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0087 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-94
Lab Sample ID: 320-90693-22
Date Collected: 07/29/22 08:33
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM071122-95
Lab Sample ID: 320-90693-23
Date Collected: 07/29/22 07:57
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:45	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0098 g	608968	08/08/22 14:40	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-95
Lab Sample ID: 320-90693-24
Date Collected: 07/29/22 07:57
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Client Sample ID: GES_PM071122-96
Lab Sample ID: 320-90693-25
Date Collected: 07/29/22 08:22
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					608782	08/11/22 04:34	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	608784	08/11/22 06:15	[redacted]	EET SAC
Total/NA	Analysis	6020		1			608956	08/11/22 13:48	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0029 g	608968	08/08/22 14:40	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP071122-96
Lab Sample ID: 320-90693-26

Date Collected: 07/29/22 08:22
Matrix: Air
Date Received: 08/04/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			608970	08/08/22 14:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					608684	08/10/22 15:28	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-90693-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90693-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-90693-1	GES_PM070522-84	Air	07/26/22 07:47	08/04/22 09:15
320-90693-2	GES_TSP070522-84	Air	07/26/22 07:47	08/04/22 09:15
320-90693-3	GES_PM070522-85	Air	07/26/22 07:03	08/04/22 09:15
320-90693-4	GES_TSP070522-85	Air	07/26/22 07:03	08/04/22 09:15
320-90693-5	GES_PM070522-86	Air	07/26/22 07:34	08/04/22 09:15
320-90693-6	GES_TSP070522-86	Air	07/26/22 07:34	08/04/22 09:15
320-90693-7	GES_PM070522-87	Air	07/27/22 07:41	08/04/22 09:15
320-90693-8	GES_TSP070522-87	Air	07/27/22 07:41	08/04/22 09:15
320-90693-9	GES_PM070522-88	Air	07/27/22 07:01	08/04/22 09:15
320-90693-10	GES_TSP070522-88	Air	07/27/22 07:01	08/04/22 09:15
320-90693-11	GES_PM070522-89	Air	07/27/22 07:16	08/04/22 09:15
320-90693-12	GES_TSP070522-89	Air	07/27/22 07:16	08/04/22 09:15
320-90693-13	GES_PM070522-90	Air	07/27/22 08:00	08/04/22 09:15
320-90693-14	GES_TSP070522-90	Air	07/27/22 08:00	08/04/22 09:15
320-90693-15	GES_PM071122-91	Air	07/28/22 07:50	08/04/22 09:15
320-90693-16	GES_TSP071122-91	Air	07/28/22 07:50	08/04/22 09:15
320-90693-17	GES_PM071122-92	Air	07/28/22 07:26	08/04/22 09:15
320-90693-18	GES_TSP071122-92	Air	07/28/22 07:26	08/04/22 09:15
320-90693-19	GES_PM071122-93	Air	07/28/22 07:40	08/04/22 09:15
320-90693-20	GES_TSP071122-93	Air	07/28/22 07:40	08/04/22 09:15
320-90693-21	GES_PM071122-94	Air	07/29/22 08:33	08/04/22 09:15
320-90693-22	GES_TSP071122-94	Air	07/29/22 08:33	08/04/22 09:15
320-90693-23	GES_PM071122-95	Air	07/29/22 07:57	08/04/22 09:15
320-90693-24	GES_TSP071122-95	Air	07/29/22 07:57	08/04/22 09:15
320-90693-25	GES_PM071122-96	Air	07/29/22 08:22	08/04/22 09:15
320-90693-26	GES_TSP071122-96	Air	07/29/22 08:22	08/04/22 09:15

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT080322AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-90693 Chain of Custody

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
1	GES_PM070522-84	A	07/26/2022	0747	[redacted]	X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1656.40 (M3)
2	GES_TSP070522-84	A	07/26/2022	0747			X		MSB01	N1	0.00	0.00	1	VOLUME: 1771.32 (M3)
3	GES_PM070522-85	A	07/26/2022	0703		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1640.17 (M3)
4	GES_TSP070522-85	A	07/26/2022	0703			X		MSB02	N1	0.00	0.00	1	VOLUME: 1754.87 (M3)
5	GES_PM070522-86	A	07/26/2022	0734		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1621.60 (M3)
6	GES_TSP070522-86	A	07/26/2022	0734			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1647.00 (M3)
7	GES_PM070522-87	A	07/27/2022	0741		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1630.68 (M3)
8	GES_TSP070522-87	A	07/27/2022	0741			X		MSB01	N1	0.00	0.00	1	VOLUME: 1743.98 (M3)
9	GES_PM070522-88	A	07/27/2022	0701		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1601.47 (M3)
10	GES_TSP070522-88	A	07/27/2022	0701			X		MSB02	N1	0.00	0.00	1	VOLUME: 1736.02 (M3)
11	GES_PM070522-89	A	07/27/2022	0716		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1585.40 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/3/22	16.00	Fed Ex	8/3/22	1600
			[redacted]	8.4.22	0915

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/3/2022

7775 4512 2511

Received by Laboratory: *(Signature, Date, Time)* **& condition**

20.0°C

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT080322AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Analytical Test Method					1	1	1						
12	GES_TSP070522-89	A	07/27/2022	0716	[redacted]		X		MSB113A	N1	0.00	0.00	1	VOLUME: 1607.22 (M3)
13	GES_PM070522-90	AQ	07/27/2022	0800		X		X	FIELDQC	TB1	0.00	0.00	1	
14	GES_TSP070522-90	AQ	07/27/2022	0800			X		FIELDQC	TB1	0.00	0.00	1	
15	GES_PM071122-91	A	07/28/2022	0750		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1652.35 (M3)
16	GES_TSP071122-91	A	07/28/2022	0750			X		MSB01	N1	0.00	0.00	1	VOLUME: 1795.60 (M3)
17	GES_PM071122-92	A	07/28/2022	0726		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1645.25 (M3)
18	GES_TSP071122-92	A	07/28/2022	0726			X		MSB02	N1	0.00	0.00	1	VOLUME: 1815.93 (M3)
19	GES_PM071122-93	A	07/28/2022	0740		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1618.52 (M3)
20	GES_TSP071122-93	A	07/28/2022	0740			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1651.72 (M3)
21	GES_PM071122-94	A	07/29/2022	0833		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1656.03 (M3)
22	GES_TSP071122-94	A	07/29/2022	0833			X		MSB01	N1	0.00	0.00	1	VOLUME: 1767.63 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/3/22	1600	Fed Ex	8/3/22	1600
			[redacted]	8-4-22	0915

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/3/2022

7775 4512 2511

Received by Laboratory: *(Signature, Date, Time)* **& condition**

20.0°c

GES.Navy_COC_Field
August 03, 2022

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT080322AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
23	GES_PM071122-95	A	07/29/2022	0757	[redacted]	X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1630.44 (M3)
24	GES_TSP071122-95	A	07/29/2022	0757			X		MSB02	N1	0.00	0.00	1	VOLUME: 1790.03 (M3)
25	GES_PM071122-96	A	07/29/2022	0822		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1602.17 (M3)
26	GES_TSP071122-96	A	07/29/2022	0822			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1650.33 (M3)
27														
28														
29														

Turnaround Time: 5 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/3/22	1600	Fed Ex	8/3/22	16:00
			[redacted]	8-4-22	0915

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/3/2022
7775 4512 2511

Received by Laboratory: *(Signature, Date, Time)* **& condition**

20.0°C

GES.Navy_COC_Field
August 03, 2022

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-90693-1

Login Number: 90693
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-90908-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

[redacted]

Authorized for release by:
8/18/2022 5:03:11 PM

[redacted]

Designee for

[redacted] Project Manager I
(916)374-4414
[redacted]

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-90908-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-90908-1

Comments
No additional comments.

Receipt
The samples were received on 8/11/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.1º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM071122-100 — Lab Sample ID: 320-90908-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00029	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GES_TSP071122-100 — Lab Sample ID: 320-90908-2

No Detections.

Client Sample ID: GES_PM071122-97 — Lab Sample ID: 320-90908-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00070	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.4		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-97 — Lab Sample ID: 320-90908-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.9573		0.2798	0.2798	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-98 — Lab Sample ID: 320-90908-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00079		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.3		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-98 — Lab Sample ID: 320-90908-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	17.6607		0.2848	0.2848	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-99 — Lab Sample ID: 320-90908-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00093		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	10		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-99 — Lab Sample ID: 320-90908-8

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.7070		0.3053	0.3053	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-101 — Lab Sample ID: 320-90908-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00089		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0025		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.7		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-101 — Lab Sample ID: 320-90908-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.8598		0.2813	0.2813	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GES_PM071122-102 — Lab Sample ID: 320-90908-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00070	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0031		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	12		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-102 — Lab Sample ID: 320-90908-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	28.8244		0.2882	0.2882	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-103 — Lab Sample ID: 320-90908-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00076		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.8		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-103 — Lab Sample ID: 320-90908-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.9909		0.3105	0.3105	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-145 — Lab Sample ID: 320-90908-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00046	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0016		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	11		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-104 — Lab Sample ID: 320-90908-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	15.8436		0.2829	0.2829	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-146 — Lab Sample ID: 320-90908-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00059	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0025		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	13		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-105 — Lab Sample ID: 320-90908-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	25.4991		0.2865	0.2865	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-147 — Lab Sample ID: 320-90908-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00044	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0017		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	13		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP071122-106 — Lab Sample ID: 320-90908-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.4568		0.3094	0.3094	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-148 — Lab Sample ID: 320-90908-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00060	J	0.00070	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021		0.00070	0.000099	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	13		0.29	0.29	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-107 — Lab Sample ID: 320-90908-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	22.1381		0.2774	0.2774	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-149 — Lab Sample ID: 320-90908-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0031		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	15		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GES_TSP071122-108 — Lab Sample ID: 320-90908-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	31.0580		0.2793	0.2793	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-150 — Lab Sample ID: 320-90908-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00069	J	0.00081	0.00012	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021		0.00081	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	14		0.34	0.34	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-145 — Lab Sample ID: 320-90908-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	13.5988		0.3333	0.3333	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM071122-100
Lab Sample ID: 320-90908-1
Date Collected: 08/02/22 08:00
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:06	1
Manganese	**0.00029**	**J**	0.0012	0.00017	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:06	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-100
Lab Sample ID: 320-90908-2
Date Collected: 08/02/22 08:00
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GES_PM071122-97
Lab Sample ID: 320-90908-3
Date Collected: 08/02/22 08:05
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.00070**	**J**	0.00072	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:15	1
Manganese	**0.0026**		0.00072	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:15	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**8.4**		0.30	0.30	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-97
Lab Sample ID: 320-90908-4
Date Collected: 08/02/22 08:05
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	**16.9573**		0.2798	0.2798	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GES_PM071122-98
Lab Sample ID: 320-90908-5
Date Collected: 08/02/22 07:22
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.00079**		0.00074	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:18	1
Manganese	**0.0019**		0.00074	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:18	1

Client Sample ID: GES_PM071122-98
Lab Sample ID: 320-90908-5
Date Collected: 08/02/22 07:22
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.3		0.31	0.31	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-98
Lab Sample ID: 320-90908-6
Date Collected: 08/02/22 07:22
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	17.6607		0.2848	0.2848	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GES_PM071122-99
Lab Sample ID: 320-90908-7
Date Collected: 08/02/22 07:43
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00093		0.00074	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:28	1
Manganese	0.0028		0.00074	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:28	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	10		0.31	0.31	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-99
Lab Sample ID: 320-90908-8
Date Collected: 08/02/22 07:43
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.7070		0.3053	0.3053	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GES_PM071122-101
Lab Sample ID: 320-90908-9
Date Collected: 08/03/22 07:45
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00089		0.00073	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:32	1
Manganese	0.0025		0.00073	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:32	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.7		0.31	0.31	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-101
Lab Sample ID: 320-90908-10
Date Collected: 08/03/22 07:45
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.8598		0.2813	0.2813	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GES_PM071122-102
Lab Sample ID: 320-90908-11
Date Collected: 08/03/22 07:11
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00070	J	0.00075	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:35	1
Manganese	0.0031		0.00075	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:35	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	12		0.31	0.31	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-102
Lab Sample ID: 320-90908-12
Date Collected: 08/03/22 07:11
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	28.8244		0.2882	0.2882	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GES_PM071122-103
Lab Sample ID: 320-90908-13
Date Collected: 08/03/22 07:28
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00076		0.00076	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:38	1
Manganese	0.0026		0.00076	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:38	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.8		0.32	0.32	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-103
Lab Sample ID: 320-90908-14
Date Collected: 08/03/22 07:28
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.9909		0.3105	0.3105	ug/m3 (Air)			08/15/22 15:00	1

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM072622-145
Lab Sample ID: 320-90908-15
Date Collected: 08/04/22 07:36
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00046	J	0.00073	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:41	1
Manganese	0.0016		0.00073	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:41	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	11		0.30	0.30	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-104
Lab Sample ID: 320-90908-16
Date Collected: 08/04/22 07:36
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	15.8436		0.2829	0.2829	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GESPM072622-146
Lab Sample ID: 320-90908-17
Date Collected: 08/04/22 07:01
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00059	J	0.00075	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:45	1
Manganese	0.0025		0.00075	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:45	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	13		0.31	0.31	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-105
Lab Sample ID: 320-90908-18
Date Collected: 08/04/22 07:01
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	25.4991		0.2865	0.2865	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GESPM072622-147
Lab Sample ID: 320-90908-19
Date Collected: 08/04/22 07:18
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00044	J	0.00075	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:48	1
Manganese	0.0017		0.00075	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:48	1

Client Sample ID: GESPM072622-147
Lab Sample ID: 320-90908-19
Date Collected: 08/04/22 07:18
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	13		0.31	0.31	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-106
Lab Sample ID: 320-90908-20
Date Collected: 08/04/22 07:18
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.4568		0.3094	0.3094	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GESPM072622-148
Lab Sample ID: 320-90908-21
Date Collected: 08/05/22 08:17
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00060	J	0.00070	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:51	1
Manganese	0.0021		0.00070	0.000099	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:51	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	13		0.29	0.29	ug/m3			08/15/22 15:42	1

Client Sample ID: GES_TSP071122-107
Lab Sample ID: 320-90908-22
Date Collected: 08/05/22 08:17
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	22.1381		0.2774	0.2774	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GESPM072622-149
Lab Sample ID: 320-90908-23
Date Collected: 08/05/22 07:31
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00073	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:55	1
Manganese	0.0031		0.00073	0.00010	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:55	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	15		0.30	0.30	ug/m3			08/15/22 15:42	1

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_TSP071122-108
Lab Sample ID: 320-90908-24
Date Collected: 08/05/22 07:31
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	31.0580		0.2793	0.2793	ug/m3 (Air)			08/15/22 15:00	1

Client Sample ID: GESPM072622-150
Lab Sample ID: 320-90908-25
Date Collected: 08/05/22 08:02
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00069	J	0.00081	0.00012	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:58	1
Manganese	0.0021		0.00081	0.00011	ug/m3 (Air)		08/17/22 10:00	08/17/22 13:58	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	14		0.34	0.34	ug/m3			08/15/22 15:42	1

Client Sample ID: GESTSP072622-145
Lab Sample ID: 320-90908-26
Date Collected: 08/05/22 08:02
Matrix: Air
Date Received: 08/11/22 13:05
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	13.5988		0.3333	0.3333	ug/m3 (Air)			08/15/22 15:00	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-610004/1-B
Matrix: Air
Analysis Batch: 610507

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 610012

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/17/22 10:00	08/18/22 13:00	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		08/17/22 10:00	08/18/22 13:00	1

Lab Sample ID: LCS 320-610004/2-B
Matrix: Air
Analysis Batch: 610201

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 610012

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead			0.240	0.261		ug/m3 (Air)		109	86 - 111		
Manganese			0.240	0.253		ug/m3 (Air)		105	88 - 110		

Lab Sample ID: LCSD 320-610004/3-B
Matrix: Air
Analysis Batch: 610201

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 610012

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead			0.240	0.256		ug/m3 (Air)		107	86 - 111	2	15
Manganese			0.240	0.247		ug/m3 (Air)		103	88 - 110	2	15

Metals

Pre Prep Batch: 610004

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-1	GES_PM071122-100	Total/NA	Air	Filter to Air	
320-90908-3	GES_PM071122-97	Total/NA	Air	Filter to Air	
320-90908-5	GES_PM071122-98	Total/NA	Air	Filter to Air	
320-90908-7	GES_PM071122-99	Total/NA	Air	Filter to Air	
320-90908-9	GES_PM071122-101	Total/NA	Air	Filter to Air	
320-90908-11	GES_PM071122-102	Total/NA	Air	Filter to Air	
320-90908-13	GES_PM071122-103	Total/NA	Air	Filter to Air	
320-90908-15	GESPM072622-145	Total/NA	Air	Filter to Air	
320-90908-17	GESPM072622-146	Total/NA	Air	Filter to Air	
320-90908-19	GESPM072622-147	Total/NA	Air	Filter to Air	
320-90908-21	GESPM072622-148	Total/NA	Air	Filter to Air	
320-90908-23	GESPM072622-149	Total/NA	Air	Filter to Air	
320-90908-25	GESPM072622-150	Total/NA	Air	Filter to Air	
MB 320-610004/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-610004/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-610004/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 610012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-1	GES_PM071122-100	Total/NA	Air	3050B	610004
320-90908-3	GES_PM071122-97	Total/NA	Air	3050B	610004
320-90908-5	GES_PM071122-98	Total/NA	Air	3050B	610004
320-90908-7	GES_PM071122-99	Total/NA	Air	3050B	610004
320-90908-9	GES_PM071122-101	Total/NA	Air	3050B	610004
320-90908-11	GES_PM071122-102	Total/NA	Air	3050B	610004
320-90908-13	GES_PM071122-103	Total/NA	Air	3050B	610004
320-90908-15	GESPM072622-145	Total/NA	Air	3050B	610004
320-90908-17	GESPM072622-146	Total/NA	Air	3050B	610004
320-90908-19	GESPM072622-147	Total/NA	Air	3050B	610004
320-90908-21	GESPM072622-148	Total/NA	Air	3050B	610004
320-90908-23	GESPM072622-149	Total/NA	Air	3050B	610004
320-90908-25	GESPM072622-150	Total/NA	Air	3050B	610004
MB 320-610004/1-B	Method Blank	Total/NA	Air	3050B	610004
LCS 320-610004/2-B	Lab Control Sample	Total/NA	Air	3050B	610004
LCSD 320-610004/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	610004

Analysis Batch: 610201

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-1	GES_PM071122-100	Total/NA	Air	6020	610012
320-90908-3	GES_PM071122-97	Total/NA	Air	6020	610012
320-90908-5	GES_PM071122-98	Total/NA	Air	6020	610012
320-90908-7	GES_PM071122-99	Total/NA	Air	6020	610012
320-90908-9	GES_PM071122-101	Total/NA	Air	6020	610012
320-90908-11	GES_PM071122-102	Total/NA	Air	6020	610012
320-90908-13	GES_PM071122-103	Total/NA	Air	6020	610012
320-90908-15	GESPM072622-145	Total/NA	Air	6020	610012
320-90908-17	GESPM072622-146	Total/NA	Air	6020	610012
320-90908-19	GESPM072622-147	Total/NA	Air	6020	610012
320-90908-21	GESPM072622-148	Total/NA	Air	6020	610012
320-90908-23	GESPM072622-149	Total/NA	Air	6020	610012
320-90908-25	GESPM072622-150	Total/NA	Air	6020	610012

Metals (Continued)

Analysis Batch: 610201 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-610004/2-B	Lab Control Sample	Total/NA	Air	6020	610012
LCSD 320-610004/3-B	Lab Control Sample Dup	Total/NA	Air	6020	610012

Analysis Batch: 610507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-610004/1-B	Method Blank	Total/NA	Air	6020	610012

General Chemistry

Pre Prep Batch: 609839

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-2	GES_TSP071122-100	Total/NA	Air	Filter to Air	
320-90908-4	GES_TSP071122-97	Total/NA	Air	Filter to Air	
320-90908-6	GES_TSP071122-98	Total/NA	Air	Filter to Air	
320-90908-8	GES_TSP071122-99	Total/NA	Air	Filter to Air	
320-90908-10	GES_TSP071122-101	Total/NA	Air	Filter to Air	
320-90908-12	GES_TSP071122-102	Total/NA	Air	Filter to Air	
320-90908-14	GES_TSP071122-103	Total/NA	Air	Filter to Air	
320-90908-16	GES_TSP071122-104	Total/NA	Air	Filter to Air	
320-90908-18	GES_TSP071122-105	Total/NA	Air	Filter to Air	
320-90908-20	GES_TSP071122-106	Total/NA	Air	Filter to Air	
320-90908-22	GES_TSP071122-107	Total/NA	Air	Filter to Air	
320-90908-24	GES_TSP071122-108	Total/NA	Air	Filter to Air	
320-90908-26	GESTSP072622-145	Total/NA	Air	Filter to Air	

Analysis Batch: 610517

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-1	GES_PM071122-100	Total/NA	Air	PM10	
320-90908-3	GES_PM071122-97	Total/NA	Air	PM10	
320-90908-5	GES_PM071122-98	Total/NA	Air	PM10	
320-90908-7	GES_PM071122-99	Total/NA	Air	PM10	
320-90908-9	GES_PM071122-101	Total/NA	Air	PM10	
320-90908-11	GES_PM071122-102	Total/NA	Air	PM10	
320-90908-13	GES_PM071122-103	Total/NA	Air	PM10	
320-90908-15	GESPM072622-145	Total/NA	Air	PM10	
320-90908-17	GESPM072622-146	Total/NA	Air	PM10	
320-90908-19	GESPM072622-147	Total/NA	Air	PM10	
320-90908-21	GESPM072622-148	Total/NA	Air	PM10	
320-90908-23	GESPM072622-149	Total/NA	Air	PM10	
320-90908-25	GESPM072622-150	Total/NA	Air	PM10	

Analysis Batch: 610524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-2	GES_TSP071122-100	Total/NA	Air	40CFR50 App B	609839
320-90908-4	GES_TSP071122-97	Total/NA	Air	40CFR50 App B	609839
320-90908-6	GES_TSP071122-98	Total/NA	Air	40CFR50 App B	609839
320-90908-8	GES_TSP071122-99	Total/NA	Air	40CFR50 App B	609839
320-90908-10	GES_TSP071122-101	Total/NA	Air	40CFR50 App B	609839
320-90908-12	GES_TSP071122-102	Total/NA	Air	40CFR50 App B	609839
320-90908-14	GES_TSP071122-103	Total/NA	Air	40CFR50 App B	609839
320-90908-16	GES_TSP071122-104	Total/NA	Air	40CFR50 App B	609839

General Chemistry (Continued)

Analysis Batch: 610524 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-90908-18	GES_TSP071122-105	Total/NA	Air	40CFR50 App B	609839
320-90908-20	GES_TSP071122-106	Total/NA	Air	40CFR50 App B	609839
320-90908-22	GES_TSP071122-107	Total/NA	Air	40CFR50 App B	609839
320-90908-24	GES_TSP071122-108	Total/NA	Air	40CFR50 App B	609839
320-90908-26	GESTSP072622-145	Total/NA	Air	40CFR50 App B	609839

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GES_PM071122-100
Lab Sample ID: 320-90908-1
Date Collected: 08/02/22 08:00
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:06	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0000 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-100
Lab Sample ID: 320-90908-2
Date Collected: 08/02/22 08:00
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GES_PM071122-97
Lab Sample ID: 320-90908-3
Date Collected: 08/02/22 08:05
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:15	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0139 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-97
Lab Sample ID: 320-90908-4
Date Collected: 08/02/22 08:05
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GES_PM071122-98
Lab Sample ID: 320-90908-5
Date Collected: 08/02/22 07:22
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:18	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0150 g	610517	08/15/22 15:42	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GES_TSP071122-98
Lab Sample ID: 320-90908-6
Date Collected: 08/02/22 07:22
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GES_PM071122-99
Lab Sample ID: 320-90908-7
Date Collected: 08/02/22 07:43
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:28	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0169 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-99
Lab Sample ID: 320-90908-8
Date Collected: 08/02/22 07:43
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GES_PM071122-101
Lab Sample ID: 320-90908-9
Date Collected: 08/03/22 07:45
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:32	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0142 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-101
Lab Sample ID: 320-90908-10
Date Collected: 08/03/22 07:45
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GES_PM071122-102
Lab Sample ID: 320-90908-11
Date Collected: 08/03/22 07:11
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:35	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0193 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-102
Lab Sample ID: 320-90908-12
Date Collected: 08/03/22 07:11
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GES_PM071122-103
Lab Sample ID: 320-90908-13
Date Collected: 08/03/22 07:28
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:38	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0156 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-103
Lab Sample ID: 320-90908-14
Date Collected: 08/03/22 07:28
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GESPM072622-145
Lab Sample ID: 320-90908-15
Date Collected: 08/04/22 07:36
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:41	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0186 g	610517	08/15/22 15:42	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GES_TSP071122-104
Lab Sample ID: 320-90908-16
Date Collected: 08/04/22 07:36
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GESPM072622-146
Lab Sample ID: 320-90908-17
Date Collected: 08/04/22 07:01
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:45	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0207 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-105
Lab Sample ID: 320-90908-18
Date Collected: 08/04/22 07:01
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GESPM072622-147
Lab Sample ID: 320-90908-19
Date Collected: 08/04/22 07:18
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:48	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0213 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-106
Lab Sample ID: 320-90908-20
Date Collected: 08/04/22 07:18
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GESPM072622-148
Lab Sample ID: 320-90908-21
Date Collected: 08/05/22 08:17
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:51	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0215 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-107
Lab Sample ID: 320-90908-22
Date Collected: 08/05/22 08:17
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GESPM072622-149
Lab Sample ID: 320-90908-23
Date Collected: 08/05/22 07:31
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:40	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:55	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0245 g	610517	08/15/22 15:42	[redacted]	EET SAC

Client Sample ID: GES_TSP071122-108
Lab Sample ID: 320-90908-24
Date Collected: 08/05/22 07:31
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Client Sample ID: GESPM072622-150
Lab Sample ID: 320-90908-25
Date Collected: 08/05/22 08:02
Matrix: Air
Date Received: 08/11/22 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					610004	08/17/22 09:41	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	610012	08/17/22 10:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			610201	08/17/22 13:58	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0213 g	610517	08/15/22 15:42	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-90908-1

Client Sample ID: GESTSP072622-145
Date Collected: 08/05/22 08:02
Date Received: 08/11/22 13:05

Lab Sample ID: 320-90908-26
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			610524	08/15/22 15:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					609839	08/16/22 13:39	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-90908-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-90908-1	GES_PM071122-100	Air	08/02/22 08:00	08/11/22 13:05
320-90908-2	GES_TSP071122-100	Air	08/02/22 08:00	08/11/22 13:05
320-90908-3	GES_PM071122-97	Air	08/02/22 08:05	08/11/22 13:05
320-90908-4	GES_TSP071122-97	Air	08/02/22 08:05	08/11/22 13:05
320-90908-5	GES_PM071122-98	Air	08/02/22 07:22	08/11/22 13:05
320-90908-6	GES_TSP071122-98	Air	08/02/22 07:22	08/11/22 13:05
320-90908-7	GES_PM071122-99	Air	08/02/22 07:43	08/11/22 13:05
320-90908-8	GES_TSP071122-99	Air	08/02/22 07:43	08/11/22 13:05
320-90908-9	GES_PM071122-101	Air	08/03/22 07:45	08/11/22 13:05
320-90908-10	GES_TSP071122-101	Air	08/03/22 07:45	08/11/22 13:05
320-90908-11	GES_PM071122-102	Air	08/03/22 07:11	08/11/22 13:05
320-90908-12	GES_TSP071122-102	Air	08/03/22 07:11	08/11/22 13:05
320-90908-13	GES_PM071122-103	Air	08/03/22 07:28	08/11/22 13:05
320-90908-14	GES_TSP071122-103	Air	08/03/22 07:28	08/11/22 13:05
320-90908-15	GESPM072622-145	Air	08/04/22 07:36	08/11/22 13:05
320-90908-16	GES_TSP071122-104	Air	08/04/22 07:36	08/11/22 13:05
320-90908-17	GESPM072622-146	Air	08/04/22 07:01	08/11/22 13:05
320-90908-18	GES_TSP071122-105	Air	08/04/22 07:01	08/11/22 13:05
320-90908-19	GESPM072622-147	Air	08/04/22 07:18	08/11/22 13:05
320-90908-20	GES_TSP071122-106	Air	08/04/22 07:18	08/11/22 13:05
320-90908-21	GESPM072622-148	Air	08/05/22 08:17	08/11/22 13:05
320-90908-22	GES_TSP071122-107	Air	08/05/22 08:17	08/11/22 13:05
320-90908-23	GESPM072622-149	Air	08/05/22 07:31	08/11/22 13:05
320-90908-24	GES_TSP071122-108	Air	08/05/22 07:31	08/11/22 13:05
320-90908-25	GESPM072622-150	Air	08/05/22 08:02	08/11/22 13:05
320-90908-26	GESTSP072622-145	Air	08/05/22 08:02	08/11/22 13:05

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT081022AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	**Event: Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-90908 Chain of Custody

					Analytical Test Method	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn												
	Event: Parcel B Air Monitoring					1	1	1												
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	GES_PM071122-100	AQ	08/02/2022	0800	[redacted]	X		X								FIELDQC	TB1	0.00	0.00	1	
2	GES_TSP071122-100	AQ	08/02/2022	0800			X									FIELDQC	TB1	0.00	0.00	1	
3	GES_PM071122-97	A	08/02/2022	0805		X		X								MSB01	N1	0.00	0.00	1	VOLUME: 1664.38 (M3)
4	GES_TSP071122-97	A	08/02/2022	0805			X									MSB01	N1	0.00	0.00	1	VOLUME: 1786.84 (M3)
5	GES_PM071122-98	A	08/02/2022	0722		X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1621.19 (M3)
6	GES_TSP071122-98	A	08/02/2022	0722			X									MSB02	N1	0.00	0.00	1	VOLUME: 1755.31 (M3)
7	GES_PM071122-99	A	08/02/2022	0743		X		X								MSB113A	N1	0.00	0.00	1	VOLUME: 1620.16 (M3)
8	GES_TSP071122-99	A	08/02/2022	0743			X									MSB113A	N1	0.00	0.00	1	VOLUME: 1637.99 (M3)
9	GES_PM071122-101	A	08/03/2022	0745		X		X								MSB01	N1	0.00	0.00	1	VOLUME: 1633.03 (M3)
10	GES_TSP071122-101	A	08/03/2022	0745			X									MSB01	N1	0.00	0.00	1	VOLUME: 1777.20 (M3)
11	GES_PM071122-102	A	08/03/2022	0711		X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1606.01 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8-10-22	1600	FEDEX	8-10-22	1600
			[redacted]	8-11-22	0930

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/10/2022/FEDEX 7776 0628 9943

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 09, 2022

20.1°C

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT081022AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	**Event: Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Analytical Test Method

	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn
Event: Parcel B Air Monitoring	1	1	1

	Sample ID	Matrix	Date	Time	Samp Init.				Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
12	GES_TSP071122-102	A	08/03/2022	0711	[redacted]		X		MSB02	N1	0.00	0.00	1	VOLUME: 1734.64 (M3)
13	GES_PM071122-103	A	08/03/2022	0728		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1586.91 (M3)
14	GES_TSP071122-103	A	08/03/2022	0728			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1610.42 (M3)
15	GESPM072622-145	A	08/04/2022	0736		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1641.25 (M3)
16	GES_TSP071122-104	A	08/04/2022	0736			X		MSB01	N1	0.00	0.00	1	VOLUME: 1767.28 (M3)
17	GESPM072622-146	A	08/04/2022	0701		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1607.65 (M3)
18	GES_TSP071122-105	A	08/04/2022	0701			X		MSB02	N1	0.00	0.00	1	VOLUME: 1745.16 (M3)
19	GESPM072622-147	A	08/04/2022	0718		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1592.35 (M3)
20	GES_TSP071122-106	A	08/04/2022	0718			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1616.17 (M3)
21	GESPM072622-148	A	08/05/2022	0817		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1703.92 (M3)
22	GES_TSP071122-107	A	08/05/2022	0817			X		MSB01	N1	0.00	0.00	1	VOLUME: 1802.32 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8-10-22	1600	FEDEX	8-10-22	1600
			[redacted]	8-11-22	093

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/10/2022/FEDEX 7776 0628 9943

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 09, 2022

22.1°C

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT081022AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
23	GESPM072622-149	A	08/05/2022	0731	[redacted]	X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1653.18 (M3)
24	GES_TSP071122-108	A	08/05/2022	0731			X		MSB02	N1	0.00	0.00	1	VOLUME: 1790.20 (M3)
25	GESPM072622-150	A	08/05/2022	0802		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1484.68 (M3)
26	GESTSP072622-145	A	08/05/2022	0802			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1500.13 (M3)
27														
28														

Turnaround Time: NA

[redacted]

[redacted]	Date	Time	Received by: *(Signature)*	Date	Time	Shipping Date / Carrier / Airbill Number
	8-10-22	1600	FEDEX	8-10-22	1600	Shipping Date: 8/10/2022/FEDEX 7776 0628 9943
			[redacted]	8-11-22	0925	
						Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 09, 2022

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-90908-1

Login Number: 90908
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1463633
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-91136-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
8/25/2022 4:50:17 PM

[redacted]

LINKS

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Have a Question? Ask The Expert

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-91136-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-91136-1

Comments
No additional comments.

Receipt
The samples were received on 8/18/2022 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 17.8º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM071122-104 — Lab Sample ID: 320-91136-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00019	J	0.0012	0.00018	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.00026	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP072622-146 — Lab Sample ID: 320-91136-2

No Detections.

Client Sample ID: GES_PM071122-105 — Lab Sample ID: 320-91136-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00060	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	10		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-147 — Lab Sample ID: 320-91136-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	13.4179		0.2795	0.2795	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-106 — Lab Sample ID: 320-91136-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00058	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0035		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	12		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-148 — Lab Sample ID: 320-91136-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	21.9693		0.2838	0.2838	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM071122-107 — Lab Sample ID: 320-91136-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00065	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0018		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	10		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-149 — Lab Sample ID: 320-91136-8

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	12.4069		0.3056	0.3056	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-153 — Lab Sample ID: 320-91136-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00052	J	0.00071	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019		0.00071	0.000099	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.0		0.29	0.29	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-150 — Lab Sample ID: 320-91136-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	14.1757		0.2802	0.2802	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GESPM072622-154 — Lab Sample ID: 320-91136-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00057	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.6		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-151 — Lab Sample ID: 320-91136-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	17.2145		0.2813	0.2813	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-155 — Lab Sample ID: 320-91136-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00047	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.8		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-152 — Lab Sample ID: 320-91136-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.7020		0.3070	0.3070	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GES_PM072622-108 — Lab Sample ID: 320-91136-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00065	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.7		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-153 — Lab Sample ID: 320-91136-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	14.6496		0.2806	0.2806	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-151 — Lab Sample ID: 320-91136-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00049	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0016		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.4		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-154 — Lab Sample ID: 320-91136-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	13.5533		0.2800	0.2800	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-152 — Lab Sample ID: 320-91136-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00049	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0018		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.0		0.30	0.30	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP072622-155 — Lab Sample ID: 320-91136-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	11.7163		0.3004	0.3004	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-156 — Lab Sample ID: 320-91136-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00072	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	10		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-156 — Lab Sample ID: 320-91136-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.8891		0.2863	0.2863	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-157 — Lab Sample ID: 320-91136-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00069	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0023		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.7		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-157 — Lab Sample ID: 320-91136-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	23.3323		0.2881	0.2881	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-158 — Lab Sample ID: 320-91136-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00072	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0045		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	14		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-158 — Lab Sample ID: 320-91136-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	38.1020		0.3154	0.3154	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM071122-104
Lab Sample ID: 320-91136-1
Date Collected: 08/08/22 08:00
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00019	J	0.0012	0.00018	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:11	1
Manganese	0.00026	J	0.0012	0.00017	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:11	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-146
Lab Sample ID: 320-91136-2
Date Collected: 08/08/22 08:00
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GES_PM071122-105
Lab Sample ID: 320-91136-3
Date Collected: 08/09/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00060	J	0.00072	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:21	1
Manganese	0.0020		0.00072	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:21	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	10		0.30	0.30	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-147
Lab Sample ID: 320-91136-4
Date Collected: 08/09/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	13.4179		0.2795	0.2795	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GES_PM071122-106
Lab Sample ID: 320-91136-5
Date Collected: 08/09/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00058	J	0.00074	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:24	1
Manganese	0.0035		0.00074	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:24	1

Client Sample ID: GES_PM071122-106
Lab Sample ID: 320-91136-5
Date Collected: 08/09/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	12		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-148
Lab Sample ID: 320-91136-6
Date Collected: 08/09/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	21.9693		0.2838	0.2838	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GES_PM071122-107
Lab Sample ID: 320-91136-7
Date Collected: 08/09/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00065	J	0.00074	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:27	1
Manganese	0.0018		0.00074	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:27	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	10		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-149
Lab Sample ID: 320-91136-8
Date Collected: 08/09/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	12.4069		0.3056	0.3056	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-153
Lab Sample ID: 320-91136-9
Date Collected: 08/10/22 08:01
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00052	J	0.00071	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:31	1
Manganese	0.0019		0.00071	0.000099	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:31	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.0		0.29	0.29	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-150
Lab Sample ID: 320-91136-10
Date Collected: 08/10/22 08:01
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	14.1757		0.2802	0.2802	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-154
Lab Sample ID: 320-91136-11
Date Collected: 08/10/22 07:28
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00057	J	0.00074	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:34	1
Manganese	0.0026		0.00074	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:34	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.6		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-151
Lab Sample ID: 320-91136-12
Date Collected: 08/10/22 07:28
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	17.2145		0.2813	0.2813	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-155
Lab Sample ID: 320-91136-13
Date Collected: 08/10/22 07:44
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00047	J	0.00073	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:37	1
Manganese	0.0020		0.00073	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:37	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.8		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-152
Lab Sample ID: 320-91136-14
Date Collected: 08/10/22 07:44
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.7020		0.3070	0.3070	ug/m3 (Air)			08/19/22 14:00	1

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GES_PM072622-108
Lab Sample ID: 320-91136-15
Date Collected: 08/11/22 08:04
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00065	J	0.00072	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:41	1
Manganese	0.0021		0.00072	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:41	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.7		0.30	0.30	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-153
Lab Sample ID: 320-91136-16
Date Collected: 08/11/22 08:04
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	14.6496		0.2806	0.2806	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-151
Lab Sample ID: 320-91136-17
Date Collected: 08/11/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00049	J	0.00073	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:44	1
Manganese	0.0016		0.00073	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:44	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.4		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-154
Lab Sample ID: 320-91136-18
Date Collected: 08/11/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	13.5533		0.2800	0.2800	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-152
Lab Sample ID: 320-91136-19
Date Collected: 08/11/22 07:55
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00049	J	0.00073	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:47	1
Manganese	0.0018		0.00073	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:47	1

Client Sample ID: GESPM072622-152
Lab Sample ID: 320-91136-19
Date Collected: 08/11/22 07:55
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.0		0.30	0.30	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-155
Lab Sample ID: 320-91136-20
Date Collected: 08/11/22 07:55
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	11.7163		0.3004	0.3004	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-156
Lab Sample ID: 320-91136-21
Date Collected: 08/12/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00072	J	0.00074	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:51	1
Manganese	0.0020		0.00074	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 18:51	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	10		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-156
Lab Sample ID: 320-91136-22
Date Collected: 08/12/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.8891		0.2863	0.2863	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-157
Lab Sample ID: 320-91136-23
Date Collected: 08/12/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00069	J	0.00075	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 19:00	1
Manganese	0.0023		0.00075	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 19:00	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.7		0.31	0.31	ug/m3			08/19/22 14:00	1

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP072622-157
Lab Sample ID: 320-91136-24
Date Collected: 08/12/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	23.3323		0.2881	0.2881	ug/m3 (Air)			08/19/22 14:00	1

Client Sample ID: GESPM072622-158
Lab Sample ID: 320-91136-25
Date Collected: 08/12/22 07:36
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00072	J	0.00075	0.00011	ug/m3 (Air)		08/23/22 09:00	08/23/22 19:04	1
Manganese	0.0045		0.00075	0.00010	ug/m3 (Air)		08/23/22 09:00	08/23/22 19:04	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	14		0.31	0.31	ug/m3			08/19/22 14:00	1

Client Sample ID: GESTSP072622-158
Lab Sample ID: 320-91136-26
Date Collected: 08/12/22 07:36
Matrix: Air
Date Received: 08/18/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	38.1020		0.3154	0.3154	ug/m3 (Air)			08/19/22 14:00	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-611395/1-B
Matrix: Air
Analysis Batch: 611707

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 611434

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/23/22 09:00	08/23/22 17:42	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		08/23/22 09:00	08/23/22 17:42	1

Lab Sample ID: LCS 320-611395/2-B
Matrix: Air
Analysis Batch: 611707

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 611434

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead			0.240	0.238		ug/m3 (Air)		99	86 - 111		
Manganese			0.240	0.246		ug/m3 (Air)		102	88 - 110		

Lab Sample ID: LCSD 320-611395/3-B
Matrix: Air
Analysis Batch: 611707

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 611434

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead			0.240	0.229		ug/m3 (Air)		96	86 - 111	4	15
Manganese			0.240	0.251		ug/m3 (Air)		105	88 - 110	2	15

QC Association Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Metals

Pre Prep Batch: 611395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-1	GES_PM071122-104	Total/NA	Air	Filter to Air	
320-91136-3	GES_PM071122-105	Total/NA	Air	Filter to Air	
320-91136-5	GES_PM071122-106	Total/NA	Air	Filter to Air	
320-91136-7	GES_PM071122-107	Total/NA	Air	Filter to Air	
320-91136-9	GESPM072622-153	Total/NA	Air	Filter to Air	
320-91136-11	GESPM072622-154	Total/NA	Air	Filter to Air	
320-91136-13	GESPM072622-155	Total/NA	Air	Filter to Air	
320-91136-15	GES_PM072622-108	Total/NA	Air	Filter to Air	
320-91136-17	GESPM072622-151	Total/NA	Air	Filter to Air	
320-91136-19	GESPM072622-152	Total/NA	Air	Filter to Air	
320-91136-21	GESPM072622-156	Total/NA	Air	Filter to Air	
320-91136-23	GESPM072622-157	Total/NA	Air	Filter to Air	
320-91136-25	GESPM072622-158	Total/NA	Air	Filter to Air	
MB 320-611395/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-611395/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-611395/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 611434

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-1	GES_PM071122-104	Total/NA	Air	3050B	611395
320-91136-3	GES_PM071122-105	Total/NA	Air	3050B	611395
320-91136-5	GES_PM071122-106	Total/NA	Air	3050B	611395
320-91136-7	GES_PM071122-107	Total/NA	Air	3050B	611395
320-91136-9	GESPM072622-153	Total/NA	Air	3050B	611395
320-91136-11	GESPM072622-154	Total/NA	Air	3050B	611395
320-91136-13	GESPM072622-155	Total/NA	Air	3050B	611395
320-91136-15	GES_PM072622-108	Total/NA	Air	3050B	611395
320-91136-17	GESPM072622-151	Total/NA	Air	3050B	611395
320-91136-19	GESPM072622-152	Total/NA	Air	3050B	611395
320-91136-21	GESPM072622-156	Total/NA	Air	3050B	611395
320-91136-23	GESPM072622-157	Total/NA	Air	3050B	611395
320-91136-25	GESPM072622-158	Total/NA	Air	3050B	611395
MB 320-611395/1-B	Method Blank	Total/NA	Air	3050B	611395
LCS 320-611395/2-B	Lab Control Sample	Total/NA	Air	3050B	611395
LCSD 320-611395/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	611395

Analysis Batch: 611707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-1	GES_PM071122-104	Total/NA	Air	6020	611434
320-91136-3	GES_PM071122-105	Total/NA	Air	6020	611434
320-91136-5	GES_PM071122-106	Total/NA	Air	6020	611434
320-91136-7	GES_PM071122-107	Total/NA	Air	6020	611434
320-91136-9	GESPM072622-153	Total/NA	Air	6020	611434
320-91136-11	GESPM072622-154	Total/NA	Air	6020	611434
320-91136-13	GESPM072622-155	Total/NA	Air	6020	611434
320-91136-15	GES_PM072622-108	Total/NA	Air	6020	611434
320-91136-17	GESPM072622-151	Total/NA	Air	6020	611434
320-91136-19	GESPM072622-152	Total/NA	Air	6020	611434
320-91136-21	GESPM072622-156	Total/NA	Air	6020	611434
320-91136-23	GESPM072622-157	Total/NA	Air	6020	611434
320-91136-25	GESPM072622-158	Total/NA	Air	6020	611434

Metals (Continued)

Analysis Batch: 611707 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-611395/1-B	Method Blank	Total/NA	Air	6020	611434
LCS 320-611395/2-B	Lab Control Sample	Total/NA	Air	6020	611434
LCSD 320-611395/3-B	Lab Control Sample Dup	Total/NA	Air	6020	611434

General Chemistry

Pre Prep Batch: 611783

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-2	GESTSP072622-146	Total/NA	Air	Filter to Air	
320-91136-4	GESTSP072622-147	Total/NA	Air	Filter to Air	
320-91136-6	GESTSP072622-148	Total/NA	Air	Filter to Air	
320-91136-8	GESTSP072622-149	Total/NA	Air	Filter to Air	
320-91136-10	GESTSP072622-150	Total/NA	Air	Filter to Air	
320-91136-12	GESTSP072622-151	Total/NA	Air	Filter to Air	
320-91136-14	GESTSP072622-152	Total/NA	Air	Filter to Air	
320-91136-16	GESTSP072622-153	Total/NA	Air	Filter to Air	
320-91136-18	GESTSP072622-154	Total/NA	Air	Filter to Air	
320-91136-20	GESTSP072622-155	Total/NA	Air	Filter to Air	
320-91136-22	GESTSP072622-156	Total/NA	Air	Filter to Air	
320-91136-24	GESTSP072622-157	Total/NA	Air	Filter to Air	
320-91136-26	GESTSP072622-158	Total/NA	Air	Filter to Air	

Analysis Batch: 612155

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-1	GES_PM071122-104	Total/NA	Air	PM10	
320-91136-3	GES_PM071122-105	Total/NA	Air	PM10	
320-91136-5	GES_PM071122-106	Total/NA	Air	PM10	
320-91136-7	GES_PM071122-107	Total/NA	Air	PM10	
320-91136-9	GESPM072622-153	Total/NA	Air	PM10	
320-91136-11	GESPM072622-154	Total/NA	Air	PM10	
320-91136-13	GESPM072622-155	Total/NA	Air	PM10	
320-91136-15	GES_PM072622-108	Total/NA	Air	PM10	
320-91136-17	GESPM072622-151	Total/NA	Air	PM10	
320-91136-19	GESPM072622-152	Total/NA	Air	PM10	
320-91136-21	GESPM072622-156	Total/NA	Air	PM10	
320-91136-23	GESPM072622-157	Total/NA	Air	PM10	
320-91136-25	GESPM072622-158	Total/NA	Air	PM10	

Analysis Batch: 612167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-2	GESTSP072622-146	Total/NA	Air	40CFR50 App B	611783
320-91136-4	GESTSP072622-147	Total/NA	Air	40CFR50 App B	611783
320-91136-6	GESTSP072622-148	Total/NA	Air	40CFR50 App B	611783
320-91136-8	GESTSP072622-149	Total/NA	Air	40CFR50 App B	611783
320-91136-10	GESTSP072622-150	Total/NA	Air	40CFR50 App B	611783
320-91136-12	GESTSP072622-151	Total/NA	Air	40CFR50 App B	611783
320-91136-14	GESTSP072622-152	Total/NA	Air	40CFR50 App B	611783
320-91136-16	GESTSP072622-153	Total/NA	Air	40CFR50 App B	611783
320-91136-18	GESTSP072622-154	Total/NA	Air	40CFR50 App B	611783
320-91136-20	GESTSP072622-155	Total/NA	Air	40CFR50 App B	611783
320-91136-22	GESTSP072622-156	Total/NA	Air	40CFR50 App B	611783

General Chemistry (Continued)

Analysis Batch: 612167 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91136-24	GESTSP072622-157	Total/NA	Air	40CFR50 App B	611783
320-91136-26	GESTSP072622-158	Total/NA	Air	40CFR50 App B	611783

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GES_PM071122-104
Lab Sample ID: 320-91136-1
Date Collected: 08/08/22 08:00
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:11	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	-0.0001 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-146
Lab Sample ID: 320-91136-2
Date Collected: 08/08/22 08:00
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GES_PM071122-105
Lab Sample ID: 320-91136-3
Date Collected: 08/09/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:21	JMD	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0172 g	612155	08/19/22 14:00	JMD	EET SAC

Client Sample ID: GESTSP072622-147
Lab Sample ID: 320-91136-4
Date Collected: 08/09/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GES_PM071122-106
Lab Sample ID: 320-91136-5
Date Collected: 08/09/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:24	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0193 g	612155	08/19/22 14:00	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GESTSP072622-148
Lab Sample ID: 320-91136-6
Date Collected: 08/09/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GES_PM071122-107
Lab Sample ID: 320-91136-7
Date Collected: 08/09/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:27	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0162 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-149
Lab Sample ID: 320-91136-8
Date Collected: 08/09/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GESPM072622-153
Lab Sample ID: 320-91136-9
Date Collected: 08/10/22 08:01
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:31	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0136 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-150
Lab Sample ID: 320-91136-10
Date Collected: 08/10/22 08:01
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GESPM072622-154
Lab Sample ID: 320-91136-11
Date Collected: 08/10/22 07:28
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:34	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0157 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-151
Lab Sample ID: 320-91136-12
Date Collected: 08/10/22 07:28
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GESPM072622-155
Lab Sample ID: 320-91136-13
Date Collected: 08/10/22 07:44
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:37	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0144 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-152
Lab Sample ID: 320-91136-14
Date Collected: 08/10/22 07:44
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GES_PM072622-108
Lab Sample ID: 320-91136-15
Date Collected: 08/11/22 08:04
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:41	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0161 g	612155	08/19/22 14:00	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GESTSP072622-153

Lab Sample ID: 320-91136-16
Date Collected: 08/11/22 08:04
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GESPM072622-151

Lab Sample ID: 320-91136-17
Date Collected: 08/11/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:44	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0154 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-154

Lab Sample ID: 320-91136-18
Date Collected: 08/11/22 07:37
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GESPM072622-152

Lab Sample ID: 320-91136-19
Date Collected: 08/11/22 07:55
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:47	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0148 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-155

Lab Sample ID: 320-91136-20
Date Collected: 08/11/22 07:55
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GESPM072622-156
Lab Sample ID: 320-91136-21
Date Collected: 08/12/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 18:51	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0169 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-156
Lab Sample ID: 320-91136-22
Date Collected: 08/12/22 07:51
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GESPM072622-157
Lab Sample ID: 320-91136-23
Date Collected: 08/12/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 19:00	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0139 g	612155	08/19/22 14:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-157
Lab Sample ID: 320-91136-24
Date Collected: 08/12/22 07:21
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Client Sample ID: GESPM072622-158
Lab Sample ID: 320-91136-25
Date Collected: 08/12/22 07:36
Matrix: Air
Date Received: 08/18/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					611395	08/23/22 07:57	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	611434	08/23/22 09:00	[redacted]	EET SAC
Total/NA	Analysis	6020		1			611707	08/23/22 19:04	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0217 g	612155	08/19/22 14:00	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91136-1

Client Sample ID: GESTSP072622-158

Date Collected: 08/12/22 07:36
Date Received: 08/18/22 09:25

Lab Sample ID: 320-91136-26

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			612167	08/19/22 14:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					611783	08/24/22 13:04	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-91136-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-91136-1	GES_PM071122-104	Air	08/08/22 08:00	08/18/22 09:25
320-91136-2	GESTSP072622-146	Air	08/08/22 08:00	08/18/22 09:25
320-91136-3	GES_PM071122-105	Air	08/09/22 07:51	08/18/22 09:25
320-91136-4	GESTSP072622-147	Air	08/09/22 07:51	08/18/22 09:25
320-91136-5	GES_PM071122-106	Air	08/09/22 07:21	08/18/22 09:25
320-91136-6	GESTSP072622-148	Air	08/09/22 07:21	08/18/22 09:25
320-91136-7	GES_PM071122-107	Air	08/09/22 07:37	08/18/22 09:25
320-91136-8	GESTSP072622-149	Air	08/09/22 07:37	08/18/22 09:25
320-91136-9	GESPM072622-153	Air	08/10/22 08:01	08/18/22 09:25
320-91136-10	GESTSP072622-150	Air	08/10/22 08:01	08/18/22 09:25
320-91136-11	GESPM072622-154	Air	08/10/22 07:28	08/18/22 09:25
320-91136-12	GESTSP072622-151	Air	08/10/22 07:28	08/18/22 09:25
320-91136-13	GESPM072622-155	Air	08/10/22 07:44	08/18/22 09:25
320-91136-14	GESTSP072622-152	Air	08/10/22 07:44	08/18/22 09:25
320-91136-15	GES_PM072622-108	Air	08/11/22 08:04	08/18/22 09:25
320-91136-16	GESTSP072622-153	Air	08/11/22 08:04	08/18/22 09:25
320-91136-17	GESPM072622-151	Air	08/11/22 07:37	08/18/22 09:25
320-91136-18	GESTSP072622-154	Air	08/11/22 07:37	08/18/22 09:25
320-91136-19	GESPM072622-152	Air	08/11/22 07:55	08/18/22 09:25
320-91136-20	GESTSP072622-155	Air	08/11/22 07:55	08/18/22 09:25
320-91136-21	GESPM072622-156	Air	08/12/22 07:51	08/18/22 09:25
320-91136-22	GESTSP072622-156	Air	08/12/22 07:51	08/18/22 09:25
320-91136-23	GESPM072622-157	Air	08/12/22 07:21	08/18/22 09:25
320-91136-24	GESTSP072622-157	Air	08/12/22 07:21	08/18/22 09:25
320-91136-25	GESPM072622-158	Air	08/12/22 07:36	08/18/22 09:25
320-91136-26	GESTSP072622-158	Air	08/12/22 07:36	08/18/22 09:25

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT081722AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	**Event: Parcel B Air Monitoring**
Project Number: J310000900	PO[redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-91136 Chain of Custody

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: Parcel B Air Monitoring					1	1	1						
1	GES_PM071122-104	AQ	08/08/2022	0800	[redacted]	X		X	FIELDQC	FB1	0.00	0.00	1	
2	GESTSP072622-146	AQ	08/08/2022	0800			X		FIELDQC	FB1	0.00	0.00	1	
3	GES_PM071122-105	A	08/09/2022	0751		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1663.70 (M3)
4	GESTSP072622-147	A	08/09/2022	0751			X		MSB01	N1	0.00	0.00	1	VOLUME: 1788.65 (M3)
5	GES_PM071122-106	A	08/09/2022	0721		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1622.89 (M3)
6	GESTSP072622-148	A	08/09/2022	0721			X		MSB02	N1	0.00	0.00	1	VOLUME: 1761.55 (M3)
7	GES_PM071122-107	A	08/09/2022	0737		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1623.49 (M3)
8	GESTSP072622-149	A	08/09/2022	0737			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1636.18 (M3)
9	GESPM072622-153	A	08/10/2022	0801		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1699.59 (M3)
10	GESTSP072622-150	A	08/10/2022	0801			X		MSB01	N1	0.00	0.00	1	VOLUME: 1784.74 (M3)
11	GESPM072622-154	A	08/10/2022	0728		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1630.75 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8-17-22	1600	FEDEX	8-17-22	1600
			[redacted]	8/17/22	925

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/17/2022 /FedEx 7776 4994 8901

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 12, 2022

17-Ec

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT081722AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

| | | | | | | | Analytical Test Method | | | | | | |

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT081722AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn								Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1														
23	GESPM072622-157	A	08/12/2022	0721	[redacted]	X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1598.56 (M3)
24	GESTSP072622-157	A	08/12/2022	0721	[redacted]		X									MSB02	N1	0.00	0.00	1	VOLUME: 1735.79 (M3)
25	GESPM072622-158	A	08/12/2022	0736	[redacted]	X		X								MSB113A	N1	0.00	0.00	1	VOLUME: 1601.40 (M3)
26	GESTSP072622-158	A	08/12/2022	0736	[redacted]		X									MSB113A	N1	0.00	0.00	1	VOLUME: 1585.22 (M3)
27									N/A												
28									[redacted]												

Turnaround Time: 5 days

Relinquished by: *(Signature)*	**Date**	**Time**	**Received by: *(Signature)***	**Date**	**Time**
[redacted]	8-17-22	1600	FEDEX	8-17-22	1600
			[redacted]		945

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/17/2022 /FedEx 7776 4994 8901

Received by Laboratory: *(Signature, Date, Time)* **& condition**

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-91136-1

Login Number: 91136
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-91387-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
9/9/2022 9:43:54 AM

[redacted], Project Manager I
[redacted]

[redacted] test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Job ID: 320-91387-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-91387-1

Comments
No additional comments.

Receipt
The samples were received on 8/25/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.0º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM072622-159 — Lab Sample ID: 320-91387-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0034		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	26		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-159 — Lab Sample ID: 320-91387-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	26.3167		0.2759	0.2759	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-160 — Lab Sample ID: 320-91387-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0033		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	26		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-160 — Lab Sample ID: 320-91387-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	36.1108		0.2861	0.2861	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-161 — Lab Sample ID: 320-91387-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0011		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0036		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	25		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP072622-161 — Lab Sample ID: 320-91387-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	44.8262		0.3083	0.3083	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM072622-162 — Lab Sample ID: 320-91387-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00051	J	0.0012	0.00018	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.00033	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP072622-162 — Lab Sample ID: 320-91387-8

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	0.5000		0.5000	0.5000	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-163 — Lab Sample ID: 320-91387-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00075		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0025		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.3		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-163 — Lab Sample ID: 320-91387-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	21.3036		0.2848	0.2848	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-164 — Lab Sample ID: 320-91387-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0010		0.00077	0.00012	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0036		0.00077	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	11		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-164 — Lab Sample ID: 320-91387-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	23.0234		0.2835	0.2835	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-165 — Lab Sample ID: 320-91387-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00078	0.00012	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0048		0.00078	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	14		0.33	0.33	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-165 — Lab Sample ID: 320-91387-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	23.4797		0.3114	0.3114	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-166 — Lab Sample ID: 320-91387-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00089		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	4.7		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-166 — Lab Sample ID: 320-91387-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	17.0568		0.2862	0.2862	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-167 — Lab Sample ID: 320-91387-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00059	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.3		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-167 — Lab Sample ID: 320-91387-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	20.1124		0.2873	0.2873	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-168 — Lab Sample ID: 320-91387-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00088		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0027		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.3		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-168 — Lab Sample ID: 320-91387-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	9.9298		0.3065	0.3065	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-169 — Lab Sample ID: 320-91387-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0010		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	2.5		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-169 — Lab Sample ID: 320-91387-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.3620		0.2831	0.2831	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-170 — Lab Sample ID: 320-91387-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00090		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0071		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.6		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-170 — Lab Sample ID: 320-91387-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	29.7042		0.2787	0.2787	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-171 — Lab Sample ID: 320-91387-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00093		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0023		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	3.8		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-171 — Lab Sample ID: 320-91387-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	7.8843		0.3032	0.3032	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM072622-159
Lab Sample ID: 320-91387-1
Date Collected: 08/16/22 07:50
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00072	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:33	1
Manganese	0.0034		0.00072	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:33	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	26		0.30	0.30	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP072622-159
Lab Sample ID: 320-91387-2
Date Collected: 08/16/22 07:50
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	26.3167		0.2759	0.2759	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM072622-160
Lab Sample ID: 320-91387-3
Date Collected: 08/16/22 07:07
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00074	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:43	1
Manganese	0.0033		0.00074	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:43	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	26		0.31	0.31	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP072622-160
Lab Sample ID: 320-91387-4
Date Collected: 08/16/22 07:07
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	36.1108		0.2861	0.2861	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM072622-161
Lab Sample ID: 320-91387-5
Date Collected: 08/16/22 07:32
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0011		0.00073	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:46	1
Manganese	0.0036		0.00073	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:46	1

Client Sample ID: GESPM072622-161
Lab Sample ID: 320-91387-5
Date Collected: 08/16/22 07:32
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	25		0.30	0.30	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP072622-161
Lab Sample ID: 320-91387-6
Date Collected: 08/16/22 07:32
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	44.8262		0.3083	0.3083	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM072622-162
Lab Sample ID: 320-91387-7
Date Collected: 08/15/22 08:00
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00051	J	0.0012	0.00018	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:49	1
Manganese	0.00033	J	0.0012	0.00017	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:49	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP072622-162
Lab Sample ID: 320-91387-8
Date Collected: 08/15/22 08:00
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	0.5000		0.5000	0.5000	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-163
Lab Sample ID: 320-91387-9
Date Collected: 08/17/22 07:47
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00075		0.00072	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:59	1
Manganese	0.0025		0.00072	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:59	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.3		0.30	0.30	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-163
Lab Sample ID: 320-91387-10
Date Collected: 08/17/22 07:47
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	21.3036		0.2848	0.2848	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-164
Lab Sample ID: 320-91387-11
Date Collected: 08/17/22 07:08
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0010		0.00077	0.00012	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:02	1
Manganese	0.0036		0.00077	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:02	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	11		0.32	0.32	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-164
Lab Sample ID: 320-91387-12
Date Collected: 08/17/22 07:08
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	23.0234		0.2835	0.2835	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-165
Lab Sample ID: 320-91387-13
Date Collected: 08/17/22 07:27
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00078	0.00012	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:05	1
Manganese	0.0048		0.00078	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:05	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	14		0.33	0.33	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-165
Lab Sample ID: 320-91387-14
Date Collected: 08/17/22 07:27
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	23.4797		0.3114	0.3114	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-166
Lab Sample ID: 320-91387-15
Date Collected: 08/18/22 07:38
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00089		0.00073	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:08	1
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:08	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	4.7		0.31	0.31	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-166
Lab Sample ID: 320-91387-16
Date Collected: 08/18/22 07:38
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	17.0568		0.2862	0.2862	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-167
Lab Sample ID: 320-91387-17
Date Collected: 08/18/22 06:58
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00059	J	0.00073	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:12	1
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:12	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.3		0.31	0.31	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-167
Lab Sample ID: 320-91387-18
Date Collected: 08/18/22 06:58
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	20.1124		0.2873	0.2873	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-168
Lab Sample ID: 320-91387-19
Date Collected: 08/18/22 07:20
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00088		0.00074	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:15	1
Manganese	0.0027		0.00074	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:15	1

Client Sample ID: GESPM080822-168
Lab Sample ID: 320-91387-19
Date Collected: 08/18/22 07:20
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.3		0.31	0.31	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-168
Lab Sample ID: 320-91387-20
Date Collected: 08/18/22 07:20
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	9.9298		0.3065	0.3065	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-169
Lab Sample ID: 320-91387-21
Date Collected: 08/19/22 07:51
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0010		0.00072	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:18	1
Manganese	0.0019		0.00072	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:18	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	2.5		0.30	0.30	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-169
Lab Sample ID: 320-91387-22
Date Collected: 08/19/22 07:51
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.3620		0.2831	0.2831	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-170
Lab Sample ID: 320-91387-23
Date Collected: 08/19/22 07:28
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00090		0.00072	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:21	1
Manganese	0.0071		0.00072	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:21	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.6		0.30	0.30	ug/m3			08/26/22 17:00	1

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-170
Lab Sample ID: 320-91387-24
Date Collected: 08/19/22 07:28
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	29.7042		0.2787	0.2787	ug/m3 (Air)			08/26/22 17:00	1

Client Sample ID: GESPM080822-171
Lab Sample ID: 320-91387-25
Date Collected: 08/19/22 07:39
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00093		0.00072	0.00011	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:25	1
Manganese	0.0023		0.00072	0.00010	ug/m3 (Air)		08/31/22 06:30	09/07/22 15:25	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	3.8		0.30	0.30	ug/m3			08/26/22 17:00	1

Client Sample ID: GESTSP080822-171
Lab Sample ID: 320-91387-26
Date Collected: 08/19/22 07:39
Matrix: Air
Date Received: 08/25/22 09:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	7.8843		0.3032	0.3032	ug/m3 (Air)			08/26/22 17:00	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-613395/1-B
Matrix: Air
Analysis Batch: 615123

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 613403

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:24	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		08/31/22 06:30	09/07/22 14:24	1

Lab Sample ID: LCS 320-613395/2-B
Matrix: Air
Analysis Batch: 615123

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 613403

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.240	0.249		ug/m3 (Air)		104	86 - 111
Manganese	0.240	0.239		ug/m3 (Air)		100	88 - 110

Lab Sample ID: LCSD 320-613395/3-B
Matrix: Air
Analysis Batch: 615123

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 613403

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	0.240	0.245		ug/m3 (Air)		102	86 - 111	2	15
Manganese	0.240	0.242		ug/m3 (Air)		101	88 - 110	1	15

Metals

Pre Prep Batch: 613395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-1	GESPM072622-159	Total/NA	Air	Filter to Air	
320-91387-3	GESPM072622-160	Total/NA	Air	Filter to Air	
320-91387-5	GESPM072622-161	Total/NA	Air	Filter to Air	
320-91387-7	GESPM072622-162	Total/NA	Air	Filter to Air	
320-91387-9	GESPM080822-163	Total/NA	Air	Filter to Air	
320-91387-11	GESPM080822-164	Total/NA	Air	Filter to Air	
320-91387-13	GESPM080822-165	Total/NA	Air	Filter to Air	
320-91387-15	GESPM080822-166	Total/NA	Air	Filter to Air	
320-91387-17	GESPM080822-167	Total/NA	Air	Filter to Air	
320-91387-19	GESPM080822-168	Total/NA	Air	Filter to Air	
320-91387-21	GESPM080822-169	Total/NA	Air	Filter to Air	
320-91387-23	GESPM080822-170	Total/NA	Air	Filter to Air	
320-91387-25	GESPM080822-171	Total/NA	Air	Filter to Air	
MB 320-613395/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-613395/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-613395/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 613403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-1	GESPM072622-159	Total/NA	Air	3050B	613395
320-91387-3	GESPM072622-160	Total/NA	Air	3050B	613395
320-91387-5	GESPM072622-161	Total/NA	Air	3050B	613395
320-91387-7	GESPM072622-162	Total/NA	Air	3050B	613395
320-91387-9	GESPM080822-163	Total/NA	Air	3050B	613395
320-91387-11	GESPM080822-164	Total/NA	Air	3050B	613395
320-91387-13	GESPM080822-165	Total/NA	Air	3050B	613395
320-91387-15	GESPM080822-166	Total/NA	Air	3050B	613395
320-91387-17	GESPM080822-167	Total/NA	Air	3050B	613395
320-91387-19	GESPM080822-168	Total/NA	Air	3050B	613395
320-91387-21	GESPM080822-169	Total/NA	Air	3050B	613395
320-91387-23	GESPM080822-170	Total/NA	Air	3050B	613395
320-91387-25	GESPM080822-171	Total/NA	Air	3050B	613395
MB 320-613395/1-B	Method Blank	Total/NA	Air	3050B	613395
LCS 320-613395/2-B	Lab Control Sample	Total/NA	Air	3050B	613395
LCSD 320-613395/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	613395

Analysis Batch: 615123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-1	GESPM072622-159	Total/NA	Air	6020	613403
320-91387-3	GESPM072622-160	Total/NA	Air	6020	613403
320-91387-5	GESPM072622-161	Total/NA	Air	6020	613403
320-91387-7	GESPM072622-162	Total/NA	Air	6020	613403
320-91387-9	GESPM080822-163	Total/NA	Air	6020	613403
320-91387-11	GESPM080822-164	Total/NA	Air	6020	613403
320-91387-13	GESPM080822-165	Total/NA	Air	6020	613403
320-91387-15	GESPM080822-166	Total/NA	Air	6020	613403
320-91387-17	GESPM080822-167	Total/NA	Air	6020	613403
320-91387-19	GESPM080822-168	Total/NA	Air	6020	613403
320-91387-21	GESPM080822-169	Total/NA	Air	6020	613403
320-91387-23	GESPM080822-170	Total/NA	Air	6020	613403
320-91387-25	GESPM080822-171	Total/NA	Air	6020	613403

Metals (Continued)

Analysis Batch: 615123 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-613395/1-B	Method Blank	Total/NA	Air	6020	613403
LCS 320-613395/2-B	Lab Control Sample	Total/NA	Air	6020	613403
LCSD 320-613395/3-B	Lab Control Sample Dup	Total/NA	Air	6020	613403

General Chemistry

Analysis Batch: 615378

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-1	GESPM072622-159	Total/NA	Air	PM10	
320-91387-3	GESPM072622-160	Total/NA	Air	PM10	
320-91387-5	GESPM072622-161	Total/NA	Air	PM10	
320-91387-7	GESPM072622-162	Total/NA	Air	PM10	
320-91387-9	GESPM080822-163	Total/NA	Air	PM10	
320-91387-11	GESPM080822-164	Total/NA	Air	PM10	
320-91387-13	GESPM080822-165	Total/NA	Air	PM10	
320-91387-15	GESPM080822-166	Total/NA	Air	PM10	
320-91387-17	GESPM080822-167	Total/NA	Air	PM10	
320-91387-19	GESPM080822-168	Total/NA	Air	PM10	
320-91387-21	GESPM080822-169	Total/NA	Air	PM10	
320-91387-23	GESPM080822-170	Total/NA	Air	PM10	
320-91387-25	GESPM080822-171	Total/NA	Air	PM10	

Pre Prep Batch: 615381

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-2	GESTSP072622-159	Total/NA	Air	Filter to Air	
320-91387-4	GESTSP072622-160	Total/NA	Air	Filter to Air	
320-91387-6	GESTSP072622-161	Total/NA	Air	Filter to Air	
320-91387-8	GESTSP072622-162	Total/NA	Air	Filter to Air	
320-91387-10	GESTSP080822-163	Total/NA	Air	Filter to Air	
320-91387-12	GESTSP080822-164	Total/NA	Air	Filter to Air	
320-91387-14	GESTSP080822-165	Total/NA	Air	Filter to Air	
320-91387-16	GESTSP080822-166	Total/NA	Air	Filter to Air	
320-91387-18	GESTSP080822-167	Total/NA	Air	Filter to Air	
320-91387-20	GESTSP080822-168	Total/NA	Air	Filter to Air	
320-91387-22	GESTSP080822-169	Total/NA	Air	Filter to Air	
320-91387-24	GESTSP080822-170	Total/NA	Air	Filter to Air	
320-91387-26	GESTSP080822-171	Total/NA	Air	Filter to Air	

Analysis Batch: 615382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-2	GESTSP072622-159	Total/NA	Air	40CFR50 App B	615381
320-91387-4	GESTSP072622-160	Total/NA	Air	40CFR50 App B	615381
320-91387-6	GESTSP072622-161	Total/NA	Air	40CFR50 App B	615381
320-91387-8	GESTSP072622-162	Total/NA	Air	40CFR50 App B	615381
320-91387-10	GESTSP080822-163	Total/NA	Air	40CFR50 App B	615381
320-91387-12	GESTSP080822-164	Total/NA	Air	40CFR50 App B	615381
320-91387-14	GESTSP080822-165	Total/NA	Air	40CFR50 App B	615381
320-91387-16	GESTSP080822-166	Total/NA	Air	40CFR50 App B	615381
320-91387-18	GESTSP080822-167	Total/NA	Air	40CFR50 App B	615381
320-91387-20	GESTSP080822-168	Total/NA	Air	40CFR50 App B	615381
320-91387-22	GESTSP080822-169	Total/NA	Air	40CFR50 App B	615381

General Chemistry (Continued)

Analysis Batch: 615382 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91387-24	GESTSP080822-170	Total/NA	Air	40CFR50 App B	615381
320-91387-26	GESTSP080822-171	Total/NA	Air	40CFR50 App B	615381

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Client Sample ID: GESPM072622-159
Lab Sample ID: 320-91387-1
Date Collected: 08/16/22 07:50
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 14:33	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0429 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-159
Lab Sample ID: 320-91387-2
Date Collected: 08/16/22 07:50
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM072622-160
Lab Sample ID: 320-91387-3
Date Collected: 08/16/22 07:07
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 14:43	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0422 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-160
Lab Sample ID: 320-91387-4
Date Collected: 08/16/22 07:07
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM072622-161
Lab Sample ID: 320-91387-5
Date Collected: 08/16/22 07:32
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 14:46	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0407 g	615378	08/26/22 17:00	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Client Sample ID: GESTSP072622-161

Lab Sample ID: 320-91387-6
Date Collected: 08/16/22 07:32
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM072622-162

Lab Sample ID: 320-91387-7
Date Collected: 08/15/22 08:00
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 14:49	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0001 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP072622-162

Lab Sample ID: 320-91387-8
Date Collected: 08/15/22 08:00
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-163

Lab Sample ID: 320-91387-9
Date Collected: 08/17/22 07:47
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 14:59	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0156 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-163

Lab Sample ID: 320-91387-10
Date Collected: 08/17/22 07:47
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Client Sample ID: GESPM080822-164
Lab Sample ID: 320-91387-11
Date Collected: 08/17/22 07:08
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:02	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0169 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-164
Lab Sample ID: 320-91387-12
Date Collected: 08/17/22 07:08
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-165
Lab Sample ID: 320-91387-13
Date Collected: 08/17/22 07:27
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:05	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0217 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-165
Lab Sample ID: 320-91387-14
Date Collected: 08/17/22 07:27
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-166
Lab Sample ID: 320-91387-15
Date Collected: 08/18/22 07:38
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:08	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0077 g	615378	08/26/22 17:00	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Client Sample ID: GESTSP080822-166
Lab Sample ID: 320-91387-16
Date Collected: 08/18/22 07:38
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-167
Lab Sample ID: 320-91387-17
Date Collected: 08/18/22 06:58
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:12	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0087 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-167
Lab Sample ID: 320-91387-18
Date Collected: 08/18/22 06:58
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-168
Lab Sample ID: 320-91387-19
Date Collected: 08/18/22 07:20
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:15	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0085 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-168
Lab Sample ID: 320-91387-20
Date Collected: 08/18/22 07:20
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Client Sample ID: GESPM080822-169
Lab Sample ID: 320-91387-21
Date Collected: 08/19/22 07:51
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:18	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0041 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-169
Lab Sample ID: 320-91387-22
Date Collected: 08/19/22 07:51
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-170
Lab Sample ID: 320-91387-23
Date Collected: 08/19/22 07:28
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:21	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0142 g	615378	08/26/22 17:00	[redacted]	EET SAC

Client Sample ID: GESTSP080822-170
Lab Sample ID: 320-91387-24
Date Collected: 08/19/22 07:28
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Client Sample ID: GESPM080822-171
Lab Sample ID: 320-91387-25
Date Collected: 08/19/22 07:39
Matrix: Air
Date Received: 08/25/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					613395	08/31/22 05:08	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	613403	08/31/22 06:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615123	09/07/22 15:25	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0063 g	615378	08/26/22 17:00	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91387-1

Client Sample ID: GESTSP080822-171
Date Collected: 08/19/22 07:39
Date Received: 08/25/22 09:30

Lab Sample ID: 320-91387-26
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			615382	08/26/22 17:00	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615381	09/08/22 17:38	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-91387-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-91387-1	GESPM072622-159	Air	08/16/22 07:50	08/25/22 09:30
320-91387-2	GESTSP072622-159	Air	08/16/22 07:50	08/25/22 09:30
320-91387-3	GESPM072622-160	Air	08/16/22 07:07	08/25/22 09:30
320-91387-4	GESTSP072622-160	Air	08/16/22 07:07	08/25/22 09:30
320-91387-5	GESPM072622-161	Air	08/16/22 07:32	08/25/22 09:30
320-91387-6	GESTSP072622-161	Air	08/16/22 07:32	08/25/22 09:30
320-91387-7	GESPM072622-162	Air	08/15/22 08:00	08/25/22 09:30
320-91387-8	GESTSP072622-162	Air	08/15/22 08:00	08/25/22 09:30
320-91387-9	GESPM080822-163	Air	08/17/22 07:47	08/25/22 09:30
320-91387-10	GESTSP080822-163	Air	08/17/22 07:47	08/25/22 09:30
320-91387-11	GESPM080822-164	Air	08/17/22 07:08	08/25/22 09:30
320-91387-12	GESTSP080822-164	Air	08/17/22 07:08	08/25/22 09:30
320-91387-13	GESPM080822-165	Air	08/17/22 07:27	08/25/22 09:30
320-91387-14	GESTSP080822-165	Air	08/17/22 07:27	08/25/22 09:30
320-91387-15	GESPM080822-166	Air	08/18/22 07:38	08/25/22 09:30
320-91387-16	GESTSP080822-166	Air	08/18/22 07:38	08/25/22 09:30
320-91387-17	GESPM080822-167	Air	08/18/22 06:58	08/25/22 09:30
320-91387-18	GESTSP080822-167	Air	08/18/22 06:58	08/25/22 09:30
320-91387-19	GESPM080822-168	Air	08/18/22 07:20	08/25/22 09:30
320-91387-20	GESTSP080822-168	Air	08/18/22 07:20	08/25/22 09:30
320-91387-21	GESPM080822-169	Air	08/19/22 07:51	08/25/22 09:30
320-91387-22	GESTSP080822-169	Air	08/19/22 07:51	08/25/22 09:30
320-91387-23	GESPM080822-170	Air	08/19/22 07:28	08/25/22 09:30
320-91387-24	GESTSP080822-170	Air	08/19/22 07:28	08/25/22 09:30
320-91387-25	GESPM080822-171	Air	08/19/22 07:39	08/25/22 09:30
320-91387-26	GESTSP080822-171	Air	08/19/22 07:39	08/25/22 09:30

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT082422AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	[redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-91387 Chain of Custody

						Analytical Test Method															
						CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn													
	Event: Parcel B Air Monitoring					1	1	1													
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	GESPM072622-159	A	08/16/2022	0750	[redacted]	X		X								MSB01	N1	0.00	0.00	1	VOLUME: 1666.46 (M3)
2	GESTSP072622-159	A	08/16/2022	0750			X									MSB01	N1	0.00	0.00	1	VOLUME: 1812.54 (M3)
3	GESPM072622-160	A	08/16/2022	0707		X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1629.77 (M3)
4	GESTSP072622-160	A	08/16/2022	0707			X									MSB02	N1	0.00	0.00	1	VOLUME: 1747.40 (M3)
5	GESPM072622-161	A	08/16/2022	0732		X		X								MSB113A	N1	0.00	0.00	1	VOLUME: 1641.67 (M3)
6	GESTSP072622-161	A	08/16/2022	0732			X									MSB113A	N1	0.00	0.00	1	VOLUME: 1621.82 (M3)
7	GESPM072622-162	AQ	08/15/2022	0800		X		X								FIELDQC	FB1	0.00	0.00	1	
8	GESTSP072622-162	AQ	08/15/2022	0800			X									FIELDQC	FB1	0.00	0.00	1	
9	GESPM080822-163	A	08/17/2022	0747		X		X								MSB01	N1	0.00	0.00	1	VOLUME: 1669.85 (M3)
10	GESTSP080822-163	A	08/17/2022	0747			X									MSB01	N1	0.00	0.00	1	VOLUME: 1755.57 (M3)
11	GESPM080822-164	A	08/17/2022	0708		X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1548.50 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/24/22	1500	[redacted]	8/24/22	1500
				8-25-22	0930

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/24/2022/FedEx 2769 7793 0231

Received by Laboratory: *(Signature, Date, Time)* **& condition**

220

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT082422AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: Parcel B Air Monitoring					1	1	1						
12	GESTSP080822-164	A	08/17/2022	0708	[redacted]		X		MSB02	N1	0.00	0.00	1	VOLUME: 1763.42 (M3)
13	GESPM080822-165	A	08/17/2022	0727		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1532.16 (M3)
14	GESTSP080822-165	A	08/17/2022	0727			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1605.64 (M3)
15	GESPM080822-166	A	08/18/2022	0738		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1638.74 (M3)
16	GESTSP080822-166	A	08/18/2022	0738			X		MSB01	N1	0.00	0.00	1	VOLUME: 1747.10 (M3)
17	GESPM080822-167	A	08/18/2022	0658		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1637.56 (M3)
18	GESTSP080822-167	A	08/18/2022	0658			X		MSB02	N1	0.00	0.00	1	VOLUME: 1740.22 (M3)
19	GESPM080822-168	A	08/18/2022	0720		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1611.00 (M3)
20	GESTSP080822-168	A	08/18/2022	0720			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1631.46 (M3)
21	GESPM080822-169	A	08/19/2022	0751		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1668.62 (M3)
22	GESTSP080822-169	A	08/19/2022	0751			X		MSB01	N1	0.00	0.00	1	VOLUME: 1766.07 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/24/22	1500	FedEx	8/24/22	1500
			[redacted]	8-25-22	0930

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/24/2022/FedEx 2769 7793 0231

Received by Laboratory: *(Signature, Date, Time)* **& condition**

2.0

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT082422AIRB

GES
AN ASRC INDUSTRIAL COMPANY

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Analytical Test Method

	Sample ID	Matrix	Date	Time	Samp Init.	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: Parcel B Air Monitoring					1	1	1						
23	GESPM080822-170	A	08/19/2022	0728	[redacted]	X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1660.59 (M3)
24	GESTSP080822-170	A	08/19/2022	0728			X		MSB02	N1	0.00	0.00	1	VOLUME: 1794.36 (M3)
25	GESPM080822-171	A	08/19/2022	0739		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1660.29 (M3)
26	GESTSP080822-171	A	08/19/2022	0739			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1648.85 (M3)
27														
28														

Turnaround Time: 5 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/24/22	1500	FedEx	8/24/22	1500
			[redacted]	8-25-22	0920

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/24/2022/FedEx 2769 7793 0231

Received by Laboratory: *(Signature, Date, Time)* **& condition**

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-91387-1

Login Number: 91387
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	1843713
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-91593-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
9/12/2022 4:00:50 PM

[redacted], Project Manager I
(916)374-4414
[redacted]

[redacted] test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Visit us at: www.eurofinsus.com/Env

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-91593-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-91593-1

Comments
No additional comments.

Receipt
The samples were received on 9/1/2022 10:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 22.2º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-172 — Lab Sample ID: 320-91593-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00075		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.6		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-172 — Lab Sample ID: 320-91593-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	15.2153		0.2807	0.2807	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-173 — Lab Sample ID: 320-91593-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00068	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0041		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.2		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-173 — Lab Sample ID: 320-91593-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	31.4313		0.2842	0.2842	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-174 — Lab Sample ID: 320-91593-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00056	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0018		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.2		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-174 — Lab Sample ID: 320-91593-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.9522		0.3076	0.3076	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-175 — Lab Sample ID: 320-91593-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00022	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP080822-175 — Lab Sample ID: 320-91593-8

No Detections.

Client Sample ID: GESPM080822-176 — Lab Sample ID: 320-91593-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00060	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0015		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.8		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-176 — Lab Sample ID: 320-91593-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	13.1380		0.2881	0.2881	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESPM080822-177 — Lab Sample ID: 320-91593-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00057	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0017		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.0		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-177 — Lab Sample ID: 320-91593-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	14.0973		0.2865	0.2865	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-178 — Lab Sample ID: 320-91593-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00067	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0020		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.8		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-178 — Lab Sample ID: 320-91593-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	15.2127		0.3196	0.3196	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-179 — Lab Sample ID: 320-91593-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00044	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0017		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	4.8		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-179 — Lab Sample ID: 320-91593-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	12.8481		0.2843	0.2843	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-180 — Lab Sample ID: 320-91593-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00061	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0025		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	3.9		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-180 — Lab Sample ID: 320-91593-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	11.9998		0.2804	0.2804	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-181 — Lab Sample ID: 320-91593-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00051	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0019		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	5.5		0.32	0.32	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-181 — Lab Sample ID: 320-91593-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	10.0147		0.3110	0.3110	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-182 — Lab Sample ID: 320-91593-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0014	J	0.0023	0.00035	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0044		0.0023	0.00033	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	6.0		0.97	0.97	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-182 — Lab Sample ID: 320-91593-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	21.7387		0.9058	0.9058	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-183 — Lab Sample ID: 320-91593-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0010	J	0.0023	0.00034	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0034		0.0023	0.00032	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP080822-183 — Lab Sample ID: 320-91593-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	12.9890		0.8659	0.8659	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-184 — Lab Sample ID: 320-91593-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0011	J	0.0024	0.00035	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0036		0.0024	0.00033	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.0		0.98	0.98	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-184 — Lab Sample ID: 320-91593-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	15.6608		0.9788	0.9788	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-172
Lab Sample ID: 320-91593-1
Date Collected: 08/23/22 07:59
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00075		0.00072	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:21	1
Manganese	0.0028		0.00072	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:21	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	6.6		0.30	0.30	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-172
Lab Sample ID: 320-91593-2
Date Collected: 08/23/22 07:59
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	15.2153		0.2807	0.2807	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-173
Lab Sample ID: 320-91593-3
Date Collected: 08/23/22 07:16
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00068	J	0.00073	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:25	1
Manganese	0.0041		0.00073	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:25	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.2		0.30	0.30	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-173
Lab Sample ID: 320-91593-4
Date Collected: 08/23/22 07:16
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	31.4313		0.2842	0.2842	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-174
Lab Sample ID: 320-91593-5
Date Collected: 08/23/22 07:43
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00056	J	0.00075	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:28	1
Manganese	0.0018		0.00075	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:28	1

Client Sample ID: GESPM080822-174
Lab Sample ID: 320-91593-5
Date Collected: 08/23/22 07:43
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**7.2**		0.31	0.31	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-174
Lab Sample ID: 320-91593-6
Date Collected: 08/23/22 07:43
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	**10.9522**		0.3076	0.3076	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-175
Lab Sample ID: 320-91593-7
Date Collected: 08/22/22 08:00
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:31	1
Manganese	**0.00022**	**J**	0.0012	0.00017	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:31	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-175
Lab Sample ID: 320-91593-8
Date Collected: 08/22/22 08:00
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-176
Lab Sample ID: 320-91593-9
Date Collected: 08/24/22 07:45
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.00060**	**J**	0.00073	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:34	1
Manganese	**0.0015**		0.00073	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:34	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**6.8**		0.31	0.31	ug/m3			09/07/22 09:17	1

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-176
Lab Sample ID: 320-91593-10
Date Collected: 08/24/22 07:45
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	13.1380		0.2881	0.2881	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-177
Lab Sample ID: 320-91593-11
Date Collected: 08/24/22 07:02
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00057	J	0.00075	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:38	1
Manganese	0.0017		0.00075	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:38	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	6.0		0.31	0.31	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-177
Lab Sample ID: 320-91593-12
Date Collected: 08/24/22 07:02
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	14.0973		0.2865	0.2865	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-178
Lab Sample ID: 320-91593-13
Date Collected: 08/24/22 07:24
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00067	J	0.00076	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:41	1
Manganese	0.0020		0.00076	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:41	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.8		0.32	0.32	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-178
Lab Sample ID: 320-91593-14
Date Collected: 08/24/22 07:24
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	15.2127		0.3196	0.3196	ug/m3 (Air)			09/07/22 09:17	1

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-179
Lab Sample ID: 320-91593-15
Date Collected: 08/25/22 07:44
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00044	J	0.00072	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:44	1
Manganese	0.0017		0.00072	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:44	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	4.8		0.30	0.30	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-179
Lab Sample ID: 320-91593-16
Date Collected: 08/25/22 07:44
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	12.8481		0.2843	0.2843	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-180
Lab Sample ID: 320-91593-17
Date Collected: 08/25/22 07:05
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00061	J	0.00073	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:47	1
Manganese	0.0025		0.00073	0.00010	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:47	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	3.9		0.31	0.31	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-180
Lab Sample ID: 320-91593-18
Date Collected: 08/25/22 07:05
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	11.9998		0.2804	0.2804	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-181
Lab Sample ID: 320-91593-19
Date Collected: 08/25/22 07:23
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00051	J	0.00076	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:51	1
Manganese	0.0019		0.00076	0.00011	ug/m3 (Air)		09/11/22 14:40	09/12/22 01:51	1

Client Sample ID: GESPM080822-181
Lab Sample ID: 320-91593-19
Date Collected: 08/25/22 07:23
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	5.5		0.32	0.32	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-181
Lab Sample ID: 320-91593-20
Date Collected: 08/25/22 07:23
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	10.0147		0.3110	0.3110	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-182
Lab Sample ID: 320-91593-21
Date Collected: 08/25/22 15:12
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0014	J	0.0023	0.00035	ug/m3 (Air)		09/11/22 14:40	09/12/22 02:00	1
Manganese	0.0044		0.0023	0.00033	ug/m3 (Air)		09/11/22 14:40	09/12/22 02:00	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	6.0		0.97	0.97	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-182
Lab Sample ID: 320-91593-22
Date Collected: 08/25/22 15:12
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	21.7387		0.9058	0.9058	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-183
Lab Sample ID: 320-91593-23
Date Collected: 08/25/22 14:53
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0010	J	0.0023	0.00034	ug/m3 (Air)		09/11/22 14:40	09/12/22 02:03	1
Manganese	0.0034		0.0023	0.00032	ug/m3 (Air)		09/11/22 14:40	09/12/22 02:03	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.95	0.95	ug/m3			09/07/22 09:17	1

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-183
Lab Sample ID: 320-91593-24
Date Collected: 08/25/22 14:53
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	12.9890		0.8659	0.8659	ug/m3 (Air)			09/07/22 09:17	1

Client Sample ID: GESPM080822-184
Lab Sample ID: 320-91593-25
Date Collected: 08/25/22 15:03
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0011	J	0.0024	0.00035	ug/m3 (Air)		09/11/22 14:40	09/12/22 02:07	1
Manganese	0.0036		0.0024	0.00033	ug/m3 (Air)		09/11/22 14:40	09/12/22 02:07	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.0		0.98	0.98	ug/m3			09/07/22 09:17	1

Client Sample ID: GESTSP080822-184
Lab Sample ID: 320-91593-26
Date Collected: 08/25/22 15:03
Matrix: Air
Date Received: 09/01/22 10:30
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	15.6608		0.9788	0.9788	ug/m3 (Air)			09/07/22 09:17	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-615798/1-B
Matrix: Air
Analysis Batch: 615873

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 615831

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/11/22 14:40	09/12/22 00:47	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		09/11/22 14:40	09/12/22 00:47	1

Lab Sample ID: LCS 320-615798/2-B
Matrix: Air
Analysis Batch: 615873

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 615831

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead			0.240	0.248		ug/m3 (Air)		103	86 - 111		
Manganese			0.240	0.243		ug/m3 (Air)		101	88 - 110		

Lab Sample ID: LCSD 320-615798/3-B
Matrix: Air
Analysis Batch: 615873

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 615831

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead			0.240	0.243		ug/m3 (Air)		101	86 - 111	2	15
Manganese			0.240	0.247		ug/m3 (Air)		103	88 - 110	2	15

Metals

Pre Prep Batch: 615798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-1	GESPM080822-172	Total/NA	Air	Filter to Air	
320-91593-3	GESPM080822-173	Total/NA	Air	Filter to Air	
320-91593-5	GESPM080822-174	Total/NA	Air	Filter to Air	
320-91593-7	GESPM080822-175	Total/NA	Air	Filter to Air	
320-91593-9	GESPM080822-176	Total/NA	Air	Filter to Air	
320-91593-11	GESPM080822-177	Total/NA	Air	Filter to Air	
320-91593-13	GESPM080822-178	Total/NA	Air	Filter to Air	
320-91593-15	GESPM080822-179	Total/NA	Air	Filter to Air	
320-91593-17	GESPM080822-180	Total/NA	Air	Filter to Air	
320-91593-19	GESPM080822-181	Total/NA	Air	Filter to Air	
320-91593-21	GESPM080822-182	Total/NA	Air	Filter to Air	
320-91593-23	GESPM080822-183	Total/NA	Air	Filter to Air	
320-91593-25	GESPM080822-184	Total/NA	Air	Filter to Air	
MB 320-615798/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-615798/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-615798/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 615831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-1	GESPM080822-172	Total/NA	Air	3050B	615798
320-91593-3	GESPM080822-173	Total/NA	Air	3050B	615798
320-91593-5	GESPM080822-174	Total/NA	Air	3050B	615798
320-91593-7	GESPM080822-175	Total/NA	Air	3050B	615798
320-91593-9	GESPM080822-176	Total/NA	Air	3050B	615798
320-91593-11	GESPM080822-177	Total/NA	Air	3050B	615798
320-91593-13	GESPM080822-178	Total/NA	Air	3050B	615798
320-91593-15	GESPM080822-179	Total/NA	Air	3050B	615798
320-91593-17	GESPM080822-180	Total/NA	Air	3050B	615798
320-91593-19	GESPM080822-181	Total/NA	Air	3050B	615798
320-91593-21	GESPM080822-182	Total/NA	Air	3050B	615798
320-91593-23	GESPM080822-183	Total/NA	Air	3050B	615798
320-91593-25	GESPM080822-184	Total/NA	Air	3050B	615798
MB 320-615798/1-B	Method Blank	Total/NA	Air	3050B	615798
LCS 320-615798/2-B	Lab Control Sample	Total/NA	Air	3050B	615798
LCSD 320-615798/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	615798

Analysis Batch: 615873

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-1	GESPM080822-172	Total/NA	Air	6020	615831
320-91593-3	GESPM080822-173	Total/NA	Air	6020	615831
320-91593-5	GESPM080822-174	Total/NA	Air	6020	615831
320-91593-7	GESPM080822-175	Total/NA	Air	6020	615831
320-91593-9	GESPM080822-176	Total/NA	Air	6020	615831
320-91593-11	GESPM080822-177	Total/NA	Air	6020	615831
320-91593-13	GESPM080822-178	Total/NA	Air	6020	615831
320-91593-15	GESPM080822-179	Total/NA	Air	6020	615831
320-91593-17	GESPM080822-180	Total/NA	Air	6020	615831
320-91593-19	GESPM080822-181	Total/NA	Air	6020	615831
320-91593-21	GESPM080822-182	Total/NA	Air	6020	615831
320-91593-23	GESPM080822-183	Total/NA	Air	6020	615831
320-91593-25	GESPM080822-184	Total/NA	Air	6020	615831

Metals (Continued)

Analysis Batch: 615873 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-615798/1-B	Method Blank	Total/NA	Air	6020	615831
LCS 320-615798/2-B	Lab Control Sample	Total/NA	Air	6020	615831
LCSD 320-615798/3-B	Lab Control Sample Dup	Total/NA	Air	6020	615831

General Chemistry

Pre Prep Batch: 615303

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-2	GESTSP080822-172	Total/NA	Air	Filter to Air	
320-91593-4	GESTSP080822-173	Total/NA	Air	Filter to Air	
320-91593-6	GESTSP080822-174	Total/NA	Air	Filter to Air	
320-91593-8	GESTSP080822-175	Total/NA	Air	Filter to Air	

Pre Prep Batch: 616119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-10	GESTSP080822-176	Total/NA	Air	Filter to Air	
320-91593-12	GESTSP080822-177	Total/NA	Air	Filter to Air	
320-91593-14	GESTSP080822-178	Total/NA	Air	Filter to Air	
320-91593-16	GESTSP080822-179	Total/NA	Air	Filter to Air	
320-91593-18	GESTSP080822-180	Total/NA	Air	Filter to Air	
320-91593-20	GESTSP080822-181	Total/NA	Air	Filter to Air	
320-91593-22	GESTSP080822-182	Total/NA	Air	Filter to Air	
320-91593-24	GESTSP080822-183	Total/NA	Air	Filter to Air	
320-91593-26	GESTSP080822-184	Total/NA	Air	Filter to Air	

Analysis Batch: 616145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-1	GESPM080822-172	Total/NA	Air	PM10	
320-91593-3	GESPM080822-173	Total/NA	Air	PM10	
320-91593-5	GESPM080822-174	Total/NA	Air	PM10	
320-91593-7	GESPM080822-175	Total/NA	Air	PM10	
320-91593-9	GESPM080822-176	Total/NA	Air	PM10	
320-91593-11	GESPM080822-177	Total/NA	Air	PM10	
320-91593-13	GESPM080822-178	Total/NA	Air	PM10	
320-91593-15	GESPM080822-179	Total/NA	Air	PM10	
320-91593-17	GESPM080822-180	Total/NA	Air	PM10	
320-91593-19	GESPM080822-181	Total/NA	Air	PM10	
320-91593-21	GESPM080822-182	Total/NA	Air	PM10	
320-91593-23	GESPM080822-183	Total/NA	Air	PM10	
320-91593-25	GESPM080822-184	Total/NA	Air	PM10	

Analysis Batch: 616146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-2	GESTSP080822-172	Total/NA	Air	40CFR50 App B	615303
320-91593-4	GESTSP080822-173	Total/NA	Air	40CFR50 App B	615303
320-91593-6	GESTSP080822-174	Total/NA	Air	40CFR50 App B	615303
320-91593-8	GESTSP080822-175	Total/NA	Air	40CFR50 App B	615303
320-91593-10	GESTSP080822-176	Total/NA	Air	40CFR50 App B	616119
320-91593-12	GESTSP080822-177	Total/NA	Air	40CFR50 App B	616119
320-91593-14	GESTSP080822-178	Total/NA	Air	40CFR50 App B	616119
320-91593-16	GESTSP080822-179	Total/NA	Air	40CFR50 App B	616119

General Chemistry (Continued)

Analysis Batch: 616146 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91593-18	GESTSP080822-180	Total/NA	Air	40CFR50 App B	616119
320-91593-20	GESTSP080822-181	Total/NA	Air	40CFR50 App B	616119
320-91593-22	GESTSP080822-182	Total/NA	Air	40CFR50 App B	616119
320-91593-24	GESTSP080822-183	Total/NA	Air	40CFR50 App B	616119
320-91593-26	GESTSP080822-184	Total/NA	Air	40CFR50 App B	616119

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESPM080822-172
Lab Sample ID: 320-91593-1
Date Collected: 08/23/22 07:59
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:21	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0111 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-172
Lab Sample ID: 320-91593-2
Date Collected: 08/23/22 07:59
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615303	09/08/22 14:26	[redacted]	EET SAC

Client Sample ID: GESPM080822-173
Lab Sample ID: 320-91593-3
Date Collected: 08/23/22 07:16
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:25	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0134 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-173
Lab Sample ID: 320-91593-4
Date Collected: 08/23/22 07:16
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615303	09/08/22 14:26	[redacted]	EET SAC

Client Sample ID: GESPM080822-174
Lab Sample ID: 320-91593-5
Date Collected: 08/23/22 07:43
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:28	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0116 g	616145	09/07/22 09:17	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESTSP080822-174
Lab Sample ID: 320-91593-6
Date Collected: 08/23/22 07:43
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615303	09/08/22 14:26	[redacted]	EET SAC

Client Sample ID: GESPM080822-175
Lab Sample ID: 320-91593-7
Date Collected: 08/22/22 08:00
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:31	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0000 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-175
Lab Sample ID: 320-91593-8
Date Collected: 08/22/22 08:00
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					615303	09/08/22 14:26	[redacted]	EET SAC

Client Sample ID: GESPM080822-176
Lab Sample ID: 320-91593-9
Date Collected: 08/24/22 07:45
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:34	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0112 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-176
Lab Sample ID: 320-91593-10
Date Collected: 08/24/22 07:45
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESPM080822-177
Lab Sample ID: 320-91593-11
Date Collected: 08/24/22 07:02
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:38	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0096 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-177
Lab Sample ID: 320-91593-12
Date Collected: 08/24/22 07:02
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Client Sample ID: GESPM080822-178
Lab Sample ID: 320-91593-13
Date Collected: 08/24/22 07:24
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:41	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0122 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-178
Lab Sample ID: 320-91593-14
Date Collected: 08/24/22 07:24
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Client Sample ID: GESPM080822-179
Lab Sample ID: 320-91593-15
Date Collected: 08/25/22 07:44
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:44	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0080 g	616145	09/07/22 09:17	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESTSP080822-179
Lab Sample ID: 320-91593-16
Date Collected: 08/25/22 07:44
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Client Sample ID: GESPM080822-180
Lab Sample ID: 320-91593-17
Date Collected: 08/25/22 07:05
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:47	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0064 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-180
Lab Sample ID: 320-91593-18
Date Collected: 08/25/22 07:05
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Client Sample ID: GESPM080822-181
Lab Sample ID: 320-91593-19
Date Collected: 08/25/22 07:23
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 01:51	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0087 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-181
Lab Sample ID: 320-91593-20
Date Collected: 08/25/22 07:23
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESPM080822-182
Lab Sample ID: 320-91593-21
Date Collected: 08/25/22 15:12
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:01	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 02:00	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0031 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-182
Lab Sample ID: 320-91593-22
Date Collected: 08/25/22 15:12
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Client Sample ID: GESPM080822-183
Lab Sample ID: 320-91593-23
Date Collected: 08/25/22 14:53
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:01	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 02:03	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0003 g	616145	09/07/22 09:17	[redacted]	EET SAC

Client Sample ID: GESTSP080822-183
Lab Sample ID: 320-91593-24
Date Collected: 08/25/22 14:53
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Client Sample ID: GESPM080822-184
Lab Sample ID: 320-91593-25
Date Collected: 08/25/22 15:03
Matrix: Air
Date Received: 09/01/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					615798	09/11/22 13:01	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	615831	09/11/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	6020		1			615873	09/12/22 02:07	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0041 g	616145	09/07/22 09:17	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91593-1

Client Sample ID: GESTSP080822-184

Date Collected: 08/25/22 15:03
Date Received: 09/01/22 10:30

Lab Sample ID: 320-91593-26

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			616146	09/07/22 09:17	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					616119	09/12/22 15:03	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-91593-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-91593-1	GESPM080822-172	Air	08/23/22 07:59	09/01/22 10:30
320-91593-2	GESTSP080822-172	Air	08/23/22 07:59	09/01/22 10:30
320-91593-3	GESPM080822-173	Air	08/23/22 07:16	09/01/22 10:30
320-91593-4	GESTSP080822-173	Air	08/23/22 07:16	09/01/22 10:30
320-91593-5	GESPM080822-174	Air	08/23/22 07:43	09/01/22 10:30
320-91593-6	GESTSP080822-174	Air	08/23/22 07:43	09/01/22 10:30
320-91593-7	GESPM080822-175	Air	08/22/22 08:00	09/01/22 10:30
320-91593-8	GESTSP080822-175	Air	08/22/22 08:00	09/01/22 10:30
320-91593-9	GESPM080822-176	Air	08/24/22 07:45	09/01/22 10:30
320-91593-10	GESTSP080822-176	Air	08/24/22 07:45	09/01/22 10:30
320-91593-11	GESPM080822-177	Air	08/24/22 07:02	09/01/22 10:30
320-91593-12	GESTSP080822-177	Air	08/24/22 07:02	09/01/22 10:30
320-91593-13	GESPM080822-178	Air	08/24/22 07:24	09/01/22 10:30
320-91593-14	GESTSP080822-178	Air	08/24/22 07:24	09/01/22 10:30
320-91593-15	GESPM080822-179	Air	08/25/22 07:44	09/01/22 10:30
320-91593-16	GESTSP080822-179	Air	08/25/22 07:44	09/01/22 10:30
320-91593-17	GESPM080822-180	Air	08/25/22 07:05	09/01/22 10:30
320-91593-18	GESTSP080822-180	Air	08/25/22 07:05	09/01/22 10:30
320-91593-19	GESPM080822-181	Air	08/25/22 07:23	09/01/22 10:30
320-91593-20	GESTSP080822-181	Air	08/25/22 07:23	09/01/22 10:30
320-91593-21	GESPM080822-182	Air	08/25/22 15:12	09/01/22 10:30
320-91593-22	GESTSP080822-182	Air	08/25/22 15:12	09/01/22 10:30
320-91593-23	GESPM080822-183	Air	08/25/22 14:53	09/01/22 10:30
320-91593-24	GESTSP080822-183	Air	08/25/22 14:53	09/01/22 10:30
320-91593-25	GESPM080822-184	Air	08/25/22 15:03	09/01/22 10:30
320-91593-26	GESTSP080822-184	Air	08/25/22 15:03	09/01/22 10:30

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT083122AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-91593 Chain of Custody

						Analytical Test Method															
						CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn													
	Event: Parcel B Air Monitoring					1	1	1													
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	GESPM080822-172	A	08/23/2022	0759	[redacted]	X		X								MSB01	N1	0.00	0.00	1	VOLUME: 1674.26 (M3)
2	GESTSP080822-172	A	08/23/2022	0759			X									MSB01	N1	0.00	0.00	1	VOLUME: 1781.10 (M3)
3	GESPM080822-173	A	08/23/2022	0716		X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1639.37 (M3)
4	GESTSP080822-173	A	08/23/2022	0716			X									MSB02	N1	0.00	0.00	1	VOLUME: 1759.39 (M3)
5	GESPM080822-174	A	08/23/2022	0743		X		X								MSB113A	N1	0.00	0.00	1	VOLUME: 1601.43 (M3)
6	GESTSP080822-174	A	08/23/2022	0743			X									MSB113A	N1	0.00	0.00	1	VOLUME: 1625.25 (M3)
7	GESPM080822-175	AQ	08/22/2022	0800		X		X								FIELDQC	FB1	0.00	0.00	1	
8	GESTSP080822-175	AQ	08/22/2022	0800			X									FIELDQC	FB1	0.00	0.00	1	
9	GESPM080822-176	A	08/24/2022	0745		X		X								MSB01	N1	0.00	0.00	1	VOLUME: 1639.29 (M3)
10	GESTSP080822-176	A	08/24/2022	0745			X									MSB01	N1	0.00	0.00	1	VOLUME: 1735.43 (M3)
11	GESPM080822-177	A	08/24/2022	0702		X		X								MSB02	N1	0.00	0.00	1	VOLUME: 1609.09 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8-31-22	1600	FEDEX	8-31-22	1600
			[redacted]	9-1-22	1030

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/31/2022/ FedEx 7777 4322 3373

Received by Laboratory: *(Signature, Date, Time)* **& condition**

222

GES Navy_COC_Field
August 26, 2022

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT083122AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

						Analytical Test Method	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn												
	Event: Parcel B Air Monitoring						1	1	1												
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
12	GESTSP080822-177	A	08/24/2022	0702	[redacted]			X								MSB02	N1	0.00	0.00	1	VOLUME: 1745.01 (M3)
13	GESPM080822-178	A	08/24/2022	0724			X		X							MSB113A	N1	0.00	0.00	1	VOLUME: 1571.14 (M3)
14	GESTSP080822-178	A	08/24/2022	0724				X								MSB113A	N1	0.00	0.00	1	VOLUME: 1564.48 (M3)
15	GESPM080822-179	A	08/25/2022	0744			X		X							MSB01	N1	0.00	0.00	1	VOLUME: 1655.34 (M3)
16	GESTSP080822-179	A	08/25/2022	0744				X								MSB01	N1	0.00	0.00	1	VOLUME: 1759.01 (M3)
17	GESPM080822-180	A	08/25/2022	0705			X		X							MSB02	N1	0.00	0.00	1	VOLUME: 1633.41 (M3)
18	GESTSP080822-180	A	08/25/2022	0705				X								MSB02	N1	0.00	0.00	1	VOLUME: 1783.36 (M3)
19	GESPM080822-181	A	08/25/2022	0723			X		X							MSB113A	N1	0.00	0.00	1	VOLUME: 1584.08 (M3)
20	GESTSP080822-181	A	08/25/2022	0723				X								MSB113A	N1	0.00	0.00	1	VOLUME: 1607.64 (M3)
21	GESPM080822-182	A	08/25/2022	1512			X		X							MSB01	N1	0.00	0.00	1	VOLUME: 513.61 (M3)
22	GESTSP080822-182	A	08/25/2022	1512				X								MSB01	N1	0.00	0.00	1	VOLUME: 552.01 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8-31-22	1600	FEDEX	8-31-22	1600
			[redacted]	9 8-1-22	1030
				8-31-22	

Shipping Date / Carrier / Airbill Number

Shipping Date: 8/31/2022/ FedEx 7777 4322 3373

Received by Laboratory: *(Signature, Date, Time)* **& condition**

22 C

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT083122AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	**Event: Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

						Analytical Test Method	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn										
	Event: Parcel B Air Monitoring						1	1	1										
	Sample ID	Matrix	Date	Time	Samp Init.										Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
23	GESPM080822-183	A	08/25/2022	1453	[redacted]		X		X						MSB02	N1	0.00	0.00	1	VOLUME: 527.62 (M3)
24	GESTSP080822-183	A	08/25/2022	1453				X							MSB02	N1	0.00	0.00	1	VOLUME: 577.41 (M3)
25	GESPM080822-184	A	08/25/2022	1503			X		X						MSB113A	N1	0.00	0.00	1	VOLUME: 510.18 (M3)
26	GESTSP080822-184	A	08/25/2022	1503				X							MSB113A	N1	0.00	0.00	1	VOLUME: 510.83 (M3)
27									N/A											
28																				

Turnaround Time: 5 days [redacted]

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8-31-22	1600	FEDEX	8-31-22	1600
			[redacted]	9-1-22	1030

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/31/2022/ FedEx 7777 4322 3373

Received by Laboratory: *(Signature, Date, Time)* **& condition**

22.2

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-91593-1

Login Number: 91593
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	SEAL
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-91804-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
9/27/2022 8:11:26 PM

[redacted], Project Manager I
(916)374-4414
[redacted]

LINKS

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Have a Question? Ask The Expert

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-91804-1

Comments
No additional comments.

Receipt
The samples were received on 9/8/2022 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 21.4º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-185 — Lab Sample ID: 320-91804-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0016		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0035		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	19		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-185 — Lab Sample ID: 320-91804-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	22.5017		0.2848	0.2848	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-186 — Lab Sample ID: 320-91804-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00071	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0048		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	18		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-186 — Lab Sample ID: 320-91804-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	31.0012		0.2839	0.2839	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-187 — Lab Sample ID: 320-91804-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00073	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0028		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	21		0.32	0.32	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-187 — Lab Sample ID: 320-91804-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	30.7431		0.3189	0.3189	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-188 — Lab Sample ID: 320-91804-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00025	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP080822-188 — Lab Sample ID: 320-91804-8

No Detections.

Client Sample ID: GESPM080822-189 — Lab Sample ID: 320-91804-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0016		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0033		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	18		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-189 — Lab Sample ID: 320-91804-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	15.5532		0.2913	0.2913	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-190 — Lab Sample ID: 320-91804-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00055	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0035		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	13		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-190 — Lab Sample ID: 320-91804-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	30.7401		0.2836	0.2836	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-191 — Lab Sample ID: 320-91804-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00059	J	0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	16		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-191 — Lab Sample ID: 320-91804-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	23.7065		0.3144	0.3144	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-192 — Lab Sample ID: 320-91804-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00046	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0017		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	12		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-192 — Lab Sample ID: 320-91804-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.1185		0.2779	0.2779	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-193 — Lab Sample ID: 320-91804-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00048	J	0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0021		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	11		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-193 — Lab Sample ID: 320-91804-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	20.3942		0.2833	0.2833	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-194 — Lab Sample ID: 320-91804-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00069	J	0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0024		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	15		0.31	0.31	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-194 — Lab Sample ID: 320-91804-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	21.3282		0.3164	0.3164	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-195 — Lab Sample ID: 320-91804-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0017	J	0.0027	0.00041	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0043		0.0027	0.00038	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.0		1.1	1.1	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-195 — Lab Sample ID: 320-91804-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	17.0962		1.0685	1.0685	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-196 — Lab Sample ID: 320-91804-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012	J	0.0027	0.00040	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0068		0.0027	0.00037	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	10		1.1	1.1	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-196 — Lab Sample ID: 320-91804-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	24.4220		1.0348	1.0348	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM080822-197 — Lab Sample ID: 320-91804-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0019	J	0.0028	0.00042	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0054		0.0028	0.00039	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.0		1.2	1.2	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-197 — Lab Sample ID: 320-91804-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	17.7854		1.1549	1.1549	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-185
Lab Sample ID: 320-91804-1
Date Collected: 08/30/22 07:48
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0016		0.00073	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:16	1
Manganese	0.0035		0.00073	0.00010	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:16	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	19		0.31	0.31	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-185
Lab Sample ID: 320-91804-2
Date Collected: 08/30/22 07:48
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	22.5017		0.2848	0.2848	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-186
Lab Sample ID: 320-91804-3
Date Collected: 08/30/22 07:11
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00071	J	0.00074	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:26	1
Manganese	0.0048		0.00074	0.00010	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:26	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	18		0.31	0.31	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-186
Lab Sample ID: 320-91804-4
Date Collected: 08/30/22 07:11
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	31.0012		0.2839	0.2839	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-187
Lab Sample ID: 320-91804-5
Date Collected: 08/30/22 07:34
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00073	J	0.00076	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:29	1
Manganese	0.0028		0.00076	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:29	1

Client Sample ID: GESPM080822-187
Lab Sample ID: 320-91804-5
Date Collected: 08/30/22 07:34
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**21**		0.32	0.32	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-187
Lab Sample ID: 320-91804-6
Date Collected: 08/30/22 07:34
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	**30.7431**		0.3189	0.3189	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-188
Lab Sample ID: 320-91804-7
Date Collected: 08/29/22 08:00
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:32	1
Manganese	**0.00025**	**J**	0.0012	0.00017	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:32	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-188
Lab Sample ID: 320-91804-8
Date Collected: 08/29/22 08:00
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-189
Lab Sample ID: 320-91804-9
Date Collected: 08/31/22 07:51
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.0016**		0.00073	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:42	1
Manganese	**0.0033**		0.00073	0.00010	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:42	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**18**		0.30	0.30	ug/m3			09/09/22 16:30	1

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-189
Lab Sample ID: 320-91804-10
Date Collected: 08/31/22 07:51
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	15.5532		0.2913	0.2913	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-190
Lab Sample ID: 320-91804-11
Date Collected: 08/31/22 07:16
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00055	J	0.00073	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:45	1
Manganese	0.0035		0.00073	0.00010	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:45	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	13		0.31	0.31	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-190
Lab Sample ID: 320-91804-12
Date Collected: 08/31/22 07:16
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	30.7401		0.2836	0.2836	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-191
Lab Sample ID: 320-91804-13
Date Collected: 08/31/22 07:38
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00059	J	0.00075	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:48	1
Manganese	0.0021		0.00075	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:48	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	16		0.31	0.31	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-191
Lab Sample ID: 320-91804-14
Date Collected: 08/31/22 07:38
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	23.7065		0.3144	0.3144	ug/m3 (Air)			09/09/22 16:30	1

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-192
Lab Sample ID: 320-91804-15
Date Collected: 09/01/22 07:47
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00046	J	0.00072	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:52	1
Manganese	0.0017		0.00072	0.00010	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:52	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	12		0.30	0.30	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-192
Lab Sample ID: 320-91804-16
Date Collected: 09/01/22 07:47
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.1185		0.2779	0.2779	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-193
Lab Sample ID: 320-91804-17
Date Collected: 09/01/22 07:18
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00048	J	0.00074	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:55	1
Manganese	0.0021		0.00074	0.00010	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:55	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	11		0.31	0.31	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-193
Lab Sample ID: 320-91804-18
Date Collected: 09/01/22 07:18
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	20.3942		0.2833	0.2833	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-194
Lab Sample ID: 320-91804-19
Date Collected: 09/01/22 07:33
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00069	J	0.00076	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:58	1
Manganese	0.0024		0.00076	0.00011	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:58	1

Client Sample ID: GESPM080822-194
Lab Sample ID: 320-91804-19
Date Collected: 09/01/22 07:33
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	15		0.31	0.31	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-194
Lab Sample ID: 320-91804-20
Date Collected: 09/01/22 07:33
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	21.3282		0.3164	0.3164	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-195
Lab Sample ID: 320-91804-21
Date Collected: 09/01/22 14:17
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0017	J	0.0027	0.00041	ug/m3 (Air)		09/14/22 04:30	09/27/22 12:02	1
Manganese	0.0043		0.0027	0.00038	ug/m3 (Air)		09/14/22 04:30	09/27/22 12:02	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.0		1.1	1.1	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-195
Lab Sample ID: 320-91804-22
Date Collected: 09/01/22 14:17
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	17.0962		1.0685	1.0685	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-196
Lab Sample ID: 320-91804-23
Date Collected: 09/01/22 14:00
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012	J	0.0027	0.00040	ug/m3 (Air)		09/14/22 04:30	09/27/22 12:05	1
Manganese	0.0068		0.0027	0.00037	ug/m3 (Air)		09/14/22 04:30	09/27/22 12:05	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	10		1.1	1.1	ug/m3			09/09/22 16:30	1

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP080822-196
Lab Sample ID: 320-91804-24
Date Collected: 09/01/22 14:00
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	24.4220		1.0348	1.0348	ug/m3 (Air)			09/09/22 16:30	1

Client Sample ID: GESPM080822-197
Lab Sample ID: 320-91804-25
Date Collected: 09/01/22 14:10
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0019	J	0.0028	0.00042	ug/m3 (Air)		09/14/22 04:30	09/27/22 12:08	1
Manganese	0.0054		0.0028	0.00039	ug/m3 (Air)		09/14/22 04:30	09/27/22 12:08	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.0		1.2	1.2	ug/m3			09/09/22 16:30	1

Client Sample ID: GESTSP080822-197
Lab Sample ID: 320-91804-26
Date Collected: 09/01/22 14:10
Matrix: Air
Date Received: 09/08/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	17.7854		1.1549	1.1549	ug/m3 (Air)			09/09/22 16:30	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-616484/1-B
Matrix: Air
Analysis Batch: 620481

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 616487

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:06	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		09/14/22 04:30	09/27/22 11:06	1

Lab Sample ID: LCS 320-616484/2-B
Matrix: Air
Analysis Batch: 620481

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 616487

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.240	0.237		ug/m3 (Air)		99	86 - 111
Manganese	0.240	0.251		ug/m3 (Air)		105	88 - 110

Lab Sample ID: LCSD 320-616484/3-B
Matrix: Air
Analysis Batch: 620481

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 616487

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	0.240	0.242		ug/m3 (Air)		101	86 - 111	2	15
Manganese	0.240	0.257		ug/m3 (Air)		107	88 - 110	2	15

Metals

Pre Prep Batch: 616484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-1	GESPM080822-185	Total/NA	Air	Filter to Air	
320-91804-3	GESPM080822-186	Total/NA	Air	Filter to Air	
320-91804-5	GESPM080822-187	Total/NA	Air	Filter to Air	
320-91804-7	GESPM080822-188	Total/NA	Air	Filter to Air	
320-91804-9	GESPM080822-189	Total/NA	Air	Filter to Air	
320-91804-11	GESPM080822-190	Total/NA	Air	Filter to Air	
320-91804-13	GESPM080822-191	Total/NA	Air	Filter to Air	
320-91804-15	GESPM080822-192	Total/NA	Air	Filter to Air	
320-91804-17	GESPM080822-193	Total/NA	Air	Filter to Air	
320-91804-19	GESPM080822-194	Total/NA	Air	Filter to Air	
320-91804-21	GESPM080822-195	Total/NA	Air	Filter to Air	
320-91804-23	GESPM080822-196	Total/NA	Air	Filter to Air	
320-91804-25	GESPM080822-197	Total/NA	Air	Filter to Air	
MB 320-616484/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-616484/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-616484/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 616487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-1	GESPM080822-185	Total/NA	Air	3050B	616484
320-91804-3	GESPM080822-186	Total/NA	Air	3050B	616484
320-91804-5	GESPM080822-187	Total/NA	Air	3050B	616484
320-91804-7	GESPM080822-188	Total/NA	Air	3050B	616484
320-91804-9	GESPM080822-189	Total/NA	Air	3050B	616484
320-91804-11	GESPM080822-190	Total/NA	Air	3050B	616484
320-91804-13	GESPM080822-191	Total/NA	Air	3050B	616484
320-91804-15	GESPM080822-192	Total/NA	Air	3050B	616484
320-91804-17	GESPM080822-193	Total/NA	Air	3050B	616484
320-91804-19	GESPM080822-194	Total/NA	Air	3050B	616484
320-91804-21	GESPM080822-195	Total/NA	Air	3050B	616484
320-91804-23	GESPM080822-196	Total/NA	Air	3050B	616484
320-91804-25	GESPM080822-197	Total/NA	Air	3050B	616484
MB 320-616484/1-B	Method Blank	Total/NA	Air	3050B	616484
LCS 320-616484/2-B	Lab Control Sample	Total/NA	Air	3050B	616484
LCSD 320-616484/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	616484

Analysis Batch: 620481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-1	GESPM080822-185	Total/NA	Air	6020	616487
320-91804-3	GESPM080822-186	Total/NA	Air	6020	616487
320-91804-5	GESPM080822-187	Total/NA	Air	6020	616487
320-91804-7	GESPM080822-188	Total/NA	Air	6020	616487
320-91804-9	GESPM080822-189	Total/NA	Air	6020	616487
320-91804-11	GESPM080822-190	Total/NA	Air	6020	616487
320-91804-13	GESPM080822-191	Total/NA	Air	6020	616487
320-91804-15	GESPM080822-192	Total/NA	Air	6020	616487
320-91804-17	GESPM080822-193	Total/NA	Air	6020	616487
320-91804-19	GESPM080822-194	Total/NA	Air	6020	616487
320-91804-21	GESPM080822-195	Total/NA	Air	6020	616487
320-91804-23	GESPM080822-196	Total/NA	Air	6020	616487
320-91804-25	GESPM080822-197	Total/NA	Air	6020	616487

Metals (Continued)

Analysis Batch: 620481 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-616484/1-B	Method Blank	Total/NA	Air	6020	616487
LCS 320-616484/2-B	Lab Control Sample	Total/NA	Air	6020	616487
LCSD 320-616484/3-B	Lab Control Sample Dup	Total/NA	Air	6020	616487

General Chemistry

Pre Prep Batch: 617514

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-2	GESTSP080822-185	Total/NA	Air	Filter to Air	
320-91804-4	GESTSP080822-186	Total/NA	Air	Filter to Air	
320-91804-6	GESTSP080822-187	Total/NA	Air	Filter to Air	
320-91804-8	GESTSP080822-188	Total/NA	Air	Filter to Air	
320-91804-10	GESTSP080822-189	Total/NA	Air	Filter to Air	
320-91804-12	GESTSP080822-190	Total/NA	Air	Filter to Air	
320-91804-14	GESTSP080822-191	Total/NA	Air	Filter to Air	
320-91804-16	GESTSP080822-192	Total/NA	Air	Filter to Air	
320-91804-18	GESTSP080822-193	Total/NA	Air	Filter to Air	
320-91804-20	GESTSP080822-194	Total/NA	Air	Filter to Air	
320-91804-22	GESTSP080822-195	Total/NA	Air	Filter to Air	
320-91804-24	GESTSP080822-196	Total/NA	Air	Filter to Air	
320-91804-26	GESTSP080822-197	Total/NA	Air	Filter to Air	

Analysis Batch: 618300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-1	GESPM080822-185	Total/NA	Air	PM10	
320-91804-3	GESPM080822-186	Total/NA	Air	PM10	
320-91804-5	GESPM080822-187	Total/NA	Air	PM10	
320-91804-7	GESPM080822-188	Total/NA	Air	PM10	
320-91804-9	GESPM080822-189	Total/NA	Air	PM10	
320-91804-11	GESPM080822-190	Total/NA	Air	PM10	
320-91804-13	GESPM080822-191	Total/NA	Air	PM10	
320-91804-15	GESPM080822-192	Total/NA	Air	PM10	
320-91804-17	GESPM080822-193	Total/NA	Air	PM10	
320-91804-19	GESPM080822-194	Total/NA	Air	PM10	
320-91804-21	GESPM080822-195	Total/NA	Air	PM10	
320-91804-23	GESPM080822-196	Total/NA	Air	PM10	
320-91804-25	GESPM080822-197	Total/NA	Air	PM10	

Analysis Batch: 618303

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-2	GESTSP080822-185	Total/NA	Air	40CFR50 App B	617514
320-91804-4	GESTSP080822-186	Total/NA	Air	40CFR50 App B	617514
320-91804-6	GESTSP080822-187	Total/NA	Air	40CFR50 App B	617514
320-91804-8	GESTSP080822-188	Total/NA	Air	40CFR50 App B	617514
320-91804-10	GESTSP080822-189	Total/NA	Air	40CFR50 App B	617514
320-91804-12	GESTSP080822-190	Total/NA	Air	40CFR50 App B	617514
320-91804-14	GESTSP080822-191	Total/NA	Air	40CFR50 App B	617514
320-91804-16	GESTSP080822-192	Total/NA	Air	40CFR50 App B	617514
320-91804-18	GESTSP080822-193	Total/NA	Air	40CFR50 App B	617514
320-91804-20	GESTSP080822-194	Total/NA	Air	40CFR50 App B	617514
320-91804-22	GESTSP080822-195	Total/NA	Air	40CFR50 App B	617514

General Chemistry (Continued)

Analysis Batch: 618303 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-91804-24	GESTSP080822-196	Total/NA	Air	40CFR50 App B	617514
320-91804-26	GESTSP080822-197	Total/NA	Air	40CFR50 App B	617514

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Client Sample ID: GESPM080822-185
Date Collected: 08/30/22 07:48
Date Received: 09/08/22 09:35

Lab Sample ID: 320-91804-1
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:16	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0317 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-185
Date Collected: 08/30/22 07:48
Date Received: 09/08/22 09:35

Lab Sample ID: 320-91804-2
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-186
Date Collected: 08/30/22 07:11
Date Received: 09/08/22 09:35

Lab Sample ID: 320-91804-3
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:26	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0294 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-186
Date Collected: 08/30/22 07:11
Date Received: 09/08/22 09:35

Lab Sample ID: 320-91804-4
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-187
Date Collected: 08/30/22 07:34
Date Received: 09/08/22 09:35

Lab Sample ID: 320-91804-5
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:29	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0337 g	618300	09/09/22 16:30	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Client Sample ID: GESTSP080822-187
Lab Sample ID: 320-91804-6
Date Collected: 08/30/22 07:34
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-188
Lab Sample ID: 320-91804-7
Date Collected: 08/29/22 08:00
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:32	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	-0.003 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-188
Lab Sample ID: 320-91804-8
Date Collected: 08/29/22 08:00
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-189
Lab Sample ID: 320-91804-9
Date Collected: 08/31/22 07:51
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:42	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0297 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-189
Lab Sample ID: 320-91804-10
Date Collected: 08/31/22 07:51
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Client Sample ID: GESPM080822-190
Lab Sample ID: 320-91804-11
Date Collected: 08/31/22 07:16
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:45	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0219 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-190
Lab Sample ID: 320-91804-12
Date Collected: 08/31/22 07:16
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-191
Lab Sample ID: 320-91804-13
Date Collected: 08/31/22 07:38
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:48	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0255 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-191
Lab Sample ID: 320-91804-14
Date Collected: 08/31/22 07:38
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-192
Lab Sample ID: 320-91804-15
Date Collected: 09/01/22 07:47
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:52	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0196 g	618300	09/09/22 16:30	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Client Sample ID: GESTSP080822-192
Lab Sample ID: 320-91804-16
Date Collected: 09/01/22 07:47
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-193
Lab Sample ID: 320-91804-17
Date Collected: 09/01/22 07:18
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:55	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0174 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-193
Lab Sample ID: 320-91804-18
Date Collected: 09/01/22 07:18
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-194
Lab Sample ID: 320-91804-19
Date Collected: 09/01/22 07:33
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 11:58	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0237 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-194
Lab Sample ID: 320-91804-20
Date Collected: 09/01/22 07:33
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Client Sample ID: GESPM080822-195
Lab Sample ID: 320-91804-21
Date Collected: 09/01/22 14:17
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 12:02	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0035 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-195
Lab Sample ID: 320-91804-22
Date Collected: 09/01/22 14:17
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-196
Lab Sample ID: 320-91804-23
Date Collected: 09/01/22 14:00
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 12:05	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0046 g	618300	09/09/22 16:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-196
Lab Sample ID: 320-91804-24
Date Collected: 09/01/22 14:00
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Client Sample ID: GESPM080822-197
Lab Sample ID: 320-91804-25
Date Collected: 09/01/22 14:10
Matrix: Air
Date Received: 09/08/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					616484	09/14/22 03:29	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	616487	09/14/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			620481	09/27/22 12:08	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0039 g	618300	09/09/22 16:30	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-91804-1

Client Sample ID: GESTSP080822-197
Date Collected: 09/01/22 14:10
Date Received: 09/08/22 09:35

Lab Sample ID: 320-91804-26
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			618303	09/09/22 16:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					617514	09/16/22 17:02	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-91804-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-91804-1	GESPM080822-185	Air	08/30/22 07:48	09/08/22 09:35
320-91804-2	GESTSP080822-185	Air	08/30/22 07:48	09/08/22 09:35
320-91804-3	GESPM080822-186	Air	08/30/22 07:11	09/08/22 09:35
320-91804-4	GESTSP080822-186	Air	08/30/22 07:11	09/08/22 09:35
320-91804-5	GESPM080822-187	Air	08/30/22 07:34	09/08/22 09:35
320-91804-6	GESTSP080822-187	Air	08/30/22 07:34	09/08/22 09:35
320-91804-7	GESPM080822-188	Air	08/29/22 08:00	09/08/22 09:35
320-91804-8	GESTSP080822-188	Air	08/29/22 08:00	09/08/22 09:35
320-91804-9	GESPM080822-189	Air	08/31/22 07:51	09/08/22 09:35
320-91804-10	GESTSP080822-189	Air	08/31/22 07:51	09/08/22 09:35
320-91804-11	GESPM080822-190	Air	08/31/22 07:16	09/08/22 09:35
320-91804-12	GESTSP080822-190	Air	08/31/22 07:16	09/08/22 09:35
320-91804-13	GESPM080822-191	Air	08/31/22 07:38	09/08/22 09:35
320-91804-14	GESTSP080822-191	Air	08/31/22 07:38	09/08/22 09:35
320-91804-15	GESPM080822-192	Air	09/01/22 07:47	09/08/22 09:35
320-91804-16	GESTSP080822-192	Air	09/01/22 07:47	09/08/22 09:35
320-91804-17	GESPM080822-193	Air	09/01/22 07:18	09/08/22 09:35
320-91804-18	GESTSP080822-193	Air	09/01/22 07:18	09/08/22 09:35
320-91804-19	GESPM080822-194	Air	09/01/22 07:33	09/08/22 09:35
320-91804-20	GESTSP080822-194	Air	09/01/22 07:33	09/08/22 09:35
320-91804-21	GESPM080822-195	Air	09/01/22 14:17	09/08/22 09:35
320-91804-22	GESTSP080822-195	Air	09/01/22 14:17	09/08/22 09:35
320-91804-23	GESPM080822-196	Air	09/01/22 14:00	09/08/22 09:35
320-91804-24	GESTSP080822-196	Air	09/01/22 14:00	09/08/22 09:35
320-91804-25	GESPM080822-197	Air	09/01/22 14:10	09/08/22 09:35
320-91804-26	GESTSP080822-197	Air	09/01/22 14:10	09/08/22 09:35

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT090722AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-91804 Chain of Custody

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
1	GESPM080822-185	A	08/30/2022	0748	[redacted]	X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1636.24 (M3)
2	GESTSP080822-185	A	08/30/2022	0748			X		MSB01	N1	0.00	0.00	1	VOLUME: 1755.42 (M3)
3	GESPM080822-186	A	08/30/2022	0711		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1617.12 (M3)
4	GESTSP080822-186	A	08/30/2022	0711			X		MSB02	N1	0.00	0.00	1	VOLUME: 1761.22 (M3)
5	GESPM080822-187	A	08/30/2022	0734		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1582.23 (M3)
6	GESTSP080822-187	A	08/30/2022	0734			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1567.83 (M3)
7	GESPM080822-188	AQ	08/29/2022	0800		X		X	FIELDQC	FB1	0.00	0.00	1	
8	GESTSP080822-188	AQ	08/29/2022	0800			X		FIELDQC	FB1	0.00	0.00	1	
9	GESPM080822-189	A	08/31/2022	0751		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1648.08 (M3)
10	GESTSP080822-189	A	08/31/2022	0751			X		MSB01	N1	0.00	0.00	1	VOLUME: 1716.69 (M3)
11	GESPM080822-190	A	08/31/2022	0716		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1637.85 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9-7-22	1600	FEDEX	9-7-22	1600
			[redacted]	9-8-22	0935

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/7/2022/FEDEX 7778 3006 3580

Received by Laboratory: *(Signature, Date, Time)* **& condition**

21.4°C

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT090722AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
12	GESTSP080822-190	A	08/31/2022	0716	[redacted]		X		MSB02	N1	0.00	0.00	1	VOLUME: 1763.17 (M3)
13	GESPM080822-191	A	08/31/2022	0738		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1596.26 (M3)
14	GESTSP080822-191	A	08/31/2022	0738			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1590.28 (M3)
15	GESPM080822-192	A	09/01/2022	0747		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1655.98 (M3)
16	GESTSP080822-192	A	09/01/2022	0747			X		MSB01	N1	0.00	0.00	1	VOLUME: 1799.18 (M3)
17	GESPM080822-193	A	09/01/2022	0718		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1629.07 (M3)
18	GESTSP080822-193	A	09/01/2022	0718			X		MSB02	N1	0.00	0.00	1	VOLUME: 1765.21 (M3)
19	GESPM080822-194	A	09/01/2022	0733		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1588.04 (M3)
20	GESTSP080822-194	A	09/01/2022	0733			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1580.07 (M3)
21	GESPM080822-195	A	09/01/2022	1417		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 439.21 (M3)
22	GESTSP080822-195	A	09/01/2022	1417			X		MSB01	N1	0.00	0.00	1	VOLUME: 467.94 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9-7-22	1600	FEDEX	9-7-22	1600
			[redacted]	9-8-22	0935

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/7/2022/FEDEX 7778 3006 3580

Received by Laboratory: *(Signature, Date, Time)* **& condition**

21.4°C

GES.Navy_COC_Field
September 06, 2022

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT090722AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

						Analytical Test Method	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn										
	Event: Parcel B Air Monitoring						1	1	1										
	Sample ID	Matrix	Date	Time	Samp Init.										Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
23	GESPM080822-196	A	09/01/2022	1400	[redacted]		X		X						MSB02	N1	0.00	0.00	1	VOLUME: 450.62 (M3)
24	GESTSP080822-196	A	09/01/2022	1400				X							MSB02	N1	0.00	0.00	1	VOLUME: 483.17 (M3)
25	GESPM080822-197	A	09/01/2022	1410			X		X						MSB113A	N1	0.00	0.00	1	VOLUME: 431.76 (M3)
26	GESTSP080822-197	A	09/01/2022	1410				X							MSB113A	N1	0.00	0.00	1	VOLUME: 432.94 (M3)
27																				
28																				

N/A [redacted]

Turnaround Time: 5 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9-7-22	1600	FEDEX	9-7-22	1600
			[signature]	9-8-22	0935

Shipping Date / Carrier / Airbill Number
Shipping Date: 9/7/2022/FEDEX 7778 3006 3580

Received by Laboratory: *(Signature, Date, Time)* **& condition**
21.4°C

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-91804-1

Login Number: 91804
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-92080-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
9/27/2022 8:34:48 AM

[redacted], Project Manager I
(916)374-4414
[redacted]

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

LINKS

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-92080-1

Comments
No additional comments.

Receipt
The samples were received on 9/15/2022 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 18.5º C.

Metals
Method 40CFR50 App B: Sample GESTSP082222-201 (320-92080-8) was recorded with a negative net weight. The sample appeared to have no particulate loading and no damage to the filter could be observed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM080822-198 — Lab Sample ID: 320-92080-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0023		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0084		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	37		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP080822-198 — Lab Sample ID: 320-92080-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	40.7565		0.2807	0.2807	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-199 — Lab Sample ID: 320-92080-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0076		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	28		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-199 — Lab Sample ID: 320-92080-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	46.1509		0.2814	0.2814	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-200 — Lab Sample ID: 320-92080-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0019		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0068		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	35		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-200 — Lab Sample ID: 320-92080-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	45.3291		0.3143	0.3143	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-201 — Lab Sample ID: 320-92080-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00022	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP082222-201 — Lab Sample ID: 320-92080-8

No Detections.

Client Sample ID: GESPM082222-202 — Lab Sample ID: 320-92080-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0014		0.00071	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0039		0.00071	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	28		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-202 — Lab Sample ID: 320-92080-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	32.3442		0.2741	0.2741	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM082222-203 — Lab Sample ID: 320-92080-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0013		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0043		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	25		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-203 — Lab Sample ID: 320-92080-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	36.1982		0.2767	0.2767	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-204 — Lab Sample ID: 320-92080-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0012		0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0033		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	21		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-204 — Lab Sample ID: 320-92080-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	38.8997		0.3092	0.3092	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-205 — Lab Sample ID: 320-92080-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0031		0.0028	0.00041	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.021		0.0028	0.00039	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	42		1.1	1.1	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-205 — Lab Sample ID: 320-92080-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	65.6412		0.9797	0.9797	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-206 — Lab Sample ID: 320-92080-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0035		0.0023	0.00035	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0074		0.0023	0.00033	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	26		0.98	0.98	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-206 — Lab Sample ID: 320-92080-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	37.3855		0.9030	0.9030	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-207 — Lab Sample ID: 320-92080-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0046		0.0024	0.00037	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.012		0.0024	0.00034	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	39		1.0	1.0	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Client Sample ID: GESTSP082222-207

Lab Sample ID: 320-92080-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	51.8866		1.0377	1.0377	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GESPM080822-198
Lab Sample ID: 320-92080-1
Date Collected: 09/07/22 07:29
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0023		0.00073	0.00011	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:04	1
Manganese	0.0084		0.00073	0.00010	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:04	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	37		0.30	0.30	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP080822-198
Lab Sample ID: 320-92080-2
Date Collected: 09/07/22 07:29
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	40.7565		0.2807	0.2807	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-199
Lab Sample ID: 320-92080-3
Date Collected: 09/07/22 06:58
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00074	0.00011	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:14	1
Manganese	0.0076		0.00074	0.00010	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:14	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	28		0.31	0.31	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-199
Lab Sample ID: 320-92080-4
Date Collected: 09/07/22 06:58
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	46.1509		0.2814	0.2814	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-200
Lab Sample ID: 320-92080-5
Date Collected: 09/07/22 07:13
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0019		0.00074	0.00011	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:17	1
Manganese	0.0068		0.00074	0.00010	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:17	1

Client Sample ID: GESPM082222-200
Lab Sample ID: 320-92080-5

Date Collected: 09/07/22 07:13
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**35**		0.31	0.31	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-200
Lab Sample ID: 320-92080-6

Date Collected: 09/07/22 07:13
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	**45.3291**		0.3143	0.3143	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-201
Lab Sample ID: 320-92080-7

Date Collected: 09/06/22 08:00
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:20	1
Manganese	**0.00022**	**J**	0.0012	0.00017	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:20	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-201
Lab Sample ID: 320-92080-8

Date Collected: 09/06/22 08:00
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-202
Lab Sample ID: 320-92080-9

Date Collected: 09/08/22 07:50
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.0014**		0.00071	0.00011	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:30	1
Manganese	**0.0039**		0.00071	0.00010	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**28**		0.30	0.30	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-202
Lab Sample ID: 320-92080-10

Date Collected: 09/08/22 07:50
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	32.3442		0.2741	0.2741	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-203
Lab Sample ID: 320-92080-11

Date Collected: 09/08/22 07:20
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0013		0.00072	0.00011	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:33	1
Manganese	0.0043		0.00072	0.00010	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:33	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	25		0.30	0.30	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-203
Lab Sample ID: 320-92080-12

Date Collected: 09/08/22 07:20
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	36.1982		0.2767	0.2767	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-204
Lab Sample ID: 320-92080-13

Date Collected: 09/08/22 07:35
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0012		0.00072	0.00011	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:36	1
Manganese	0.0033		0.00072	0.00010	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:36	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	21		0.30	0.30	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-204
Lab Sample ID: 320-92080-14

Date Collected: 09/08/22 07:35
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	38.8997		0.3092	0.3092	ug/m3 (Air)			09/19/22 13:30	1

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM082222-205
Lab Sample ID: 320-92080-15
Date Collected: 09/08/22 14:52
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0031		0.0028	0.00041	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:40	1
Manganese	0.021		0.0028	0.00039	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:40	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	42		1.1	1.1	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-205
Lab Sample ID: 320-92080-16
Date Collected: 09/08/22 14:52
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	65.6412		0.9797	0.9797	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-206
Lab Sample ID: 320-92080-17
Date Collected: 09/08/22 14:56
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0035		0.0023	0.00035	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:43	1
Manganese	0.0074		0.0023	0.00033	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:43	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	26		0.98	0.98	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-206
Lab Sample ID: 320-92080-18
Date Collected: 09/08/22 14:56
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	37.3855		0.9030	0.9030	ug/m3 (Air)			09/19/22 13:30	1

Client Sample ID: GESPM082222-207
Lab Sample ID: 320-92080-19
Date Collected: 09/08/22 14:57
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0046		0.0024	0.00037	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:46	1
Manganese	0.012		0.0024	0.00034	ug/m3 (Air)		09/22/22 05:25	09/22/22 14:46	1

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM082222-207
Lab Sample ID: 320-92080-19

Date Collected: 09/08/22 14:57
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	39		1.0	1.0	ug/m3			09/19/22 13:30	1

Client Sample ID: GESTSP082222-207
Lab Sample ID: 320-92080-20

Date Collected: 09/08/22 14:57
Matrix: Air
Date Received: 09/15/22 09:25
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	51.8866		1.0377	1.0377	ug/m3 (Air)			09/19/22 13:30	1

QC Sample Results

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-618866/1-B
Matrix: Air
Analysis Batch: 619292

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 618876

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/22/22 05:25	09/22/22 13:55	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		09/22/22 05:25	09/22/22 13:55	1

Lab Sample ID: LCS 320-618866/2-B
Matrix: Air
Analysis Batch: 619292

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 618876

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead			0.240	0.256		ug/m3 (Air)		107	86 - 111		
Manganese			0.240	0.248		ug/m3 (Air)		103	88 - 110		

Lab Sample ID: LCSD 320-618866/3-B
Matrix: Air
Analysis Batch: 619292

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 618876

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead			0.240	0.258		ug/m3 (Air)		108	86 - 111	1	15
Manganese			0.240	0.256		ug/m3 (Air)		106	88 - 110	3	15

Metals

Pre Prep Batch: 618866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-1	GESPM080822-198	Total/NA	Air	Filter to Air	
320-92080-3	GESPM082222-199	Total/NA	Air	Filter to Air	
320-92080-5	GESPM082222-200	Total/NA	Air	Filter to Air	
320-92080-7	GESPM082222-201	Total/NA	Air	Filter to Air	
320-92080-9	GESPM082222-202	Total/NA	Air	Filter to Air	
320-92080-11	GESPM082222-203	Total/NA	Air	Filter to Air	
320-92080-13	GESPM082222-204	Total/NA	Air	Filter to Air	
320-92080-15	GESPM082222-205	Total/NA	Air	Filter to Air	
320-92080-17	GESPM082222-206	Total/NA	Air	Filter to Air	
320-92080-19	GESPM082222-207	Total/NA	Air	Filter to Air	
MB 320-618866/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-618866/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-618866/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 618876

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-1	GESPM080822-198	Total/NA	Air	3050B	618866
320-92080-3	GESPM082222-199	Total/NA	Air	3050B	618866
320-92080-5	GESPM082222-200	Total/NA	Air	3050B	618866
320-92080-7	GESPM082222-201	Total/NA	Air	3050B	618866
320-92080-9	GESPM082222-202	Total/NA	Air	3050B	618866
320-92080-11	GESPM082222-203	Total/NA	Air	3050B	618866
320-92080-13	GESPM082222-204	Total/NA	Air	3050B	618866
320-92080-15	GESPM082222-205	Total/NA	Air	3050B	618866
320-92080-17	GESPM082222-206	Total/NA	Air	3050B	618866
320-92080-19	GESPM082222-207	Total/NA	Air	3050B	618866
MB 320-618866/1-B	Method Blank	Total/NA	Air	3050B	618866
LCS 320-618866/2-B	Lab Control Sample	Total/NA	Air	3050B	618866
LCSD 320-618866/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	618866

Analysis Batch: 619292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-1	GESPM080822-198	Total/NA	Air	6020	618876
320-92080-3	GESPM082222-199	Total/NA	Air	6020	618876
320-92080-5	GESPM082222-200	Total/NA	Air	6020	618876
320-92080-7	GESPM082222-201	Total/NA	Air	6020	618876
320-92080-9	GESPM082222-202	Total/NA	Air	6020	618876
320-92080-11	GESPM082222-203	Total/NA	Air	6020	618876
320-92080-13	GESPM082222-204	Total/NA	Air	6020	618876
320-92080-15	GESPM082222-205	Total/NA	Air	6020	618876
320-92080-17	GESPM082222-206	Total/NA	Air	6020	618876
320-92080-19	GESPM082222-207	Total/NA	Air	6020	618876
MB 320-618866/1-B	Method Blank	Total/NA	Air	6020	618876
LCS 320-618866/2-B	Lab Control Sample	Total/NA	Air	6020	618876
LCSD 320-618866/3-B	Lab Control Sample Dup	Total/NA	Air	6020	618876

General Chemistry

Pre Prep Batch: 619388

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-2	GESTSP080822-198	Total/NA	Air	Filter to Air	

General Chemistry (Continued)

Pre Prep Batch: 619388 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-4	GESTSP082222-199	Total/NA	Air	Filter to Air	
320-92080-6	GESTSP082222-200	Total/NA	Air	Filter to Air	
320-92080-8	GESTSP082222-201	Total/NA	Air	Filter to Air	
320-92080-10	GESTSP082222-202	Total/NA	Air	Filter to Air	
320-92080-12	GESTSP082222-203	Total/NA	Air	Filter to Air	
320-92080-14	GESTSP082222-204	Total/NA	Air	Filter to Air	
320-92080-16	GESTSP082222-205	Total/NA	Air	Filter to Air	
320-92080-18	GESTSP082222-206	Total/NA	Air	Filter to Air	
320-92080-20	GESTSP082222-207	Total/NA	Air	Filter to Air	

Analysis Batch: 619608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-1	GESPM080822-198	Total/NA	Air	PM10	
320-92080-3	GESPM082222-199	Total/NA	Air	PM10	
320-92080-5	GESPM082222-200	Total/NA	Air	PM10	
320-92080-7	GESPM082222-201	Total/NA	Air	PM10	
320-92080-9	GESPM082222-202	Total/NA	Air	PM10	
320-92080-11	GESPM082222-203	Total/NA	Air	PM10	
320-92080-13	GESPM082222-204	Total/NA	Air	PM10	
320-92080-15	GESPM082222-205	Total/NA	Air	PM10	
320-92080-17	GESPM082222-206	Total/NA	Air	PM10	
320-92080-19	GESPM082222-207	Total/NA	Air	PM10	

Analysis Batch: 619634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92080-2	GESTSP080822-198	Total/NA	Air	40CFR50 App B	619388
320-92080-4	GESTSP082222-199	Total/NA	Air	40CFR50 App B	619388
320-92080-6	GESTSP082222-200	Total/NA	Air	40CFR50 App B	619388
320-92080-8	GESTSP082222-201	Total/NA	Air	40CFR50 App B	619388
320-92080-10	GESTSP082222-202	Total/NA	Air	40CFR50 App B	619388
320-92080-12	GESTSP082222-203	Total/NA	Air	40CFR50 App B	619388
320-92080-14	GESTSP082222-204	Total/NA	Air	40CFR50 App B	619388
320-92080-16	GESTSP082222-205	Total/NA	Air	40CFR50 App B	619388
320-92080-18	GESTSP082222-206	Total/NA	Air	40CFR50 App B	619388
320-92080-20	GESTSP082222-207	Total/NA	Air	40CFR50 App B	619388

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Client Sample ID: GESPM080822-198
Lab Sample ID: 320-92080-1
Date Collected: 09/07/22 07:29
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:04	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0614 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP080822-198
Lab Sample ID: 320-92080-2
Date Collected: 09/07/22 07:29
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-199
Lab Sample ID: 320-92080-3
Date Collected: 09/07/22 06:58
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:14	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0463 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-199
Lab Sample ID: 320-92080-4
Date Collected: 09/07/22 06:58
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-200
Lab Sample ID: 320-92080-5
Date Collected: 09/07/22 07:13
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:17	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0566 g	619608	09/19/22 13:30	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Client Sample ID: GESTSP082222-200
Lab Sample ID: 320-92080-6
Date Collected: 09/07/22 07:13
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-201
Lab Sample ID: 320-92080-7
Date Collected: 09/06/22 08:00
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:20	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0000 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-201
Lab Sample ID: 320-92080-8
Date Collected: 09/06/22 08:00
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-202
Lab Sample ID: 320-92080-9
Date Collected: 09/08/22 07:50
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:30	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0464 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-202
Lab Sample ID: 320-92080-10
Date Collected: 09/08/22 07:50
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Client Sample ID: GESPM082222-203
Lab Sample ID: 320-92080-11
Date Collected: 09/08/22 07:20
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:33	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0409 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-203
Lab Sample ID: 320-92080-12
Date Collected: 09/08/22 07:20
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-204
Lab Sample ID: 320-92080-13
Date Collected: 09/08/22 07:35
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:36	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0357 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-204
Lab Sample ID: 320-92080-14
Date Collected: 09/08/22 07:35
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-205
Lab Sample ID: 320-92080-15
Date Collected: 09/08/22 14:52
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:40	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0185 g	619608	09/19/22 13:30	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92080-1

Client Sample ID: GESTSP082222-205
Lab Sample ID: 320-92080-16
Date Collected: 09/08/22 14:52
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-206
Lab Sample ID: 320-92080-17
Date Collected: 09/08/22 14:56
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.083333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:43	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0132 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-206
Lab Sample ID: 320-92080-18
Date Collected: 09/08/22 14:56
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Client Sample ID: GESPM082222-207
Lab Sample ID: 320-92080-19
Date Collected: 09/08/22 14:57
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					618866	09/22/22 03:45	[redacted]	EET SAC
Total/NA	Prep	3050B			0.083333 Sample	100 mL	618876	09/22/22 05:25	[redacted]	EET SAC
Total/NA	Analysis	6020		1			619292	09/22/22 14:46	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0194 g	619608	09/19/22 13:30	[redacted]	EET SAC

Client Sample ID: GESTSP082222-207
Lab Sample ID: 320-92080-20
Date Collected: 09/08/22 14:57
Matrix: Air
Date Received: 09/15/22 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			619634	09/19/22 13:30	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					619388	09/23/22 13:17	[redacted]	EET SAC

Laboratory References:
EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Job ID: 320-92080-1
Project/Site: Hunters Point, Parcel B, Phase 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-92080-1	GESPM080822-198	Air	09/07/22 07:29	09/15/22 09:25
320-92080-2	GESTSP080822-198	Air	09/07/22 07:29	09/15/22 09:25
320-92080-3	GESPM082222-199	Air	09/07/22 06:58	09/15/22 09:25
320-92080-4	GESTSP082222-199	Air	09/07/22 06:58	09/15/22 09:25
320-92080-5	GESPM082222-200	Air	09/07/22 07:13	09/15/22 09:25
320-92080-6	GESTSP082222-200	Air	09/07/22 07:13	09/15/22 09:25
320-92080-7	GESPM082222-201	Air	09/06/22 08:00	09/15/22 09:25
320-92080-8	GESTSP082222-201	Air	09/06/22 08:00	09/15/22 09:25
320-92080-9	GESPM082222-202	Air	09/08/22 07:50	09/15/22 09:25
320-92080-10	GESTSP082222-202	Air	09/08/22 07:50	09/15/22 09:25
320-92080-11	GESPM082222-203	Air	09/08/22 07:20	09/15/22 09:25
320-92080-12	GESTSP082222-203	Air	09/08/22 07:20	09/15/22 09:25
320-92080-13	GESPM082222-204	Air	09/08/22 07:35	09/15/22 09:25
320-92080-14	GESTSP082222-204	Air	09/08/22 07:35	09/15/22 09:25
320-92080-15	GESPM082222-205	Air	09/08/22 14:52	09/15/22 09:25
320-92080-16	GESTSP082222-205	Air	09/08/22 14:52	09/15/22 09:25
320-92080-17	GESPM082222-206	Air	09/08/22 14:56	09/15/22 09:25
320-92080-18	GESTSP082222-206	Air	09/08/22 14:56	09/15/22 09:25
320-92080-19	GESPM082222-207	Air	09/08/22 14:57	09/15/22 09:25
320-92080-20	GESTSP082222-207	Air	09/08/22 14:57	09/15/22 09:25

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT091422AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-92080 Chain of Custody

						Analytical Test Method																				
						CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn																		
	Event: Parcel B Air Monitoring					1	1	1																		
	Sample ID	Matrix	Date	Time	Samp Init.																					
1	GESPM080822-198	A	09/07/2022	0729	[redacted]	X		X																		
2	GESTSP080822-198	A	09/07/2022	0729			X																			
3	GESPM082222-199	A	09/07/2022	0658		X		X																		
4	GESTSP082222-199	A	09/07/2022	0658			X																			
5	GESPM082222-200	A	09/07/2022	0713		X		X																		
6	GESTSP082222-200	A	09/07/2022	0713			X																			
7	GESPM082222-201	AQ	09/06/2022	0800		X		X																		
8	GESTSP082222-201	AQ	09/06/2022	0800			X																			
9	GESPM082222-202	A	09/08/2022	0750		X		X																		
10	GESTSP082222-202	A	09/08/2022	0750			X																			
11	GESPM082222-203	A	09/08/2022	0720		X		X																		

	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	MSB01	N1	0.00	0.00	1	VOLUME: 1649.77 (M3)
2	MSB01	N1	0.00	0.00	1	VOLUME: 1781.31 (M3)
3	MSB02	N1	0.00	0.00	1	VOLUME: 1630.41 (M3)
4	MSB02	N1	0.00	0.00	1	VOLUME: 1776.78 (M3)
5	MSB113A	N1	0.00	0.00	1	VOLUME: 1611.43 (M3)
6	MSB113A	N1	0.00	0.00	1	VOLUME: 1590.59 (M3)
7	FIELDQC	FB1	0.00	0.00	1	
8	FIELDQC	FB1	0.00	0.00	1	
9	MSB01	N1	0.00	0.00	1	VOLUME: 1685.89 (M3)
10	MSB01	N1	0.00	0.00	1	VOLUME: 1824.13 (M3)
11	MSB02	N1	0.00	0.00	1	VOLUME: 1668.92 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9/14/22	1430	Fedex	9/14/22	1430
			[redacted]	9.15.22	0925

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/14/2022/ FEDEX 7778 7092 7444

Received by Laboratory: *(Signature, Date, Time)* **& condition**

18.5°C

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT091422AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Event: Parcel B Air Monitoring					1	1	1						
12	GESTSP082222-203	A	09/08/2022	0720	[redacted]		X		MSB02	N1	0.00	0.00	1	VOLUME: 1806.72 (M3)
13	GESPM082222-204	A	09/08/2022	0735		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1661.41 (M3)
14	GESTSP082222-204	A	09/08/2022	0735			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1616.98 (M3)
15	GESPM082222-205	A	09/08/2022	1452		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 435.50 (M3)
16	GESTSP082222-205	A	09/08/2022	1452			X		MSB01	N1	0.00	0.00	1	VOLUME: 510.35 (M3)
17	GESPM082222-206	A	09/08/2022	1456		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 512.06 (M3)
18	GESTSP082222-206	A	09/08/2022	1456			X		MSB02	N1	0.00	0.00	1	VOLUME: 553.69 (M3)
19	GESPM082222-207	A	09/08/2022	1457		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 491.77 (M3)
20	GESTSP082222-207	A	09/08/2022	1457			X		MSB113A	N1	0.00	0.00	1	VOLUME: 481.82 (M3)
21														
22														

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9/14/22	1430	FedEx	9/14/22	1430
			[redacted]	9-15-22	0905

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/14/2022/ FEDEX 7778 7092 7444

Received by Laboratory: *(Signature, Date, Time)* **& condition**

18.5°C

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-92080-1

Login Number: 92080
List Number: 1
Creator: [redacted]

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-92271-1
Client Project/Site: Hunters Point, Parcel B, Phase 2

For:
GES-AIS, LLC
1501 W Fountainhead Parkway
Ste 550
Tempe, Arizona 85282

Attn: [redacted]

Authorized for release by:
9/29/2022 2:51:03 PM

[redacted], Project Manager I
(916)374-4414
[redacted]

LINKS

Review your project results through my EOL

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: GES-AIS, LLC
Job ID: 320-92271-1
Project/Site: Hunters Point, Parcel B, Phase 2

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 320-92271-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative
320-92271-1

Comments
No additional comments.

Receipt
The samples were received on 9/21/2022 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 20.0º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-92271-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESPM082222-208 — Lab Sample ID: 320-92271-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00091		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026		0.00076	0.00011	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	24		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-208 — Lab Sample ID: 320-92271-2

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	32.6602		0.2880	0.2880	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-209 — Lab Sample ID: 320-92271-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00081		0.00074	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0068		0.00074	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	23		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-209 — Lab Sample ID: 320-92271-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	64.5251		0.2891	0.2891	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-210 — Lab Sample ID: 320-92271-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0010		0.00075	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0038		0.00075	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	27		0.31	0.31	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-210 — Lab Sample ID: 320-92271-6

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	38.5093		0.3204	0.3204	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-211 — Lab Sample ID: 320-92271-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.00029	J	0.0012	0.00017	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP082222-211 — Lab Sample ID: 320-92271-8

No Detections.

Client Sample ID: GESPM082222-212 — Lab Sample ID: 320-92271-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00059	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0016		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.4		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-212 — Lab Sample ID: 320-92271-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.4894		0.2824	0.2824	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESPM082222-213 — Lab Sample ID: 320-92271-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00043	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0024		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	8.5		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-213 — Lab Sample ID: 320-92271-12

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	20.8634		0.2804	0.2804	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-214 — Lab Sample ID: 320-92271-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00075		0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	9.6		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-214 — Lab Sample ID: 320-92271-14

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.8665		0.3112	0.3112	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-215 — Lab Sample ID: 320-92271-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00042	J	0.00072	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00072	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	10		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-215 — Lab Sample ID: 320-92271-16

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.1628		0.2826	0.2826	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM082222-216 — Lab Sample ID: 320-92271-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00054	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	7.9		0.30	0.30	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP082222-216 — Lab Sample ID: 320-92271-18

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	19.5706		0.2820	0.2820	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM090622-235 — Lab Sample ID: 320-92271-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00056	J	0.00073	0.00011	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0026		0.00073	0.00010	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	14		0.30	0.30	ug/m3	1		PM10	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GES-AIS, LLC
Job ID: 320-92271-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP090622-235 — Lab Sample ID: 320-92271-20

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	16.7464		0.3113	0.3113	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM090622-236 — Lab Sample ID: 320-92271-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.00072	J	0.0026	0.00038	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0046		0.0026	0.00036	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	4.5		1.1	1.1	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP090622-236 — Lab Sample ID: 320-92271-22

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	19.0476		1.0132	1.0132	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM090622-237 — Lab Sample ID: 320-92271-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0011	J	0.0024	0.00036	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0056		0.0024	0.00034	ug/m3 (Air)	1		6020	Total/NA
Particulate Matter as PM 10	3.6		1.0	1.0	ug/m3	1		PM10	Total/NA

Client Sample ID: GESTSP090622-237 — Lab Sample ID: 320-92271-24

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	23.0333		0.9363	0.9363	ug/m3 (Air)	1		40CFR50 App B	Total/NA

Client Sample ID: GESPM090622-238 — Lab Sample ID: 320-92271-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.0016	J	0.0025	0.00038	ug/m3 (Air)	1		6020	Total/NA
Manganese	0.0062		0.0025	0.00036	ug/m3 (Air)	1		6020	Total/NA

Client Sample ID: GESTSP090622-238 — Lab Sample ID: 320-92271-26

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Particulates	22.5078		1.0926	1.0926	ug/m3 (Air)	1		40CFR50 App B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GESPM082222-208
Lab Sample ID: 320-92271-1
Date Collected: 09/13/22 07:30
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00091		0.00076	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:33	1
Manganese	0.0026		0.00076	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:33	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	24		0.31	0.31	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-208
Lab Sample ID: 320-92271-2
Date Collected: 09/13/22 07:30
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	32.6602		0.2880	0.2880	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-209
Lab Sample ID: 320-92271-3
Date Collected: 09/13/22 07:00
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00081		0.00074	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:42	1
Manganese	0.0068		0.00074	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:42	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	23		0.31	0.31	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-209
Lab Sample ID: 320-92271-4
Date Collected: 09/13/22 07:00
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	64.5251		0.2891	0.2891	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-210
Lab Sample ID: 320-92271-5
Date Collected: 09/13/22 07:15
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0010		0.00075	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:45	1
Manganese	0.0038		0.00075	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:45	1

Client Sample ID: GESPM082222-210
Lab Sample ID: 320-92271-5
Date Collected: 09/13/22 07:15
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**27**		0.31	0.31	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-210
Lab Sample ID: 320-92271-6
Date Collected: 09/13/22 07:15
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	**38.5093**		0.3204	0.3204	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-211
Lab Sample ID: 320-92271-7
Date Collected: 09/12/22 08:00
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:49	1
Manganese	**0.00029**	**J**	0.0012	0.00017	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:49	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		0.50	0.50	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-211
Lab Sample ID: 320-92271-8
Date Collected: 09/12/22 08:00
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	ND		0.5000	0.5000	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-212
Lab Sample ID: 320-92271-9
Date Collected: 09/14/22 07:47
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**0.00059**	**J**	0.00072	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:52	1
Manganese	**0.0016**		0.00072	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:52	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	**9.4**		0.30	0.30	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-212
Lab Sample ID: 320-92271-10
Date Collected: 09/14/22 07:47
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.4894		0.2824	0.2824	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-213
Lab Sample ID: 320-92271-11
Date Collected: 09/14/22 07:15
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00043	J	0.00073	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:55	1
Manganese	0.0024		0.00073	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:55	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	8.5		0.30	0.30	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-213
Lab Sample ID: 320-92271-12
Date Collected: 09/14/22 07:15
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	20.8634		0.2804	0.2804	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-214
Lab Sample ID: 320-92271-13
Date Collected: 09/14/22 07:34
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00075		0.00073	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:59	1
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:59	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	9.6		0.30	0.30	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-214
Lab Sample ID: 320-92271-14
Date Collected: 09/14/22 07:34
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.8665		0.3112	0.3112	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-215
Lab Sample ID: 320-92271-15
Date Collected: 09/15/22 08:00
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00042	J	0.00072	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:02	1
Manganese	0.0022		0.00072	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:02	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	10		0.30	0.30	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-215
Lab Sample ID: 320-92271-16
Date Collected: 09/15/22 08:00
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.1628		0.2826	0.2826	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM082222-216
Lab Sample ID: 320-92271-17
Date Collected: 09/15/22 07:32
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00054	J	0.00073	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:05	1
Manganese	0.0022		0.00073	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:05	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	7.9		0.30	0.30	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP082222-216
Lab Sample ID: 320-92271-18
Date Collected: 09/15/22 07:32
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	19.5706		0.2820	0.2820	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM090622-235
Lab Sample ID: 320-92271-19
Date Collected: 09/15/22 07:46
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00056	J	0.00073	0.00011	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:09	1
Manganese	0.0026		0.00073	0.00010	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:09	1

Client Sample ID: GESPM090622-235
Lab Sample ID: 320-92271-19

Date Collected: 09/15/22 07:46
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	14		0.30	0.30	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP090622-235
Lab Sample ID: 320-92271-20

Date Collected: 09/15/22 07:46
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	16.7464		0.3113	0.3113	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM090622-236
Lab Sample ID: 320-92271-21

Date Collected: 09/15/22 14:50
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.00072	J	0.0026	0.00038	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:12	1
Manganese	0.0046		0.0026	0.00036	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:12	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	4.5		1.1	1.1	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP090622-236
Lab Sample ID: 320-92271-22

Date Collected: 09/15/22 14:50
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	19.0476		1.0132	1.0132	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM090622-237
Lab Sample ID: 320-92271-23

Date Collected: 09/15/22 14:55
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0011	J	0.0024	0.00036	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:22	1
Manganese	0.0056		0.0024	0.00034	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:22	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	3.6		1.0	1.0	ug/m3			09/22/22 14:45	1

Client: GES-AIS, LLC
Job ID: 320-92271-1
Project/Site: Hunters Point, Parcel B, Phase 2

Client Sample ID: GESTSP090622-237
Lab Sample ID: 320-92271-24
Date Collected: 09/15/22 14:55
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	23.0333		0.9363	0.9363	ug/m3 (Air)			09/22/22 14:45	1

Client Sample ID: GESPM090622-238
Lab Sample ID: 320-92271-25
Date Collected: 09/15/22 14:42
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0016	J	0.0025	0.00038	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:25	1
Manganese	0.0062		0.0025	0.00036	ug/m3 (Air)		09/28/22 04:30	09/28/22 22:25	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Particulate Matter as PM 10	ND		1.1	1.1	ug/m3			09/22/22 14:45	1

Client Sample ID: GESTSP090622-238
Lab Sample ID: 320-92271-26
Date Collected: 09/15/22 14:42
Matrix: Air
Date Received: 09/21/22 09:35
Sample Container: Folder/Filter

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Particulates	22.5078		1.0926	1.0926	ug/m3 (Air)			09/22/22 14:45	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 320-620635/1-B
Matrix: Air
Analysis Batch: 621022

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 620640

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0012	0.00018	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:04	1
Manganese	ND		0.0012	0.00017	ug/m3 (Air)		09/28/22 04:30	09/28/22 21:04	1

Lab Sample ID: LCS 320-620635/2-B
Matrix: Air
Analysis Batch: 621022

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 620640

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead			0.240	0.251		ug/m3 (Air)		105	86 - 111		
Manganese			0.240	0.244		ug/m3 (Air)		102	88 - 110		

Lab Sample ID: LCSD 320-620635/3-B
Matrix: Air
Analysis Batch: 621022

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 620640

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead			0.240	0.248		ug/m3 (Air)		103	86 - 111	1	15
Manganese			0.240	0.239		ug/m3 (Air)		100	88 - 110	2	15

Metals

Pre Prep Batch: 620635

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-1	GESPM082222-208	Total/NA	Air	Filter to Air	
320-92271-3	GESPM082222-209	Total/NA	Air	Filter to Air	
320-92271-5	GESPM082222-210	Total/NA	Air	Filter to Air	
320-92271-7	GESPM082222-211	Total/NA	Air	Filter to Air	
320-92271-9	GESPM082222-212	Total/NA	Air	Filter to Air	
320-92271-11	GESPM082222-213	Total/NA	Air	Filter to Air	
320-92271-13	GESPM082222-214	Total/NA	Air	Filter to Air	
320-92271-15	GESPM082222-215	Total/NA	Air	Filter to Air	
320-92271-17	GESPM082222-216	Total/NA	Air	Filter to Air	
320-92271-19	GESPM090622-235	Total/NA	Air	Filter to Air	
320-92271-21	GESPM090622-236	Total/NA	Air	Filter to Air	
320-92271-23	GESPM090622-237	Total/NA	Air	Filter to Air	
320-92271-25	GESPM090622-238	Total/NA	Air	Filter to Air	
MB 320-620635/1-B	Method Blank	Total/NA	Air	Filter to Air	
LCS 320-620635/2-B	Lab Control Sample	Total/NA	Air	Filter to Air	
LCSD 320-620635/3-B	Lab Control Sample Dup	Total/NA	Air	Filter to Air	

Prep Batch: 620640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-1	GESPM082222-208	Total/NA	Air	3050B	620635
320-92271-3	GESPM082222-209	Total/NA	Air	3050B	620635
320-92271-5	GESPM082222-210	Total/NA	Air	3050B	620635
320-92271-7	GESPM082222-211	Total/NA	Air	3050B	620635
320-92271-9	GESPM082222-212	Total/NA	Air	3050B	620635
320-92271-11	GESPM082222-213	Total/NA	Air	3050B	620635
320-92271-13	GESPM082222-214	Total/NA	Air	3050B	620635
320-92271-15	GESPM082222-215	Total/NA	Air	3050B	620635
320-92271-17	GESPM082222-216	Total/NA	Air	3050B	620635
320-92271-19	GESPM090622-235	Total/NA	Air	3050B	620635
320-92271-21	GESPM090622-236	Total/NA	Air	3050B	620635
320-92271-23	GESPM090622-237	Total/NA	Air	3050B	620635
320-92271-25	GESPM090622-238	Total/NA	Air	3050B	620635
MB 320-620635/1-B	Method Blank	Total/NA	Air	3050B	620635
LCS 320-620635/2-B	Lab Control Sample	Total/NA	Air	3050B	620635
LCSD 320-620635/3-B	Lab Control Sample Dup	Total/NA	Air	3050B	620635

Analysis Batch: 621022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-1	GESPM082222-208	Total/NA	Air	6020	620640
320-92271-3	GESPM082222-209	Total/NA	Air	6020	620640
320-92271-5	GESPM082222-210	Total/NA	Air	6020	620640
320-92271-7	GESPM082222-211	Total/NA	Air	6020	620640
320-92271-9	GESPM082222-212	Total/NA	Air	6020	620640
320-92271-11	GESPM082222-213	Total/NA	Air	6020	620640
320-92271-13	GESPM082222-214	Total/NA	Air	6020	620640
320-92271-15	GESPM082222-215	Total/NA	Air	6020	620640
320-92271-17	GESPM082222-216	Total/NA	Air	6020	620640
320-92271-19	GESPM090622-235	Total/NA	Air	6020	620640
320-92271-21	GESPM090622-236	Total/NA	Air	6020	620640
320-92271-23	GESPM090622-237	Total/NA	Air	6020	620640
320-92271-25	GESPM090622-238	Total/NA	Air	6020	620640

Metals (Continued)

Analysis Batch: 621022 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-620635/1-B	Method Blank	Total/NA	Air	6020	620640
LCS 320-620635/2-B	Lab Control Sample	Total/NA	Air	6020	620640
LCSD 320-620635/3-B	Lab Control Sample Dup	Total/NA	Air	6020	620640

General Chemistry

Pre Prep Batch: 620653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-2	GESTSP082222-208	Total/NA	Air	Filter to Air	
320-92271-4	GESTSP082222-209	Total/NA	Air	Filter to Air	
320-92271-6	GESTSP082222-210	Total/NA	Air	Filter to Air	
320-92271-8	GESTSP082222-211	Total/NA	Air	Filter to Air	
320-92271-10	GESTSP082222-212	Total/NA	Air	Filter to Air	
320-92271-12	GESTSP082222-213	Total/NA	Air	Filter to Air	
320-92271-14	GESTSP082222-214	Total/NA	Air	Filter to Air	
320-92271-16	GESTSP082222-215	Total/NA	Air	Filter to Air	
320-92271-18	GESTSP082222-216	Total/NA	Air	Filter to Air	
320-92271-20	GESTSP090622-235	Total/NA	Air	Filter to Air	
320-92271-22	GESTSP090622-236	Total/NA	Air	Filter to Air	
320-92271-24	GESTSP090622-237	Total/NA	Air	Filter to Air	
320-92271-26	GESTSP090622-238	Total/NA	Air	Filter to Air	

Analysis Batch: 620878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-1	GESPM082222-208	Total/NA	Air	PM10	
320-92271-3	GESPM082222-209	Total/NA	Air	PM10	
320-92271-5	GESPM082222-210	Total/NA	Air	PM10	
320-92271-7	GESPM082222-211	Total/NA	Air	PM10	
320-92271-9	GESPM082222-212	Total/NA	Air	PM10	
320-92271-11	GESPM082222-213	Total/NA	Air	PM10	
320-92271-13	GESPM082222-214	Total/NA	Air	PM10	
320-92271-15	GESPM082222-215	Total/NA	Air	PM10	
320-92271-17	GESPM082222-216	Total/NA	Air	PM10	
320-92271-19	GESPM090622-235	Total/NA	Air	PM10	
320-92271-21	GESPM090622-236	Total/NA	Air	PM10	
320-92271-23	GESPM090622-237	Total/NA	Air	PM10	
320-92271-25	GESPM090622-238	Total/NA	Air	PM10	

Analysis Batch: 620905

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-2	GESTSP082222-208	Total/NA	Air	40CFR50 App B	620653
320-92271-4	GESTSP082222-209	Total/NA	Air	40CFR50 App B	620653
320-92271-6	GESTSP082222-210	Total/NA	Air	40CFR50 App B	620653
320-92271-8	GESTSP082222-211	Total/NA	Air	40CFR50 App B	620653
320-92271-10	GESTSP082222-212	Total/NA	Air	40CFR50 App B	620653
320-92271-12	GESTSP082222-213	Total/NA	Air	40CFR50 App B	620653
320-92271-14	GESTSP082222-214	Total/NA	Air	40CFR50 App B	620653
320-92271-16	GESTSP082222-215	Total/NA	Air	40CFR50 App B	620653
320-92271-18	GESTSP082222-216	Total/NA	Air	40CFR50 App B	620653
320-92271-20	GESTSP090622-235	Total/NA	Air	40CFR50 App B	620653
320-92271-22	GESTSP090622-236	Total/NA	Air	40CFR50 App B	620653

General Chemistry (Continued)

Analysis Batch: 620905 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92271-24	GESTSP090622-237	Total/NA	Air	40CFR50 App B	620653
320-92271-26	GESTSP090622-238	Total/NA	Air	40CFR50 App B	620653

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESPM082222-208
Lab Sample ID: 320-92271-1
Date Collected: 09/13/22 07:30
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:33	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0374 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-208
Lab Sample ID: 320-92271-2
Date Collected: 09/13/22 07:30
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-209
Lab Sample ID: 320-92271-3
Date Collected: 09/13/22 07:00
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:42	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0376 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-209
Lab Sample ID: 320-92271-4
Date Collected: 09/13/22 07:00
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-210
Lab Sample ID: 320-92271-5
Date Collected: 09/13/22 07:15
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:45	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0434 g	620878	09/22/22 14:45	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESTSP082222-210

Lab Sample ID: 320-92271-6

Date Collected: 09/13/22 07:15

Matrix: Air

Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-211

Lab Sample ID: 320-92271-7

Date Collected: 09/12/22 08:00

Matrix: Air

Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:49	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0001 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-211

Lab Sample ID: 320-92271-8

Date Collected: 09/12/22 08:00

Matrix: Air

Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-212

Lab Sample ID: 320-92271-9

Date Collected: 09/14/22 07:47

Matrix: Air

Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:52	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0157 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-212

Lab Sample ID: 320-92271-10

Date Collected: 09/14/22 07:47

Matrix: Air

Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESPM082222-213
Date Collected: 09/14/22 07:15
Date Received: 09/21/22 09:35

Lab Sample ID: 320-92271-11
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:55	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0140 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-213
Date Collected: 09/14/22 07:15
Date Received: 09/21/22 09:35

Lab Sample ID: 320-92271-12
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-214
Date Collected: 09/14/22 07:34
Date Received: 09/21/22 09:35

Lab Sample ID: 320-92271-13
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 21:59	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0157 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-214
Date Collected: 09/14/22 07:34
Date Received: 09/21/22 09:35

Lab Sample ID: 320-92271-14
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-215
Date Collected: 09/15/22 08:00
Date Received: 09/21/22 09:35

Lab Sample ID: 320-92271-15
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 22:02	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0170 g	620878	09/22/22 14:45	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESTSP082222-215
Lab Sample ID: 320-92271-16
Date Collected: 09/15/22 08:00
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM082222-216
Lab Sample ID: 320-92271-17
Date Collected: 09/15/22 07:32
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 22:05	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0130 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP082222-216
Lab Sample ID: 320-92271-18
Date Collected: 09/15/22 07:32
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM090622-235
Lab Sample ID: 320-92271-19
Date Collected: 09/15/22 07:46
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 22:09	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0235 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP090622-235
Lab Sample ID: 320-92271-20
Date Collected: 09/15/22 07:46
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESPM090622-236
Lab Sample ID: 320-92271-21
Date Collected: 09/15/22 14:50
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 22:12	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0021 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP090622-236
Lab Sample ID: 320-92271-22
Date Collected: 09/15/22 14:50
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM090622-237
Lab Sample ID: 320-92271-23
Date Collected: 09/15/22 14:55
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 22:22	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0018 g	620878	09/22/22 14:45	[redacted]	EET SAC

Client Sample ID: GESTSP090622-237
Lab Sample ID: 320-92271-24
Date Collected: 09/15/22 14:55
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Client Sample ID: GESPM090622-238
Lab Sample ID: 320-92271-25
Date Collected: 09/15/22 14:42
Matrix: Air
Date Received: 09/21/22 09:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Filter to Air					620635	09/28/22 04:00	[redacted]	EET SAC
Total/NA	Prep	3050B			0.08333 Sample	100 mL	620640	09/28/22 04:30	[redacted]	EET SAC
Total/NA	Analysis	6020		1			621022	09/28/22 22:25	[redacted]	EET SAC
Total/NA	Analysis	PM10		1	0 g	0.0002 g	620878	09/22/22 14:45	[redacted]	EET SAC

Lab Chronicle

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Client Sample ID: GESTSP090622-238
Date Collected: 09/15/22 14:42
Date Received: 09/21/22 09:35

Lab Sample ID: 320-92271-26
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	40CFR50 App B		1			620905	09/22/22 14:45	[redacted]	EET SAC
Total/NA	Pre Prep	Filter to Air					620653	09/28/22 09:02	[redacted]	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: GES-AIS, LLC
Job ID: 320-92271-1
Project/Site: Hunters Point, Parcel B, Phase 2

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2468	01-20-24
Oregon	NELAP	4040	01-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
40CFR50 App B		Air	Total Suspended Particulates
PM10		Air	Particulate Matter as PM 10

Method Summary

Client: GES-AIS, LLC
Job ID: 320-92271-1
Project/Site: Hunters Point, Parcel B, Phase 2

Method	Method Description	Protocol	Laboratory
6020	Metals (ICP/MS)	SW846	EET SAC
40CFR50 App B	Suspended Particulate Matter in Ambient Air	EPA	EET SAC
PM10	Particulate Matter	40CFR50J	EET SAC
3050B	Preparation, Metals	SW846	EET SAC
Filter to Air	Filter to Air volume ratio	None	EET SAC

Protocol References:

40CFR50J = 40 CFR Part 50 Appendix J

EPA = US Environmental Protection Agency

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: GES-AIS, LLC
Project/Site: Hunters Point, Parcel B, Phase 2

Job ID: 320-92271-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-92271-1	GESPM082222-208	Air	09/13/22 07:30	09/21/22 09:35
320-92271-2	GESTSP082222-208	Air	09/13/22 07:30	09/21/22 09:35
320-92271-3	GESPM082222-209	Air	09/13/22 07:00	09/21/22 09:35
320-92271-4	GESTSP082222-209	Air	09/13/22 07:00	09/21/22 09:35
320-92271-5	GESPM082222-210	Air	09/13/22 07:15	09/21/22 09:35
320-92271-6	GESTSP082222-210	Air	09/13/22 07:15	09/21/22 09:35
320-92271-7	GESPM082222-211	Air	09/12/22 08:00	09/21/22 09:35
320-92271-8	GESTSP082222-211	Air	09/12/22 08:00	09/21/22 09:35
320-92271-9	GESPM082222-212	Air	09/14/22 07:47	09/21/22 09:35
320-92271-10	GESTSP082222-212	Air	09/14/22 07:47	09/21/22 09:35
320-92271-11	GESPM082222-213	Air	09/14/22 07:15	09/21/22 09:35
320-92271-12	GESTSP082222-213	Air	09/14/22 07:15	09/21/22 09:35
320-92271-13	GESPM082222-214	Air	09/14/22 07:34	09/21/22 09:35
320-92271-14	GESTSP082222-214	Air	09/14/22 07:34	09/21/22 09:35
320-92271-15	GESPM082222-215	Air	09/15/22 08:00	09/21/22 09:35
320-92271-16	GESTSP082222-215	Air	09/15/22 08:00	09/21/22 09:35
320-92271-17	GESPM082222-216	Air	09/15/22 07:32	09/21/22 09:35
320-92271-18	GESTSP082222-216	Air	09/15/22 07:32	09/21/22 09:35
320-92271-19	GESPM090622-235	Air	09/15/22 07:46	09/21/22 09:35
320-92271-20	GESTSP090622-235	Air	09/15/22 07:46	09/21/22 09:35
320-92271-21	GESPM090622-236	Air	09/15/22 14:50	09/21/22 09:35
320-92271-22	GESTSP090622-236	Air	09/15/22 14:50	09/21/22 09:35
320-92271-23	GESPM090622-237	Air	09/15/22 14:55	09/21/22 09:35
320-92271-24	GESTSP090622-237	Air	09/15/22 14:55	09/21/22 09:35
320-92271-25	GESPM090622-238	Air	09/15/22 14:42	09/21/22 09:35
320-92271-26	GESTSP090622-238	Air	09/15/22 14:42	09/21/22 09:35

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT092122AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

320-92271 Chain of Custody

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
	Analytical Test Method					1	1	1						
1	GESPM082222-208	A	09/13/2022	0730	[redacted]	X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1589.23 (M3)
2	GESTSP082222-208	A	09/13/2022	0730			X		MSB01	N1	0.00	0.00	1	VOLUME: 1736.06 (M3)
3	GESPM082222-209	A	09/13/2022	0700		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1614.36 (M3)
4	GESTSP082222-209	A	09/13/2022	0700			X		MSB02	N1	0.00	0.00	1	VOLUME: 1729.56 (M3)
5	GESPM082222-210	A	09/13/2022	0715		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1608.82 (M3)
6	GESTSP082222-210	A	09/13/2022	0715			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1560.66 (M3)
7	GESPM082222-211	AQ	09/12/2022	0800		X		X	FIELDQC	FB1	0.00	0.00	1	
8	GESTSP082222-211	AQ	09/12/2022	0800			X		FIELDQC	FB1	0.00	0.00	1	
9	GESPM082222-212	A	09/14/2022	0747		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1674.65 (M3)
10	GESTSP082222-212	A	09/14/2022	0747			X		MSB01	N1	0.00	0.00	1	VOLUME: 1770.83 (M3)
11	GESPM082222-213	A	09/14/2022	0715		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1649.19 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9/20/22	1430	Fedex	9/20/22	1430
[redacted]			[redacted]	9.21.22	0935

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/21/2022/FEDEX 7779 2181 4814

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
September 16, 2022

2.0

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT092122AIRB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

Analytical Test Method

	Sample ID	Matrix	Date	Time	Samp Init.	CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
12	GESTSP082222-213	A	09/14/2022	0715	[redacted]		X		MSB02	N1	0.00	0.00	1	VOLUME: 1783.03 (M3)
13	GESPM082222-214	A	09/14/2022	0734		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1643.13 (M3)
14	GESTSP082222-214	A	09/14/2022	0734			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1606.74 (M3)
15	GESPM082222-215	A	09/15/2022	0800		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 1670.91 (M3)
16	GESTSP082222-215	A	09/15/2022	0800			X		MSB01	N1	0.00	0.00	1	VOLUME: 1769.49 (M3)
17	GESPM082222-216	A	09/15/2022	0732		X		X	MSB02	N1	0.00	0.00	1	VOLUME: 1648.13 (M3)
18	GESTSP082222-216	A	09/15/2022	0732			X		MSB02	N1	0.00	0.00	1	VOLUME: 1773.07 (M3)
19	GESPM090622-235	A	09/15/2022	0746		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 1648.11 (M3)
20	GESTSP090622-235	A	09/15/2022	0746			X		MSB113A	N1	0.00	0.00	1	VOLUME: 1606.32 (M3)
21	GESPM090622-236	A	09/15/2022	1450		X		X	MSB01	N1	0.00	0.00	1	VOLUME: 469.15 (M3)
22	GESTSP090622-236	A	09/15/2022	1450			X		MSB01	N1	0.00	0.00	1	VOLUME: 493.50 (M3)

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9/20/22	1430	Fedex	9/20/22	1430
			[redacted]	9.21.22	0935

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/21/2022/FEDEX 7779 2181 4814

Received by Laboratory: *(Signature, Date, Time)* **& condition**

EDD

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1655 Grant Street, Suite 1200, Concord, CA 94520
bwomack@gilbaneco.com

COC # KT092122AIRB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: EUROFINS ENVIRONMENT TESTING NORTHERN CALIFORNIA, LLC (EETN	Event: **Parcel B Air Monitoring**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 880 Riverside Parkway, West Sacramento, CA 95605	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
1	1x 250-mL Plastic, 4 Degrees C
1	1x Envelope, None

Event: Parcel B Air Monitoring

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: CAAIR - Air PM10	N0500 - Air TSP	SW6020 - Air Pb Mn	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						1	1	1						
23	GESPM090622-237	A	09/15/2022	1455	[redacted]	X		X	MSB02	N1	0.00	0.00	1	VOLUME: 495.02 (M3)
24	GESTSP090622-237	A	09/15/2022	1455			X		MSB02	N1	0.00	0.00	1	VOLUME: 534.01 (M3)
25	GESPM090622-238	A	09/15/2022	1442		X		X	MSB113A	N1	0.00	0.00	1	VOLUME: 472.73 (M3)
26	GESTSP090622-238	A	09/15/2022	1442			X		MSB113A	N1	0.00	0.00	1	VOLUME: 457.62 (M3)
27														
28														

Turnaround Time: 5 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	9/20/22	1430	Fedex	9/20/22	1430
			[redacted]	9-21-22	0935

Shipping Date / Carrier / Airbill Number

Shipping Date: 9/21/2022/FEDEX 7779 2181 4814

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
September 16, 2022

W.O

Login Sample Receipt Checklist

Client: GES-AIS, LLC

Job Number: 320-92271-1

Login Number: 92271

List Source: Eurofins Sacramento

List Number: 1

Creator: [redacted]

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	SEAL
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ARS Aleut Analytical, LLC

Laboratory Analytical Report

ARS1-22-01492 Revision 1

Gilbane Federal
[redacted]
1655 Grant Street
Suite 1200
Concord, CA 94520
[redacted]

COC Number: **KT072722RADB**
Job Number: **J310000900**
Job Location: **Not Provided**
Sample ID Prefix: **MSB**
Project Name: **IIPNS Parcel B Rad Sampling**

Questions regarding this analytical report should be addressed to ARS project manager, [redacted], who can be reached by email at projectmanagers@aaa.aleutfederal.com.

I certify that the test results presented in this report (in either hardcopy or electronic file (EDD)) meet the requirements of the laboratory's certifications and other applicable contract terms and conditions. A full list of the Port Allen, LA laboratory's certifications is provided with this report. Any exceptions to the certification or contract will be noted within the case narratives presented in the report. Any subcontracted sample results will be identified within the case narratives presented in the report. In the event this report is an amendment to a previously released report, the case narrative will clearly identify the original report as well as the reason(s) for reissuance. A statement of uncertainty for each analysis is available upon request. I authorize release and issuance of this report on the date signed below.

		Laboratory Management, ARS Aleut Analytical
Signature	**Date**	**Title**

This report provides analytical results of the requested analysis and does not include any opinions or interpretations. ARS Aleut Analytical, LLC assumes no liability for the use or interpretation of analytical results. Results relate only to items tested. A partial reproduction of this test report is prohibited. Reproduction of this report in full requires the written approval of the laboratory.

NELAP ACCREDITED TNI LABORATORY
LELAP Cert # 01949

ANAB ACCREDITED ISO/IEC 17025 DOD ELAP

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Certifications and Accreditations List

State or Accrediting Body (AB)	Certificate Number
AIHA LAP, LLC	209312
Alaska	LA01131
California	3085
ANAB DoD	ADE-1489
ANAB DOE	ADE-1489.01
Louisiana DEQ - NELAC	01949
Louisiana DHH	LA022
Nevada	LA011312023-1
New Jersey	LA009
New York	65039
Pennsylvania	68-04294-011
Texas	T104704447-21-17
Utah	LA011312022-13
Washington	C1010

For additional information related to the specific matrices, methods, and analytes recognized by each accrediting body, contact us at QA@aaa.aleutfederal.com for additional information.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Case Narrative

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PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs

Client Sample ID	ARS Aleut Analytical Sample ID
FB-070722	**ARS1-22-01492-001**
MSB01-070722	**ARS1-22-01492-002**
MSB02-070722	**ARS1-22-01492-003**
MSB113A-070722	**ARS1-22-01492-004**
MSB01-071122	**ARS1-22-01492-005**
MSB02-071122	**ARS1-22-01492-006**
MSB113A-071122	**ARS1-22-01492-007**

Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
001	07/07/22 08:00	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30
001	07/07/22 08:00	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
001	07/07/22 08:00	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36
001	07/07/22 08:00	07/20/22	GAM-A-AF	As Received	N/A	07/28/22 14:01
001	07/07/22 08:00	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:39
001	07/07/22 08:00	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31
002	07/08/22 08:11	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30
002	07/08/22 08:11	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
002	07/08/22 08:11	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36
002	07/08/22 08:11	07/20/22	GAM-A-AF	As Received	N/A	07/28/22 14:22
002	07/08/22 08:11	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:39
002	07/08/22 08:11	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31
003	07/08/22 09:01	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30

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Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
003	07/08/22 09:01	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
003	07/08/22 09:01	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36
003	07/08/22 09:01	07/20/22	GAM-A-AF	As Received	N/A	07/29/22 14:22
003	07/08/22 09:01	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:39
003	07/08/22 09:01	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31
004	07/08/22 08:30	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30
004	07/08/22 08:30	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
004	07/08/22 08:30	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36
004	07/08/22 08:30	07/20/22	GAM-A-AF	As Received	N/A	07/29/22 14:25
004	07/08/22 08:30	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:39
004	07/08/22 08:30	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31
005	07/15/22 08:27	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30
005	07/15/22 08:27	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
005	07/15/22 08:27	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36
005	07/15/22 08:27	07/20/22	GAM-A-AF	As Received	N/A	07/29/22 14:28
005	07/15/22 08:27	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:39
005	07/15/22 08:27	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31
006	07/15/22 07:57	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30
006	07/15/22 07:57	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
006	07/15/22 07:57	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36

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006	07/15/22 07:57	07/20/22	GAM-A-AF	As Received	N/A	07/30/22 11:26
006	07/15/22 07:57	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:40
006	07/15/22 07:57	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31
007	07/15/22 08:07	07/20/22	ASP-PU239-AF	As Received	08/08/22 12:54	08/10/22 22:30
007	07/15/22 08:07	07/20/22	ASP-TH-AF	As Received	08/08/22 09:53	08/09/22 22:32
007	07/15/22 08:07	07/20/22	ASP-U-AF	As Received	08/08/22 12:54	08/16/22 20:36
007	07/15/22 08:07	07/20/22	GAM-A-AF	As Received	N/A	07/28/22 14:04
007	07/15/22 08:07	07/20/22	GPC-RA226-AF	As Received	08/10/22 14:10	08/19/22 11:40
007	07/15/22 08:07	07/20/22	GPC-SR90-AF	As Received	08/05/22 09:26	08/09/22 10:31

SAMPLE RECEIPT/PREP

The samples arrived in good condition. The samples were screened for radioactive contamination as per procedure **PALA-SR-001-SOP Sample Receiving**. Sample date(s) and time(s) are listed as provided by the client. The results related to Air Filters are based upon the beginning/ending collection time(s) and the sample flow rate(s) provided by the client. Turnaround time was set at 28 calendar days.

ANALYTICAL METHODS

Pu-239/240 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Th-232 analysis was performed using **PALA-RAD-031, "Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom ACW-08 & Eichrom ACW-10)"**.

U-235 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Co-60, Cs-137, Ra-226 analyses were performed using **PALA-RAD-007, "Modified Gamma Emitting Radionuclides in Soil, Air, and Biota Matrices (EPA 901.1 Mod, SM 7120B, & HASL-300 Ga-01-R)"**.

Ra-226 analysis was performed using **PALA-RAD-008, "Alpha Emitting Radium Isotopes in Water (EPA 903.0, EPA 9315, SM 7500-Ra C, SM 7500-Ra C)"**.

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Sr-90 analysis was performed using **PALA-RAD-032, "Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom SRW01, EPA 905.0, HASL 300 Sr-01-RC)**".

ANALYTICAL RESULTS

Batch ARS1-B22-01012: DUP and/or parent sample value(s) for Co-60 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01012: DUP and/or parent sample value(s) for Cs-137 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01012: DUP and/or parent sample value(s) for Ra-226 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01100: The Method Blank is greater than the MDC for Th-230; all positive detects for Th-230 in this analytical batch are qualified with a 'B'.

Batch ARS1-B22-01102: Fraction 001 has tracer recovery of 28.7%, which is outside limits of 30%-110%. The sample results have been qualified with a "Q".

Batch ARS1-B22-01102: Fraction 002 has tracer recovery of 28.9%, which is outside limits of 30%-110%. The sample results have been qualified with a "Q".

Batch ARS1-B22-01102: Fraction 004 has tracer recovery of 22.6%, which is outside limits of 30%-110%. The sample results have been qualified with a "Q".

Batch ARS1-B22-01124: The Method Blank is greater than the MDC for Ra-226; all positive detects for Ra-226 in this analytical batch are qualified with a 'B'.

Fraction 001 has elevated MDC for Pu-239/240 with ACT of -7.025E-8 uCi/filter, MDC of 2.181E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for U-235 with ACT of 4.839E-8 uCi/filter, MDC of 6.557E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Th-232 with ACT of 2.414E-8 uCi/filter, MDC of 1.503E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Ra-226 with ACT of -8.469E-5 uCi/filter, MDC of 3.111E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 002 has elevated MDC for Pu-239/240 with ACT of -3.521E-8 uCi/filter, MDC of 2.574E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for U-235 with ACT of -7.325E-8 uCi/filter, MDC of 2.934E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Th-232 with ACT of 5.819E-8 uCi/filter, MDC of 8.015E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Ra-226 with ACT of 2.078E-6 uCi/filter, MDC of 9.110E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 003 has elevated MDC for Pu-239/240 with ACT of -1.134E-7 uCi/filter, MDC of 2.540E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for U-235 with ACT of 0.000 uCi/filter, MDC of 1.621E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Th-232 with ACT of 5.993E-8 uCi/filter, MDC of 1.198E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Ra-226 with ACT of -9.021E-5 uCi/filter, MDC of 3.095E-5 uCi/filter and

CRDL of 4.4E-06 uCi/filter.
Fraction 004 has elevated MDC for Pu-239/240 with ACT of -7.545E-8 uCi/filter, MDC of 2.682E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for U-235 with ACT of 3.218E-8 uCi/filter, MDC of 3.465E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Th-232 with ACT of 4.270E-8 uCi/filter, MDC of 1.149E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Ra-226 with ACT of -1.251E-5 uCi/filter, MDC of 1.552E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 005 has elevated MDC for Pu-239/240 with ACT of -6.442E-8 uCi/filter, MDC of 2.615E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 005 has elevated MDC for U-235 with ACT of -2.893E-8 uCi/filter, MDC of 2.173E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 005 has elevated MDC for Th-232 with ACT of 6.238E-8 uCi/filter, MDC of 1.231E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 005 has elevated MDC for Ra-226 with ACT of -4.004E-6 uCi/filter, MDC of 9.804E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 006 has elevated MDC for Pu-239/240 with ACT of -1.158E-7 uCi/filter, MDC of 2.679E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 006 has elevated MDC for U-235 with ACT of 2.326E-8 uCi/filter, MDC of 1.712E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 006 has elevated MDC for Th-232 with ACT of 4.933E-8 uCi/filter, MDC of 1.327E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 006 has elevated MDC for Ra-226 with ACT of -9.251E-6 uCi/filter, MDC of 1.563E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 007 has elevated MDC for Pu-239/240 with ACT of -5.991E-8 uCi/filter, MDC of 3.190E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 007 has elevated MDC for U-235 with ACT of 0.000 uCi/filter, MDC of 2.013E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 007 has elevated MDC for Th-232 with ACT of 2.300E-8 uCi/filter, MDC of 1.008E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 007 has elevated MDC for Ra-226 with ACT of -9.335E-6 uCi/filter, MDC of 1.496E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.

ARS1-B22-01099: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01100: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01100: The FWHM is greater than 100 keV for Th-229 on batch samples -01, -02, and -07.

ARS1-B22-01102: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01124: Gravimetric yield below acceptance limits for batch samples 8 and 10.

For batch ARS1-B22-01012, sample “MSB113A-071122” (ARS1-22-01492-007) was used as the Sample Duplicate.

REVISION: All batches have been recalculated using an air flow volume of 1L, final units of uCi/filter, and new CRDLs specified by the client.

Notes (Case Narrative)

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23)
DO	Duplicate Original
DUP	Sample Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MBL	Method Blank
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NC	Not Calculated
NP	Not Provided
NR	Not Referenced
PQL	Practical Quantitation Limit

Data Qualifiers:

B	The result of both the method blank and the target sample are above the MDL.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the LOD but below the LOQ, or above the MDL but below the PQL.
Q	One or more quality control criteria failed.
U	Result is below the MDA, MDL, PQL, LOD, or LOQ
*	LCS/LCSD or Sample DUP fails all Duplicate criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected
‡	Method/Matrix/Analyte not accredited for this certification

Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

8.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.

9.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Non-Potable Water**:
Gross Alpha and Gross Beta (EPA 900.0, EPA 9310); Radium 226 (EPA 903.0, EPA 903.1, EPA 9315); Radium 228 (EPA 904.0, EPA 9320); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7470A); Strontium-89 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-02-RC); Tritium (EPA 906.0); Enriched Tritium (ARS-040), Carbon-14 (ARS-019), Tritium/Carbon (ARS-151); Gamma Emitters (EPA 901.1, SM 7120B, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-10); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02)

10.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Solid and Chemical Materials**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7471B); Strontium-89 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-02); Tritium (EPA 906.0 Mod); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-01-RC); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-02-RC, HASL 300 Pu-03-RC); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03, HASL 300 U-02, HASL 300 U-04); Technetium-99 (Eichrom TCS01)

11.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Air and Emissions**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); Strontium-89 (Eichrom SRW01, HASL 300 Sr-01-RC); Strontium-90 (Eichrom SRW01, HASL 300 Sr-02-RC); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02, Eichrom TCS01)

General Comments:

1.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of “M” or “Mod” to the procedure number (i.e. 901.1M, 901.1 Mod).

2.0) All NIOSH method results are reported without blank corrections applied.

3.0) Basis: “As Received” = analyzed as received from client; “Dry” = dried prior to being analyzed; “Dry Weight Corrected” = analyzed as received; result corrected for percent moisture.

ARS Aleut Analytical

2609 North River Road • Port Allen, Louisiana 70767

(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Analytical Results

ARS Aleut Analytical

2609 North River Road • Port Allen, Louisiana 70767

(225) 228-1394 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: FB-070722
Sample Collection Date: 07/07/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-001
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-7.025E-8	7.920E-8	2.181E-7	8.666E-8	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	57.2%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	2.414E-8	7.446E-8	1.503E-7	5.336E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	60.2%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	4.839E-8	6.732E-8	6.557E-8	0.000	4.8E-08	UQ	uCi/filter	08/16/22 20:36	[redacted]	28.7%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-2.935E-7	1.714E-6	1.761E-6	8.805E-7	0.00024	U	uCi/filter	07/28/22 14:01	[redacted]	N/A
Cs-137	7.089E-7	1.330E-6	1.486E-6	7.430E-7	0.00048	U	uCi/filter	07/28/22 14:01	[redacted]	N/A
Ra-226	-8.469E-5	3.161E-5	3.111E-5	1.556E-5	4.4E-06	U	uCi/filter	07/28/22 14:01	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	4.422E-7	4.419E-7	6.564E-7	2.434E-7	4.4E-06	U	uCi/filter	08/19/22 11:39	[redacted]	50.6%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-7.154E-7	9.934E-7	1.934E-6	8.917E-7	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	93.6%

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: MSB01-070722
Sample Collection Date: 07/08/22 8:11
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-002
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-3.521E-8	1.123E-7	2.574E-7	1.032E-7	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	51.3%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	5.819E-8	6.094E-8	8.015E-8	2.205E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	72.9%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-7.325E-8	1.074E-7	2.934E-7	1.136E-7	4.8E-08	UQ	uCi/filter	08/16/22 20:36	[redacted]	28.9%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-3.923E-7	9.146E-7	9.322E-7	4.661E-7	0.00024	U	uCi/filter	07/28/22 14:22	[redacted]	N/A
Cs-137	-1.038E-7	6.730E-7	7.323E-7	3.662E-7	0.00048	U	uCi/filter	07/28/22 14:22	[redacted]	N/A
Ra-226	2.078E-6	7.207E-6	9.110E-6	4.555E-6	4.4E-06	U	uCi/filter	07/28/22 14:22	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	5.957E-7	4.055E-7	4.978E-7	1.859E-7	4.4E-06	B	uCi/filter	08/19/22 11:39	[redacted]	71.0%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	1.084E-6	1.602E-6	2.703E-6	1.274E-6	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	92.0%

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: MSB02-070722
Sample Collection Date: 07/08/22 9:01
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-003
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.134E-7	9.104E-8	2.540E-7	1.042E-7	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	62.9%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	5.993E-8	7.631E-8	1.198E-7	3.795E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	58.4%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	0.000	6.104E-8	1.621E-7	5.123E-8	4.8E-08	U	uCi/filter	08/16/22 20:36	[redacted]	32.3%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	8.097E-7	1.340E-6	1.368E-6	6.840E-7	0.00024	U	uCi/filter	07/29/22 14:22	[redacted]	N/A
Cs-137	-3.852E-7	1.125E-6	1.879E-6	9.395E-7	0.00048	U	uCi/filter	07/29/22 14:22	[redacted]	N/A
Ra-226	-9.021E-5	3.147E-5	3.095E-5	1.548E-5	4.4E-06	U	uCi/filter	07/29/22 14:22	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	9.102E-7	6.030E-7	7.331E-7	2.754E-7	4.4E-06	B	uCi/filter	08/19/22 11:39	[redacted]	46.6%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-3.467E-7	1.203E-6	2.236E-6	1.036E-6	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	88.7%

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ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: MSB113A-070722
Sample Collection Date: 07/08/22 8:30
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-004
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-7.545E-8	1.118E-7	2.682E-7	1.107E-7	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	54.3%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	4.270E-8	6.675E-8	1.149E-7	3.640E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	62.0%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.218E-8	1.669E-7	3.465E-7	1.297E-7	4.8E-08	UQ	uCi/filter	08/16/22 20:36	[redacted]	22.6%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	1.845E-7	8.907E-7	9.788E-7	4.894E-7	0.00024	U	uCi/filter	07/29/22 14:25	[redacted]	N/A
Cs-137	7.100E-7	5.448E-7	7.214E-7	3.607E-7	0.00048	U	uCi/filter	07/29/22 14:25	[redacted]	N/A
Ra-226	-1.251E-5	1.484E-5	1.552E-5	7.760E-6	4.4E-06	U	uCi/filter	07/29/22 14:25	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	2.002E-7	4.587E-7	8.613E-7	3.236E-7	4.4E-06	U	uCi/filter	08/19/22 11:39	[redacted]	44.6%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-1.703E-7	1.069E-6	1.976E-6	9.110E-7	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	96.9%

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: MSB01-071122
Sample Collection Date: 07/15/22 8:27
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-005
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-6.442E-8	1.024E-7	2.615E-7	1.039E-7	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	49.7%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	6.238E-8	7.876E-8	1.231E-7	3.900E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	63.5%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-2.893E-8	9.827E-8	2.173E-7	8.903E-8	4.8E-08	U	uCi/filter	08/16/22 20:36	[redacted]	49.7%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	1.235E-7	8.107E-7	8.361E-7	4.181E-7	0.00024	U	uCi/filter	07/29/22 14:28	[redacted]	N/A
Cs-137	6.384E-8	6.293E-7	6.869E-7	3.435E-7	0.00048	U	uCi/filter	07/29/22 14:28	[redacted]	N/A
Ra-226	-4.004E-6	7.798E-6	9.804E-6	4.902E-6	4.4E-06	U	uCi/filter	07/29/22 14:28	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.360E-6	8.880E-7	1.096E-6	4.208E-7	4.4E-06	B	uCi/filter	08/19/22 11:39	[redacted]	39.1%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-3.067E-7	1.085E-6	2.024E-6	9.352E-7	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	93.6%

ARS Aleut Analytical

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(225) 228-1394 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: MSB02-071122
Sample Collection Date: 07/15/22 7:57
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-006
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.158E-7	1.049E-7	2.679E-7	1.123E-7	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	64.4%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	4.933E-8	7.711E-8	1.327E-7	4.206E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	52.2%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	2.326E-8	7.900E-8	1.712E-7	5.410E-8	4.8E-08	U	uCi/filter	08/16/22 20:36	[redacted]	32.4%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-3.838E-7	1.002E-6	1.091E-6	5.455E-7	0.00024	U	uCi/filter	07/30/22 11:26	[redacted]	N/A
Cs-137	3.865E-7	7.220E-7	8.384E-7	4.192E-7	0.00048	U	uCi/filter	07/30/22 11:26	[redacted]	N/A
Ra-226	-9.251E-6	1.490E-5	1.563E-5	7.815E-6	4.4E-06	U	uCi/filter	07/30/22 11:26	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	8.261E-7	4.791E-7	5.197E-7	1.913E-7	4.4E-06	B	uCi/filter	08/19/22 11:40	[redacted]	64.6%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	5.890E-7	1.119E-6	1.924E-6	8.896E-7	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	99.4%

ARS Aleut Analytical

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(225) 228-1394 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-22-01492
Client Sample ID: MSB113A-071122
Sample Collection Date: 07/15/22 8:07
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01492-007
Date Received: 07/20/22
Report Date: 09/06/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-5.991E-8	1.427E-7	3.190E-7	1.324E-7	4.8E-08	U	uCi/filter	08/10/22 22:30	[redacted]	49.0%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	2.300E-8	5.076E-8	1.008E-7	2.773E-8	4.8E-08	U	uCi/filter	08/09/22 22:32	[redacted]	58.9%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	0.000	8.494E-8	2.013E-7	7.129E-8	4.8E-08	U	uCi/filter	08/16/22 20:36	[redacted]	36.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-1.841E-7	9.671E-7	1.060E-6	5.300E-7	0.00024	U	uCi/filter	07/28/22 14:04	[redacted]	N/A
Cs-137	9.329E-9	7.874E-7	9.255E-7	4.628E-7	0.00048	U	uCi/filter	07/28/22 14:04	[redacted]	N/A
Ra-226	-9.335E-6	1.445E-5	1.496E-5	7.480E-6	4.4E-06	U	uCi/filter	07/28/22 14:04	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.166E-6	7.723E-7	9.390E-7	3.527E-7	4.4E-06	B	uCi/filter	08/19/22 11:40	[redacted]	36.0%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	8.432E-7	1.127E-6	1.891E-6	8.737E-7	2.4E-05	U	uCi/filter	08/09/22 10:31	[redacted]	92.8%

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QC Summary

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QC Sample Results

Analytical Batch: ARS1-B22-01012
Lab Sample ID: ARS1-B22-01012-01
Method: EPA 901.1M

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 07/28/22 13:58

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Am-241	33.065	32.454		uCi/filter	98.2	75 - 125
Co-60	20.928	20.902		uCi/filter	99.9	75 - 125
Cs-137	12.996	13.111		uCi/filter	100.9	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01012
Lab Sample ID: ARS1-B22-01012-02
Method: EPA 901.1M

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 07/28/22 14:10

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Am-241	33.065	31.496		uCi/filter	95.3	75 - 125	3.0	25	0.535	3
Co-60	20.928	21.537		uCi/filter	102.9	75 - 125	3.0	25	0.685	3
Cs-137	12.996	13.147		uCi/filter	101.2	75 - 125	0.3	25	0.071	3

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QC Sample Results

Analytical Batch: ARS1-B22-01012
Lab Sample ID: ARS1-B22-01012-03
Method: EPA 901.1M

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 07/30/22 11:25

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Co-60	5.501E-4	0.002	0.002	8.300E-4	U	uCi/filter
Cs-137	-8.258E-4	0.002	0.002	8.650E-4	U	uCi/filter
Ra-226	-0.080	0.024	0.032	0.016	U	uCi/filter

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QC Sample Results

Analytical Batch: ARS1-B22-01012
Lab Sample ID: ARS1-B22-01012-11
Method: EPA 901.1M

Sample Type: DUP
Matrix: Air Filter
Analysis Date: 07/30/22 11:28

Analyte	DO Result	DO Qual	DUP Result	DUP Qual	Analysis Units	RPD	RPD Limit	DER	DER Limit
Co-60	-1.841E-7	U	-2.044E-7	U	uCi/filter	NC	25	0.031	3
Cs-137	9.329E-9	U	3.404E-7	U	uCi/filter	NC	25	0.655	3
Ra-226	-9.335E-6	U	-3.833E-6	U	uCi/filter	NC	25	0.655	3

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01492 **Analytical Batch:** ARS1-B22-01012

Analysis: Gamma Spec (Short) in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01492-001	FB-070722	Air Filter	EPA 901.1M	N/A
ARS1-22-01492-002	MSB01-070722	Air Filter	EPA 901.1M	N/A
ARS1-22-01492-003	MSB02-070722	Air Filter	EPA 901.1M	N/A
ARS1-22-01492-004	MSB113A-070722	Air Filter	EPA 901.1M	N/A
ARS1-22-01492-005	MSB01-071122	Air Filter	EPA 901.1M	N/A
ARS1-22-01492-006	MSB02-071122	Air Filter	EPA 901.1M	N/A
ARS1-22-01492-007	MSB113A-071122	Air Filter	EPA 901.1M	N/A
ARS1-B22-01012-01	Lab Control Sample	Air Filter	EPA 901.1M	N/A
ARS1-B22-01012-02	Lab Control Sample Duplicate	Air Filter	EPA 901.1M	N/A
ARS1-B22-01012-03	Method Blank	Air Filter	EPA 901.1M	N/A
ARS1-B22-01012-11	Sample Duplicate (MSB113A-071122)	Air Filter	EPA 901.1M	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01124
Lab Sample ID: ARS1-B22-01124-01
Method: EPA 9315

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/19/22 11:39

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Ra-226	2.767E-5	2.619E-5		uCi/filter	94.6	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01124
Lab Sample ID: ARS1-B22-01124-02
Method: EPA 9315

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/19/22 11:39

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Ra-226	2.767E-5	2.825E-5		uCi/filter	102.1	75 - 125	7.6	25	0.646	3

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QC Sample Results

Analytical Batch: ARS1-B22-01124
Lab Sample ID: ARS1-B22-01124-03
Method: EPA 9315

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/19/22 11:39

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Ra-226	1.471E-7	8.807E-8	9.526E-8	3.434E-8		uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01492 **Analytical Batch:** ARS1-B22-01124

Analysis: Radium-226 in Air Filter

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01492-001	FB-070722	Air Filter	EPA 9315	N/A
ARS1-22-01492-002	MSB01-070722	Air Filter	EPA 9315	N/A
ARS1-22-01492-003	MSB02-070722	Air Filter	EPA 9315	N/A
ARS1-22-01492-004	MSB113A-070722	Air Filter	EPA 9315	N/A
ARS1-22-01492-005	MSB01-071122	Air Filter	EPA 9315	N/A
ARS1-22-01492-006	MSB02-071122	Air Filter	EPA 9315	N/A
ARS1-22-01492-007	MSB113A-071122	Air Filter	EPA 9315	N/A
ARS1-B22-01124-01	Lab Control Sample	Air Filter	EPA 9315	N/A
ARS1-B22-01124-02	Lab Control Sample Duplicate	Air Filter	EPA 9315	N/A
ARS1-B22-01124-03	Method Blank	Air Filter	EPA 9315	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01099
Lab Sample ID: ARS1-B22-01099-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/10/22 22:30

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Pu-239/240	7.747E-6	7.963E-6		uCi/filter	102.8	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01099
Lab Sample ID: ARS1-B22-01099-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/10/22 22:30

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Pu-239/240	7.726E-6	7.330E-6		uCi/filter	94.9	75 - 125	8.3	25	0.887	3

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QC Sample Results

Analytical Batch: ARS1-B22-01099
Lab Sample ID: ARS1-B22-01099-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/10/22 22:30

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Pu-238	2.307E-8	3.953E-8	6.939E-8	2.828E-8	U	uCi/filter
Pu-239/240	2.366E-9	4.231E-8	8.298E-8	3.508E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01492

Analytical Batch: ARS1-B22-01099

Analysis: Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01492-001	FB-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-002	MSB01-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-003	MSB02-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-004	MSB113A-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-005	MSB01-071122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-006	MSB02-071122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-007	MSB113A-071122	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01099-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01099-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01099-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01102
Lab Sample ID: ARS1-B22-01102-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/16/22 20:36

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
U-238	8.208E-6	8.089E-6		uCi/filter	98.5	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01102
Lab Sample ID: ARS1-B22-01102-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/16/22 20:36

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
U-238	8.192E-6	8.343E-6		uCi/filter	101.8	75 - 125	3.1	25	0.346	3

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QC Sample Results

Analytical Batch: ARS1-B22-01102
Lab Sample ID: ARS1-B22-01102-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/16/22 20:36

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
U-234	-6.587E-9	5.774E-8	1.070E-7	4.906E-8	U	uCi/filter
U-235	-3.817E-9	2.698E-8	5.734E-8	2.350E-8	U	uCi/filter
U-238	-4.601E-8	4.853E-8	9.938E-8	4.524E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01492

Analytical Batch: ARS1-B22-01102

Analysis: Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01492-001	FB-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-002	MSB01-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-003	MSB02-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-004	MSB113A-070722	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-005	MSB01-071122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-006	MSB02-071122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01492-007	MSB113A-071122	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01102-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01102-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01102-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01100
Lab Sample ID: ARS1-B22-01100-01
Method: Eichrom ACW10

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/09/22 22:32

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Th-230	5.141E-6	5.406E-6		uCi/filter	105.2	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01100
Lab Sample ID: ARS1-B22-01100-02
Method: Eichrom ACW10

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/09/22 22:32

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Th-230	5.166E-6	5.159E-6		uCi/filter	99.9	75 - 125	4.7	25	0.493	3

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QC Sample Results

Analytical Batch: ARS1-B22-01100
Lab Sample ID: ARS1-B22-01100-03
Method: Eichrom ACW10

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/09/22 22:32

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Th-228	-1.392E-8	3.083E-8	6.595E-8	2.826E-8	U	uCi/filter
Th-230	5.926E-8	3.678E-8	4.743E-8	1.903E-8		uCi/filter
Th-232	1.295E-9	7.983E-9	2.081E-8	5.725E-9	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01492

Analytical Batch: ARS1-B22-01100

Analysis: Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01492-001	FB-070722	Air Filter	Eichrom ACW10	N/A
ARS1-22-01492-002	MSB01-070722	Air Filter	Eichrom ACW10	N/A
ARS1-22-01492-003	MSB02-070722	Air Filter	Eichrom ACW10	N/A
ARS1-22-01492-004	MSB113A-070722	Air Filter	Eichrom ACW10	N/A
ARS1-22-01492-005	MSB01-071122	Air Filter	Eichrom ACW10	N/A
ARS1-22-01492-006	MSB02-071122	Air Filter	Eichrom ACW10	N/A
ARS1-22-01492-007	MSB113A-071122	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01100-01	Lab Control Sample	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01100-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01100-03	Method Blank	Air Filter	Eichrom ACW10	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01103
Lab Sample ID: ARS1-B22-01103-01
Method: Eichrom SRW01

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/09/22 10:31

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
SR-90	2.035E-5	2.062E-5		uCi/filter	101.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01103
Lab Sample ID: ARS1-B22-01103-02
Method: Eichrom SRW01

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/09/22 10:31

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
SR-90	2.021E-5	2.160E-5		uCi/filter	106.9	75 - 125	4.6	25	0.417	3

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QC Sample Results

Analytical Batch: ARS1-B22-01103
Lab Sample ID: ARS1-B22-01103-03
Method: Eichrom SRW01

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/09/22 10:31

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
SR-90	2.325E-8	2.199E-7	3.975E-7	1.825E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01492 **Analytical Batch:** ARS1-B22-01103

Analysis: Strontium-90 in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01492-001	FB-070722	Air Filter	Eichrom SRW01	N/A
ARS1-22-01492-002	MSB01-070722	Air Filter	Eichrom SRW01	N/A
ARS1-22-01492-003	MSB02-070722	Air Filter	Eichrom SRW01	N/A
ARS1-22-01492-004	MSB113A-070722	Air Filter	Eichrom SRW01	N/A
ARS1-22-01492-005	MSB01-071122	Air Filter	Eichrom SRW01	N/A
ARS1-22-01492-006	MSB02-071122	Air Filter	Eichrom SRW01	N/A
ARS1-22-01492-007	MSB113A-071122	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01103-01	Lab Control Sample	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01103-02	Lab Control Sample Duplicate	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01103-03	Method Blank	Air Filter	Eichrom SRW01	N/A

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01099**
SDG	**ARS1-22-01492**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

			Analysis Date	08/10/22 22:30	**Analysis Technician**	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**Expected Value**	**LCS Rec (%)**	**MDC**
ARS1-B22-01099-01	**LCS**	PU-239/240	7.963E-6	1.029E-6	7.747E-6	102.8	7.982E-8

Duplicate RER/DER/RPD

		Analysis Date	08/10/22 22:30	**Analysis Technician**	[redacted]	
Analyte	**Results LCS**	**CSU LCS (2s)**	**Results LCSD**	**CSU LCSD (2s)**	**DER**	**RPD**
PU-239/240	7.963E-6	1.029E-6	7.330E-6	9.464E-7	0.887	8.3

Method Blank

		Analysis Date	08/10/22 22:30	**Analysis Technician**	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**MDC**	**Qual**
ARS1-B22-01099-03	**MBL**	PU-238	2.307E-8	3.953E-8	6.939E-8	U
ARS1-B22-01099-03	**MBL**	PU-239/240	2.366E-9	4.231E-8	8.298E-8	U

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01124**
SDG	**ARS1-22-01492**
Analysis	**Radium-226 in Air Filter**
Method	**Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/19/22 11:39	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01124-01	**LCS**	RA-226	2.619E-5	4.246E-6	2.767E-5	94.6	1.022E-7

Duplicate RER/DER/RPD

Analysis Date	08/19/22 11:39	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
RA-226	2.619E-5	4.246E-6	2.825E-5	4.572E-6	0.646	7.6

Method Blank

Analysis Date	08/19/22 11:39	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01124-03	**MBL**	RA-226	1.471E-7	8.807E-8	9.526E-8	

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01012**
SDG	**ARS1-22-01492**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Method	**EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date: 07/28/22 13:58 | Analysis Technician: [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01012-01	**LCS**	AM-241	32.454	2.520	33.065	98.2	0.079
ARS1-B22-01012-01	**LCS**	CO-60	20.902	1.271	20.928	99.9	0.414
ARS1-B22-01012-01	**LCS**	CS-137	13.111	0.699	12.996	100.9	0.075

Duplicate RER/DER/RPD

Analysis Date: 07/28/22 14:10 | Analysis Technician: [redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
AM-241	32.454	2.520	31.496	2.447	0.535	3.0
CO-60	20.902	1.271	21.537	1.298	0.685	3.0
CS-137	13.111	0.699	13.147	0.701	0.071	0.3

Duplicate RER/DER/RPD (Dup Sample)

Analysis Date: 07/30/22 11:28 | Analysis Technician: [redacted]

Analysis Batch Sample ID	Analyte	Results DO	CSU DO (2s)	Results DUP	CSU DUP (2s)	DER	RPD
ARS1-B22-01012-11	CO-60	-1.841E-7	9.671E-7	-2.044E-7	8.259E-7	0.031	NC
ARS1-B22-01012-11	CS-137	9.329E-9	7.874E-7	3.404E-7	6.018E-7	0.655	NC
ARS1-B22-01012-11	RA-226	-9.335E-6	1.445E-5	-3.833E-6	7.877E-6	0.655	NC

Method Blank

Analysis Date: 07/30/22 11:25 | Analysis Technician: [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01012-03	**MBL**	CO-60	5.501E-4	0.002	0.002	U
ARS1-B22-01012-03	**MBL**	CS-137	-8.258E-4	0.002	0.002	U
ARS1-B22-01012-03	**MBL**	RA-226	-0.080	0.024	0.032	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01100**
SDG	**ARS1-22-01492**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Method	**Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/09/22 22:32	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01100-01	**LCS**	TH-230	5.406E-6	7.010E-7	5.141E-6	105.2	4.229E-8

Duplicate RER/DER/RPD

Analysis Date	08/09/22 22:32	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
TH-230	5.406E-6	7.010E-7	5.159E-6	6.889E-7	0.493	4.7

Method Blank

Analysis Date	08/09/22 22:32	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01100-03	**MBL**	TH-228	-1.392E-8	3.083E-8	6.595E-8	U
ARS1-B22-01100-03	**MBL**	TH-230	5.926E-8	3.678E-8	4.743E-8	
ARS1-B22-01100-03	**MBL**	TH-232	1.295E-9	7.983E-9	2.081E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01102**
SDG	**ARS1-22-01492**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/16/22 20:36	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01102-01	**LCS**	U-238	8.089E-6	1.004E-6	8.208E-6	98.5	4.212E-8

Duplicate RER/DER/RPD

Analysis Date	08/16/22 20:36	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
U-238	8.089E-6	1.004E-6	8.343E-6	1.034E-6	0.346	3.1

Method Blank

Analysis Date	08/16/22 20:36	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01102-03	**MBL**	U-234	-6.587E-9	5.774E-8	1.070E-7	U
ARS1-B22-01102-03	**MBL**	U-235	-3.817E-9	2.698E-8	5.734E-8	U
ARS1-B22-01102-03	**MBL**	U-238	-4.601E-8	4.853E-8	9.938E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01103**
SDG	**ARS1-22-01492**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Method	**Eichrom SRW01,HASL 300 Sr-01-RC/Sr-02-**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/09/22 10:31	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01103-01	**LCS**	SR-90	2.062E-5	3.165E-6	2.035E-5	101.3	3.906E-7

Duplicate RER/DER/RPD

Analysis Date	08/09/22 10:31	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
SR-90	2.062E-5	3.165E-6	2.160E-5	3.304E-6	0.417	4.6

Method Blank

Analysis Date	08/09/22 10:31	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01103-03	**MBL**	SR-90	2.325E-8	2.199E-7	3.975E-7	U

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01124**
SDG	**ARS1-22-01492**
Analysis	**Radium-226 in Air Filter**
Analysis Test Method	**PALA-RAD-008/Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/19/22 11:39	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	RA-226	2.619E-5	2.166E-6	2.767E-5	3.221E-7	0.678
LCSD	RA-226	2.825E-5	2.333E-6	2.767E-5	3.221E-7	0.243

Method Blank	**Analysis Date**	08/19/22 11:39	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	RA-226	1.471E-7	4.493E-8	3.273

Duplicate Sample	**Analysis Date**	08/19/22 11:39	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	RA-226	2.825E-5	2.333E-6	2.619E-5	2.166E-6	0.646

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01012**
SDG	**ARS1-22-01492**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Analysis Test Method	**PALA-RAD-007/EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample

Analysis Date 07/28/22 13:58 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Expected Value	CSU (1s)	Z
LCS	AM-241	32.454	1.286	33.065	0.001	0.475
LCSD	AM-241	31.496	1.248	33.065	0.001	1.257
LCS	CO-60	20.902	0.649	20.928	5.860E-4	0.040
LCSD	CO-60	21.537	0.662	20.928	5.860E-4	0.920
LCS	CS-137	13.111	0.356	12.996	3.119E-4	0.323
LCSD	CS-137	13.147	0.358	12.996	3.119E-4	0.423

Method Blank

Analysis Date 07/30/22 11:25 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Z
MBL	CS-137	-8.258E-4	7.923E-4	1.042
MBL	RA-226	-0.080	0.012	6.481
MBL	CO-60	5.501E-4	8.265E-4	0.666

Duplicate Sample

Analysis Date 07/30/22 11:28 **Analysis Technician** [redacted]

QC Type	Analyte	Results Dup	CSU (1s)	Results DO	CSU (1s)	Z
DUP	CO-60	-2.044E-7	4.214E-7	-1.841E-7	4.934E-7	0.031
DUP	CS-137	3.404E-7	3.070E-7	9.329E-9	4.017E-7	0.655
DUP	RA-226	-3.833E-6	4.019E-6	-9.335E-6	7.373E-6	0.655
LCSD	AM-241	31.496	1.248	32.454	1.286	0.535
LCSD	CO-60	21.537	0.662	20.902	0.649	0.685
LCSD	CS-137	13.147	0.358	13.111	0.356	0.071

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01102**
SDG	**ARS1-22-01492**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/16/22 20:36	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	U-238	8.089E-6	5.124E-7	8.208E-6	3.939E-8	0.232
LCSD	U-238	8.343E-6	5.276E-7	8.192E-6	3.939E-8	0.285

Method Blank	**Analysis Date**	08/16/22 20:36	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	U-234	-6.587E-9	2.946E-8	0.224
MBL	U-235	-3.817E-9	1.377E-8	0.277
MBL	U-238	-4.601E-8	2.476E-8	1.859

Duplicate Sample	**Analysis Date**	08/16/22 20:36	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	U-238	8.343E-6	5.276E-7	8.089E-6	5.124E-7	0.346

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01099**
SDG	**ARS1-22-01492**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/10/22 22:30	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	PU-239/240	7.963E-6	5.250E-7	7.747E-6	1.263E-7	0.399
LCSD	PU-239/240	7.330E-6	4.829E-7	7.726E-6	1.263E-7	0.794

Method Blank	**Analysis Date**	08/10/22 22:30	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	PU-238	2.307E-8	2.017E-8	1.144
MBL	PU-239/240	2.366E-9	2.159E-8	0.110

Duplicate Sample	**Analysis Date**	08/10/22 22:30	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	PU-239/240	7.330E-6	4.829E-7	7.963E-6	5.250E-7	0.887

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01100**
SDG	**ARS1-22-01492**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Analysis Test Method	**PALA-RAD-031/Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/09/22 22:32	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	TH-230	5.406E-6	3.577E-7	5.141E-6	1.018E-7	0.714
LCSD	TH-230	5.159E-6	3.515E-7	5.166E-6	1.018E-7	0.019

Method Blank	**Analysis Date**	08/09/22 22:32	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	TH-228	-1.392E-8	1.573E-8	0.885
MBL	TH-230	5.926E-8	1.877E-8	3.158
MBL	TH-232	1.295E-9	4.073E-9	0.318

Duplicate Sample	**Analysis Date**	08/09/22 22:32	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	TH-230	5.159E-6	3.515E-7	5.406E-6	3.577E-7	0.493

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01103**
SDG	**ARS1-22-01492**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Analysis Test Method	**PALA-RAD-032/Eichrom SRW01,HASL 300**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/09/22 10:31	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	SR-90	2.062E-5	1.615E-6	2.035E-5	3.426E-7	0.165
LCSD	SR-90	2.160E-5	1.686E-6	2.021E-5	3.426E-7	0.806

Method Blank	**Analysis Date**	08/09/22 10:31	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	SR-90	2.325E-8	1.122E-7	0.207

Duplicate Sample	**Analysis Date**	08/09/22 10:31	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	SR-90	2.160E-5	1.686E-6	2.062E-5	1.615E-6	0.417

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Sample Management Records

Event ID: Air Monitoring COC# KT071922RADB

Chain-of-Custody

Project Name and Number: _HPNS Parcel B Rad Sampling
Project Manager: [redacted]
Site Location: _San Francisco, CA 94124_

Laboratory Name: _ARS Aleut Analytical_
Address: _2609 North River Road
Port Allen, LA 70767

Contact Name: [redacted]
Phone: [redacted]

Date: _07/19/22_
Page: _1__ of _1__

Sample ID	Date	Time	Sample Matrix	No. of Containers	Analysis: ROCS per Project	Gamma-spec (901.1)	Ra-226 (903.1)	Sr-90 (905.0)	Pu by alpha	U by alpha	Th by alpha		Total Flow (L) / Special Instructions/Comments
FB-070722	7/7/2022	800	SO	1	6	X	X	X	X	X	X		0
MSB01-070722	7/8/2022	811	SO	1	6	X	X	X	X	X	X		80100
MSB02-070722	7/8/2022	901	SO	1	6	X	X	X	X	X	X		86580
MSB113A-070722	7/8/2022	830	SO	1	6	X	X	X	X	X	X		81720
MSB01-071122	7/15/2022	827	SO	1	6	X	X	X	X	X	X		348180
MSB02-071122	7/15/2022	757	SO	1	6	X	X	X	X	X	X		347340
MSB113A-071122	7/15/2022	807	SO	1	6	X	X	X	X	X	X		347460

Sampled by: [redacted]
Signature: [redacted]
Special Instructions: None

Send Results To: [redacted]

Turnaround Time: _standard_

Sampler: [redacted]

Relinquished By/Affiliation:	Date:	Time:
[redacted] / GES	7/19/22	1600

Courier/Airbill No.: FedEx 7774 2625 5842

Received By/Affiliation:	Date:	Time:
[redacted]	7/19/22	1600
	7/20/22	945

7/19/22

Procedures: GES-003 / EPA 900.0M

File ID Number: _____

	Sample ID	Date In:	Time In:	Date Out:	Time Out:	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)	Total Run Time (Hours)	Total Run Time (Minutes)	Average Flow Rate (LPM)	Initial Flow Rate (CFM)	Final Flow Rate (CFM)	Average Flow Rate (CFM)	Average Flow Rate (Cu.M/h)	Flow Rate (Cu.M/min)	Total Flow (L)
1	FB-070722	07/07/22	8:00	07/07/22	8:00	0	0	0.0	188	0.00	0.00	0.0	0	0.00	0.00	0.00	0.00	0.00	0
2	MSB01-070722	07/07/22	9:56	07/08/22	8:11	60	60	80.1	189	0.93	22.25	1335.0	60	2.12	2.12	2.12	3.60	0.06	80100
3	MSB02-070722	07/07/22	8:58	07/08/22	9:01	60	60	86.6	189	1.00	24.05	1443.0	60	2.12	2.12	2.12	3.60	0.06	86580
4	MSB113A-070722	07/07/22	9:48	07/08/22	8:30	60	60	81.7	189	0.95	22.70	1362.0	60	2.12	2.12	2.12	3.60	0.06	81720
5	MSB01-071122	07/11/22	7:44	07/15/22	8:27	60	60	348.2	196	4.03	96.72	5803.0	60	2.12	2.12	2.12	3.60	0.06	348180
6	MSB02-071122	07/11/22	7:28	07/15/22	7:57	60	60	347.3	196	4.02	96.48	5789.0	60	2.12	2.12	2.12	3.60	0.06	347340
7	MSB113A-071122	07/11/22	7:36	07/15/22	8:07	60	60	347.5	196	4.02	96.52	5791.0	60	2.12	2.12	2.12	3.60	0.06	347460
8																			
9																			
10																			
11																			
12																			
13																			

FORMULAS:

Number of Days = (Date Out +Time Out) minus (Date In+Time In)

Number of Minutes = # of Days X 24hr X 60min

Flow Rate (m3/h) = Flow Rate (CFM) x 60min x (12in x 2.54cm/in / 100cm/m)^3 :

Mid-Sample Date/Time = [(Date+Time Out) + (Date+Time In)] / 2

Flow Rate (Cu.M/min) = CFM X 0.0283168466 Cu.M/CF

Flow Rate (LPM) = Cu.M X 1000

Total Flow (L) = LPM X Total Minutes

SDG Report - Samples and Containers

SDG Specific Data							
SDG	ARS1-22-01492		TAT Days	28 Calendar Days	Project Type	Environmental
Sample Count	7	Rpt Level 4	Date Received	07/20/2022	COC Number	KT072722RADB
Client	Gilbane Federal		Discrepancy Resol	N/A	PO Number	
Client Code	1138		Client Deadline	08/17/2022	Job Number	J310000900
Profile Number	PN-01411				Job Location	
Comment						

Samples and Containers Checked In Thus Far

FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Comments
001	FB-070722	Air Filter	07/07/2022 07:59	07/07/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421068	1	HDP Container	1	LPM		0	1	
			Mid-Sample Date:	07/07/2022 07:59	AF Volume (CuM):		0.001		
002	MSB01-070722	Air Filter	07/08/2022 08:10	07/08/2022 08:11	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421069	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/08/2022 08:10	AF Volume (CuM):		0.001		
003	MSB02-070722	Air Filter	07/08/2022 09:00	07/08/2022 09:01	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421070	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/08/2022 09:00	AF Volume (CuM):		0.001		
004	MSB113A-070722	Air Filter	07/08/2022 08:29	07/08/2022 08:30	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421071	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/08/2022 08:29	AF Volume (CuM):		0.001		
005	MSB01-071122	Air Filter	07/15/2022 08:26	07/15/2022 08:27	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421072	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/15/2022 08:26	AF Volume (CuM):		0.001		
006	MSB02-071122	Air Filter	07/15/2022 07:56	07/15/2022 07:57	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421073	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/15/2022 07:56	AF Volume (CuM):		0.001		

007	MSB113A-071122	Air Filter	07/15/2022 08:06	07/15/2022 08:07	H	30	10	PrePrep	

IC_ID	Cnt	Container Type	AF Volume (L)	AF Units	Rate	Mins	Comments
421074	1	HDP Container	1	LPM		1	
		Mid-Sample Date:	07/15/2022 08:06	AF Volume (CuM):	0.001		

SDG Report - Analysis Assignments

SDG	ARS1-22-01492	Sample Count	7
Client	Gilbane Federal	Analysis Count	6-42

Sample Count Totals Per Analysis

Analysis Code	Analysis Description	In/Out	Samples Count
ASP-PU239-AF	Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	7
ASP-TH-AF	Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	7
ASP-U-AF	Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	7
GAM-A-AF	Gamma Spec (Short) in (Air Filters, Smears [AF])	I	7
GPC-RA226-AF	Radium-226 in Air Filter	I	7
GPC-SR90-AF	Strontium-90 in (Air Filters, Smears [AF])	I	7

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-PU239-AF	X
001	ASP-TH-AF	X
001	ASP-U-AF	X
001	GAM-A-AF	X
001	GPC-RA226-AF	X
001	GPC-SR90-AF	X
002	ASP-PU239-AF	X
002	ASP-TH-AF	X
002	ASP-U-AF	X
002	GAM-A-AF	X
002	GPC-RA226-AF	X
002	GPC-SR90-AF	X
003	ASP-PU239-AF	X
003	ASP-TH-AF	X
003	ASP-U-AF	X
003	GAM-A-AF	X
003	GPC-RA226-AF	X
003	GPC-SR90-AF	X
004	ASP-PU239-AF	X
004	ASP-TH-AF	X
004	ASP-U-AF	X
004	GAM-A-AF	X
004	GPC-RA226-AF	X
004	GPC-SR90-AF	X
005	ASP-PU239-AF	X
005	ASP-TH-AF	X
005	ASP-U-AF	X

005	GAM-A-AF	**X**
005	GPC-RA226-AF	**X**
005	GPC-SR90-AF	**X**
006	ASP-PU239-AF	**X**
006	ASP-TH-AF	**X**
006	ASP-U-AF	**X**
006	GAM-A-AF	**X**
006	GPC-RA226-AF	**X**
006	GPC-SR90-AF	**X**
007	ASP-PU239-AF	**X**
007	ASP-TH-AF	**X**
007	ASP-U-AF	**X**
007	GAM-A-AF	**X**
007	GPC-RA226-AF	**X**
007	GPC-SR90-AF	**X**

Client Name: Gilbane Federal Profile Name: Parcel B Rad Sampling Report Level: 4

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time					
ASP-PU239-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Pu-239/240 (15117-48-3)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-TH-AF	WRAD	uCi	filter	N/A	PALA-RAD-031						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Th-232 (7440-29-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-U-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	U-235 (15117-96-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GAM-A-AF	WGAM	uCi	filter	N/A	PALA-RAD-007						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Co-60 (10198-40-0)			0.00024 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Cs-137 (10045-97-3)			0.00048 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-RA226-AF	WRAD	uCi	filter		PALA-RAD-008						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-SR90-AF	WRAD	uCi	filter	N/A	PALA-RAD-032						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Sr-90 (10098-97-2)			2.4E-05 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A

Analysis Code	Fraction	Units	Aliquot	Conductivity	Analyte Count
ASP-PU239-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	006	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	007	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-TH-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	

ASP-TH-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	006	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	007	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-U-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	006	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	007	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
GAM-A-AF	001	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	

GAM-A-AF	002	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	003	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	004	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	005	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	006	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	007	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	

GPC-RA226-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	006	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	007	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-SR90-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	006	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

GPC-SR90-AF	007	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

ARS Aleut Analytical

PALA Sample Receipt Inspection Form

Client Name: GES

SDG: ARS1-22-01492

Sample Custodian: [redacted] Survey Start Date: 7/20/22 Survey Start Time: 1019

Thermometer ID: E0064010085 Calibration Due Date: 2-28-23 pH Paper Lot# NA

Exposure Rate Meter + Probe Unit ID: PR3544C9/273629 Calibration Due Date: 5-27-22 Background: 4 µR/hr

Count Rate Meter + Probe Unit ID: PR368083/331788 Calibration Due Date: 9-22-22 Background: 20 cpm

Delivery Type (circle one): Direct Lock Box (Commercial Carrier: FEDEX) Total # of ESCs: 1

*True temperature is recorded which includes any applicable correction factors.

External Shipping Container Tracking:	Exposure Rate (µR/hr) (limit <500 µR/hr)	Max External Swipe Counts (cpm)	Max Internal Swipe Counts (cpm)	ESC True Temps* (°C)	TRAX Matrix ID (circle all that apply): (See Section 4.3 of SOP)
A: 777426255882	5	30	50		AQ WD WG WO
B:					WS WW SI UR
C:					SO OL BI VG
D:					WP SM (AF)
E:					
F:					

Visual Inspection: External Shipping Container (Circle response)

Good Condition with no Leaks or Tears	(Yes)	No
Marked Radioactive	Yes	(No)
UN2910	Yes	(No)
Security Seals	(Yes)	~~No~~
If yes, intact?	(Yes)	No (N/A)

7.24.22 [redacted]

Internal Shipping Container

COC's Present	(Yes)	No
Well packaged container with no signs of leakage	(Yes)	No

COC/Sample Inspection (Circle response)

Sample Containers in good condition	(Yes)	No	
No spills or leaks	(Yes)	No	
Marked Radioactive	Yes	(No)	
Durable labels w/indelible ink	(Yes)	No	
COC reliquished/received correctly	(Yes)	No	
Adequate volume/filled correctly	(Yes)	No	
Hold Time sufficient for analysis	(Yes)	No	
For VOC/Radon, Head space?	Yes	(No)	N/A
If yes, <6mm?	Yes	No	(N/A)
# of containers received matches # on COC	(Yes)	No	
Samples received on ice?	Yes	(No)	

Type (circle one): Bagged Ice Loose Ice Blue Ice (N/A)

Comments:

ARS Aleut Analytical

PALA Sample Survey Form

Client Name: GES

SDG: ARS1-22-01492

Sample Survey Form
PALA-SR-001-FM-02 r 0.1
Effective 08/30/2019

Pipette ID: NA Tip Lot#: NA

Disposible pipette lot#: NA

Sample ID from Client on COC or Sample	ESC Letter	Sample Container Type	Approx. Fill Level (%)	pH <2 is Acceptable: pH As Rec'd	pH <2 is Acceptable: pH Adjusted	Acid Lot # or Ind container temp (°C)	Vol. of Acid Used (mL)	Acceptance Limits: <100 cpm/cm cpm
FB-070722	A	Ziploc	25	NA	NA	NA	NA	50
MSB01-070722	↓	↓	↓	↓	↓	↓	↓	↓
MSB02-070722								
MSB113A-070722								
MSB01-071122								
MSB02-071122								
MSB113A-071122								

Sample Custodian: [redacted] Survey End Date: 7/20/22 Survey/pH End Time: 1025

pH re-check required? YES or NO *NOTE: Any metals sample acidified at sample receiving must be re-checked after a 24 hour hold.*

If YES: pH re-check date/time: _____/_____ Analyst: _____ pH strip lot #: _____

Were all re-checked samples' pH < 2? YES or NO*

**If no, complete and send to Project Management:*
1. Section A of PALA-SR-001-FM-05 (24 Hour Hold pH Readjustment)
2. SR section of PALA-SR-001-FM-03 (Discrepant Sample Receipt Report).

ENVIRONMENTAL SOLUTIONS | QUALITY CONSCIOUS

ORIGIN ID:JCCA [redacted]
[redacted]
200 FISHER STREET

SAN FRANCISCO, CA 94124
UNITED STATES US

SHIP DATE: 19JUL22
ACTWGT: 1.00 LB
CAD: 254128867/INET4490

BILL SENDER

TO [redacted]

ARS ALEUT ANALYTICAL, LLC
2609 NORTH RIVER ROAD

PORT ALLEN LA 70767

[redacted]
REF: J31000.900.01.21.06
INV
PO: DEPT:

591J20A92/FE4A

FedEx Express

J222022041201uv

WED - 20 JUL 4:30P
STANDARD OVERNIGHT

TRK# 0201 **7774 2625 5882**

XN OPLA

70767
LA-US **MSY**

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Alpha Spec Th-Raw Data

Analytical Batch Report

Analysis Batch ID ARS1-B22-01100

Procedure PALA-RAD-031 **Analysis** ASP-TH-AF **Prep** N/A

Description Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01100-01	LCS	B-31712										
ARS1-B22-01100-02	LCSD	B-31713										
ARS1-B22-01100-03	MBL											
ARS1-B22-01100-04	TRG				**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-05	TRG				**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-06	TRG				**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-07	TRG				**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-08	TRG				**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-09	TRG				**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-10	TRG				**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/22/22

Analytical Batch Report

Analysis Batch ID ARS1-B22-01100

Procedure PALA-RAD-031 **Analysis** ASP-TH-AF **Prep** N/A

Description Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01100-01	LCS	B-31712										
ARS1-B22-01100-02	LCSD	B-31713										
ARS1-B22-01100-03	MBL											
ARS1-B22-01100-04	TRG		0.2	421068	**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-05	TRG		16,020	421069	**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-06	TRG		17,316	421070	**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-07	TRG		16,344	421071	**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-08	TRG		69,636	421072	**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-09	TRG		69,468	421073	**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01100-10	TRG		69,492	421074	**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/22/22

Technical Note Report

ABATCH	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

#	Date	Dept	Technical Note	User ID
1	08/10/2022 3:19 PM	COUNTROOM	ROI's adjusted to better fit the peaks of interest.	[redacted]
2	08/10/2022 3:20 PM	COUNTROOM	The FWHM is greater than 100 keV for Th-229 on batch samples -01, -02, and -07.	

LCS Report
Analytical Batch: ARS1-B22-01100

Blind ID	ABatch Sample ID	Blind Group	Std ID	Isotope	Exp Addition (g)	Expected Value (pCi/g)	Empty Wt (g)	Gross Wt (g)	Net Wt (g)	Expected Value CT (pCi/g)	Mid Point Count Date	Known Value (pCi)	User ID	Mod Date
B-31712	ARS1-B22-01100-01	B-Th230	S-0365	Th-230	1	5.08989	1.981	2.991	1.0100	5.08989	08/09/2022	5.14079	[redacted]	08/08/2022
B-31713	ARS1-B22-01100-02	B-Th230	S-0365	Th-230	1	5.08989	1.969	2.984	1.0150	5.08989	08/09/2022	5.16624	[redacted]	08/08/2022

Tracer Report
Analytical Batch: ARS1-B22-01100

ABatch Sample ID	Sample Type	Empty Wt	Filled Wt	Net Wt	Exp Val	Std ID	Isotope	Tracer Date	HL Days	Ref Date	Cert dpm/g	Curr ACT	User ID
ARS1-B22-01100-01	LCS	0.976	1.981	1.005	9.919	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	[redacted]
ARS1-B22-01100-02	LCSD	0.967	1.969	1.002	9.889	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-03	MBL	0.957	1.957	1.000	9.870	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-04	TRG	0.940	1.940	1.000	9.870	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-05	TRG	0.952	1.952	1.000	9.870	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-06	TRG	0.947	1.948	1.001	9.879	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-07	TRG	0.935	1.934	0.999	9.860	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-08	TRG	0.953	1.953	1.000	9.870	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-09	TRG	0.937	1.941	1.004	9.909	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	
ARS1-B22-01100-10	TRG	0.964	1.966	1.002	9.889	S-0373	Th-229	08/08/2022	2680555.556	08/03/2022	9.870	9.870	

Calculation Report
ARS1-B22-01100

ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01100-01	LCS					Th-229	4.46796E-6	2.99650E-7	5.87314E-7	4.51595E-8	1.84070E-8	1.17831E-7	2.30950E-7		uCi/sample
ARS1-B22-01100-01	LCS					Th-230	5.40647E-6	3.57676E-7	7.01045E-7	4.22940E-8	1.69659E-8	1.29572E-7	2.53961E-7		uCi/sample
ARS1-B22-01100-02	LCSD					Th-229	4.45462E-6	3.08040E-7	6.03759E-7	6.86124E-8	2.84856E-8	1.39411E-7	2.73246E-7		uCi/sample
ARS1-B22-01100-02	LCSD					Th-230	5.15923E-6	3.51496E-7	6.88931E-7	4.94230E-8	1.88792E-8	1.49461E-7	2.92943E-7		uCi/sample
ARS1-B22-01100-03	MBL					Th-228	-1.39178E-8	1.57292E-8	3.08292E-8	6.59461E-8	2.82584E-8	1.57057E-8	3.07833E-8		uCi/sample
ARS1-B22-01100-03	MBL					Th-229	4.44573E-6	3.01504E-7	5.90948E-7	7.51330E-8	3.28873E-8	1.25508E-7	2.45996E-7		uCi/sample
ARS1-B22-01100-03	MBL					Th-230	5.92568E-8	1.87659E-8	3.67812E-8	4.74283E-8	1.90255E-8	1.84067E-8	3.60772E-8		uCi/sample
ARS1-B22-01100-03	MBL					Th-232	1.29500E-9	4.07311E-9	7.98330E-9	2.08084E-8	5.72493E-9	4.07233E-9	7.98177E-9		uCi/sample
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	FB-070722	1	Th-228	9.41677E-8	9.03152E-8	1.77018E-7	3.11567E-7	1.33099E-7	9.01283E-8	1.76652E-7		uCi/sample
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	FB-070722	1	Th-229	2.22288E-5	1.49860E-6	2.93727E-6	3.59321E-7	1.57852E-7	6.05785E-7	1.18734E-6		uCi/sample
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	FB-070722	1	Th-230	1.69332E-7	7.75209E-8	1.51941E-7	2.28930E-7	9.26132E-8	7.68145E-8	1.50556E-7		uCi/sample
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	FB-070722	1	Th-232	2.41419E-8	3.79882E-8	7.44569E-8	1.50343E-7	5.33633E-8	3.79590E-8	7.43997E-8		uCi/sample
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Th-228	3.45549E-8	5.30144E-8	1.03908E-7	1.96211E-7	7.93766E-8	5.29716E-8	1.03824E-7		uCi/sample
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Th-229	2.22288E-5	1.47676E-6	2.89444E-6	2.96966E-7	1.30459E-7	5.49519E-7	1.07706E-6		uCi/sample
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Th-230	1.03294E-7	5.67581E-8	1.11246E-7	1.75865E-7	6.98725E-8	5.63996E-8	1.10543E-7		uCi/sample
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Th-232	5.81945E-8	3.10911E-8	6.09385E-8	8.01502E-8	2.20514E-8	3.08833E-8	6.05313E-8		uCi/sample
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Th-228	9.04048E-8	8.02247E-8	1.57240E-7	2.75513E-7	1.14966E-7	8.00308E-8	1.56860E-7		uCi/sample
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Th-229	2.22511E-5	1.49892E-6	2.93789E-6	2.51729E-7	1.03931E-7	6.03465E-7	1.18279E-6		uCi/sample
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Th-230	2.77756E-7	7.48324E-8	1.46672E-7	1.37099E-7	4.65721E-8	7.28460E-8	1.42778E-7		uCi/sample
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Th-232	5.99314E-8	3.89355E-8	7.63136E-8	1.19766E-7	3.79499E-8	3.87598E-8	7.59691E-8		uCi/sample
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Th-228	1.33112E-7	7.69202E-8	1.50764E-7	2.43891E-7	1.00083E-7	7.64810E-8	1.49903E-7		uCi/sample
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Th-229	2.22066E-5	1.49215E-6	2.92462E-6	3.09598E-7	1.33759E-7	5.92815E-7	1.16192E-6		uCi/sample
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Th-230	1.75036E-7	6.56884E-8	1.28749E-7	1.68525E-7	6.31804E-8	6.47956E-8	1.26999E-7		uCi/sample
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Th-232	4.27009E-8	3.40547E-8	6.67472E-8	1.14888E-7	3.64042E-8	3.39528E-8	6.65474E-8		uCi/sample
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Th-228	6.43724E-8	6.41367E-8	1.25708E-7	2.26502E-7	8.99913E-8	6.40137E-8	1.25467E-7		uCi/sample
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Th-229	2.22288E-5	1.50160E-6	2.94313E-6	3.03785E-7	1.29352E-7	6.13159E-7	1.20179E-6		uCi/sample
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Th-230	2.89614E-7	8.76696E-8	1.71832E-7	2.10969E-7	8.28989E-8	8.58313E-8	1.68229E-7		uCi/sample
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Th-232	6.23816E-8	4.01823E-8	7.87574E-8	1.23083E-7	3.90007E-8	3.99978E-8	7.83957E-8		uCi/sample
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Th-228	5.09058E-8	6.65760E-8	1.30489E-7	2.44253E-7	9.70437E-8	6.65020E-8	1.30344E-7		uCi/sample
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Th-229	2.23177E-5	1.51672E-6	2.97278E-6	3.07867E-7	1.29627E-7	6.37617E-7	1.24973E-6		uCi/sample
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Th-230	2.29173E-7	8.71789E-8	1.70871E-7	2.37169E-7	9.42291E-8	8.60259E-8	1.68611E-7		uCi/sample
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Th-232	4.93305E-8	3.93419E-8	7.71101E-8	1.32725E-7	4.20562E-8	3.92241E-8	7.68793E-8		uCi/sample
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Th-228	1.14339E-7	8.09986E-8	1.58757E-7	2.68394E-7	1.10812E-7	8.06911E-8	1.58155E-7		uCi/sample

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Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Th-229	2.22732E-5	1.50390E-6	2.94764E-6	2.20681E-7	8.76786E-8	6.12663E-7	1.20082E-6		uCi/sample
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Th-230	1.25687E-7	5.75087E-8	1.12717E-7	1.56542E-7	5.55636E-8	5.69841E-8	1.11689E-7		uCi/sample
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Th-232	2.29964E-8	2.58980E-8	5.07600E-8	1.00776E-7	2.77262E-8	2.58591E-8	5.06839E-8		uCi/sample

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ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01100-01	LCS			65.2%		1459.000000	900	13.000000	1440	0.24938	1	8/8/2022	8/9/2022
ARS1-B22-01100-01	LCS			65.2%		1759.000000	900	11.000000	1440	0.24938	1	8/8/2022	8/9/2022
ARS1-B22-01100-02	LCSD			47.8%		1047.000000	900	16.000000	1440	0.24369	1	8/8/2022	8/9/2022
ARS1-B22-01100-02	LCSD			47.8%		1203.000000	900	7.000000	1440	0.24369	1	8/8/2022	8/9/2022
ARS1-B22-01100-03	MBL			54.9%		11.000000	900	24.000000	1440	0.26422	1	8/8/2022	8/9/2022
ARS1-B22-01100-03	MBL			54.9%		1308.000000	900	33.000000	1440	0.26422	1	8/8/2022	8/9/2022
ARS1-B22-01100-03	MBL			54.9%		24.000000	900	11.000000	1440	0.26422	1	8/8/2022	8/9/2022
ARS1-B22-01100-03	MBL			54.9%		1.000000	900	1.000000	1440	0.26422	1	8/8/2022	8/9/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	60.2%		20.000000	900	23.000000	1440	0.25826	0.2	7/7/2022	8/9/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	60.2%		1403.000000	900	35.000000	1440	0.25826	0.2	7/7/2022	8/9/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	60.2%		18.000000	900	12.000000	1440	0.25826	0.2	7/7/2022	8/9/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	60.2%		4.000000	900	4.000000	1440	0.25826	0.2	7/7/2022	8/9/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	72.9%		10.000000	900	12.000000	1440	0.25796	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	72.9%		1693.000000	900	35.000000	1440	0.25796	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	72.9%		14.000000	900	10.000000	1440	0.25796	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	72.9%		5.000000	900	1.000000	1440	0.25796	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	58.4%		16.000000	900	17.000000	1440	0.26477	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	58.4%		1384.000000	900	15.000000	1440	0.26477	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	58.4%		19.000000	900	3.000000	1440	0.26477	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	58.4%		4.952469	900	2.000000	1440	0.26477	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	62.0%		17.000000	900	14.000000	1440	0.25980	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	62.0%		1447.000000	900	27.000000	1440	0.25980	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	62.0%		15.000000	900	6.000000	1440	0.25980	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	62.0%		4.000000	900	2.000000	1440	0.25980	0.2	7/8/2022	8/9/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	63.5%		10.000000	900	10.000000	1440	0.23679	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	63.5%		1350.000000	900	22.000000	1440	0.23679	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	63.5%		23.000000	900	9.000000	1440	0.23679	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	63.5%		5.000000	900	2.000000	1440	0.23679	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	52.2%		9.000000	900	10.000000	1440	0.26702	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	52.2%		1256.000000	900	19.000000	1440	0.26702	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	52.2%		19.000000	900	10.000000	1440	0.26702	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	52.2%		4.000000	900	2.000000	1440	0.26702	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	58.9%		16.000000	900	15.000000	1440	0.25400	0.2	7/15/2022	8/9/2022

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Calculation Report
ARS1-B22-01100

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	58.9%		1338.000000	900	10.000000	1440	0.25400	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	58.9%		10.000000	900	4.000000	1440	0.25400	0.2	7/15/2022	8/9/2022
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	58.9%		2.000000	900	1.000000	1440	0.25400	0.2	7/15/2022	8/9/2022

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Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01100-01	LCS			2220000	1	1.62111	0.00903	1.61208	0.715	17166651 - E5		1	Th-229	8/3/2022
ARS1-B22-01100-01	LCS			2220000	1	1.95444	0.00764	1.94681	0.715	17166651 - E5		0.998	Th-229	8/3/2022
ARS1-B22-01100-02	LCSD			2220000	1	1.16333	0.01111	1.15222	0.715	17166651 - E6		1	Th-229	8/3/2022
ARS1-B22-01100-02	LCSD			2220000	1	1.33667	0.00486	1.33181	0.715	17166651 - E6		0.998	Th-229	8/3/2022
ARS1-B22-01100-03	MBL			2220000	1	0.01222	0.01667	-0.00444	0.715	17166652 - E7		0.994	Th-229	8/3/2022
ARS1-B22-01100-03	MBL			2220000	1	1.45333	0.02292	1.43042	0.715	17166652 - E7		1	Th-229	8/3/2022
ARS1-B22-01100-03	MBL			2220000	1	0.02667	0.00764	0.01903	0.715	17166652 - E7		0.998	Th-229	8/3/2022
ARS1-B22-01100-03	MBL			2220000	1	0.00111	0.00069	0.00042	0.715	17166652 - E7		1	Th-229	8/3/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	2220000	1	0.02222	0.01597	0.00625	0.715	17166652 - E8		0.994	Th-229	8/3/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	2220000	1	1.55889	0.02431	1.53458	0.715	17166652 - E8		1	Th-229	8/3/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	2220000	1	0.02000	0.00833	0.01167	0.715	17166652 - E8		0.998	Th-229	8/3/2022
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	2220000	1	0.00444	0.00278	0.00167	0.715	17166652 - E8		1	Th-229	8/3/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	2220000	1	0.01111	0.00833	0.00278	0.715	17165813 - F1		0.994	Th-229	8/3/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	2220000	1	1.88111	0.02431	1.85681	0.715	17165813 - F1		1	Th-229	8/3/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	2220000	1	0.01556	0.00694	0.00861	0.715	17165813 - F1		0.998	Th-229	8/3/2022
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	2220000	1	0.00556	0.00069	0.00486	0.715	17165813 - F1		1	Th-229	8/3/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	2220000	1	0.01778	0.01181	0.00597	0.715	17165813 - F2		0.994	Th-229	8/3/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	2220000	1	1.53778	0.01042	1.52736	0.715	17165813 - F2		1	Th-229	8/3/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	2220000	1	0.02111	0.00208	0.01903	0.715	17165813 - F2		0.998	Th-229	8/3/2022
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	2220000	1	0.00550	0.00139	0.00411	0.715	17165813 - F2		1	Th-229	8/3/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	2220000	1	0.01889	0.00972	0.00917	0.715	17165814 - F3		0.994	Th-229	8/3/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	2220000	1	1.60778	0.01875	1.58903	0.715	17165814 - F3		1	Th-229	8/3/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	2220000	1	0.01667	0.00417	0.01250	0.715	17165814 - F3		0.998	Th-229	8/3/2022
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	2220000	1	0.00444	0.00139	0.00306	0.715	17165814 - F3		1	Th-229	8/3/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	2220000	1	0.01111	0.00694	0.00417	0.715	17165814 - F4		0.994	Th-229	8/3/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	2220000	1	1.50000	0.01528	1.48472	0.715	17165814 - F4		1	Th-229	8/3/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	2220000	1	0.02556	0.00625	0.01931	0.715	17165814 - F4		0.998	Th-229	8/3/2022
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	2220000	1	0.00556	0.00139	0.00417	0.715	17165814 - F4		1	Th-229	8/3/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	2220000	1	0.01000	0.00694	0.00306	0.715	17165815 - F5		0.994	Th-229	8/3/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	2220000	1	1.39556	0.01319	1.38236	0.715	17165815 - F5		1	Th-229	8/3/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	2220000	1	0.02111	0.00694	0.01417	0.715	17165815 - F5		0.998	Th-229	8/3/2022
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	2220000	1	0.00444	0.00139	0.00306	0.715	17165815 - F5		1	Th-229	8/3/2022
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	2220000	1	0.01778	0.01042	0.00736	0.715	17165816 - F6		0.994	Th-229	8/3/2022

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Calculation Report
ARS1-B22-01100

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	2220000	1	1.48667	0.00694	1.47972	0.715	17165816 - F6		1	Th-229	8/3/2022
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	2220000	1	0.01111	0.00278	0.00833	0.715	17165816 - F6		0.998	Th-229	8/3/2022
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	2220000	1	0.00222	0.00069	0.00153	0.715	17165816 - F6		1	Th-229	8/3/2022

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Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01100-01	LCS			2.68056E+6			1.52708			1.00000					
ARS1-B22-01100-01	LCS			2.75347E+7			1.52708			1.00000					
ARS1-B22-01100-02	LCSD			2.68056E+6			1.52708			1.00000					
ARS1-B22-01100-02	LCSD			2.75347E+7			1.52708			1.00000					
ARS1-B22-01100-03	MBL			698.35648			1.52708			0.99849					
ARS1-B22-01100-03	MBL			2.68056E+6			1.52708			1.00000					
ARS1-B22-01100-03	MBL			2.75347E+7			1.52708			1.00000					
ARS1-B22-01100-03	MBL			5.13194E+12			1.52708			1.00000					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	698.35648			33.60556			0.96720					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	2.68056E+6			33.60556			0.99999					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	2.75347E+7			33.60556			1.00000					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	5.13194E+12			33.60556			1.00000					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	698.35648			32.59792			0.96816					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	2.68056E+6			32.59792			0.99999					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	2.75347E+7			32.59792			1.00000					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	5.13194E+12			32.59792			1.00000					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	698.35648			32.56319			0.96820					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	2.68056E+6			32.56319			0.99999					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	2.75347E+7			32.56319			1.00000					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	5.13194E+12			32.56319			1.00000					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	698.35648			32.58472			0.96818					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	2.68056E+6			32.58472			0.99999					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	2.75347E+7			32.58472			1.00000					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	5.13194E+12			32.58472			1.00000					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	698.35648			25.58681			0.97492					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	2.68056E+6			25.58681			0.99999					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	2.75347E+7			25.58681			1.00000					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	5.13194E+12			25.58681			1.00000					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	698.35648			25.60764			0.97490					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	2.68056E+6			25.60764			0.99999					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	2.75347E+7			25.60764			1.00000					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	5.13194E+12			25.60764			1.00000					
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	698.35648			25.60069			0.97491					

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Calculation Report
ARS1-B22-01100

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	2.68056E+6			25.60069			0.99999					
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	2.75347E+7			25.60069			1.00000					
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	5.13194E+12			25.60069			1.00000					

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ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU F5	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01100-01	LCS			0	0.02	0.05833	0	0	0	0.06166	3.60810E+5	3.24729E+8	1.19389E-7	2.46611E-7	0.11375
ARS1-B22-01100-01	LCS			0	0.02	0.05833	0	0	0	0.06166	3.60088E+5	3.24079E+8	9.34393E-8	1.94840E-7	0.08903
ARS1-B22-01100-02	LCSD			0	0.02	0.05833	0	0	0	0.06166	2.58658E+5	2.32792E+8	1.19389E-7	2.49907E-7	0.11375
ARS1-B22-01100-02	LCSD			0	0.02	0.05833	0	0	0	0.06166	2.58140E+5	2.32326E+8	9.34393E-8	1.98142E-7	0.08903
ARS1-B22-01100-03	MBL			0	0.02	0.05833	0	0	0	0.06166	3.19336E+5	2.87402E+8	4.44409E-8	9.81204E-8	0.04228
ARS1-B22-01100-03	MBL			0	0.02	0.05833	0	0	0	0.06166	3.21751E+5	2.89576E+8	1.19389E-7	2.47624E-7	0.11375
ARS1-B22-01100-03	MBL			0	0.02	0.05833	0	0	0	0.06166	3.21107E+5	2.88997E+8	9.34393E-8	1.95855E-7	0.08903
ARS1-B22-01100-03	MBL			0	0.02	0.05833	0	0	0	0.06166	3.21751E+5	2.89576E+8	4.73410E-8	1.03837E-7	0.04511
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	66370.95507	5.97339E+7	2.29393E-7	5.03170E-7	0.04228
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	69035.70254	6.21321E+7	5.96951E-7	1.23496E-6	0.11375
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	68898.17156	6.20084E+7	4.67197E-7	9.76093E-7	0.08903
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	69036.30245	6.21327E+7	2.36705E-7	5.16011E-7	0.04511
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	80387.47075	7.23487E+7	2.29164E-7	4.94802E-7	0.04228
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	83531.40988	7.51783E+7	5.96950E-7	1.22739E-6	0.11375
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	83364.98135	7.50285E+7	4.67197E-7	9.68509E-7	0.08903
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	83532.11399	7.51789E+7	2.36705E-7	5.08442E-7	0.04511
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	66060.91063	5.94548E+7	2.29156E-7	5.02909E-7	0.04228
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	68642.17559	6.17780E+7	5.96950E-7	1.23521E-6	0.11375
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	68505.41191	6.16549E+7	4.67197E-7	9.76343E-7	0.08903
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	68642.75358	6.17785E+7	2.36705E-7	5.16261E-7	0.04511
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	68864.21896	6.19778E+7	2.29161E-7	5.01064E-7	0.04228
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	71556.54897	6.44009E+7	5.96950E-7	1.23342E-6	0.11375
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	71413.97902	6.42726E+7	4.67197E-7	9.74553E-7	0.08903
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	71557.15190	6.44014E+7	2.36705E-7	5.14474E-7	0.04511
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	64727.57259	5.82548E+7	2.27575E-7	5.00693E-7	0.04228
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	66792.75866	6.01135E+7	5.96949E-7	1.23642E-6	0.11375
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	66659.57124	5.99936E+7	4.67197E-7	9.77560E-7	0.08903
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	66793.20058	6.01139E+7	2.36705E-7	5.17476E-7	0.04511
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	60023.72257	5.40214E+7	2.27579E-7	5.04348E-7	0.04228
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	61940.10891	5.57461E+7	5.96949E-7	1.23995E-6	0.11375
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	61816.59818	5.56349E+7	4.67197E-7	9.81099E-7	0.08903
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	61940.51906	5.57465E+7	2.36705E-7	5.21007E-7	0.04511
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	64379.94469	5.79420E+7	2.27578E-7	5.00950E-7	0.04228

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Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU F5	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	66434.95499	5.97915E+7	5.96949E-7	1.23666E-6	0.11375
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	66302.48127	5.96722E+7	4.67197E-7	9.77804E-7	0.08903
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	66435.39478	5.97919E+7	2.36705E-7	5.17718E-7	0.04511

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ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01100-01	LCS								
ARS1-B22-01100-01	LCS				5.14079E-6	105.2%			
ARS1-B22-01100-02	LCSD								
ARS1-B22-01100-02	LCSD				5.16624E-6	99.9%	4.7%	0.34863	0.49302
ARS1-B22-01100-03	MBL			U					
ARS1-B22-01100-03	MBL								
ARS1-B22-01100-03	MBL								
ARS1-B22-01100-03	MBL			U					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	B					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01100-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	B					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01100-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	B					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	B					
ARS1-B22-01100-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	B					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	B					
ARS1-B22-01100-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	B					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	B					
ARS1-B22-01100-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	B					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01100-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	U					

Calculated By: [redacted] on 9/1/2022 1:59:59 PM

Calculation Report
ARS1-B22-01100

Analytical Batch ID	ARS1-B22-01100
Analysis Code	ASP-TH-AF
Procedure No	PALA-RAD-031
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	B					
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	U					
ARS1-B22-01100-10	TRG	ARS1-22-01492	007	U					

Calculated By [redacted] on 9/1/2022 1:59:59 PM

PALA-RAD-031

Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation

Preparation Date: 08/08/2022 09:53

Prepared By: [redacted]

Procedure Data

ABatch Sample ID	Type	SDG/Fraction	ICOC ID	Aliquot Vol/Wt	Aliquot Units
ARS1-B22-01100-01	LCS			1.0000	Sample
ARS1-B22-01100-02	LCSD			1.0000	Sample
ARS1-B22-01100-03	MBL			1.0000	Sample
ARS1-B22-01100-04	TRG	ARS1-22-01492-001	421954	0.2000	Sample
ARS1-B22-01100-05	TRG	ARS1-22-01492-002	421955	0.2000	Sample
ARS1-B22-01100-06	TRG	ARS1-22-01492-003	421956	0.2000	Sample
ARS1-B22-01100-07	TRG	ARS1-22-01492-004	421957	0.2000	Sample
ARS1-B22-01100-08	TRG	ARS1-22-01492-005	421958	0.2000	Sample
ARS1-B22-01100-09	TRG	ARS1-22-01492-006	421959	0.2000	Sample
ARS1-B22-01100-10	TRG	ARS1-22-01492-007	421960	0.2000	Sample

Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation

Reagent Amounts

ABatch Sample ID	Type	SDG/Fraction	14.4.2.2. Condition TEVA Resin - Nitric Acid 3N (mL)
ARS1-B22-01100-01	LCS		5.00
ARS1-B22-01100-02	LCSD		5.00
ARS1-B22-01100-03	MBL		5.00
ARS1-B22-01100-04	TRG	ARS1-22-01492-001	5.00
ARS1-B22-01100-05	TRG	ARS1-22-01492-002	5.00
ARS1-B22-01100-06	TRG	ARS1-22-01492-003	5.00
ARS1-B22-01100-07	TRG	ARS1-22-01492-004	5.00
ARS1-B22-01100-08	TRG	ARS1-22-01492-005	5.00
ARS1-B22-01100-09	TRG	ARS1-22-01492-006	5.00
ARS1-B22-01100-10	TRG	ARS1-22-01492-007	5.00

Reagent Tracking

Procedure Section	Reagent ID
14.0. Air Filter Leaching	R22-00553
14.3.1.3. Set Up TEVA Cartridge	R22-00207
14.4.1.1. Dissolve Residue in Load Solution	R22-00514
14.4.2.2. Condition TEVA Resin	R22-00553
14.4.2.4. Beaker Rinse	R22-00553
14.4.2.5. Loaded Column Rinse	R22-00553
14.4.2.7. Elude Th	R22-00552
14.5.1.4. Electrolyte Solution-A	R22-00435
14.5.1.4. Electrolyte Solution-B	R22-00405
14.5.1.4. Add Plating Solution-C	R22-00506
14.5.1.10. Quench Electrolysis Reaction	R22-00073
14.5.1.12. Rinse Electrolysis Cell	R22-00261
14.5.1.13. Rinse Planchet-A	R22-00261
14.5.1.13. Rinse Planchet-C	R22-00210
14.5.1.1. Rinse Planchet	R22-00210
14.5.1.13. Rinse Planchet-B	R21-00357

Support Equipment

Equipment Type	Serial/Batch/Lot	Comments
Fume Hood	030807173-B (WET LAB)	
Hot Block	#11 SN 143475 (Radiochem)	
Balance	T0350192 (Soil LAB)	
Pipette	PU29204	
Pipette Tip	5mL VWR 19480271	
Eichrom Outer Tip	22011733001	
Eichrom Support Tube	21012629871	
Planchette	Lot 12-10-21 (3/4 inch)	
Fume Hood	030807171-B (WET LAB)	
Hot Block	#12 SN 145414 (Radiochem)	

Samples to be counted:

Sample 22-01100-01 to detector 17166651 - E5, marked to be counted
Sample 22-01100-02 to detector 17166651 - E6, marked to be counted
Sample 22-01100-03 to detector 17166652 - E7, marked to be counted
Sample 22-01100-04 to detector 17166652 - E8, marked to be counted
Sample 22-01100-05 to detector 17165813 - F1, marked to be counted
Sample 22-01100-06 to detector 17165813 - F2, marked to be counted
Sample 22-01100-07 to detector 17165814 - F3, marked to be counted
Sample 22-01100-08 to detector 17165814 - F4, marked to be counted
Sample 22-01100-09 to detector 17165815 - F5, marked to be counted
Sample 22-01100-10 to detector 17165816 - F6, marked to be counted

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,288 9:32:13AM 8/10/2022

Sample

Sample: 22-01100-01 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCS

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

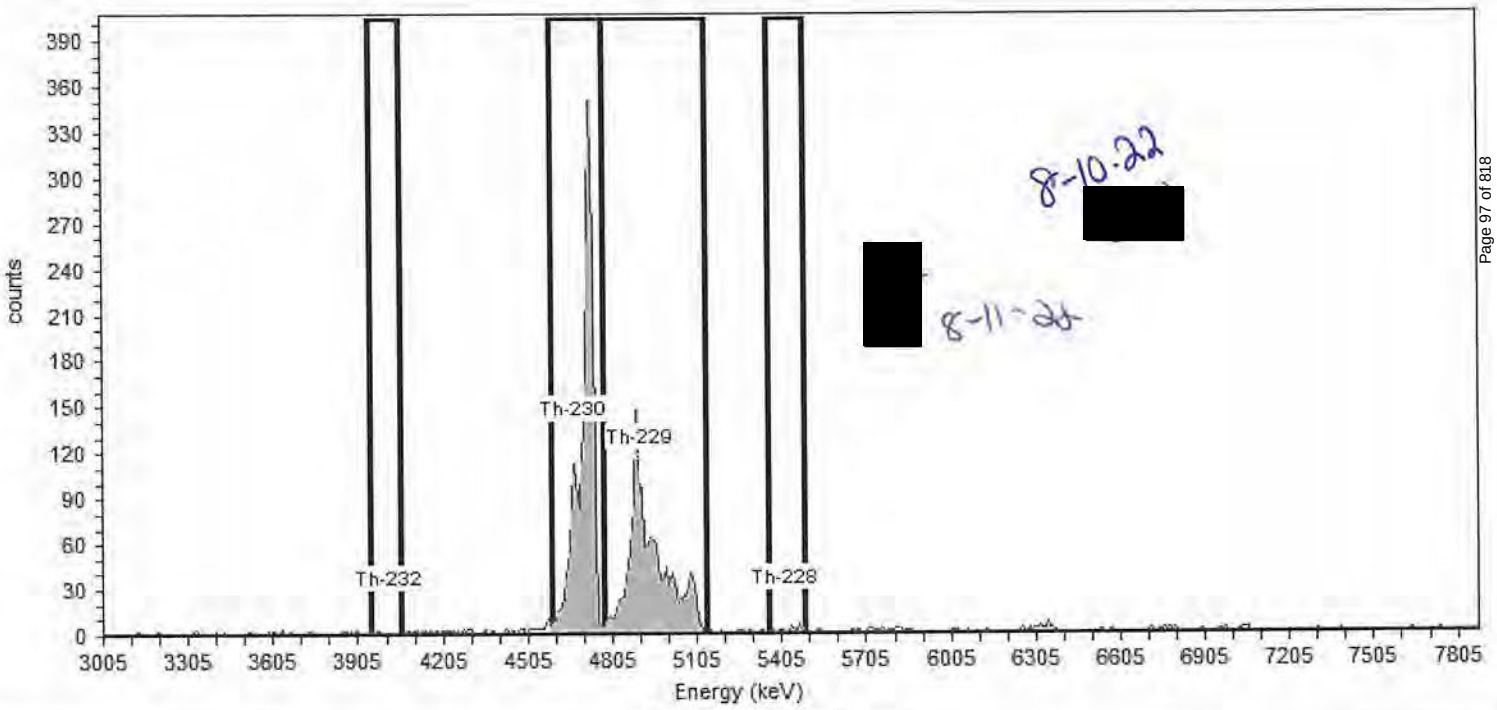
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3943.584	4050.462	0.0	100.0	3.00	1.2500	1.75	7.797E-003	8.666E-003	1.045E-002	3.295E-002
Th-230	4674.607	4592.604	4775.800	35.2	99.7	1,759.00	6.8750	1752.13	7.830E+000	2.784E-001	2.457E-002	6.123E-002
Th-229	4900.994	4775.800	5141.059	108.5	98.8	1,459.00	8.1250	1450.88	6.546E+000	2.436E-001	2.697E-002	6.615E-002
Th-228	5423.000	5361.403	5485.700	17.9	72.7	17.00	11.2500	5.75	3.524E-002	3.006E-002	4.310E-002	1.028E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,248 6:02:17AM 8/10/2022

Sample

Sample: 22-01100-01 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCS

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

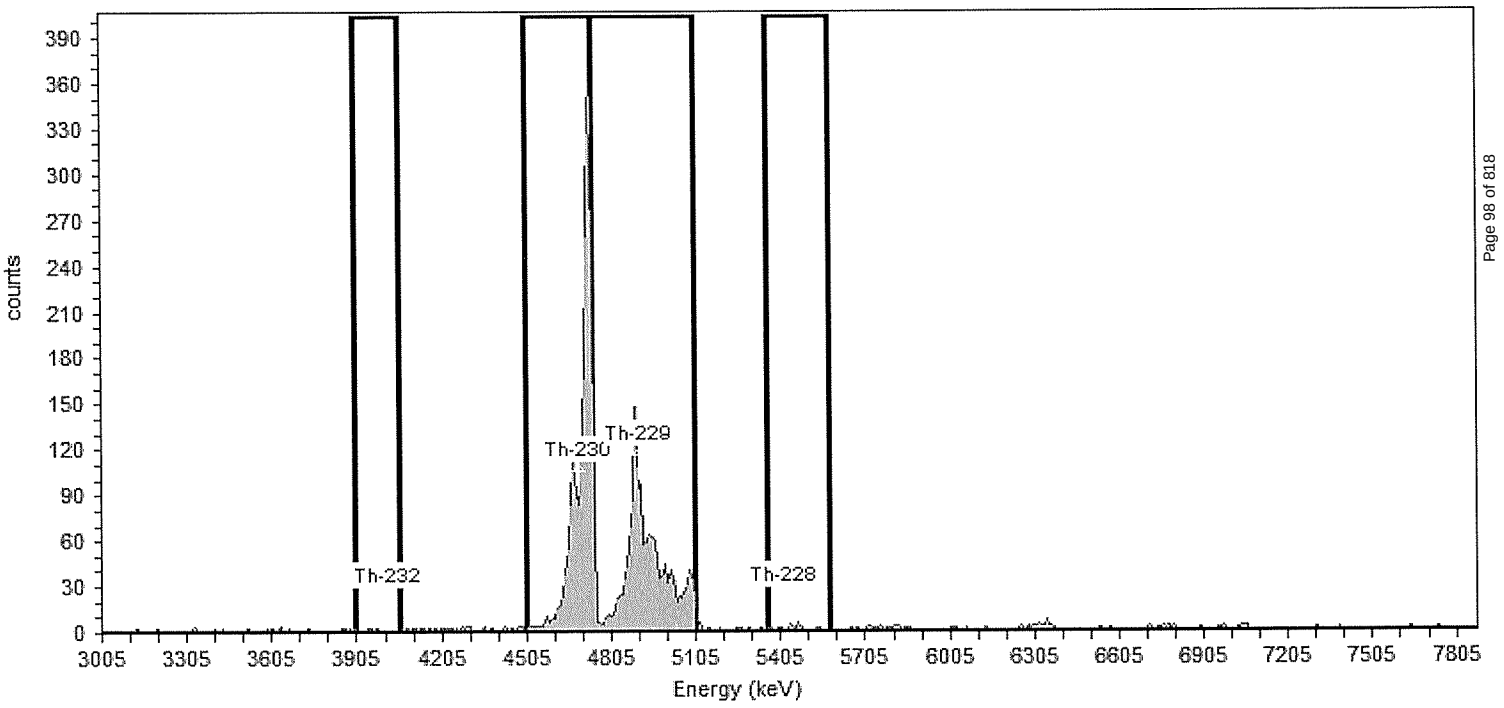
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	3.79	1.3810	2.41	1.073E-002	9.615E-003	1.098E-002	3.402E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	1,685.36	5.5575	1679.80	7.507E+000	2.694E-001	2.209E-002	5.628E-002
Th-229	4901.000	4738.000	5107.000	0.0	99.6	1,692.02	8.7023	1683.32	7.526E+000	2.702E-001	2.766E-002	6.742E-002
Th-228	5423.000	5359.000	5583.000	50.0	72.7	18.75	12.0319	6.72	4.116E-002	3.143E-002	4.458E-002	1.057E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,287 9:31:24AM 8/10/2022

Sample

Sample: 22-01100-02 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCSD

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

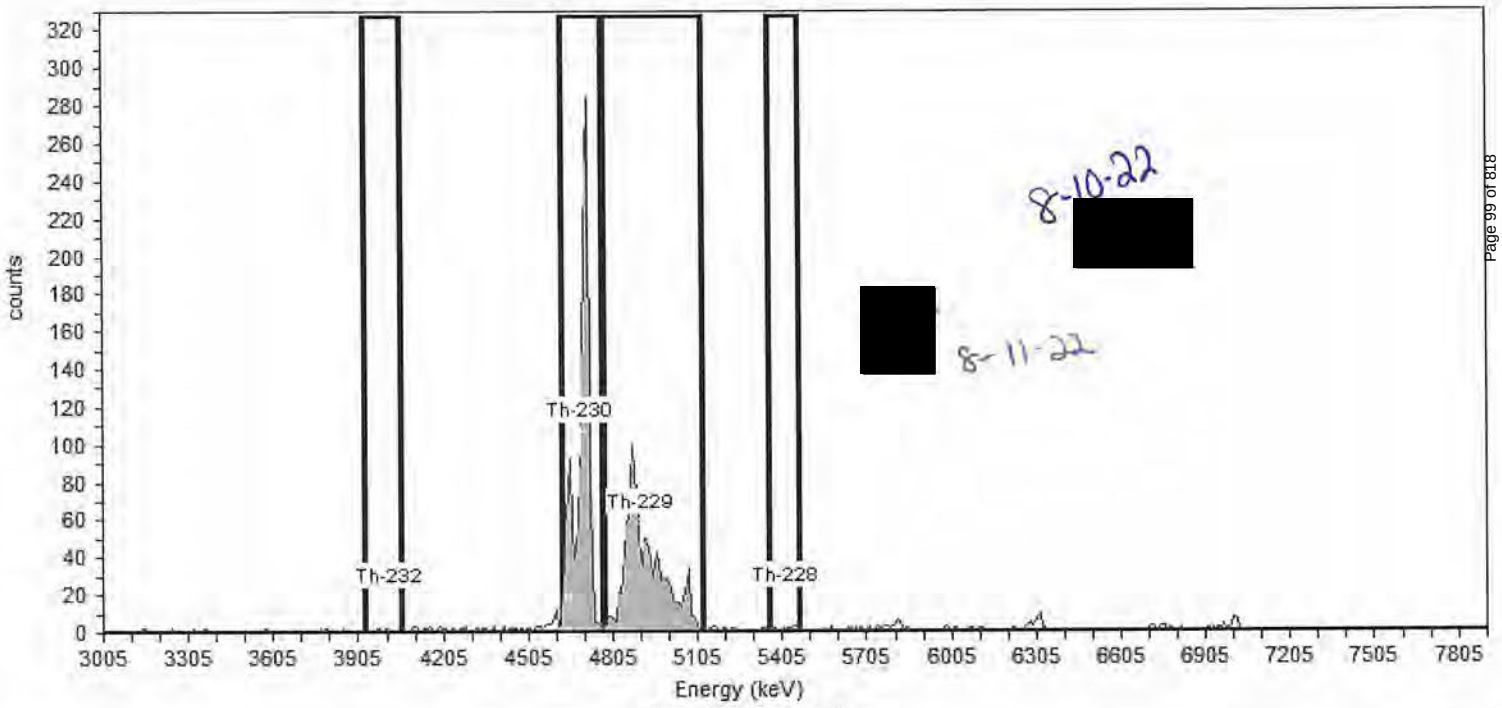
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3924.138	4050.462	21.9	100.0	2.00	2.5000	-0.50	0.000E+000	8.606E-003	1.512E-002	4.257E-002
Th-230	4686.997	4621.555	4766.167	30.4	76.3	1,203.00	4.3750	1198.63	7.163E+000	2.541E-001	2.621E-002	6.859E-002
Th-229	4900.994	4775.800	5121.872	116.3	98.8	1,047.00	10.0000	1037.00	4.788E+000	1.791E-001	3.062E-002	7.373E-002
Th-228	5423.000	5361.403	5466.589	19.8	72.7	8.00	15.0000	-7.00	0.000E+000	2.616E-002	5.094E-002	1.188E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,251 6:02:56AM 8/10/2022

Sample

Sample: 22-01100-02 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCSD

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

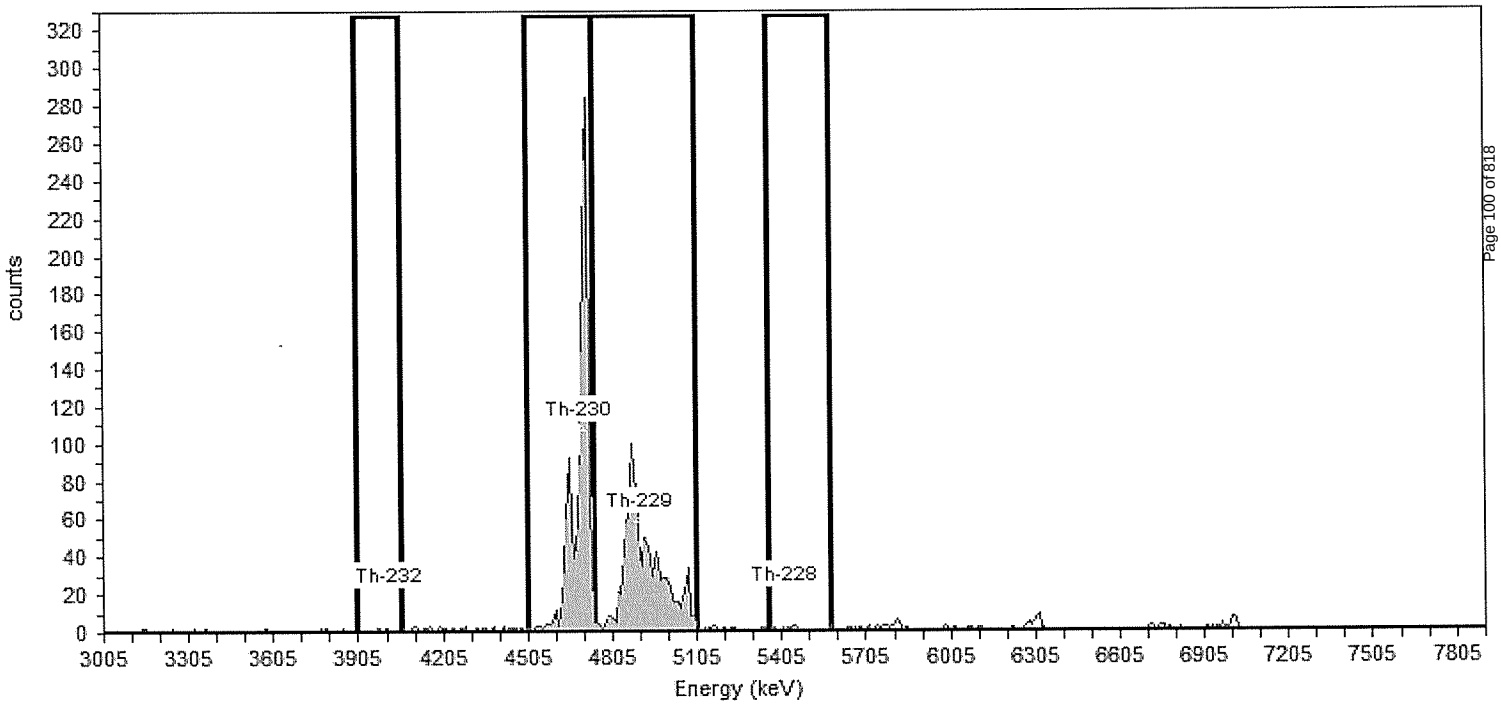
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	21.9	100.0	2.00	1.9047	0.10	4.345E-004	8.144E-003	1.320E-002	3.873E-002
Th-230	4687.000	4506.000	4738.000	26.9	99.7	1,226.97	1.9227	1225.05	5.602E+000	1.971E-001	1.330E-002	3.897E-002
Th-229	4901.000	4738.000	5107.000	116.3	99.6	1,053.65	10.8915	1042.76	4.771E+000	1.782E-001	3.167E-002	7.571E-002
Th-228	5423.000	5359.000	5583.000	89.4	72.7	9.62	15.3111	-5.69	0.000E+000	2.748E-002	5.146E-002	1.199E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 32,297 1:38:31PM 8/10/2022

Sample

Sample: 22-01100-03 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: MBL

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

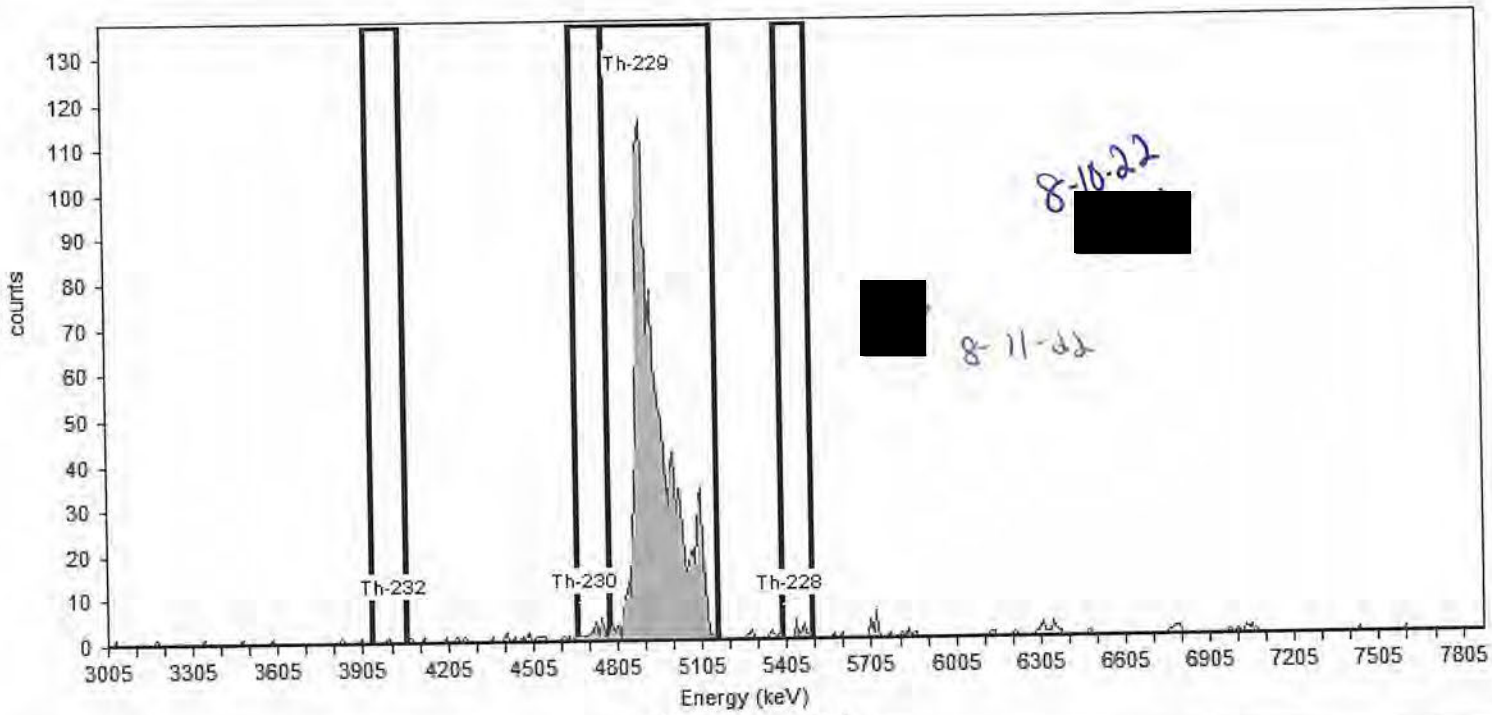
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3933.861	4050.462	23.8	100.0	1.00	0.6250	0.38	1.577E-003	4.959E-003	6.971E-003	2.532E-002
Th-230	4686.997	4660.141	4775.800	27.7	76.3	24.00	6.8750	17.13	9.438E-002	2.938E-002	3.030E-002	7.552E-002
Th-229	4900.994	4775.800	5160.241	87.0	98.8	1,308.00	20.6250	1287.38	5.482E+000	1.911E-001	4.056E-002	9.263E-002
Th-228	5423.000	5390.103	5495.254	58.4	72.7	11.00	15.0000	-4.00	0.000E+000	2.611E-002	4.698E-002	1.096E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,249 6:02:33AM 8/10/2022

Sample

Sample: 22-01100-03 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: MBL

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

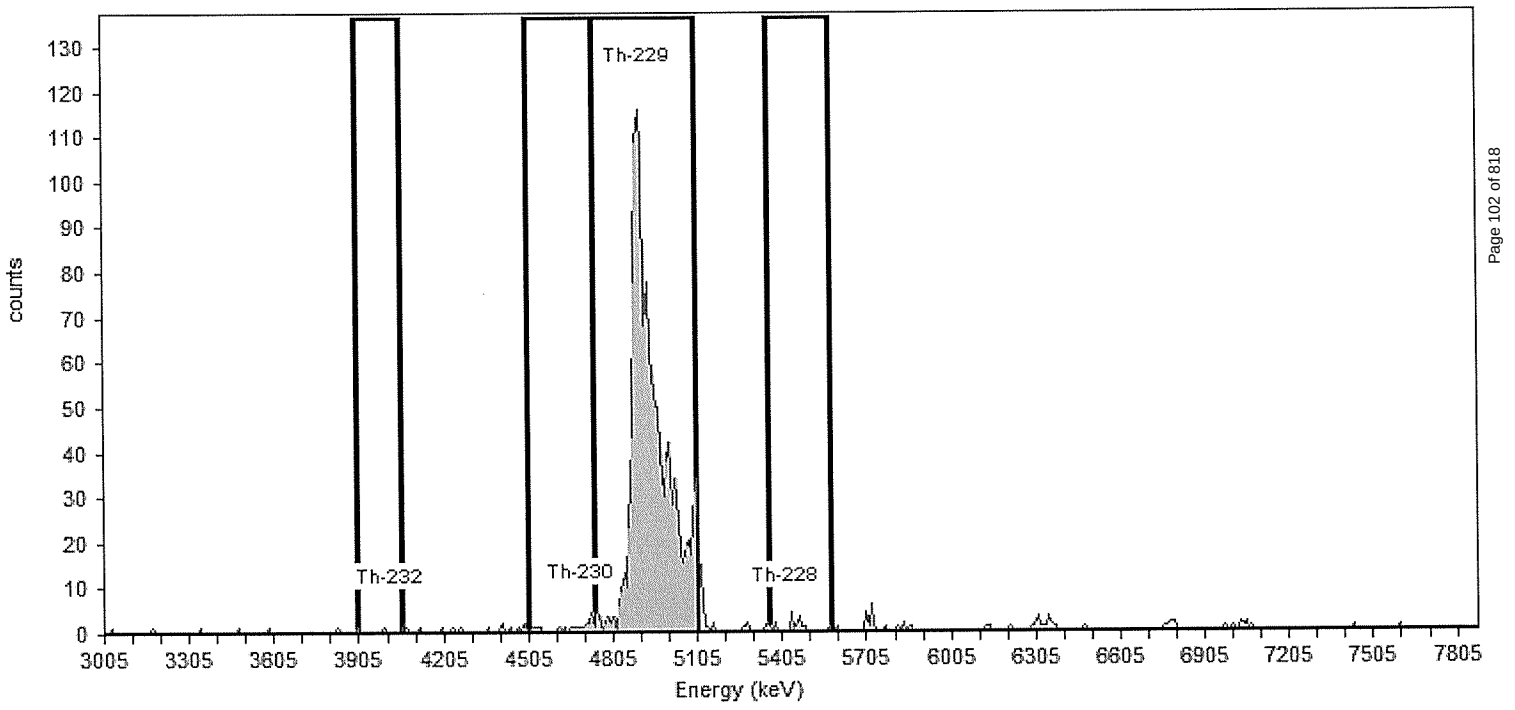
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	1.79	0.6250	1.17	4.901E-003	6.211E-003	6.971E-003	2.532E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	20.34	6.2500	14.09	5.942E-002	2.080E-002	2.211E-002	5.564E-002
Th-229	4901.000	4738.000	5107.000	87.0	99.6	1,276.11	13.4687	1262.64	5.329E+000	1.864E-001	3.248E-002	7.638E-002
Th-228	5423.000	5359.000	5583.000	52.4	72.7	15.25	17.8139	-2.56	0.000E+000	2.971E-002	5.120E-002	1.180E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,298 1:39:37PM 8/10/2022

Sample

Sample: 22-01100-04 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-001

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

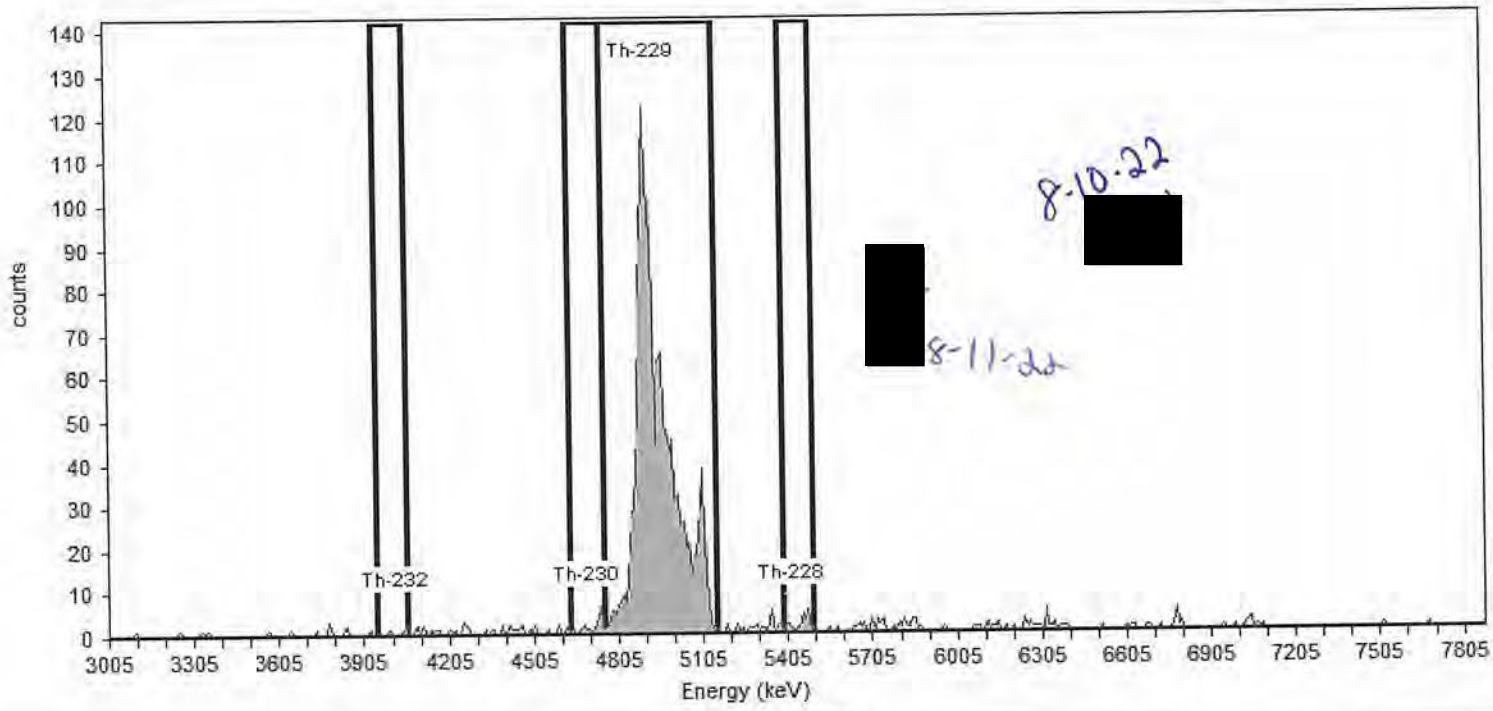
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3943.584	4050.462	0.0	100.0	4.00	2.5000	1.50	6.453E-003	1.015E-002	1.426E-002	4.017E-002
Th-230	4686.997	4631.203	4756.534	18.1	76.3	18.00	7.5000	10.50	5.921E-002	2.689E-002	3.238E-002	8.002E-002
Th-229	4900.994	4756.534	5150.650	99.0	99.6	1,403.00	21.8750	1381.13	5.963E+000	2.032E-001	4.235E-002	9.637E-002
Th-228	5423.000	5390.103	5495.254	17.3	72.7	20.00	14.3750	5.63	3.329E-002	3.187E-002	4.705E-002	1.101E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,254 6:03:31AM 8/10/2022

Sample

Sample: 22-01100-04 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-001

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

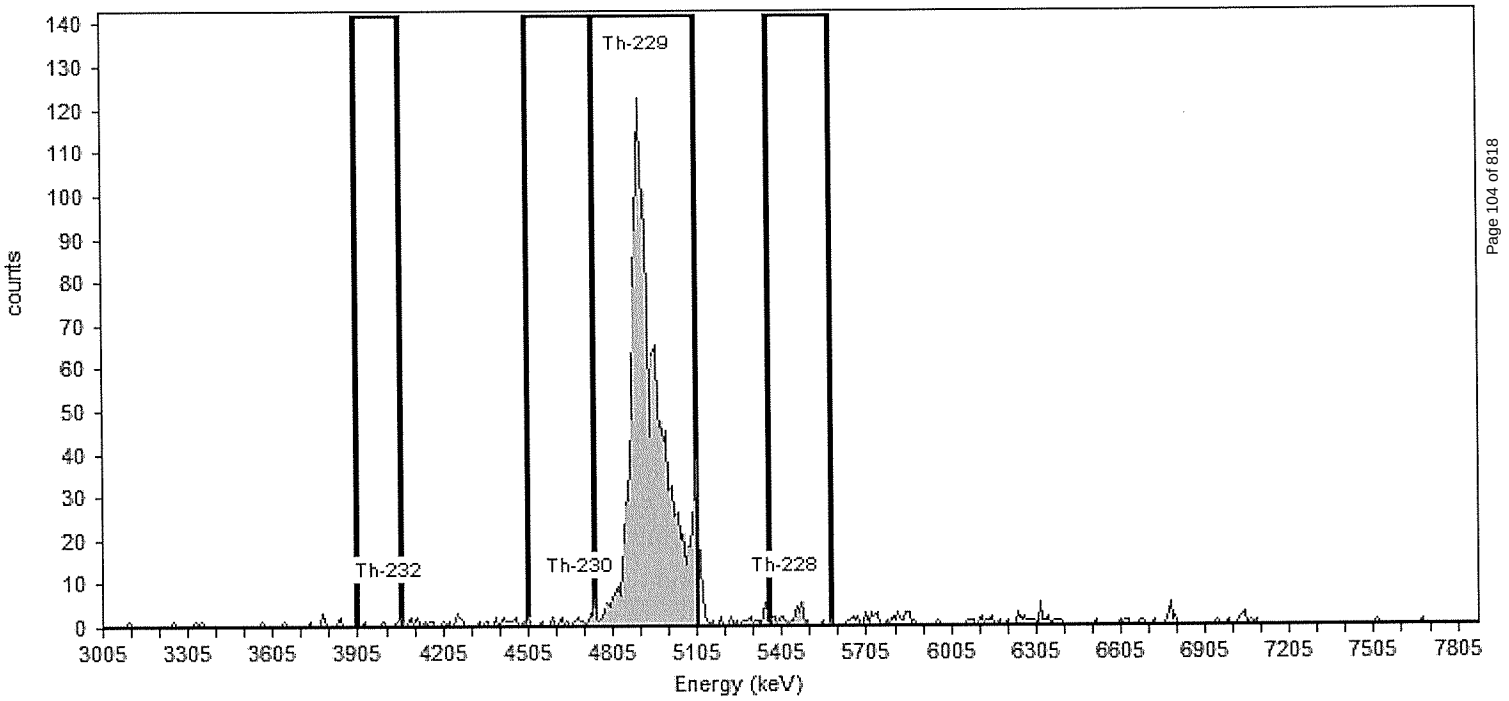
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	3.95	1.9047	2.05	8.810E-003	9.758E-003	1.245E-002	3.654E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	21.63	9.3470	12.28	5.301E-002	2.264E-002	2.767E-002	6.701E-002
Th-229	4901.000	4738.000	5107.000	99.0	99.6	1,369.04	20.2335	1348.81	5.824E+000	1.999E-001	4.073E-002	9.313E-002
Th-228	5423.000	5359.000	5583.000	31.8	72.7	26.31	20.0000	6.31	3.736E-002	3.688E-002	5.550E-002	1.270E-001

ARS1-22-01492-Revision

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,291 1:29:38PM 8/10/2022

Sample

Sample: 22-01100-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

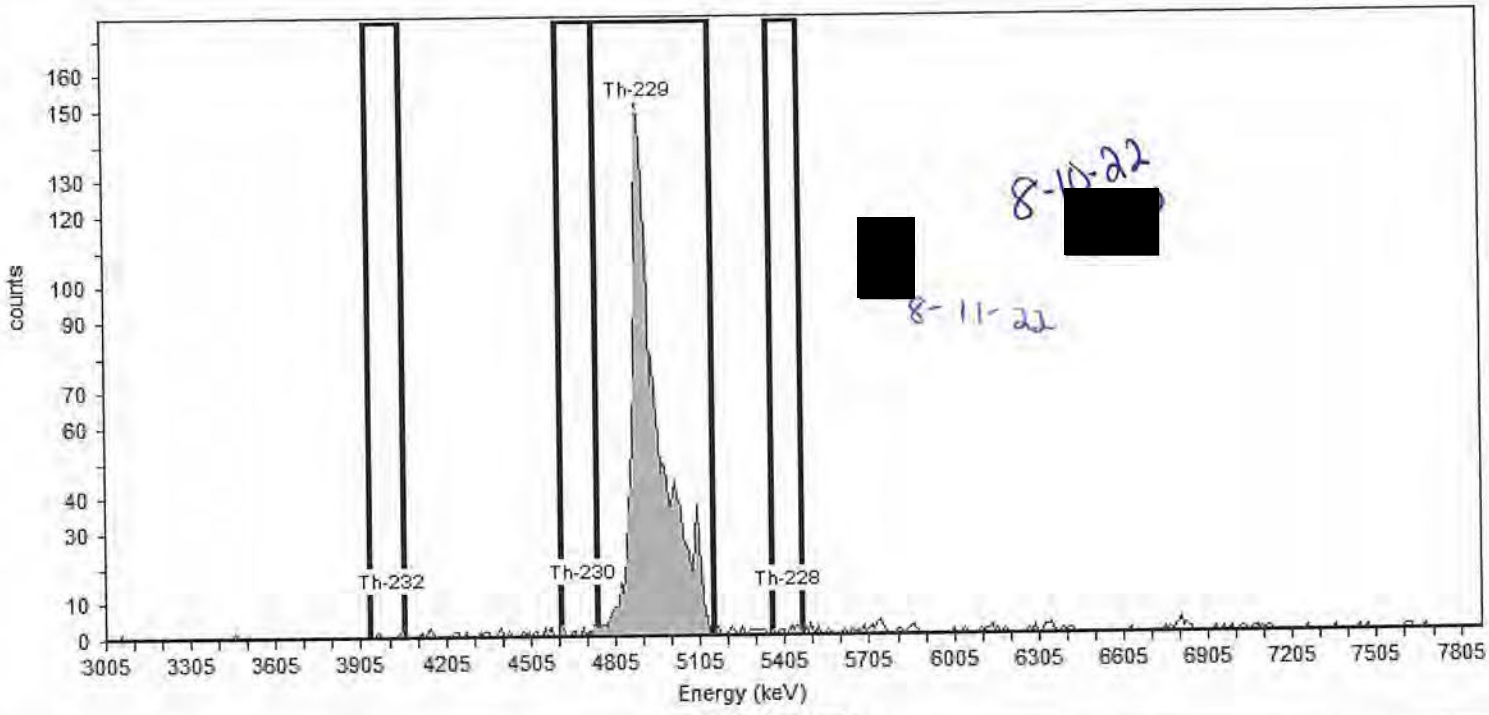
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F1, SN: 5702110, ID: 17
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F1; Det: 17165813 - F1; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 17

Energy Calibration: F1 calib 6-2-21
Efficiency Calibration:F1 calib 6-2-21
Calibration Date: 6/3/2021 6:20:39AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.80% +/- 1.35% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3933.861	4050.462	0.0	100.0	5.00	0.6250	4.38	1.884E-002	1.001E-002	7.141E-003	2.594E-002
Th-230	4686.997	4611.906	4737.264	0.0	99.7	14.00	6.2500	7.75	3.348E-002	1.830E-002	2.265E-002	5.699E-002
Th-229	4900.994	4737.264	5150.650	86.0	99.6	1,693.00	21.8750	1671.13	7.224E+000	2.605E-001	4.239E-002	9.649E-002
Th-228	5423.000	5361.403	5466.589	21.6	72.7	10.00	7.5000	2.50	1.481E-002	2.271E-002	3.402E-002	8.408E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,291 1:29:57PM 8/10/2022

Sample

Sample: 22-01100-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

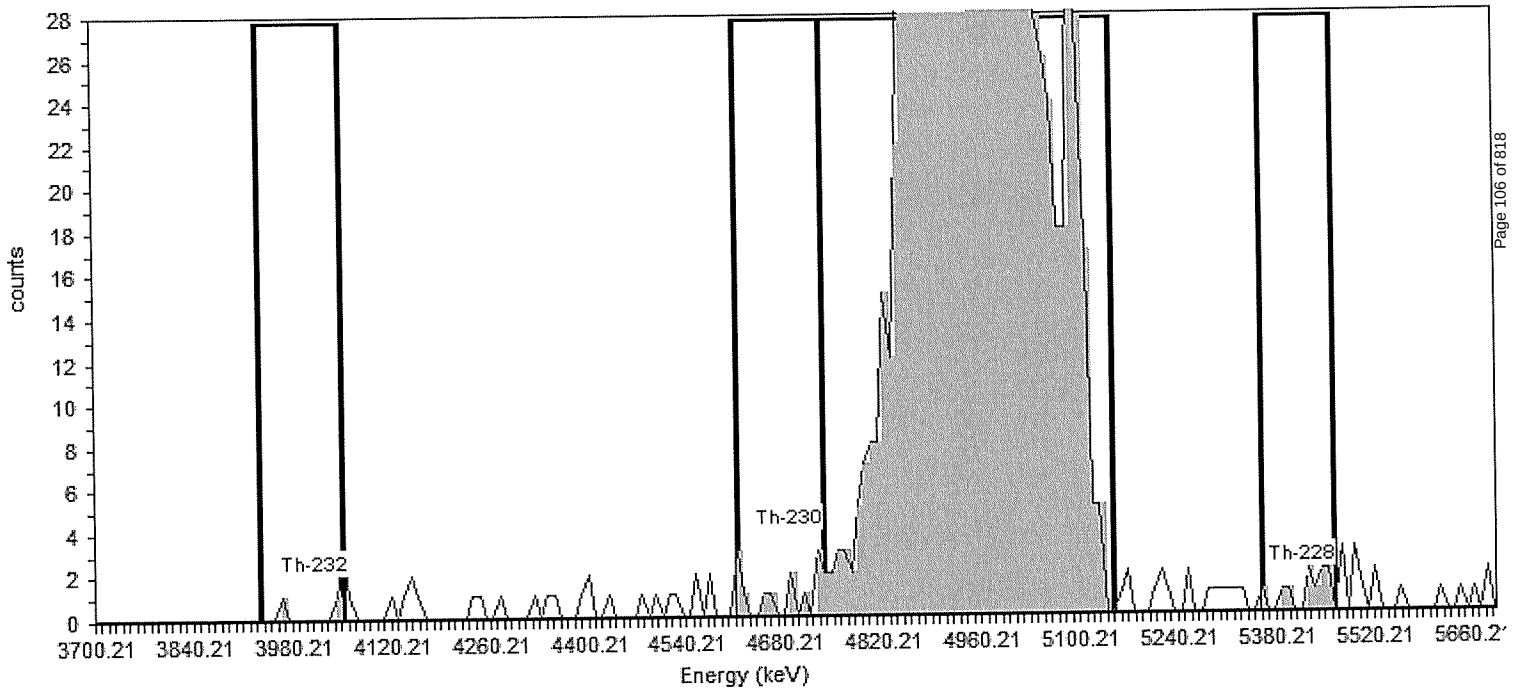
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F1, SN: 5702110, ID: 17
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F1; Det: 17165813 - F1; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 17

Energy Calibration: F1 calib 6-2-21
Efficiency Calibration:F1 calib 6-2-21
Calibration Date: 6/3/2021 6:20:39AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.80% +/- 1.35% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3933.861	4050.462	0.0	100.0	5.00	0.6250	4.38	1.884E-002	1.001E-002	7.141E-003	2.594E-002
Th-230	4686.997	4611.906	4737.264	0.0	99.7	14.00	6.2500	7.75	3.348E-002	1.830E-002	2.265E-002	5.699E-002
Th-229	4900.994	4737.264	5150.650	86.0	99.6	1,693.00	21.8750	1671.13	7.224E+000	2.605E-001	4.239E-002	9.649E-002
Th-228	5423.000	5361.403	5466.589	21.6	72.7	10.00	7.5000	2.50	1.481E-002	2.271E-002	3.402E-002	8.408E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,252 6:03:05AM 8/10/2022

Sample

Sample: 22-01100-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

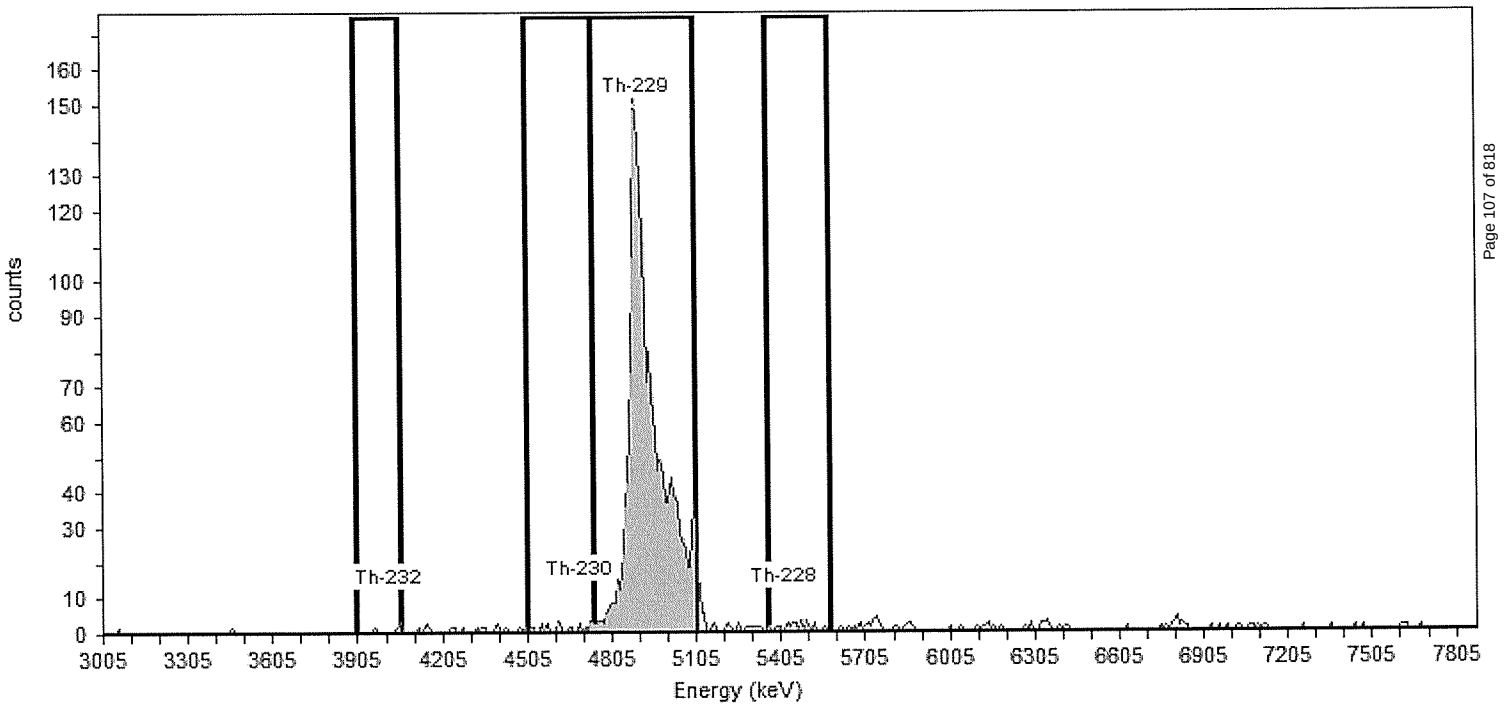
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F1, SN: 5702110, ID: 17
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F1; Det: 17165813 - F1; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 17

Energy Calibration: F1 calib 6-2-21
Efficiency Calibration:F1 calib 6-2-21
Calibration Date: 6/3/2021 6:20:39AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.80% +/- 1.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	3.90	0.6250	3.28	1.413E-002	8.935E-003	7.141E-003	2.594E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	19.03	8.6265	10.41	4.495E-002	2.138E-002	2.661E-002	6.491E-002
Th-229	4901.000	4738.000	5107.000	86.0	99.6	1,659.05	17.3568	1641.69	7.096E+000	2.567E-001	3.776E-002	8.722E-002
Th-228	5423.000	5359.000	5583.000	84.5	72.7	19.75	13.4389	6.31	3.739E-002	3.145E-002	4.555E-002	1.071E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,292 1:31:12PM 8/10/2022

Sample

Sample: 22-01100-06 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-003

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

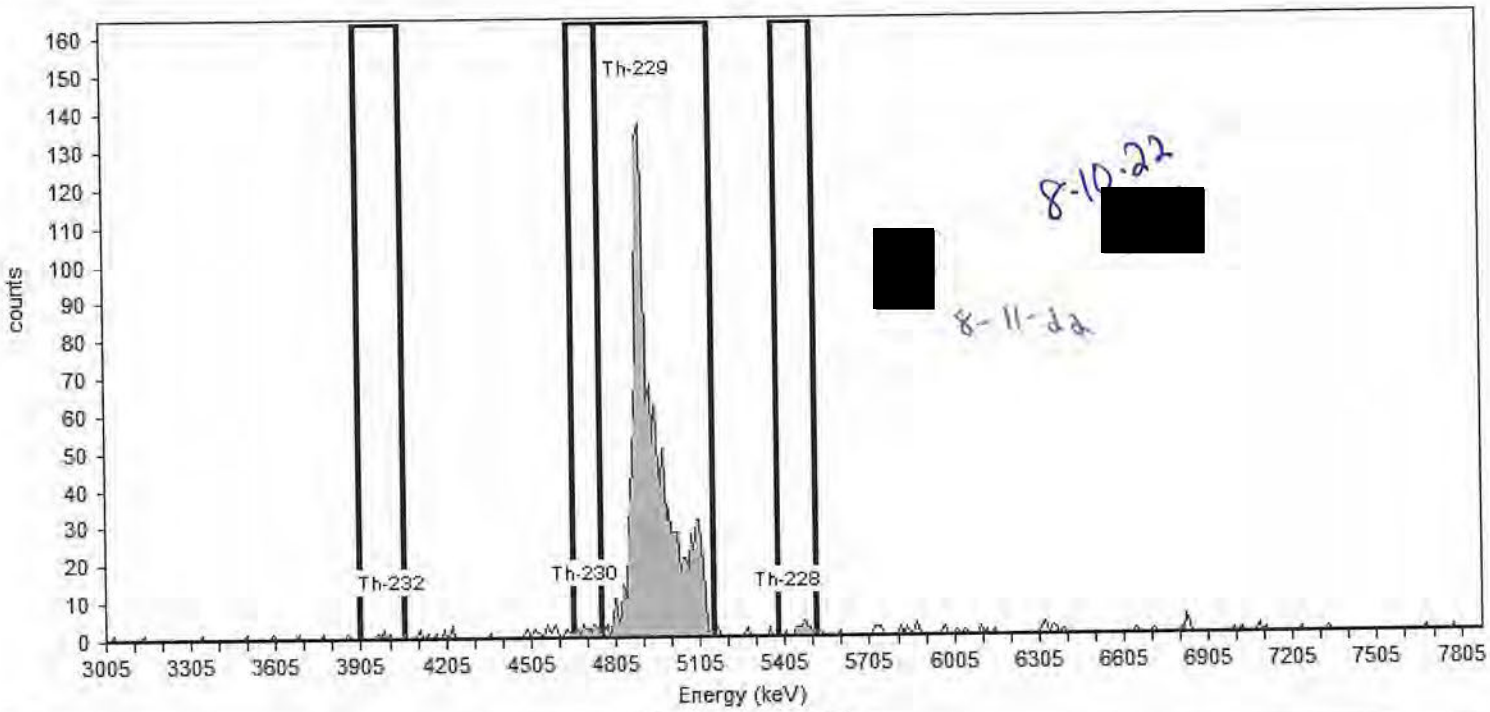
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F2, SN: 5702112, ID: 18
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F2; Det: 17165813 - F2; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 18

Energy Calibration: F2 calib 6-3-21.
Efficiency Calibration:F2 calib 6-3-21.
Calibration Date: 6/4/2021 7:07:22AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.48% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	33.1	100.0	4.95	1.2500	3.70	1.554E-002	1.005E-002	9.839E-003	3.103E-002
Th-230	4703.531	4650.496	4756.534	56.1	76.3	19.00	1.8750	17.13	9.419E-002	2.478E-002	1.579E-002	4.647E-002
Th-229	4900.994	4756.534	5150.650	79.7	99.6	1,384.00	9.3750	1374.63	5.789E+000	1.966E-001	2.704E-002	6.547E-002
Th-228	5423.000	5380.537	5514.359	52.5	72.7	16.00	10.6250	5.38	3.103E-002	2.747E-002	3.946E-002	9.453E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,253 6:03:18AM 8/10/2022

Sample

Sample: 22-01100-06 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-003

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

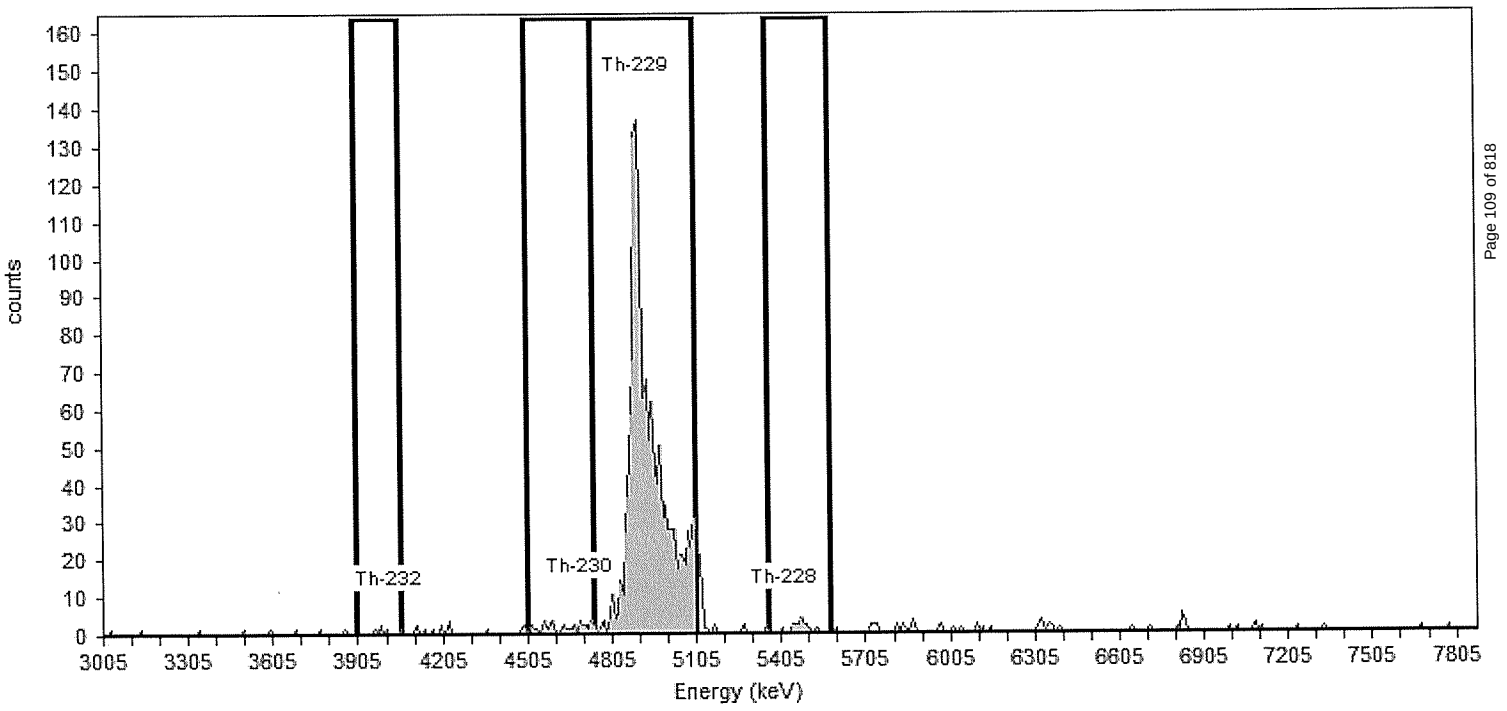
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F2, SN: 5702112, ID: 18
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F2; Det: 17165813 - F2; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 18

Energy Calibration: F2 calib 6-3-21.
Efficiency Calibration:F2 calib 6-3-21.
Calibration Date: 6/4/2021 7:07:22AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.48% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	33.1	100.0	4.95	1.2500	3.70	1.554E-002	1.005E-002	9.839E-003	3.103E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	33.06	5.6053	27.46	1.156E-001	2.556E-002	2.090E-002	5.318E-002
Th-229	4901.000	4738.000	5107.000	79.7	99.6	1,344.85	7.5000	1337.35	5.632E+000	1.929E-001	2.418E-002	5.977E-002
Th-228	5423.000	5359.000	5583.000	49.6	72.7	17.50	11.2500	6.25	3.609E-002	2.860E-002	4.060E-002	9.682E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,293 1:32:17PM 8/10/2022

Sample

Sample: 22-01100-07 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-004

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

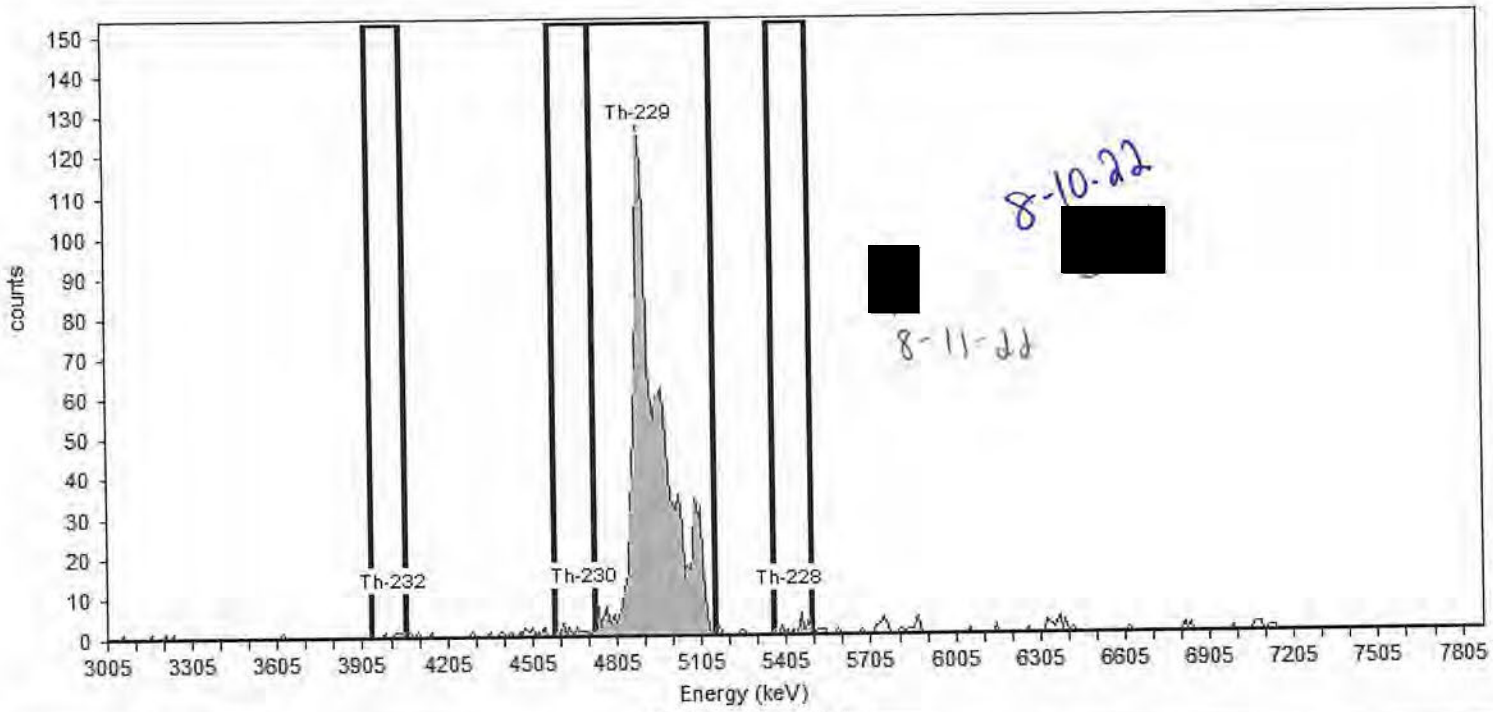
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F3, SN: 5702113, ID: 19
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F3; Det: 17165814 - F3; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 19

Energy Calibration: F3 calib 6-2-21
Efficiency Calibration:F3 calib 6-2-21
Calibration Date: 6/3/2021 6:21:54AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.98% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3933.861	4050.462	20.7	100.0	4.00	1.2500	2.75	1.176E-002	9.355E-003	1.003E-002	3.163E-002
Th-230	4686.997	4582.952	4727.627	0.0	99.7	15.00	3.7500	11.25	4.826E-002	1.789E-002	1.742E-002	4.645E-002
Th-229	4900.994	4727.627	5150.650	114.6	99.6	1,447.00	16.8750	1430.13	6.138E+000	2.064E-001	3.697E-002	8.556E-002
Th-228	5423.000	5361.403	5495.254	0.0	72.7	17.00	8.7500	8.25	4.853E-002	2.790E-002	3.649E-002	8.890E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,255 6:03:44AM 8/10/2022

Sample

Sample: 22-01100-07 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-004

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

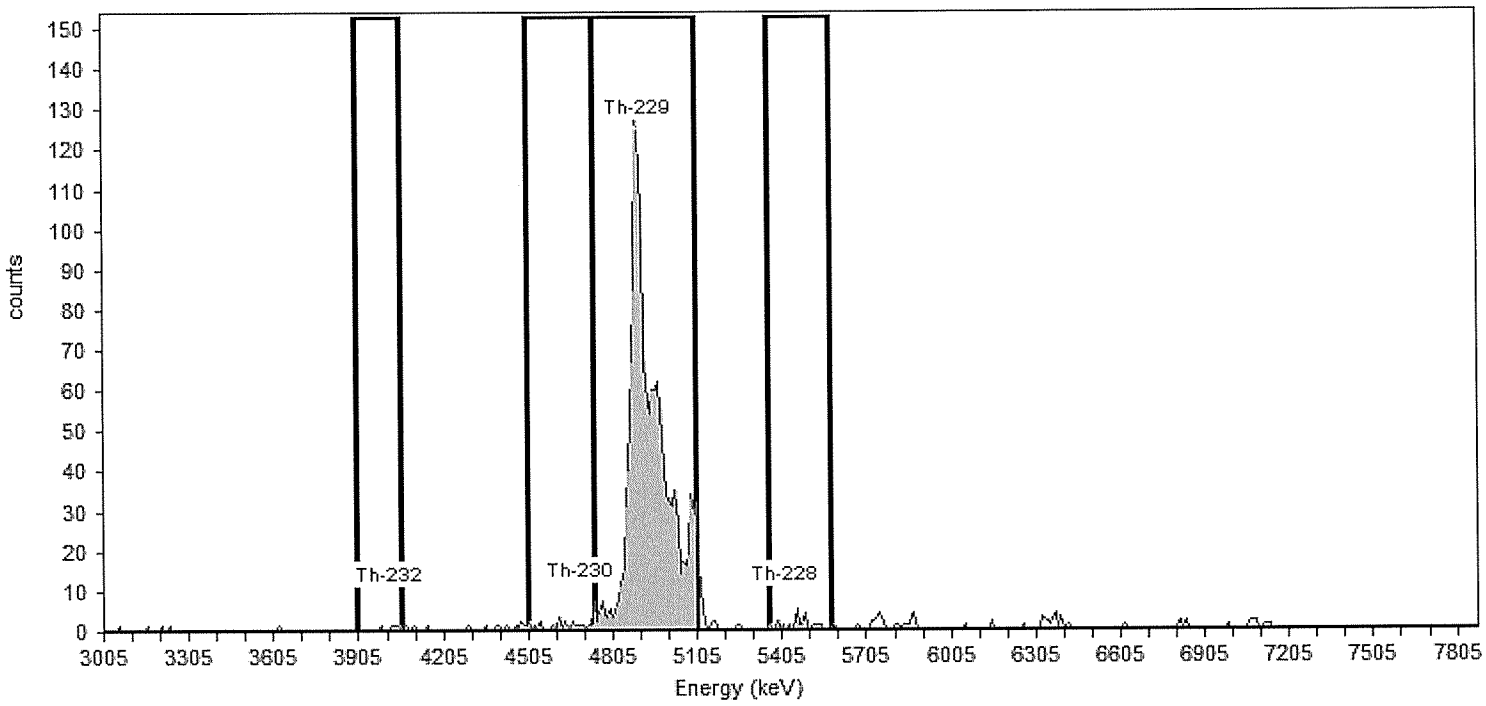
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F3, SN: 5702113, ID: 19
Acquisition Start Date: 8/9/2022 3:02:12PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F3; Det: 17165814 - F3; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 19

Energy Calibration: F3 calib 6-2-21
Efficiency Calibration:F3 calib 6-2-21
Calibration Date: 6/3/2021 6:21:54AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.98% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	3.05	1.2500	1.80	7.688E-003	8.370E-003	1.003E-002	3.163E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	26.55	5.0197	21.54	9.238E-002	2.345E-002	2.015E-002	5.192E-002
Th-229	4901.000	4738.000	5107.000	114.6	99.6	1,412.42	14.7187	1397.70	5.999E+000	2.031E-001	3.453E-002	8.067E-002
Th-228	5423.000	5359.000	5583.000	50.7	72.7	20.94	8.8297	12.11	7.123E-002	3.029E-002	3.666E-002	8.923E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 32,294 1:33:30PM 8/10/2022

Sample

Sample: 22-01100-08 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-005

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

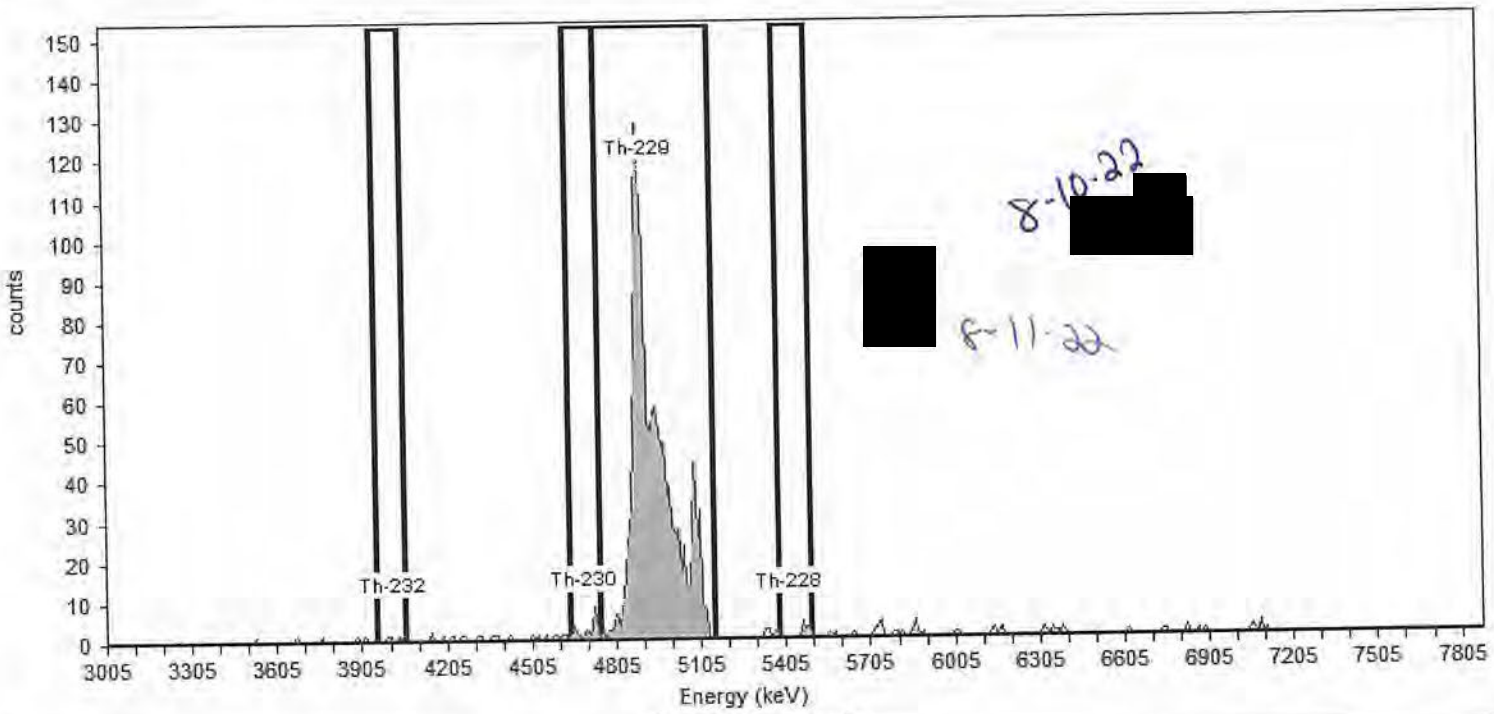
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F4, SN: 5702116, ID: 20
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F4; Det: 17165814 - F4; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 20

Energy Calibration: F4 calib 6-3-21
Efficiency Calibration:F4 calib 6-3-21
Calibration Date: 6/4/2021 7:08:05AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.68% +/- 0.97% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3953.305	4050.462	0.0	77.0	5.00	1.2500	3.75	2.285E-002	1.466E-002	1.429E-002	4.506E-002
Th-230	4686.997	4640.850	4746.899	16.5	76.3	23.00	5.6250	17.38	1.069E-001	3.174E-002	3.059E-002	7.781E-002
Th-229	4900.994	4746.899	5150.650	92.7	99.6	1,350.00	13.7500	1336.25	6.292E+000	2.163E-001	3.662E-002	8.597E-002
Th-228	5423.000	5380.537	5495.254	23.2	72.7	10.00	6.2500	3.75	2.420E-002	2.407E-002	3.384E-002	8.514E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,256 6:03:57AM 8/10/2022

Sample

Sample: 22-01100-08 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-005

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

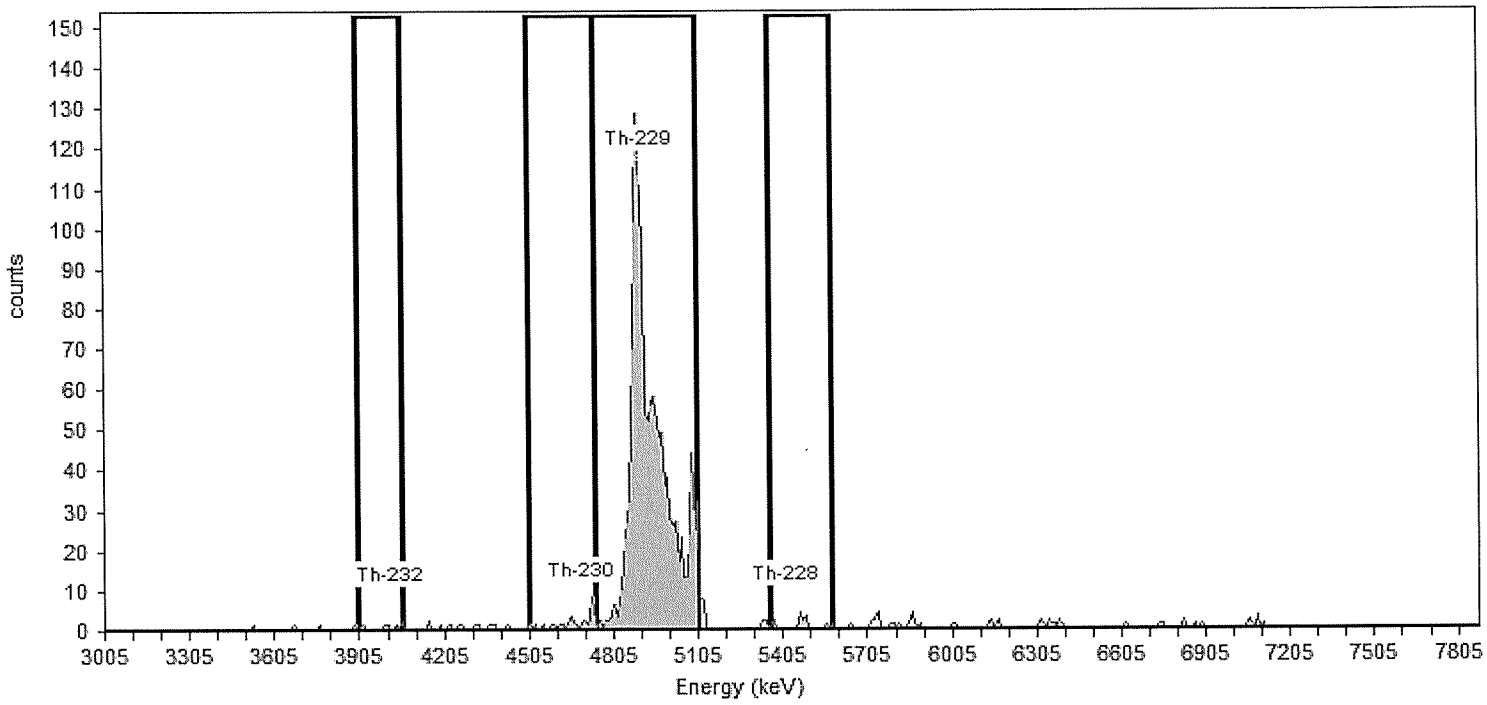
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F4, SN: 5702116, ID: 20
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F4; Det: 17165814 - F4; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 20

Energy Calibration: F4 calib 6-3-21
Efficiency Calibration:F4 calib 6-3-21
Calibration Date: 6/4/2021 7:08:05AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.68% +/- 0.97% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	46.3	100.0	5.90	1.2500	4.65	2.184E-002	1.214E-002	1.100E-002	3.470E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	29.82	6.8750	22.94	1.080E-001	2.758E-002	2.588E-002	6.449E-002
Th-229	4901.000	4738.000	5107.000	92.7	99.6	1,325.05	10.6250	1314.42	6.190E+000	2.136E-001	3.219E-002	7.712E-002
Th-228	5423.000	5359.000	5583.000	29.9	72.7	13.81	9.2181	4.59	2.964E-002	2.856E-002	4.109E-002	9.965E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,295 1:35:41PM 8/10/2022

Sample

Sample: 22-01100-09 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-006

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

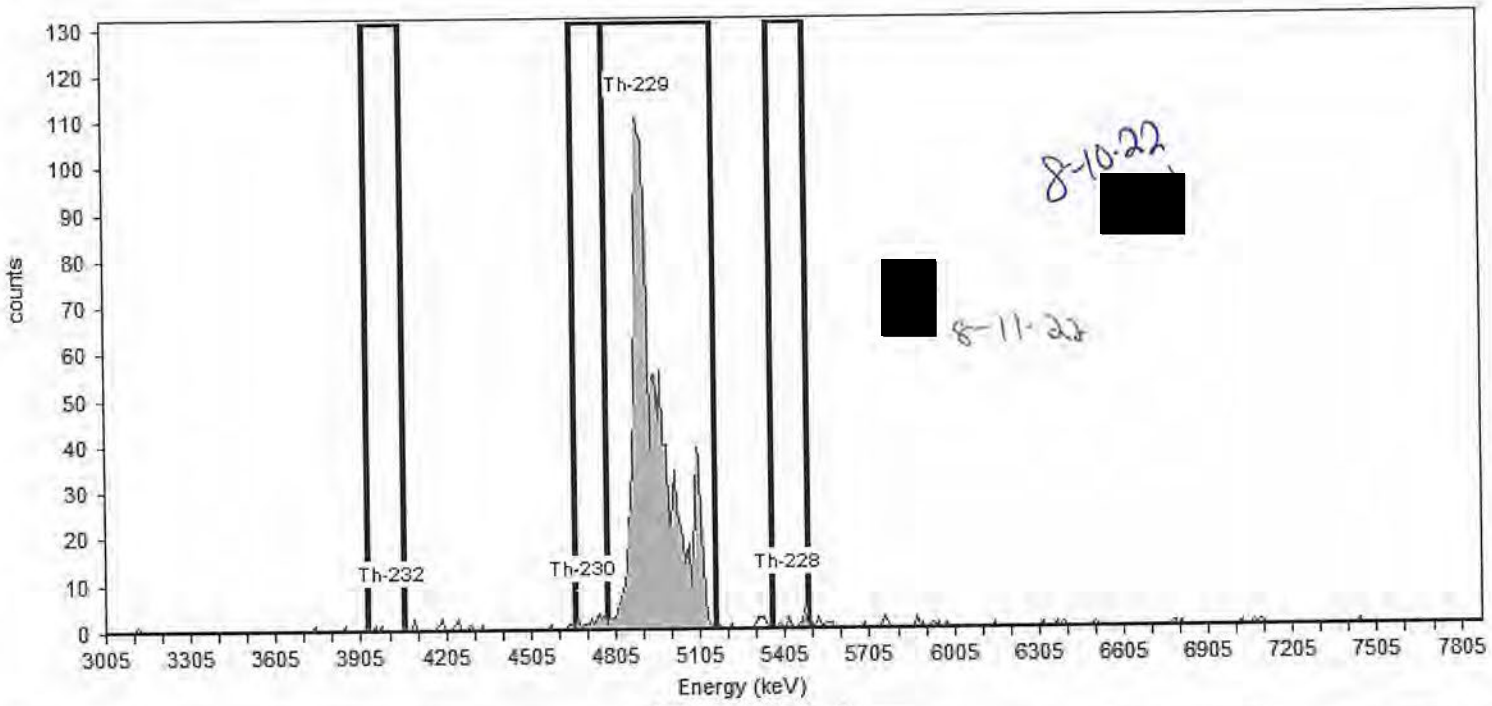
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165815 - F5, SN: 5702117, ID: 21
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F5; Det: 17165815 - F5; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 21

Energy Calibration: F5 calib 6-3-21
Efficiency Calibration:F5 calib 6-3-21
Calibration Date: 6/4/2021 7:08:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.70% +/- 1.40% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3924.138	4050.462	0.0	100.0	4.00	1.2500	2.75	1.144E-002	9.104E-003	9.756E-003	3.077E-002
Th-230	4686.997	4660.141	4775.800	0.0	76.3	19.00	6.2500	12.75	6.953E-002	2.616E-002	2.859E-002	7.194E-002
Th-229	4900.994	4775.800	5160.241	88.4	98.8	1,256.00	11.8750	1244.13	5.242E+000	2.033E-001	3.045E-002	7.230E-002
Th-228	5423.000	5361.403	5485.700	15.4	72.7	9.00	6.2500	2.75	1.574E-002	2.057E-002	3.001E-002	7.550E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,257 6:04:11AM 8/10/2022

Sample

Sample: 22-01100-09 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-006

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

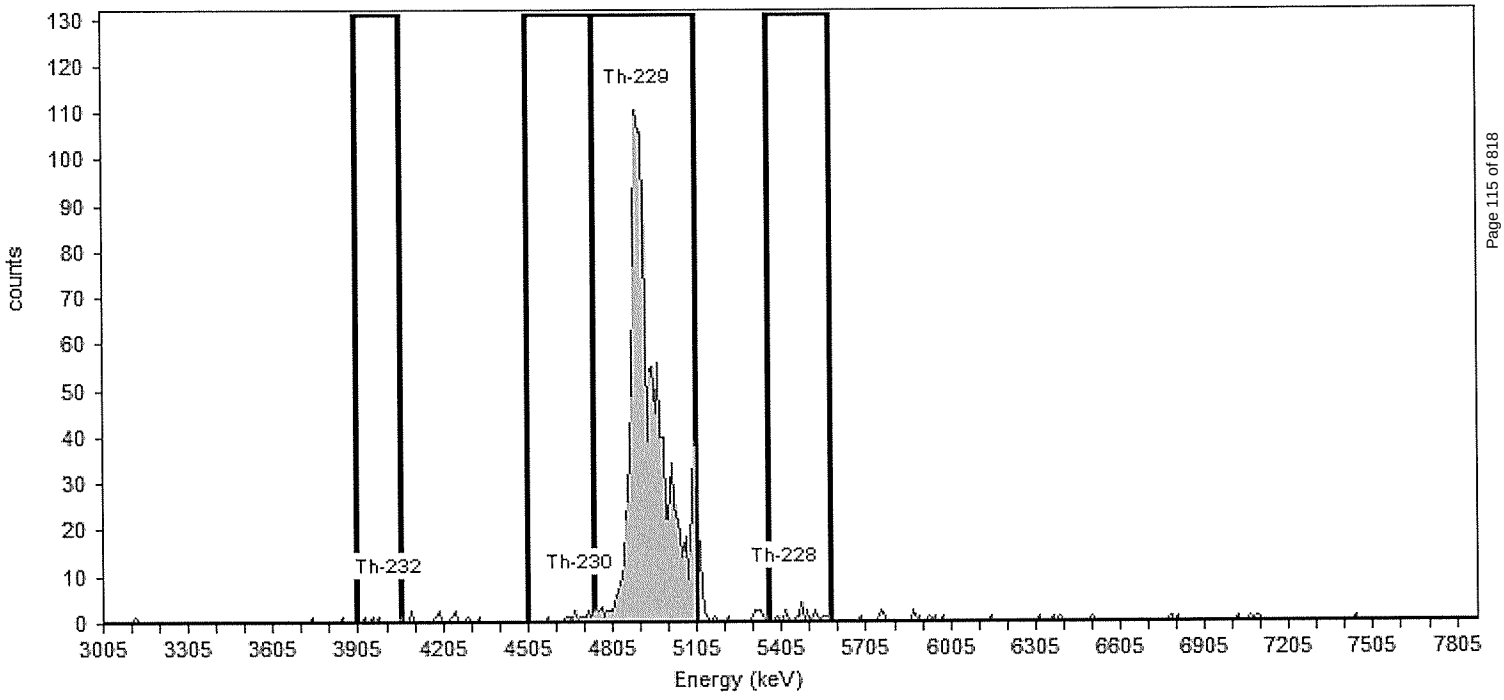
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165815 - F5, SN: 5702117, ID: 21
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F5; Det: 17165815 - F5; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 21

Energy Calibration: F5 calib 6-3-21
Efficiency Calibration:F5 calib 6-3-21
Calibration Date: 6/4/2021 7:08:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.70% +/- 1.40% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	68.0	100.0	3.95	1.2500	2.70	1.125E-002	9.058E-003	9.756E-003	3.077E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	13.08	5.1432	7.93	3.311E-002	1.687E-002	1.985E-002	5.099E-002
Th-229	4901.000	4738.000	5107.000	88.4	99.6	1,224.88	10.7682	1214.11	5.070E+000	1.979E-001	2.873E-002	6.877E-002
Th-228	5423.000	5359.000	5583.000	30.2	72.7	18.25	7.6569	10.59	6.064E-002	2.752E-002	3.321E-002	8.191E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,296 1:36:55PM 8/10/2022

Sample

Sample: 22-01100-10 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-007

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

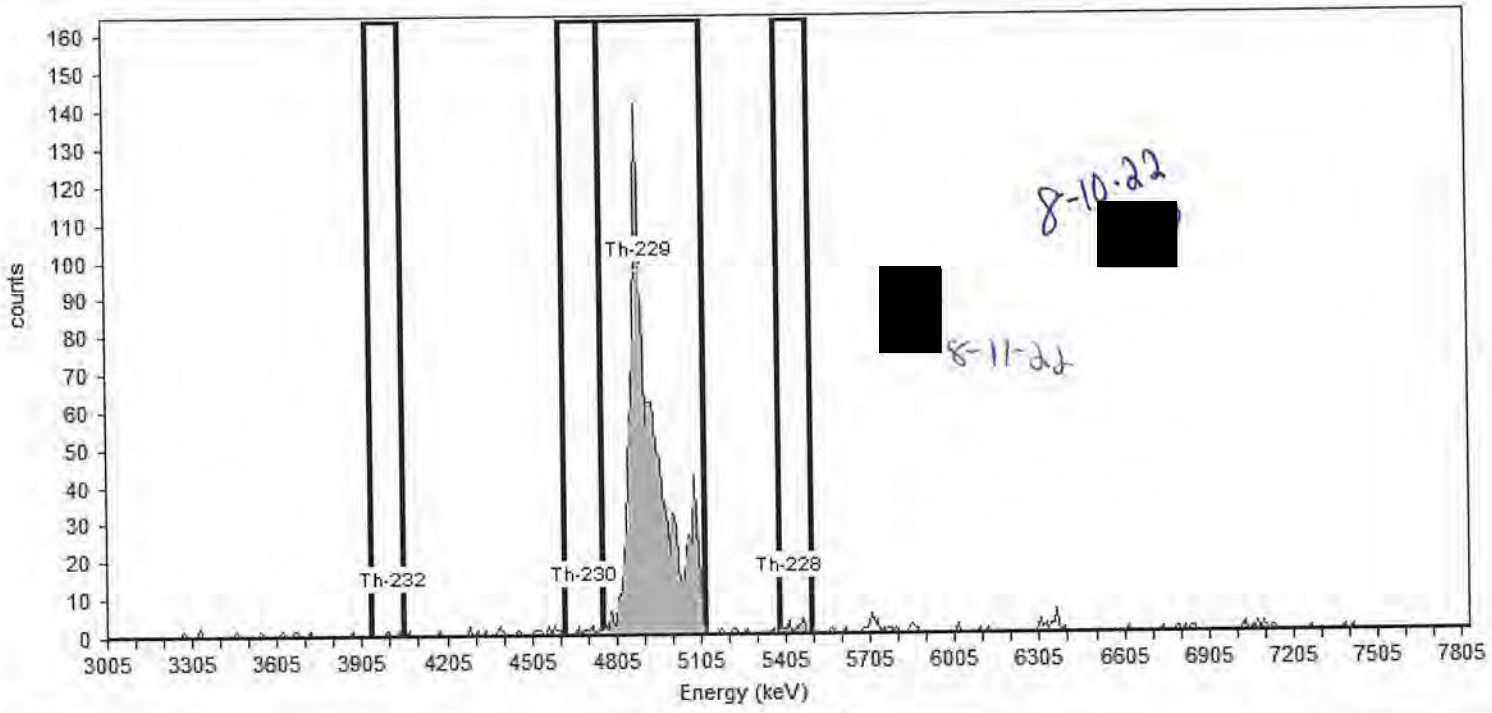
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F6, SN: 5702119, ID: 22
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F6; Det: 17165816 - F6; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 22

Energy Calibration: F6 calib 6-4-21.
Efficiency Calibration:F6 calib 6-4-21.
Calibration Date: 6/7/2021 6:38:01AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.40% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3933.861	4050.462	14.5	100.0	2.00	0.6250	1.38	6.015E-003	6.765E-003	7.252E-003	2.634E-002
Th-230	4686.997	4621.555	4756.534	0.0	76.3	10.00	2.5000	7.50	4.300E-002	1.953E-002	1.901E-002	5.353E-002
Th-229	4900.994	4756.534	5121.872	97.5	99.6	1,338.00	6.2500	1331.75	5.846E+000	2.223E-001	2.301E-002	5.791E-002
Th-228	5423.000	5380.537	5495.254	73.5	72.7	16.00	9.3750	6.63	3.986E-002	2.815E-002	3.863E-002	9.355E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,250 6:02:45AM 8/10/2022

Sample

Sample: 22-01100-10 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-007

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01100
:
Description:

Client Name: Undefined
Client Contact:

Tracer

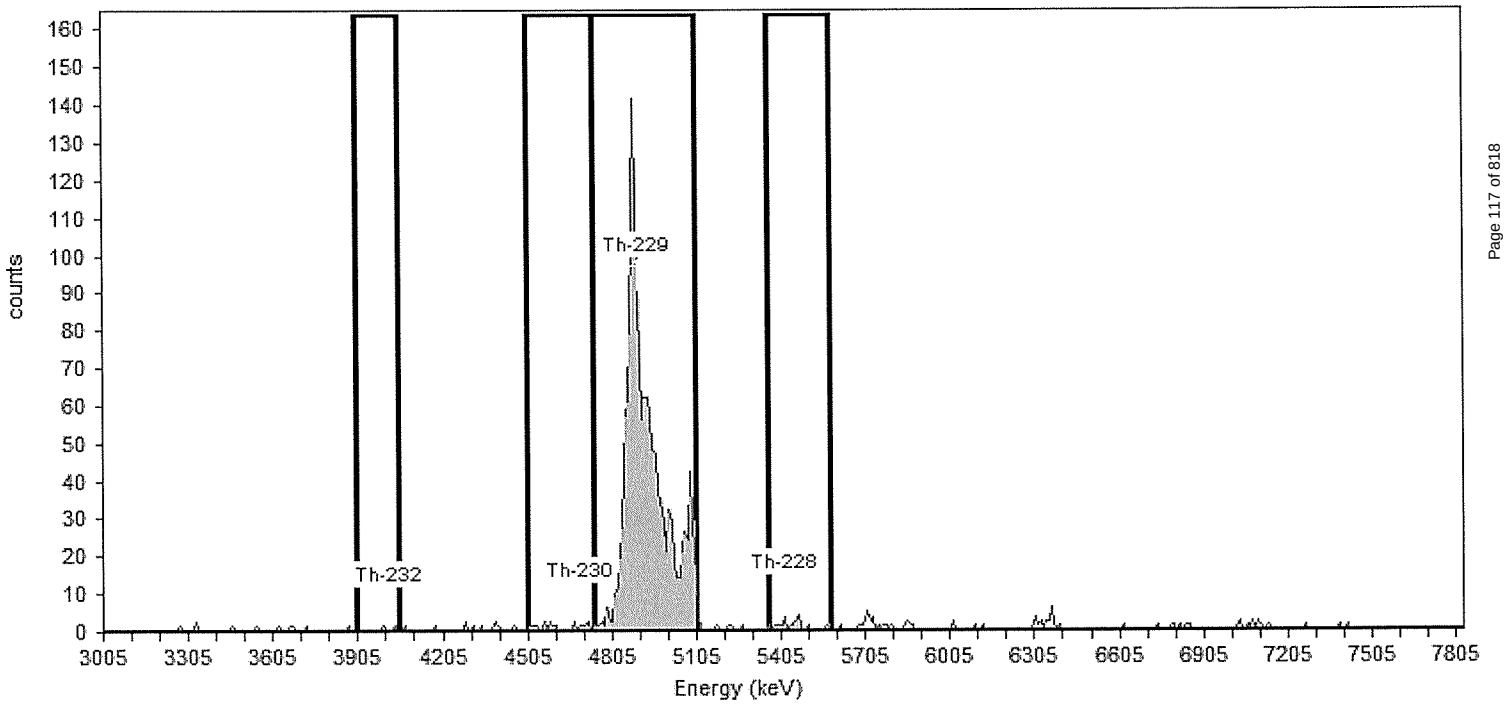
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F6, SN: 5702119, ID: 22
Acquisition Start Date: 8/9/2022 3:02:11PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F6; Det: 17165816 - F6; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 22

Energy Calibration: F6 calib 6-4-21.
Efficiency Calibration:F6 calib 6-4-21.
Calibration Date: 6/7/2021 6:38:01AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.40% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/9/2022 2:59:33PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	13.2	100.0	2.00	1.2500	0.75	3.281E-003	7.296E-003	1.026E-002	3.235E-002
Th-230	4687.000	4506.000	4738.000	15.7	99.7	16.03	3.7303	12.30	5.397E-002	1.886E-002	1.777E-002	4.741E-002
Th-229	4901.000	4738.000	5107.000	97.5	99.6	1,330.50	5.6250	1324.87	5.816E+000	2.214E-001	2.183E-002	5.555E-002
Th-228	5423.000	5359.000	5583.000	71.1	72.7	18.75	10.4681	8.28	4.983E-002	3.029E-002	4.082E-002	9.793E-002

ARS1-22-01492-Revision

Ortec Ensembles

Date	Time	Batch ID	Fraction	Detector(s)	Procedure	File #	Tech
08-09-2022	09:26	daily	QA	all	pulser	N/A	[redacted]
08-09-2022	09:34	weekly	QA	D1,D3,F7	source	N/A	
08-09-2022	13:45	weekly	QA	F7	source	N/A	
08-09-2022	14:57	22-01104	1	D1	U	32317	
08-09-2022	14:57	22-01104	2	D2	U	32318	
08-09-2022	14:57	22-01104	3	D3	U	32319	
08-09-2022	14:57	22-01104	4	D4	U	32320	
08-09-2022	14:57	22-01104	5	D5	U	32321	
08-09-2022	14:57	22-01104	6	D6	U	32322	
08-09-2022	14:57	22-01104	7	D7	U	32323	
08-09-2022	14:58	22-01101	1	E1	Th	32282	
08-09-2022	14:58	22-01101	2	E2	Th	32283	
08-09-2022	14:58	22-01101	3	E3	Th	32284	
08-09-2022	14:58	22-01101	4	E4	Th	32285	
08-09-2022	15:02	22-01100	1	E5	Th	32288	
08-09-2022	15:02	22-01100	2	E6	Th	32287	
08-09-2022	15:02	22-01100	3	E7	Th	32297	
08-09-2022	15:02	22-01100	4	E8	Th	32298	
08-09-2022	15:02	22-01100	5	F1	Th	32291	
08-09-2022	15:02	22-01100	6	F2	Th	32292	
08-09-2022	15:02	22-01100	7	F3	Th	32293	
08-09-2022	15:02	22-01100	8	F4	Th	32294	
08-09-2022	15:02	22-01100	9	F5	Th	32295	
08-09-2022	15:02	22-01100	10	F6	Th	32296	
08-10-2022	09:09	daily	QA	all	pulser	N/A	

ARS Aleut Analytical
2609 North River Road • Port Allen, Louisiana 70767
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ARS Aleut Analytical, LLC
Analytical Reports

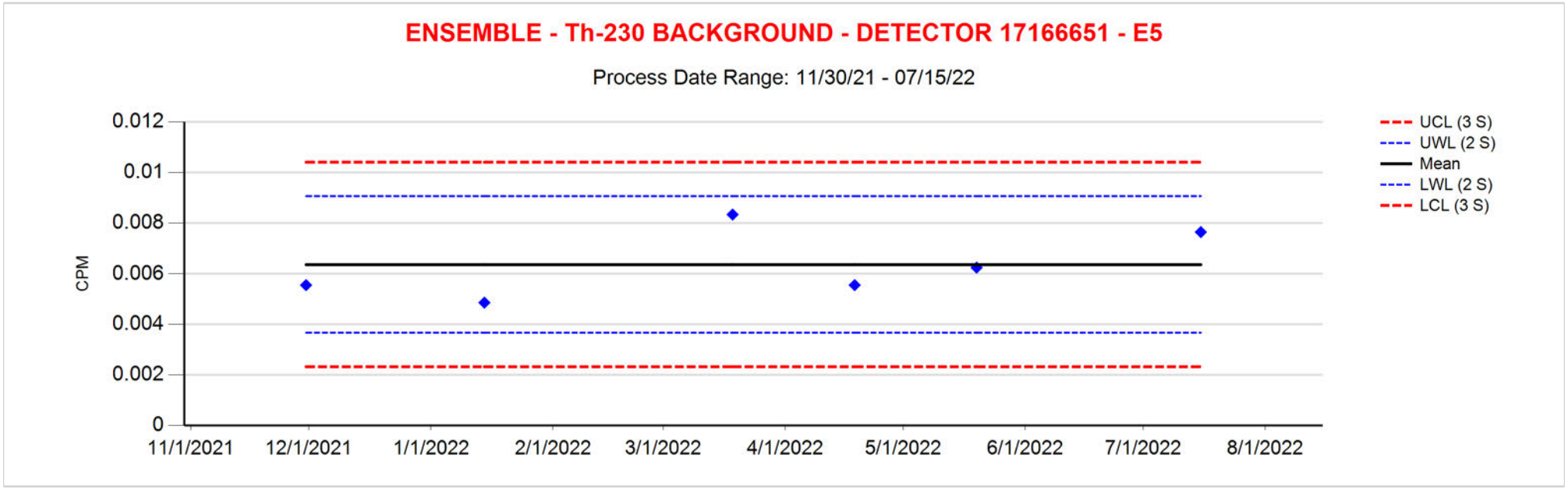
for

Gilbane Federal

Alpha Spec Th-Backgrounds

Th-230 Background - ARS1-B22-01100-01

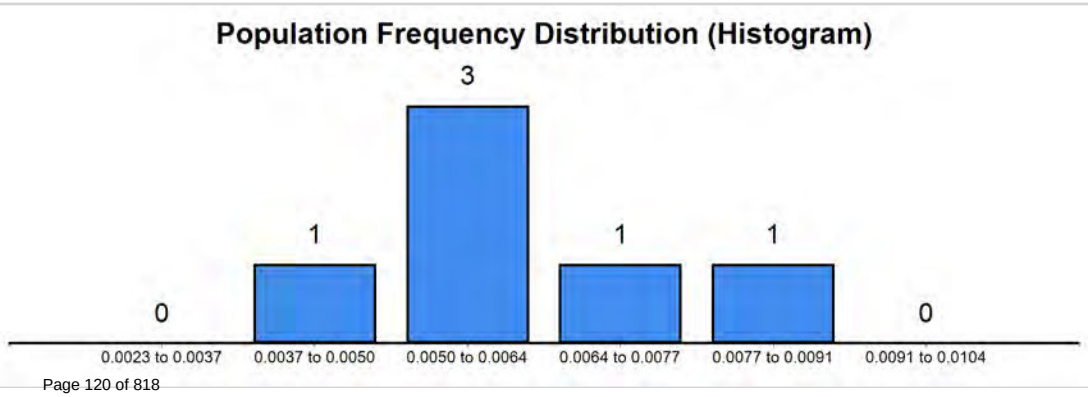
Population Statistics				Trending Analysis	
Population Size	6	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0064	CPM	0.0076	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0013	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0104	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	0.0023	CPM	0.0063	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK



ARS Aleut Analytical

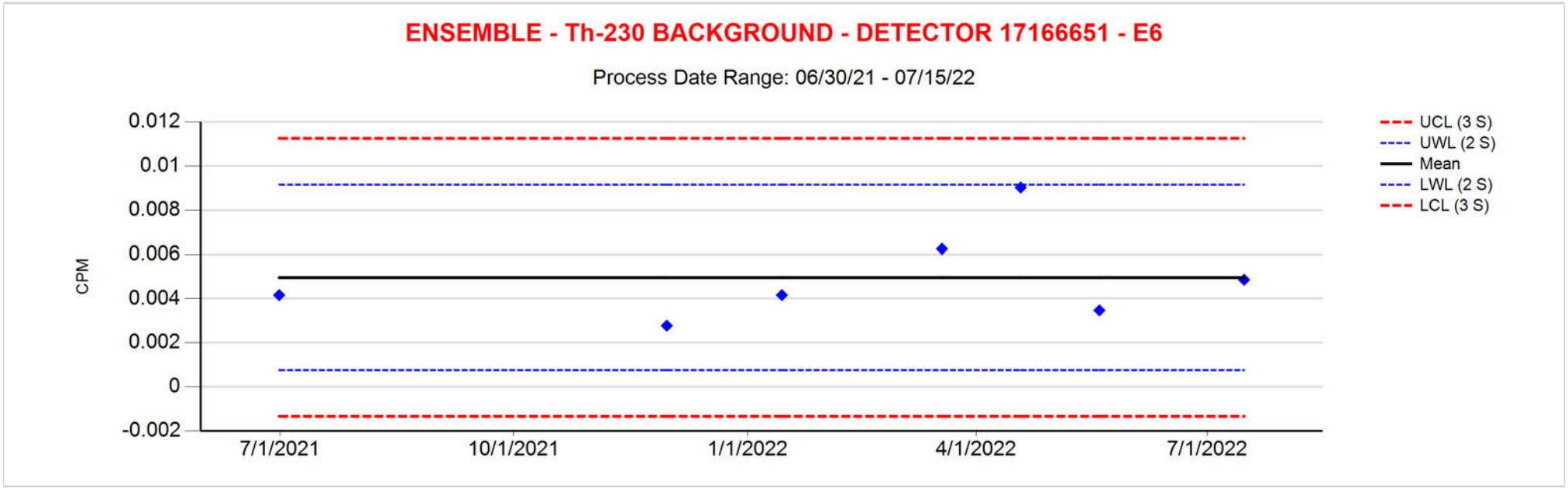
Statistical Process Control

Bin	Frequency
0.0023 to 0.0037	0
0.0037 to 0.0050	1
0.0050 to 0.0064	3
0.0064 to 0.0077	1
0.0077 to 0.0091	1
0.0091 to 0.0104	0



Th-230 Background - ARS1-B22-01100-02

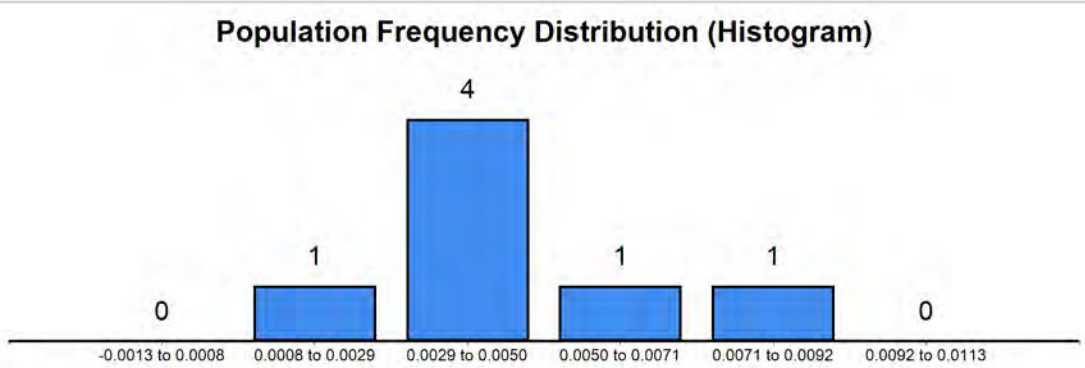
Population Statistics				Trending Analysis	
Population Size	7	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0050	CPM	0.0049	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0021	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0113	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	-0.0013	CPM	0.0035	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK



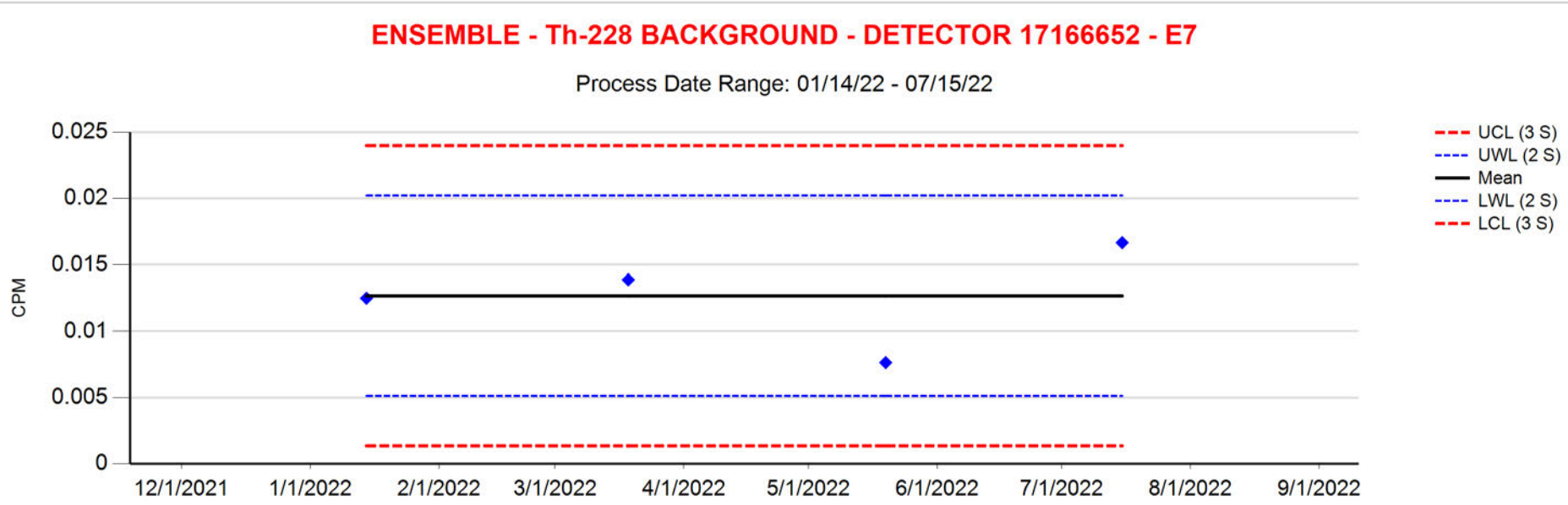
ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0013 to 0.0008	0
0.0008 to 0.0029	1
0.0029 to 0.0050	4
0.0050 to 0.0071	1
0.0071 to 0.0092	1
0.0092 to 0.0113	0

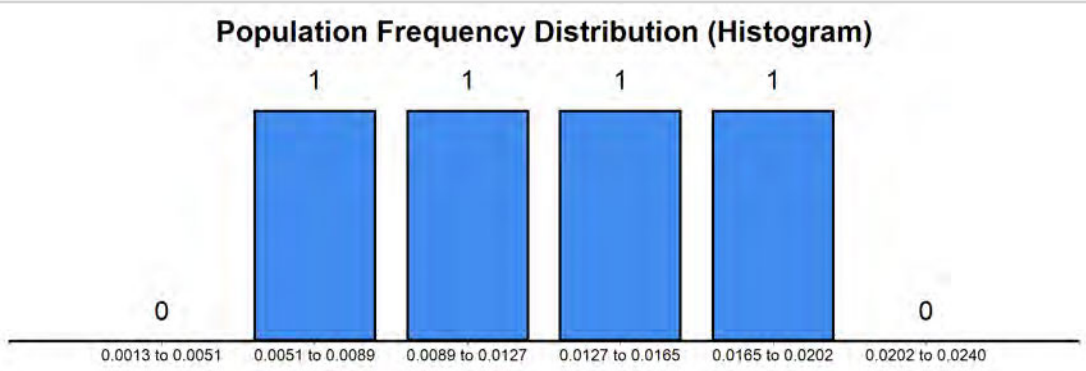


Population Statistics				Trending Analysis	
Population Size	**4**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0127	CPM	0.0167	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0038	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0240	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0013	CPM	0.0076	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



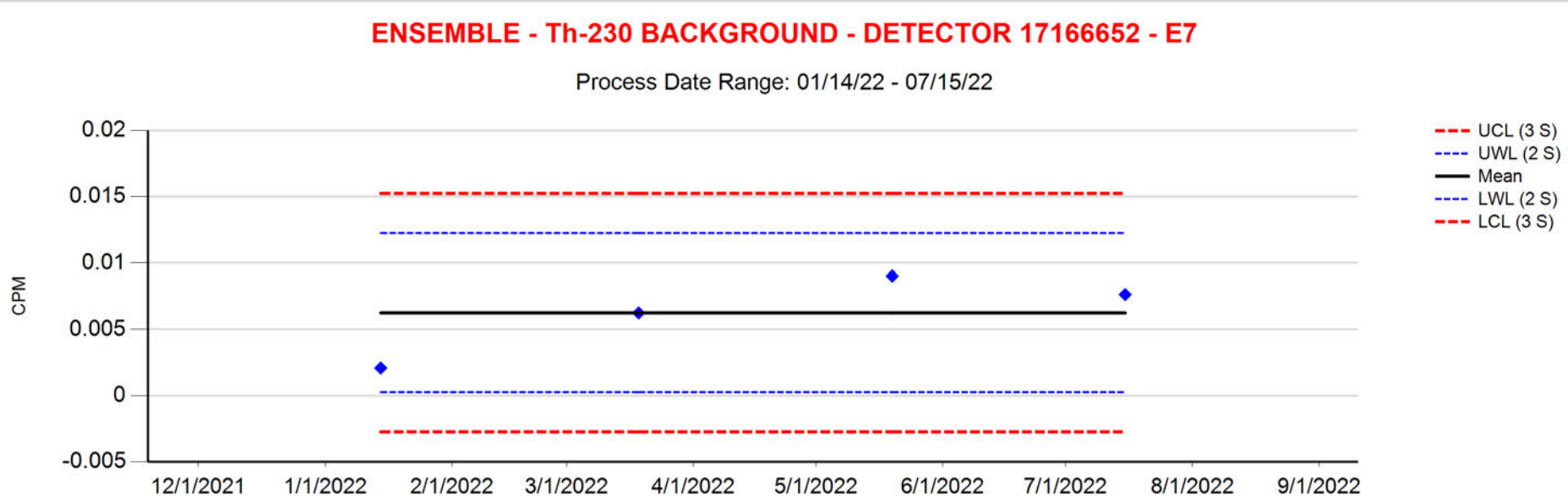
Statistical Process Control

Bin	Frequency
0.0013 to 0.0051	0
0.0051 to 0.0089	1
0.0089 to 0.0127	1
0.0127 to 0.0165	1
0.0165 to 0.0202	1
0.0202 to 0.0240	0



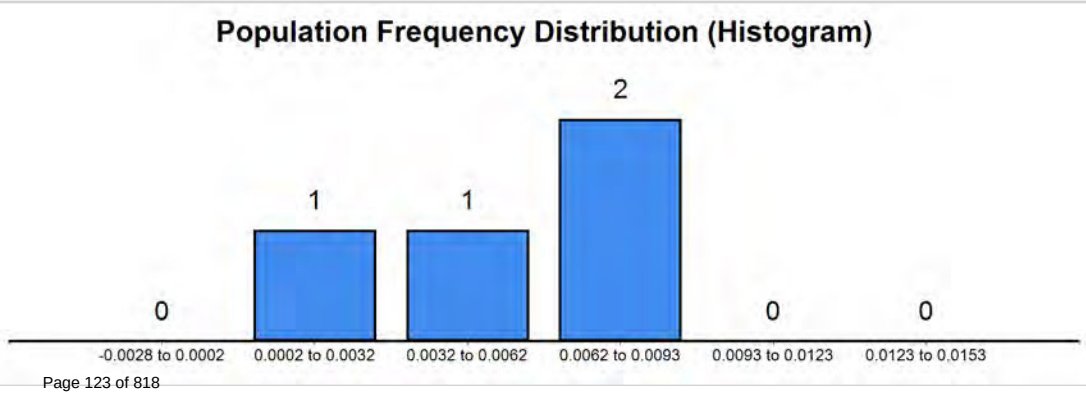
Th-230 Background - ARS1-B22-01100-03

Population Statistics				Trending Analysis	
Population Size	**4**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0063	CPM	0.0076	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0030	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0153	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0028	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



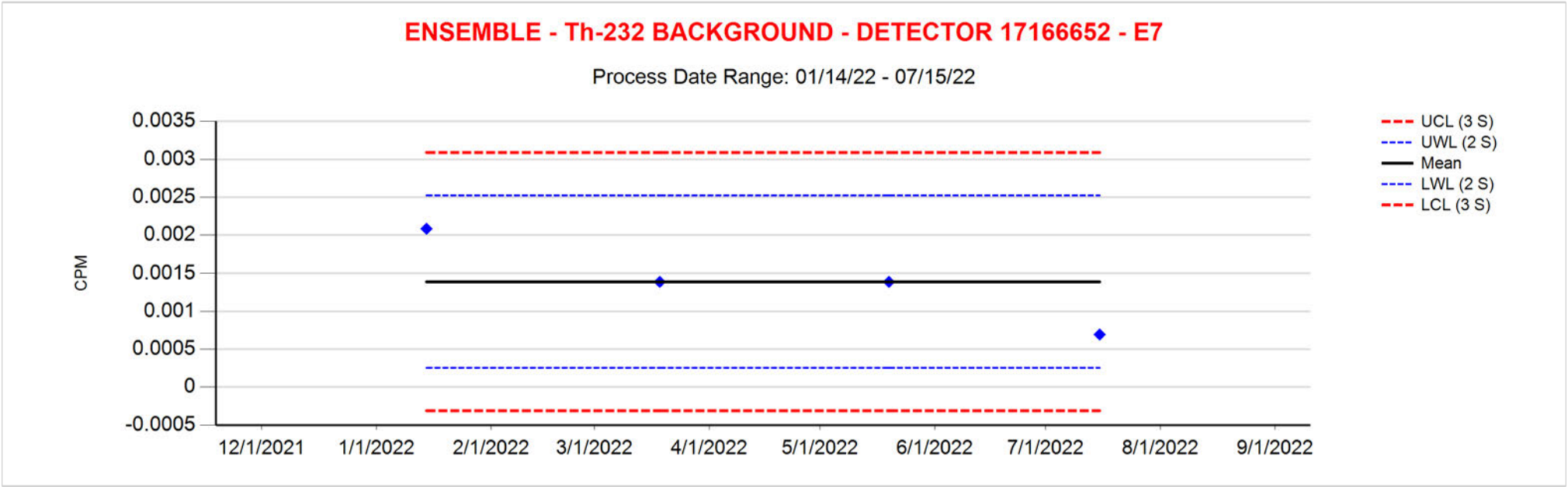
Statistical Process Control

Bin	Frequency
-0.0028 to 0.0002	0
0.0002 to 0.0032	1
0.0032 to 0.0062	1
0.0062 to 0.0093	2
0.0093 to 0.0123	0
0.0123 to 0.0153	0



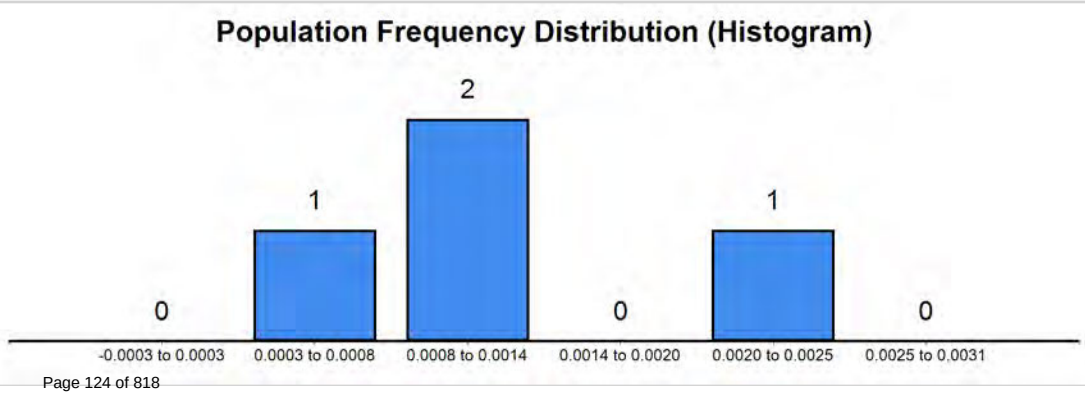
Th-232 Background - ARS1-B22-01100-03

Population Statistics				Trending Analysis	
Population Size	**4**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0014	CPM	0.0007	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0006	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0031	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0003	CPM	0.0014	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



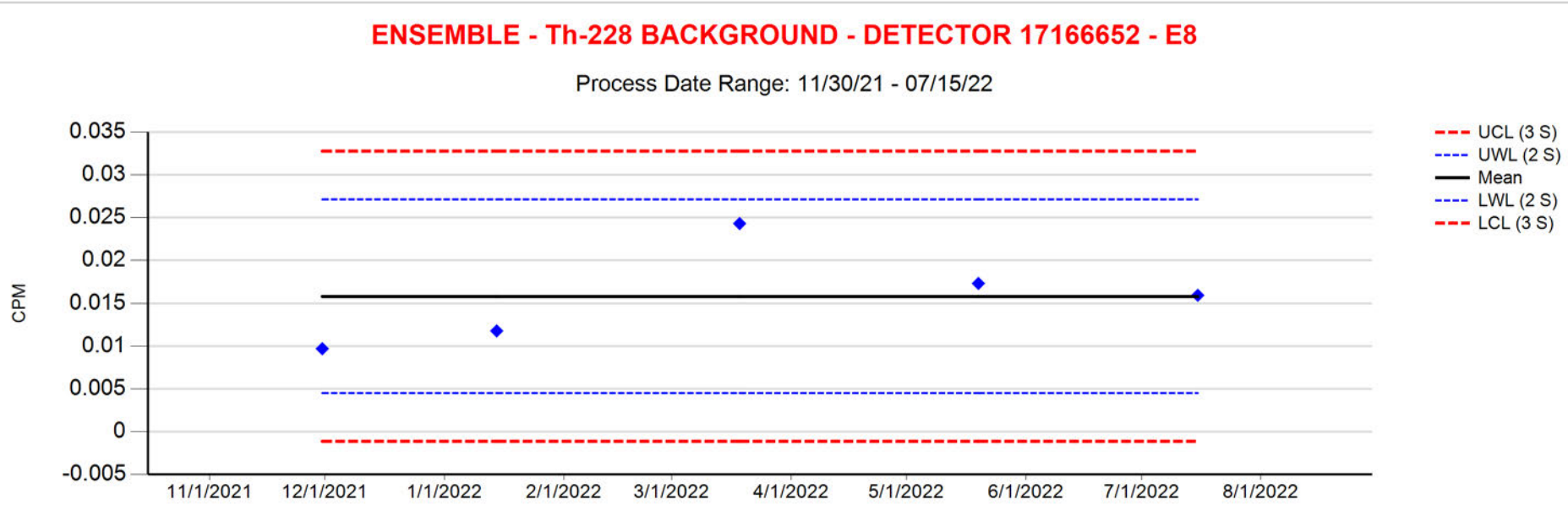
Statistical Process Control

Bin	Frequency
-0.0003 to 0.0003	0
0.0003 to 0.0008	1
0.0008 to 0.0014	2
0.0014 to 0.0020	0
0.0020 to 0.0025	1
0.0025 to 0.0031	0



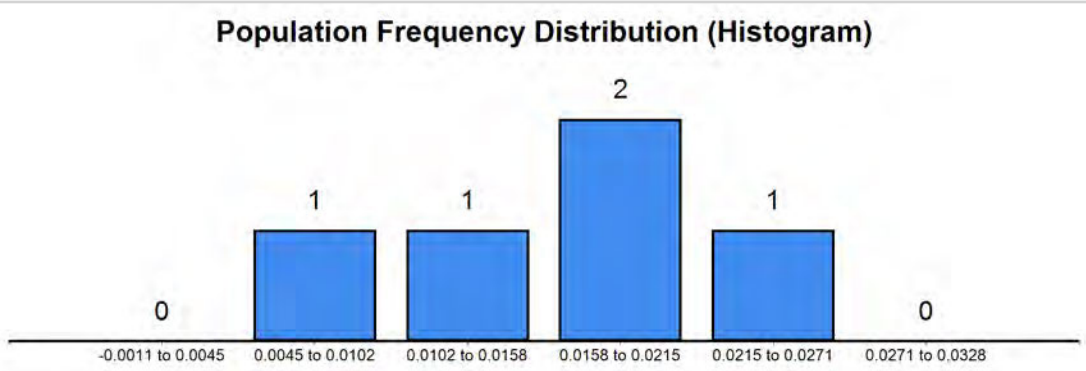
Th-228 Background - ARS1-B22-01100-04

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0158	CPM	0.0160	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0057	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0328	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0011	CPM	0.0174	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



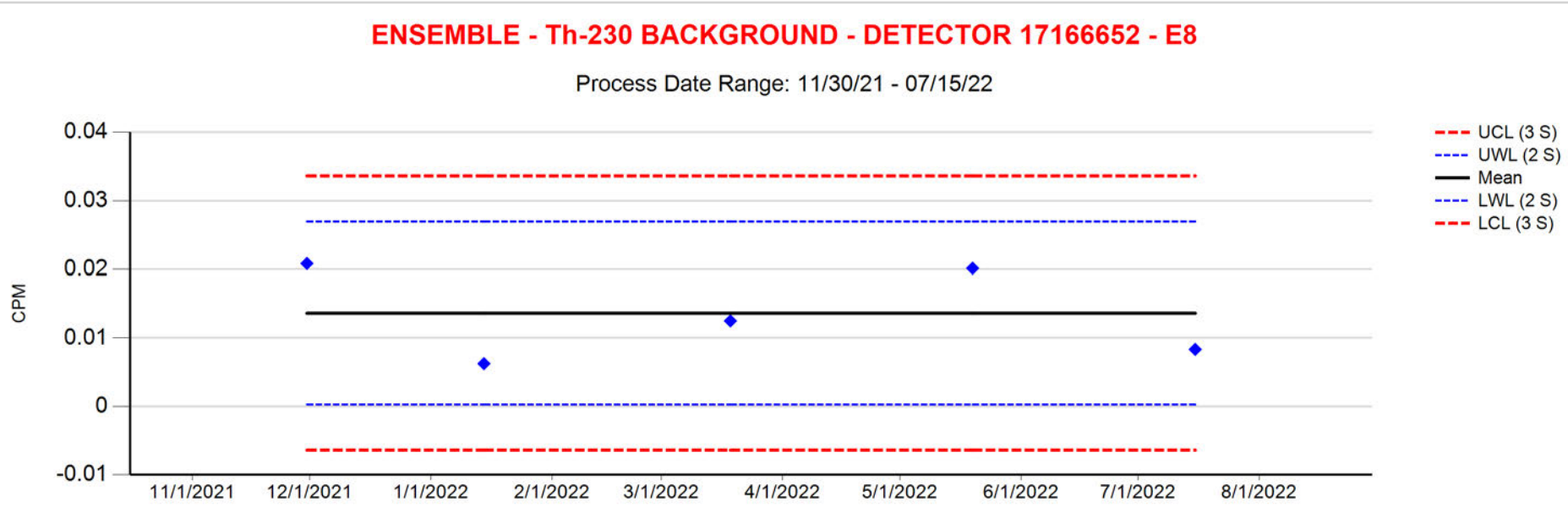
Statistical Process Control

Bin	Frequency
-0.0011 to 0.0045	0
0.0045 to 0.0102	1
0.0102 to 0.0158	1
0.0158 to 0.0215	2
0.0215 to 0.0271	1
0.0271 to 0.0328	0



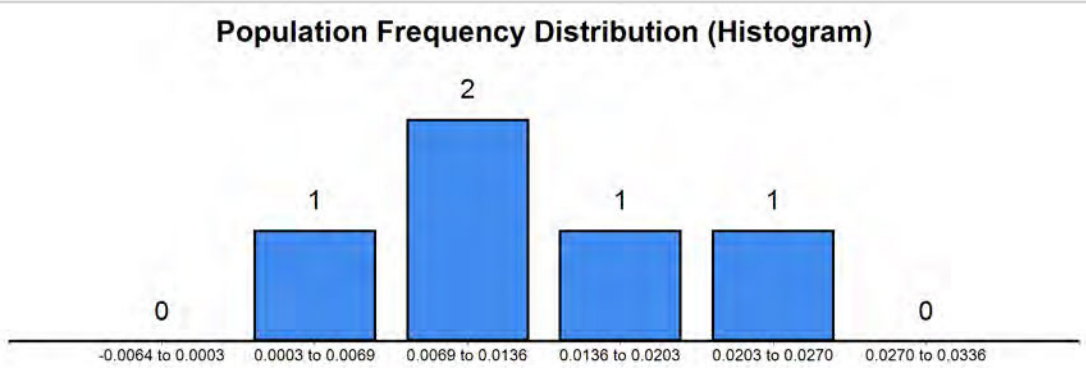
Th-230 Background - ARS1-B22-01100-04

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0136	CPM	0.0083	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0067	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0336	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0064	CPM	0.0201	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

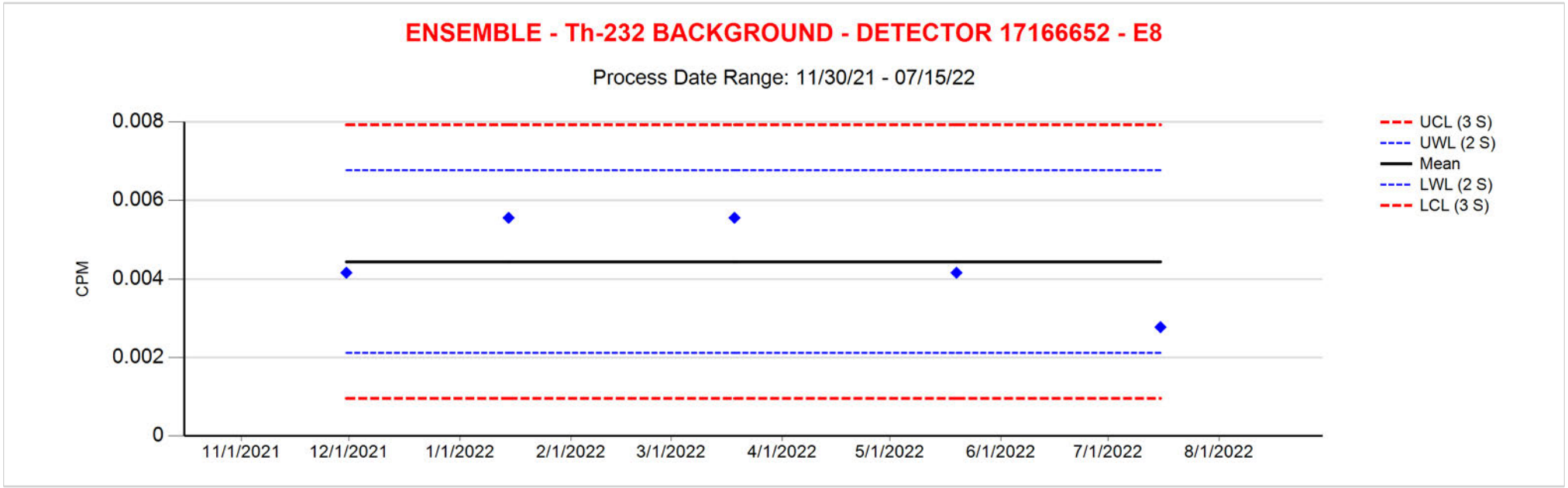


Statistical Process Control

Bin	Frequency
-0.0064 to 0.0003	0
0.0003 to 0.0069	1
0.0069 to 0.0136	2
0.0136 to 0.0203	1
0.0203 to 0.0270	1
0.0270 to 0.0336	0

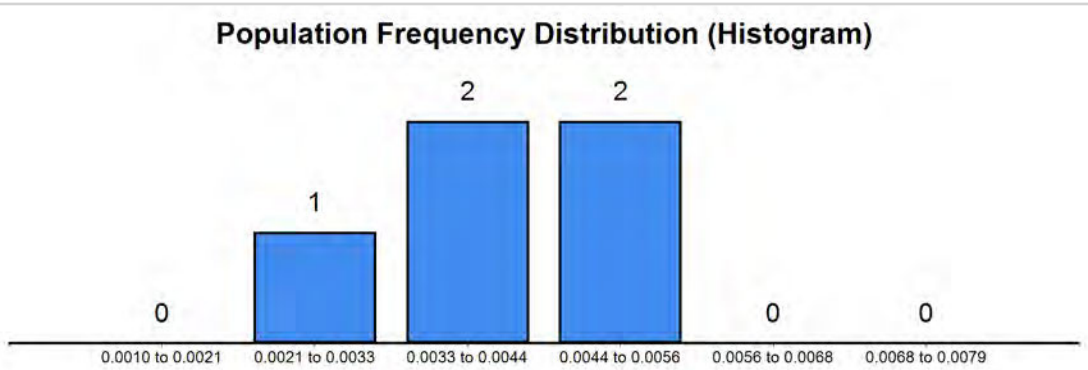


Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0044	CPM	0.0028	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0012	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0079	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0010	CPM	0.0042	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

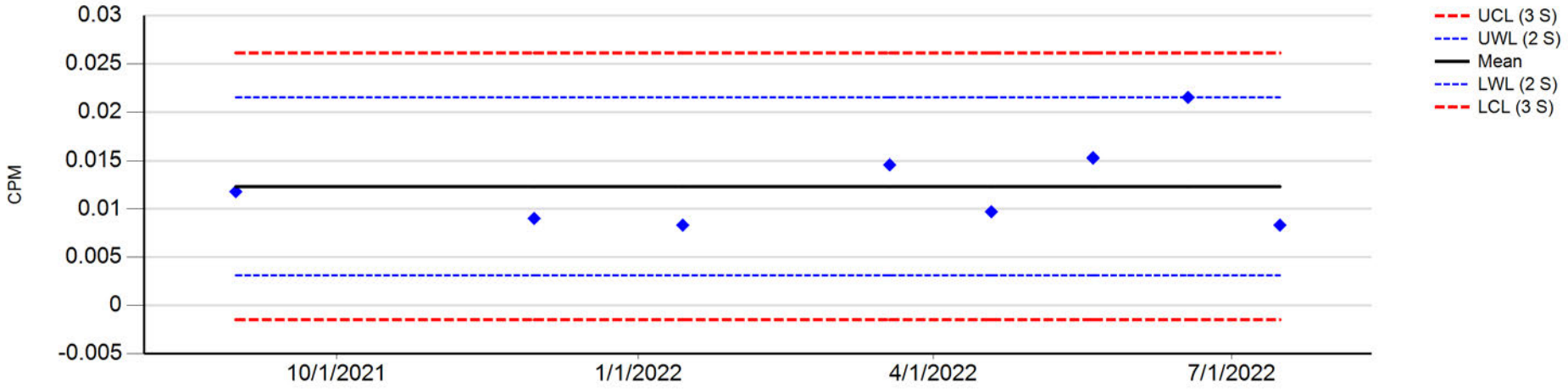
Bin	Frequency
0.0010 to 0.0021	0
0.0021 to 0.0033	1
0.0033 to 0.0044	2
0.0044 to 0.0056	2
0.0056 to 0.0068	0
0.0068 to 0.0079	0



Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0123	CPM	0.0083	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0046	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0261	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0015	CPM	0.0215	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

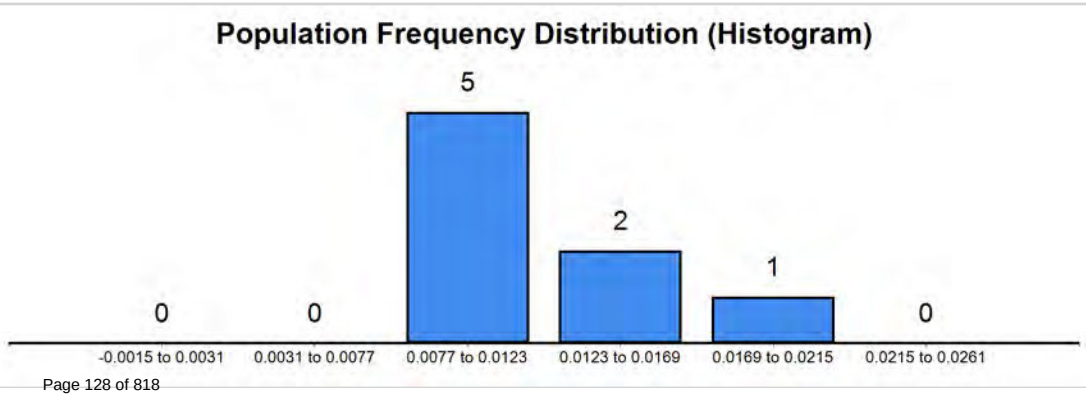
ENSEMBLE - Th-228 BACKGROUND - DETECTOR 17165813 - F1

Process Date Range: 08/31/21 - 07/15/22



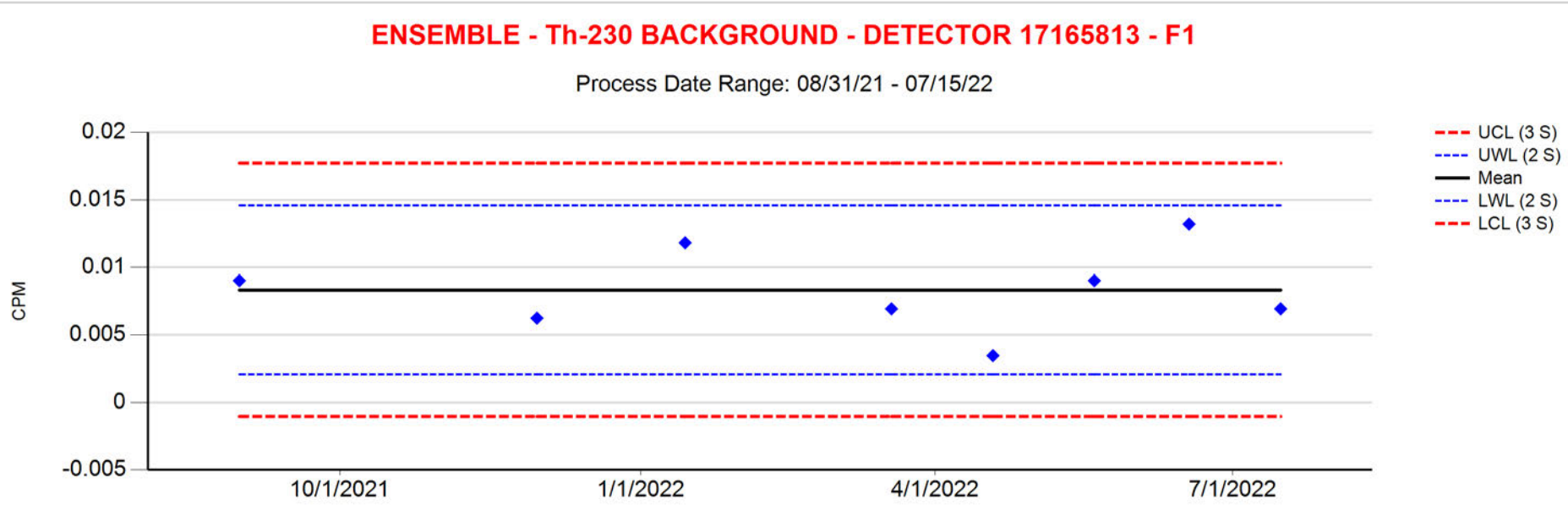
Statistical Process Control

Bin	Frequency
-0.0015 to 0.0031	0
0.0031 to 0.0077	0
0.0077 to 0.0123	5
0.0123 to 0.0169	2
0.0169 to 0.0215	1
0.0215 to 0.0261	0



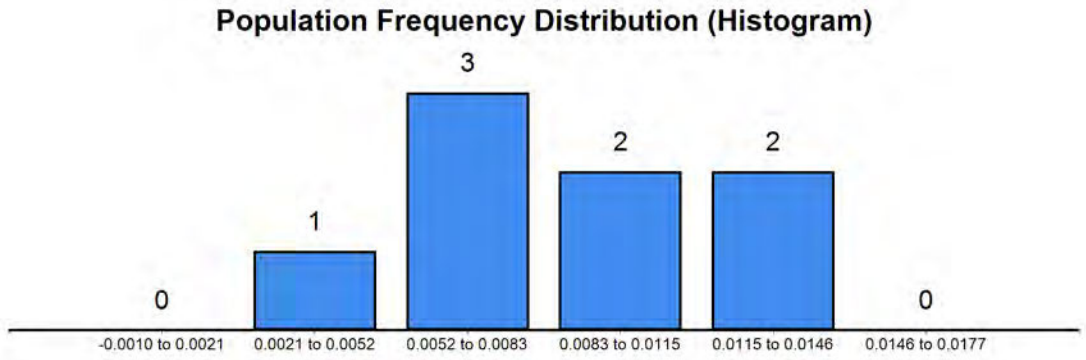
Th-230 Background - ARS1-B22-01100-05

Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0083	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0031	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0177	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0010	CPM	0.0132	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

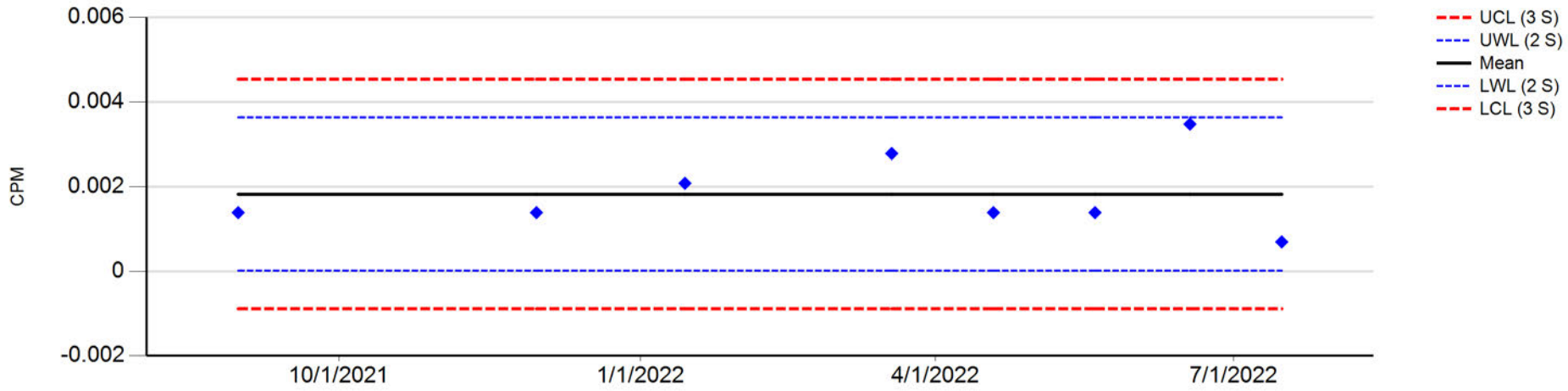
Bin	Frequency
-0.0010 to 0.0021	0
0.0021 to 0.0052	1
0.0052 to 0.0083	3
0.0083 to 0.0115	2
0.0115 to 0.0146	2
0.0146 to 0.0177	0



Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0018	CPM	0.0007	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0009	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0045	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0009	CPM	0.0035	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

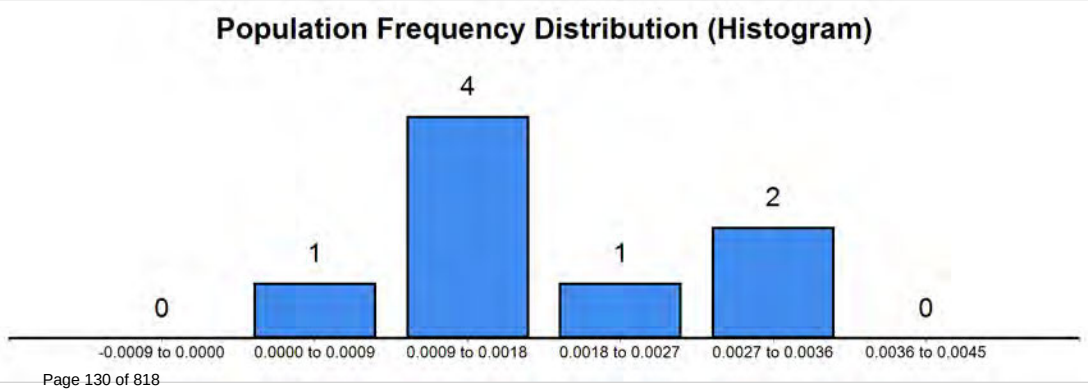
ENSEMBLE - Th-232 BACKGROUND - DETECTOR 17165813 - F1

Process Date Range: 08/31/21 - 07/15/22

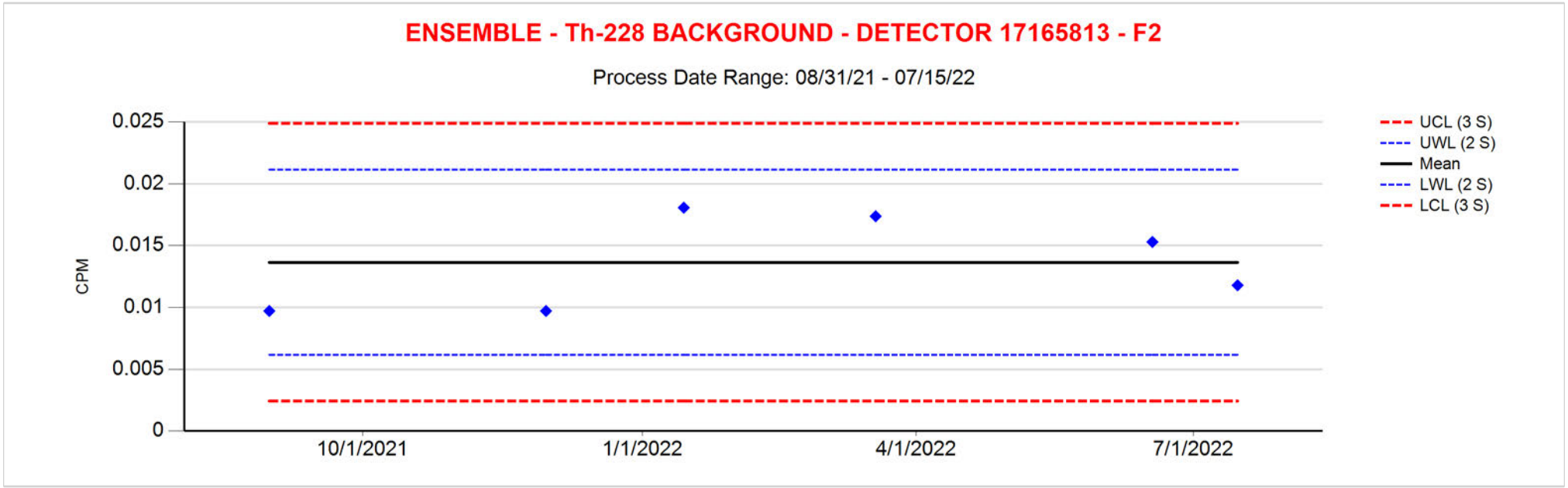


Statistical Process Control

Bin	Frequency
-0.0009 to 0.0000	0
0.0000 to 0.0009	1
0.0009 to 0.0018	4
0.0018 to 0.0027	1
0.0027 to 0.0036	2
0.0036 to 0.0045	0

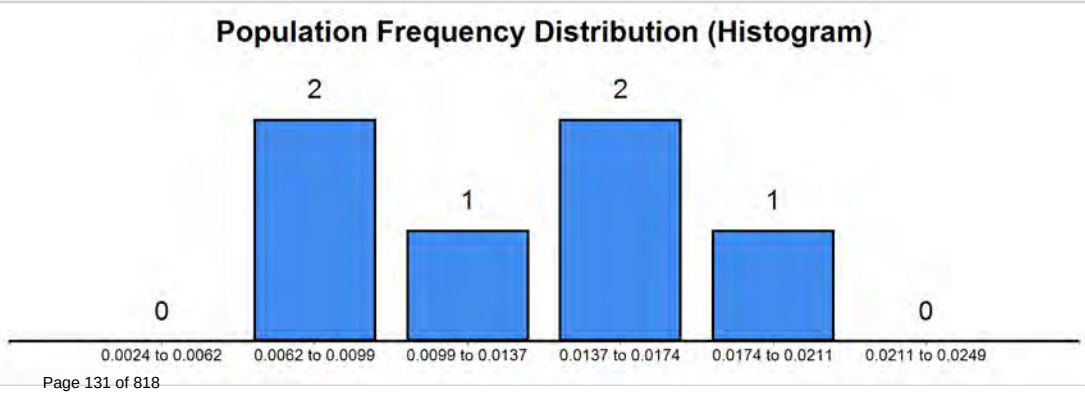


Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0137	CPM	0.0118	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0037	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0249	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0024	CPM	0.0153	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



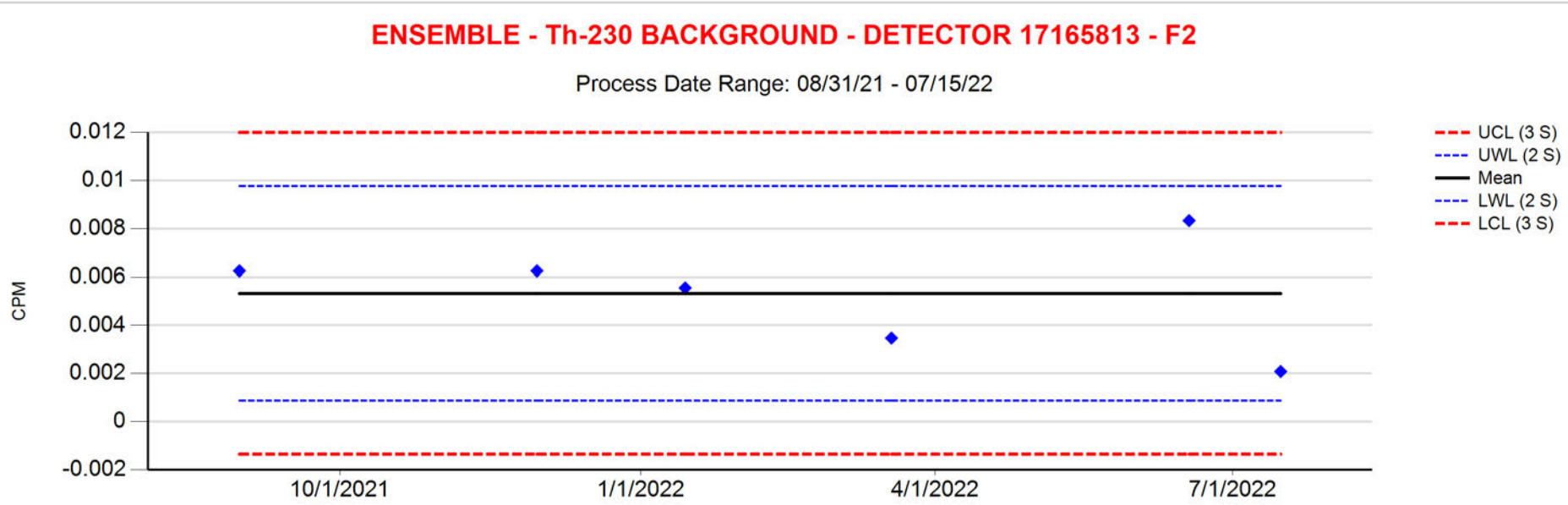
Statistical Process Control

Bin	Frequency
0.0024 to 0.0062	0
0.0062 to 0.0099	2
0.0099 to 0.0137	1
0.0137 to 0.0174	2
0.0174 to 0.0211	1
0.0211 to 0.0249	0



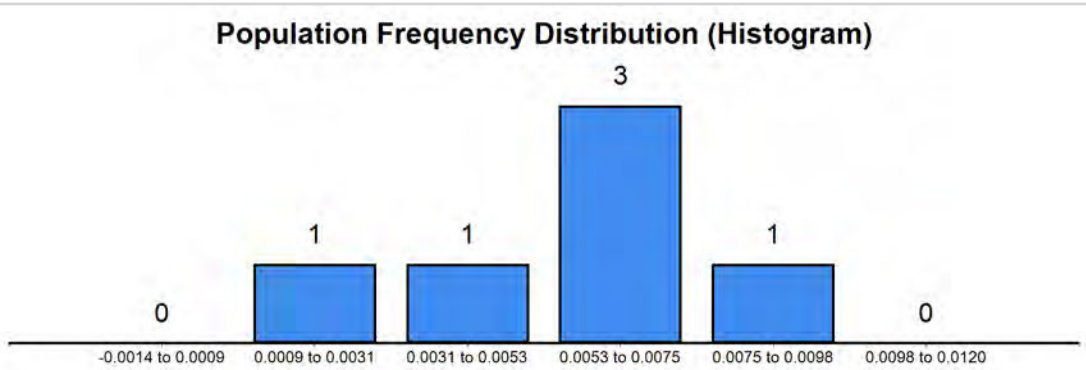
Th-230 Background - ARS1-B22-01100-06

Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0053	CPM	0.0021	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0022	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0120	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0014	CPM	0.0083	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

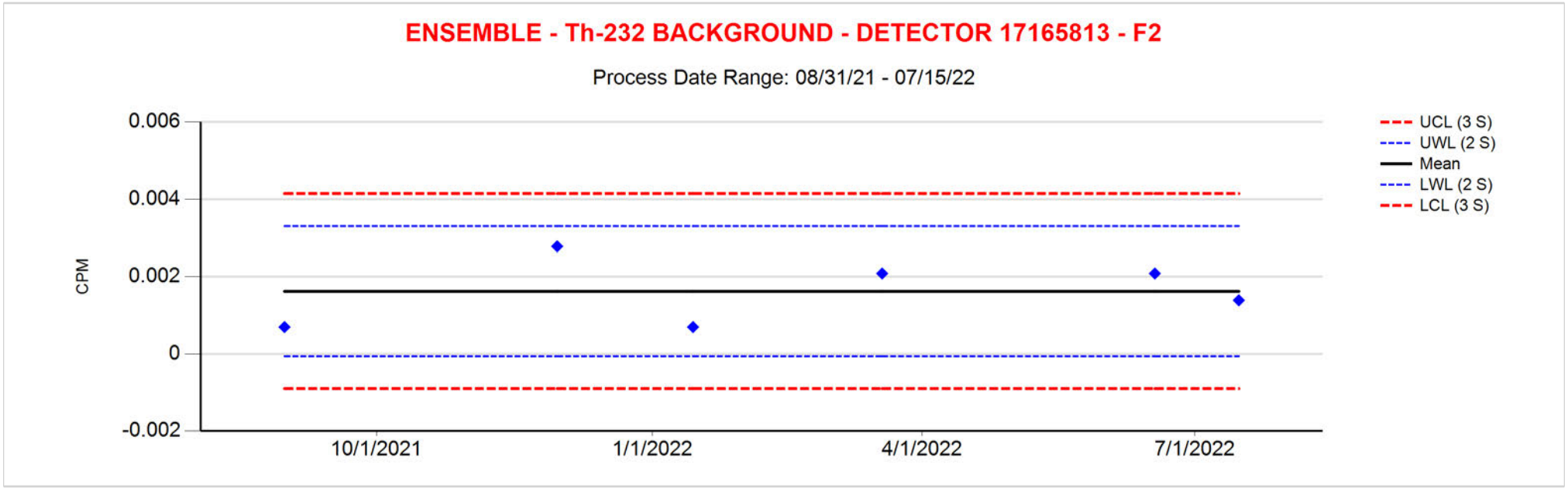


Statistical Process Control

Bin	Frequency
-0.0014 to 0.0009	0
0.0009 to 0.0031	1
0.0031 to 0.0053	1
0.0053 to 0.0075	3
0.0075 to 0.0098	1
0.0098 to 0.0120	0

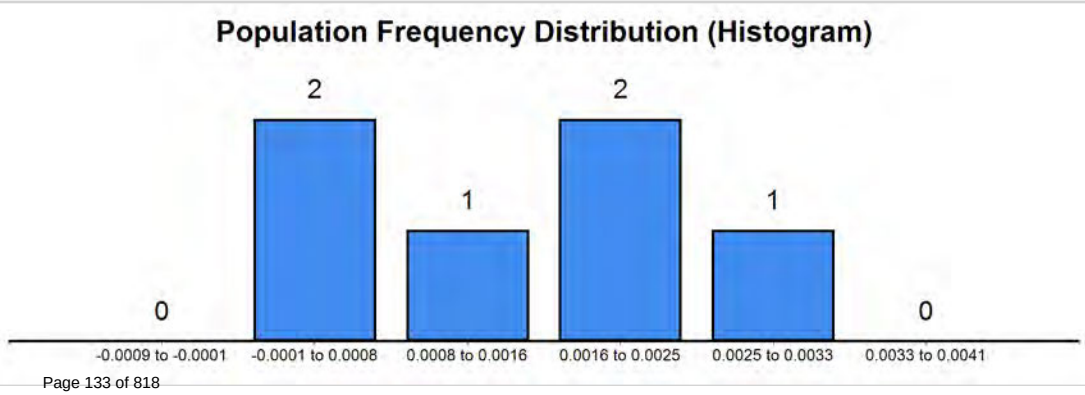


Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0016	CPM	0.0014	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0008	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0041	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0009	CPM	0.0021	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

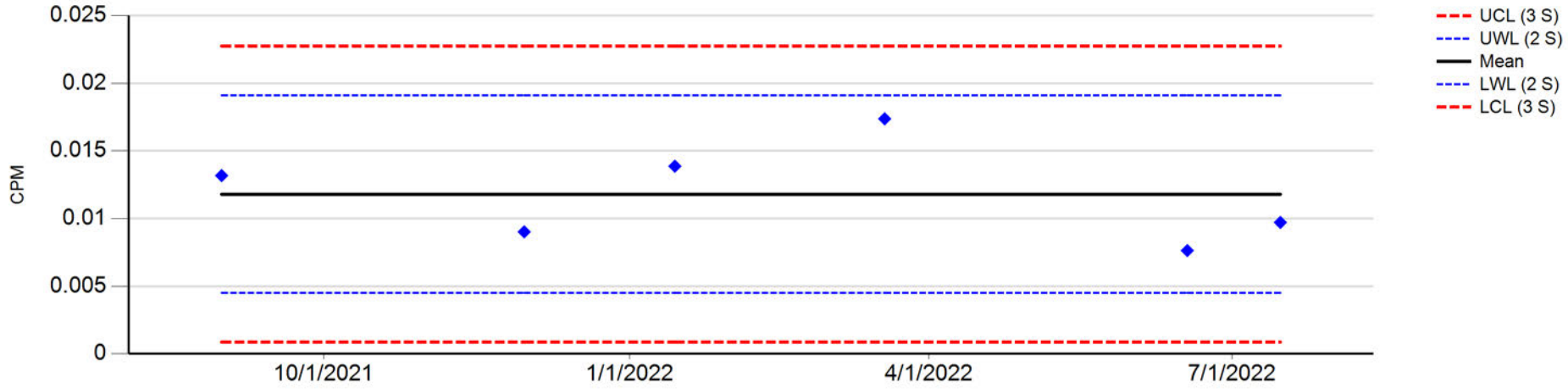
Bin	Frequency
-0.0009 to -0.0001	0
-0.0001 to 0.0008	2
0.0008 to 0.0016	1
0.0016 to 0.0025	2
0.0025 to 0.0033	1
0.0033 to 0.0041	0



Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0118	CPM	0.0097	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0036	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0228	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0009	CPM	0.0076	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

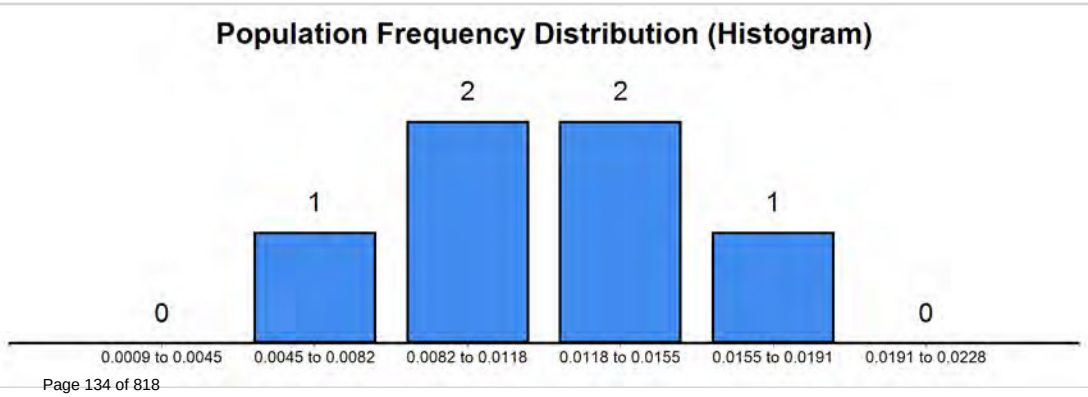
ENSEMBLE - Th-228 BACKGROUND - DETECTOR 17165814 - F3

Process Date Range: 08/31/21 - 07/15/22



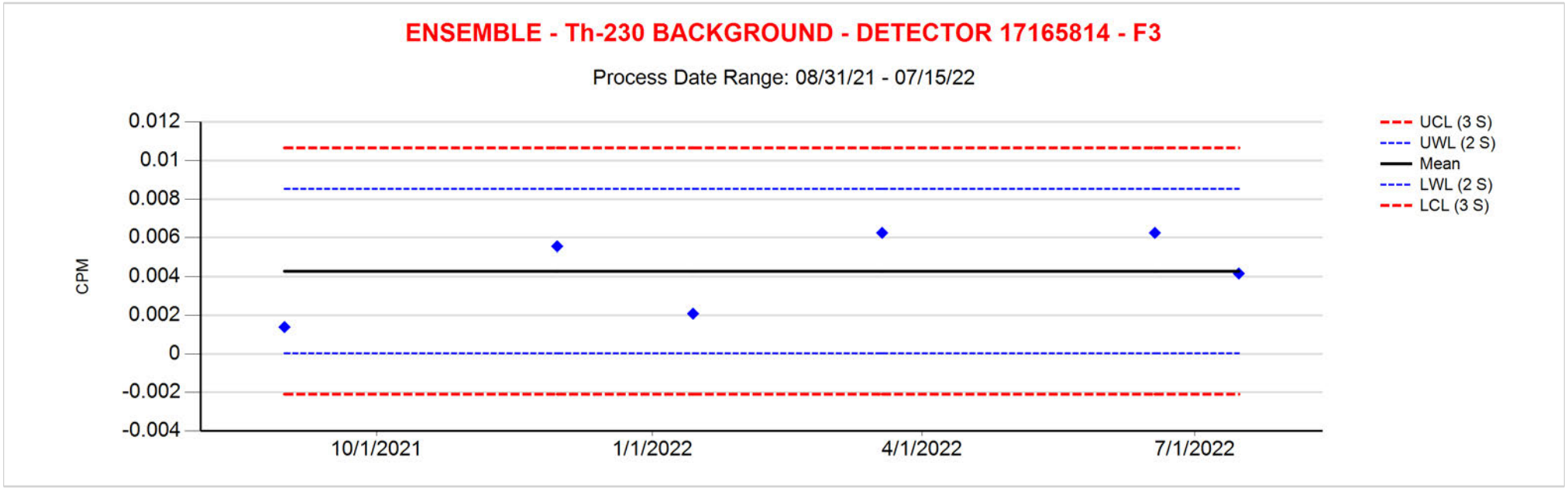
Statistical Process Control

Bin	Frequency
0.0009 to 0.0045	0
0.0045 to 0.0082	1
0.0082 to 0.0118	2
0.0118 to 0.0155	2
0.0155 to 0.0191	1
0.0191 to 0.0228	0



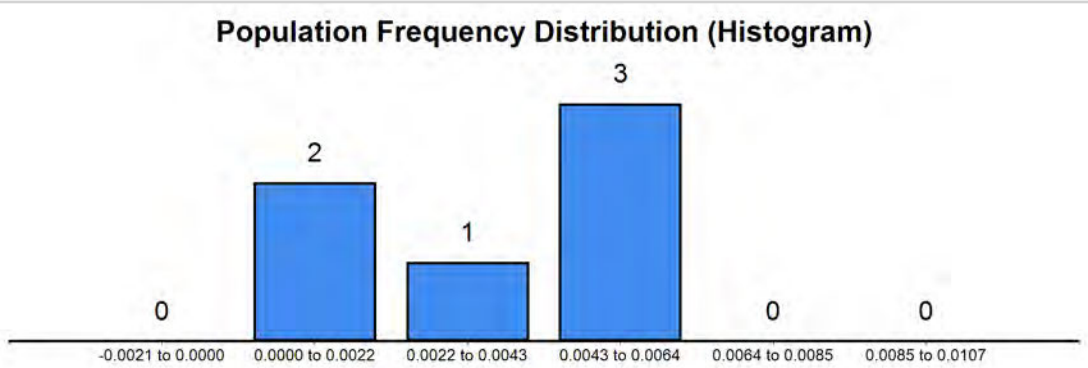
Th-230 Background - ARS1-B22-01100-07

Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0043	CPM	0.0042	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0021	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0107	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0021	CPM	0.0063	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



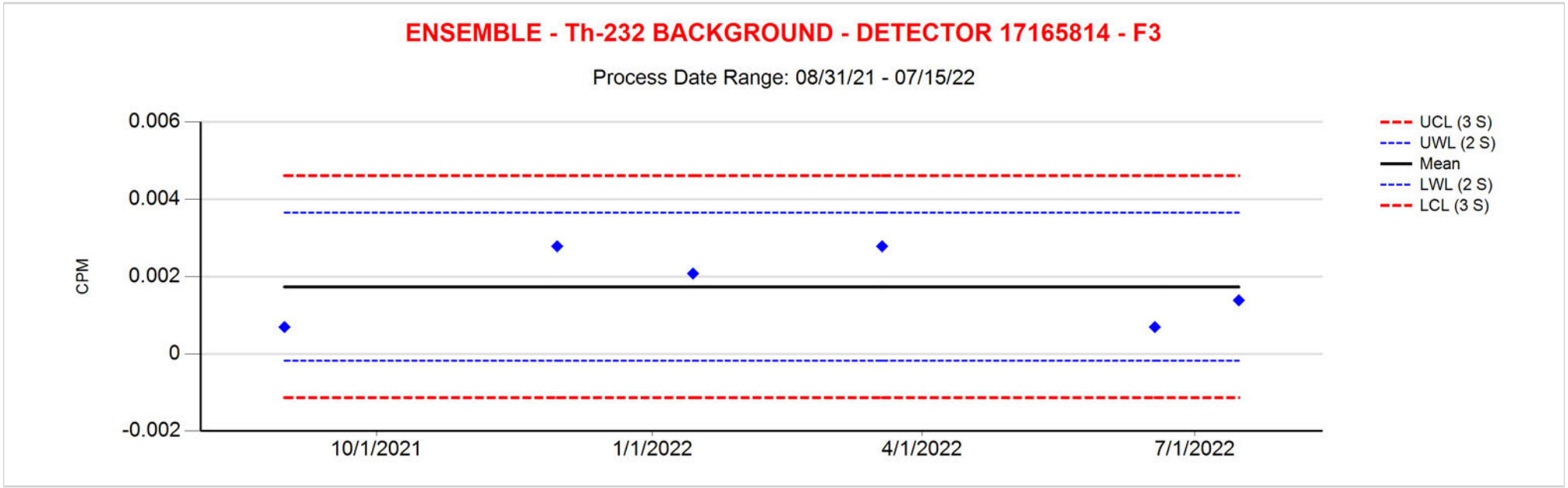
Statistical Process Control

Bin	Frequency
-0.0021 to 0.0000	0
0.0000 to 0.0022	2
0.0022 to 0.0043	1
0.0043 to 0.0064	3
0.0064 to 0.0085	0
0.0085 to 0.0107	0



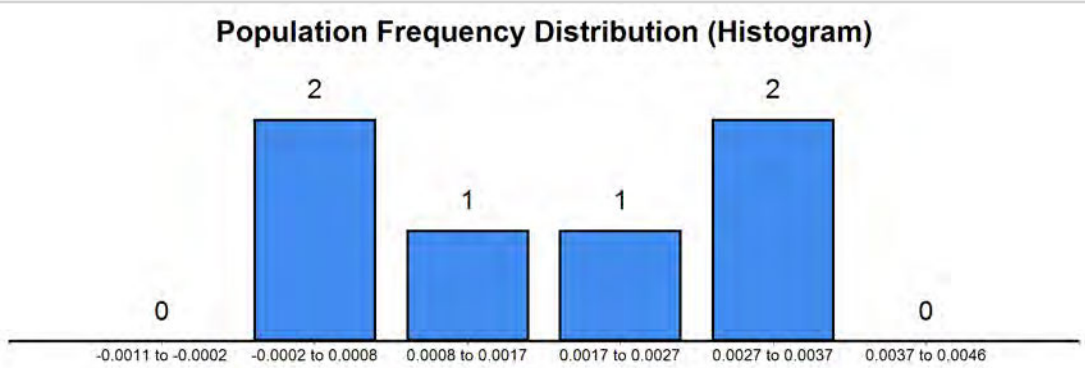
Th-232 Background - ARS1-B22-01100-07

Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0017	CPM	0.0014	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0010	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0046	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0011	CPM	0.0007	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



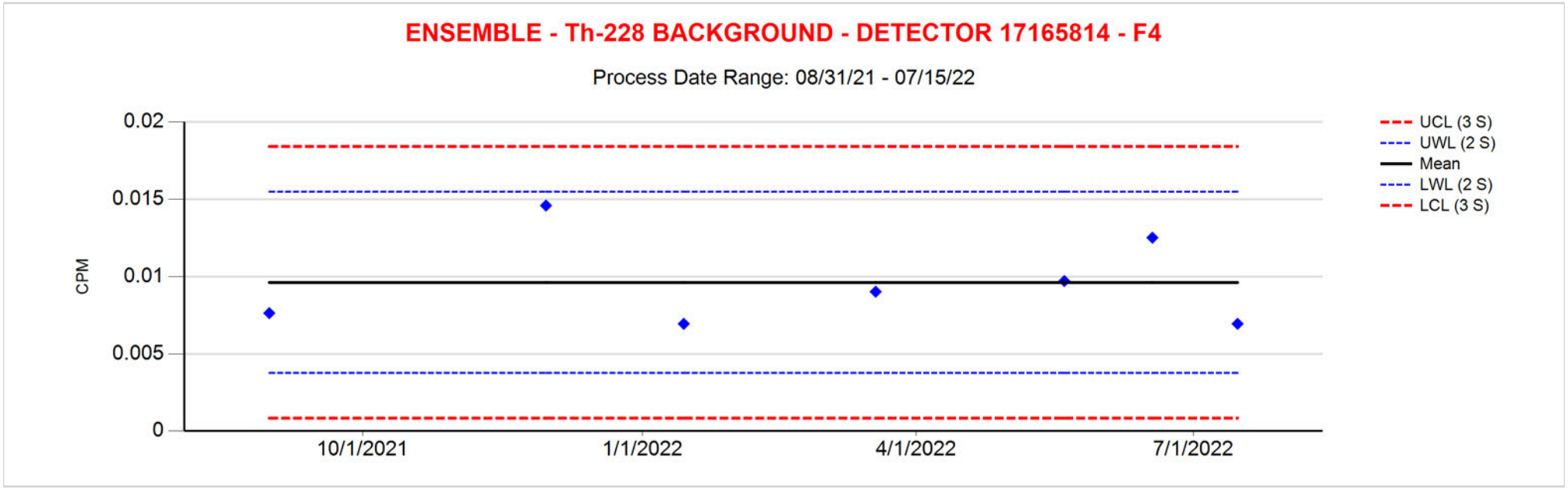
Statistical Process Control

Bin	Frequency
-0.0011 to -0.0002	0
-0.0002 to 0.0008	2
0.0008 to 0.0017	1
0.0017 to 0.0027	1
0.0027 to 0.0037	2
0.0037 to 0.0046	0



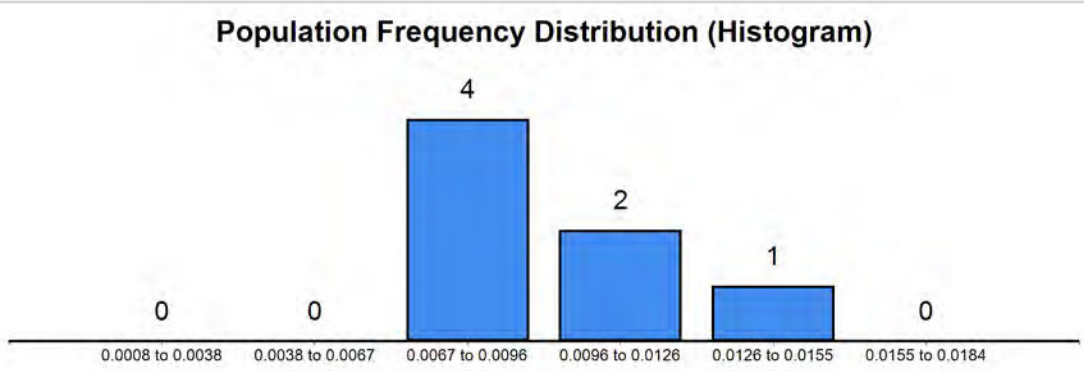
Th-228 Background - ARS1-B22-01100-08

Population Statistics				Trending Analysis	
Population Size	7	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0096	CPM	0.0069	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0029	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0184	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	0.0008	CPM	0.0125	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK



Statistical Process Control

Bin	Frequency
0.0008 to 0.0038	0
0.0038 to 0.0067	0
0.0067 to 0.0096	4
0.0096 to 0.0126	2
0.0126 to 0.0155	1
0.0155 to 0.0184	0

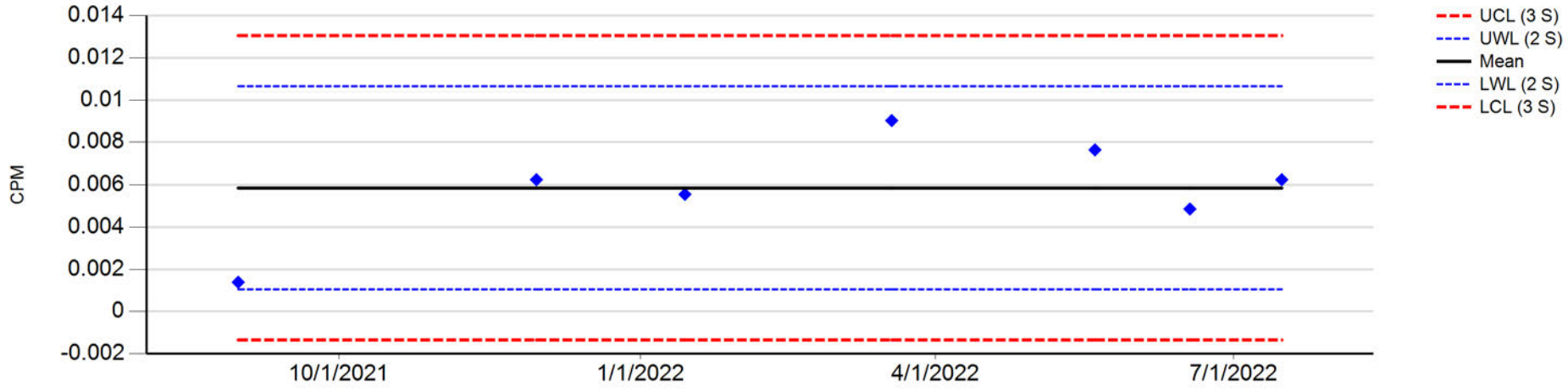


Th-230 Background - ARS1-B22-01100-08

Population Statistics				Trending Analysis	
Population Size	7	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0059	CPM	0.0063	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0024	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0131	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	-0.0013	CPM	0.0049	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK

ENSEMBLE - Th-230 BACKGROUND - DETECTOR 17165814 - F4

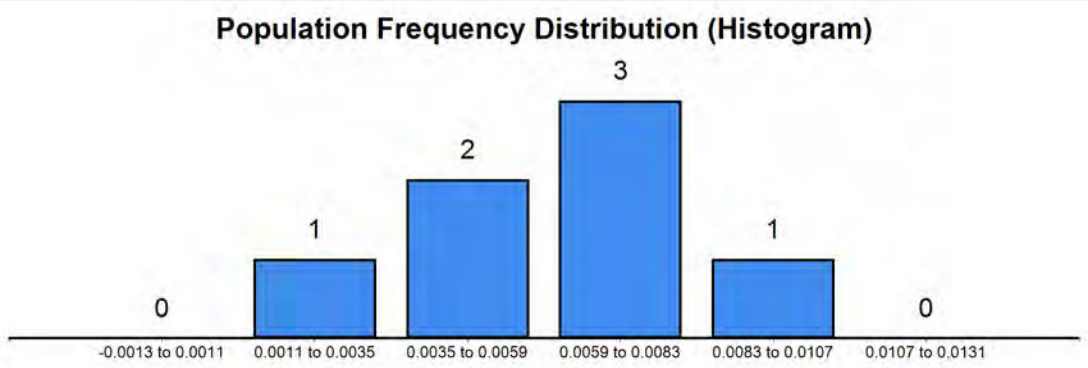
Process Date Range: 08/31/21 - 07/15/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0013 to 0.0011	0
0.0011 to 0.0035	1
0.0035 to 0.0059	2
0.0059 to 0.0083	3
0.0083 to 0.0107	1
0.0107 to 0.0131	0

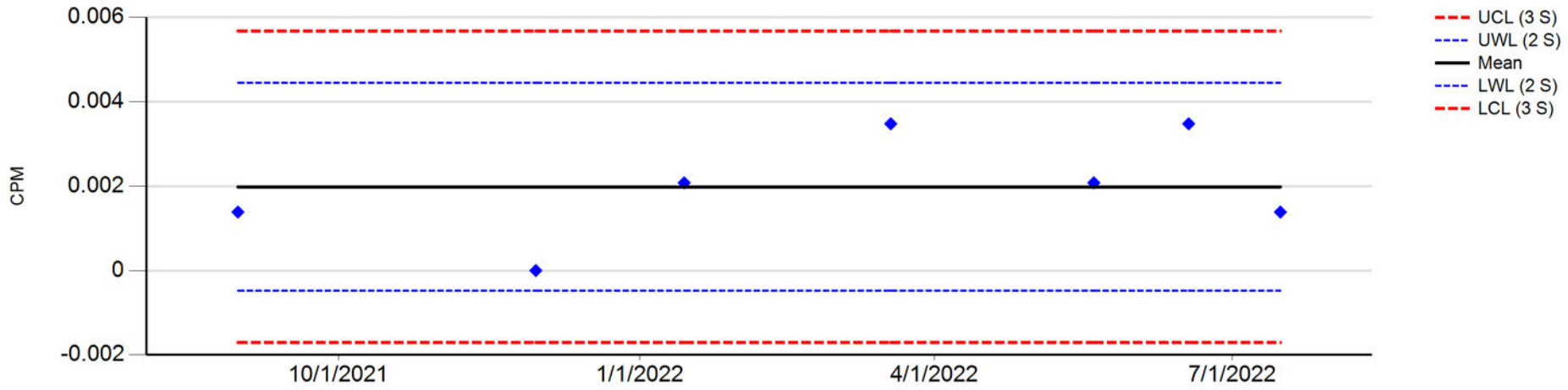


Th-232 Background - ARS1-B22-01100-08

Population Statistics				Trending Analysis	
Population Size	7	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0020	CPM	0.0014	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0012	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0057	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	-0.0017	CPM	0.0035	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK

ENSEMBLE - Th-232 BACKGROUND - DETECTOR 17165814 - F4

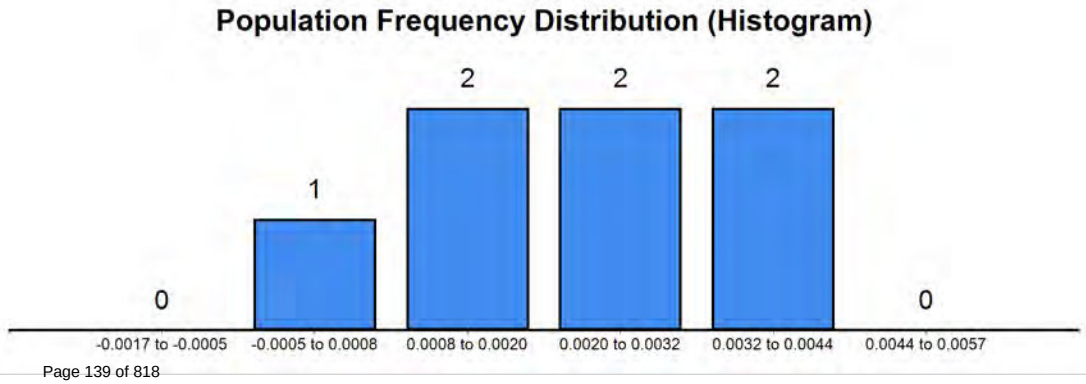
Process Date Range: 08/31/21 - 07/15/22



ARS Aleut Analytical

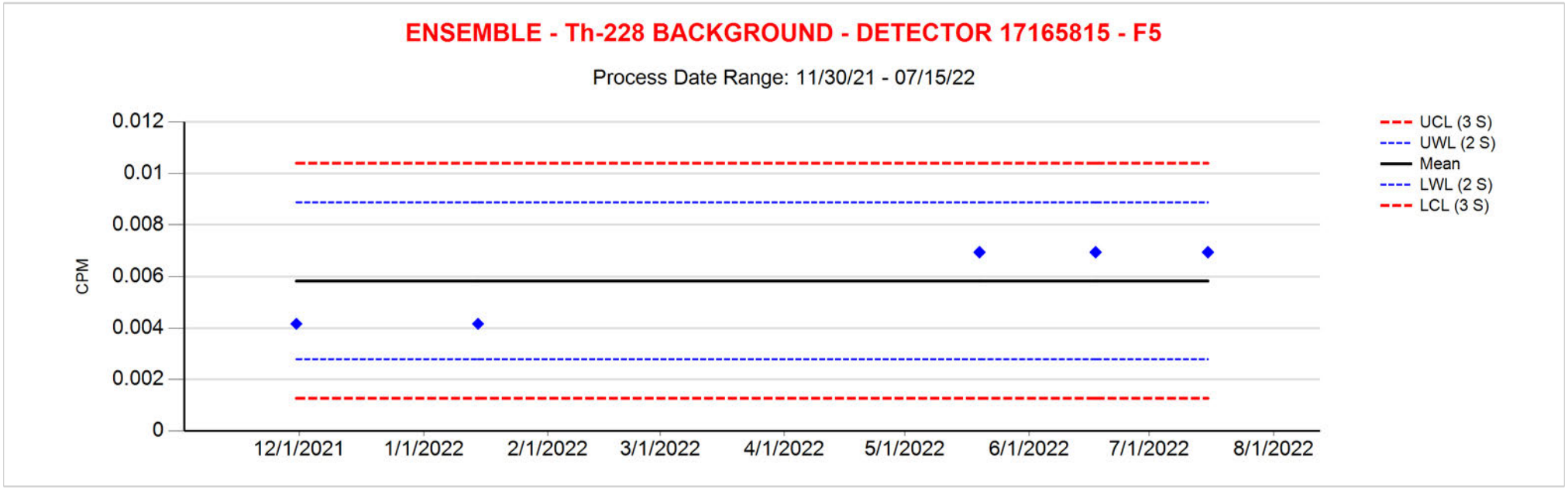
Statistical Process Control

Bin	Frequency
-0.0017 to -0.0005	0
-0.0005 to 0.0008	1
0.0008 to 0.0020	2
0.0020 to 0.0032	2
0.0032 to 0.0044	2
0.0044 to 0.0057	0



Th-228 Background - ARS1-B22-01100-09

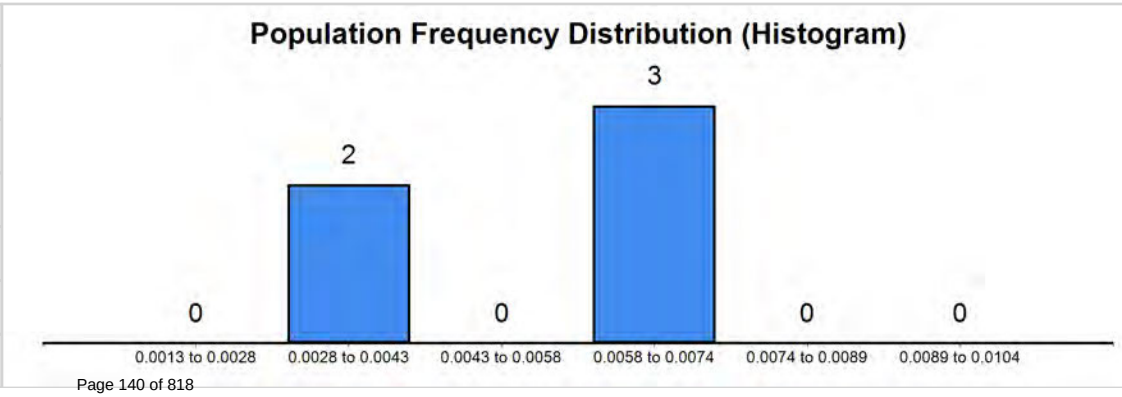
Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0058	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0015	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0104	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0013	CPM	0.0069	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

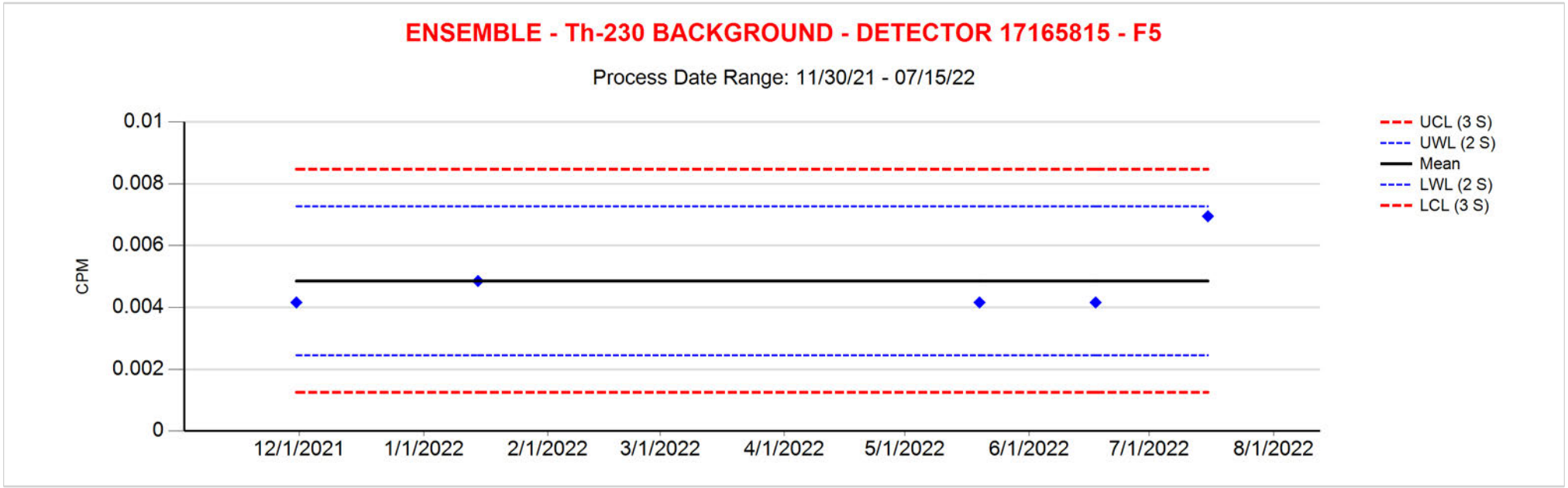
Statistical Process Control

Bin	Frequency
0.0013 to 0.0028	0
0.0028 to 0.0043	2
0.0043 to 0.0058	0
0.0058 to 0.0074	3
0.0074 to 0.0089	0
0.0089 to 0.0104	0



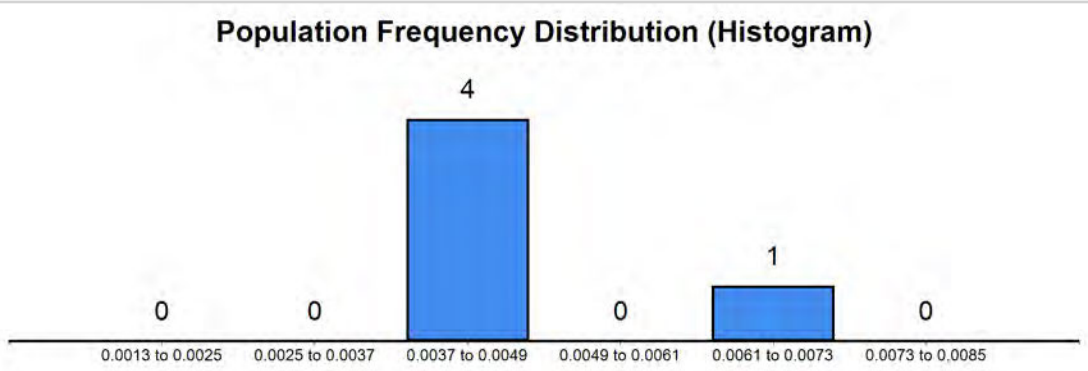
Th-230 Background - ARS1-B22-01100-09

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0049	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0012	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0085	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0013	CPM	0.0042	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



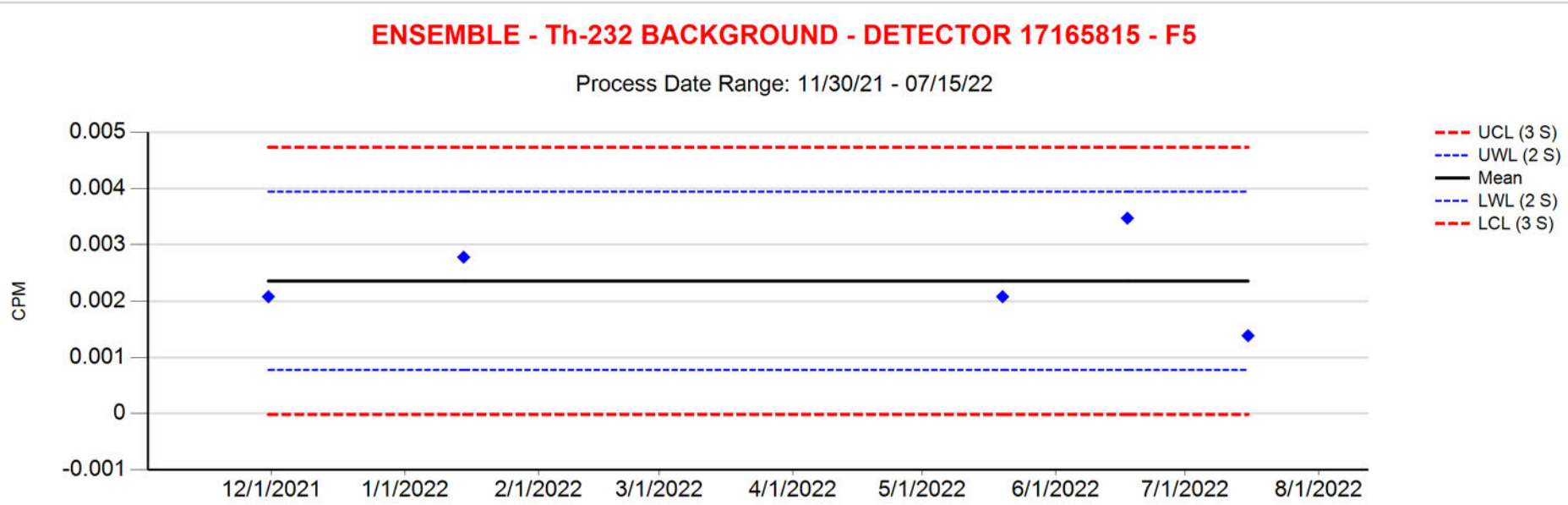
Statistical Process Control

Bin	Frequency
0.0013 to 0.0025	0
0.0025 to 0.0037	0
0.0037 to 0.0049	4
0.0049 to 0.0061	0
0.0061 to 0.0073	1
0.0073 to 0.0085	0



Th-232 Background - ARS1-B22-01100-09

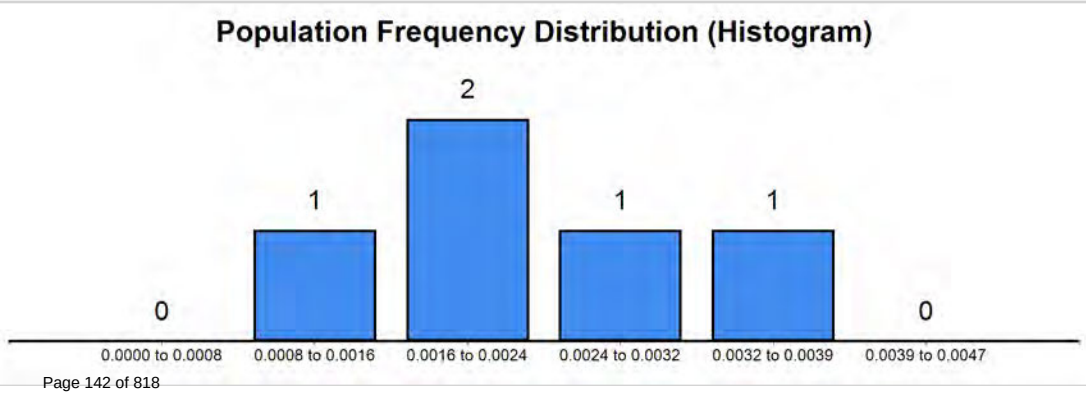
Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0024	CPM	0.0014	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0008	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0047	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0000	CPM	0.0035	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.0000 to 0.0008	0
0.0008 to 0.0016	1
0.0016 to 0.0024	2
0.0024 to 0.0032	1
0.0032 to 0.0039	1
0.0039 to 0.0047	0

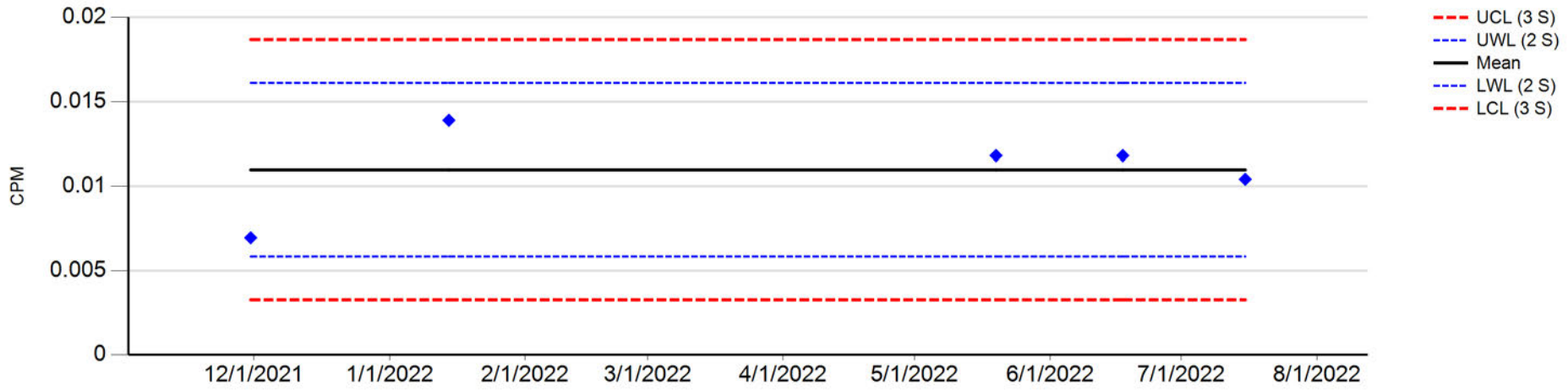


Th-228 Background - ARS1-B22-01100-10

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0110	CPM	0.0104	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0026	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0187	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0033	CPM	0.0118	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - Th-228 BACKGROUND - DETECTOR 17165816 - F6

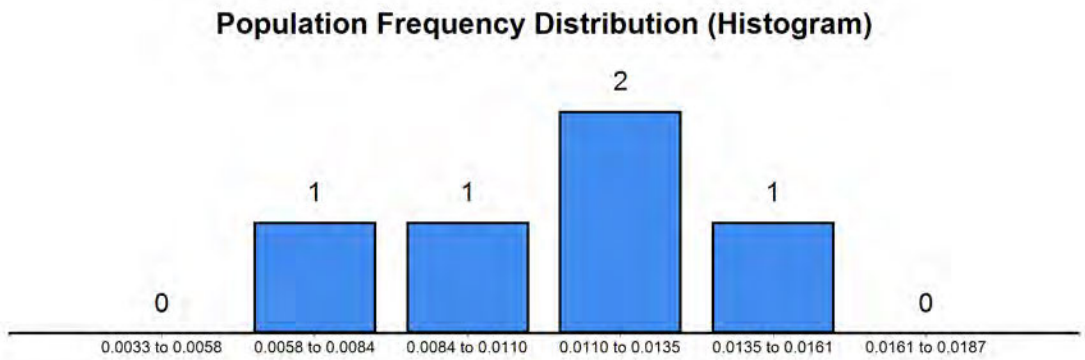
Process Date Range: 11/30/21 - 07/15/22



ARS Aleut Analytical

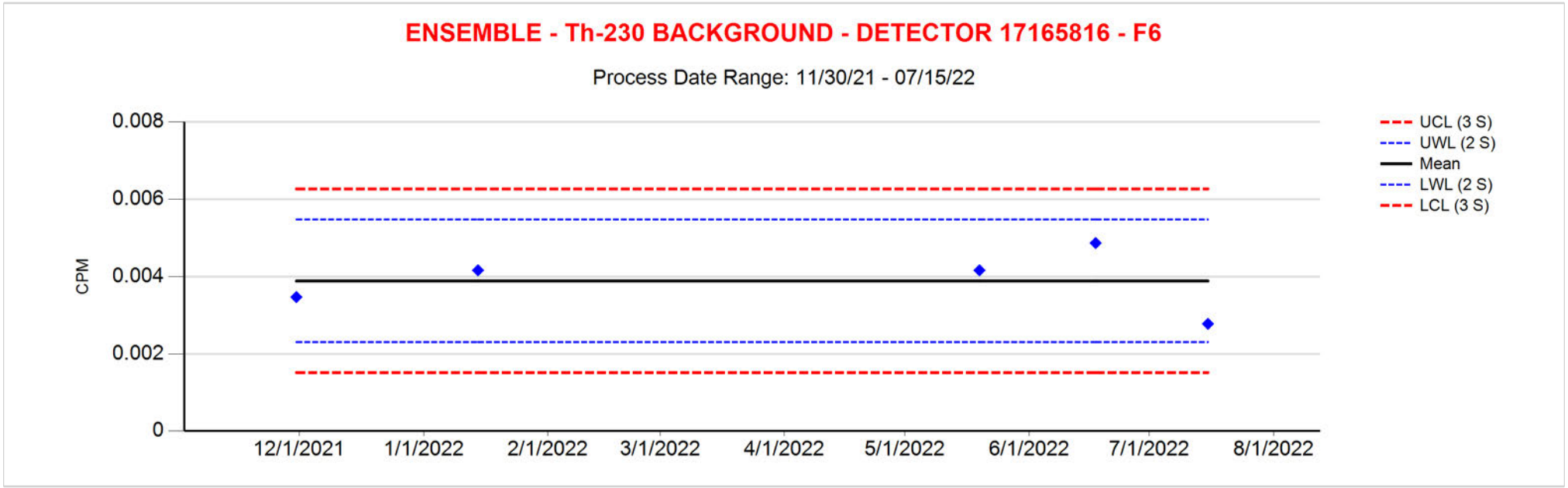
Statistical Process Control

Bin	Frequency
0.0033 to 0.0058	0
0.0058 to 0.0084	1
0.0084 to 0.0110	1
0.0110 to 0.0135	2
0.0135 to 0.0161	1
0.0161 to 0.0187	0



Th-230 Background - ARS1-B22-01100-10

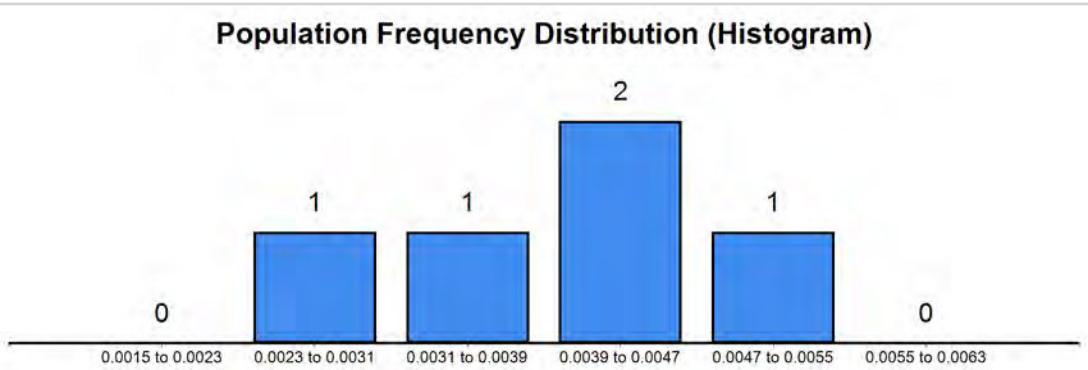
Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0039	CPM	0.0028	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0008	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0063	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0015	CPM	0.0049	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



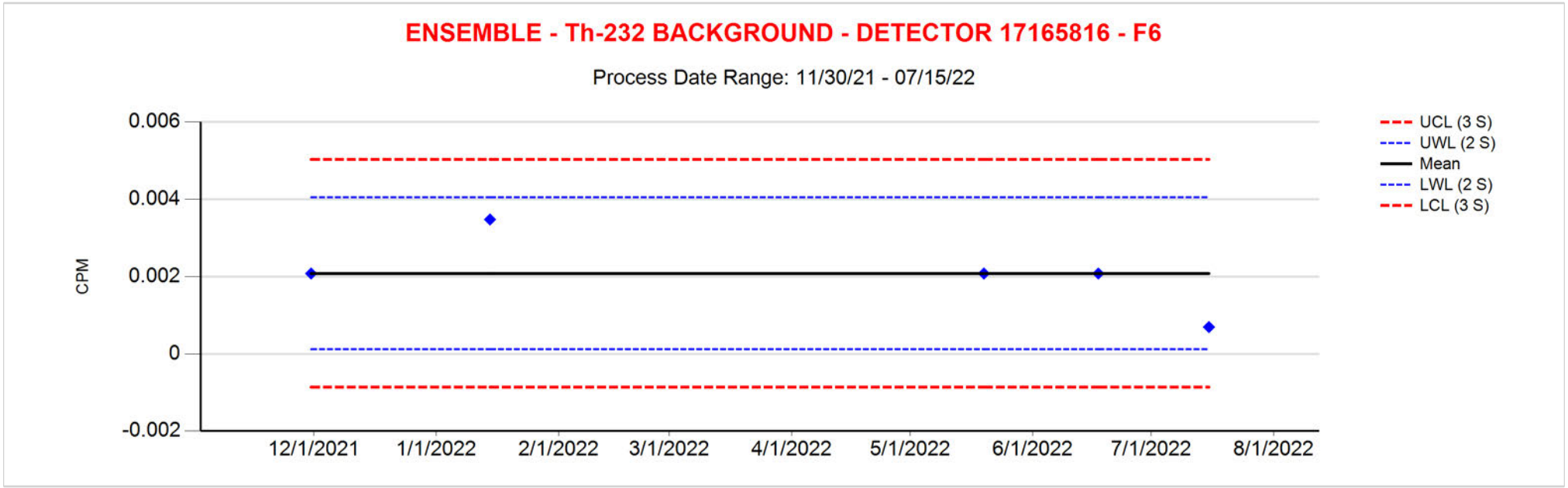
ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.0015 to 0.0023	0
0.0023 to 0.0031	1
0.0031 to 0.0039	1
0.0039 to 0.0047	2
0.0047 to 0.0055	1
0.0055 to 0.0063	0

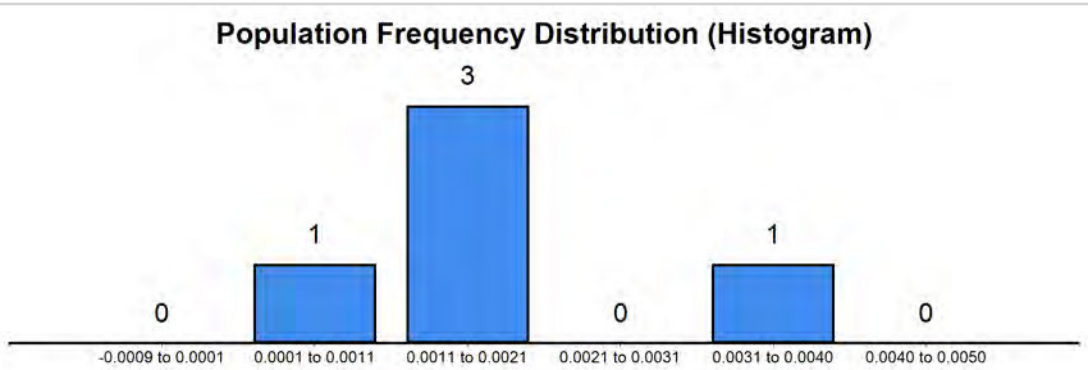


Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0021	CPM	0.0007	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0010	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0050	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0009	CPM	0.0021	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
-0.0009 to 0.0001	0
0.0001 to 0.0011	1
0.0011 to 0.0021	3
0.0021 to 0.0031	0
0.0031 to 0.0040	1
0.0040 to 0.0050	0



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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Alpha Spec Th-Standards

Alpa Spec Standard Verification

	Std. ID	Isotope
Analyte	**S-0365**	**Th-230**
Tracer	**S-0344**	**Th-229**

Expires: 4/18/2023

S-0365 Net	S-0344 Net	Grams of S-0344	S-0344 dpm/g	S-0344 dpm added	S-0365 dpm	Grams of S-0365	S-0365 dpm/g
1831	1545	1	9.9225	9.9225	11.759	1.008	11.66595874
1748	1486.5	0.985	9.9225	9.7736625	11.493	1.002	11.47007166
1681.5	1464	1.005	9.9225	9.9721125	11.454	1.013	11.30663881
1846.5	1533.5	1.004	9.9225	9.96219	11.996	1.014	11.82993605
1851.5	1569	0.96	9.9225	9.5256	11.241	1.015	11.07457506

Average	11.469
Known Value	11.300
Average/stdev	2.583%
% Bias	1.481%

Performed by: [redacted] Date: 4/18/2022

Reviewed by: [redacted] Date: 4-18-22

QA Approval: [redacted] Date: 4-18-22

ARS-038-003 r0.2
Revision Date: 01/23/2019

ARS Aleut Analytical

Weight Spreadsheet for Standard Verification

Verification Weights

Tech:	[redacted]
Pippete:	SH39912
Scale ID:	Soil-T0350192
Standard ID:	S-0365
Tracer ID:	S-0344

Sample ID	Std. Weight(g)	Tracer Weight(g)
S-0365-V1	1.008	1
S-0365-V2	1.002	0.985
S-0365-V3	1.013	1.005
S-0365-V4	1.014	1.004
S-0365-V5	1.015	0.996

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 27,734 9:20:34AM 4/18/2022

Sample

Sample: Th Std Ver-1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
.
Description:

Client Name: Undefined
Client Contact:

Tracer

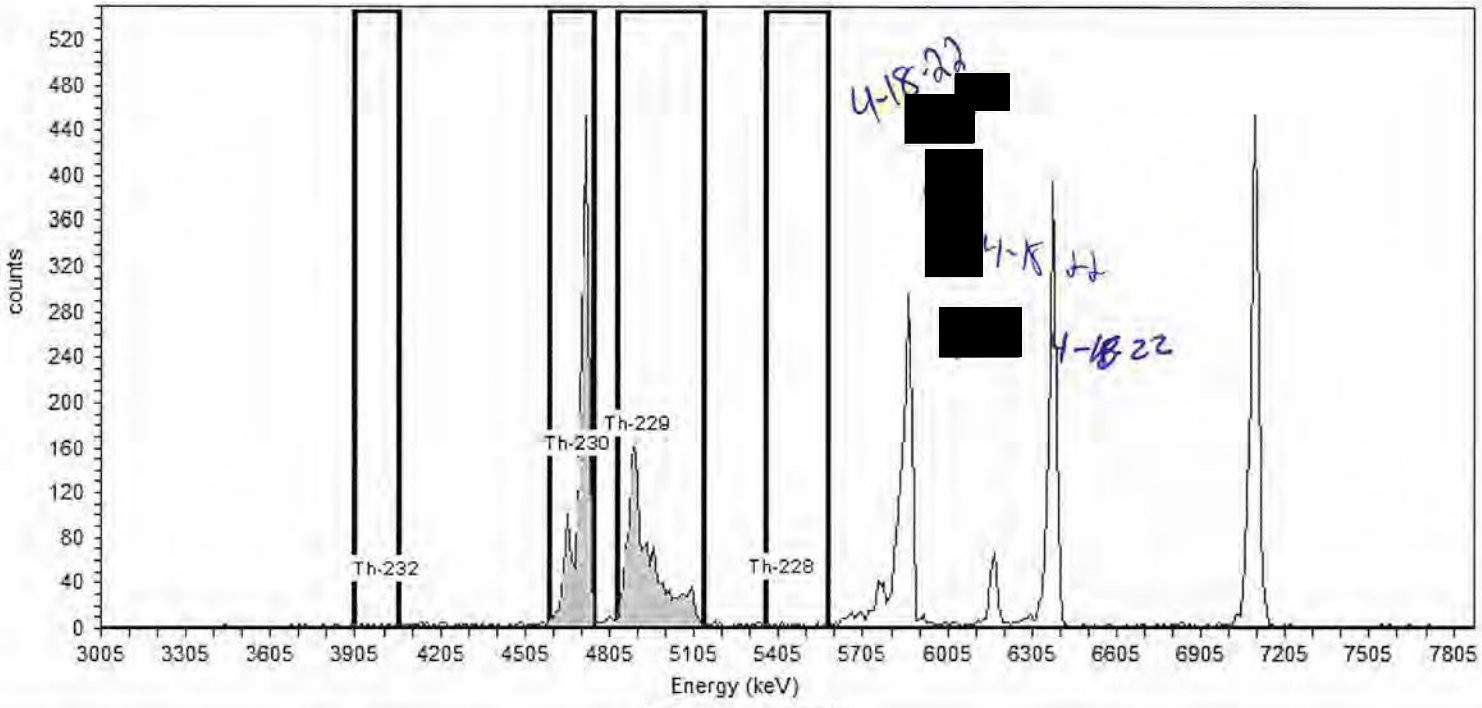
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E1, SN: 5702125, ID: 9
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:41PM
Bkgd Info: Sample: E1; Det: 17166649 - E1; Spectrum #1; 3/18/2022 3:30:41 PM; Live Time: 1440.000(min.); ID: 9

Energy Calibration: E1 calib 5-19-21
Efficiency Calibration:E1 calib 5-19-21
Calibration Date: 5/20/2021 6:18:40AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.28% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	95.5	100.0	9.21	3.5000	5.71	3.137E-002	1.821E-002	2.071E-002	5.629E-002
Th-230	4686.997	4592.604	4746.899	29.4	99.7	1,849.00	18.0000	1831.00	1.009E+001	3.559E-001	4.711E-002	1.091E-001
Th-229	4900.994	4833.573	5141.059	80.7	87.7	1,571.00	26.0000	1545.00	9.684E+000	3.562E-001	6.439E-002	1.457E-001
Th-228	5423.000	5359.000	5583.000	24.7	72.7	20.75	10.0000	10.75	8.124E-002	3.841E-002	4.815E-002	1.168E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,701 5:14:38AM 4/16/2022

Sample

Sample: Th Std Ver-1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

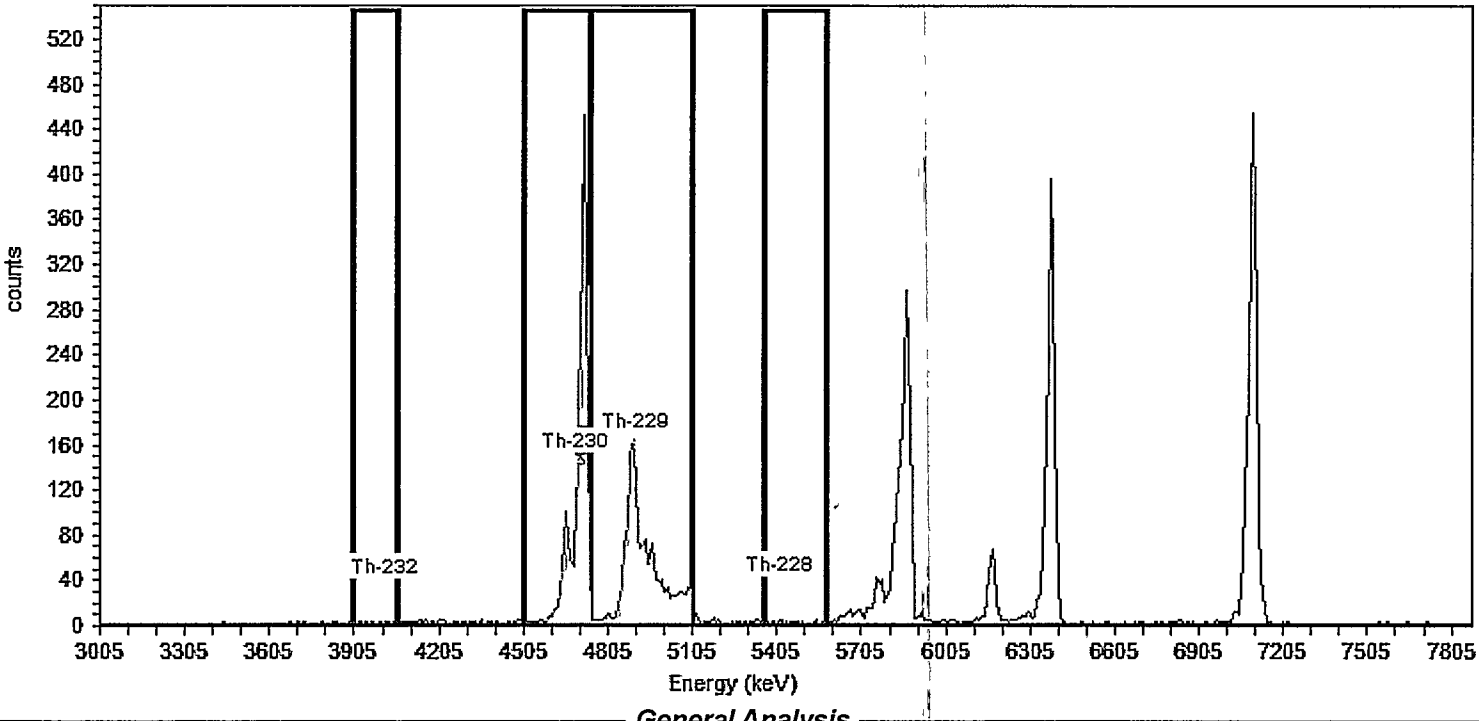
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E1, SN: 5702125, ID: 9
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:41PM
Bkgd Info: Sample: E1; Det: 17166649 - E1; Spectrum #1; 3/18/2022 3:30:41 PM; Live Time: 1440.000(min.); ID: 9

Energy Calibration: E1 calib 5-19-21
Efficiency Calibration:E1 calib 5-19-21
Calibration Date: 5/20/2021 6:18:40AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.28% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	95.5	100.0	9.21	3.5000	5.71	3.137E-002	1.821E-002	2.071E-002	5.629E-002
Th-230	4687.000	4506.000	4738.000	21.0	99.7	1,851.06	19.0382	1832.02	1.010E+001	3.561E-001	4.845E-002	1.118E-001
Th-229	4901.000	4738.000	5107.000	84.3	99.6	1,632.28	33.3132	1598.96	8.817E+000	3.221E-001	6.412E-002	1.432E-001
Th-228	5423.000	5359.000	5583.000	24.7	72.7	20.75	10.0000	10.75	8.124E-002	3.841E-002	4.815E-002	1.168E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 27,735 9:21:09AM 4/18/2022

Sample

Sample: Th Std Ver-2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

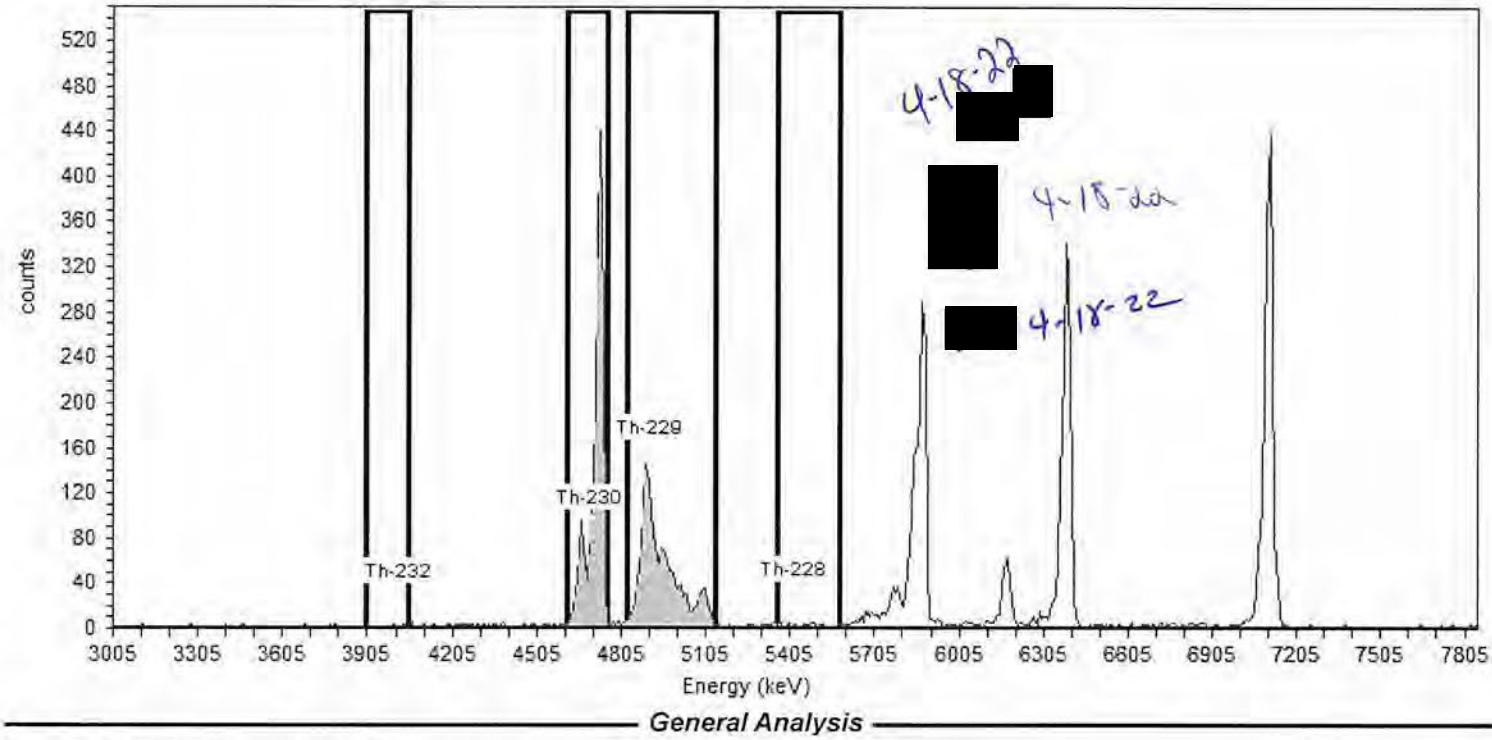
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E2, SN: 5702126, ID: 10
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:41PM
Bkgd Info: Sample: E2; Det: 17166649 - E2; Spectrum #1; 3/18/2022 3:30:41 PM; Live Time: 1440.000(min.); ID: 10

Energy Calibration: E2 calib 5-19-21
Efficiency Calibration:E2 calib 5-19-21
Calibration Date: 5/20/2021 6:21:31AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.15% +/- 0.99% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	13.2	100.0	4.16	1.0000	3.16	1.819E-002	1.242E-002	1.159E-002	3.874E-002
Th-230	4686.997	4611.906	4756.534	28.7	99.7	1,754.00	6.0000	1748.00	1.008E+001	3.181E-001	2.847E-002	7.255E-002
Th-229	4900.994	4823.947	5141.059	97.3	88.0	1,494.00	7.5000	1486.50	9.719E+000	3.220E-001	3.608E-002	8.985E-002
Th-228	5423.000	5359.000	5583.000	0.0	72.7	25.06	8.1564	16.91	1.337E-001	4.279E-002	4.552E-002	1.124E-001

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,700 5:14:23AM 4/16/2022

Sample

Sample: Th Std Ver-2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

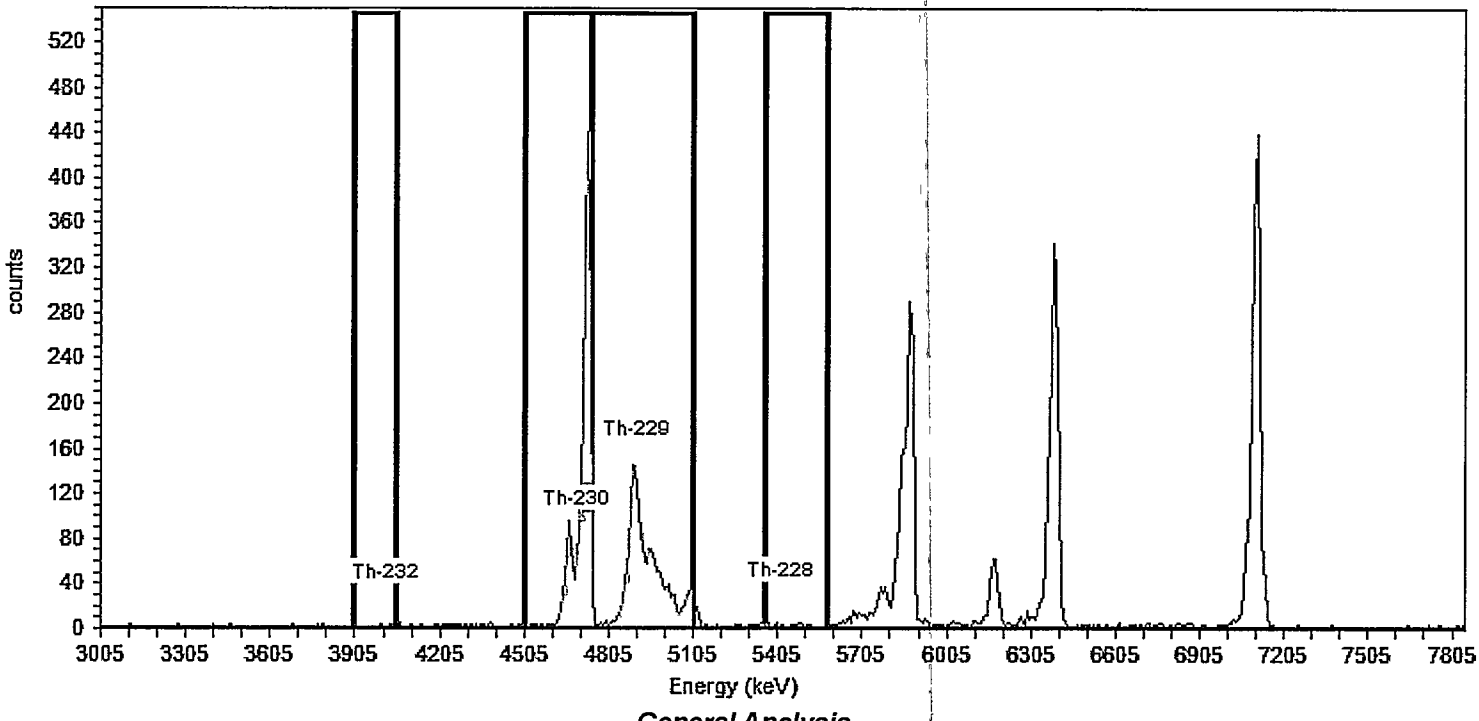
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E2, SN: 5702126, ID: 10
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:41PM
Bkgd Info: Sample: E2; Det: 17166649 - E2; Spectrum #1; 3/18/2022 3:30:41 PM; Live Time: 1440.000(min.); ID: 10

Energy Calibration: E2 calib 5-19-21
Efficiency Calibration:E2 calib 5-19-21
Calibration Date: 5/20/2021 6:21:31AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 24.15% +/- 0.99% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	13.2	100.0	4.16	1.0000	3.16	1.819E-002	1.242E-002	1.159E-002	3.874E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	1,712.21	6.4618	1705.74	9.840E+000	3.126E-001	2.954E-002	7.470E-002
Th-229	4901.000	4738.000	5107.000	0.0	99.6	1,731.81	5.6868	1726.12	9.962E+000	3.154E-001	2.773E-002	7.108E-002
Th-228	5423.000	5359.000	5583.000	0.0	72.7	25.06	8.1564	16.91	1.337E-001	4.279E-002	4.552E-002	1.124E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 27,736 9:21:42AM 4/18/2022

Sample

Sample: Th Std Ver-3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

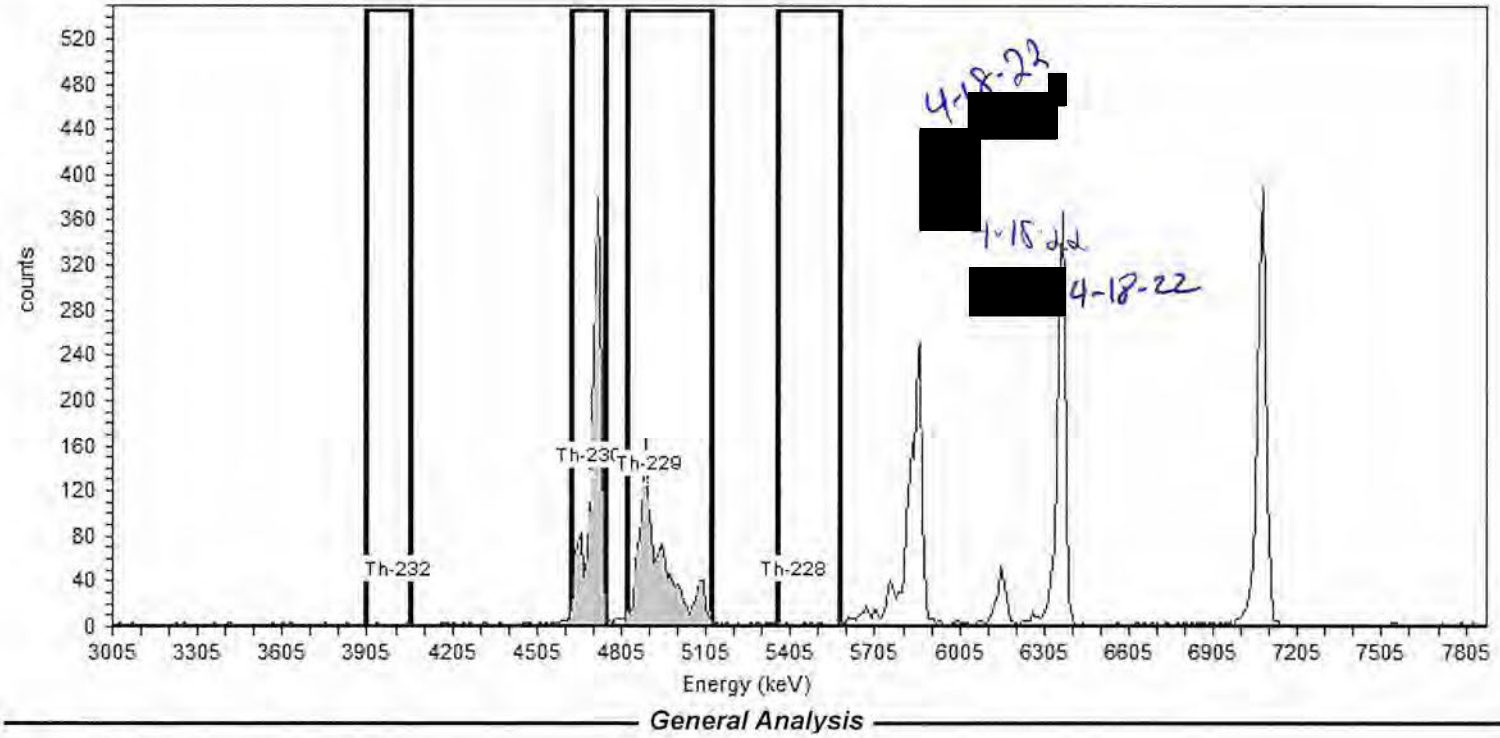
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E3, SN: 21251286, ID: 11
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:42PM
Bkgd Info: Sample: E3; Det: 17166650 - E3; Spectrum #1; 3/18/2022 3:30:42 PM; Live Time: 1440.000(min.); ID: 11

Energy Calibration: E3 calib 2-3-22
Efficiency Calibration:E3 calib 2-3-22
Calibration Date: 2/4/2022 10:44:46AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 23.00% +/- 0.94% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	1.05	2.0000	-0.95	0.000E+000	8.641E-003	1.720E-002	5.075E-002
Th-230	4686.997	4621.555	4746.899	32.7	76.3	1,688.00	6.5000	1681.50	1.331E+001	4.248E-001	4.065E-002	1.027E-001
Th-229	4900.994	4823.947	5121.872	47.2	88.0	1,468.00	4.0000	1464.00	1.005E+001	3.343E-001	2.766E-002	7.389E-002
Th-228	5423.000	5359.000	5583.000	16.1	72.7	9.50	0.5000	9.00	7.473E-002	2.598E-002	1.183E-002	4.614E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,702 5:14:55AM 4/16/2022

Sample

Sample: Th Std Ver-3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

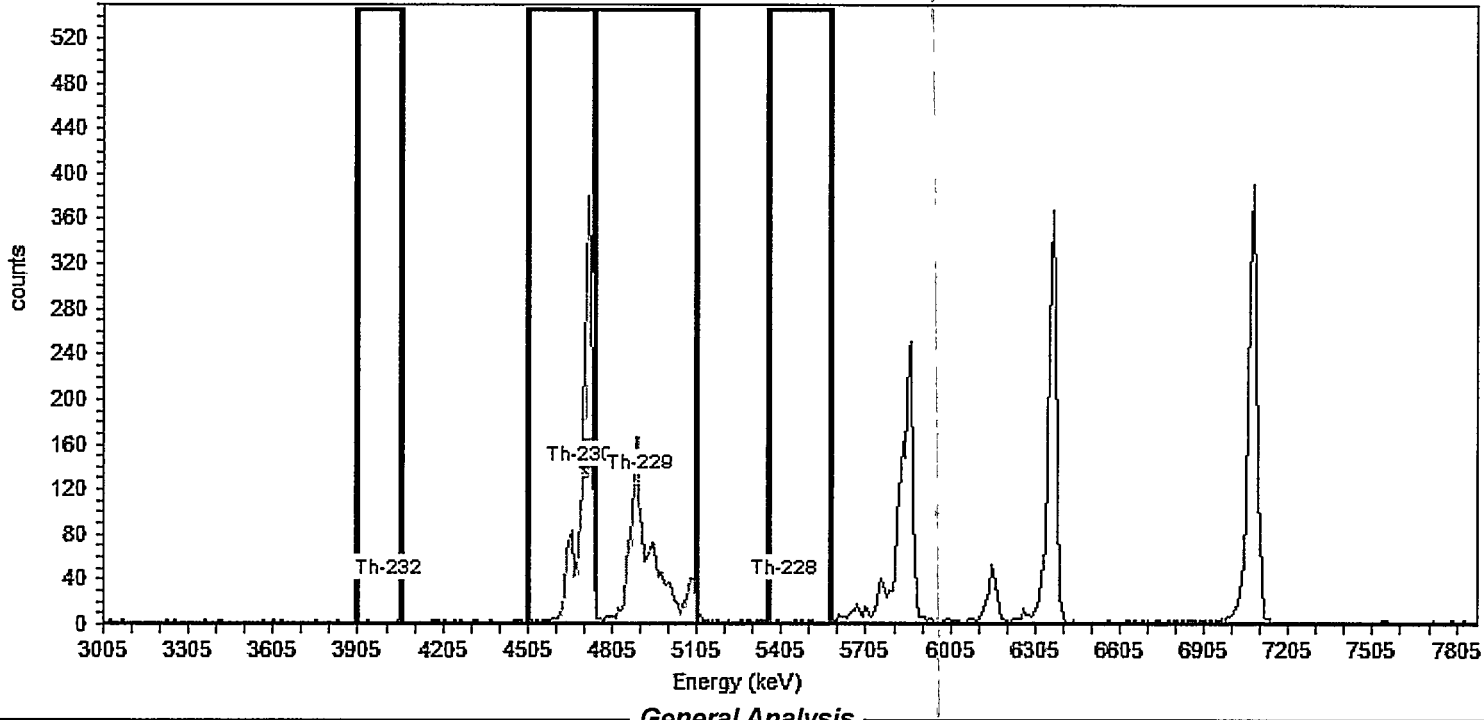
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E3, SN: 21251286, ID: 11
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:42PM
Bkgd Info: Sample: E3; Det: 17166650 - E3; Spectrum #1; 3/18/2022 3:30:42 PM; Live Time: 1440.000(min.); ID: 11

Energy Calibration: E3 calib 2-3-22
Efficiency Calibration:E3 calib 2-3-22
Calibration Date: 2/4/2022 10:44:46AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.00% +/- 0.94% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	1.05	2.0000	-0.95	0.000E+000	8.641E-003	1.720E-002	5.075E-002
Th-230	4687.000	4506.000	4738.000	21.8	99.7	1,698.21	8.5382	1689.67	1.023E+001	3.264E-001	3.565E-002	8.769E-002
Th-229	4901.000	4738.000	5107.000	82.7	99.6	1,528.93	9.2632	1519.67	9.208E+000	3.033E-001	3.715E-002	9.071E-002
Th-228	5423.000	5359.000	5583.000	16.1	72.7	9.50	0.5000	9.00	7.473E-002	2.598E-002	1.183E-002	4.614E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,737 9:22:15AM 4/18/2022

Sample

Sample: Th Std Ver-4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

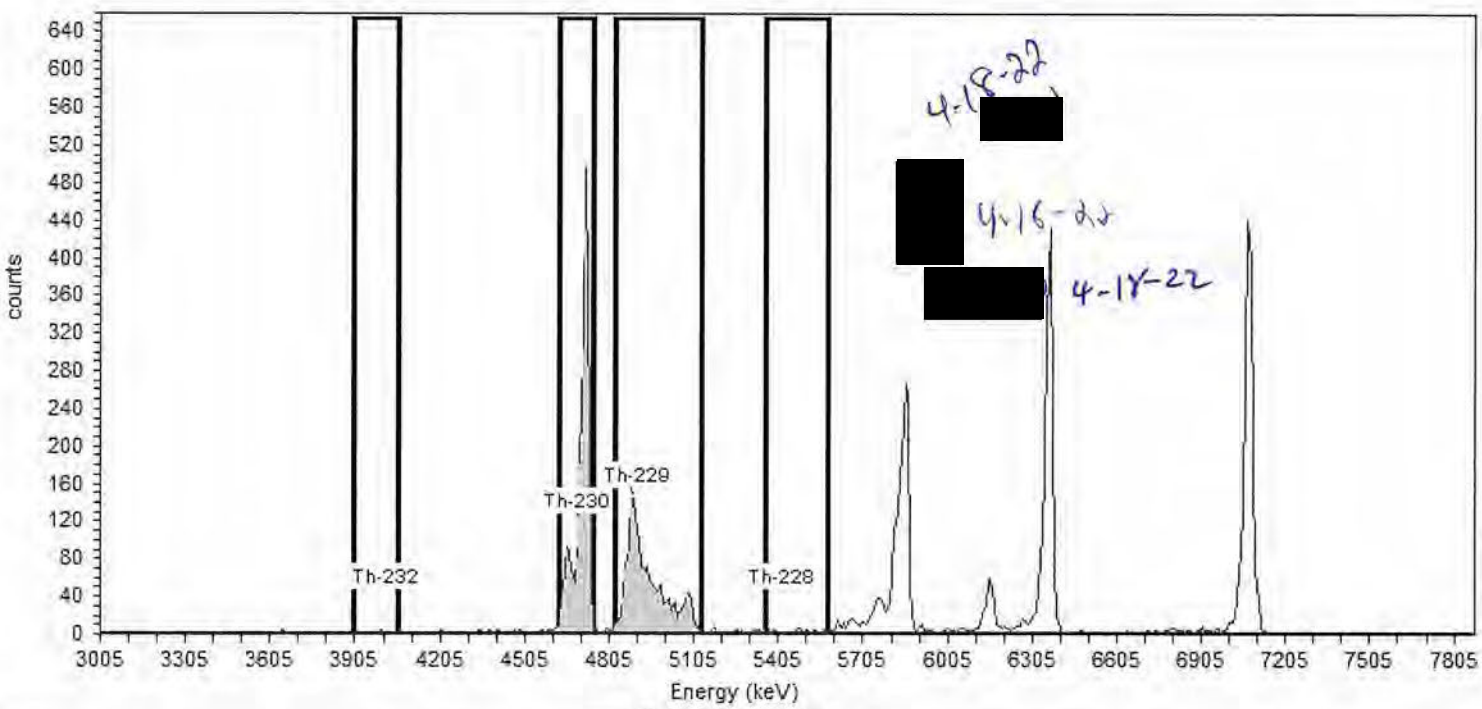
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:42PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 3/18/2022 3:30:42 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	50.5	100.0	5.00	3.5238	1.48	7.779E-003	1.370E-002	1.993E-002	5.412E-002
Th-230	4686.997	4621.555	4746.899	27.1	76.3	1,857.00	10.5000	1846.50	1.275E+001	3.960E-001	4.509E-002	1.089E-001
Th-229	4900.994	4823.947	5131.466	79.2	88.0	1,549.00	15.5000	1533.50	9.187E+000	3.019E-001	4.752E-002	1.112E-001
Th-228	5423.000	5359.000	5583.000	0.0	72.7	23.88	8.6255	15.26	1.106E-001	3.855E-002	4.289E-002	1.054E-001

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,703 5:15:11AM 4/16/2022

Sample

Sample: Th Std Ver-4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

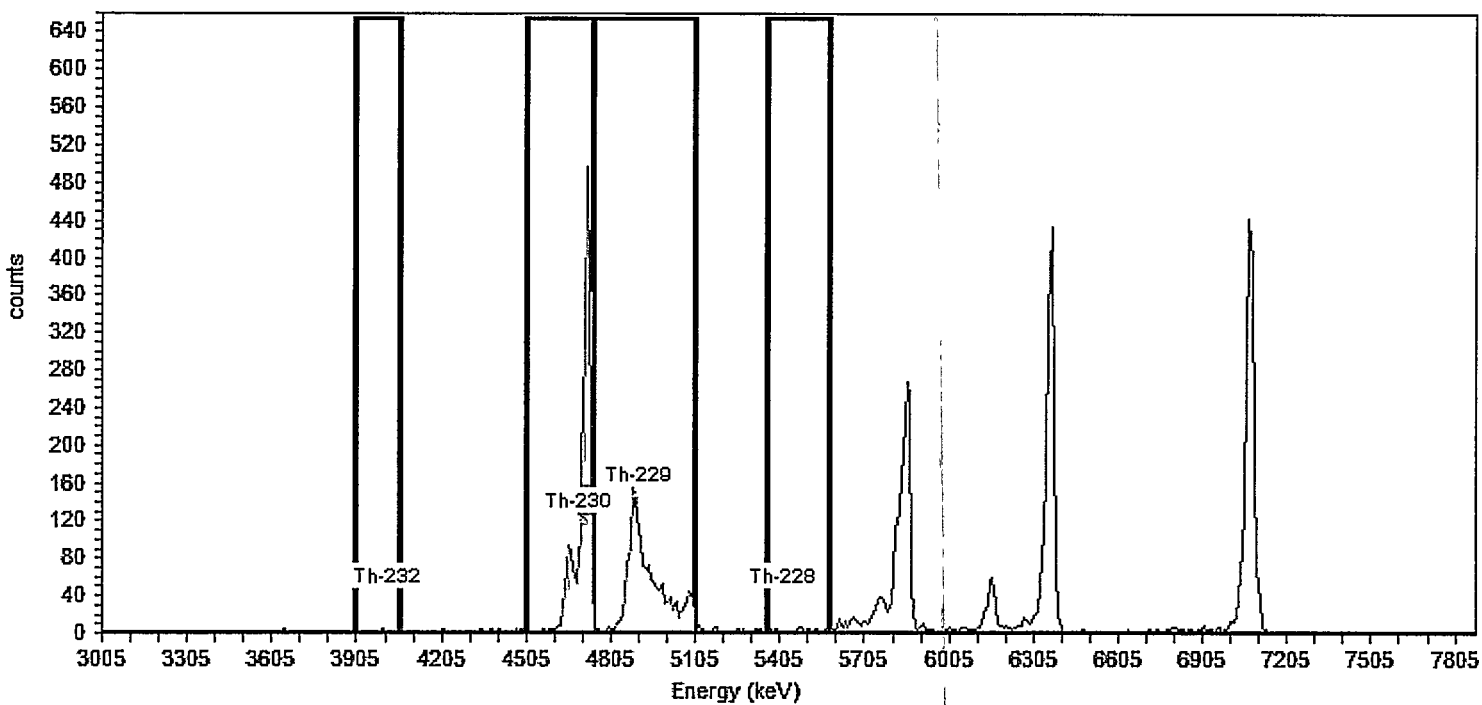
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:42PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 3/18/2022 3:30:42 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	50.5	100.0	5.00	3.5238	1.48	7.779E-003	1.370E-002	1.993E-002	5.412E-002
Th-230	4687.000	4506.000	4738.000	21.0	99.7	1,868.06	11.4236	1856.64	9.813E+000	3.043E-001	3.599E-002	8.628E-002
Th-229	4901.000	4738.000	5107.000	81.9	99.6	1,598.43	19.5486	1578.88	8.349E+000	2.723E-001	4.711E-002	1.085E-001
Th-228	5423.000	5359.000	5583.000	0.0	72.7	23.88	8.6256	15.26	1.106E-001	3.855E-002	4.289E-002	1.054E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,738 9:22:46AM 4/18/2022

Sample

Sample: Th Std Ver-5 Type: Sample
Spectrum #1 Analysis #1

Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver

Description:

Client Name: Undefined
Client Contact:

Tracer

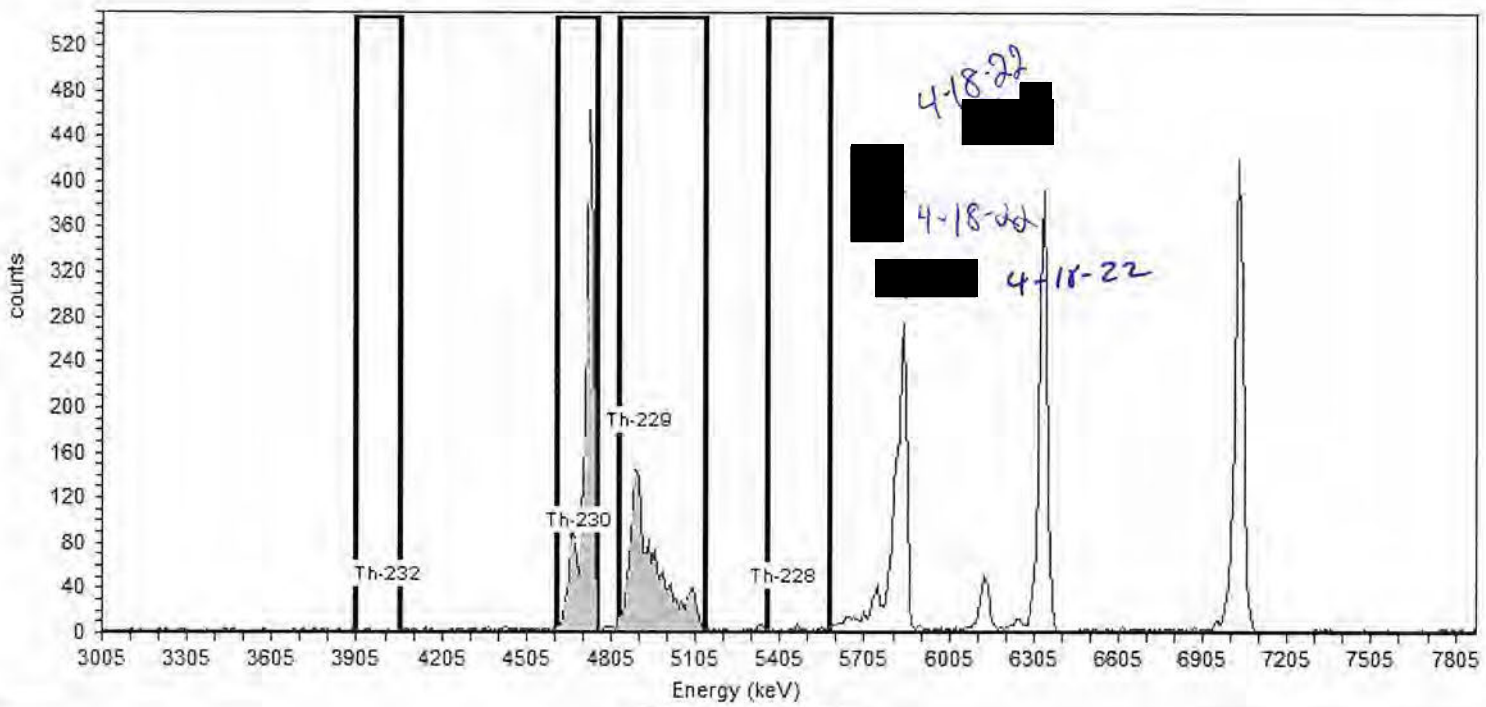
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:42PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 3/18/2022 3:30:42 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	23.1	100.0	5.90	1.6048	4.30	2.395E-002	1.444E-002	1.421E-002	4.350E-002
Th-230	4686.997	4611.906	4756.534	28.7	99.7	1,857.00	5.5000	1851.50	1.034E+001	3.630E-001	2.639E-002	6.790E-002
Th-229	4900.994	4833.573	5141.059	104.3	87.7	1,576.00	7.0000	1569.00	9.967E+000	3.637E-001	3.386E-002	8.491E-002
Th-228	5423.000	5359.000	5583.000	107.2	72.7	29.06	10.0000	19.06	1.460E-001	4.487E-002	4.881E-002	1.183E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 27,699 5:14:09AM 4/16/2022

Sample

Sample: Th Std Ver-5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: Th-T S-0344 / Th-B S-0365

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: Th Std Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

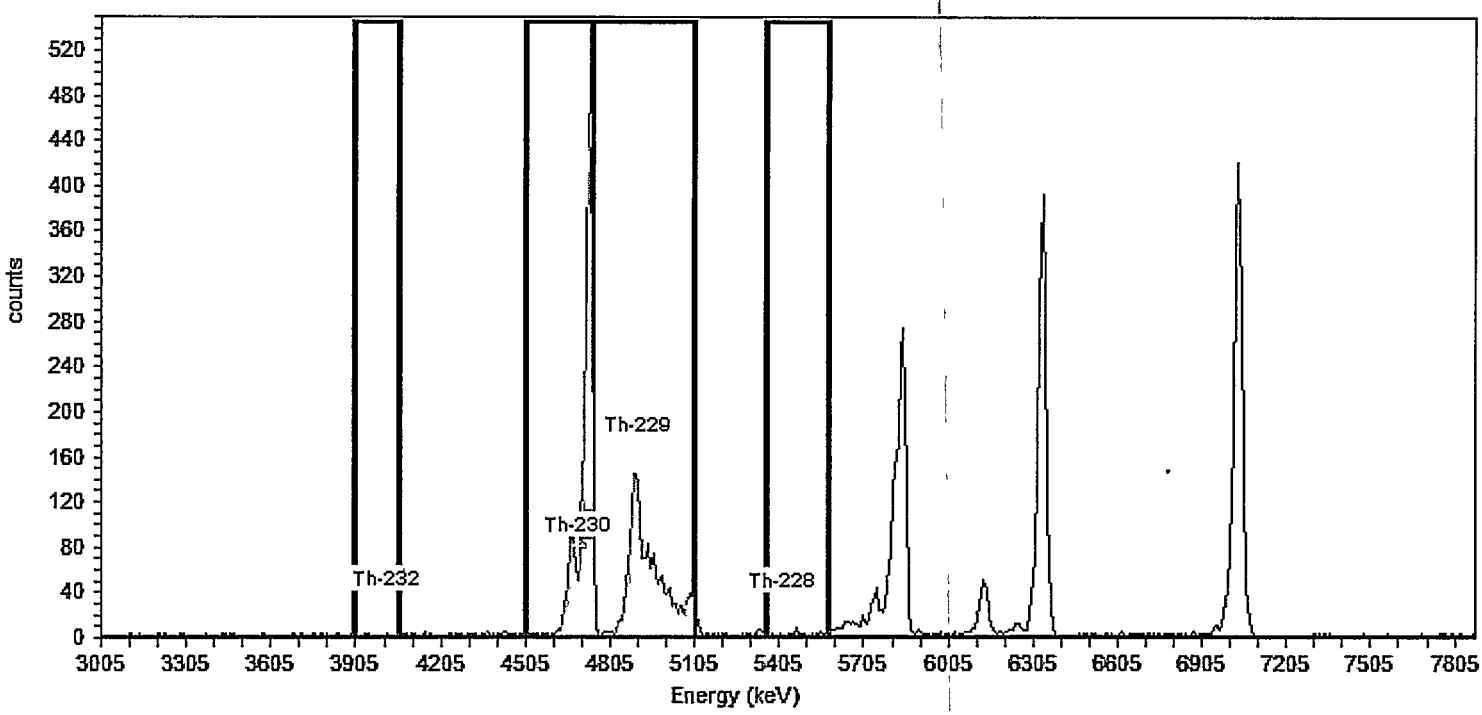
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 4/15/2022 5:14:03PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 3/18/2022 3:30:42PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 3/18/2022 3:30:42 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:4/15/2022 5:11:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	23.1	100.0	5.90	1.6048	4.30	2.395E-002	1.444E-002	1.421E-002	4.350E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	1,754.21	5.0764	1749.14	9.771E+000	3.473E-001	2.536E-002	6.583E-002
Th-229	4901.000	4738.000	5107.000	0.0	99.6	1,895.46	9.0264	1886.44	1.054E+001	3.688E-001	3.383E-002	8.278E-002
Th-228	5423.000	5359.000	5583.000	107.2	72.7	29.06	10.0000	19.06	1.460E-001	4.487E-002	4.881E-002	1.183E-001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

75861-526

Th-230 5 mL Liquid in Flame Sealed Vial

Customer: American Radiation Services
P.O. No.: 07-0568, Item 2

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

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

Isotope:	Th-230
Activity (Bq):	4.017 E4
Half-Life:	7.538 E4 years
Calibration Date:	September 10, 2007 12:00 EST
Relative Expanded Uncertainty (k=2):	2.0%

Comments:
Impurities: γ-impurities <0.1%, α-impurities <0.04%.
5.06973 grams 0.5M HNO3 solution.

Source Prepared By: [redacted] Radiochemist

QA Approved: [redacted], QA Manager Date: 9-11-07

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

Alpa Spec Standard Verification

ARS Aleut Analytical

	Std. ID	Isotope
Analyte	**S-0373**	**Th-229**
Tracer	**S-0365**	**Th-230**

Expires: 8/4/2023

S-0373 Net	S-0365 Net	Grams of S-0365	S-0365 dpm/g	S-0365 dpm added	S-0373 dpm	Grams of S-0373	S-0373 dpm/g
1610.5	1968	1.014	11.2996	11.4577944	9.376	1	9.376411525
1609.5	1957	1.014	11.2996	11.4577944	9.423	0.994	9.480140982
1617	1895.5	1.013	11.2996	11.4464948	9.765	0.996	9.803912083
1599	1922	1.01	11.2996	11.412596	9.495	0.99	9.590568013
1571.5	1970.5	1.008	11.2996	11.3899968	9.084	0.988	9.194002206

Average	9.489
Known Value	9.870
Average/stdev	2.410%
% Bias	4.010%

Performed by: [redacted] Date: 8/4/2022

Reviewed by: [redacted] Date: 8-4-22

QA Approval: [redacted] Date: 8-4-22

ARS-038-003 r0.2
Revision Date: 01/23/2019

ARS Aleut Analytical

Weight Spreadsheet for Standard Verification

Verification Weights

Tech:	SDW
Pippete:	PU29204
Scale ID:	Soil-T0350192
Standard ID:	S-0373
Tracer ID:	S-0365

Sample ID	Std. Weight(g)	Tracer Weight(g)
S-0373-V1	1	1.014
S-0373-V2	0.994	1.014
S-0373-V3	0.996	1.013
S-0373-V4	0.99	1.01
S-0373-V5	0.988	1.008

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,023 7:48:04AM 8/4/2022

Sample

Sample: S-0365-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

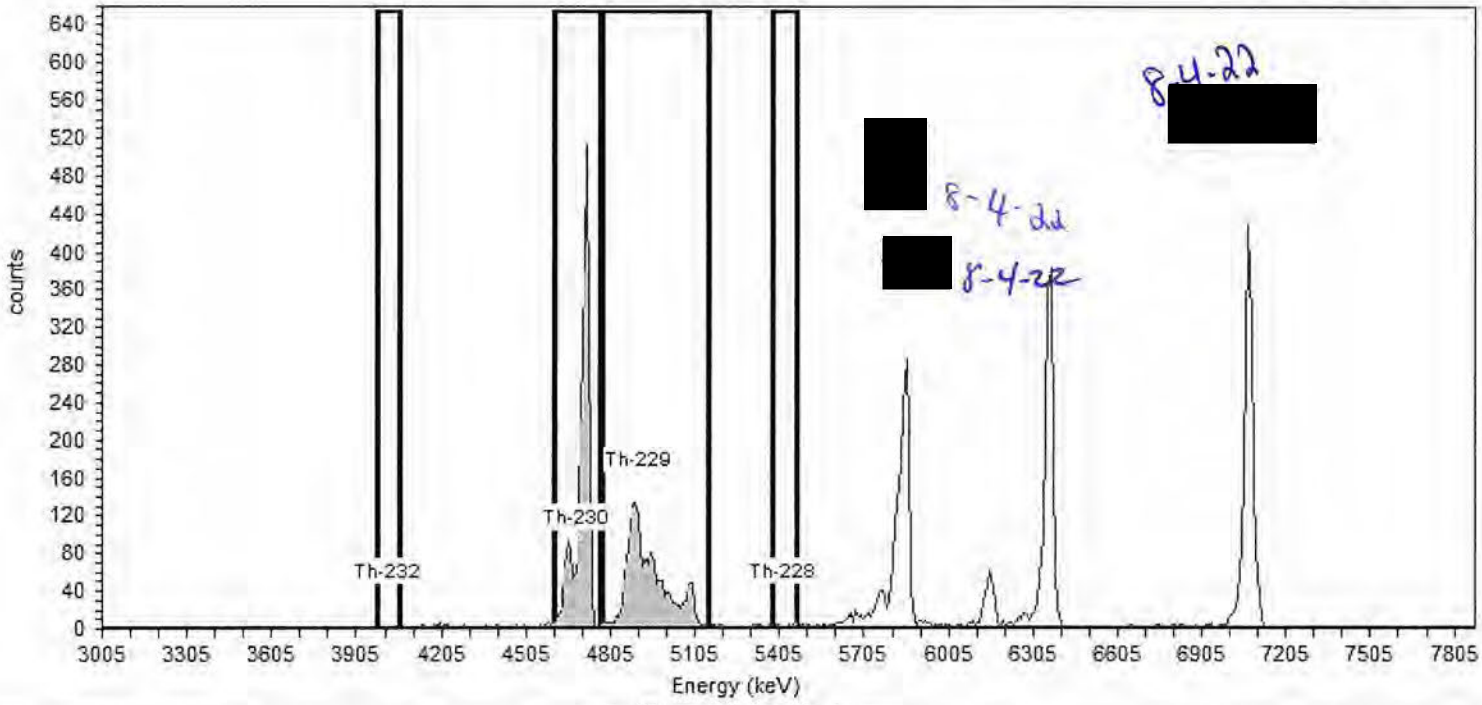
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 8/3/2022 3:26:15PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3972.745	4050.462	12.6	77.0	4.00	3.5000	0.50	3.422E-003	1.641E-002	2.579E-002	7.011E-002
Th-230	4684.250	4602.255	4766.167	31.6	99.7	1,982.00	14.0000	1968.00	1.040E+001	3.175E-001	3.984E-002	9.399E-002
Th-229	4900.994	4775.800	5150.650	112.7	98.8	1,626.00	15.5000	1610.50	8.594E+000	2.782E-001	4.233E-002	9.909E-002
Th-228	5423.000	5380.537	5466.589	0.0	72.7	17.00	5.5000	11.50	8.336E-002	3.226E-002	3.425E-002	8.811E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,998 3:28:15AM 8/4/2022

Sample

Sample: S-0365-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

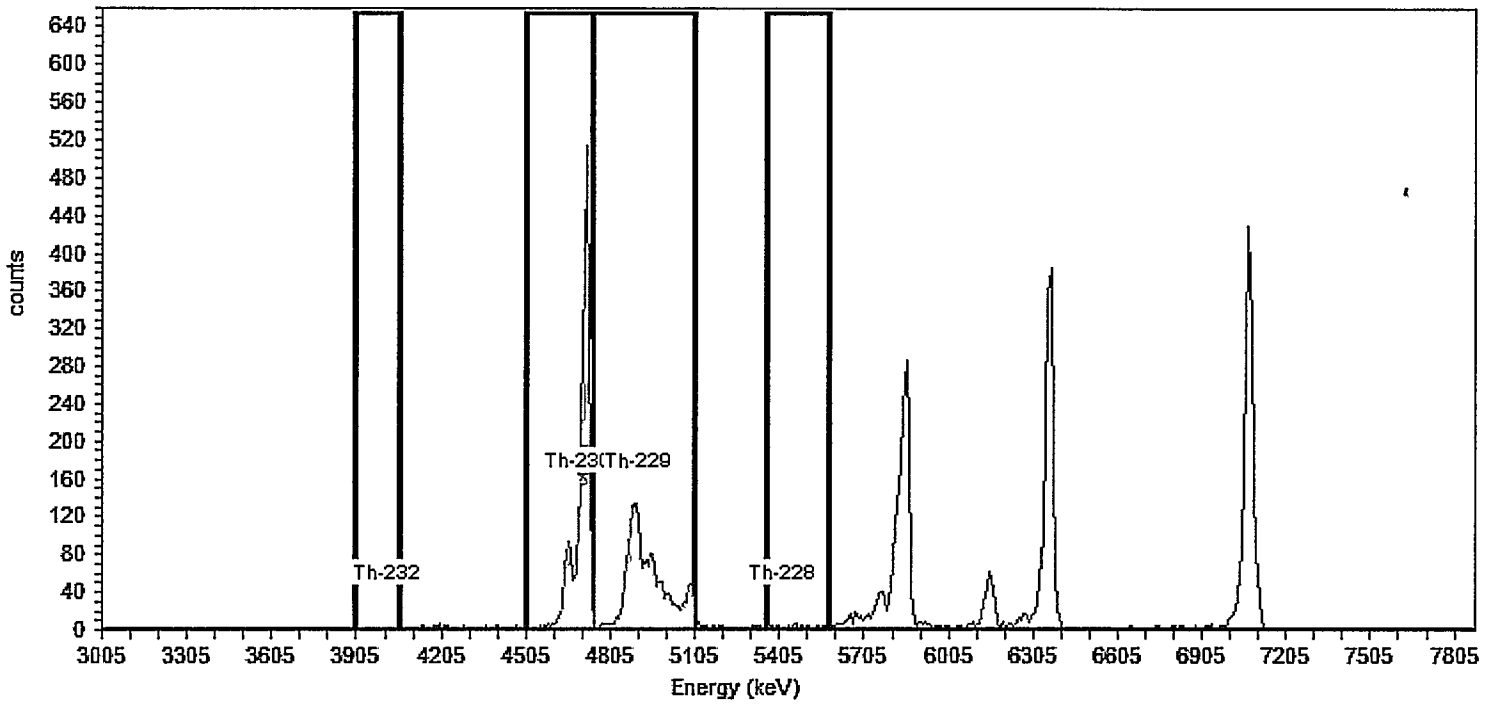
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 8/3/2022 3:26:15PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	4.84	5.4762	-0.64	0.000E+000	1.450E-002	2.484E-002	6.395E-002
Th-230	4687.000	4506.000	4738.000	20.5	99.7	1,991.48	13.0540	1978.42	1.046E+001	3.187E-001	3.847E-002	9.125E-002
Th-229	4901.000	4738.000	5107.000	112.7	99.6	1,638.08	14.5382	1623.54	8.586E+000	2.772E-001	4.062E-002	9.556E-002
Th-228	5423.000	5359.000	5583.000	114.0	72.7	34.19	9.3744	24.81	1.799E-001	4.534E-002	4.471E-002	1.090E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,024 7:49:19AM 8/4/2022

Sample

Sample: S-0365-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

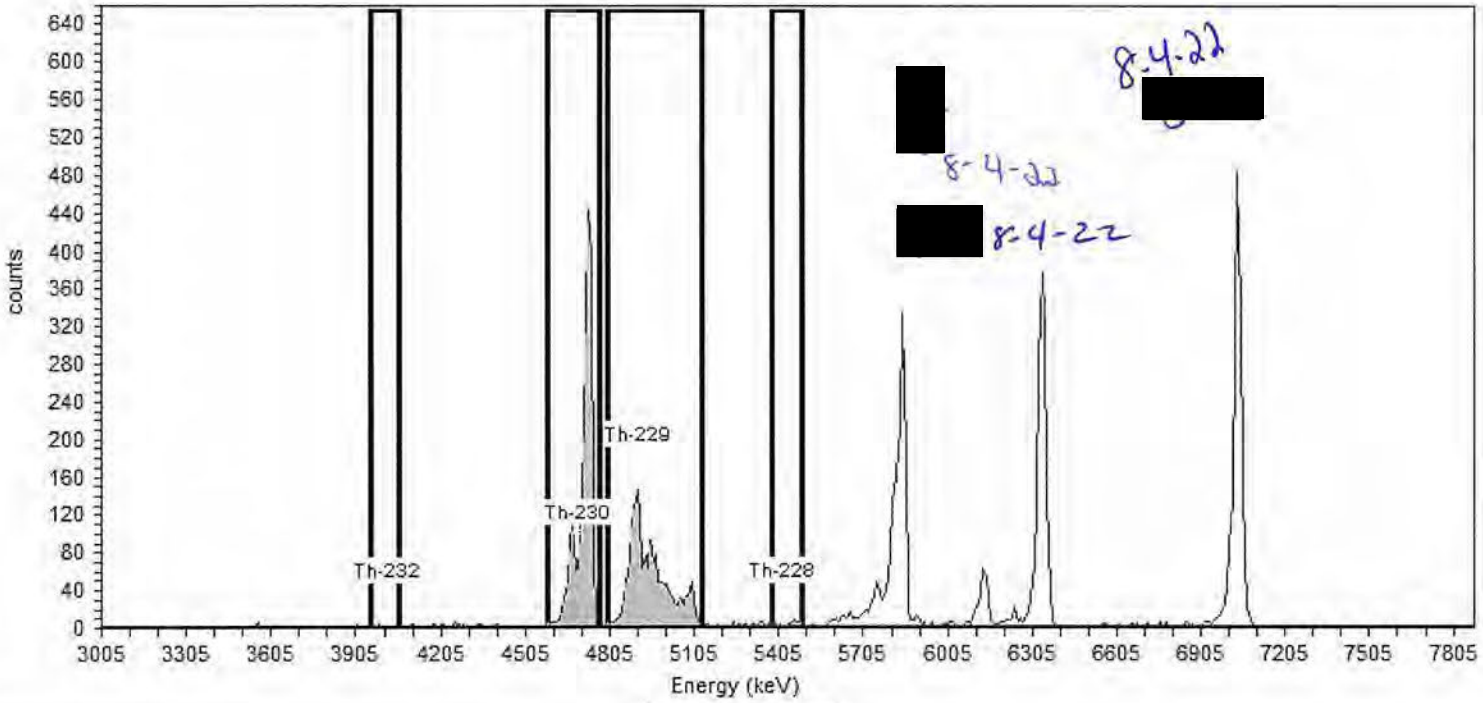
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3953.305	4050.462	0.0	77.0	4.00	1.0000	3.00	2.170E-002	1.535E-002	1.457E-002	4.872E-002
Th-230	4686.997	4582.952	4766.167	36.9	99.7	1,962.00	4.5000	1957.50	1.093E+001	3.791E-001	2.387E-002	6.286E-002
Th-229	4900.994	4795.062	5131.466	119.7	98.8	1,615.00	5.5000	1609.50	9.077E+000	3.290E-001	2.665E-002	6.856E-002
Th-228	5423.000	5380.537	5485.700	25.1	72.7	28.00	8.0000	20.00	1.532E-001	4.352E-002	4.365E-002	1.080E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,994 3:26:28AM 8/4/2022

Sample

Sample: S-0365-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

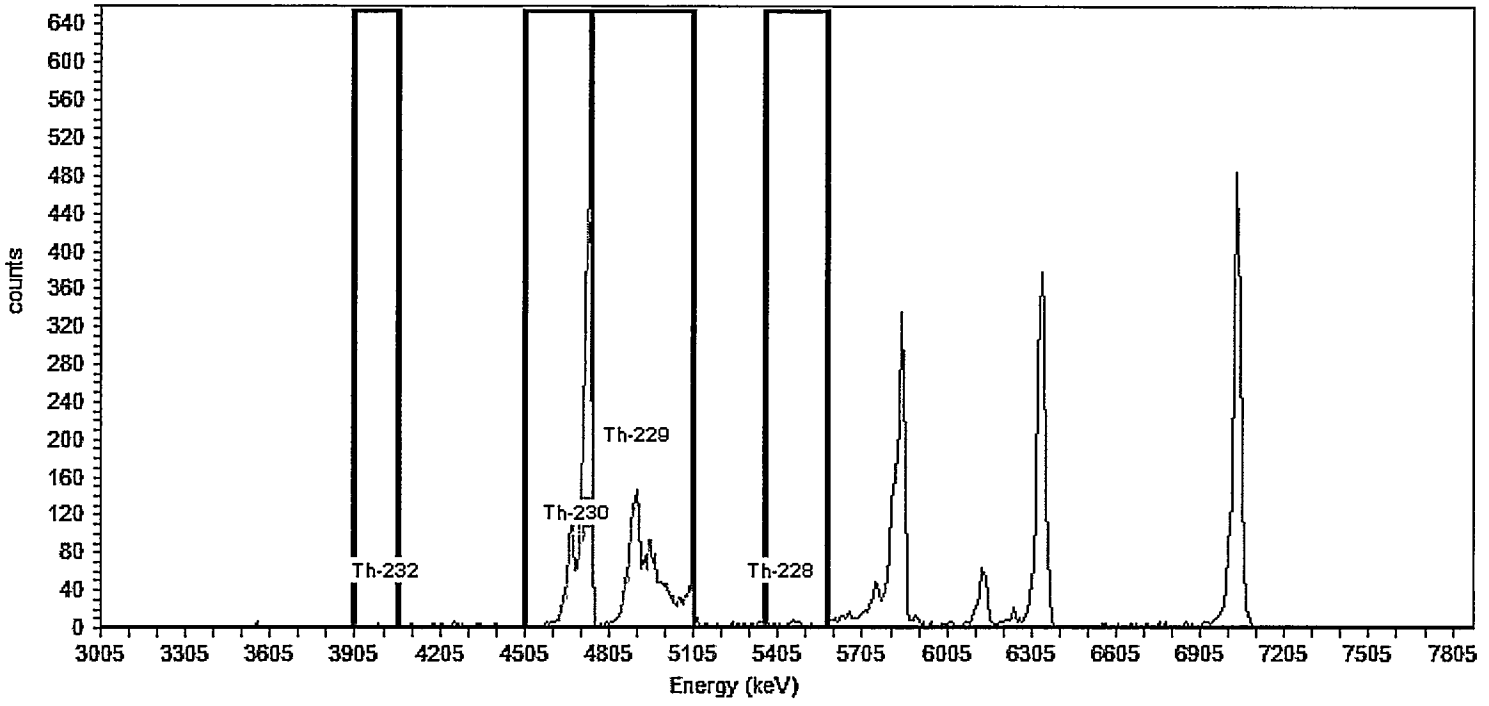
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	18.7	100.0	5.37	1.1048	4.27	2.376E-002	1.357E-002	1.179E-002	3.866E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	1,855.12	4.4460	1850.67	1.034E+001	3.628E-001	2.373E-002	6.258E-002
Th-229	4901.000	4738.000	5107.000	0.0	99.6	1,974.34	6.9618	1967.38	1.100E+001	3.810E-001	2.971E-002	7.454E-002
Th-228	5423.000	5359.000	5583.000	37.7	72.7	38.69	9.6256	29.07	2.227E-001	5.086E-002	4.788E-002	1.165E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,025 7:50:33AM 8/4/2022

Sample

Sample: S-0365-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

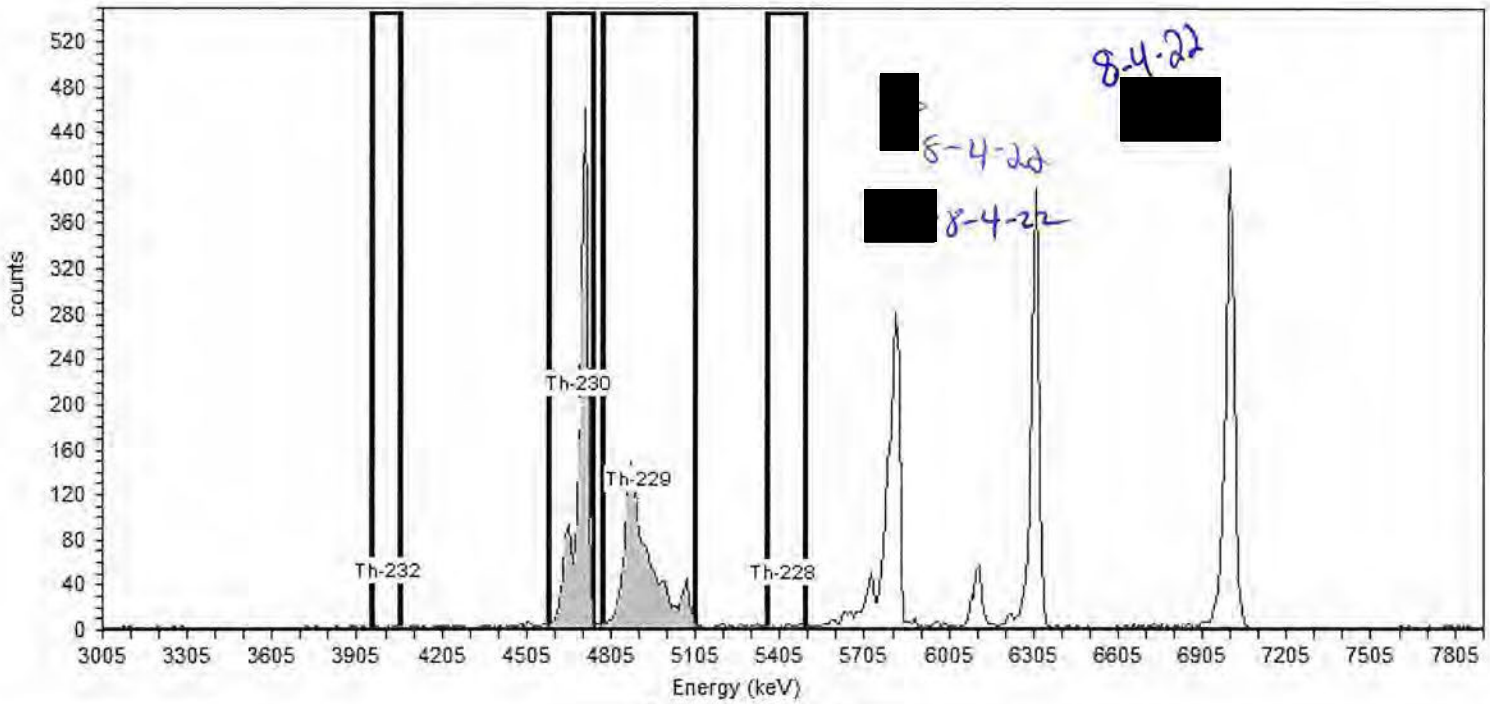
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3953.305	4050.462	0.0	77.0	8.00	2.0000	6.00	4.441E-002	2.222E-002	2.109E-002	6.221E-002
Th-230	4686.997	4582.952	4737.264	29.3	99.7	1,897.00	1.5000	1895.50	1.084E+001	3.336E-001	1.411E-002	4.368E-002
Th-229	4900.994	4775.800	5102.682	90.4	98.8	1,623.00	6.0000	1617.00	9.333E+000	3.012E-001	2.848E-002	7.258E-002
Th-228	5423.000	5361.403	5495.254	62.4	72.7	23.00	12.0000	11.00	8.624E-002	4.225E-002	5.471E-002	1.306E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,996 3:27:21AM 8/4/2022

Sample

Sample: S-0365-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

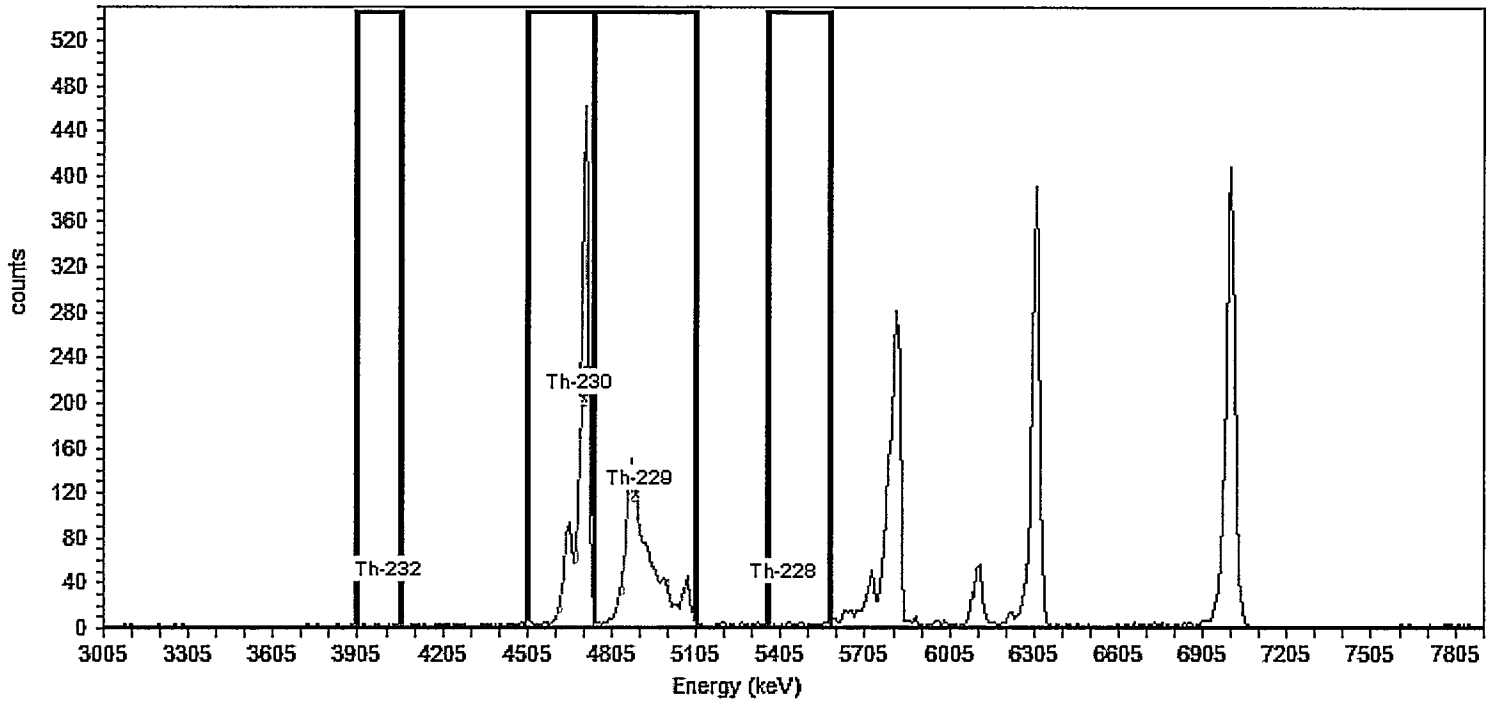
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	7.84	1.5238	6.31	3.599E-002	1.673E-002	1.417E-002	4.377E-002
Th-230	4687.000	4506.000	4738.000	29.3	99.7	1,915.09	1.5382	1913.55	1.094E+001	3.359E-001	1.428E-002	4.404E-002
Th-229	4901.000	4738.000	5107.000	90.4	99.6	1,630.60	8.7132	1621.89	9.277E+000	2.993E-001	3.401E-002	8.351E-002
Th-228	5423.000	5359.000	5583.000	0.0	72.7	39.95	12.2489	27.70	2.171E-001	5.340E-002	5.528E-002	1.318E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,026 7:51:50AM 8/4/2022

Sample

Sample: S-0365-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

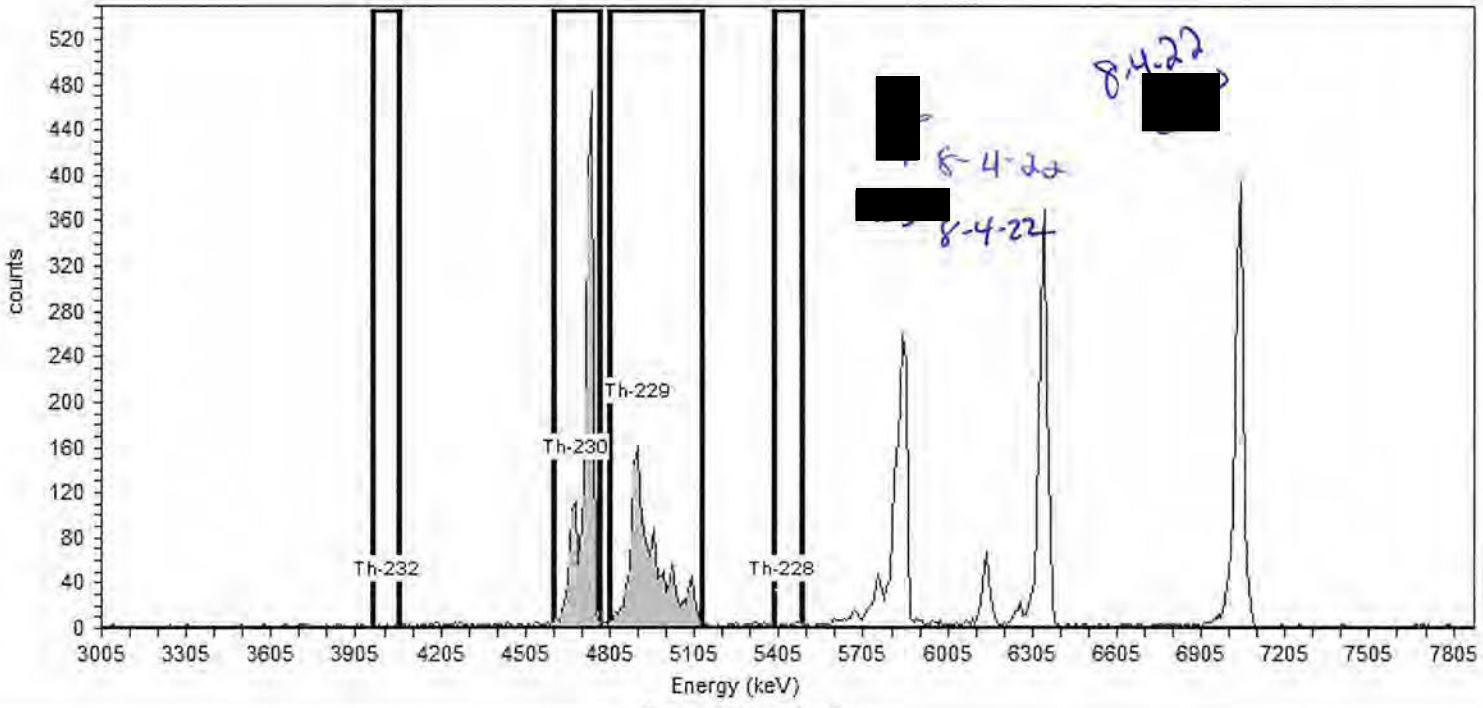
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3963.025	4050.462	12.6	77.0	5.00	0.5000	4.50	3.072E-002	1.565E-002	9.725E-003	3.792E-002
Th-230	4684.250	4602.255	4766.167	33.8	99.7	1,927.00	5.0000	1922.00	1.013E+001	3.107E-001	2.375E-002	6.177E-002
Th-229	4900.994	4804.691	5131.466	97.7	97.5	1,608.00	9.0000	1599.00	8.623E+000	2.792E-001	3.259E-002	7.978E-002
Th-228	5423.000	5390.103	5485.700	21.2	72.7	14.00	12.0000	2.00	1.446E-002	3.234E-002	5.046E-002	1.205E-001

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom Results ID: 31,995 3:26:55AM 8/4/2022

Sample

Sample: S-0365-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

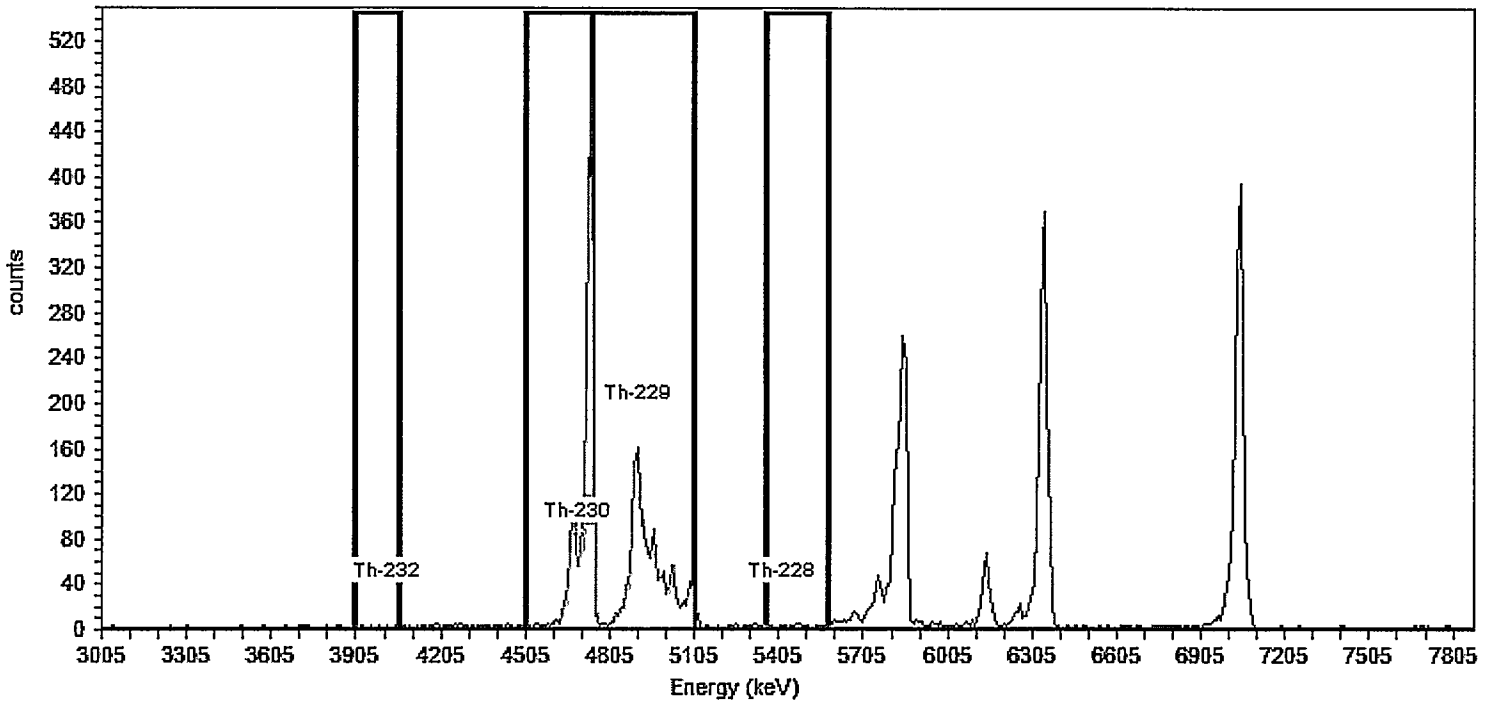
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	0.0	100.0	5.51	0.5000	5.01	2.636E-002	1.263E-002	7.489E-003	2.920E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	1,689.09	5.0000	1684.09	8.879E+000	2.828E-001	2.375E-002	6.177E-002
Th-229	4901.000	4738.000	5107.000	0.0	99.6	2,063.56	10.7750	2052.79	1.083E+001	3.265E-001	3.489E-002	8.405E-002
Th-228	5423.000	5359.000	5583.000	0.0	72.7	26.56	14.2511	12.31	8.903E-002	4.201E-002	5.499E-002	1.296E-001

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,027 7:53:10AM 8/4/2022

Sample

Sample: S-0365-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

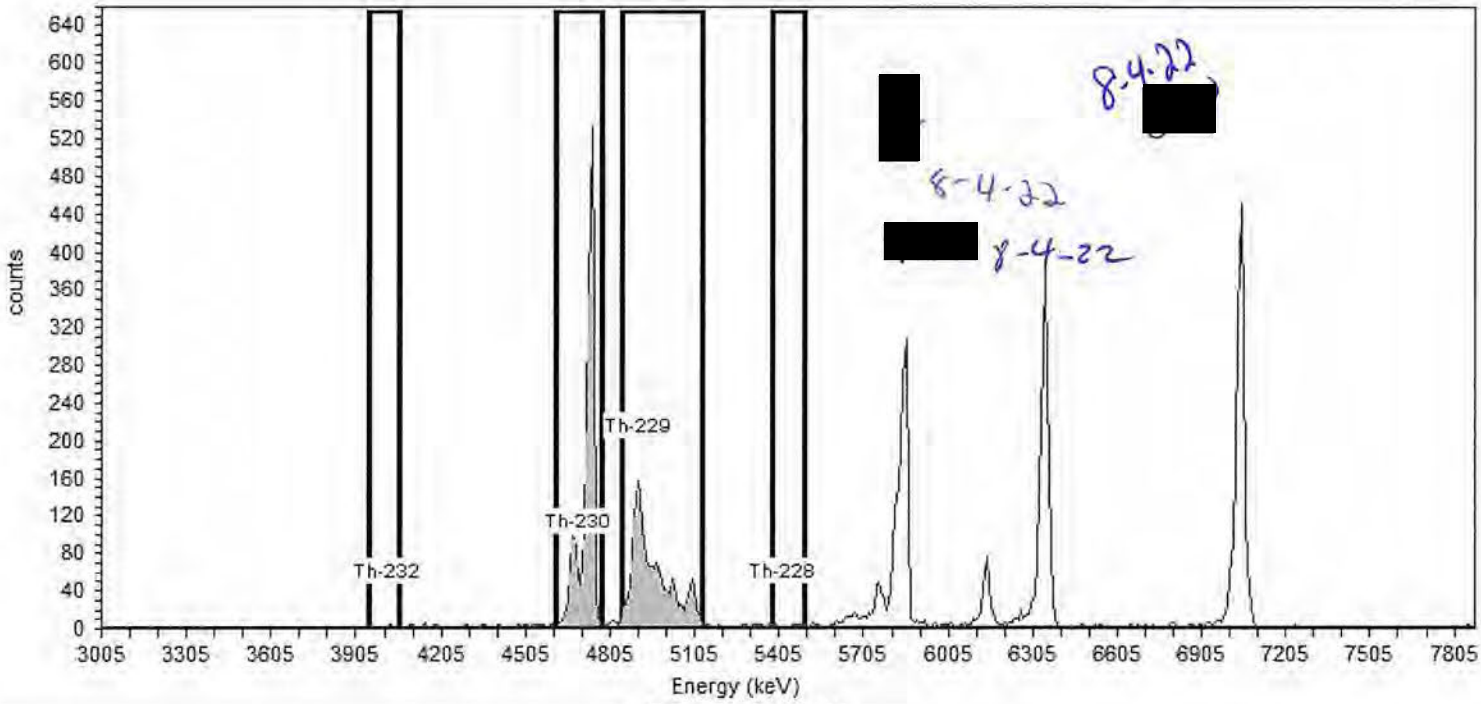
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3943.584	4050.462	42.8	100.0	5.00	2.0000	3.00	1.613E-002	1.318E-002	1.532E-002	4.520E-002
Th-230	4686.997	4611.906	4775.800	31.1	99.7	1,979.00	8.5000	1970.50	1.063E+001	3.240E-001	3.168E-002	7.796E-002
Th-229	4900.994	4843.198	5131.466	48.1	82.9	1,582.00	10.5000	1571.50	1.020E+001	3.322E-001	4.237E-002	1.023E-001
Th-228	5423.000	5380.537	5495.254	0.0	72.7	17.00	12.0000	5.00	3.699E-002	3.548E-002	5.163E-002	1.233E-001

AlphaVision v6.0 **Alpha Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,997 3:27:48AM 8/4/2022

Sample

Sample: S-0365-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0365/S-0373 Ver

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0365/S-0373 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

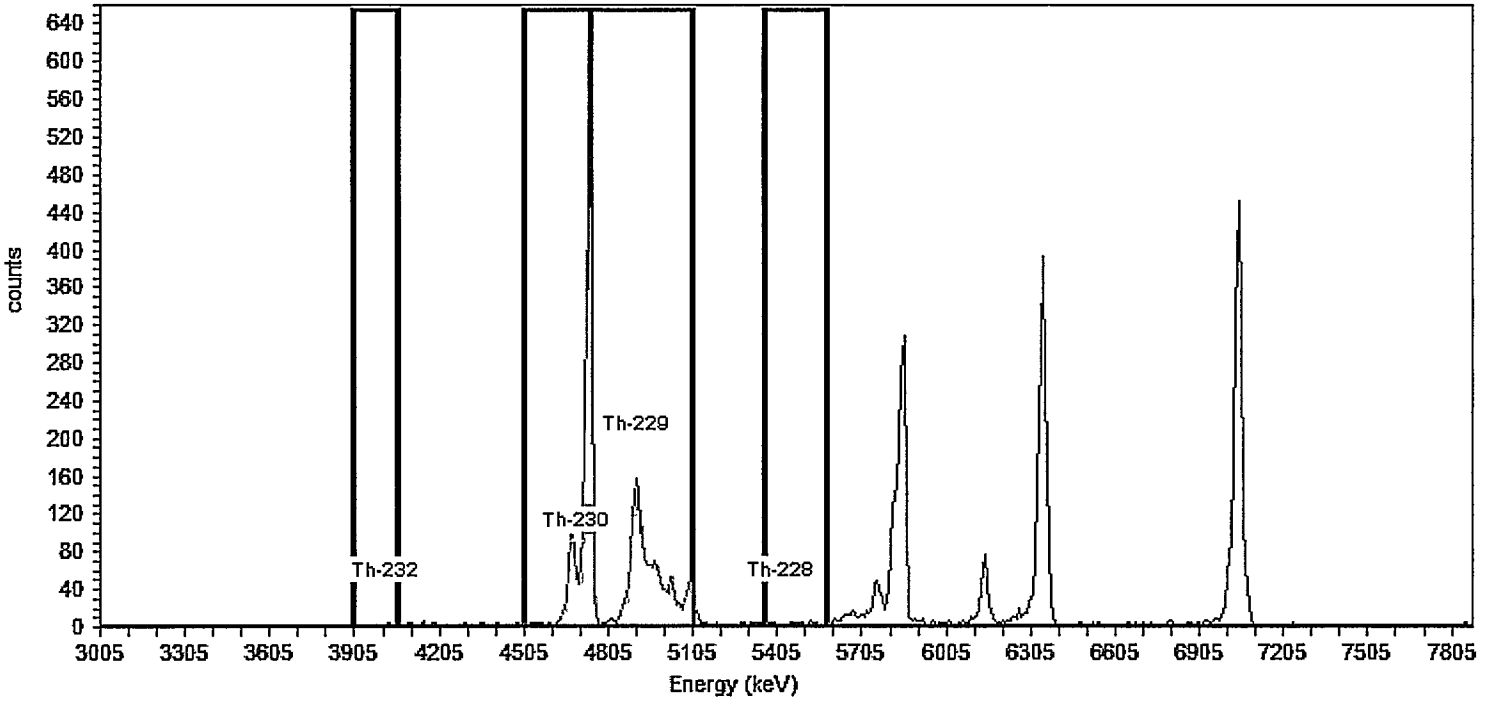
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 8/3/2022 3:26:14PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th
Decay Correction:8/3/2022 3:24:54PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Th-232	4012.000	3897.000	4050.000	16.2	100.0	5.84	1.5238	4.31	2.320E-002	1.382E-002	1.337E-002	4.130E-002
Th-230	4687.000	4506.000	4738.000	0.0	99.7	1,592.49	7.4776	1585.01	8.550E+000	2.776E-001	2.972E-002	7.403E-002
Th-229	4901.000	4738.000	5107.000	0.0	99.6	2,114.65	16.1868	2098.47	1.133E+001	3.399E-001	4.375E-002	1.021E-001
Th-228	5423.000	5359.000	5583.000	169.2	72.7	32.19	16.0000	16.19	1.198E-001	4.696E-002	5.961E-002	1.392E-001

Add / Edit *Secondary* Standards

Planning

Planning Comments	Create a Th-229 tracer solution.
Target dpm/g (on dil. date)	10
Target Final Volume mL	1000.00
Appx mass g of Parent Sol'n	8.71900242884311
Appx vol ml of Parent Sol'n	8.7050743099472
Expected Addition for Analysis g	1

Standards Preparation / Dilution

Secondary Solution #	S-0373
Dilution Date (New Ref Date)	08/03/2022 10:50
Ampoule, Empty (g)	
Ampoule/Solution Gross (g)	
Net Wt Removed (g)	
Transfer Container, empty (g)	13.573
Container Plus Solution(g)	22.173
Net Wt Transferred (g)	8.6
DPM Xferred On08/03/2022 10:50	9863.51371064028
Diluent/matrix	0.1N HNO3
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	336.73
Dilution Full Cont g (if measured)	1336.12
Dilution Final Volume ml (if measured)	1000
Final Dilution Density (g/mL)	0.99939
Final Dilution Measured Mass g	999.39
Comments	Th-229 tracer standard. Dilution performed as stated above by B Steffens. -BJS 8/3/2022
Final Dilution dpm/g	9.86953412645742
Final Dil New Ref Date/Time	08/03/2022 10:50

Parent Standard Data

Parent Solution Reference #	1984-21			
Parent Solution #	S-0343			
Parent Principal Radionuclide	Th-229	Half Life (Days)	2680555.55555556	
Parent Reference Date	07/26/2019 10:18			
Parent Certified Act	1147.24767052395	Cert Act/Vol Units	dpm	g
Parent Cert Act Uncert 1 Sigma	0.032			
Parent Sp. Gravity G/ML	1.0016			
Parent Supplier	Eckert & Ziegler Isotope Products			
Parent Date Recvd				
Parent Received By	Sample Receiving			
Parent Cert Exp Date	12/01/22			
Parent Matrix	.1M HNO3			
Certified dpm/g At Ref Date	1147.24767052395			
Certified dpm/g On 08/03/2022 10:50	1146.92019891166			
Parent Comments	Intermediate level Th-229 standard to be used for creating working tracer solutions. Dilution performed as stated above by B Steffens. -BJS 7-26-2019			
Parent Tech	BJS			
Is Primary	FALSE			
Is LCS	FALSE			
Is Tracer	TRUE			
Is Calib	FALSE			

S-0373

Add/Edit Secondary Standard

Planning

Target dpm/g (on dil. date):

10

Target Final Volume (mL):

1000

Appx Mass of Parent Sol'n (g):

8.719002262880288

Appx Vol of Parent Sol'n (ml):

8.705074144249489

Expected Addition for Analysis (g):

Planning Comments:

Standards Preparation / Dilution

Dilution Date (New Ref Date):

Ampoule Empty (g):

Ampoule/Solution Gross (g):

Net Wt Removed (g):

Transfer Container Empty (g):

13.573

Container Plus Solution (g):

22.173

Net Wt Transferred (g):

DPM Xferred on :

Diluent / Matrix:

Diluent Density Cont. Empty (g):

Test Mass of 5ml of Diluent (g):

Diluent Density Test (g/mL):

Dilution Empty Cont. Mass (g):

336.73

Dilution Full Container (g):

1336.12

Dilution Final Volume (mL):

Final Dilution Density (g/mL):

Final Dilution Measured Mass (g):

Comments:

Final Dilution (dpm/g):

Final Dil New Ref Date/Time:

08/03/2022 9:04

Contamination

Pu-241 Contam. dpm/g (on ref date):

Parent Standard Data

Solution Reference #:

1984-21

Solution #:

S-0343

Principal Radionuclide:

Th-229

Half Life (Days):

2680555.55555556

Reference Date:

07/26/2019 10:18

Certified Act:

1147.2476705239474 dpm/g

Cert Act Uncert 1 Sigma:

0.032

Sp. Gravity (g/ml):

1.0016

Supplier:

Eckert & Ziegler Isotope Products

Date Received:

Received By:

Sample Receiving

Cert Exp Date:

12/01/2022

Matrix:

.1M HNO3

Certified dpm/g At Reference Date:

1147.2476705239474

Certified dpm/g On 08/03/2022 9:04

1146.920220742842

Comments:

Intermediate level Th-229 standard to be used for creating working tracer solutions. Dilution performed as stated above by B Steffens. -BJS 7-26-2019

Primary Tech:

BJS

Types:

☐ Primary ☐ LCS ☑ Tracer ☐ Calib

Save Cancel

© 2016 - Trax, Build Version 0.76.1

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CELEBRATING 50 YEARS
Eckert & Ziegler Isotope Products 1967 - 2017

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-229	**Customer:**	AMERICAN RADIATION SERVICE
Half-life:	7340 ± 160 years	**P.O. No.:**	17-0372 ARA
Catalog No.:	7229	**Reference Date:**	1-Dec-17 12:00 PST
Source No.:	1984-21	**Contained Radioactivity: (Th-229 only)**	0.5237 **µCi** 19.38 **kBq**

Physical Description:

A. Mass of solution:	5.11245 g in 5 mL flame-sealed ampoule
B. Chemical form:	$Th(NO_3)_4$ in 0.1M HNO_3
C. Carrier content:	10 µg Zr/mL of solution
D. Density:	1.0016 g/mL @ 20°C

Radioimpurities:

See Technical Data Sheet (Lot# 3321201)

Radionuclide Concentration: 0.1024 µCi/g, 3.789 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:	± 1.0 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.1 %
D. Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP 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 IAEA Technical Reports Series No. 261, 1986.
- This solution has a recommended working life of 5 years.

[redacted]
Quality Control

21-OCT-17
Date

EZIP Ref. No.: 1984-21

THE LEAK TEST(S) INDICATED BY THE CHECKED BOX(ES) WAS(WERE) APPLIED TO DETERMINE THE INTEGRITY OF THE SOURCE DESCRIBED ON THE FRONT SIDE. THE LEAK TESTS INDICATED BELOW WERE EITHER TAKEN DIRECTLY FROM ISO 9978:1992 OR DERIVED FROM THE LEAK TEST METHODS LISTED IN ISO 9978:1992. THE REGULATORY LIMIT FOR LEAK TEST RESULTS IS <5 nCi (185 Bq) FOR BOTH ALPHA AND BETA-GAMMA ACTIVITY. LEAK TEST RESULTS MARKED BELOW CONTAINED <5 nCi (185 Bq) OF REMOVABLE ACTIVITY UNLESS OTHERWISE STATED ON THIS CERTIFICATE.

☑ **Standard Wipe Test**

The source was wiped over its entire surface with a moistened filter paper disk. After drying, the disk was checked for activity using a scintillation detector.

☐ **Special Wipe Test**

The source was wiped over its entire surface with moistened polystyrene. The polystyrene was then dissolved in a liquid scintillation cocktail and counted in a liquid scintillation counter.

☐ **Distilled Water Soak Test**

The source was immersed in distilled water and maintained at (50 ± 5)°C for a minimum of four hours or room temperature (20 ± 5)°C for 24 hours. After removal of the source, the liquid was a) checked for activity using a liquid scintillation counter, or b) evaporated in a planchet and the residue checked for activity using a windowless proportional counter or end-window G.M. tube.

☐ **Liquid Scintillation Soak Test**

The source was immersed for a minimum of 3 hours at room temperature(20 ± 5)°C in a liquid scintillation cocktail, which does not attack the source's outer surface material. The source was stored away from light to avoid photoluminescence. The sealed source was then removed and the activity of the liquid scintillation cocktail was measured.

☐ **Gas Source Test**

The source was placed in a vacuum desiccator and maintained at a pressure of <10 mm Hg for not less than 12 hours. The activity was checked by introducing air into the desiccator and monitoring the air with an end-window G.M. tube.

☑ **Ampoule Leak Test**

The ampoule was kept in an inverted position on a filter paper disk or polystyrene wipe for a minimum of 16 hours. The wipe was then checked for activity using a scintillation detector or liquid scintillation counter.

☐ **Bubble Leak Test**

The container was pressurized to its fill pressure; then soapy water was applied over its valve and neck or, the valve and neck of the vessel were immersed in water. If no growing bubbles were observed, the container was considered leak free.

☐ **Wipe Test for Industrial Ni-63 Sources**

The sources were wipe tested by an approved sampling plan, which called for either 100% of the batch to be individually wipe tested, or, a subset thereof. The wipe test(s) used to test for removable contamination and the results of those tests are recorded on the front of this form.

☐ **Pressure Test for Triotech Kr-85 Sources**

Prior to filling the vessel with Kr-85 gas, the vessel was evacuated to <5 mm Hg, the gas manifold system shut off and the system allowed to stand for a minimum of 30 minutes. A vacuum difference not greater than the known vacuum loss of the manifold system itself signified the vessel did not leak.

☐ **Leak Test Not Applicable**

The active area of the source is uncovered or is protected by a very thin coating. Although the deposit is adherent, it is not designed or certified to pass a standard leak test. The inactive portions of the source have been checked using the standard wipe test or special wipe test depending on the nuclide.

☐ **Other Leak Test**

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Alpha Spec Pu-Raw Data

Analytical Batch Report

Analysis Batch ID ARS1-B22-01099

Procedure PALA-RAD-026 **Analysis** ASP-PU239-AF **Prep** N/A

Description Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01099-01	LCS	B-31718										
ARS1-B22-01099-02	LCSD	B-31719										
ARS1-B22-01099-03	MBL											
ARS1-B22-01099-04	TRG				**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-05	TRG				**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-06	TRG				**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-07	TRG				**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-08	TRG				**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-09	TRG				**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-10	TRG				**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/22/22

Analytical Batch Report

Analysis Batch ID ARS1-B22-01099

Procedure PALA-RAD-026 **Analysis** ASP-PU239-AF **Prep** N/A

Description Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01099-01	LCS	B-31718										
ARS1-B22-01099-02	LCSD	B-31719										
ARS1-B22-01099-03	MBL											
ARS1-B22-01099-04	TRG			421068	**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-05	TRG			421069	**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-06	TRG			421070	**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-07	TRG			421071	**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-08	TRG			421072	**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-09	TRG			421073	**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01099-10	TRG			421074	**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/22/22

Technical Note Report

ABATCH	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

#	Date	Dept	Technical Note	User ID
1	08/12/2022 1:09 PM	COUNTROOM	ROI's adjusted to better fit the peaks of interest.	[redacted]

LCS Report
Analytical Batch: ARS1-B22-01099

Blind ID	ABatch Sample ID	Blind Group	Std ID	Isotope	Exp Addition (g)	Expected Value (pCi/g)	Empty Wt (g)	Gross Wt (g)	Net Wt (g)	Expected Value CT (pCi/g)	Mid Point Count Date	Known Value (pCi)	User ID	Mod Date
B-31718	ARS1-B22-01099-01	B-Pu239	S-0329	Pu-239	1.00001	7.01727	3.058	4.162	1.1040	7.01727	08/10/2022	7.74707	[redacted]	08/08/2022
B-31719	ARS1-B22-01099-02	B-Pu239	S-0329	Pu-239	1.00001	7.01727	3.069	4.17	1.1010	7.01727	08/10/2022	7.72602	[redacted]	08/08/2022

Tracer Report
Analytical Batch: ARS1-B22-01099

ABatch Sample ID	Sample Type	Empty Wt	Filled Wt	Net Wt	Exp Val	Std ID	Isotope	Tracer Date	HL Days	Ref Date	Cert dpm/g	Curr ACT	User ID
ARS1-B22-01099-01	LCS	0.922	2.022	1.100	6.013	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	[redacted]
ARS1-B22-01099-02	LCSD	0.939	2.034	1.095	5.985	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-03	MBL	0.949	2.042	1.093	5.974	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-04	TRG	0.946	2.041	1.095	5.985	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-05	TRG	0.912	2.005	1.093	5.974	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-06	TRG	0.981	2.078	1.097	5.996	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-07	TRG	0.943	2.032	1.089	5.952	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-08	TRG	0.920	2.017	1.097	5.996	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-09	TRG	0.943	2.038	1.095	5.985	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	
ARS1-B22-01099-10	TRG	0.971	2.063	1.092	5.969	S-0351	Pu-242	08/08/2022	136458333.333	07/17/2020	5.466	5.466	

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Preparation Date: 08/08/2022 12:54

Prepared By: [redacted]

Procedure Data

ABatch Sample ID	Type	SDG/Fraction	IC_ID	Aliquot VolWt (L/g)	Aliquot Units
ARS1-B22-01099-01	LCS			1.0000	Sample
ARS1-B22-01099-02	LCSD			1.0000	Sample
ARS1-B22-01099-03	MBL			1.0000	Sample
ARS1-B22-01099-04	TRG	ARS1-22-01492-001	422008	0.2000	Sample
ARS1-B22-01099-05	TRG	ARS1-22-01492-002	422009	0.2000	Sample
ARS1-B22-01099-06	TRG	ARS1-22-01492-003	422010	0.2000	Sample
ARS1-B22-01099-07	TRG	ARS1-22-01492-004	422011	0.2000	Sample
ARS1-B22-01099-08	TRG	ARS1-22-01492-005	422012	0.2000	Sample
ARS1-B22-01099-09	TRG	ARS1-22-01492-006	422013	0.2000	Sample
ARS1-B22-01099-10	TRG	ARS1-22-01492-007	422014	0.2000	Sample

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Reagent Amounts

ABatch Sample ID	Type	SDG/Fraction	14.5.7.6. Condition Columns - Nitric Acid 3N (mL)
ARS1-B22-01099-01	LCS		5.00
ARS1-B22-01099-02	LCSD		5.00
ARS1-B22-01099-03	MBL		5.00
ARS1-B22-01099-04	TRG	ARS1-22-01492-001	5.00
ARS1-B22-01099-05	TRG	ARS1-22-01492-002	5.00
ARS1-B22-01099-06	TRG	ARS1-22-01492-003	5.00
ARS1-B22-01099-07	TRG	ARS1-22-01492-004	5.00
ARS1-B22-01099-08	TRG	ARS1-22-01492-005	5.00
ARS1-B22-01099-09	TRG	ARS1-22-01492-006	5.00
ARS1-B22-01099-10	TRG	ARS1-22-01492-007	5.00

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Reagent Tracking

Procedure Section	Reagent ID
14.1. Air Filter Leaching	R22-00553
14.5.2. Dissolve Reside in Load Solution	R22-00514
14.5.7. Set Up Vacuum Box System-B	R21-00864
14.5.7. Set Up Vacuum Box System-A	R22-00474
14.5.4. Add Reducing Agent	R22-00556
14.5.5. Add Indicator	R22-00114
14.5.6. Valence Adjustment	R22-00555
14.5.7.6. Condition Columns	R22-00553
14.5.9.2. Oxidize Pu	R22-00560
14.5.9.6.1. Elude Americium	R22-00503
14.5.9.7.1. Post Am Rinse	R22-00186
14.5.9.7.3. Elude Pu	R22-00229
14.5.8.2. Beaker Rinse	R22-00553
14.5.9.1. Recondition TRU Column	R22-00553
14.6.1. Rinse Planchet	R22-00529
14.6.10. Quench Electrolysis	R22-00073
14.6.4. Electrolyte Solution-B	R22-00435
14.6.4. Electrolyte Solution-A	R22-00405
14.6.6. Add Plating Solution	R22-00506
14.6.12. Rinse Electrolysis Cell	R22-00261
14.6.13. Rinse Planchet-B	R21-00357
14.6.13. Rinse Planchet-C	R22-00210
14.6.13. Rinse Planchet-A	R22-00261
14.5.8.3. Post Load Column Rinse	R22-00553

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Support Equipment

Equipment Type	Serial/Batch/Lot	Comments
Fume Hood	030807171-B (WET LAB)	
Hot Block	#12 SN 145414 (Radiochem)	
Balance	T0350192 (Soil LAB)	
Pipette	SH39912	
Pipette Tip	5mL VWR 19480271	
Eichrom Outer Tip	22011733001	
Eichrom Support Tube	21012629781	
Planchette	Lot 12-10-21 (3/4 inch)	

Calculation Report
ARS1-B22-01099

ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01099-01	LCS					Pu-239/240	7.96267E-6	5.25040E-7	1.02908E-6	7.98189E-8	3.40982E-8	1.85957E-7	3.64475E-7		uCi/sample
ARS1-B22-01099-01	LCS					Pu-242	2.70837E-6	1.98952E-7	3.89946E-7	4.00624E-8	1.42199E-8	1.08122E-7	2.11919E-7		uCi/sample
ARS1-B22-01099-02	LCSD					Pu-239/240	7.32974E-6	4.82880E-7	9.46444E-7	7.62469E-8	3.28567E-8	1.69968E-7	3.33136E-7		uCi/sample
ARS1-B22-01099-02	LCSD					Pu-242	2.69606E-6	1.95513E-7	3.83205E-7	4.46305E-8	1.70485E-8	1.02892E-7	2.01668E-7		uCi/sample
ARS1-B22-01099-03	MBL					Pu-236	-4.14268E-9	2.03224E-8	3.98319E-8	8.12552E-8	3.42123E-8	2.03208E-8	3.98287E-8		uCi/sample
ARS1-B22-01099-03	MBL					Pu-238	2.30681E-8	2.01695E-8	3.95323E-8	6.93914E-8	2.82840E-8	2.01193E-8	3.94338E-8		uCi/sample
ARS1-B22-01099-03	MBL					Pu-239/240	2.36583E-9	2.15867E-8	4.23099E-8	8.29831E-8	3.50801E-8	2.15862E-8	4.23089E-8		uCi/sample
ARS1-B22-01099-03	MBL					Pu-242	2.69113E-6	2.01243E-7	3.94435E-7	6.24336E-8	2.48054E-8	1.13846E-7	2.23138E-7		uCi/sample
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	FB-070722	1	Pu-236	5.70320E-8	5.98854E-8	1.17375E-7	2.13879E-7	8.40424E-8	5.97821E-8	1.17173E-7		uCi/sample
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	FB-070722	1	Pu-238	-2.06781E-9	5.98238E-8	1.17255E-7	2.42588E-7	9.88791E-8	5.98237E-8	1.17254E-7		uCi/sample
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	FB-070722	1	Pu-239/240	-7.02531E-8	4.04057E-8	7.91952E-8	2.18113E-7	8.66581E-8	4.01728E-8	7.87387E-8		uCi/sample
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	FB-070722	1	Pu-242	1.34803E-5	9.56506E-7	1.87475E-6	1.54411E-7	5.48072E-8	4.73223E-7	9.27518E-7		uCi/sample
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Pu-236	2.63751E-8	6.22239E-8	1.21959E-7	2.42782E-7	9.53993E-8	6.22027E-8	1.21917E-7		uCi/sample
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Pu-238	1.38577E-7	7.68385E-8	1.50603E-7	2.37823E-7	9.34507E-8	7.63618E-8	1.49669E-7		uCi/sample
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Pu-239/240	-3.52059E-8	5.72921E-8	1.12293E-7	2.57362E-7	1.03239E-7	5.72510E-8	1.12212E-7		uCi/sample
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Pu-242	1.34557E-5	9.71389E-7	1.90392E-6	2.15596E-7	8.23559E-8	5.05130E-7	9.90054E-7		uCi/sample
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Pu-236	-1.93104E-8	5.96657E-8	1.16945E-7	2.51715E-7	1.02599E-7	5.96539E-8	1.16922E-7		uCi/sample
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Pu-238	6.72583E-8	5.86967E-8	1.15046E-7	2.03254E-7	7.88431E-8	5.85500E-8	1.14758E-7		uCi/sample
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Pu-239/240	-1.13416E-7	4.64489E-8	9.10398E-8	2.53983E-7	1.04224E-7	4.59194E-8	9.00019E-8		uCi/sample
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Pu-242	1.35049E-5	9.59676E-7	1.88096E-6	1.24320E-7	3.93929E-8	4.76957E-7	9.34836E-7		uCi/sample
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Pu-236	-4.18428E-8	3.84211E-8	7.53053E-8	2.02295E-7	7.72749E-8	3.83343E-8	7.51353E-8		uCi/sample
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Pu-238	-3.88312E-8	4.85860E-8	9.52286E-8	2.27721E-7	9.04754E-8	4.85270E-8	9.51129E-8		uCi/sample
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Pu-239/240	-7.54504E-8	5.70212E-8	1.11762E-7	2.68194E-7	1.10729E-7	5.68311E-8	1.11389E-7		uCi/sample
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Pu-242	1.34064E-5	9.57776E-7	1.87724E-6	2.18276E-7	8.57702E-8	4.83655E-7	9.47965E-7		uCi/sample
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Pu-236	-2.26730E-8	7.00556E-8	1.37309E-7	2.95547E-7	1.20465E-7	7.00417E-8	1.37282E-7		uCi/sample
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Pu-238	-4.46208E-8	5.58301E-8	1.09427E-7	2.61674E-7	1.03965E-7	5.57623E-8	1.09294E-7		uCi/sample
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Pu-239/240	-6.44154E-8	5.22380E-8	1.02387E-7	2.61524E-7	1.03906E-7	5.20868E-8	1.02090E-7		uCi/sample
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Pu-242	1.35049E-5	9.80590E-7	1.92196E-6	1.19428E-7	3.28578E-8	5.17752E-7	1.01479E-6		uCi/sample
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Pu-236	2.84134E-8	3.16207E-8	6.19765E-8	1.20131E-7	3.80656E-8	3.15721E-8	6.18813E-8		uCi/sample
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Pu-238	-3.79439E-8	3.48410E-8	6.82884E-8	1.83445E-7	7.00744E-8	3.47624E-8	6.81342E-8		uCi/sample
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Pu-239/240	-1.15762E-7	5.35107E-8	1.04881E-7	2.67880E-7	1.12305E-7	5.30324E-8	1.03944E-7		uCi/sample
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Pu-242	1.34803E-5	9.52764E-7	1.86742E-6	1.72949E-7	6.48390E-8	4.65613E-7	9.12602E-7		uCi/sample
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Pu-236	-5.58470E-8	6.88603E-8	1.34966E-7	3.06973E-7	1.25969E-7	6.87742E-8	1.34797E-7		uCi/sample

Calculated By: [redacted] on 9/1/2022 1:44:12 PM

Calculation Report
ARS1-B22-01099

Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Pu-238	5.24555E-8	6.24309E-8	1.22365E-7	2.29451E-7	8.76483E-8	6.23470E-8	1.22200E-7		uCi/sample
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Pu-239/240	-5.99148E-8	7.27915E-8	1.42671E-7	3.18995E-7	1.32436E-7	7.26977E-8	1.42488E-7		uCi/sample
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Pu-242	1.34434E-5	9.79859E-7	1.92052E-6	2.73742E-7	1.09810E-7	5.22437E-7	1.02398E-6		uCi/sample

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Calculation Report
ARS1-B22-01099

ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01099-01	LCS			44.2%		1871.000000	900	23.000000	1440	0.26422	1	8/8/2022	8/10/2022
ARS1-B22-01099-01	LCS			44.2%		634.000000	900	4.000000	1440	0.26422	1	8/8/2022	8/10/2022
ARS1-B22-01099-02	LCSD			49.9%		1902.000000	900	26.000000	1440	0.25826	1	8/8/2022	8/10/2022
ARS1-B22-01099-02	LCSD			49.9%		698.000000	900	7.000000	1440	0.25826	1	8/8/2022	8/10/2022
ARS1-B22-01099-03	MBL			41.0%		11.000000	900	19.000000	1440	0.25796	1	8/8/2022	8/10/2022
ARS1-B22-01099-03	MBL			41.0%		13.000000	900	13.000000	1440	0.25796	1	8/8/2022	8/10/2022
ARS1-B22-01099-03	MBL			41.0%		13.000000	900	20.000000	1440	0.25796	1	8/8/2022	8/10/2022
ARS1-B22-01099-03	MBL			41.0%		575.000000	900	10.000000	1440	0.25796	1	8/8/2022	8/10/2022
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	57.2%		9.000000	900	9.000000	1440	0.26477	0.2	7/7/2022	8/10/2022
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	57.2%		8.000000	900	13.000000	1440	0.26477	0.2	7/7/2022	8/10/2022
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	57.2%		2.000000	900	10.000000	1440	0.26477	0.2	7/7/2022	8/10/2022
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	57.2%		818.000000	900	4.000000	1440	0.26477	0.2	7/7/2022	8/10/2022
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	51.3%		7.000000	900	9.000000	1440	0.25980	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	51.3%		13.000000	900	9.000000	1440	0.25980	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	51.3%		5.000000	900	11.000000	1440	0.25980	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	51.3%		721.000000	900	7.000000	1440	0.25980	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	62.9%		7.000000	900	13.000000	1440	0.23679	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	62.9%		9.000000	900	8.000000	1440	0.23679	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	62.9%		2.000000	900	14.000000	1440	0.23679	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	62.9%		805.000000	900	2.000000	1440	0.23679	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	54.3%		2.000000	900	7.000000	1440	0.26702	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	54.3%		4.000000	900	10.000000	1440	0.26702	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	54.3%		5.000000	900	15.000000	1440	0.26702	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	54.3%		783.000000	900	9.000000	1440	0.26702	0.2	7/8/2022	8/10/2022
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	49.7%		7.000000	900	13.000000	1440	0.25400	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	49.7%		4.000000	900	10.000000	1440	0.25400	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	49.7%		3.000000	900	10.000000	1440	0.25400	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	49.7%		682.000000	900	1.000000	1440	0.25400	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	64.4%		3.000000	900	2.000000	1440	0.24356	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	64.4%		2.000000	900	7.000000	1440	0.24356	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	64.4%		4.000000	900	18.000000	1440	0.24356	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	64.4%		848.000000	900	6.000000	1440	0.24356	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	49.0%		6.000000	900	14.000000	1440	0.25589	0.2	7/15/2022	8/10/2022

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Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	49.0%		7.000000	900	7.000000	1440	0.25589	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	49.0%		7.000000	900	16.000000	1440	0.25589	0.2	7/15/2022	8/10/2022
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	49.0%		680.000000	900	11.000000	1440	0.25589	0.2	7/15/2022	8/10/2022

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ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01099-01	LCS			2220000	1	2.07889	0.01597	2.06292	0.7	17166652 - E7		1	Pu-242	7/17/2020
ARS1-B22-01099-01	LCS			2220000	1	0.70444	0.00278	0.70167	0.7	17166652 - E7		1	Pu-242	7/17/2020
ARS1-B22-01099-02	LCSD			2220000	1	2.11333	0.01806	2.09528	0.7	17166652 - E8		1	Pu-242	7/17/2020
ARS1-B22-01099-02	LCSD			2220000	1	0.77556	0.00486	0.77069	0.7	17166652 - E8		1	Pu-242	7/17/2020
ARS1-B22-01099-03	MBL			2220000	1	0.01222	0.01319	-0.00097	0.7	17165813 - F1		1.001	Pu-242	7/17/2020
ARS1-B22-01099-03	MBL			2220000	1	0.01444	0.00903	0.00542	0.7	17165813 - F1		1	Pu-242	7/17/2020
ARS1-B22-01099-03	MBL			2220000	1	0.01444	0.01389	0.00056	0.7	17165813 - F1		1	Pu-242	7/17/2020
ARS1-B22-01099-03	MBL			2220000	1	0.63889	0.00694	0.63194	0.7	17165813 - F1		1	Pu-242	7/17/2020
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	2220000	1	0.01000	0.00625	0.00375	0.7	17165813 - F2		1.001	Pu-242	7/17/2020
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	2220000	1	0.00889	0.00903	-0.00014	0.7	17165813 - F2		1	Pu-242	7/17/2020
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	2220000	1	0.00222	0.00694	-0.00472	0.7	17165813 - F2		1	Pu-242	7/17/2020
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	2220000	1	0.90889	0.00278	0.90611	0.7	17165813 - F2		1	Pu-242	7/17/2020
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	2220000	1	0.00778	0.00625	0.00153	0.7	17165814 - F3		1.001	Pu-242	7/17/2020
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	2220000	1	0.01444	0.00625	0.00819	0.7	17165814 - F3		1	Pu-242	7/17/2020
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	2220000	1	0.00556	0.00764	-0.00208	0.7	17165814 - F3		1	Pu-242	7/17/2020
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	2220000	1	0.80111	0.00486	0.79625	0.7	17165814 - F3		1	Pu-242	7/17/2020
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	2220000	1	0.00778	0.00903	-0.00125	0.7	17165814 - F4		1.001	Pu-242	7/17/2020
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	2220000	1	0.01000	0.00556	0.00444	0.7	17165814 - F4		1	Pu-242	7/17/2020
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	2220000	1	0.00222	0.00972	-0.00750	0.7	17165814 - F4		1	Pu-242	7/17/2020
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	2220000	1	0.89444	0.00139	0.89306	0.7	17165814 - F4		1	Pu-242	7/17/2020
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	2220000	1	0.00222	0.00486	-0.00264	0.7	17165815 - F5		1.001	Pu-242	7/17/2020
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	2220000	1	0.00444	0.00694	-0.00250	0.7	17165815 - F5		1	Pu-242	7/17/2020
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	2220000	1	0.00556	0.01042	-0.00486	0.7	17165815 - F5		1	Pu-242	7/17/2020
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	2220000	1	0.87000	0.00625	0.86375	0.7	17165815 - F5		1	Pu-242	7/17/2020
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	2220000	1	0.00778	0.00903	-0.00125	0.7	17165816 - F6		1.001	Pu-242	7/17/2020
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	2220000	1	0.00444	0.00694	-0.00250	0.7	17165816 - F6		1	Pu-242	7/17/2020
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	2220000	1	0.00333	0.00694	-0.00361	0.7	17165816 - F6		1	Pu-242	7/17/2020
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	2220000	1	0.75778	0.00069	0.75708	0.7	17165816 - F6		1	Pu-242	7/17/2020
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	2220000	1	0.00333	0.00139	0.00194	0.7	17165816 - F7		1.001	Pu-242	7/17/2020
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	2220000	1	0.00222	0.00486	-0.00264	0.7	17165816 - F7		1	Pu-242	7/17/2020
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	2220000	1	0.00444	0.01250	-0.00806	0.7	17165816 - F7		1	Pu-242	7/17/2020
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	2220000	1	0.94222	0.00417	0.93806	0.7	17165816 - F7		1	Pu-242	7/17/2020
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	2220000	1	0.00667	0.00972	-0.00306	0.7	17165816 - F8		1.001	Pu-242	7/17/2020

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Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	2220000	1	0.00778	0.00486	0.00292	0.7	17165816 - F8		1	Pu-242	7/17/2020
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	2220000	1	0.00778	0.01111	-0.00333	0.7	17165816 - F8		1	Pu-242	7/17/2020
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	2220000	1	0.75556	0.00764	0.74792	0.7	17165816 - F8		1	Pu-242	7/17/2020

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Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01099-01	LCS			8.80671E+6			2.40000			1.00000					
ARS1-B22-01099-01	LCS			1.36458E+8			2.40000			1.00000					
ARS1-B22-01099-02	LCSD			8.80671E+6			2.40000			1.00000					
ARS1-B22-01099-02	LCSD			1.36458E+8			2.40000			1.00000					
ARS1-B22-01099-03	MBL			1041.31944			2.40000			0.99840					
ARS1-B22-01099-03	MBL			32037.03704			2.40000			0.99995					
ARS1-B22-01099-03	MBL			8.80671E+6			2.40000			1.00000					
ARS1-B22-01099-03	MBL			1.36458E+8			2.40000			1.00000					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	1041.31944			34.60417			0.97723					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	32037.03704			34.60417			0.99925					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	8.80671E+6			34.60417			1.00000					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	1.36458E+8			34.60417			1.00000					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	1041.31944			33.59653			0.97788					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	32037.03704			33.59653			0.99927					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	8.80671E+6			33.59653			1.00000					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	1.36458E+8			33.59653			1.00000					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	1041.31944			33.56181			0.97791					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	32037.03704			33.56181			0.99927					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	8.80671E+6			33.56181			1.00000					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	1.36458E+8			33.56181			1.00000					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	1041.31944			33.58333			0.97789					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	32037.03704			33.58333			0.99927					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	8.80671E+6			33.58333			1.00000					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	1.36458E+8			33.58333			1.00000					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	1041.31944			26.58542			0.98246					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	32037.03704			26.58542			0.99942					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	8.80671E+6			26.58542			1.00000					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	1.36458E+8			26.58542			1.00000					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	1041.31944			26.60625			0.98245					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	32037.03704			26.60625			0.99942					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	8.80671E+6			26.60625			1.00000					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	1.36458E+8			26.60625			1.00000					
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	1041.31944			26.59931			0.98245					

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Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	32037.03704			26.59931			0.99942					
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	8.80671E+6			26.59931			1.00000					
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	1.36458E+8			26.59931			1.00000					

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Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU FS	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01099-01	LCS			0	0.02	0.05833	0	0	0	0.06166	2.59074E+5	2.33166E+8	6.47973E-8	1.40939E-7	0.06174
ARS1-B22-01099-01	LCS			0	0.02	0.05833	0	0	0	0.06166	2.59074E+5	2.33166E+8	5.36554E-8	1.18703E-7	0.05112
ARS1-B22-01099-02	LCSD			0	0.02	0.05833	0	0	0	0.06166	2.85860E+5	2.57274E+8	6.47973E-8	1.39850E-7	0.06174
ARS1-B22-01099-02	LCSD			0	0.02	0.05833	0	0	0	0.06166	2.85860E+5	2.57274E+8	5.36554E-8	1.17614E-7	0.05112
ARS1-B22-01099-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.34684E+5	2.11216E+8	5.35364E-8	1.19674E-7	0.05093
ARS1-B22-01099-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.34812E+5	2.11331E+8	4.58755E-8	1.04378E-7	0.04371
ARS1-B22-01099-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.34825E+5	2.11342E+8	6.47973E-8	1.42139E-7	0.06174
ARS1-B22-01099-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.34825E+5	2.11342E+8	5.36554E-8	1.19903E-7	0.05112
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	65752.59075	5.91773E+7	2.73482E-7	5.91585E-7	0.05093
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	67167.19181	6.04505E+7	2.29537E-7	5.02920E-7	0.04371
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	67217.31491	6.04956E+7	3.23987E-7	6.91381E-7	0.06174
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	67217.48617	6.04957E+7	2.68277E-7	5.80199E-7	0.05112
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	57925.00893	5.21325E+7	2.73299E-7	5.97408E-7	0.05093
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	59132.82209	5.32195E+7	2.29532E-7	5.09001E-7	0.04371
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	59175.66417	5.32581E+7	3.23987E-7	6.97468E-7	0.06174
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	59175.81055	5.32582E+7	2.68277E-7	5.86287E-7	0.05112
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	64731.95337	5.82588E+7	2.73293E-7	5.91929E-7	0.05093
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	66080.22267	5.94722E+7	2.29532E-7	5.03647E-7	0.04371
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	66128.04870	5.95152E+7	3.23987E-7	6.92118E-7	0.06174
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	66128.21211	5.95154E+7	2.68277E-7	5.80937E-7	0.05112
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	63066.80369	5.67601E+7	2.73296E-7	5.93165E-7	0.05093
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	64381.28301	5.79432E+7	2.29532E-7	5.04850E-7	0.04371
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	64427.90932	5.79851E+7	3.23987E-7	6.93320E-7	0.06174
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	64428.06862	5.79853E+7	2.68277E-7	5.82139E-7	0.05112
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	55131.61214	4.96185E+7	2.72026E-7	5.97502E-7	0.05093
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	56027.63093	5.04249E+7	2.29498E-7	5.11754E-7	0.04371
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	56059.74983	5.04538E+7	3.23987E-7	7.00296E-7	0.06174
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	56059.85956	5.04539E+7	2.68277E-7	5.89115E-7	0.05112
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	68434.01998	6.15906E+7	2.72030E-7	5.86893E-7	0.05093
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	69547.16738	6.25925E+7	2.29498E-7	5.01306E-7	0.04371
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	69587.06785	6.26284E+7	3.23987E-7	6.89855E-7	0.06174
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	69587.20417	6.26285E+7	2.68277E-7	5.78674E-7	0.05112
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	54712.95760	4.92417E+7	2.72029E-7	5.97925E-7	0.05093

Calculated By [redacted] on 9/1/2022 1:44:12 PM

Calculation Report
ARS1-B22-01099

Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU F5	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	55602.66961	5.00424E+7	2.29498E-7	5.12164E-7	0.04371
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	55634.56154	5.00711E+7	3.23987E-7	7.00707E-7	0.06174
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	55634.67049	5.00712E+7	2.68277E-7	5.89525E-7	0.05112

Calculated By: [redacted] on 9/1/2022 1:44:12 PM

ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01099
Analysis Code	ASP-PU239-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01099-01	LCS				7.74707E-6	102.8%			
ARS1-B22-01099-01	LCS								
ARS1-B22-01099-02	LCSD				7.72602E-6	94.9%	8.3%	0.62795	0.88729
ARS1-B22-01099-02	LCSD								
ARS1-B22-01099-03	MBL			U					
ARS1-B22-01099-03	MBL			U					
ARS1-B22-01099-03	MBL			U					
ARS1-B22-01099-03	MBL								
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01099-04	TRG	ARS1-22-01492	001	B					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01099-05	TRG	ARS1-22-01492	002	B					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01099-06	TRG	ARS1-22-01492	003	B					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01099-07	TRG	ARS1-22-01492	004	B					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01099-08	TRG	ARS1-22-01492	005	B					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01099-09	TRG	ARS1-22-01492	006	B					
ARS1-B22-01099-10	TRG	ARS1-22-01492	007	U					

Calculated By: [redacted] on 9/1/2022 1:44:12 PM

Samples to be counted:

Sample 22-01099-01 to detector 17166652 - E7, marked to be counted
Sample 22-01099-02 to detector 17166652 - E8, marked to be counted
Sample 22-01099-03 to detector 17165813 - F1, marked to be counted
Sample 22-01099-04 to detector 17165813 - F2, marked to be counted
Sample 22-01099-05 to detector 17165814 - F3, marked to be counted
Sample 22-01099-06 to detector 17165814 - F4, marked to be counted
Sample 22-01099-07 to detector 17165815 - F5, marked to be counted
Sample 22-01099-08 to detector 17165816 - F6, marked to be counted
Sample 22-01099-09 to detector 17165816 - F7, marked to be counted
Sample 22-01099-10 to detector 17165816 - F8, marked to be counted

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,365 12:34:51PM 8/12/2022

Sample

Sample: 22-01099-01 Type: Sample
Spectrum #1 Analysis #1
;
Sample Collection Date:
Comment: LCS

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

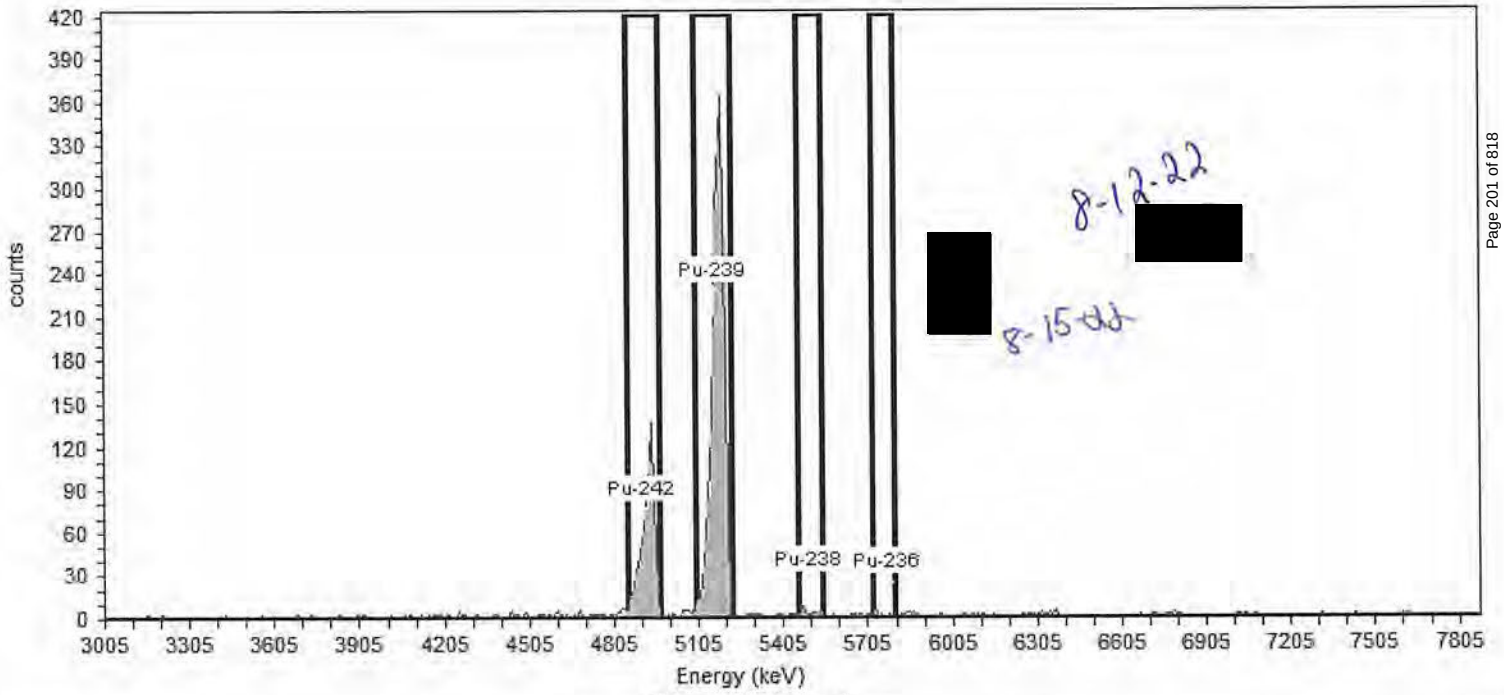
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 8/10/2022 2:59:59PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-236	5769.999	5724.236	5800.430	0.0	68.1	9.00	8.1250	0.88	5.403E-003	2.317E-002	3.691E-002	9.053E-002
Pu-242	4901.995	4852.822	4968.230	34.9	100.4	634.00	2.5000	631.50	2.645E+000	1.186E-001	1.389E-002	3.911E-002
Pu-239	5155.993	5093.085	5227.346	50.2	99.9	1,871.00	14.3750	1856.63	7.815E+000	2.426E-001	3.347E-002	7.833E-002
Pu-238	5498.999	5457.032	5543.008	28.0	71.6	22.00	8,7500	13.25	7.782E-002	3.082E-002	3.643E-002	8.876E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,312 6:01:28AM 8/11/2022

Sample

Sample: 22-01099-01 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCS

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

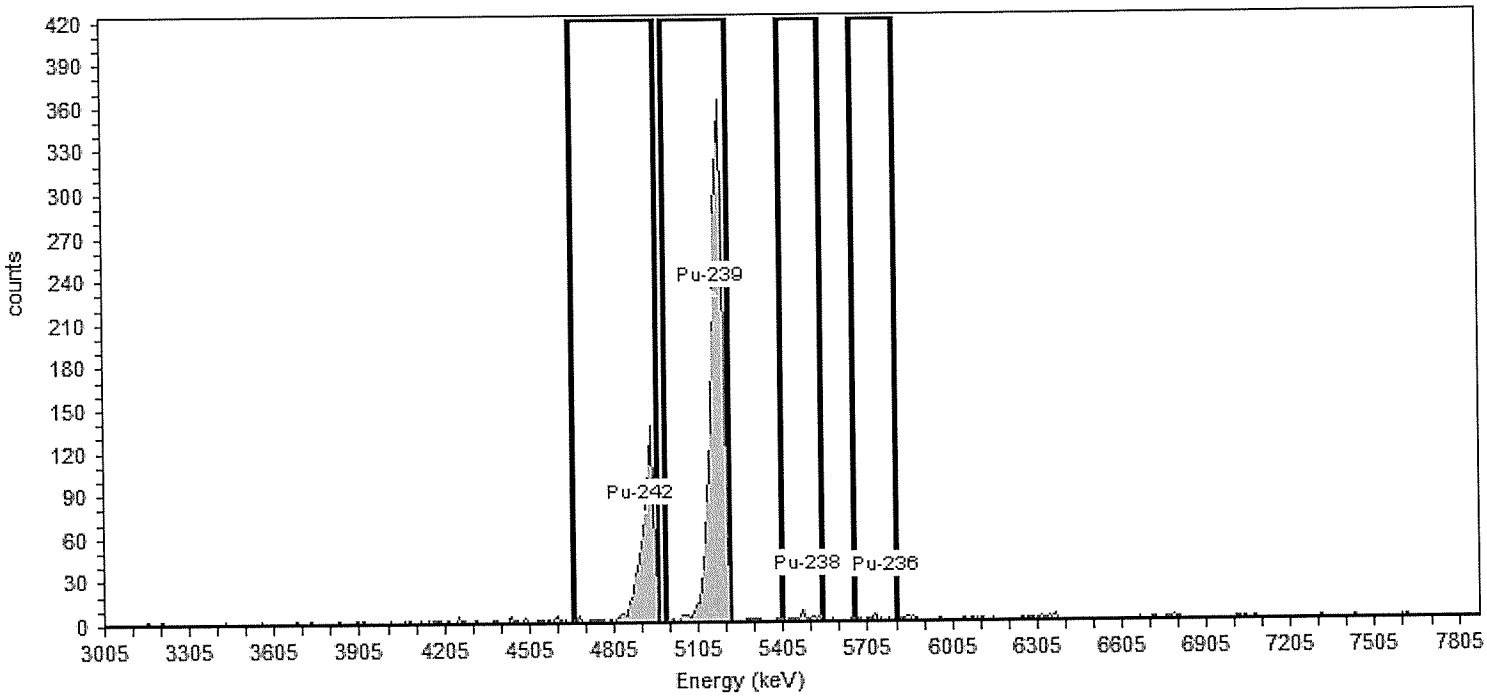
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 8/10/2022 2:59:59PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	0.0	100.5	661.35	14.9504	646.40	2.705E+000	1.217E-001	3.393E-002	7.918E-002
Pu-239	5156.000	4988.000	5219.000	45.4	100.0	1,890.80	16.8750	1873.92	7.880E+000	2.441E-001	3.622E-002	8.382E-002
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	25.26	14.9772	10.28	4.328E-002	2.478E-002	3.416E-002	7.971E-002
Pu-236	5770.000	5662.000	5810.000	37.1	99.9	13.53	12.5000	1.03	4.333E-003	1.945E-002	3.121E-002	7.381E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,366 12:35:44PM 8/12/2022

Sample

Sample: 22-01099-02 Type: Sample
Spectrum #1 Analysis #1

Sample Collection Date:
Comment: LCSD

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099

Description:

Client Name: Undefined
Client Contact:

Tracer

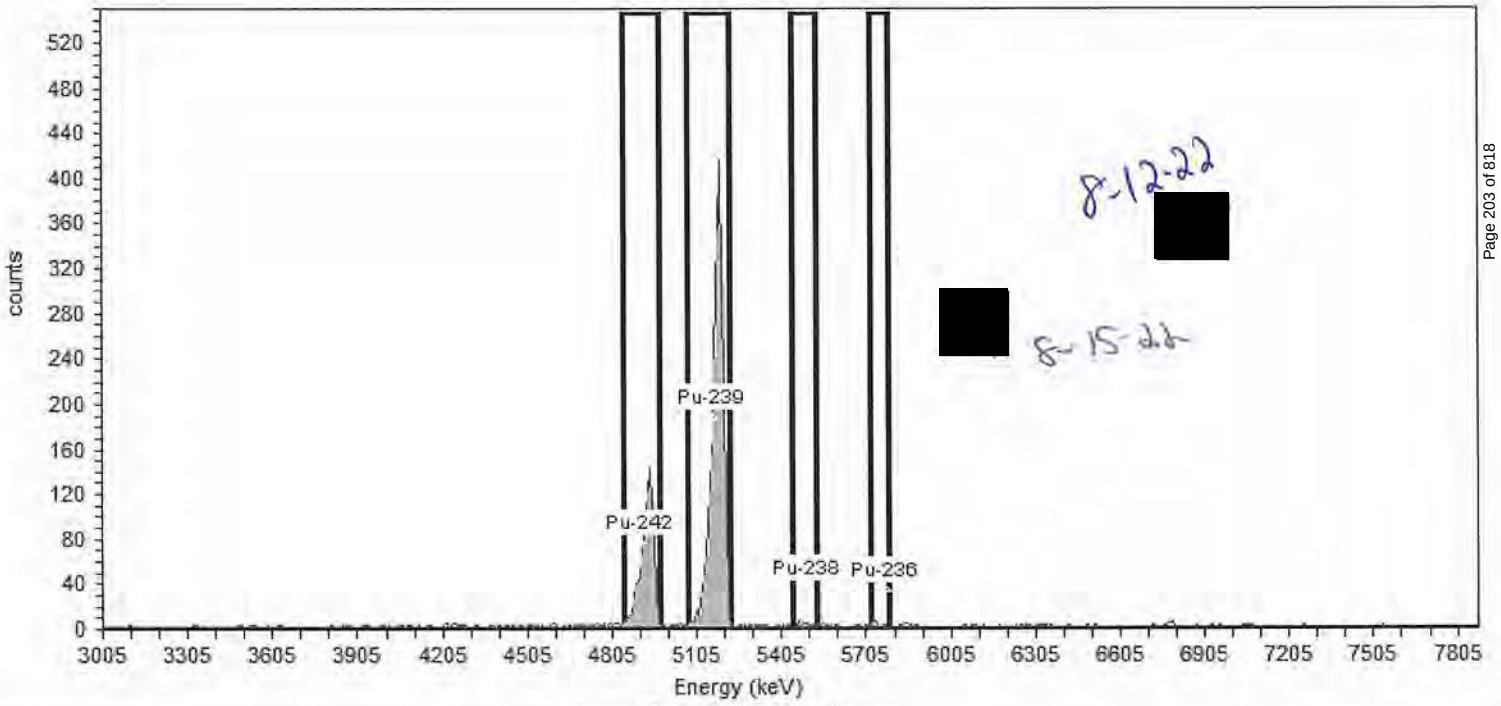
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4843.198	4977.840	44.9	100.4	698.00	4.3750	693.63	2.972E+000	1.287E-001	1.880E-002	4.919E-002
Pu-239	5155.993	5073.888	5227.346	44.6	99.9	1,902.00	16.2500	1885.75	8.121E+000	2.511E-001	3.640E-002	8.446E-002
Pu-238	5498.999	5447.474	5533.459	49.2	99.9	18.00	12.5000	5.50	2.369E-002	2.189E-002	3.193E-002	7.551E-002
Pu-236	5769.999	5724.236	5790.910	21.3	68.1	11.00	6.8750	4.13	2.606E-002	2.471E-002	3.474E-002	8.657E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,310 6:00:54AM 8/11/2022

Sample

Sample: 22-01099-02 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCSD

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

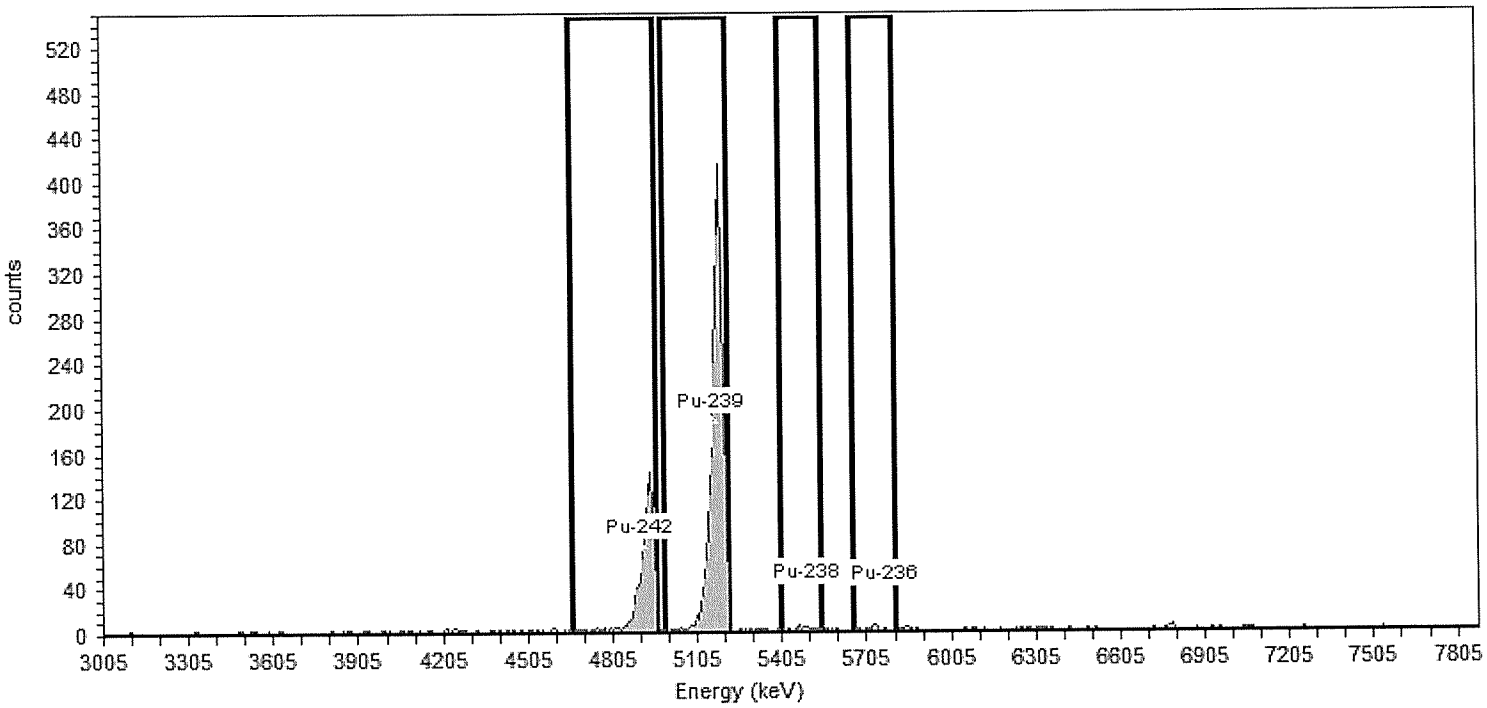
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	0.0	100.5	721.78	18.1250	703.66	3.012E+000	1.313E-001	3.822E-002	8.802E-002
Pu-239	5156.000	4988.000	5219.000	37.2	100.0	1,910.14	19.4108	1890.72	8.134E+000	2.515E-001	3.974E-002	9.113E-002
Pu-238	5499.000	5396.000	5539.000	58.3	99.9	21.77	15.8646	5.90	2.542E-002	2.425E-002	3.597E-002	8.359E-002
Pu-236	5770.000	5662.000	5810.000	26.2	99.9	15.47	13.1283	2.34	1.009E-002	2.096E-002	3.272E-002	7.710E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,367 12:36:42PM 8/12/2022

Sample

Sample: 22-01099-03 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: MBL

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

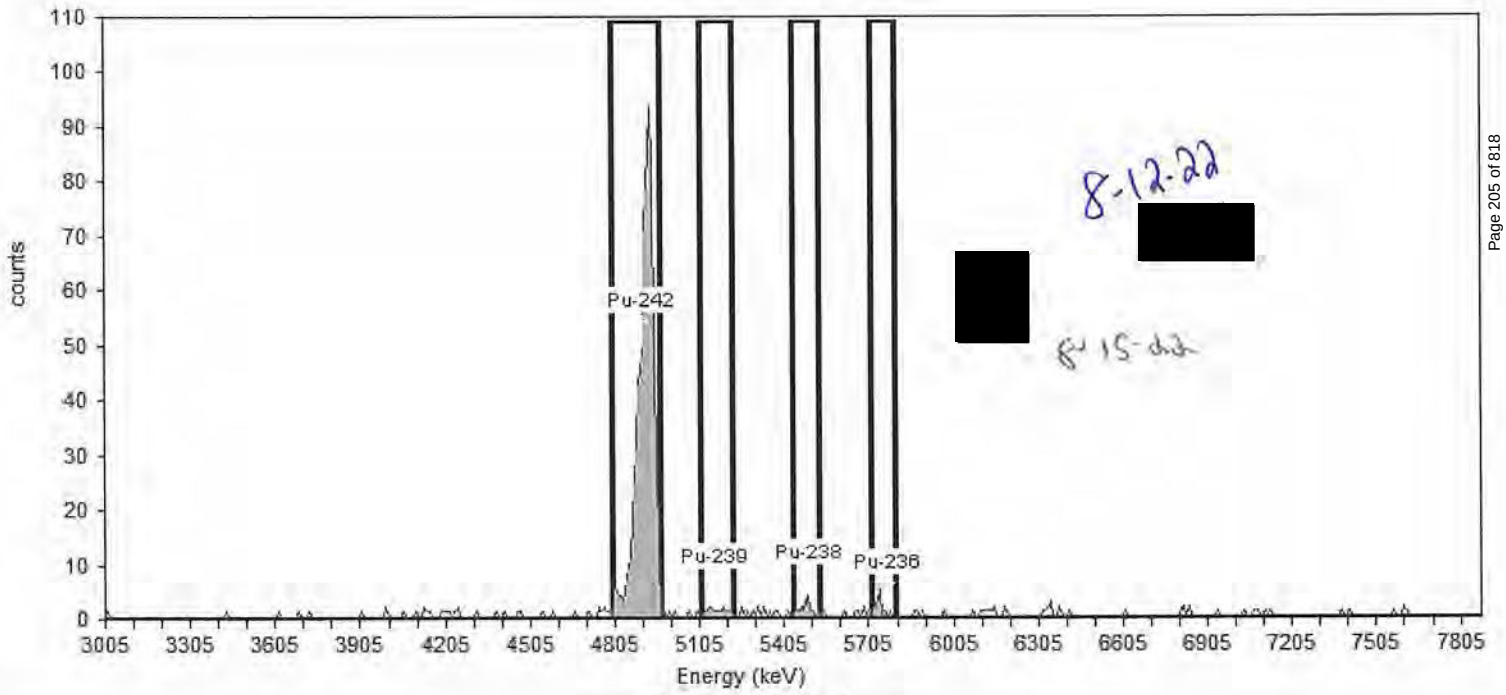
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F1, SN: 5702110, ID: 17
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F1; Det: 17165813 - F1; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 17

Energy Calibration: F1 calib 6-2-21
Efficiency Calibration:F1 calib 6-2-21
Calibration Date: 6/3/2021 6:20:39AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.80% +/- 1.35% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4795.062	4968.230	58.5	100.4	575.00	6.2500	568.75	2.440E+000	1.215E-001	2.249E-002	5.659E-002
Pu-239	5155.993	5112.277	5227.346	96.5	88.4	13.00	12.5000	0.50	2.436E-003	2.223E-002	3.612E-002	8.543E-002
Pu-238	5498.999	5437.914	5533.459	44.5	99.9	13.00	8.1250	4.88	2.102E-002	1.834E-002	2.577E-002	6.321E-002
Pu-236	5769.999	5714.708	5800.430	27.3	99.9	11.00	11.8750	-0.88	0.000E+000	1.851E-002	3.116E-002	7.398E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,314 6:02:03AM 8/11/2022

Sample

Sample: 22-01099-03 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: MBL

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

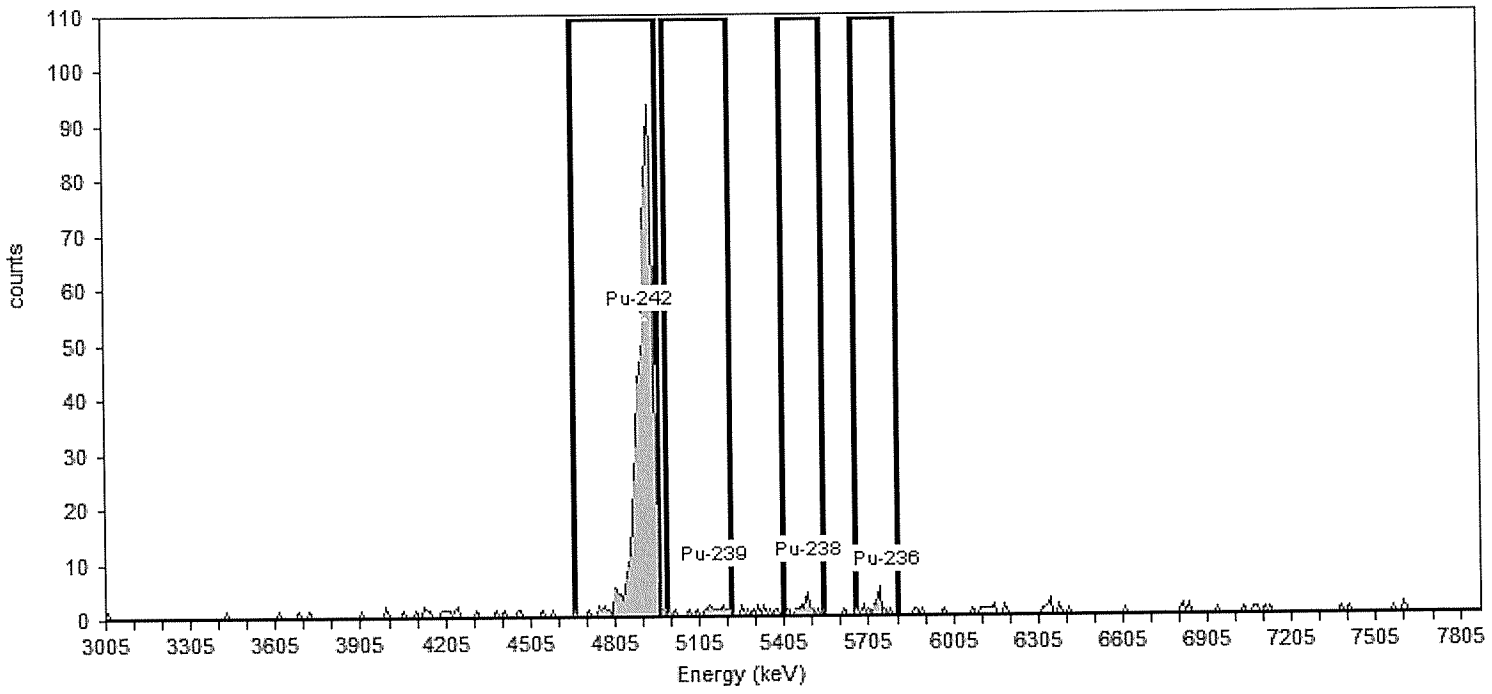
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F1, SN: 5702110, ID: 17
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F1; Det: 17165813 - F1; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 17

Energy Calibration: F1 calib 6-2-21
Efficiency Calibration:F1 calib 6-2-21
Calibration Date: 6/3/2021 6:20:39AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.80% +/- 1.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	0.0	100.5	583.51	14.3750	569.13	2.439E+000	1.224E-001	3.408E-002	7.975E-002
Pu-239	5156.000	4988.000	5219.000	0.0	100.0	15.93	18.7142	-2.79	0.000E+000	2.264E-002	3.907E-002	8.979E-002
Pu-238	5499.000	5396.000	5539.000	51.5	99.9	14.58	10.0000	4.58	1.975E-002	1.969E-002	2.859E-002	6.885E-002
Pu-236	5770.000	5662.000	5810.000	26.5	99.9	15.00	13.7500	1.25	5.390E-003	2.094E-002	3.353E-002	7.872E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,368 12:37:31PM 8/12/2022

Sample

Sample: 22-01099-04 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-001

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

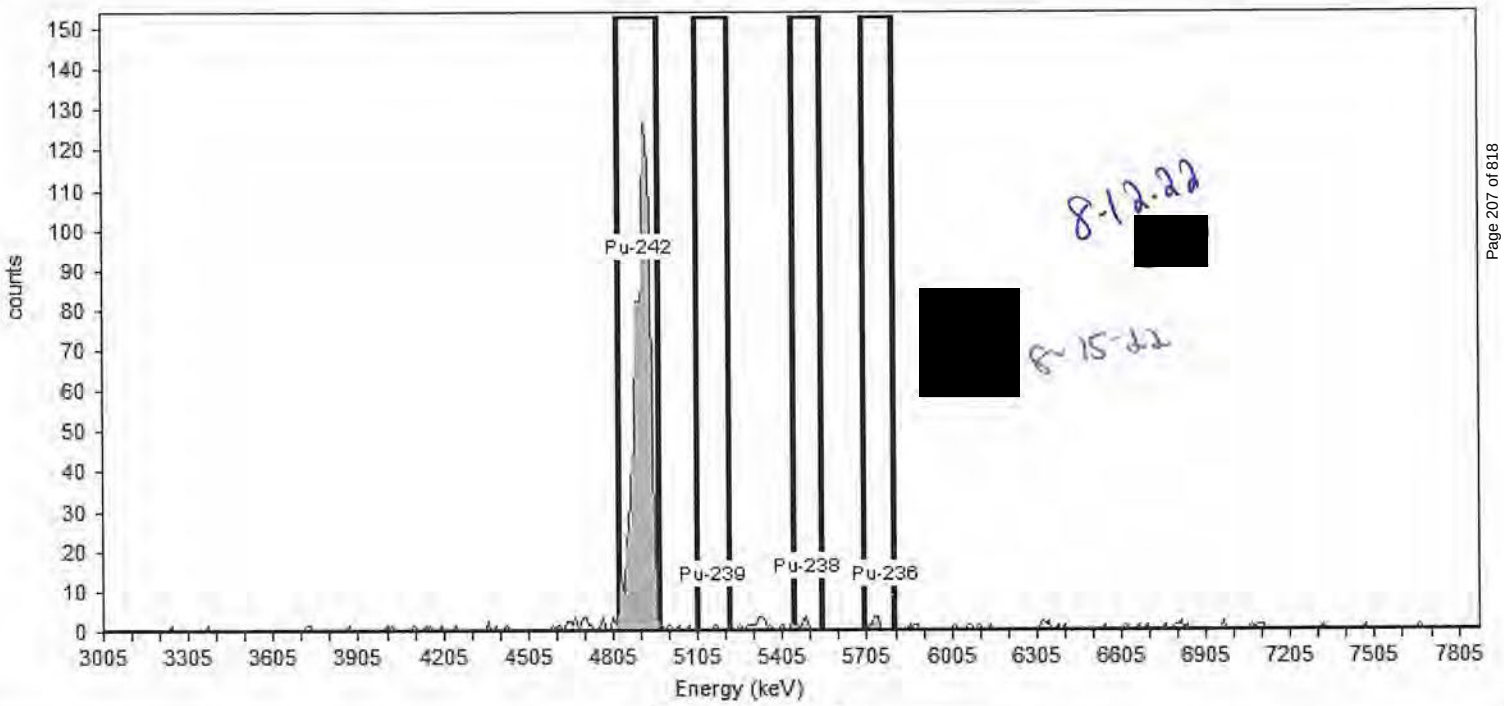
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F2, SN: 5702112, ID: 18
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F2; Det: 17165813 - F2; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 18

Energy Calibration: F2 calib 6-3-21.
Efficiency Calibration:F2 calib 6-3-21.
Calibration Date: 6/4/2021 7:07:22AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.48% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4968.230	66.7	100.4	818.00	2.5000	815.50	3.409E+000	1.385E-001	1.386E-002	3.903E-002
Pu-239	5155.993	5102.682	5217.763	0.0	99.9	2.00	6.2500	-4.25	0.000E+000	1.022E-002	2.202E-002	5.541E-002
Pu-238	5498.999	5447.474	5543.008	23.2	99.9	8.00	8.1250	-0.13	0.000E+000	1.519E-002	2.511E-002	6.158E-002
Pu-236	5769.999	5695.646	5800.430	28.7	99.9	9.00	5.6250	3.38	1.418E-002	1.486E-002	2.089E-002	5.315E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,315 6:02:21AM 8/11/2022

Sample

Sample: 22-01099-04 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-001

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

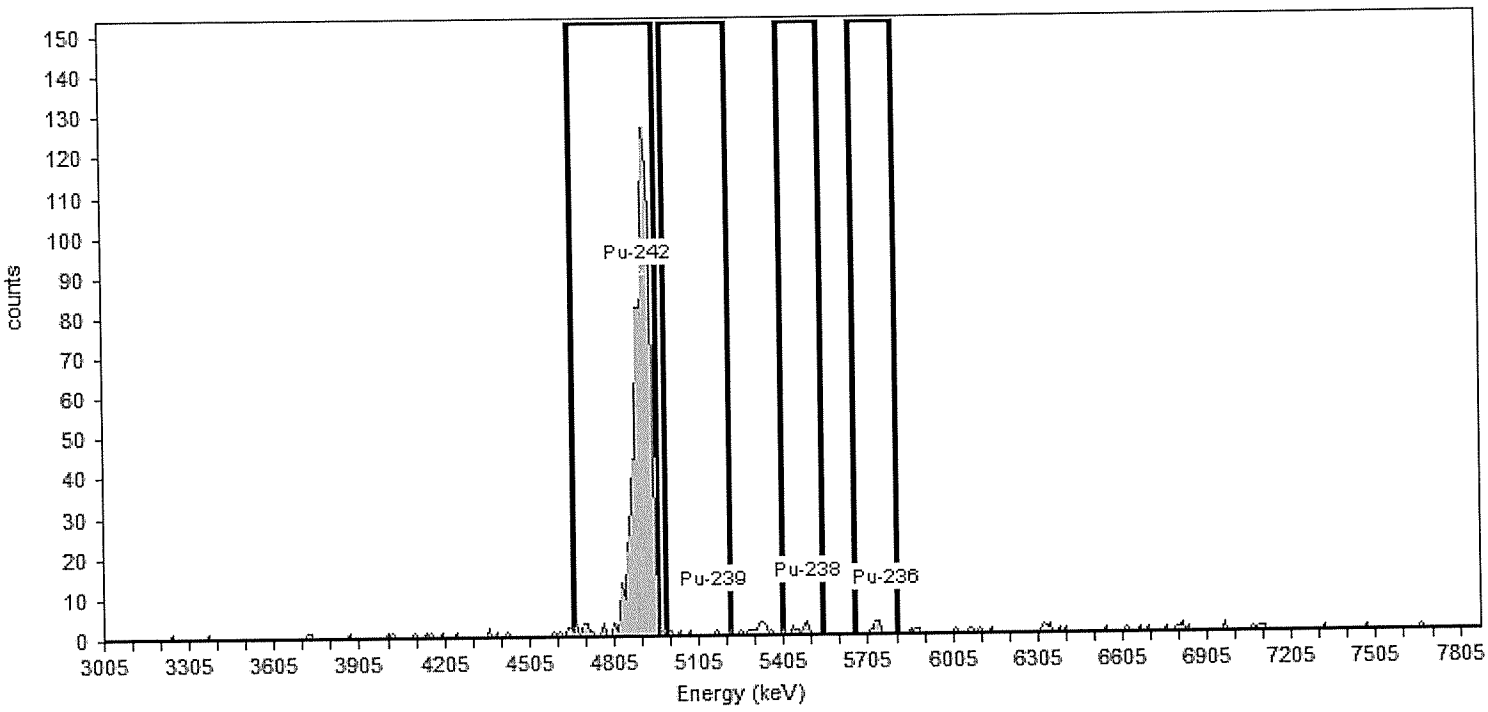
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165813 - F2, SN: 5702112, ID: 18
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F2; Det: 17165813 - F2; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 18

Energy Calibration: F2 calib 6-3-21.
Efficiency Calibration:F2 calib 6-3-21.
Calibration Date: 6/4/2021 7:07:22AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.48% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	25.7	100.5	838.82	7.4908	831.33	3.471E+000	1.405E-001	2.397E-002	5.923E-002
Pu-239	5156.000	4988.000	5219.000	0.0	100.0	4.87	7.4551	-2.58	0.000E+000	1.296E-002	2.402E-002	5.940E-002
Pu-238	5499.000	5396.000	5539.000	61.0	99.9	11.62	9.0124	2.60	1.094E-002	1.745E-002	2.644E-002	6.426E-002
Pu-236	5770.000	5662.000	5810.000	28.7	99.9	9.00	6.2500	2.75	1.155E-002	1.509E-002	2.202E-002	5.541E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,369 12:38:21PM 8/12/2022

Sample

Sample: 22-01099-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

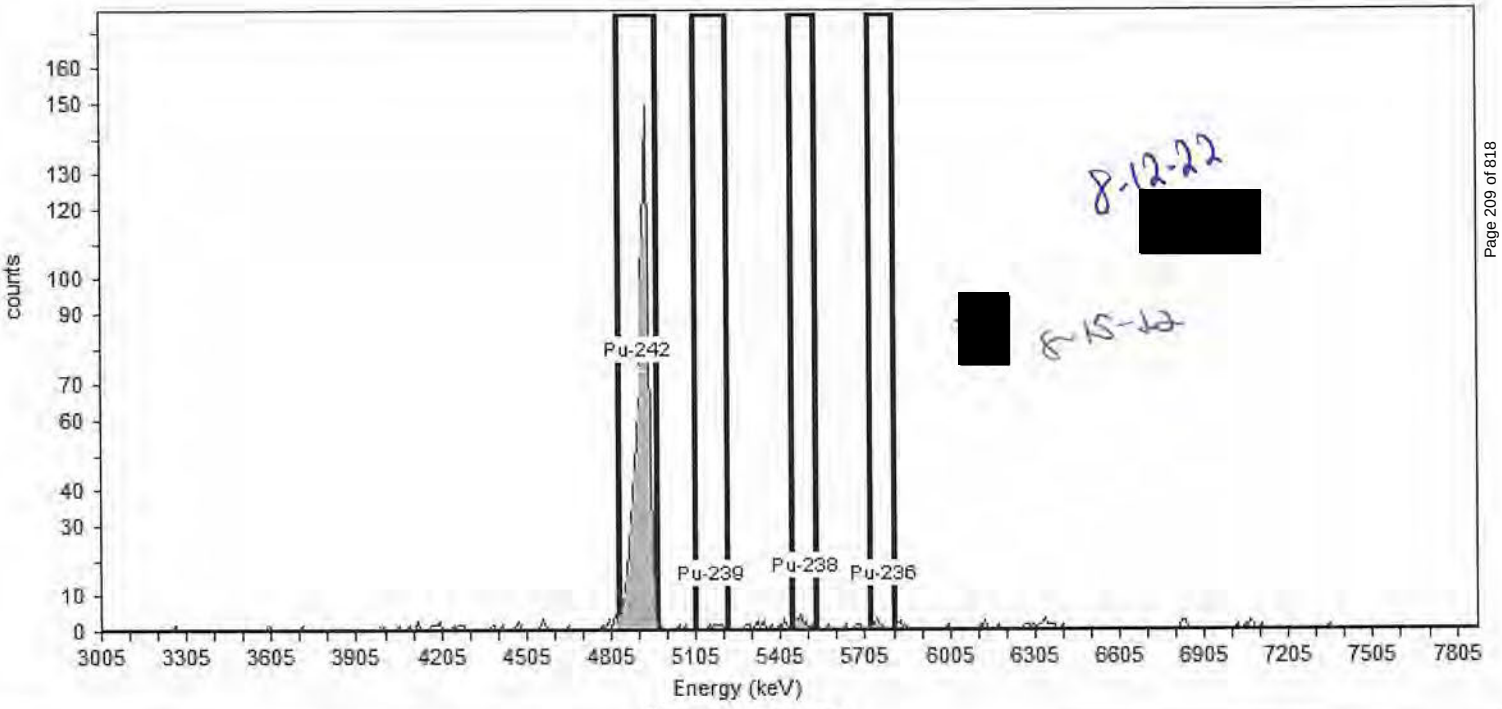
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F3, SN: 5702113, ID: 19
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F3; Det: 17165814 - F3; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 19

Energy Calibration: F3 calib 6-2-21
Efficiency Calibration:F3 calib 6-2-21
Calibration Date: 6/3/2021 6:21:54AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.98% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4833.573	4968.230	51.3	100.4	721.00	4.3750	716.63	3.053E+000	1.305E-001	1.868E-002	4.889E-002
Pu-239	5155.993	5102.682	5217.763	30.6	99.9	5.00	6.8750	-1.88	0.000E+000	1.305E-002	2.354E-002	5.866E-002
Pu-238	5498.999	5447.474	5533.459	35.0	99.9	13.00	5.6250	7.38	3.157E-002	1.741E-002	2.129E-002	5.417E-002
Pu-236	5769.999	5724.236	5809.950	26.5	68.1	7.00	5.6250	1.38	8.635E-003	2.037E-002	3.123E-002	7.946E-002

ARS1-22-01492 Revision 1

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,313 6:01:46AM 8/11/2022

Sample

Sample: 22-01099-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

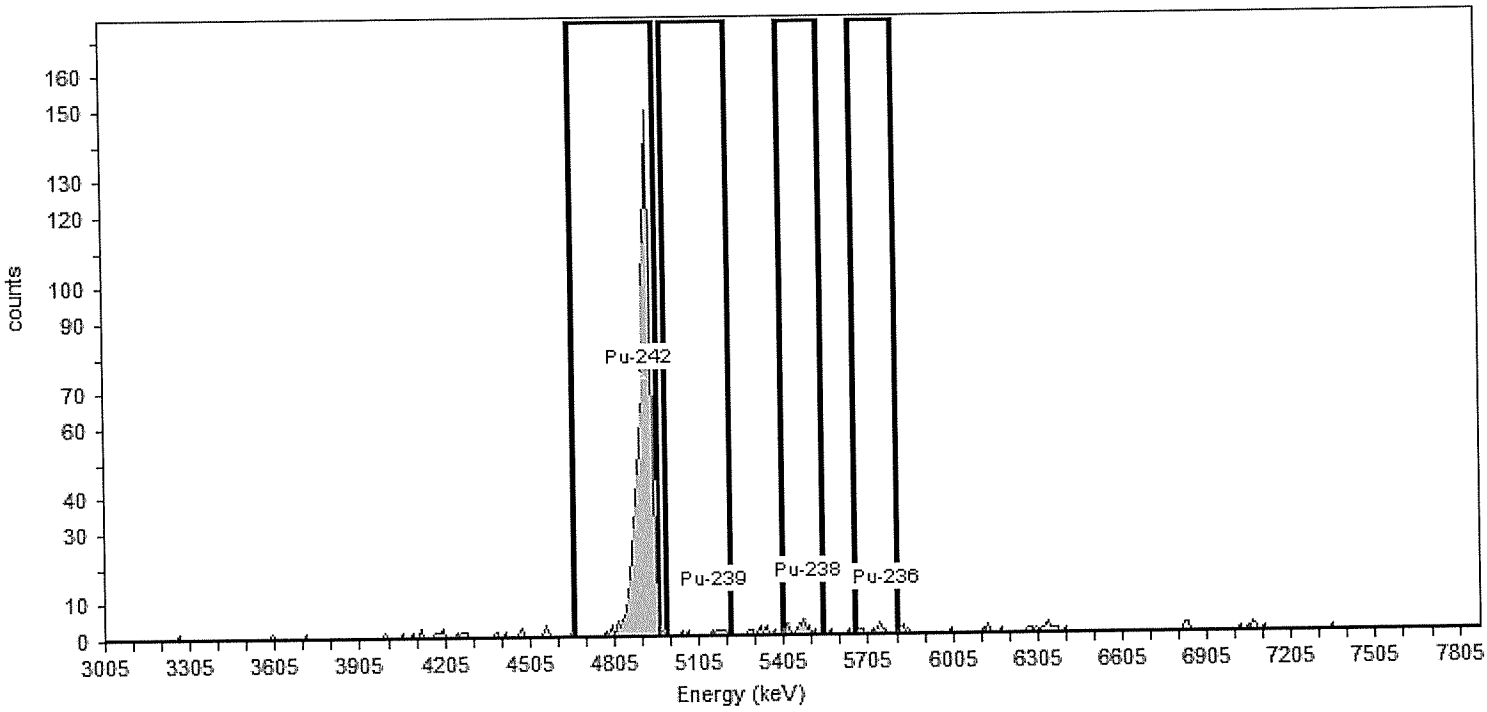
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F3, SN: 5702113, ID: 19
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F3; Det: 17165814 - F3; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 19

Energy Calibration: F3 calib 6-2-21
Efficiency Calibration:F3 calib 6-2-21
Calibration Date: 6/3/2021 6:21:54AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.98% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	23.1	100.5	730.82	11.8410	718.98	3.060E+000	1.315E-001	3.071E-002	7.293E-002
Pu-239	5156.000	4988.000	5219.000	30.6	100.0	7.00	11.8750	-4.88	0.000E+000	1.625E-002	3.090E-002	7.338E-002
Pu-238	5499.000	5396.000	5539.000	34.8	99.9	16.62	7.1146	9.50	4.068E-002	1.967E-002	2.395E-002	5.948E-002
Pu-236	5770.000	5662.000	5810.000	26.7	99.9	9.01	8.4192	0.59	2.509E-003	1.617E-002	2.605E-002	6.368E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,370 12:39:05PM 8/12/2022

Sample

Sample: 22-01099-06 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-003

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

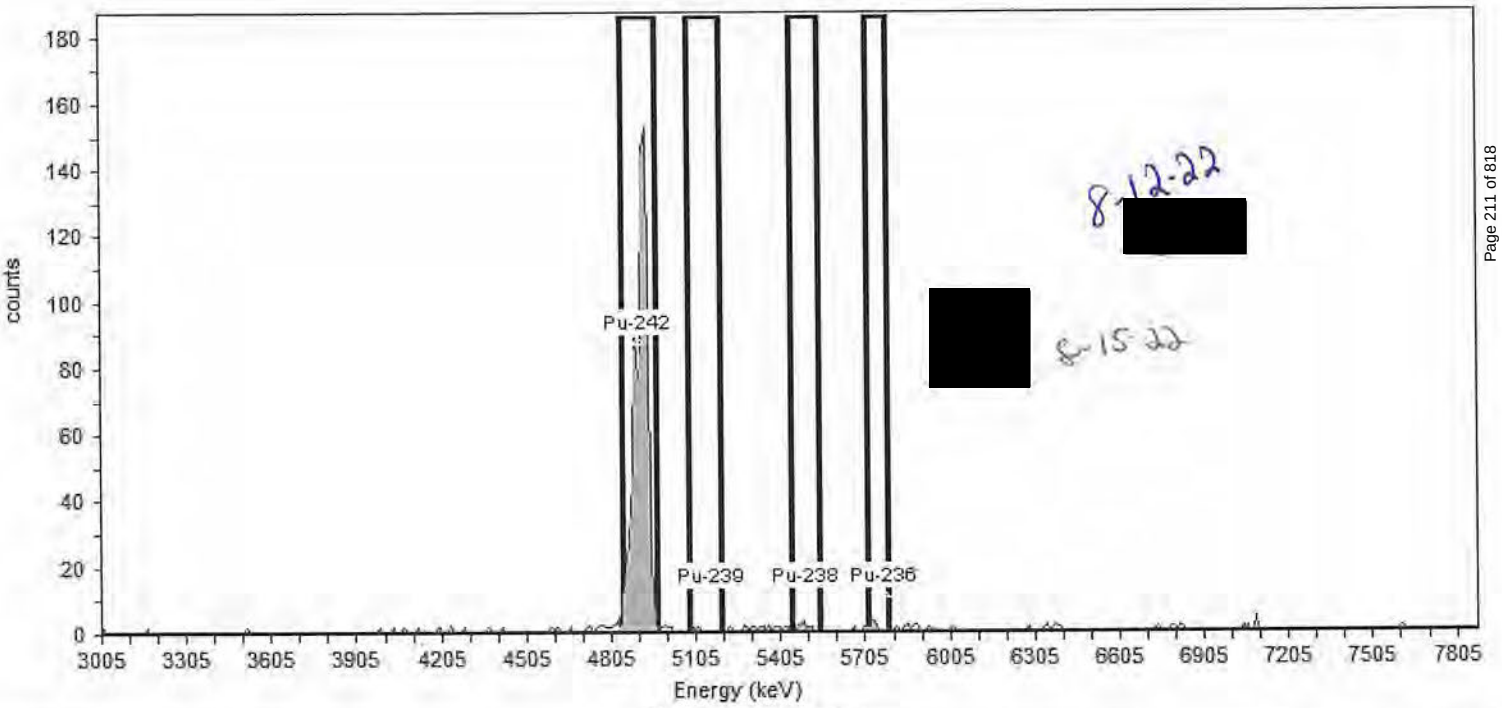
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F4, SN: 5702116, ID: 20
Acquisition Start Date: 8/10/2022 2:59:56PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F4; Det: 17165814 - F4; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 20

Energy Calibration: F4 calib 6-3-21
Efficiency Calibration:F4 calib 6-3-21
Calibration Date: 6/4/2021 7:08:05AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.68% +/- 0.97% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-239	5155.993	5083.487	5198.593	30.1	99.9	2.00	8.7500	-6.75	0.000E+000	1.285E-002	2.914E-002	7.098E-002
Pu-238	5498.999	5447.474	5543.008	25.9	99.9	9.00	5.0000	4.00	1.879E-002	1.636E-002	2.202E-002	5.676E-002
Pu-236	5769.999	5714.708	5790.910	30.4	99.9	7.00	8.1250	-1.13	0.000E+000	1.632E-002	2.808E-002	6.886E-002
Pu-242	4901.995	4843.198	4968.230	51.0	100.4	805.00	1.2500	803.75	3.756E+000	1.534E-001	1.096E-002	3.456E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,316 6:02:38AM 8/11/2022

Sample

Sample: 22-01099-06 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-003

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

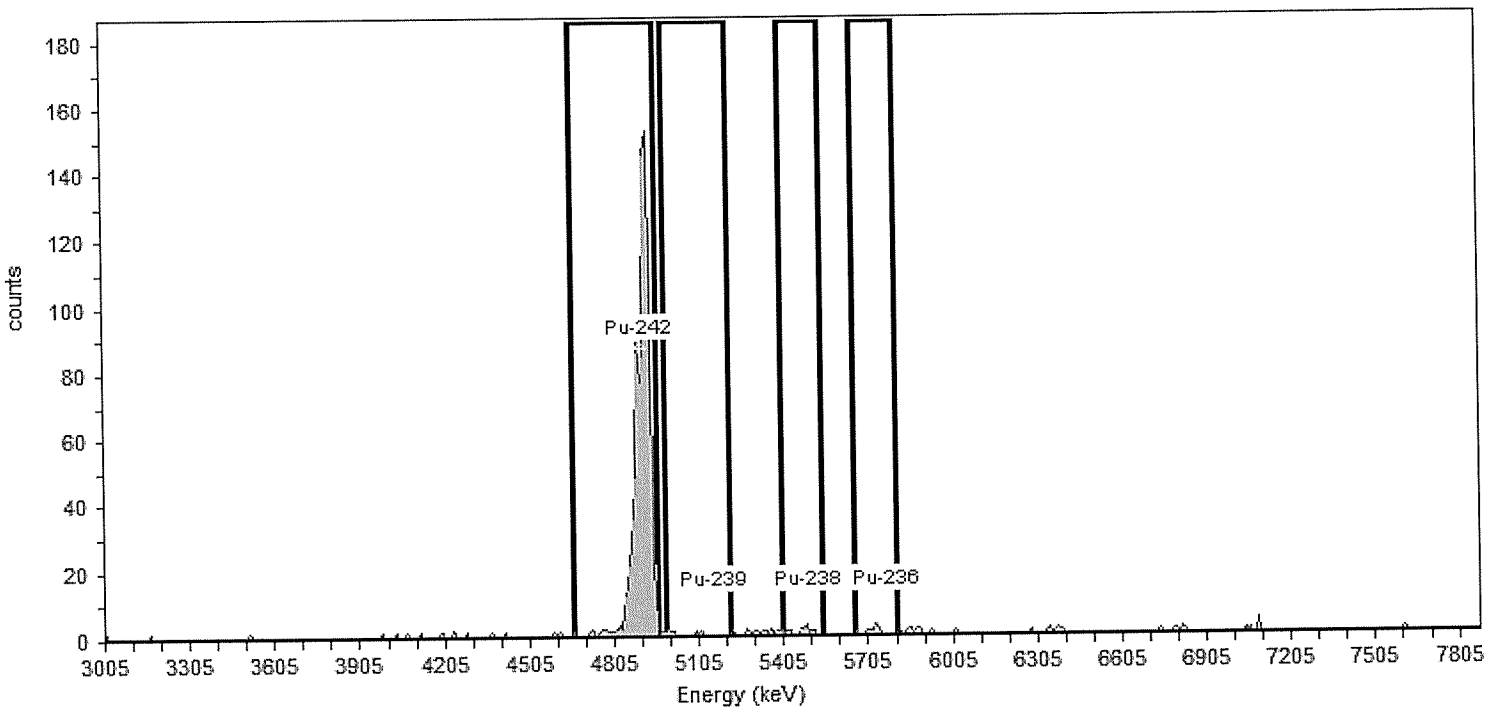
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165814 - F4, SN: 5702116, ID: 20
Acquisition Start Date: 8/10/2022 2:59:56PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: F4; Det: 17165814 - F4; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 20

Energy Calibration: F4 calib 6-3-21
Efficiency Calibration:F4 calib 6-3-21
Calibration Date: 6/4/2021 7:08:05AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.68% +/- 0.97% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	21.5	100.5	823.87	13.1002	810.77	3.785E+000	1.554E-001	3.544E-002	8.351E-002
Pu-239	5156.000	4988.000	5219.000	0.0	100.0	5.19	10.7057	-5.52	0.000E+000	1.618E-002	3.219E-002	7.708E-002
Pu-238	5499.000	5396.000	5539.000	24.7	99.9	12.00	7.1146	4.89	2.295E-002	1.905E-002	2.627E-002	6.525E-002
Pu-236	5770.000	5662.000	5810.000	27.9	99.9	8.48	9.3750	-0.90	0.000E+000	1.778E-002	3.016E-002	7.303E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,371 12:39:51PM 8/12/2022

Sample

Sample: 22-01099-07 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-004

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

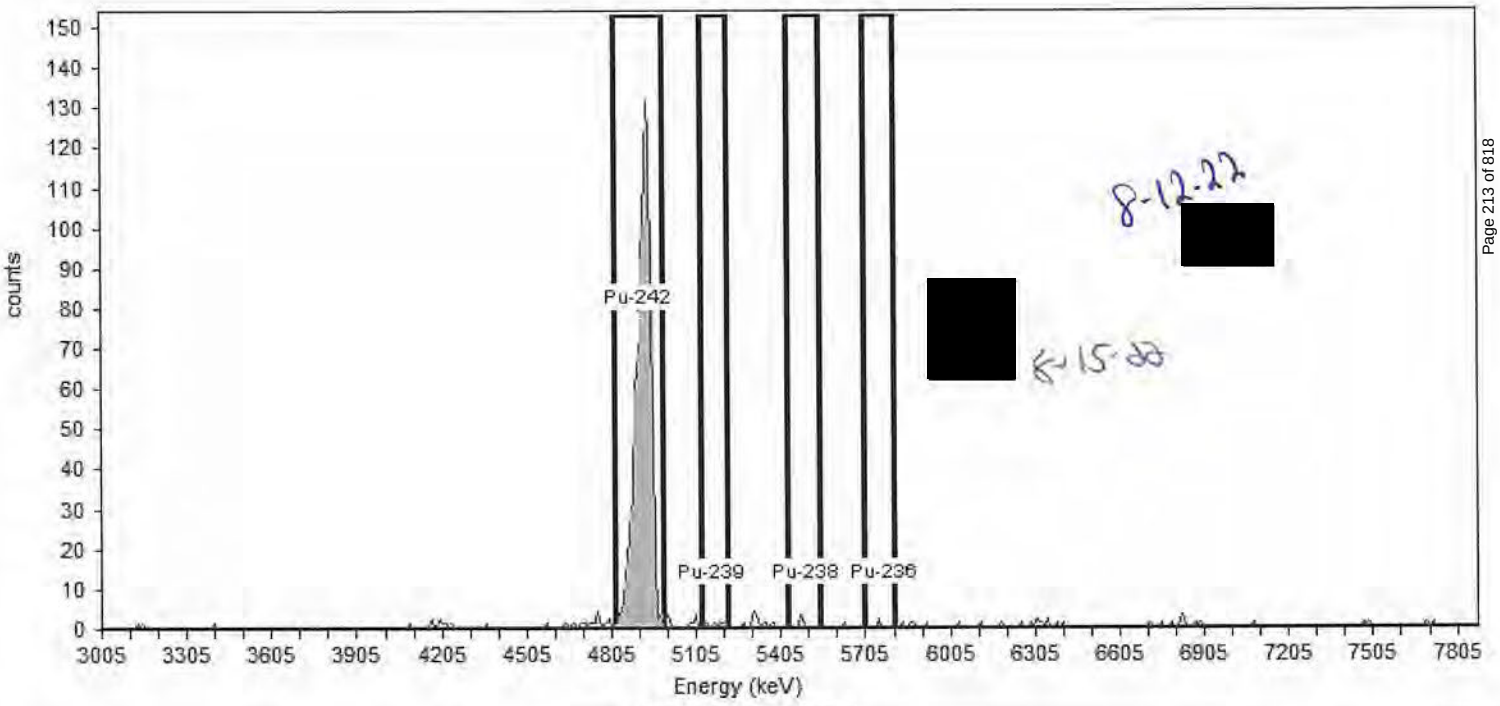
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165815 - F5, SN: 5702117, ID: 21
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F5; Det: 17165815 - F5; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 21

Energy Calibration: F5 calib 6-3-21
Efficiency Calibration:F5 calib 6-3-21
Calibration Date: 6/4/2021 7:08:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.70% +/- 1.40% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4814.319	4987.450	54.8	100.4	783.00	5.6250	777.38	3.222E+000	1.437E-001	2.061E-002	5.244E-002
Pu-239	5155.993	5121.872	5217.763	19.8	88.4	5.00	9.3750	-4.38	0.000E+000	1.552E-002	3.022E-002	7.318E-002
Pu-238	5498.999	5428.354	5543.008	23.0	99.9	4.00	6.2500	-2.25	0.000E+000	1.171E-002	2.184E-002	5.494E-002
Pu-236	5769.999	5705.178	5809.950	23.3	99.9	2.00	4.3750	-2.38	0.000E+000	9.067E-003	1.827E-002	4.781E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,307 6:00:03AM 8/11/2022

Sample

Sample: 22-01099-07 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-004

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

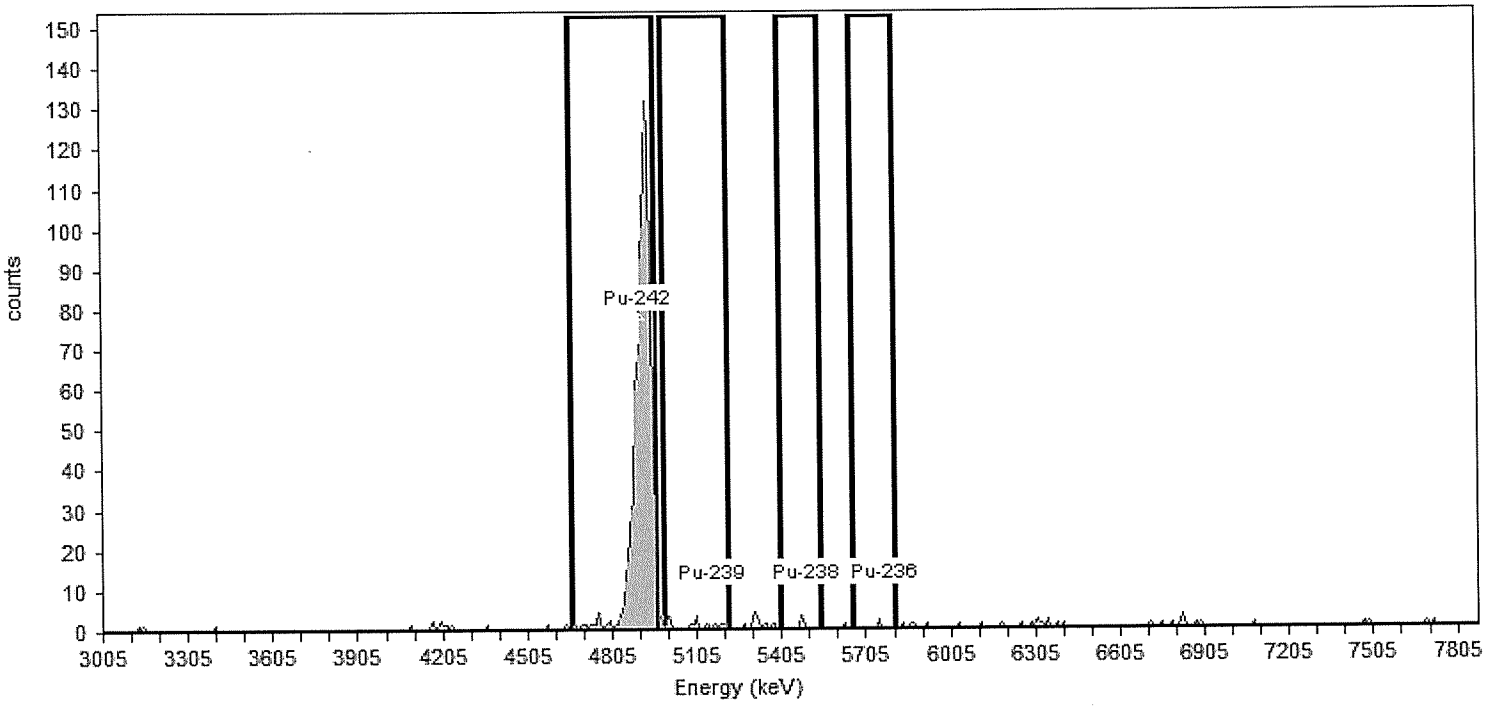
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165815 - F5, SN: 5702117, ID: 21
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F5; Det: 17165815 - F5; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 21

Energy Calibration: F5 calib 6-3-21
Efficiency Calibration:F5 calib 6-3-21
Calibration Date: 6/4/2021 7:08:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.70% +/- 1.40% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	0.0	100.5	790.40	14.9660	775.44	3.211E+000	1.442E-001	3.359E-002	7.838E-002
Pu-239	5156.000	4988.000	5219.000	219.7	100.0	13.06	9.9193	3.14	1.306E-002	1.826E-002	2.748E-002	6.622E-002
Pu-238	5499.000	5396.000	5539.000	23.0	99.9	4.00	6.3666	-2.37	0.000E+000	1.177E-002	2.204E-002	5.535E-002
Pu-236	5770.000	5662.000	5810.000	23.3	99.9	2.00	4.3717	-2.37	0.000E+000	9.065E-003	1.826E-002	4.780E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,372 12:40:58PM 8/12/2022

Sample

Sample: 22-01099-08 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-005

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

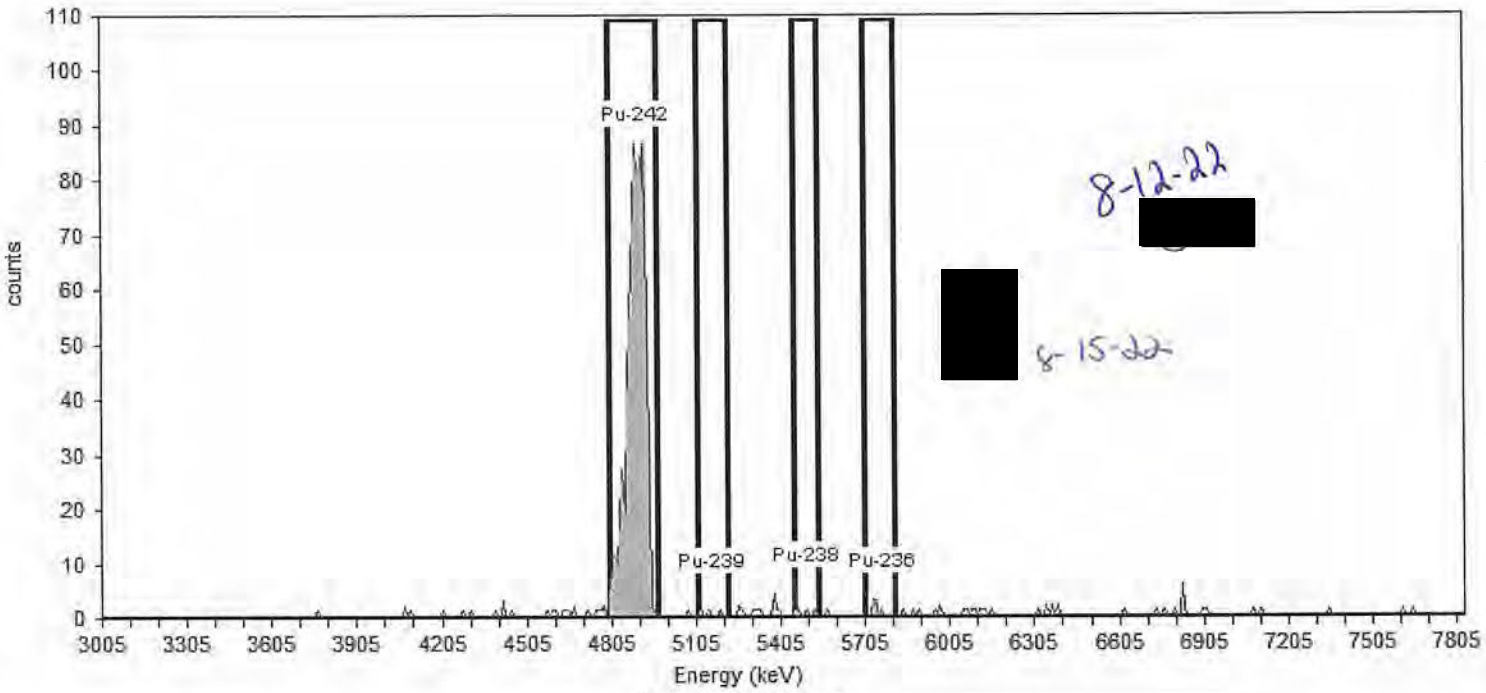
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F6, SN: 5702119, ID: 22
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F6; Det: 17165816 - F6; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 22

Energy Calibration: F6 calib 6-4-21.
Efficiency Calibration:F6 calib 6-4-21.
Calibration Date: 6/7/2021 6:38:01AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.40% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4795.062	4968.230	68.1	100.4	682.00	0.6250	681.38	2.969E+000	1.379E-001	7.223E-003	2.624E-002
Pu-239	5155.993	5112.277	5217.763	15.2	88.4	3.00	6.2500	-3.25	0.000E+000	1.301E-002	2.594E-002	6.527E-002
Pu-238	5498.999	5457.032	5543.008	13.6	71.6	4.00	6.2500	-2.25	0.000E+000	1.718E-002	3.203E-002	8.059E-002
Pu-236	5769.999	5705.178	5809.950	24.2	99.9	7.00	8.1250	-1.13	0.000E+000	1.522E-002	2.617E-002	6.420E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,308 6:00:20AM 8/11/2022

Sample

Sample: 22-01099-08 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-005

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

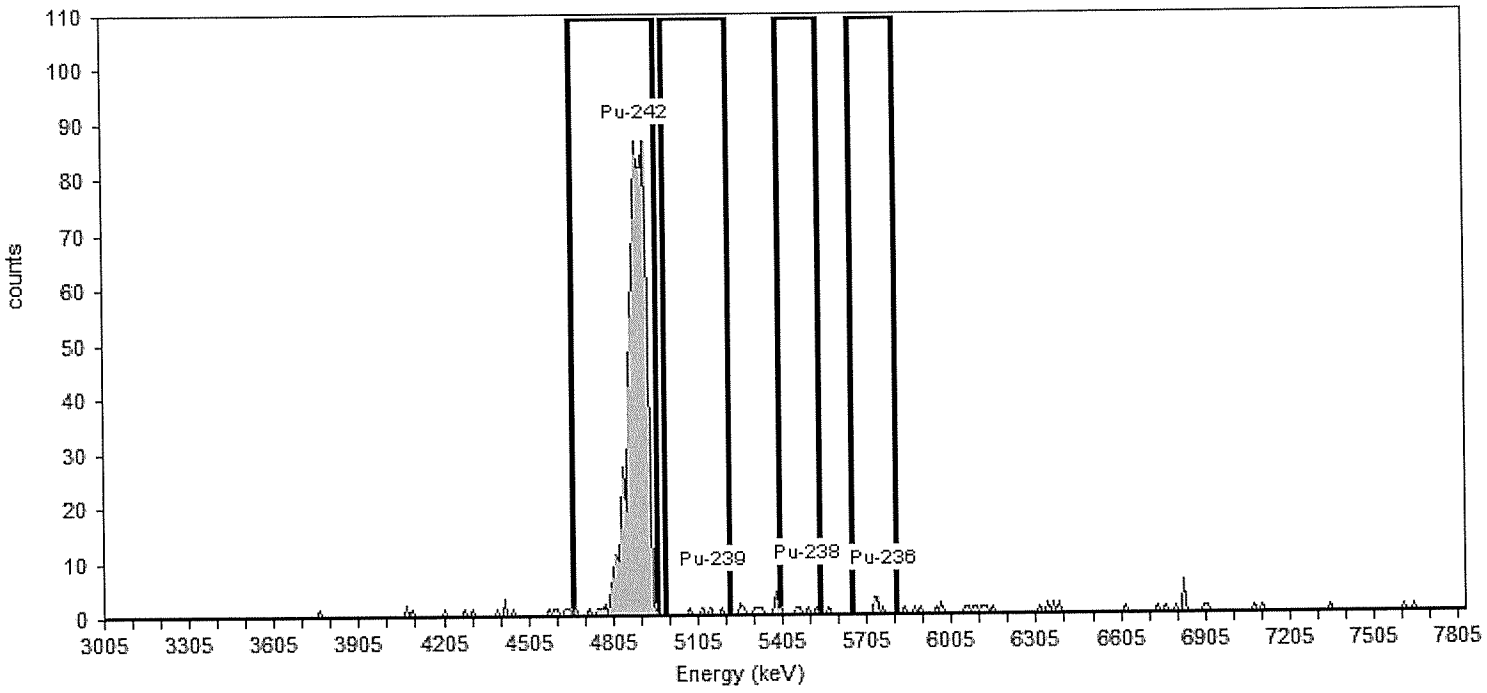
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F6, SN: 5702119, ID: 22
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F6; Det: 17165816 - F6; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 22

Energy Calibration: F6 calib 6-4-21.
Efficiency Calibration:F6 calib 6-4-21.
Calibration Date: 6/7/2021 6:38:01AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.40% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	5.00	9.3750	-4.38	0.000E+000	1.444E-002	2.811E-002	6.808E-002
Pu-236	5770.000	5662.000	5810.000	24.1	99.9	7.00	8.7467	-1.75	0.000E+000	1.546E-002	2.716E-002	6.616E-002
Pu-242	4902.000	4660.000	4959.000	69.5	100.5	690.01	4.3750	685.64	2.984E+000	1.388E-001	1.909E-002	4.996E-002
Pu-239	5156.000	4988.000	5219.000	99.1	100.0	4.00	8.7500	-4.75	0.000E+000	1.347E-002	2.713E-002	6.610E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,373 12:41:42PM 8/12/2022

Sample

Sample: 22-01099-09 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-006

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

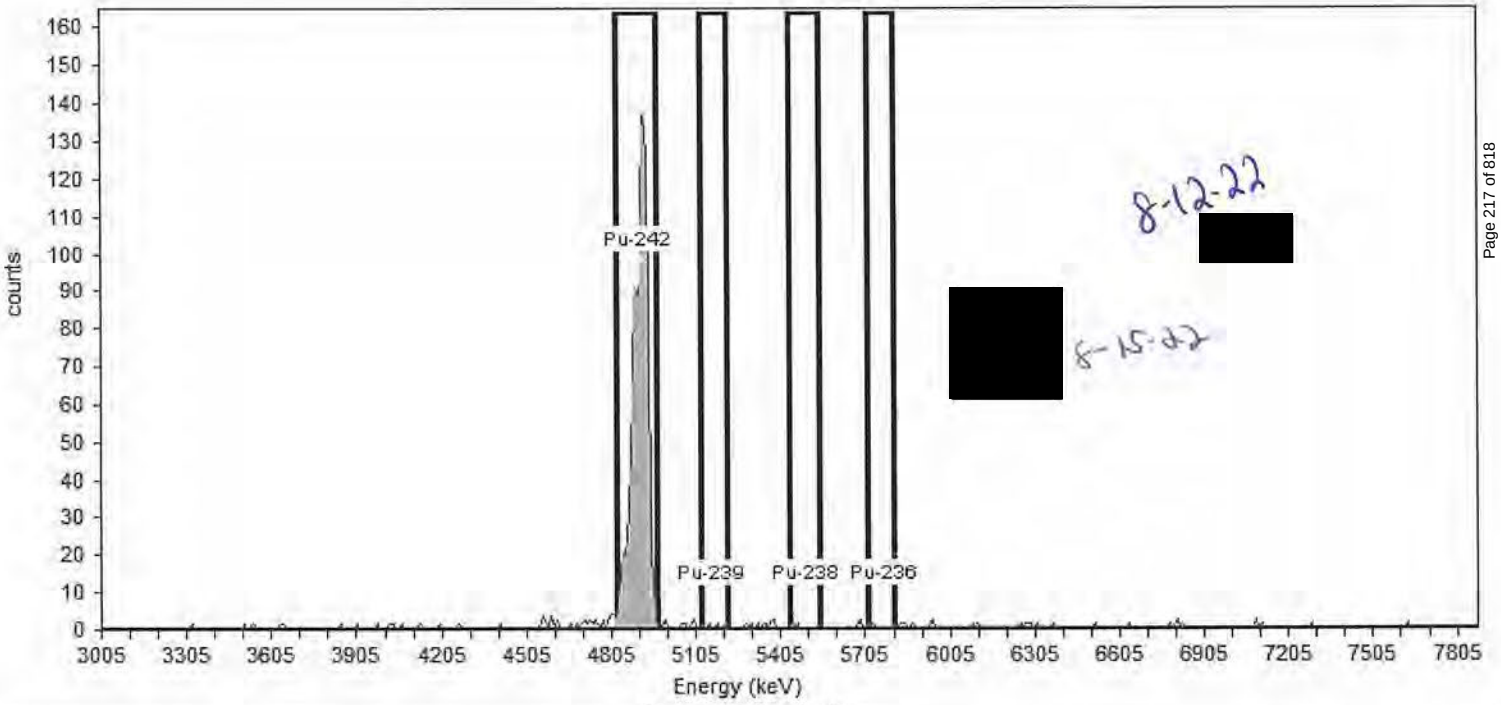
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F7, SN: 21251284, ID: 23
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F7; Det: 17165816 - F7; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 23

Energy Calibration: F7 calib 1-4-22
Efficiency Calibration:F7 calib 1-4-22
Calibration Date: 1/4/2022 2:55:45PM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.36% +/- 1.28% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4968.230	61.9	100.4	848.00	3.7500	844.25	3.836E+000	1.665E-001	1.845E-002	4.920E-002
Pu-239	5155.993	5121.872	5217.763	12.5	88.4	4.00	11.2500	-7.25	0.000E+000	1.717E-002	3.630E-002	8.656E-002
Pu-238	5498.999	5437.914	5543.008	30.0	99.9	2.00	4.3750	-2.38	0.000E+000	9.940E-003	2.003E-002	5.242E-002
Pu-236	5769.999	5714.708	5809.950	0.0	99.9	3.00	1.2500	1.75	7.991E-003	8.882E-003	1.071E-002	3.377E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,311 6:01:11AM 8/11/2022

Sample

Sample: 22-01099-09 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-006

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

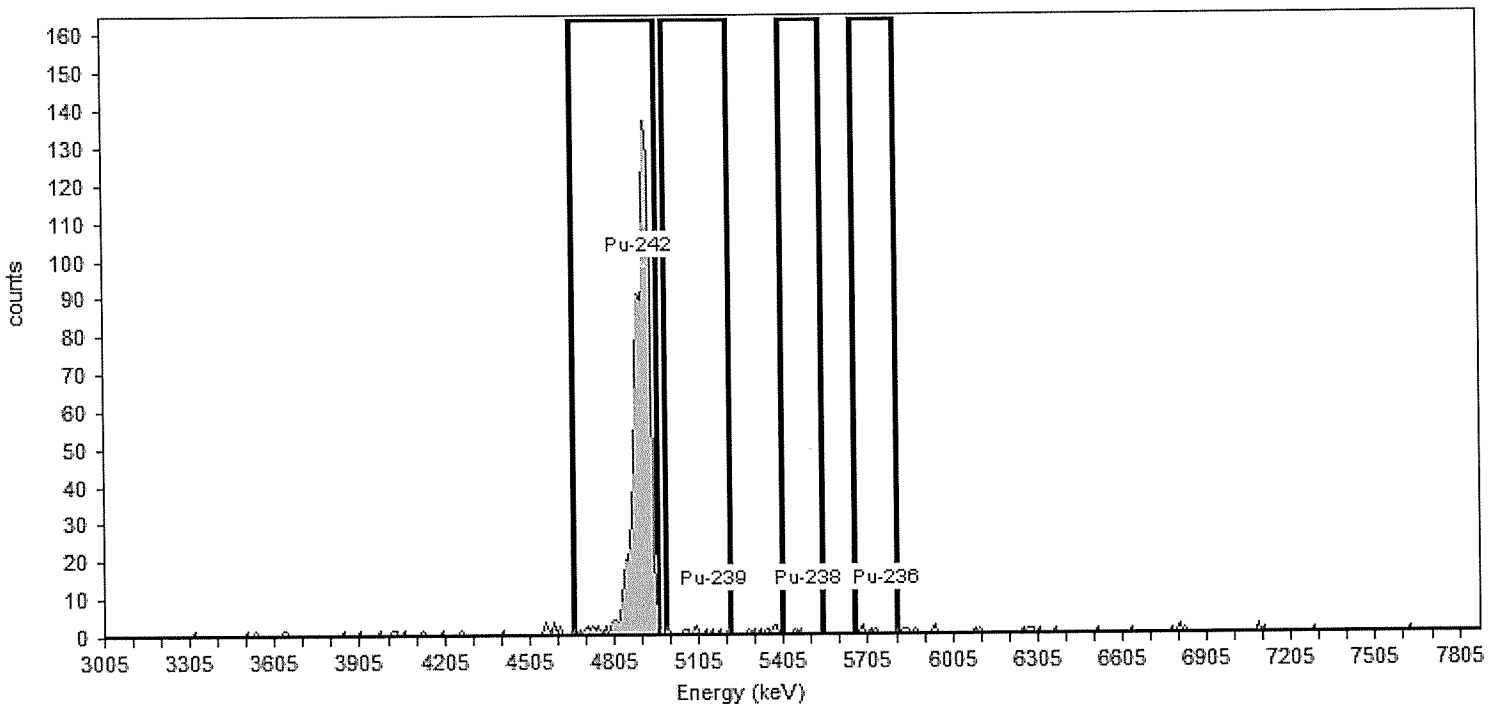
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F7, SN: 21251284, ID: 23
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F7; Det: 17165816 - F7; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 23

Energy Calibration: F7 calib 1-4-22
Efficiency Calibration:F7 calib 1-4-22
Calibration Date: 1/4/2022 2:55:45PM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.36% +/- 1.28% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	23.3	100.5	871.87	8.7500	863.12	3.918E+000	1.693E-001	2.816E-002	6.860E-002
Pu-239	5156.000	4988.000	5219.000	160.8	100.0	10.06	17.5000	-7.44	0.000E+000	2.092E-002	4.001E-002	9.237E-002
Pu-238	5499.000	5396.000	5539.000	38.2	99.9	2.00	4.0124	-2.01	0.000E+000	9.698E-003	1.918E-002	5.072E-002
Pu-236	5770.000	5662.000	5810.000	22.7	99.9	4.99	3.0883	1.91	8.706E-003	1.202E-002	1.683E-002	4.601E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,374 12:42:24PM 8/12/2022

Sample

Sample: 22-01099-10 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-007

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

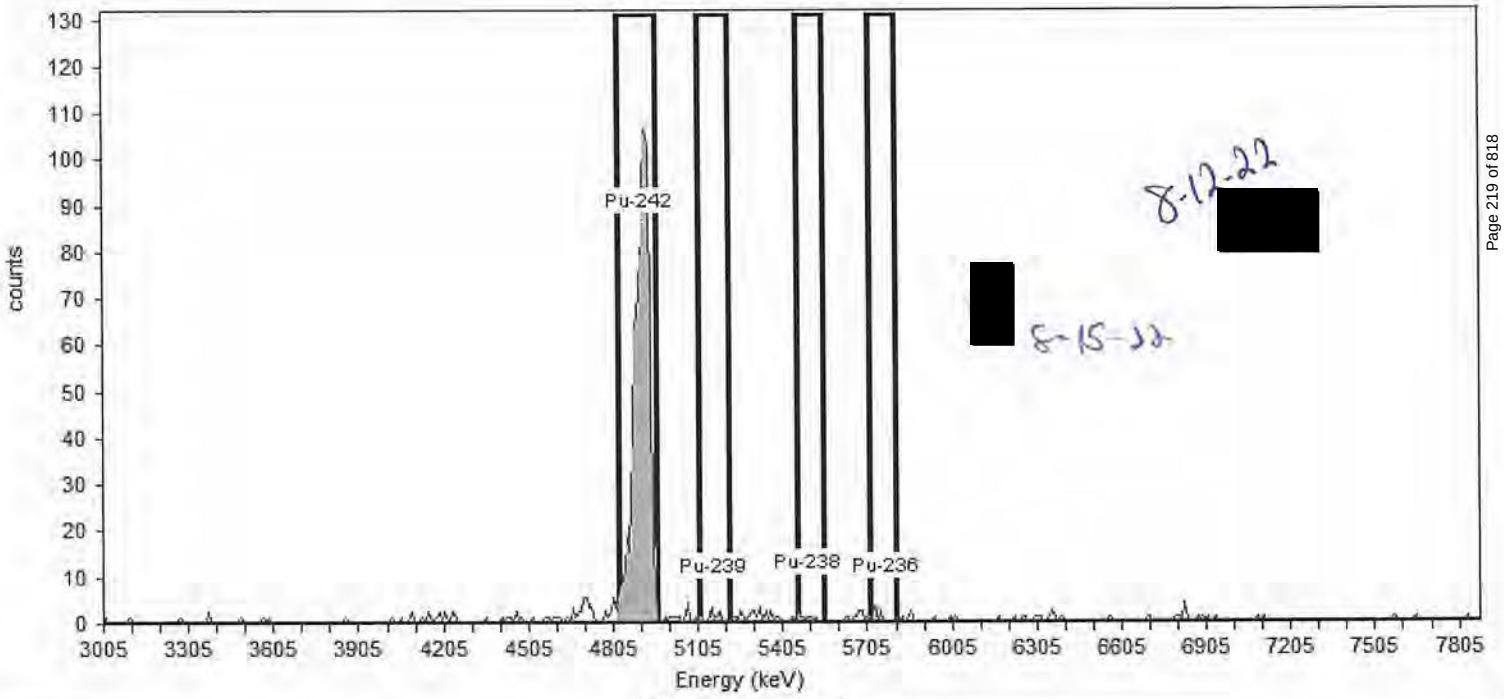
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F8, SN: 124, ID: 24
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F8; Det: 17165816 - F8; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 24

Energy Calibration: F8 calib 6-4-21
Efficiency Calibration:F8 calib 6-4-21
Calibration Date: 6/7/2021 6:39:38AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.59% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4958.618	64.3	100.4	680.00	6.8750	673.13	2.911E+000	1.279E-001	2.378E-002	5.926E-002
Pu-239	5155.993	5112.277	5217.763	49.4	88.4	7.00	10.0000	-3.00	0.000E+000	1.788E-002	3.257E-002	7.844E-002
Pu-238	5498.999	5457.032	5552.556	0.0	71.6	7.00	4.3750	2.63	1.592E-002	1.892E-002	2.660E-002	6.961E-002
Pu-236	5769.999	5714.708	5809.950	31.7	99.9	6.00	8.7500	-2.75	0.000E+000	1.472E-002	2.696E-002	6.568E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,309 6:00:36AM 8/11/2022

Sample

Sample: 22-01099-10 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-007

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01099
:
Description:

Client Name: Undefined
Client Contact:

Tracer

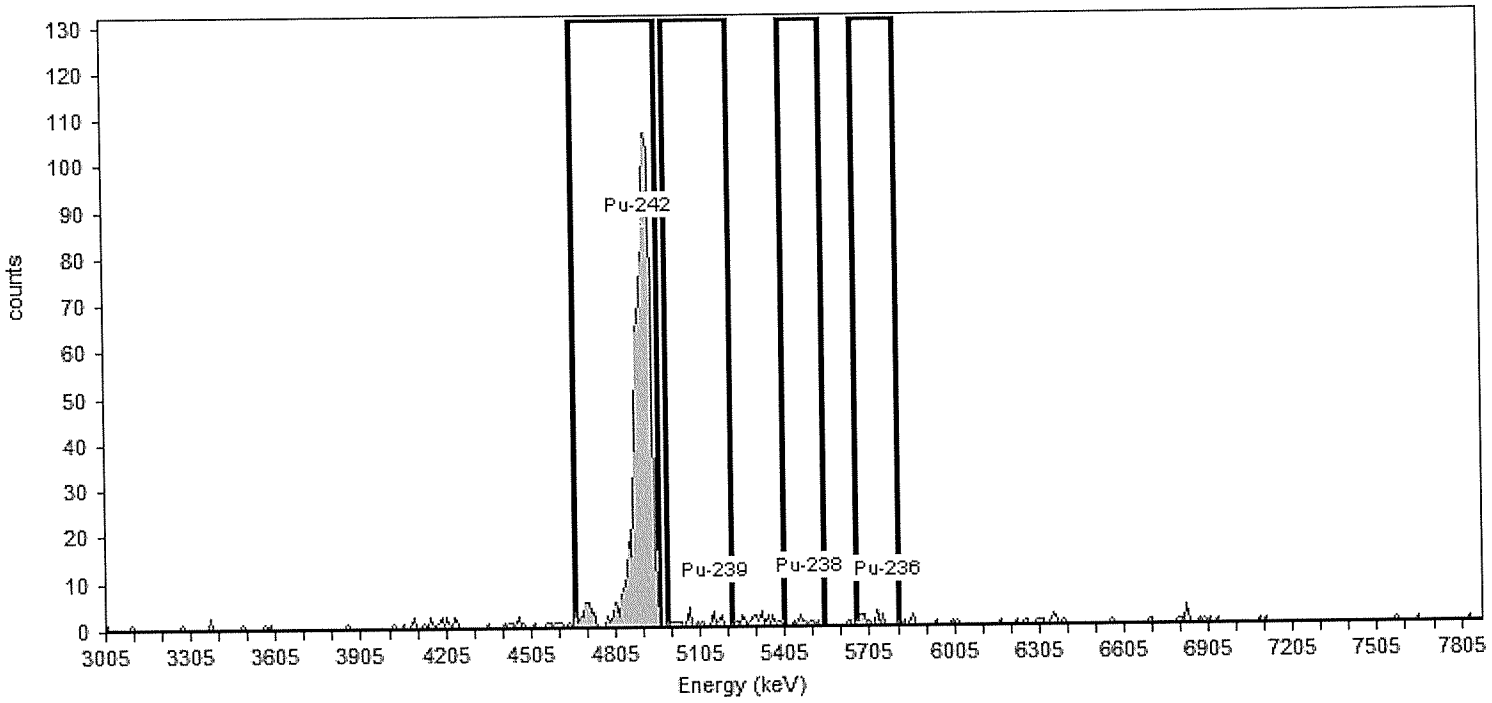
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17165816 - F8, SN: 124, ID: 24
Acquisition Start Date: 8/10/2022 2:59:55PM
Live Time: 900.00 min.
Real Time: 900.00 min.
Background Date: 7/15/2022 2:23:12PM
Bkgd Info: Sample: F8; Det: 17165816 - F8; Spectrum #1; 7/15/2022 2:23:12 PM; Live Time: 1440.000(min.); ID: 24

Energy Calibration: F8 calib 6-4-21
Efficiency Calibration:F8 calib 6-4-21
Calibration Date: 6/7/2021 6:39:38AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.59% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:8/10/2022 2:56:57PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	22.6	100.5	715.96	18.7840	697.17	3.012E+000	1.318E-001	3.927E-002	9.023E-002
Pu-239	5156.000	4988.000	5219.000	62.9	100.0	17.07	13.7500	3.32	1.442E-002	2.200E-002	3.376E-002	7.927E-002
Pu-238	5499.000	5396.000	5539.000	64.5	99.9	8.38	6.8750	1.51	6.556E-003	1.548E-002	2.390E-002	5.956E-002
Pu-236	5770.000	5662.000	5810.000	0.0	99.9	11.99	11.2467	0.75	3.251E-003	1.896E-002	3.057E-002	7.289E-002

Ortec Ensembles

Date	Time	Batch ID	Fraction	Detector(s)	Procedure	File #	Tech
08-10-2022	09:09	daily	QA	all	pulser	N/A	[redacted]
08-10-2022	14:51	22-00567	1	D1	Am	32324	
08-10-2022	14:51	22-00567	2	D2	Am	32325	
08-10-2022	14:51	22-00567	3	D3	Am	32326	
08-10-2022	14:51	22-00567	4	D4	Am	32327	
08-10-2022	14:51	22-00567	5	D5	Am	32328	
08-10-2022	14:51	22-00567	6	D6	Am	32329	
08-10-2022	14:51	22-00567	7	E1	Am	32330	
08-10-2022	14:51	22-00567	8	E2	Am	32331	
08-10-2022	14:59	22-01099	1	E7	Pu	32365	
08-10-2022	14:59	22-01099	2	E8	Pu	32366	
08-10-2022	14:59	22-01099	3	F1	Pu	32367	
08-10-2022	14:59	22-01099	4	F2	Pu	32368	
08-10-2022	14:59	22-01099	5	F3	Pu	32369	
08-10-2022	14:59	22-01099	6	F4	Pu	32370	
08-10-2022	14:59	22-01099	7	F5	Pu	32371	
08-10-2022	14:59	22-01099	8	F6	Pu	32372	
08-10-2022	14:59	22-01099	9	F7	Pu	32373	
08-10-2022	14:59	22-01099	10	F8	Pu	32374	
08-11-2022	13:51	daily	QA	all	pulser	N/A	

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ARS Aleut Analytical, LLC
Analytical Reports

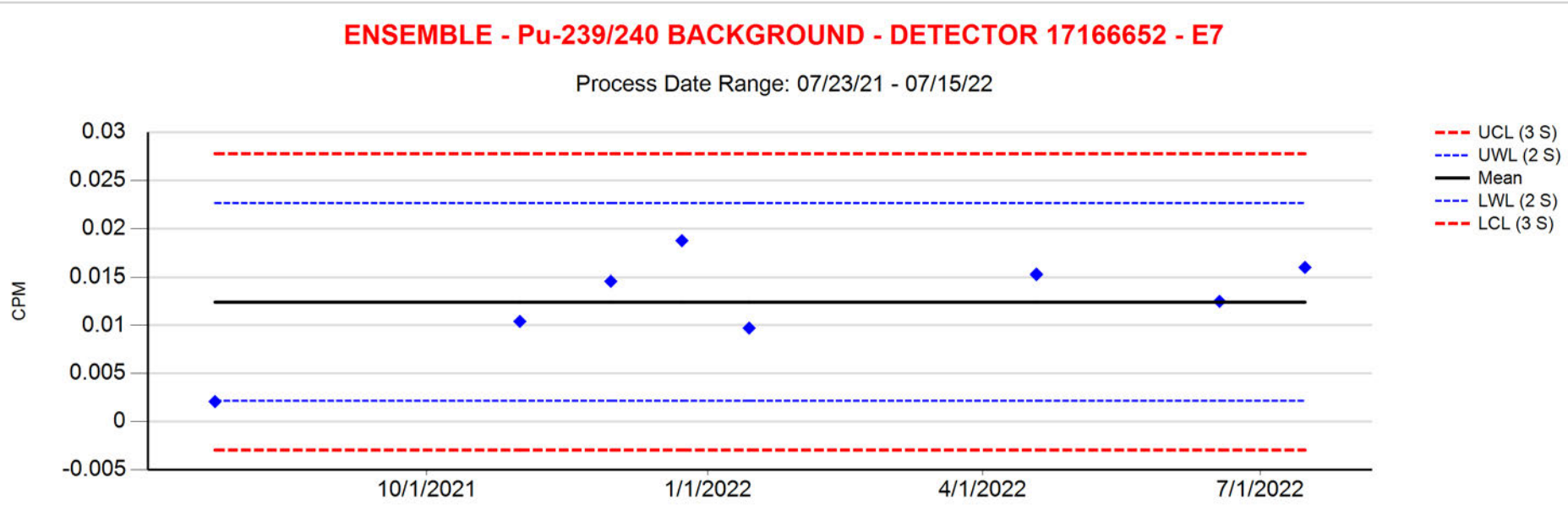
for

Gilbane Federal

Alpha Spec Pu-Backgrounds

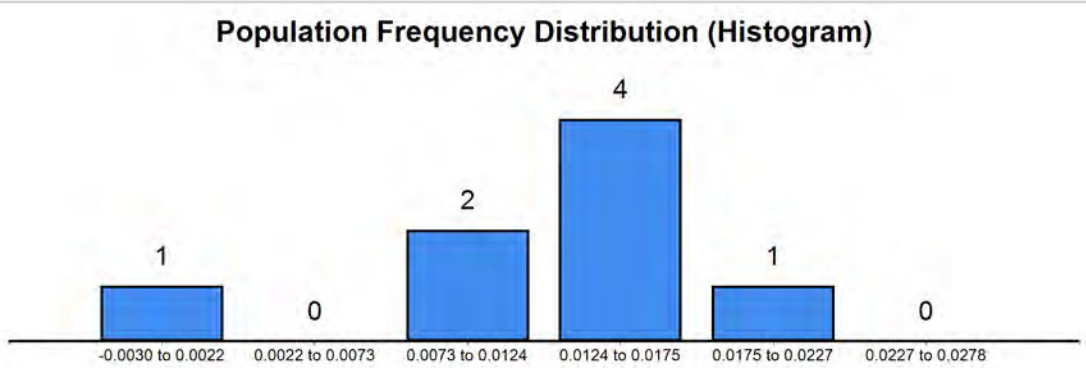
Pu-239/240 Background - ARS1-B22-01099-01

Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0124	CPM	0.0160	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0051	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0278	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0030	CPM	0.0125	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



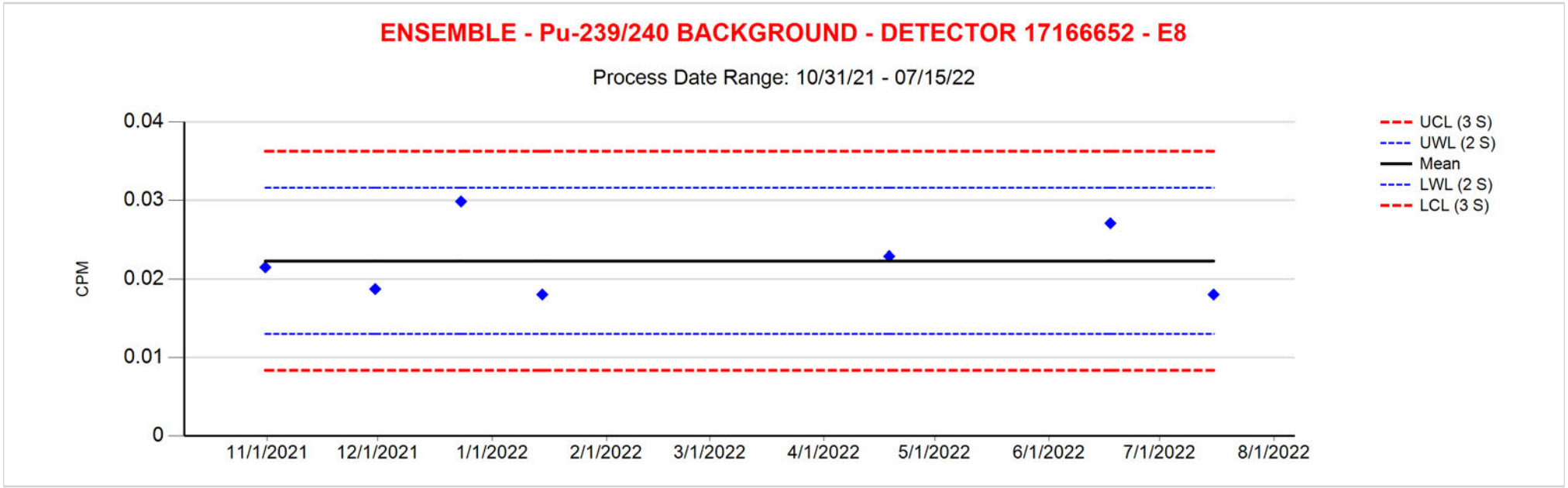
Statistical Process Control

Bin	Frequency
-0.0030 to 0.0022	1
0.0022 to 0.0073	0
0.0073 to 0.0124	2
0.0124 to 0.0175	4
0.0175 to 0.0227	1
0.0227 to 0.0278	0



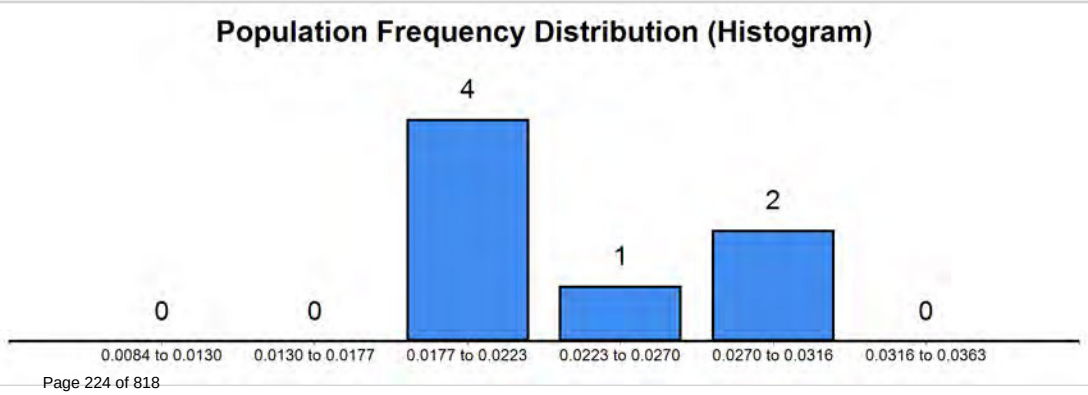
Pu-239/240 Background - ARS1-B22-01099-02

Population Statistics				Trending Analysis	
Population Size	**7**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0223	CPM	0.0181	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0046	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0363	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0084	CPM	0.0271	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



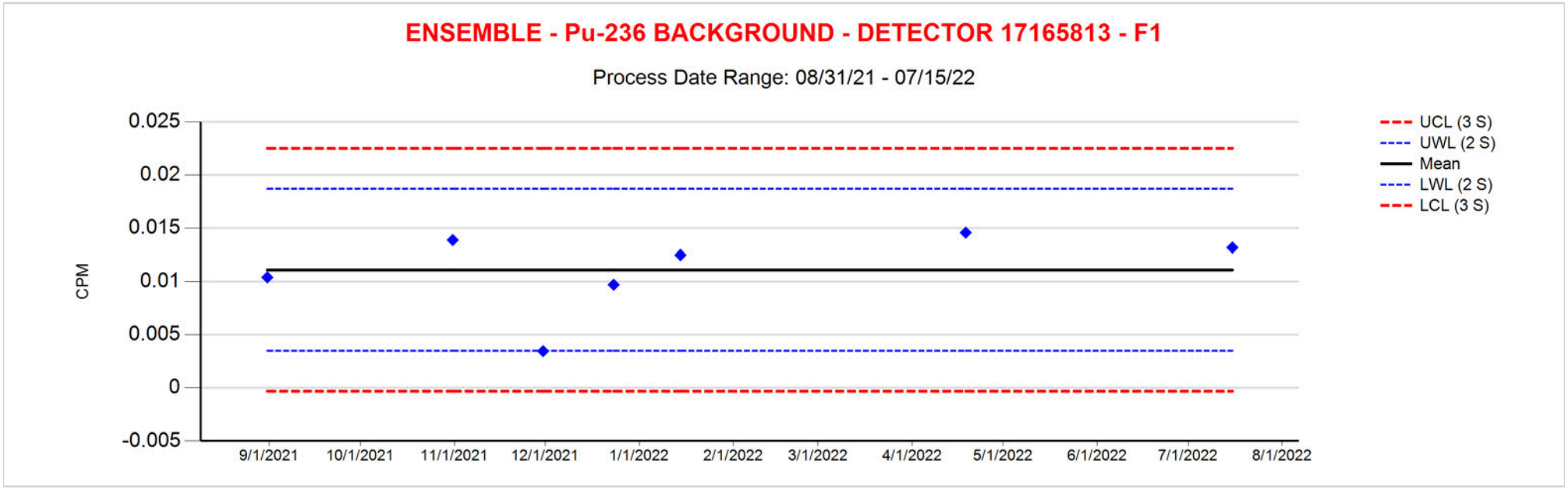
Statistical Process Control

Bin	Frequency
0.0084 to 0.0130	0
0.0130 to 0.0177	0
0.0177 to 0.0223	4
0.0223 to 0.0270	1
0.0270 to 0.0316	2
0.0316 to 0.0363	0



Pu-236 Background - ARS1-B22-01099-03

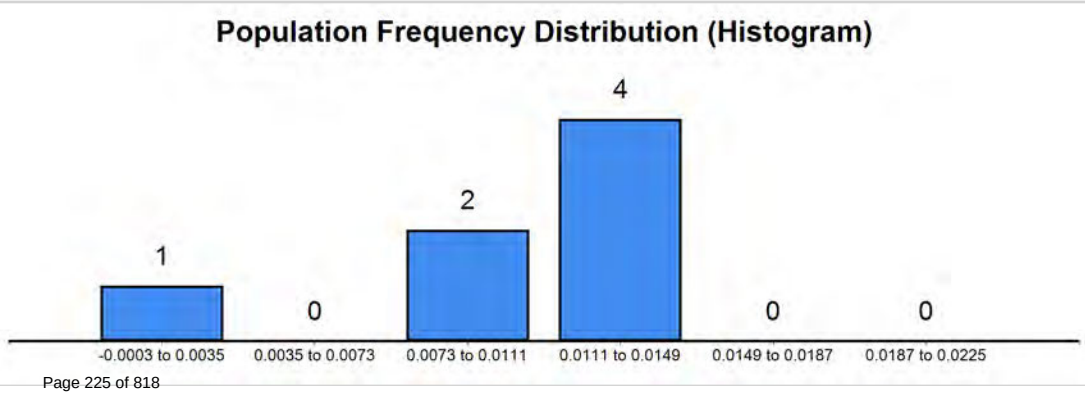
Population Statistics				Trending Analysis	
Population Size	7	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0111	CPM	0.0132	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0038	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0225	Date	4/18/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	-0.0003	CPM	0.0146	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK



ARS Aleut Analytical

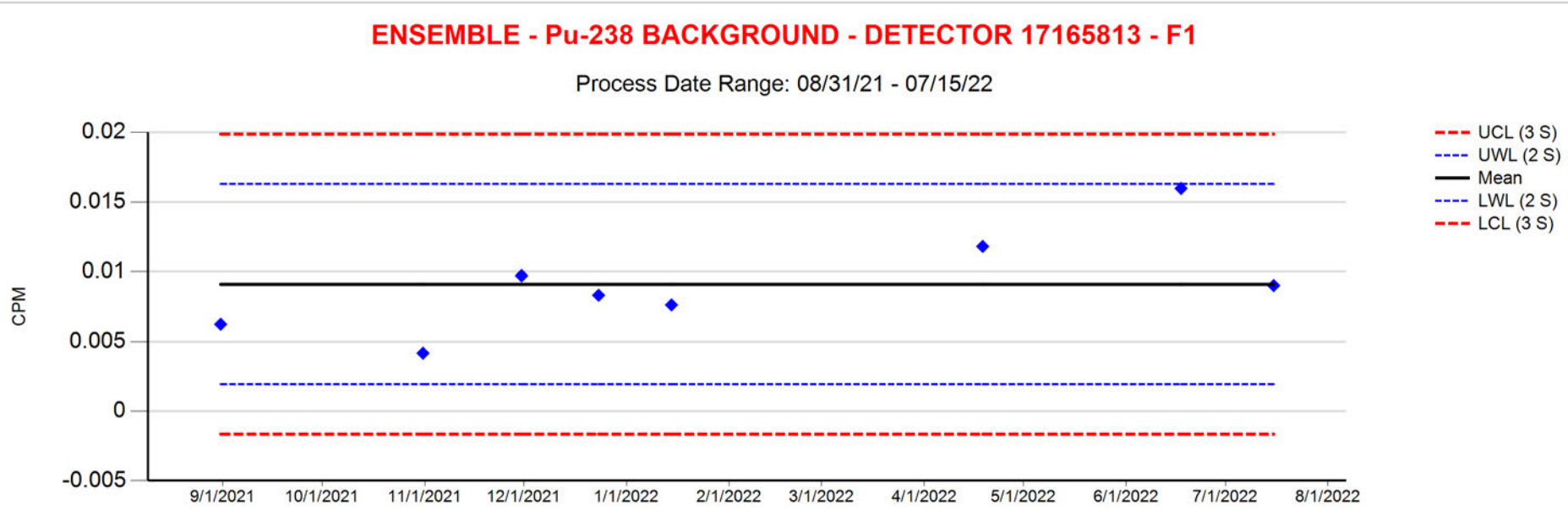
Statistical Process Control

Bin	Frequency
-0.0003 to 0.0035	1
0.0035 to 0.0073	0
0.0073 to 0.0111	2
0.0111 to 0.0149	4
0.0149 to 0.0187	0
0.0187 to 0.0225	0



Pu-238 Background - ARS1-B22-01099-03

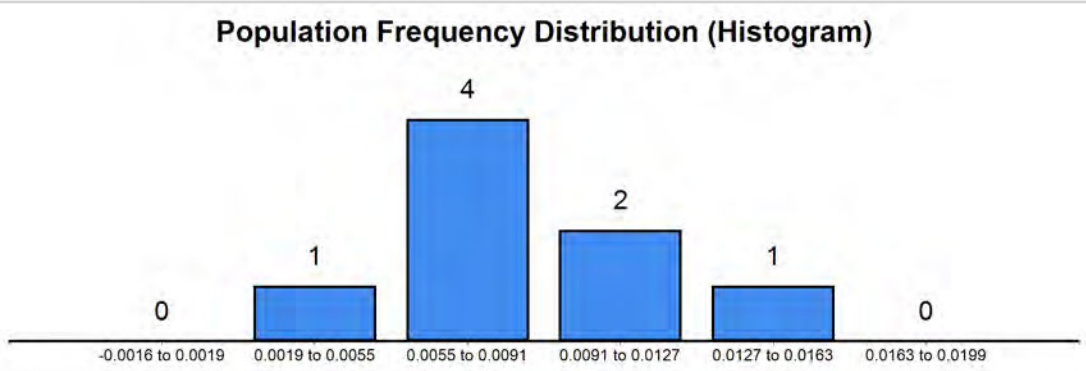
Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0091	CPM	0.0090	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0036	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0199	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0016	CPM	0.0160	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0016 to 0.0019	0
0.0019 to 0.0055	1
0.0055 to 0.0091	4
0.0091 to 0.0127	2
0.0127 to 0.0163	1
0.0163 to 0.0199	0

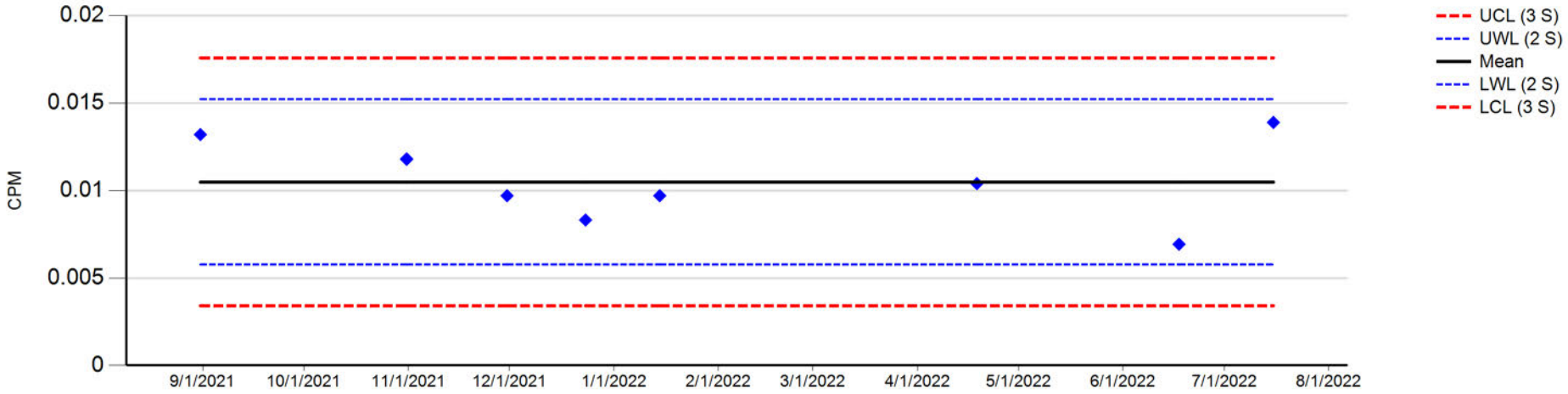


Pu-239/240 Background - ARS1-B22-01099-03

Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0105	CPM	0.0139	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0024	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0176	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0034	CPM	0.0069	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - Pu-239/240 BACKGROUND - DETECTOR 17165813 - F1

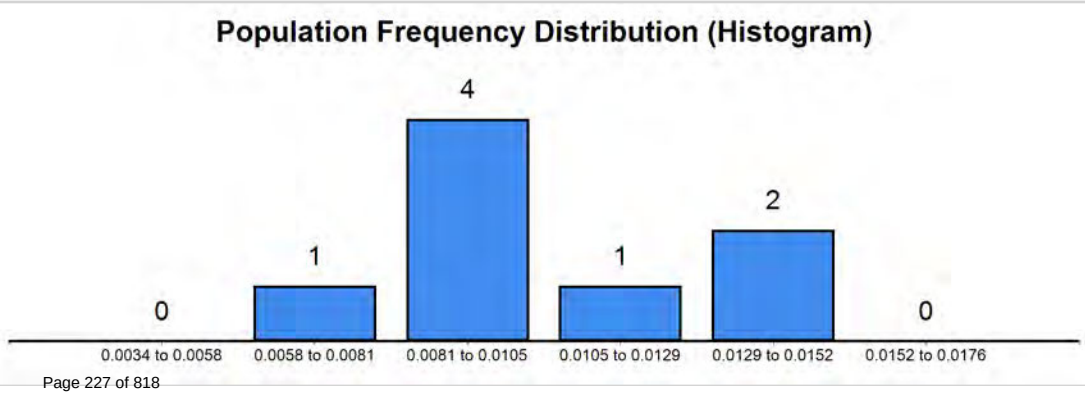
Process Date Range: 08/31/21 - 07/15/22



ARS Aleut Analytical

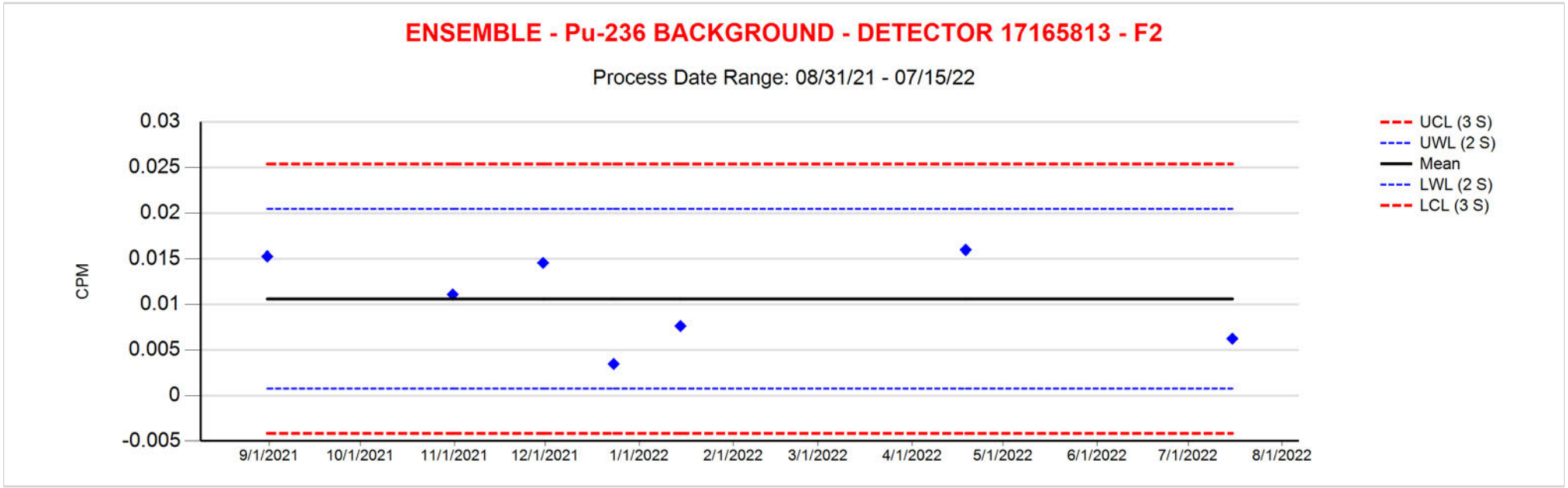
Statistical Process Control

Bin	Frequency
0.0034 to 0.0058	0
0.0058 to 0.0081	1
0.0081 to 0.0105	4
0.0105 to 0.0129	1
0.0129 to 0.0152	2
0.0152 to 0.0176	0



Pu-236 Background - ARS1-B22-01099-04

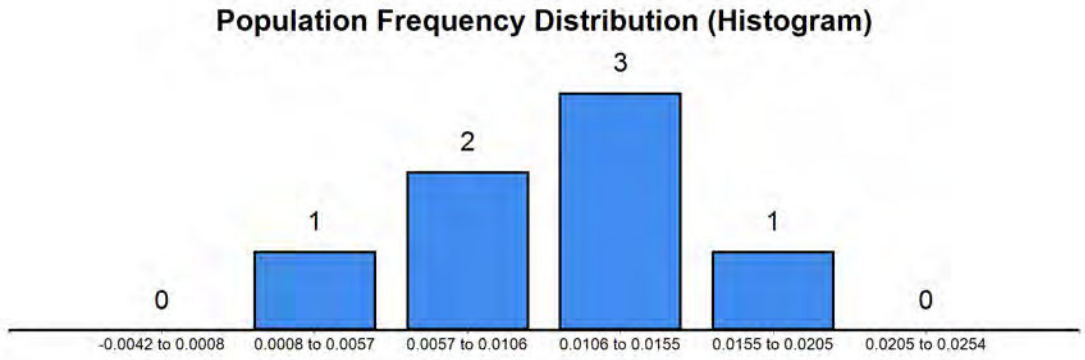
Population Statistics				Trending Analysis	
Population Size	7	Date	7/15/2022	Most recent point outside of the 3-sigma values.	OK
Average	0.0106	CPM	0.0063	8 consecutive most recent points on one side of the mean.	OK
Standard Deviation	0.0049	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	OK
+ 3-sigma value	0.0254	Date	4/18/2022	4 of 5 most recents points beyond the 1-sigma.	OK
- 3-sigma value	-0.0042	CPM	0.0160	7 trending most recent points in a row.	OK
		Count Mins	1440.00	15 most recent points inside 1 sigma.	OK
				8 most recent points outside 1 sigma.	OK



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0042 to 0.0008	0
0.0008 to 0.0057	1
0.0057 to 0.0106	2
0.0106 to 0.0155	3
0.0155 to 0.0205	1
0.0205 to 0.0254	0

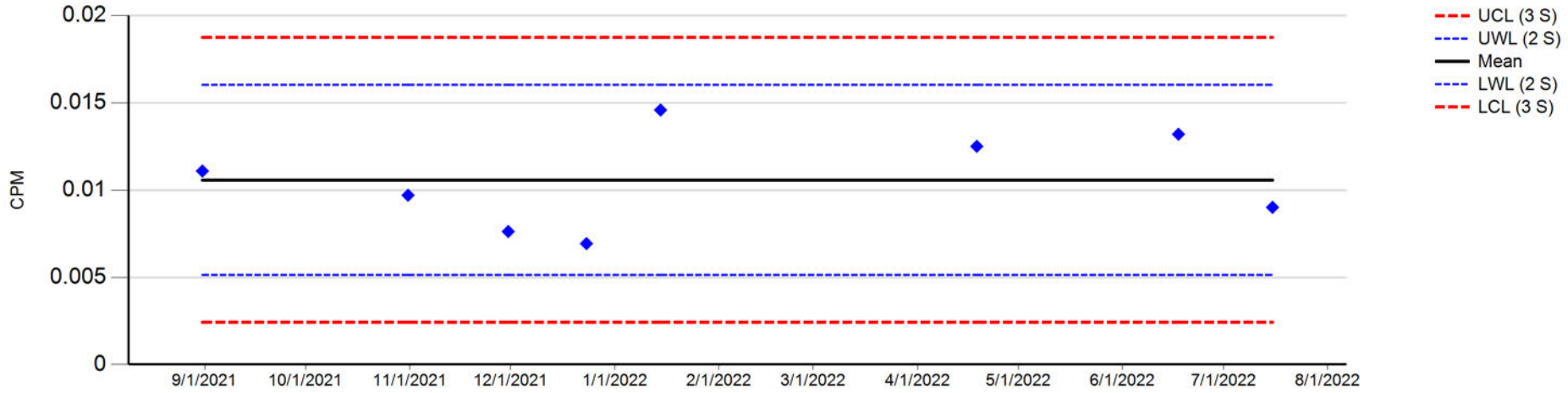


Pu-238 Background - ARS1-B22-01099-04

Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0106	CPM	0.0090	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0027	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0188	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0024	CPM	0.0132	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - Pu-238 BACKGROUND - DETECTOR 17165813 - F2

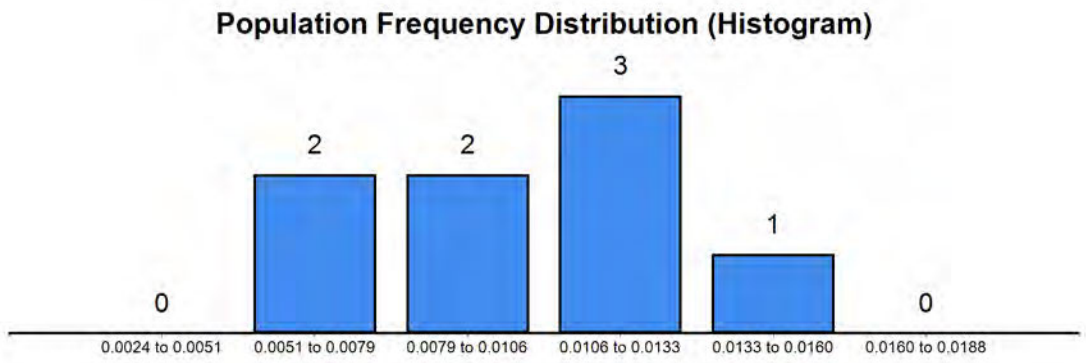
Process Date Range: 08/31/21 - 07/15/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.0024 to 0.0051	0
0.0051 to 0.0079	2
0.0079 to 0.0106	2
0.0106 to 0.0133	3
0.0133 to 0.0160	1
0.0160 to 0.0188	0

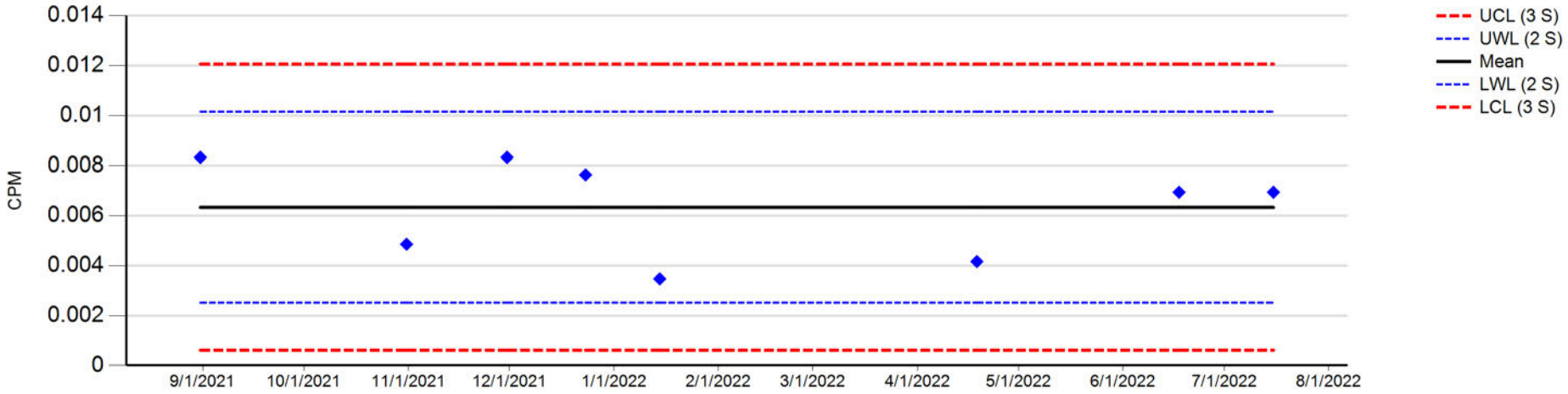


Pu-239/240 Background - ARS1-B22-01099-04

Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0063	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0019	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0121	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0006	CPM	0.0069	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

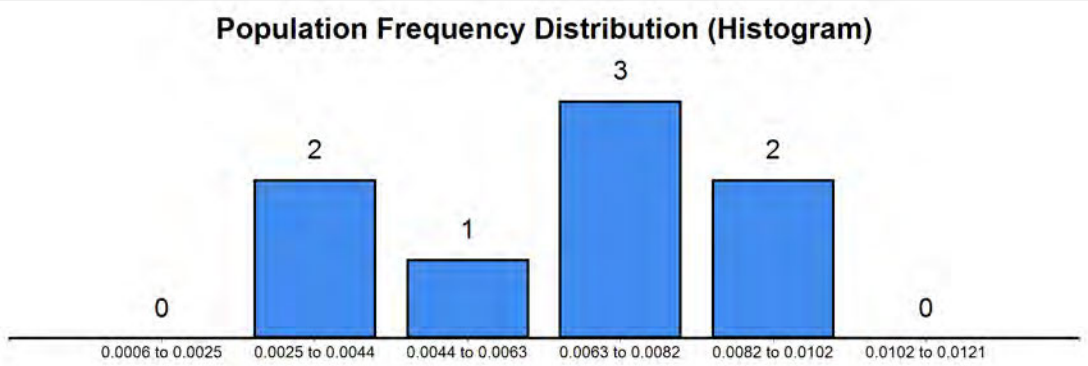
ENSEMBLE - Pu-239/240 BACKGROUND - DETECTOR 17165813 - F2

Process Date Range: 08/31/21 - 07/15/22



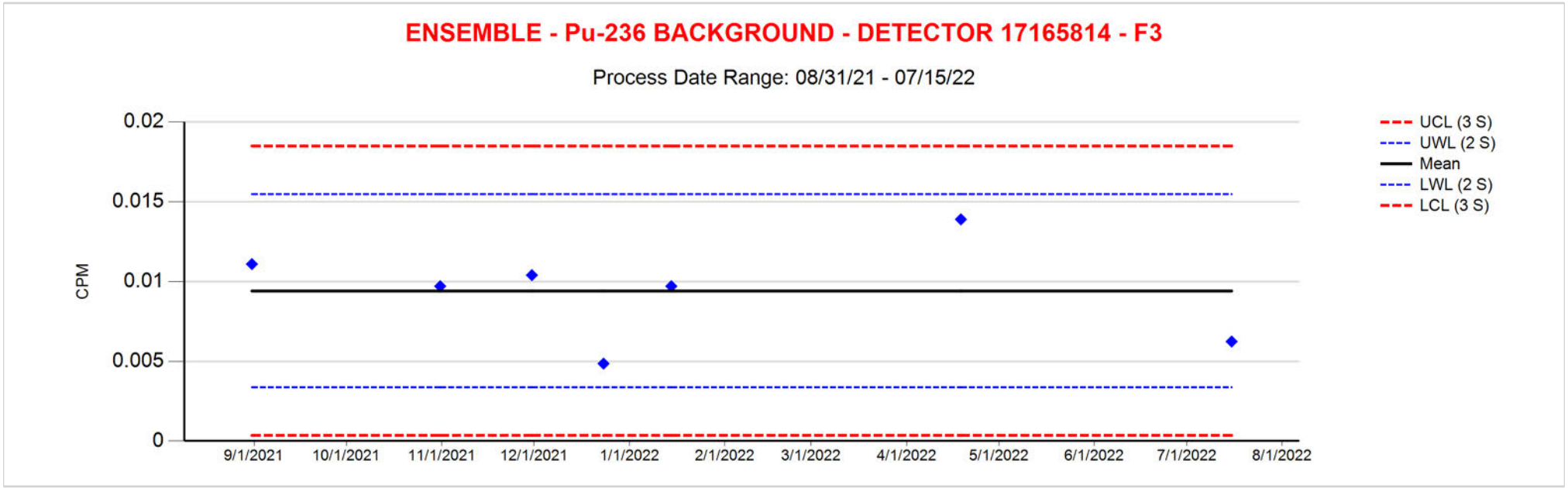
Statistical Process Control

Bin	Frequency
0.0006 to 0.0025	0
0.0025 to 0.0044	2
0.0044 to 0.0063	1
0.0063 to 0.0082	3
0.0082 to 0.0102	2
0.0102 to 0.0121	0



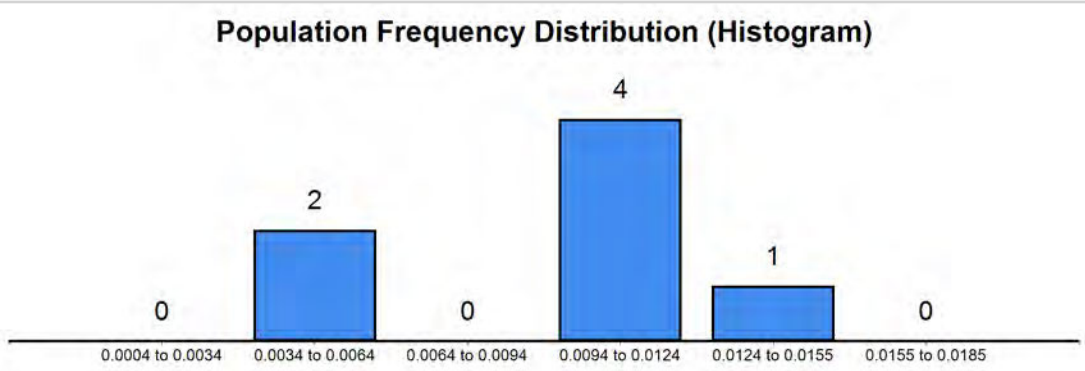
Pu-236 Background - ARS1-B22-01099-05

Population Statistics				Trending Analysis	
Population Size	**7**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0094	CPM	0.0063	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0030	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0185	Date	4/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0004	CPM	0.0139	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



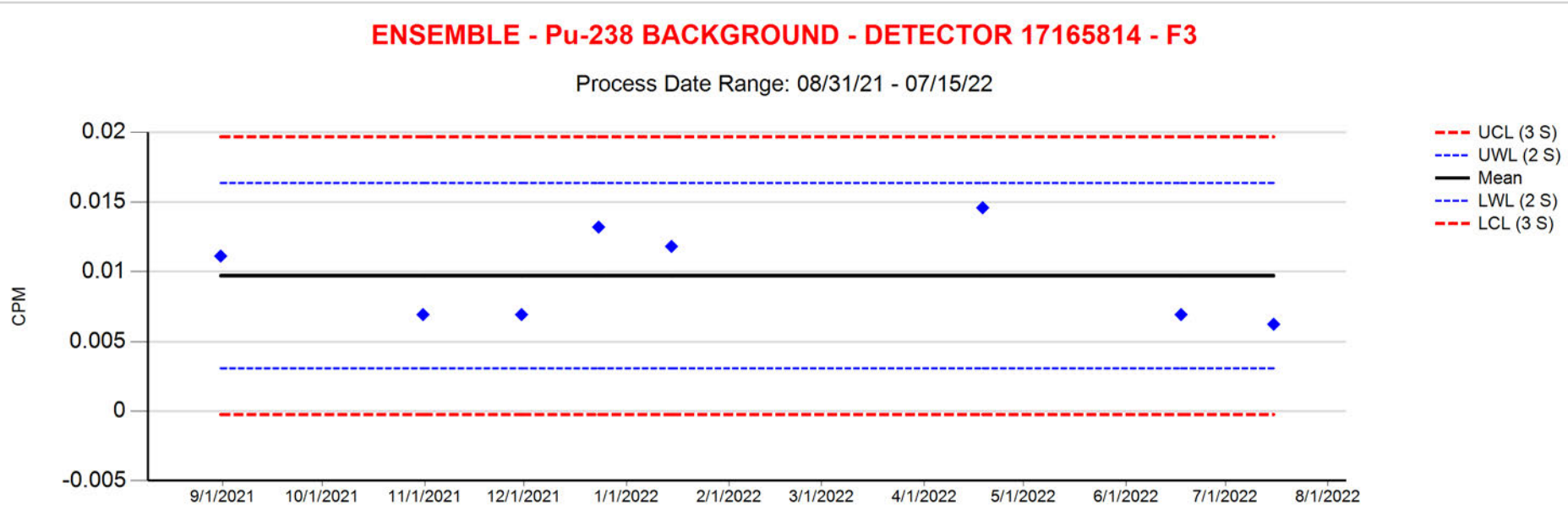
Statistical Process Control

Bin	Frequency
0.0004 to 0.0034	0
0.0034 to 0.0064	2
0.0064 to 0.0094	0
0.0094 to 0.0124	4
0.0124 to 0.0155	1
0.0155 to 0.0185	0



Pu-238 Background - ARS1-B22-01099-05

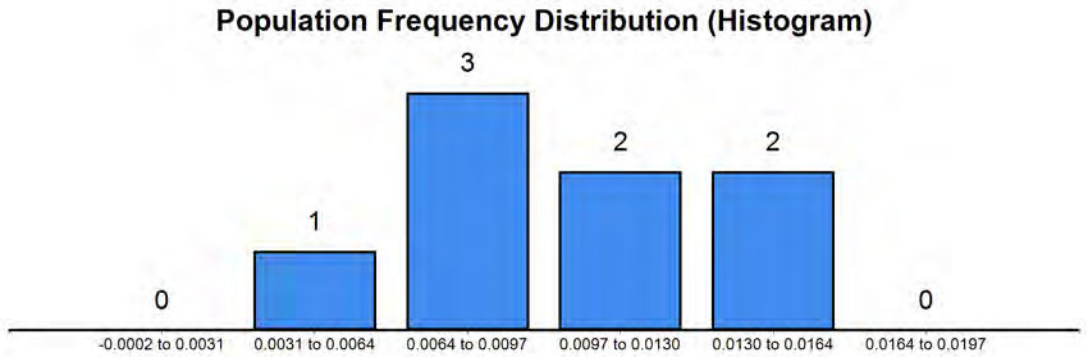
Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0097	CPM	0.0063	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0033	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0197	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0002	CPM	0.0069	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

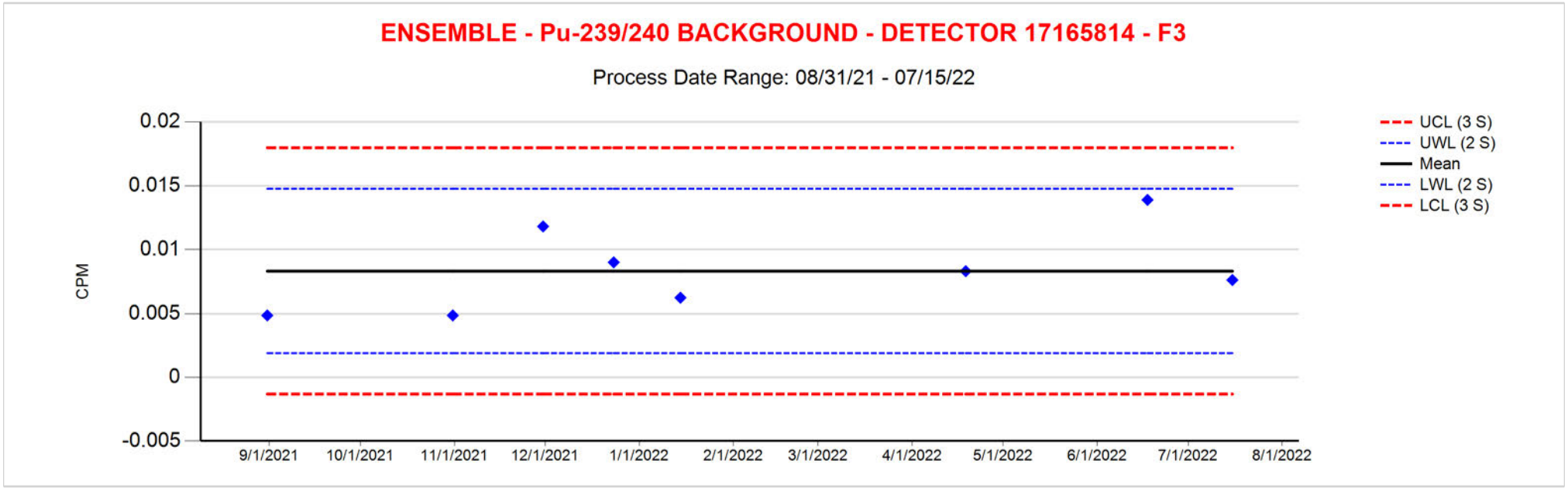
Statistical Process Control

Bin	Frequency
-0.0002 to 0.0031	0
0.0031 to 0.0064	1
0.0064 to 0.0097	3
0.0097 to 0.0130	2
0.0130 to 0.0164	2
0.0164 to 0.0197	0



Pu-239/240 Background - ARS1-B22-01099-05

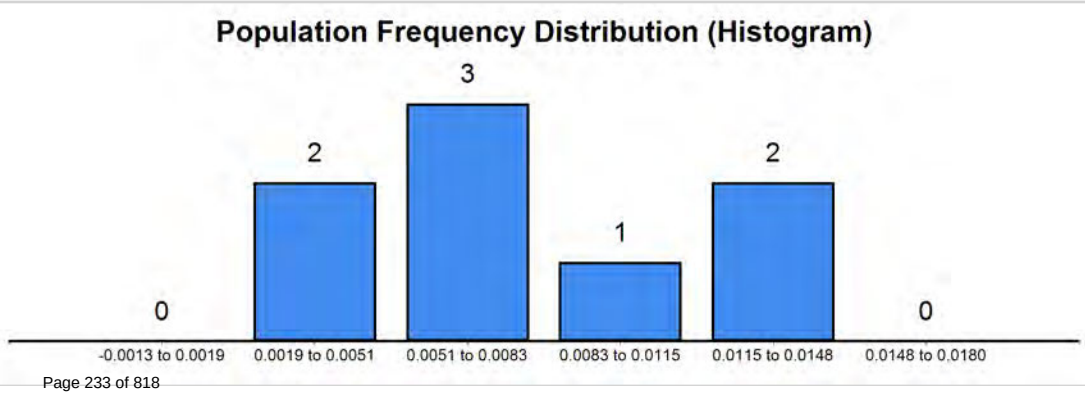
Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0083	CPM	0.0076	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0032	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0180	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0013	CPM	0.0139	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0013 to 0.0019	0
0.0019 to 0.0051	2
0.0051 to 0.0083	3
0.0083 to 0.0115	1
0.0115 to 0.0148	2
0.0148 to 0.0180	0

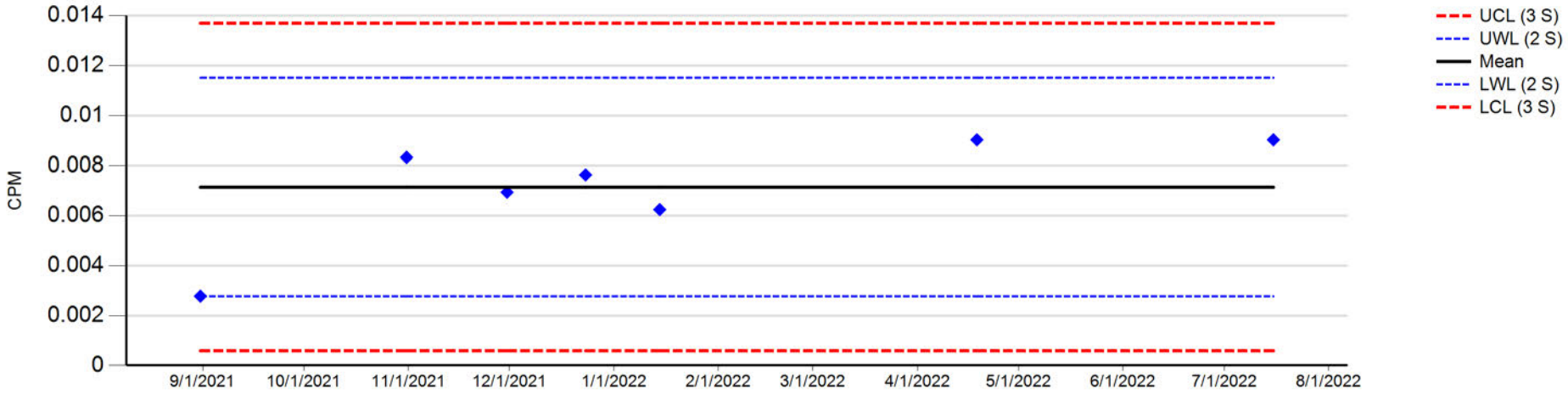


Pu-236 Background - ARS1-B22-01099-06

Population Statistics				Trending Analysis	
Population Size	**7**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0071	CPM	0.0090	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0022	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0137	Date	4/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0006	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

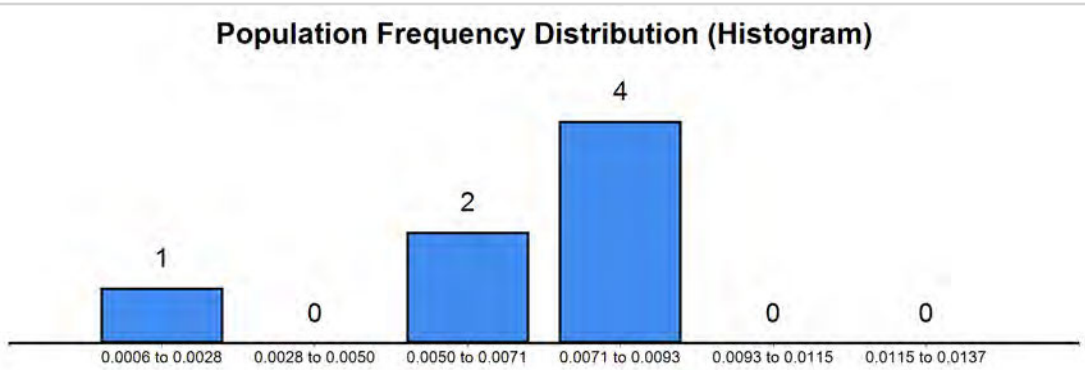
ENSEMBLE - Pu-236 BACKGROUND - DETECTOR 17165814 - F4

Process Date Range: 08/31/21 - 07/15/22



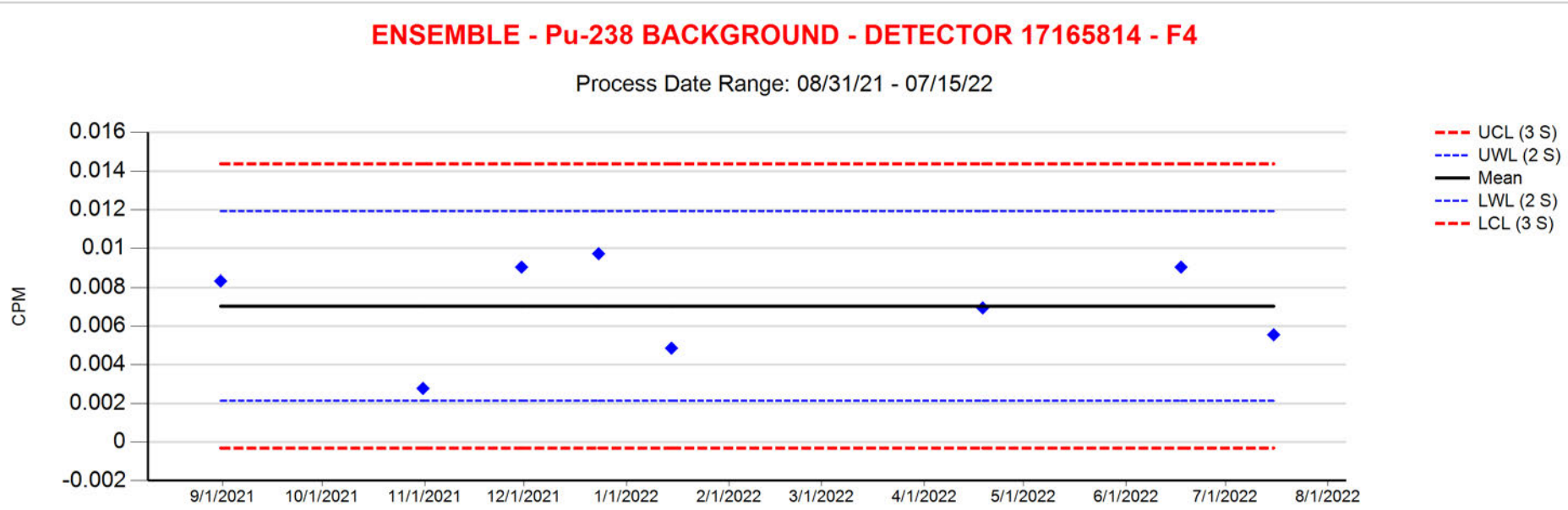
Statistical Process Control

Bin	Frequency
0.0006 to 0.0028	1
0.0028 to 0.0050	0
0.0050 to 0.0071	2
0.0071 to 0.0093	4
0.0093 to 0.0115	0
0.0115 to 0.0137	0



Pu-238 Background - ARS1-B22-01099-06

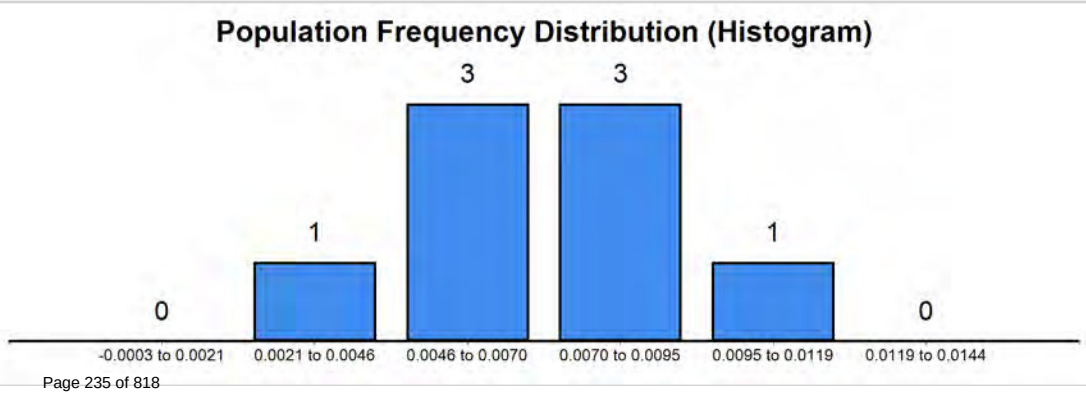
Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0070	CPM	0.0056	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0024	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0144	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0003	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

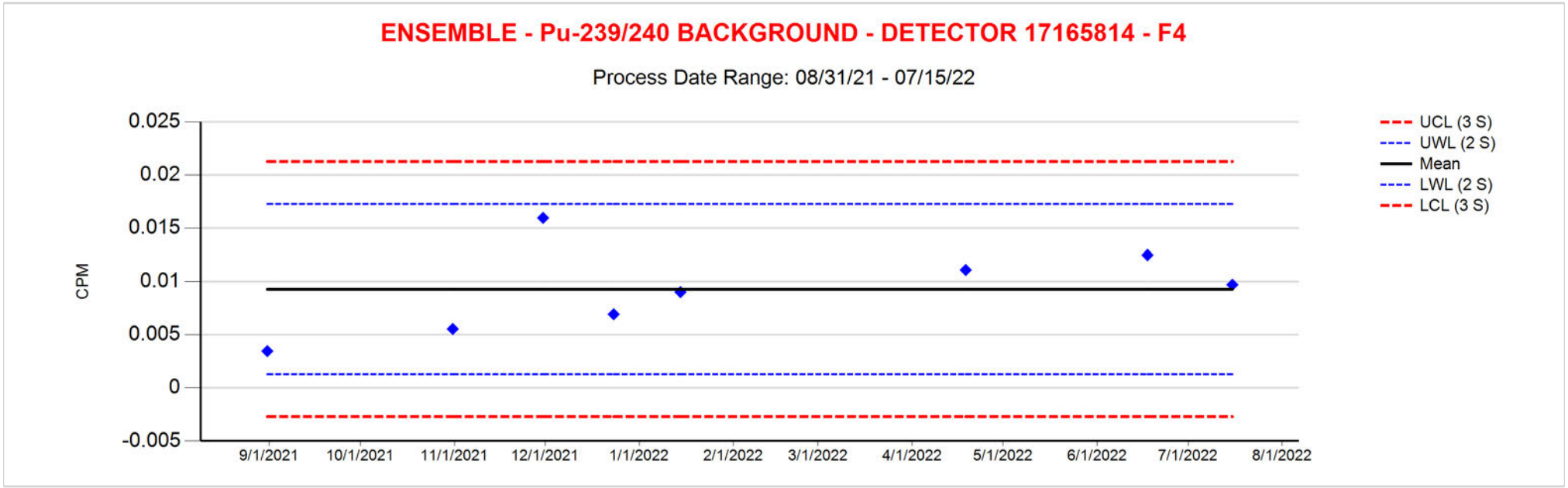
Statistical Process Control

Bin	Frequency
-0.0003 to 0.0021	0
0.0021 to 0.0046	1
0.0046 to 0.0070	3
0.0070 to 0.0095	3
0.0095 to 0.0119	1
0.0119 to 0.0144	0



Pu-239/240 Background - ARS1-B22-01099-06

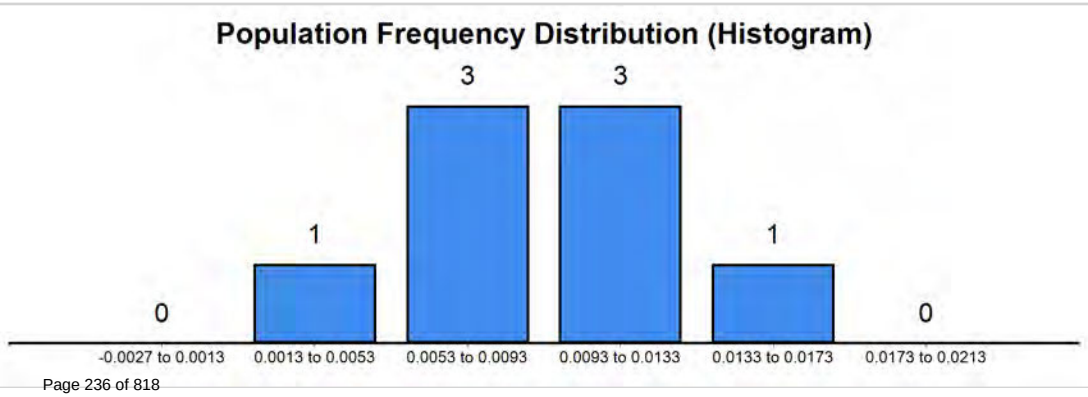
Population Statistics				Trending Analysis	
Population Size	**8**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0093	CPM	0.0097	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0040	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0213	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0027	CPM	0.0125	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

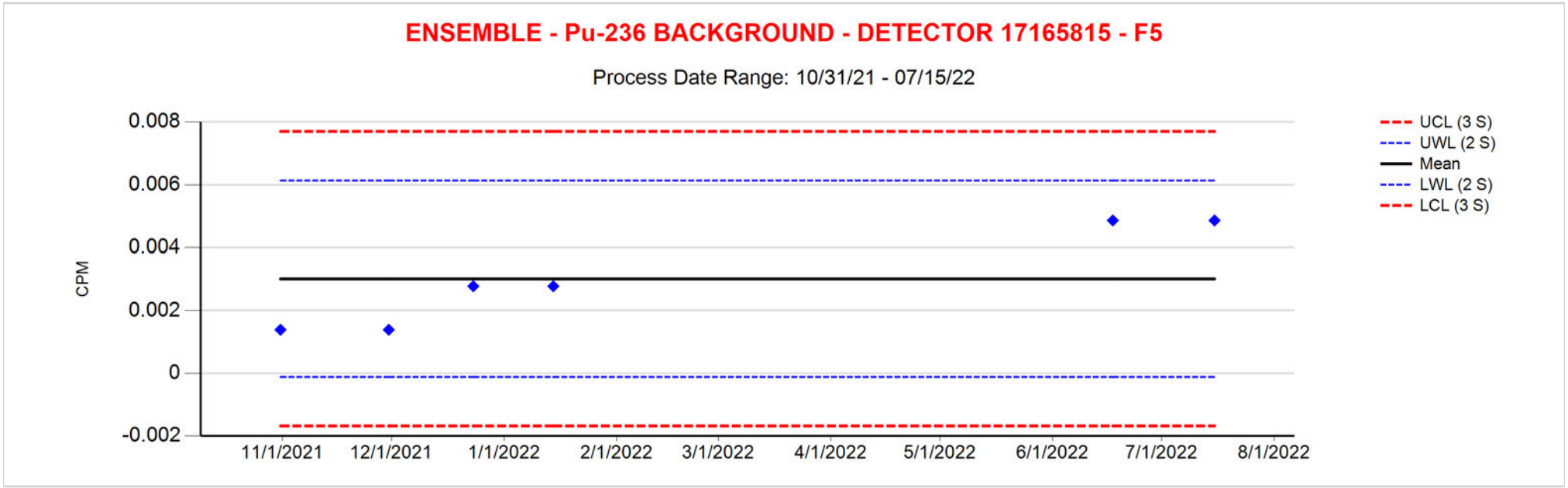
Statistical Process Control

Bin	Frequency
-0.0027 to 0.0013	0
0.0013 to 0.0053	1
0.0053 to 0.0093	3
0.0093 to 0.0133	3
0.0133 to 0.0173	1
0.0173 to 0.0213	0



Pu-236 Background - ARS1-B22-01099-07

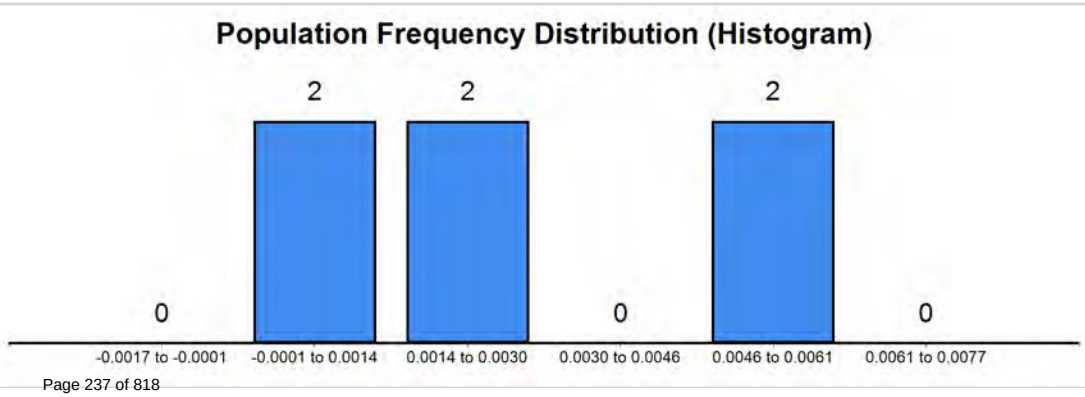
Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0030	CPM	0.0049	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0016	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0077	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0017	CPM	0.0049	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

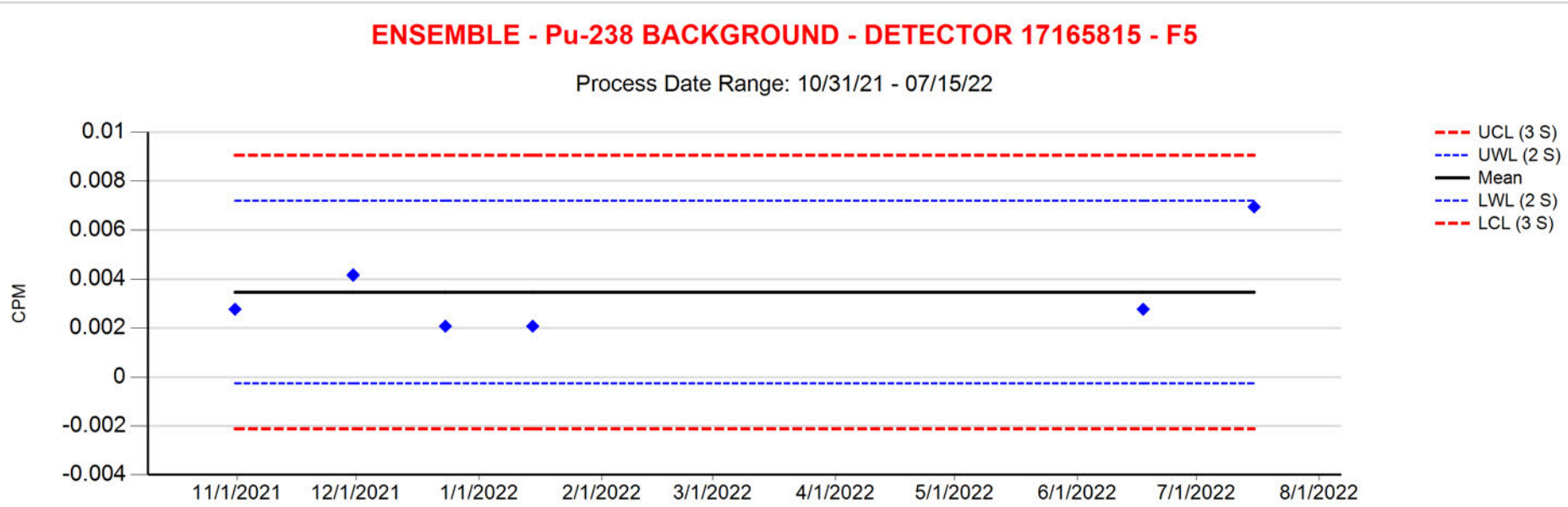
Statistical Process Control

Bin	Frequency
-0.0017 to -0.0001	0
-0.0001 to 0.0014	2
0.0014 to 0.0030	2
0.0030 to 0.0046	0
0.0046 to 0.0061	2
0.0061 to 0.0077	0



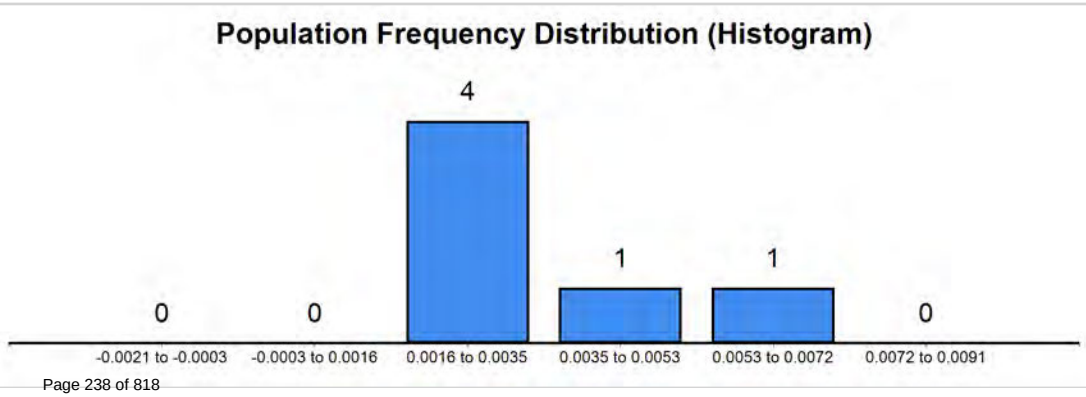
Pu-238 Background - ARS1-B22-01099-07

Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0035	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0019	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0091	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0021	CPM	0.0028	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



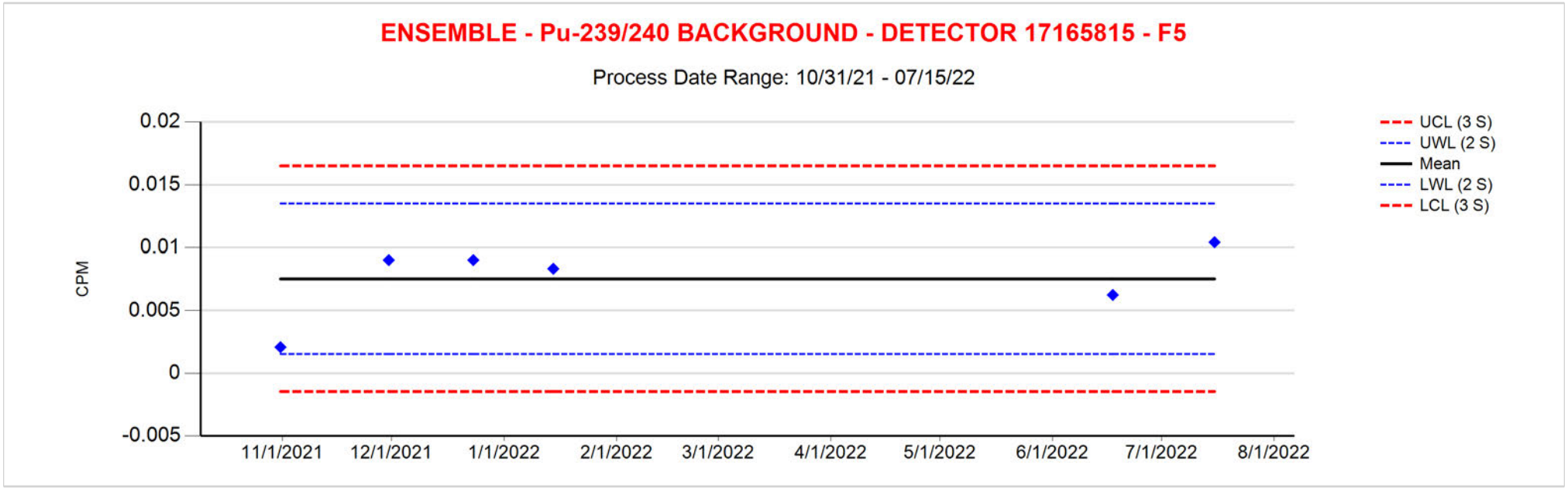
Statistical Process Control

Bin	Frequency
-0.0021 to -0.0003	0
-0.0003 to 0.0016	0
0.0016 to 0.0035	4
0.0035 to 0.0053	1
0.0053 to 0.0072	1
0.0072 to 0.0091	0



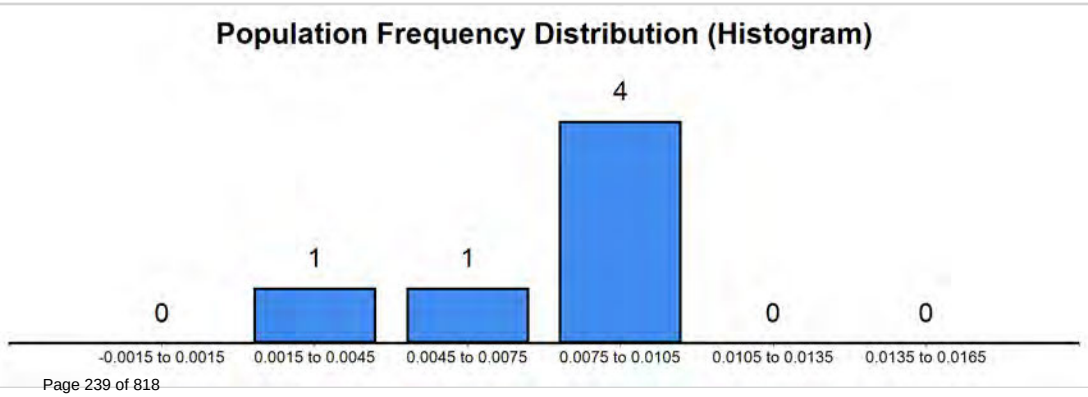
Pu-239/240 Background - ARS1-B22-01099-07

Population Statistics				Trending Analysis	
Population Size	**6**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0075	CPM	0.0104	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0030	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0165	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0015	CPM	0.0063	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



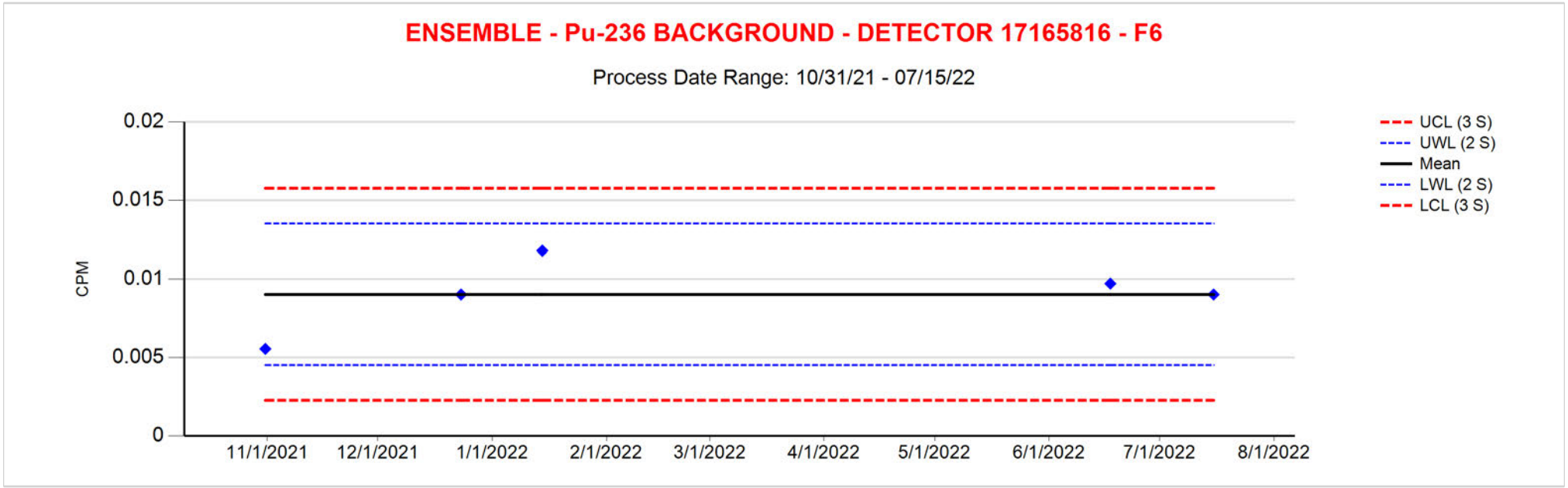
Statistical Process Control

Bin	Frequency
-0.0015 to 0.0015	0
0.0015 to 0.0045	1
0.0045 to 0.0075	1
0.0075 to 0.0105	4
0.0105 to 0.0135	0
0.0135 to 0.0165	0



Pu-236 Background - ARS1-B22-01099-08

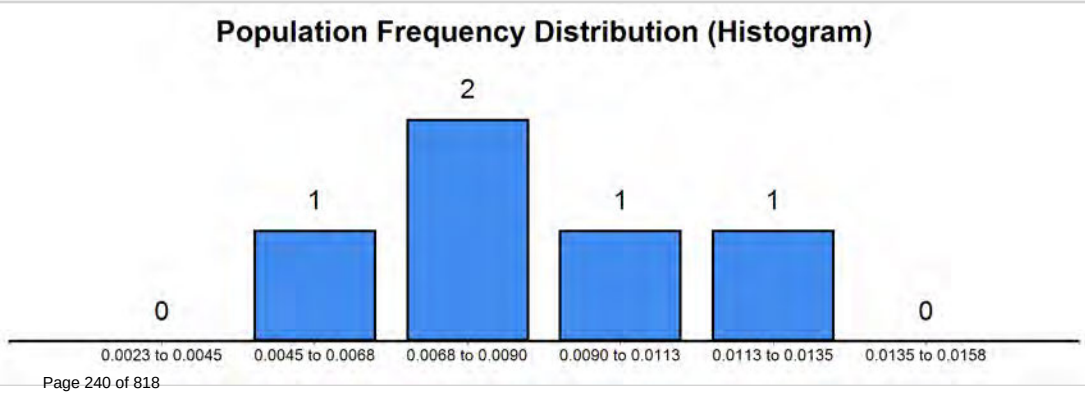
Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0090	CPM	0.0090	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0023	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0158	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0023	CPM	0.0097	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

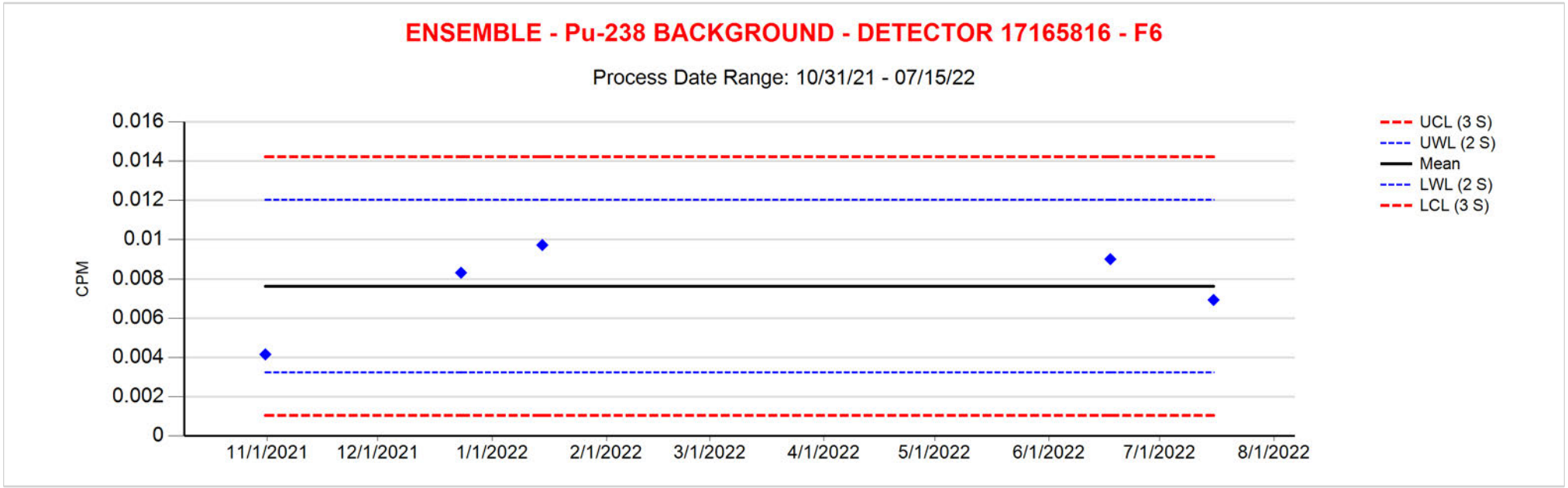
Statistical Process Control

Bin	Frequency
0.0023 to 0.0045	0
0.0045 to 0.0068	1
0.0068 to 0.0090	2
0.0090 to 0.0113	1
0.0113 to 0.0135	1
0.0135 to 0.0158	0



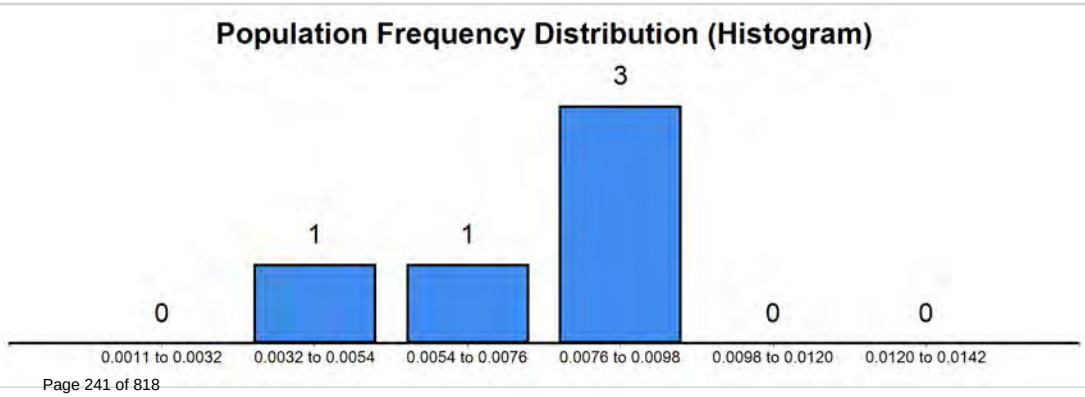
Pu-238 Background - ARS1-B22-01099-08

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0076	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0022	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0142	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0011	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



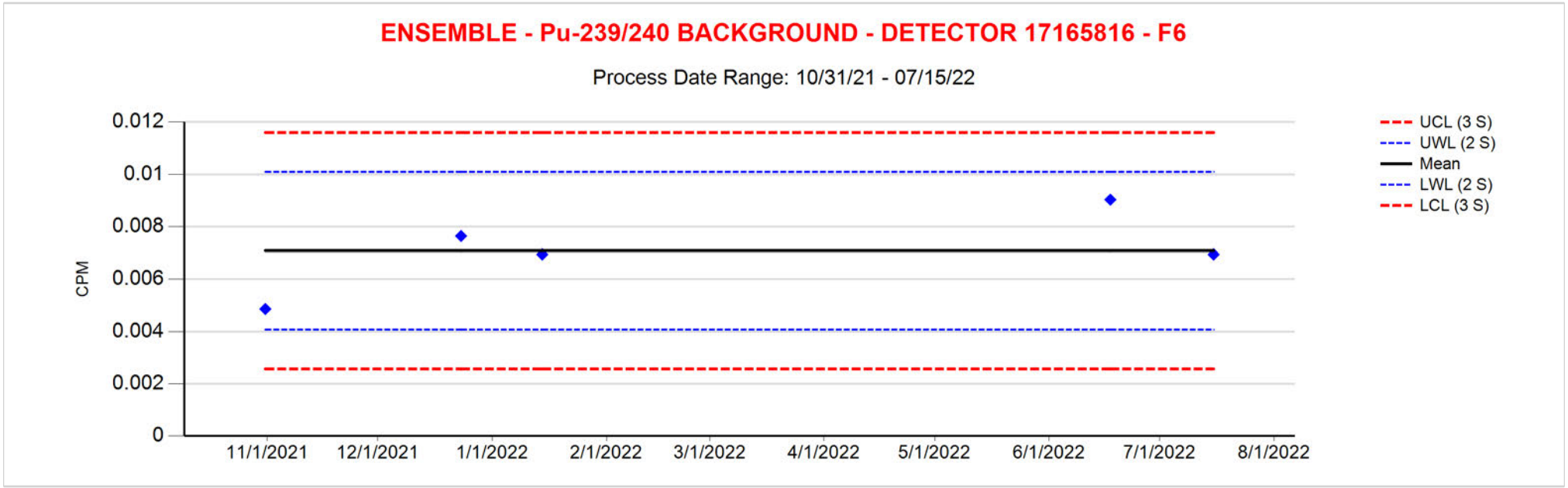
Statistical Process Control

Bin	Frequency
0.0011 to 0.0032	0
0.0032 to 0.0054	1
0.0054 to 0.0076	1
0.0076 to 0.0098	3
0.0098 to 0.0120	0
0.0120 to 0.0142	0



Pu-239/240 Background - ARS1-B22-01099-08

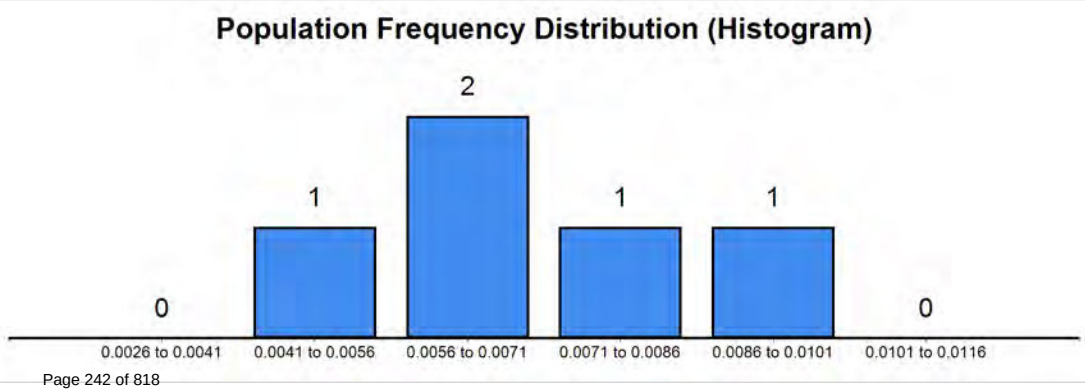
Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0071	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0015	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0116	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0026	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

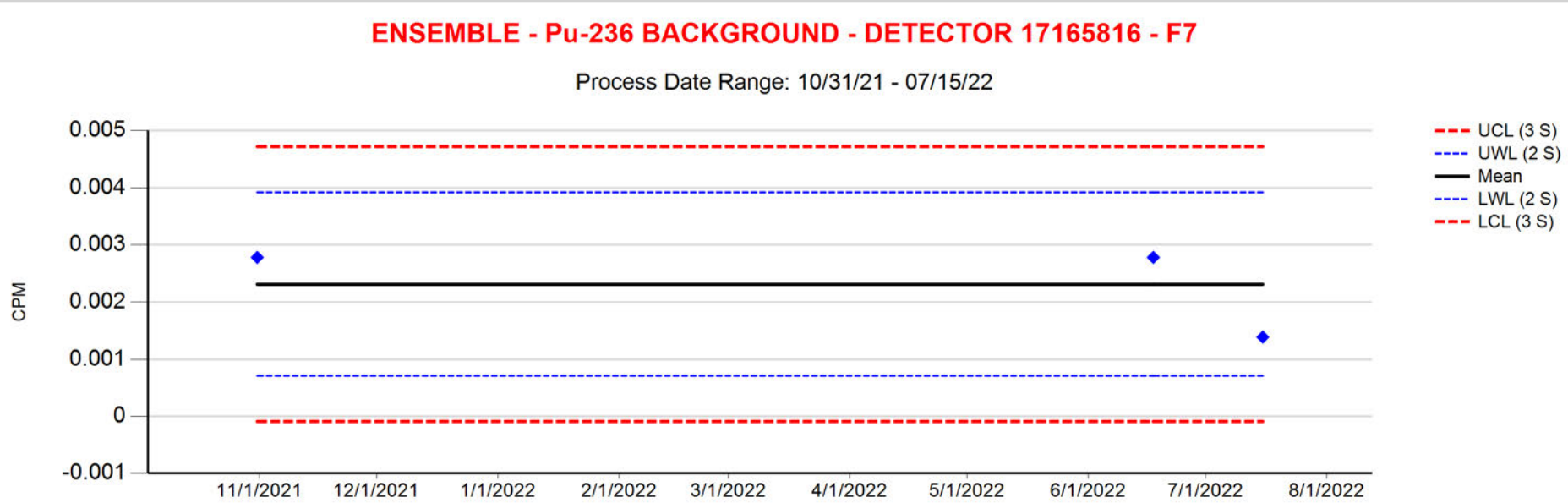
Statistical Process Control

Bin	Frequency
0.0026 to 0.0041	0
0.0041 to 0.0056	1
0.0056 to 0.0071	2
0.0071 to 0.0086	1
0.0086 to 0.0101	1
0.0101 to 0.0116	0



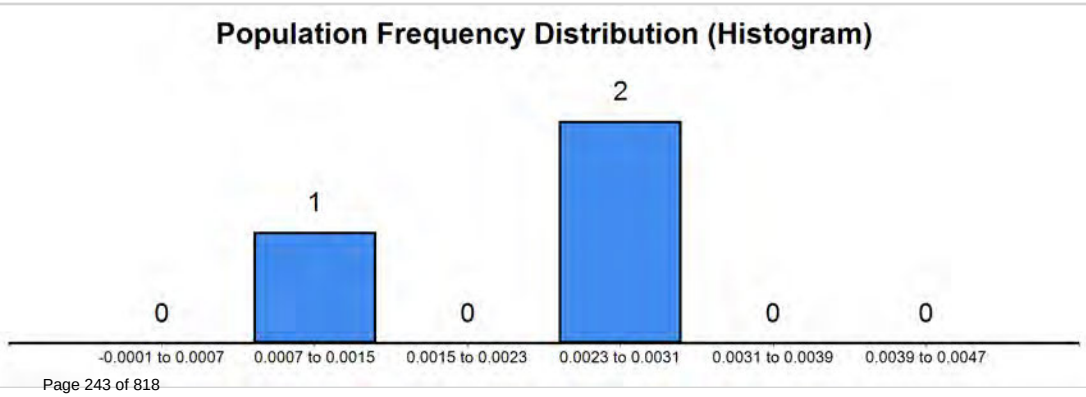
Pu-236 Background - ARS1-B22-01099-09

Population Statistics				Trending Analysis	
Population Size	**3**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0023	CPM	0.0014	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0008	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0047	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0001	CPM	0.0028	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



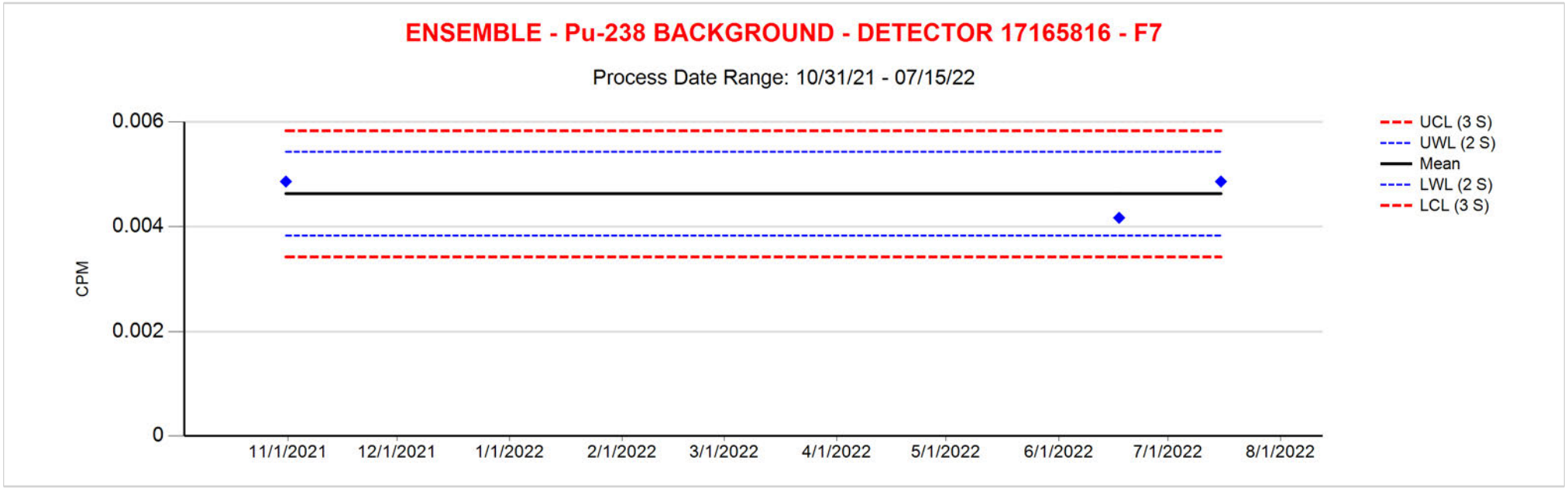
Statistical Process Control

Bin	Frequency
-0.0001 to 0.0007	0
0.0007 to 0.0015	1
0.0015 to 0.0023	0
0.0023 to 0.0031	2
0.0031 to 0.0039	0
0.0039 to 0.0047	0



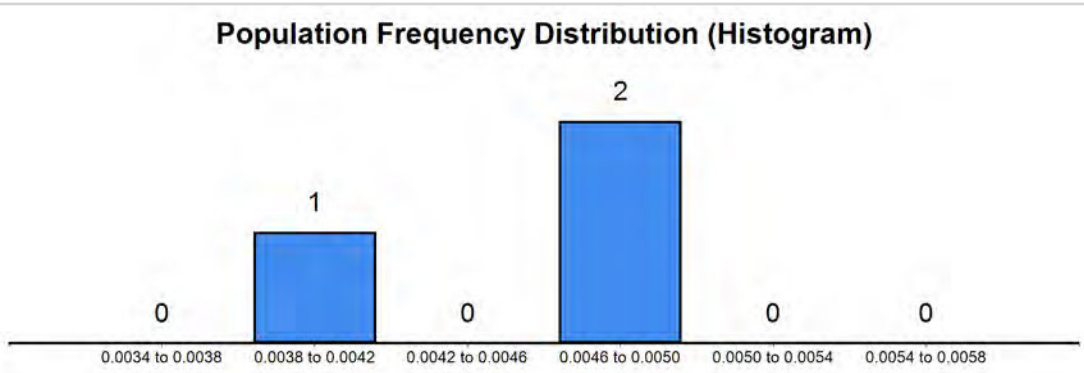
Pu-238 Background - ARS1-B22-01099-09

Population Statistics				Trending Analysis	
Population Size	**3**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0046	CPM	0.0049	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0004	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0058	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0034	CPM	0.0042	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



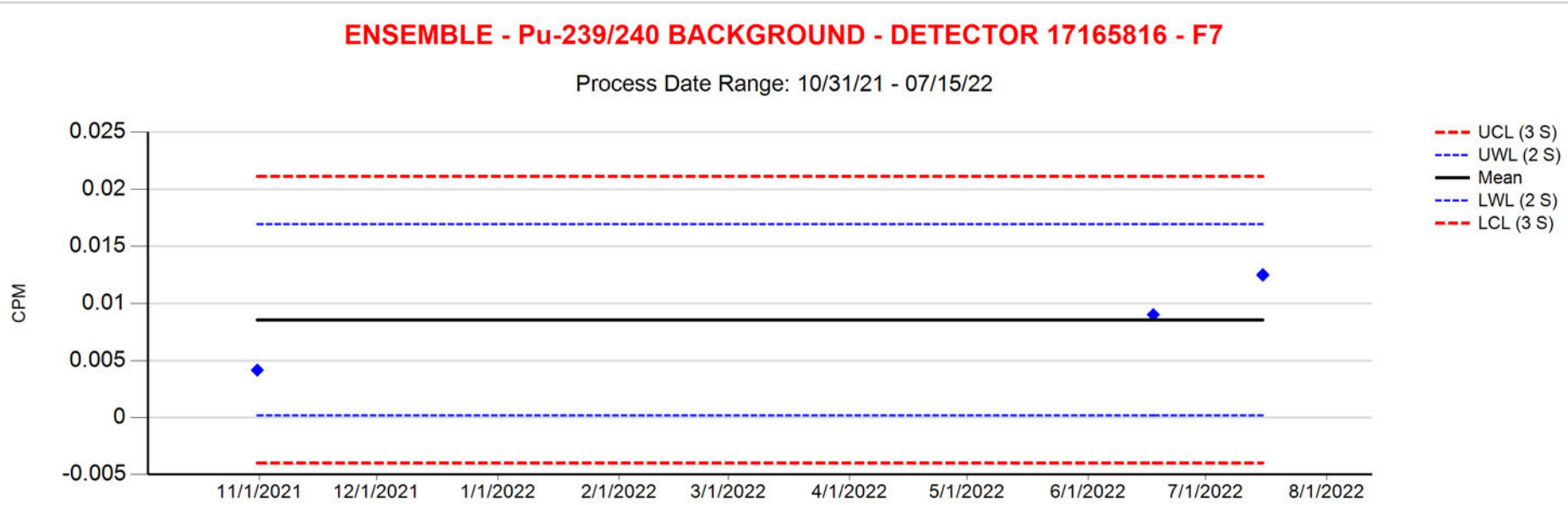
Statistical Process Control

Bin	Frequency
0.0034 to 0.0038	0
0.0038 to 0.0042	1
0.0042 to 0.0046	0
0.0046 to 0.0050	2
0.0050 to 0.0054	0
0.0054 to 0.0058	0



Pu-239/240 Background - ARS1-B22-01099-09

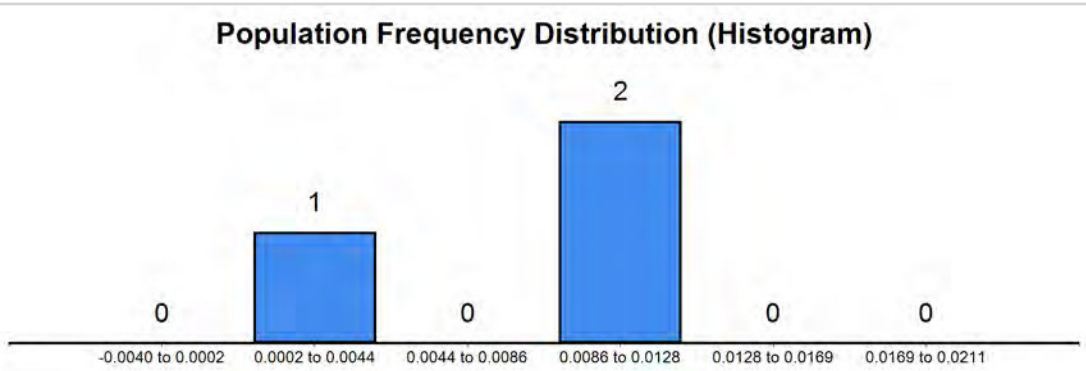
Population Statistics				Trending Analysis	
Population Size	**3**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0086	CPM	0.0125	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0042	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0211	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0040	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

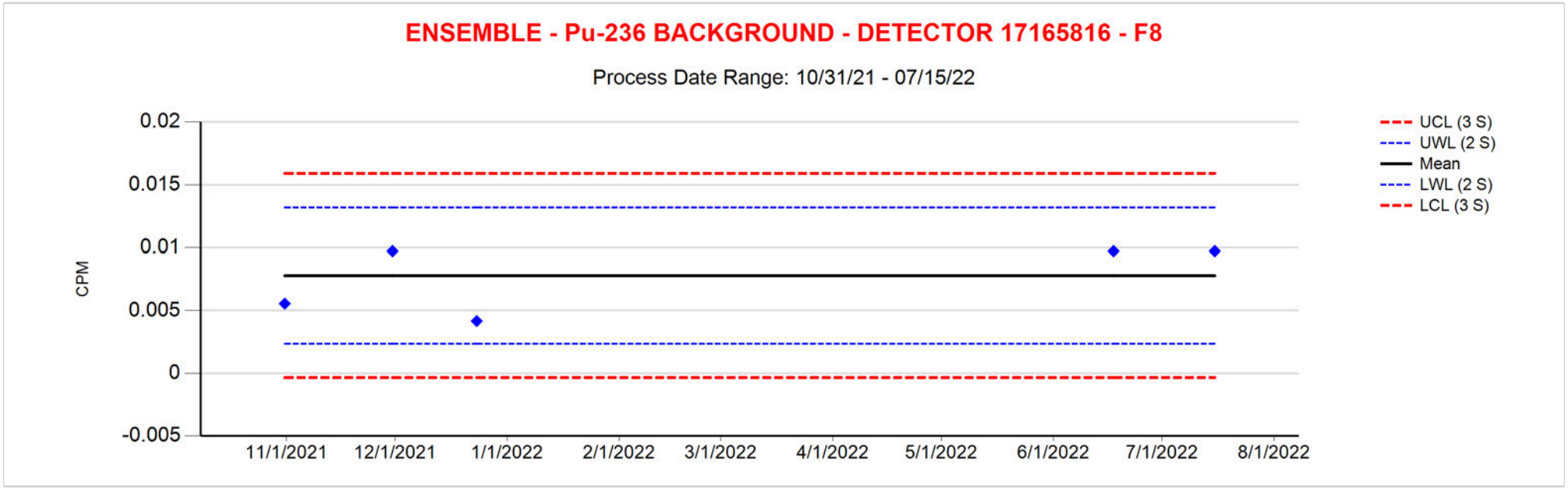
Statistical Process Control

Bin	Frequency
-0.0040 to 0.0002	0
0.0002 to 0.0044	1
0.0044 to 0.0086	0
0.0086 to 0.0128	2
0.0128 to 0.0169	0
0.0169 to 0.0211	0



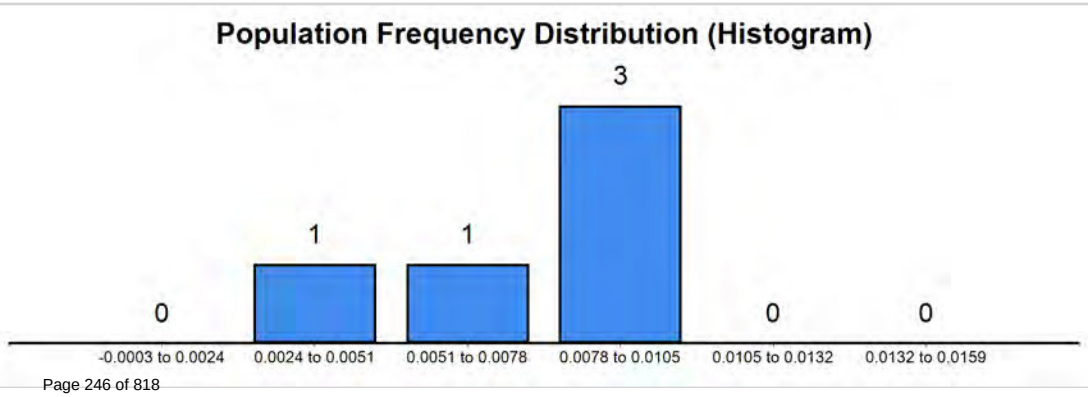
Pu-236 Background - ARS1-B22-01099-10

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0078	CPM	0.0097	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0027	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0159	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0003	CPM	0.0097	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



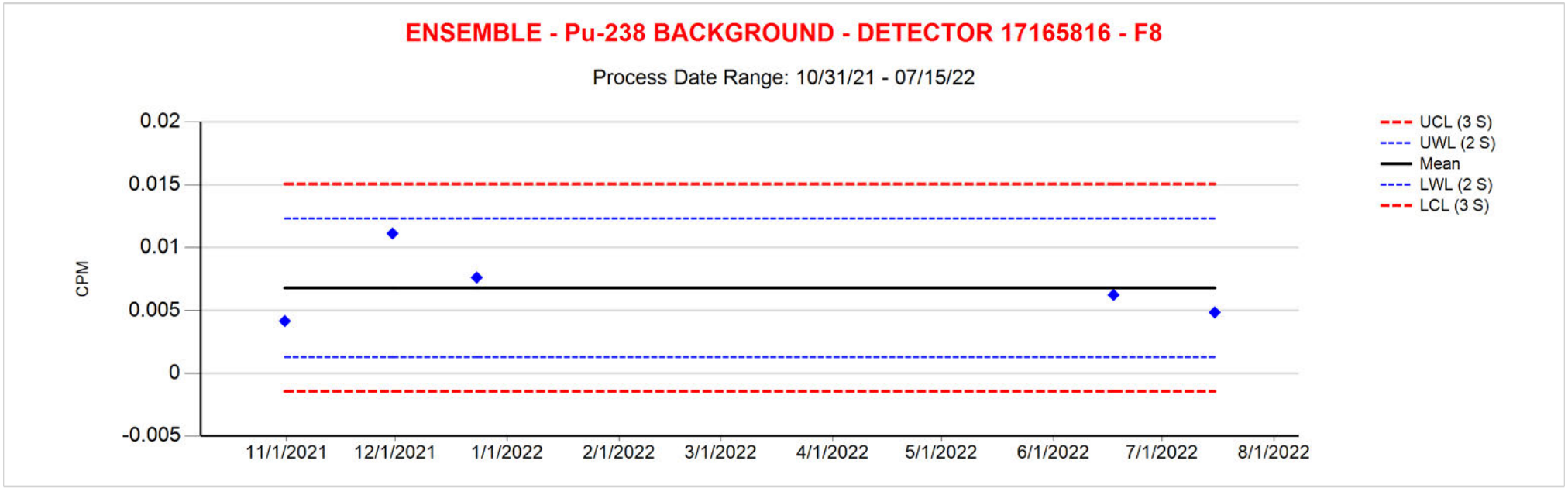
Statistical Process Control

Bin	Frequency
-0.0003 to 0.0024	0
0.0024 to 0.0051	1
0.0051 to 0.0078	1
0.0078 to 0.0105	3
0.0105 to 0.0132	0
0.0132 to 0.0159	0



Pu-238 Background - ARS1-B22-01099-10

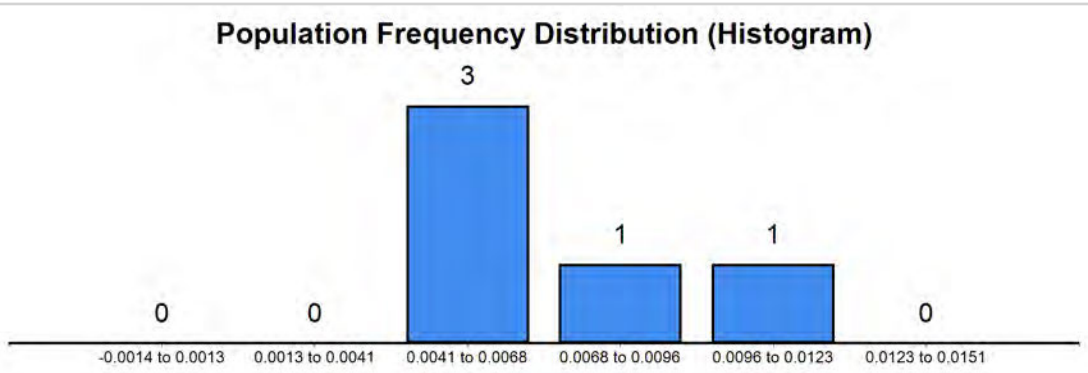
Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0068	CPM	0.0049	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0028	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0151	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0014	CPM	0.0063	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

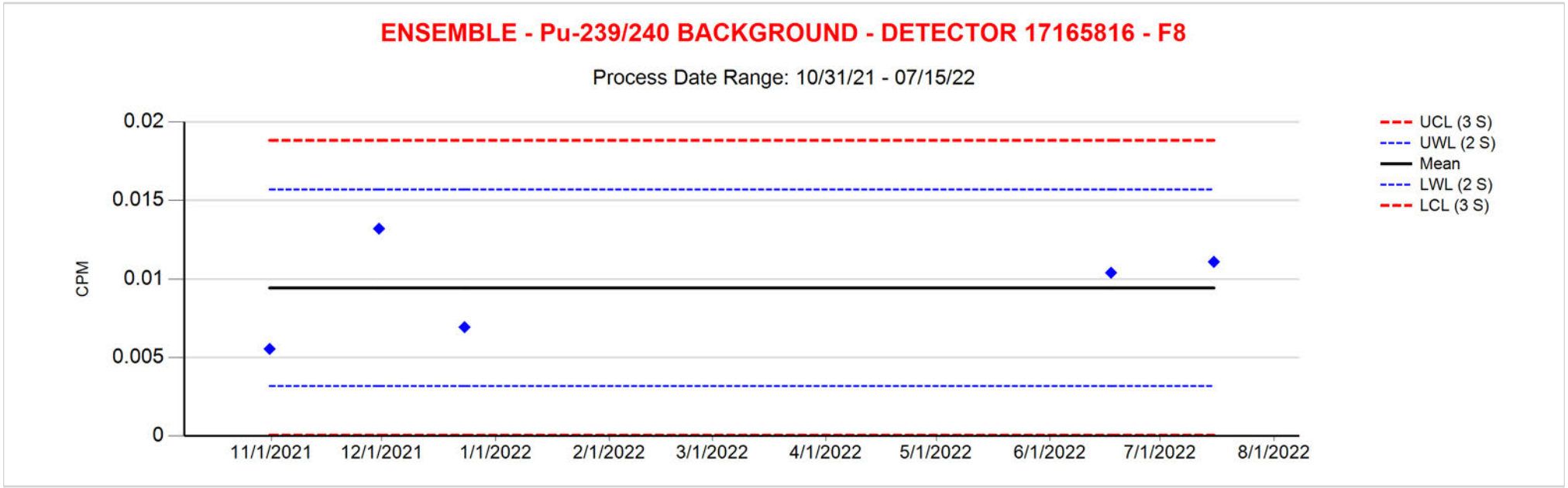
Statistical Process Control

Bin	Frequency
-0.0014 to 0.0013	0
0.0013 to 0.0041	0
0.0041 to 0.0068	3
0.0068 to 0.0096	1
0.0096 to 0.0123	1
0.0123 to 0.0151	0



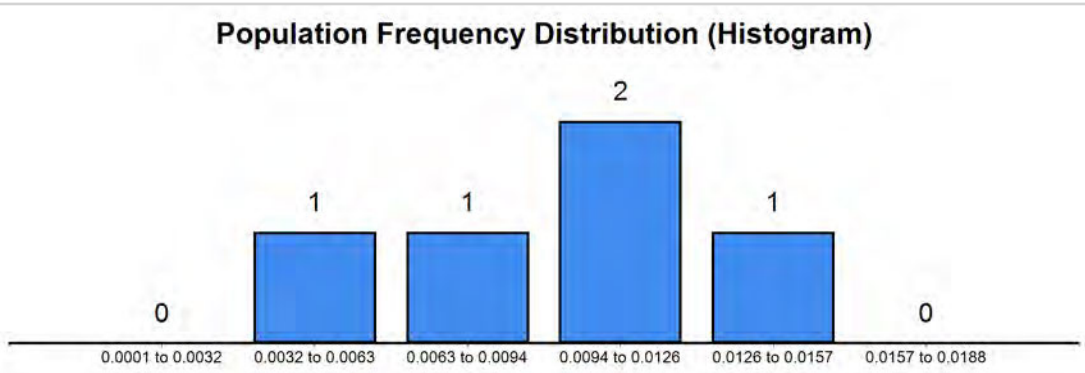
Pu-239/240 Background - ARS1-B22-01099-10

Population Statistics				Trending Analysis	
Population Size	**5**	Date	7/15/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0094	CPM	0.0111	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0031	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0188	Date	6/17/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0001	CPM	0.0104	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.0001 to 0.0032	0
0.0032 to 0.0063	1
0.0063 to 0.0094	1
0.0094 to 0.0126	2
0.0126 to 0.0157	1
0.0157 to 0.0188	0



2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Alpha Spec Pu-Standards

ARS Aleut Analytical

Alpa Spec Standard Verification

	Std. ID	Isotope
Analyte	**S-0329**	**Pu-239**
Tracer	**S-0351**	**Pu-242**

Expires: 12/31/2022

S-0329 Net	S-0351 Net	Grams of S-0351	S-0351 dpm/g	S-0351 dpm added	S-0329 dpm	Grams of S-0329	S-0329 dpm/g
2961	948.5	1.1071	5.4660	6.0514086	18.891	1.1201	16.8655595
3014	1070	1.0989	5.4660	6.0065874	16.919	1.1095	15.2496531
2829	1012.5	1.1001	5.4660	6.0131466	16.801	1.1067	15.18132919
2787	1006	1.0984	5.4660	6.0038544	16.633	1.1058	15.04154869
2626	988.5	1.0977	5.4660	6.0000282	15.939	1.1049	14.42608099

Average	15.353
Known Value	15.581
Average/stdev	5.902%
% Bias	1.484%

Performed by: [redacted] Date: 12/31/2021

Reviewed by: [redacted] Date: 12-31-21

QA Approval: [redacted] Date: 1-4-22

ARS-038-003 r0.2
Revision Date: 01/23/2019

ARS Aleut Analytical

Weight Spreadsheet for TWO Standards Verification

S-0329 Verification Weights	
Tech:	GPR
Pippete:	RU07688
Scale ID:	P214062006
Standard 1 ID:	S-0329
Standard 2 ID:	S-0351

Sample ID	Std. Weight(g)
S-0329-V1	1.1201
S-0329-V2	1.1095
S-0329-V3	1.1067
S-0329-V4	1.1058
S-0329-V5	1.1049
S-0351-V1	1.1071
S-0351-V2	1.0989
S-0351-V3	1.1001
S-0351-V4	1.0984
S-0351-V5	1.0977

Samples to be counted:

Sample S-0329-V1 to detector 14314612 - D4, marked to be counted
Sample S-0329-V2 to detector 14314613 - D5, marked to be counted
Sample S-0329-V3 to detector 14314613 - D6, marked to be counted
Sample S-0329-V4 to detector 14314614 - D7, marked to be counted
Sample S-0329-V5 to detector 14314614 - D8, marked to be counted
Sample S-0351-V1 not assigned to a detector
Sample S-0351-V2 not assigned to a detector
Sample S-0351-V3 not assigned to a detector
Sample S-0351-V4 not assigned to a detector
Sample S-0351-V5 not assigned to a detector

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,811 7:18:05AM 12/29/2021

Sample

Sample: S-0329-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

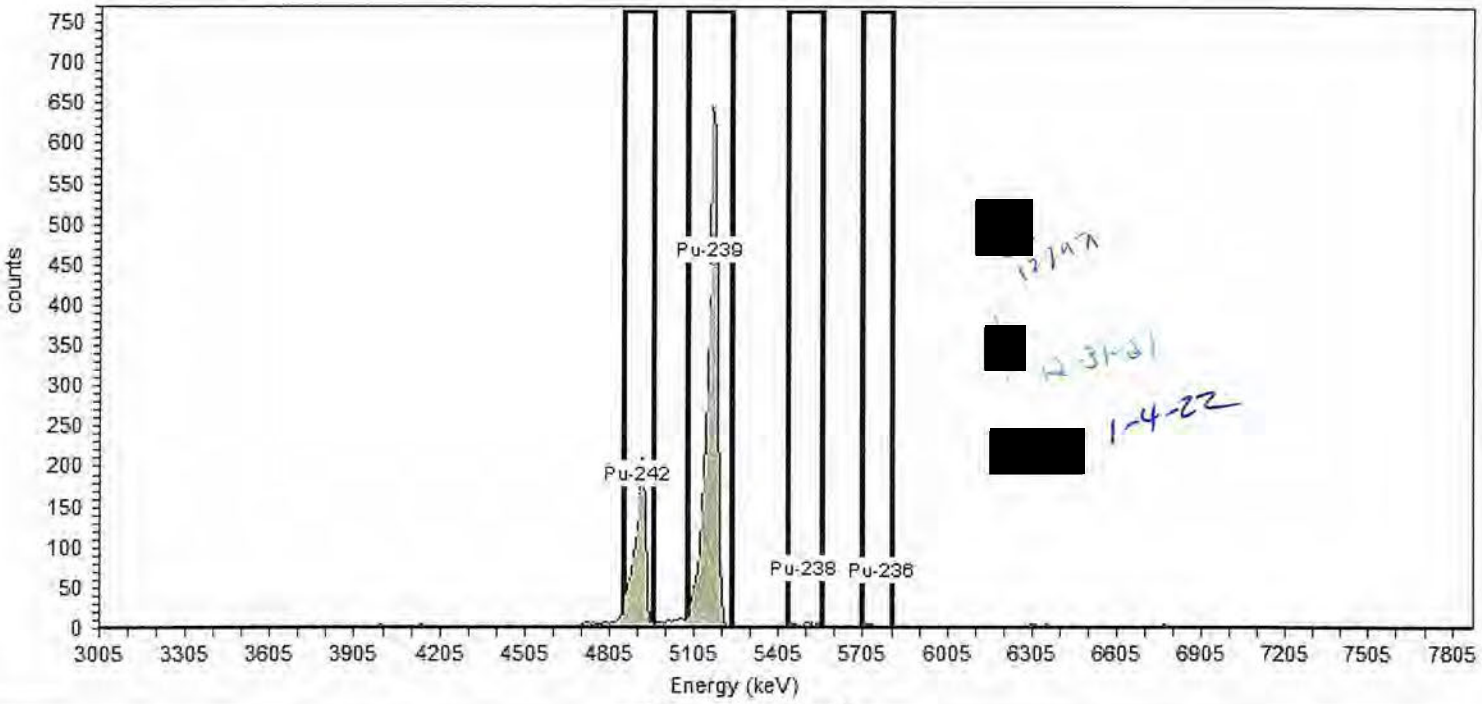
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D4, SN: 5402927, ID: 4
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D4; Det: 14314612 - D4; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 4

Energy Calibration: D4 calib 10-14-18
Efficiency Calibration:D4 calib 10-14-18
Calibration Date: 10/25/2018 6:23:58AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 26.16% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4852.822	4958.618	42.3	100.4	953.00	4.5000	948.50	5.016E+000	2.099E-001	2.260E-002	5.952E-002
Pu-239	5155.993	5083.487	5236.928	36.7	99.9	2,961.00	14.0000	2947.00	1.566E+001	5.028E-001	4.007E-002	9.452E-002
Pu-238	5498.999	5437.914	5562.103	102.2	99.9	29.00	10.0000	19.00	1.010E-001	3.111E-002	3.386E-002	8.211E-002
Pu-236	5769.999	5705.178	5809.950	24.0	99.9	9.00	8.0000	1.00	5.315E-003	1.916E-002	3.029E-002	7.496E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,804 1:01:35AM 12/29/2021

Sample

Sample: S-0329-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

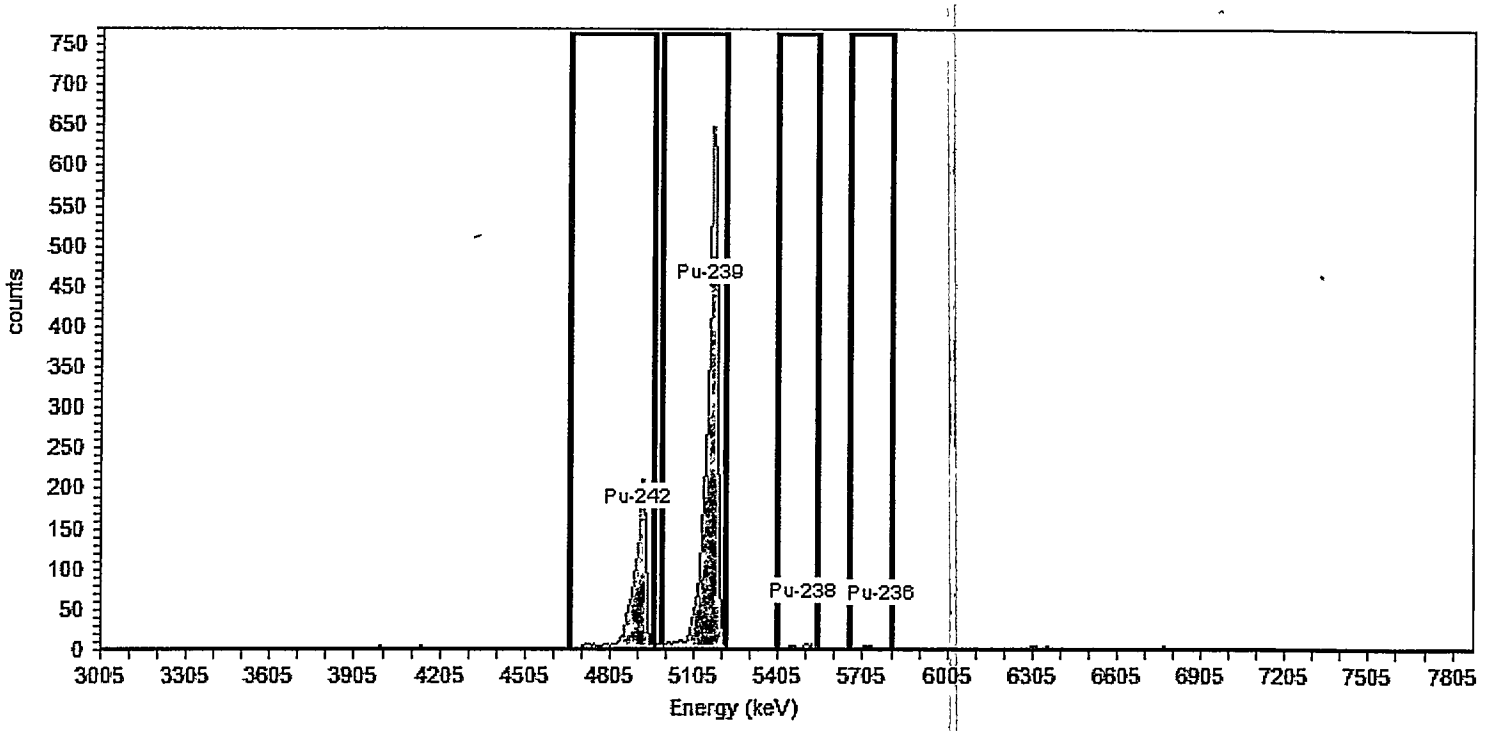
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D4, SN: 5402927, ID: 4
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D4; Det: 14314612 - D4; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 4

Energy Calibration: D4 calib 10-14-18
Efficiency Calibration:D4 calib 10-14-18
Calibration Date: 10/25/2018 6:23:58AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 26.16% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	37.1	100.5	1,024.99	17.9927	1006.99	5.320E+000	2.199E-001	4.515E-002	1.046E-001
Pu-239	5156.000	4988.000	5219.000	37.1	100.0	3,025.57	14.0645	3011.51	1.599E+001	5.114E-001	4.012E-002	9.460E-002
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	28.78	11.0000	17.78	9.449E-002	3.122E-002	3.552E-002	8.542E-002
Pu-236	5770.000	5662.000	5810.000	24.0	99.9	10.53	10.4759	0.05	2.839E-004	2.111E-002	3.466E-002	8.370E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 23,812 7:18:19AM 12/29/2021

Sample

Sample: S-0329-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

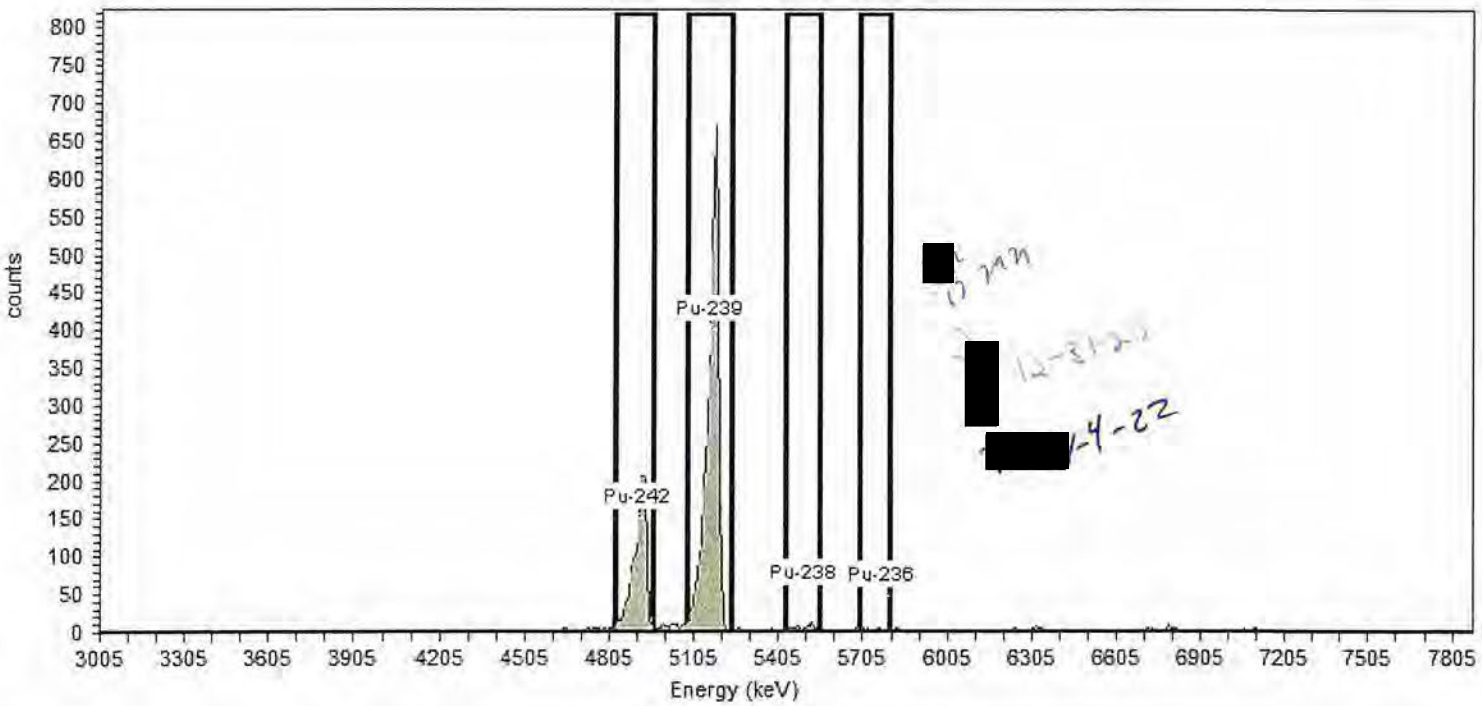
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D5, SN: 5402928, ID: 5
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D5; Det: 14314613 - D5; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 5

Energy Calibration: D5 calib 10-10-18
Efficiency Calibration:D5 calib 10-10-18
Calibration Date: 10/15/2018 9:50:48AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.74% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4958.618	47.2	100.4	1,071.00	1.0000	1070.00	5.751E+000	2.117E-001	1.083E-002	3.620E-002
Pu-239	5155.993	5083.487	5236.928	38.3	99.9	3,014.00	8.5000	3005.50	1.623E+001	4.454E-001	3.173E-002	7.807E-002
Pu-238	5498.999	5428.354	5552.556	32.2	99.9	39.00	11.0000	28.00	1.512E-001	3.617E-002	3.609E-002	8.681E-002
Pu-236	5769.999	5695.646	5800.430	30.8	99.9	12.00	11.0000	1.00	5.402E-003	2.260E-002	3.609E-002	8.681E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,800 1:00:56AM 12/29/2021

Sample

Sample: S-0329-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

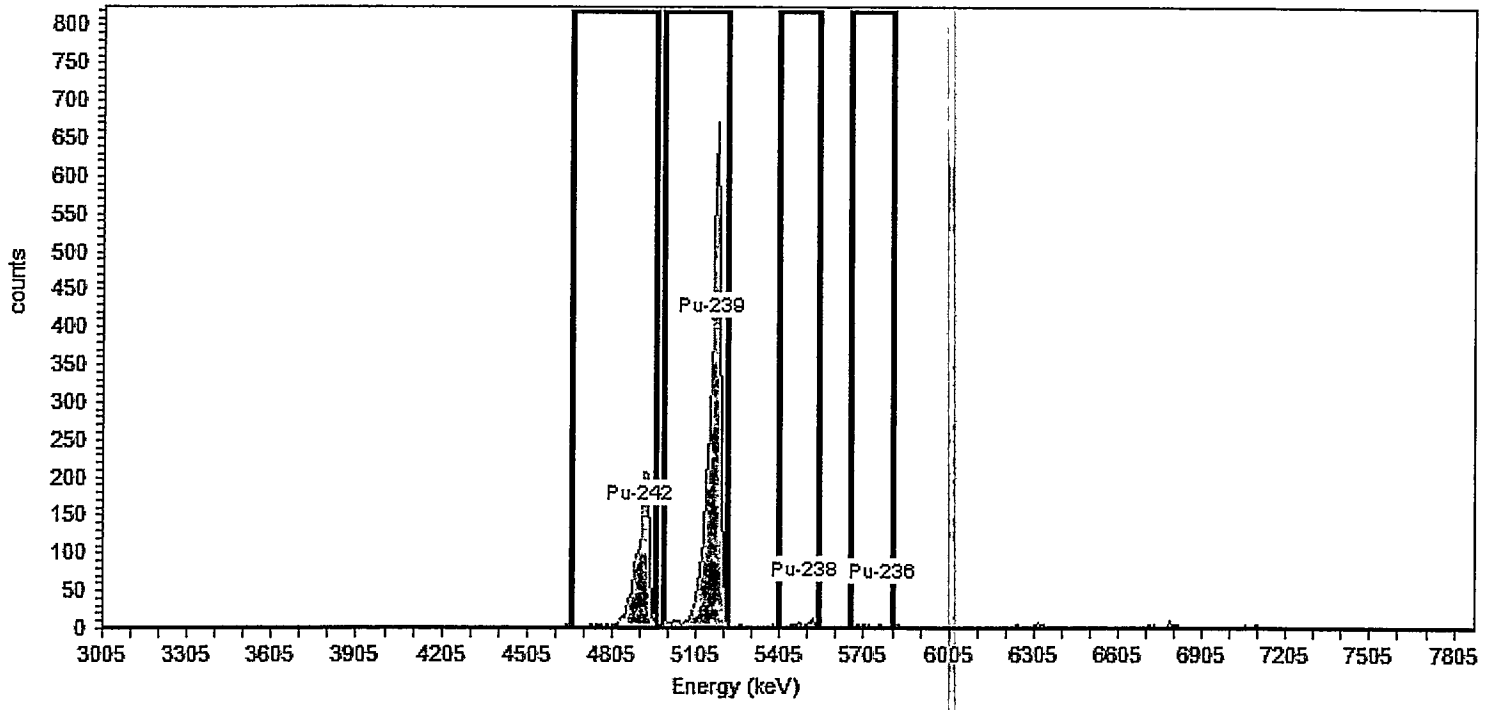
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D5, SN: 5402928, ID: 5
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D5; Det: 14314613 - D5; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 5

Energy Calibration: D5 calib 10-10-18
Efficiency Calibration:D5 calib 10-10-18
Calibration Date: 10/15/2018 9:50:48AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.74% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. / %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	38.3	100.5	1,096.16	5.0000	1091.16	5.859E+000	2.146E-001	2.419E-002	6.291E-002
Pu-239	5156.000	4988.000	5219.000	43.7	100.0	3,071.27	9.0645	3062.21	1.652E+001	4.515E-001	3.273E-002	8.006E-002
Pu-238	5499.000	5396.000	5539.000	29.6	99.9	38.42	12.5751	25.84	1.396E-001	3.623E-002	3.859E-002	9.180E-002
Pu-236	5770.000	5662.000	5810.000	51.2	99.9	15.00	13.5026	1.50	8.088E-003	2.519E-002	3.999E-002	9.460E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 23,813 7:18:33AM 12/29/2021

Sample

Sample: S-0329-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

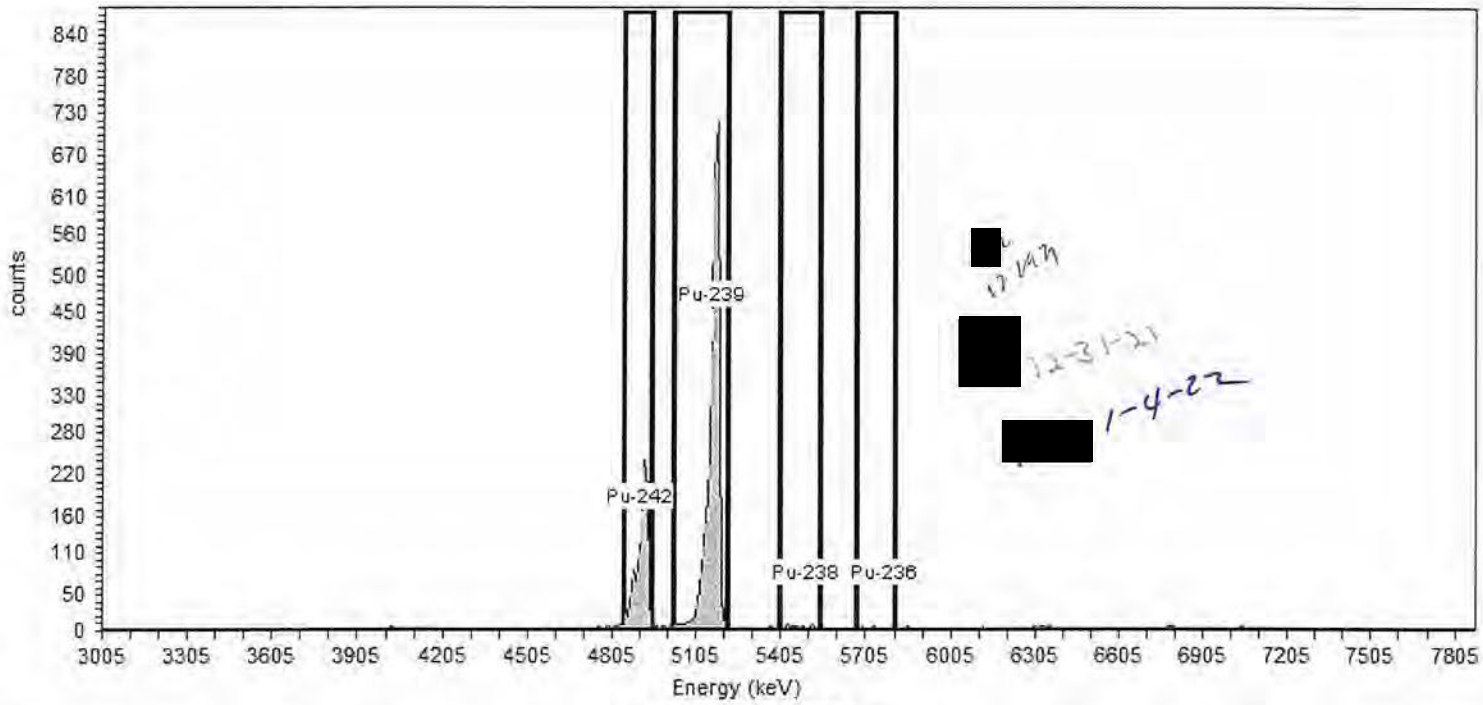
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D6, SN: 5403002, ID: 6
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D6; Det: 14314613 - D6; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 6

Energy Calibration: 10-18-18 D6
Efficiency Calibration:10-18-18 D6
Calibration Date: 10/19/2018 6:42:33AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.53% +/- 1.04% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4843.198	4949.006	32.1	100.4	1,013.00	0.5000	1012.50	5.487E+000	2.058E-001	7.720E-003	3.010E-002
Pu-239	5155.993	5025.877	5217.763	32.8	99.9	2,829.00	14.5000	2814.50	1.533E+001	4.272E-001	4.178E-002	9.830E-002
Pu-238	5498.999	5396.000	5539.000	0.0	99.9	30.42	9.8083	20.61	1.123E-001	3.245E-002	3.436E-002	8.347E-002
Pu-236	5769.999	5676.582	5809.950	55.7	99.9	8.00	7.5000	0.50	2.723E-003	1.867E-002	3.005E-002	7.484E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,801 1:01:07AM 12/29/2021

Sample

Sample: S-0329-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

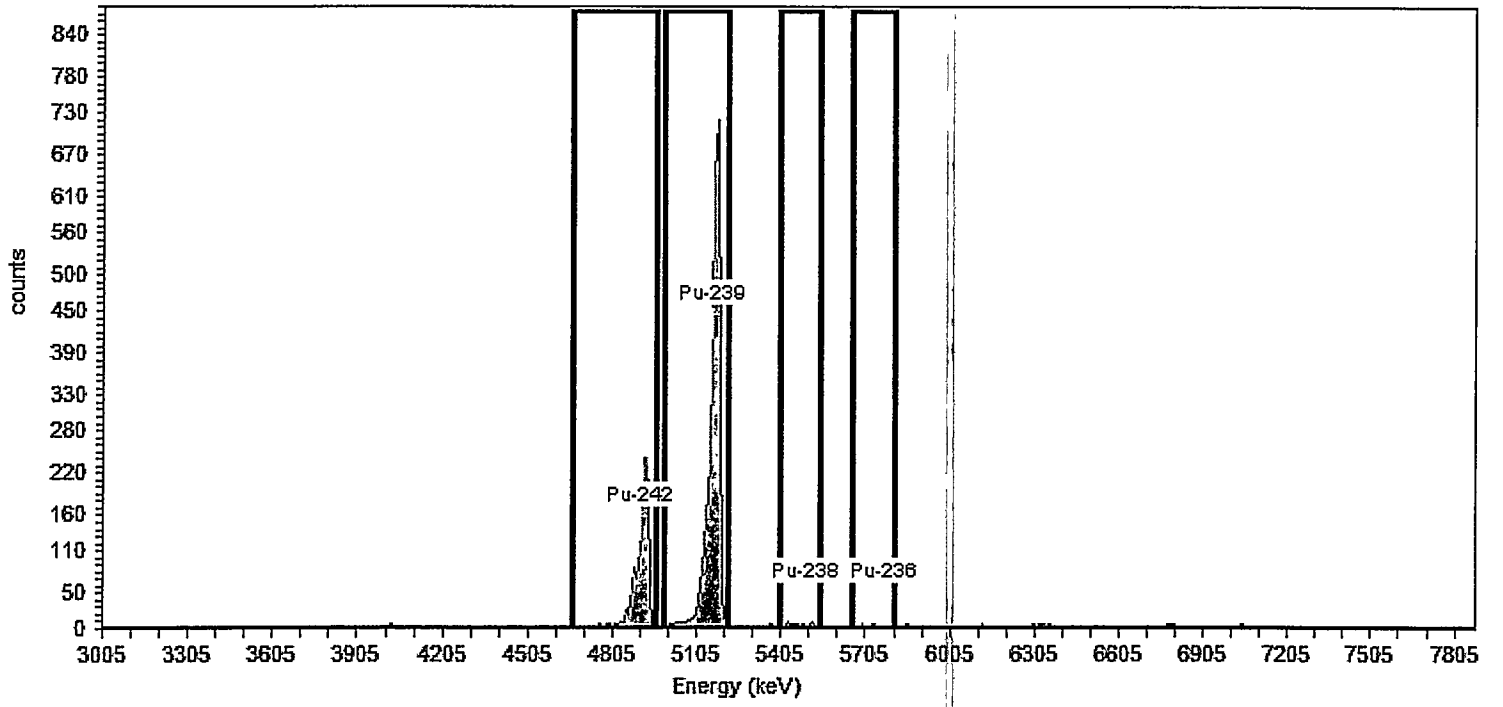
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D6, SN: 5403002, ID: 6
Acquisition Start Date: 12/28/2021 , 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D6; Det: 14314613 - D6; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 6

Energy Calibration: 10-18-18 D6
Efficiency Calibration:10-18-18 D6
Calibration Date: 10/19/2018 6:42:33AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.53% +/- 1.04% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	32.1	100.5	1,040.05	13.4927	1026.56	5.558E+000	2.088E-001	4.007E-002	9.478E-002
Pu-239	5156.000	4988.000	5219.000	32.8	100.0	2,837.89	14.5286	2823.36	1.536E+001	4.278E-001	4.178E-002	9.828E-002
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	30.42	9.8083	20.61	1.123E-001	3.245E-002	3.436E-002	8.347E-002
Pu-236	5770.000	5662.000	5810.000	53.8	99.9	8.00	7.7647	0.24	1.282E-003	1.877E-002	3.058E-002	7.589E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 23,814 7:18:46AM 12/29/2021

Sample

Sample: S-0329-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

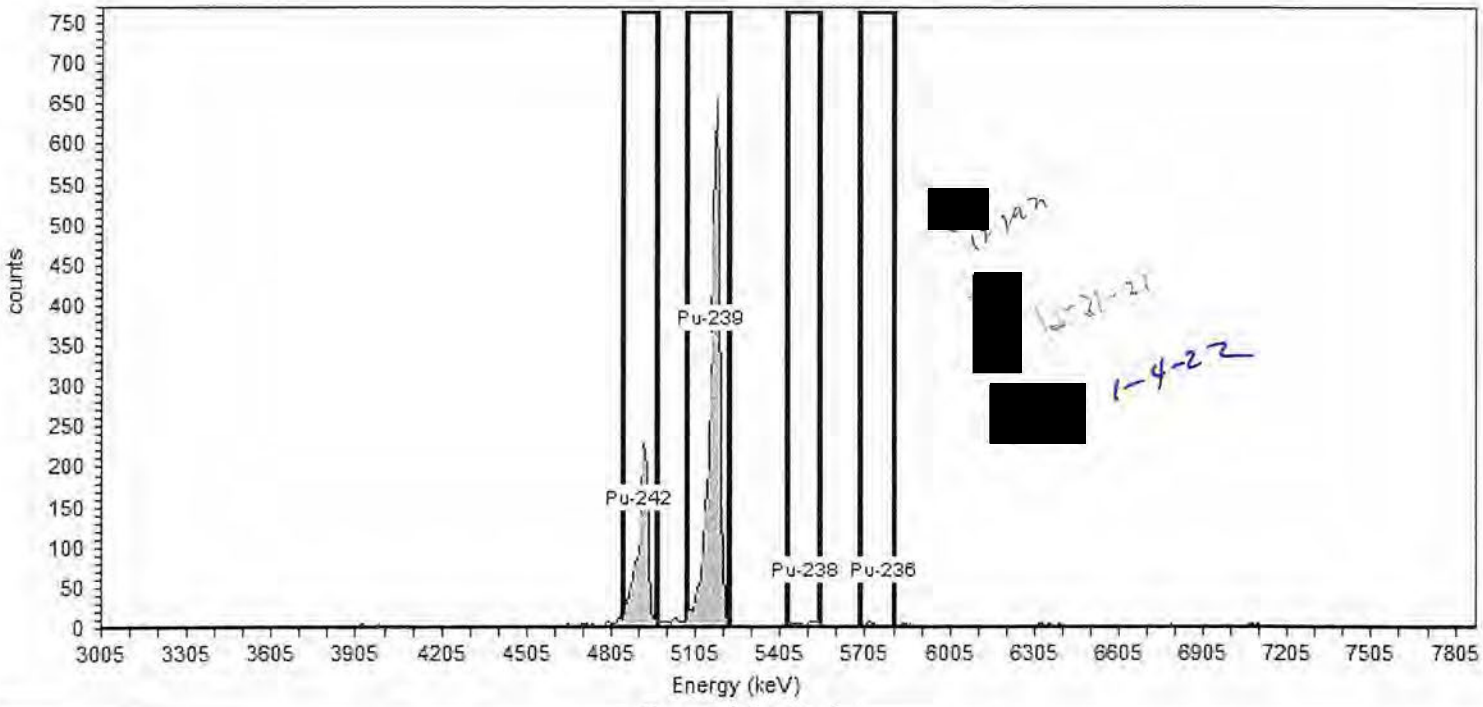
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D7, SN: 5403003, ID: 7
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D7; Det: 14314614 - D7; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 7

Energy Calibration: D7 calib 10-22-18
Efficiency Calibration: D7 calib 10-22-18
Calibration Date: 10/23/2018 6:29:02AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.02% +/- 1.02% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction: 12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4843.198	4968.230	34.6	100.4	1,008.00	2.0000	1006.00	5.561E+000	2.093E-001	1.575E-002	4.646E-002
Pu-239	5155.993	5073.888	5227.346	34.8	99.9	2,787.00	17.5000	2769.50	1.539E+001	4.307E-001	4.683E-002	1.087E-001
Pu-238	5498.999	5428.354	5543.008	0.0	99.9	31.00	10.0000	21.00	1.167E-001	3.342E-002	3.540E-002	8.583E-002
Pu-236	5769.999	5686.115	5809.950	24.1	99.9	10.00	7.5000	2.50	1.389E-002	2.060E-002	3.066E-002	7.635E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,803 1:01:26AM 12/29/2021

Sample

Sample: S-0329-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

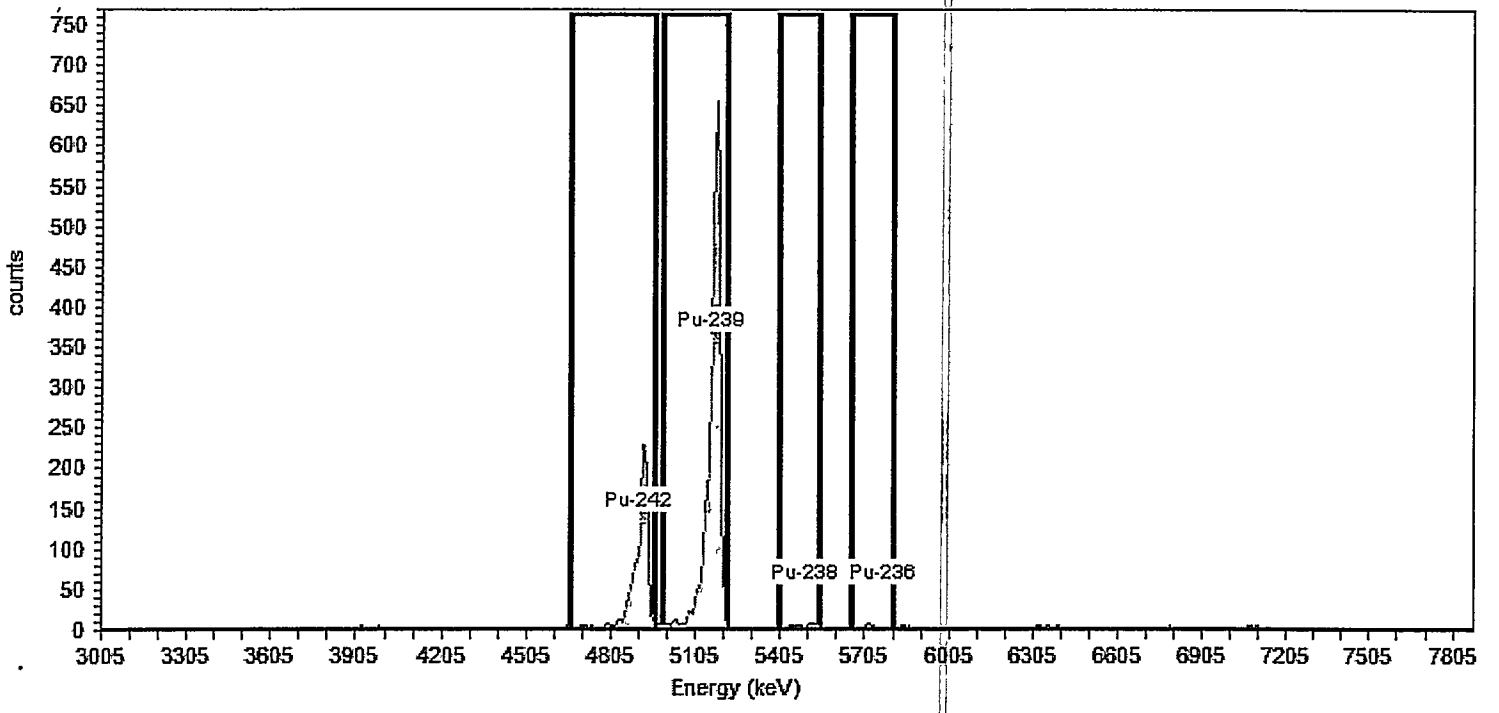
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D7, SN: 5403003, ID: 7
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D7; Det: 14314614 - D7; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 7

Energy Calibration: D7 calib 10-22-18
Efficiency Calibration:D7 calib 10-22-18
Calibration Date: 10/23/2018 6:29:02AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.02% +/- 1.02% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	32.0	100.5	1,042.90	16.0073	1026.89	5.671E+000	2.134E-001	4.452E-002	1.040E-001
Pu-239	5156.000	4988.000	5219.000	39.6	100.0	2,829.93	19.6005	2810.33	1.560E+001	4.352E-001	4.950E-002	1.140E-001
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	29.22	11.1166	18.11	1.006E-001	3.283E-002	3.732E-002	8.968E-002
Pu-236	5770.000	5662.000	5810.000	24.0	99.9	10.48	7.9974	2.48	1.377E-002	2.114E-002	3.166E-002	7.835E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,815 7:19:01AM 12/29/2021

Sample

Sample: S-0329-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

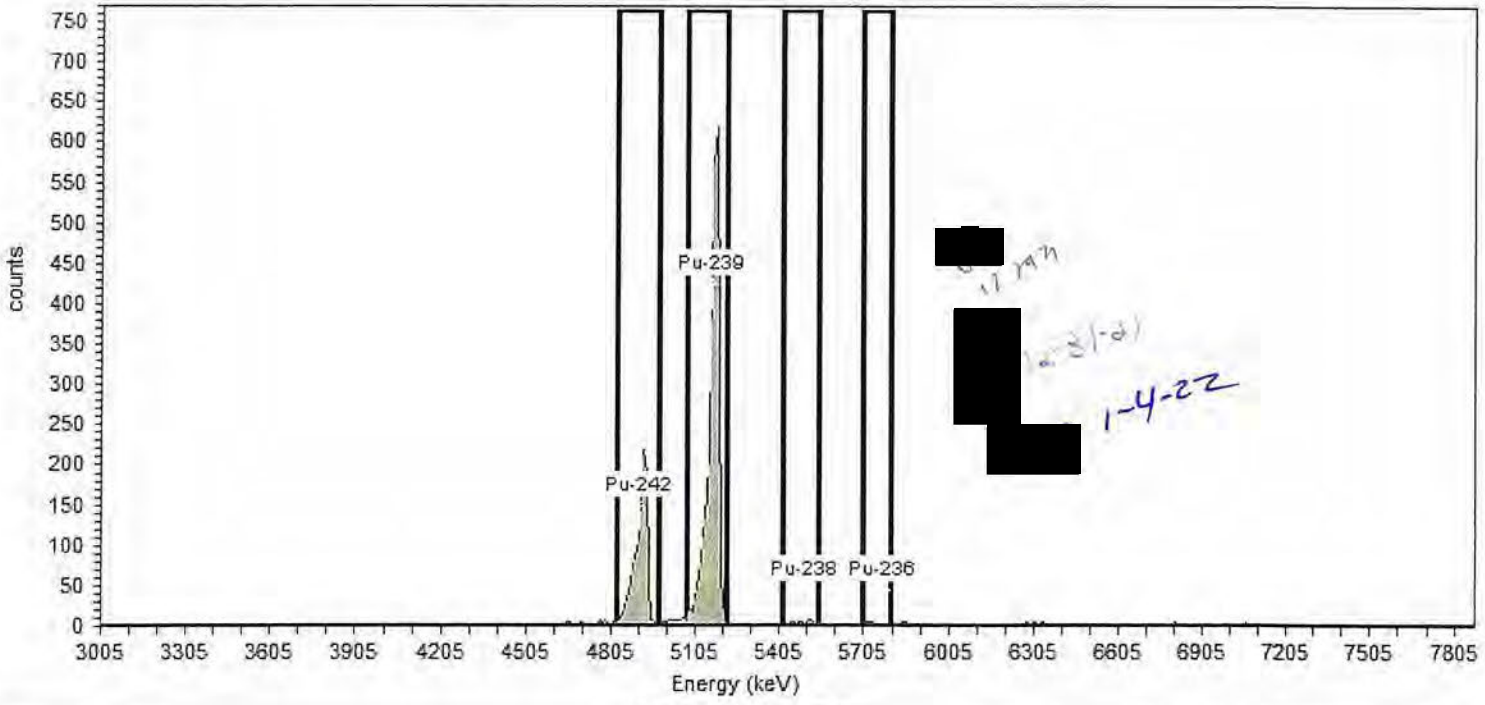
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D8, SN: 5403004, ID: 8
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D8; Det: 14314614 - D8; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 8

Energy Calibration: D8 calib 10-24-18
Efficiency Calibration:D8 calib 10-24-18
Calibration Date: 10/25/2018 6:25:10AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.21% +/- 1.03% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4977.840	35.8	100.4	992.00	3.5000	988.50	5.424E+000	2.055E-001	2.068E-002	5.621E-002
Pu-239	5155.993	5073.888	5217.763	34.8	99.9	2,626.00	25.0000	2601.00	1.434E+001	4.080E-001	5.555E-002	1.260E-001
Pu-238	5498.999	5418.792	5543.008	20.6	99.9	24.00	12.0000	12.00	6.617E-002	3.023E-002	3.849E-002	9.189E-002
Pu-236	5769.999	5705.178	5800.430	25.4	99.9	8.00	14.0000	-6.00	0.000E+000	2.137E-002	4.157E-002	9.806E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,802 1:01:17AM 12/29/2021

Sample

Sample: S-0329-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

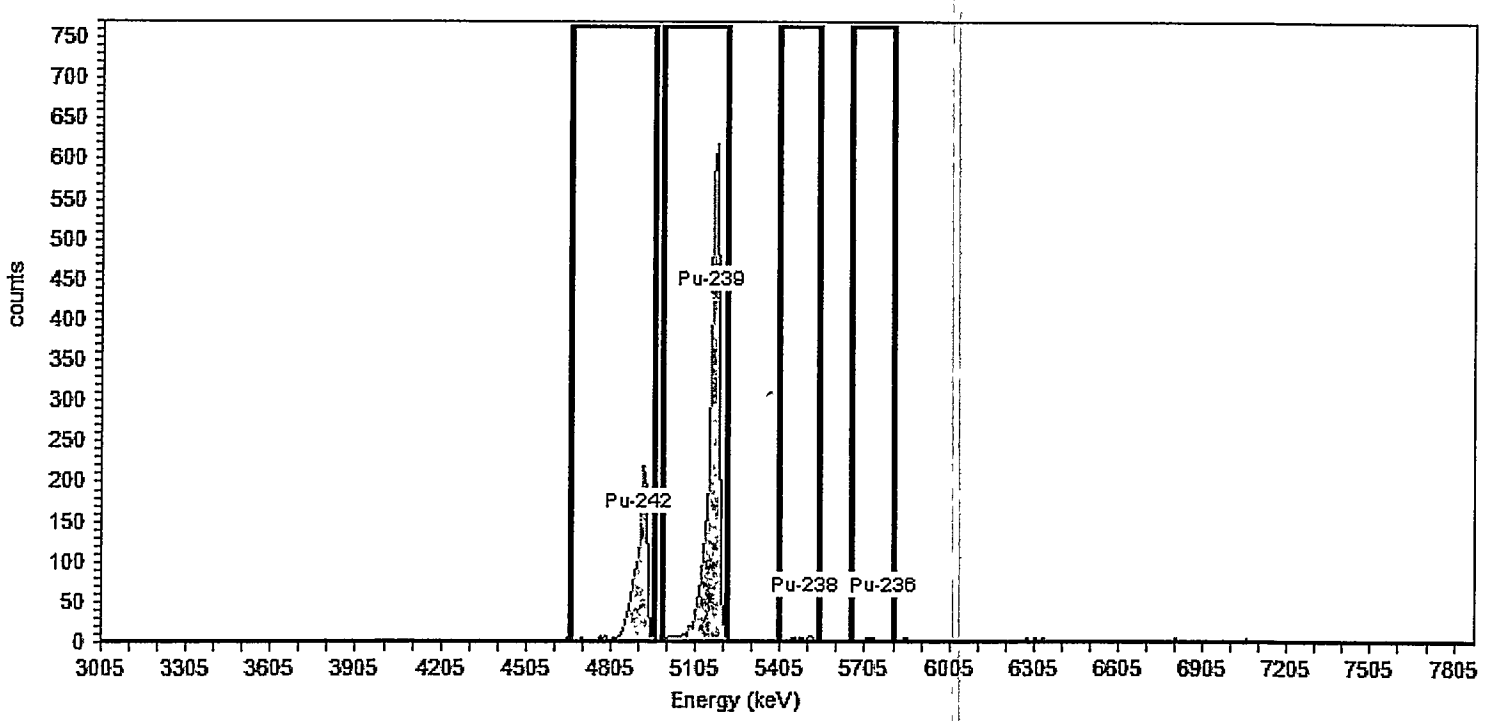
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D8, SN: 5403004, ID: 8
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D8; Det: 14314614 - D8; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 8

Energy Calibration: D8 calib 10-24-18
Efficiency Calibration:D8 calib 10-24-18
Calibration Date: 10/25/2018 6:25:10AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.21% +/- 1.03% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	33.8	100.5	1,005.95	14.0617	991.88	5.437E+000	2.069E-001	4.141E-002	9.766E-002
Pu-239	5156.000	4988.000	5219.000	34.8	100.0	2,660.00	27.6291	2632.37	1.450E+001	4.114E-001	5.833E-002	1.316E-001
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	23.80	12.4067	11.40	6.284E-002	3.023E-002	3.913E-002	9.319E-002
Pu-236	5770.000	5662.000	5810.000	24.0	99.9	11.00	14.2353	-3.24	0.000E+000	2.347E-002	4.192E-002	9.876E-002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

81164-526
Pu-239 5 mL Liquid in Flame Sealed Vial

Customer: American Radiation Service
P.O. No.: 09-0738, Item 1

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Pu-239	8.803E+06	3.619E+04	0.1	0.9	1.8	11/23/2009

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities <0.1%, Pu-240 1189 Bq, Pu-241 1169 Bq, Pu-242 0.18 Bq, Am-241 278 Bq. 5.55048 g 3M HNO3 solution, carrier free.

Source Prepared by: [redacted]
[redacted] Radiochemist

QA Approved: [redacted]
[redacted] QA Manager

Date: 11-30-09

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

ARS Aleut Analytical

Alpa Spec Standard Verification

	Std. ID	Isotope
Analyte	**S-0329**	**Pu-239**
Tracer	**S-0351**	**Pu-242**

Expires: 12/31/2022

S-0329 Net	S-0351 Net	Grams of S-0351	S-0351 dpm/g	S-0351 dpm added	S-0329 dpm	Grams of S-0329	S-0329 dpm/g
2961	948.5	1.1071	5.4660	6.0514086	18.891	1.1201	16.8655595
3014	1070	1.0989	5.4660	6.0065874	16.919	1.1095	15.2496531
2829	1012.5	1.1001	5.4660	6.0131466	16.801	1.1067	15.18132919
2787	1006	1.0984	5.4660	6.0038544	16.633	1.1058	15.04154869
2626	988.5	1.0977	5.4660	6.0000282	15.939	1.1049	14.42608099

Average	15.353
Known Value	15.581
Average/stdev	5.902%
% Bias	1.484%

Performed by: [redacted] Date: 12/31/2021

Reviewed by: [redacted] Date: 12-31-21

QA Approval: [redacted] Date: 1-4-22

ARS-038-003 r0.2
Revision Date: 01/23/2019

ARS Aleut Analytical

Weight Spreadsheet for TWO Standards Verification

S-0329 Verification Weights	
Tech:	GPR
Pippete:	RU07688
Scale ID:	P214062006
Standard 1 ID:	S-0329
Standard 2 ID:	S-0351
Sample ID	Std. Weight(g)
S-0329-V1	1.1201
S-0329-V2	1.1095
S-0329-V3	1.1067
S-0329-V4	1.1058
S-0329-V5	1.1049
S-0351-V1	1.1071
S-0351-V2	1.0989
S-0351-V3	1.1001
S-0351-V4	1.0984
S-0351-V5	1.0977

Samples to be counted:

Sample S-0329-V1 to detector 14314612 - D4, marked to be counted
Sample S-0329-V2 to detector 14314613 - D5, marked to be counted
Sample S-0329-V3 to detector 14314613 - D6, marked to be counted
Sample S-0329-V4 to detector 14314614 - D7, marked to be counted
Sample S-0329-V5 to detector 14314614 - D8, marked to be counted
Sample S-0351-V1 not assigned to a detector
Sample S-0351-V2 not assigned to a detector
Sample S-0351-V3 not assigned to a detector
Sample S-0351-V4 not assigned to a detector
Sample S-0351-V5 not assigned to a detector

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 23,811 7:18:05AM 12/29/2021

Sample

Sample: S-0329-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

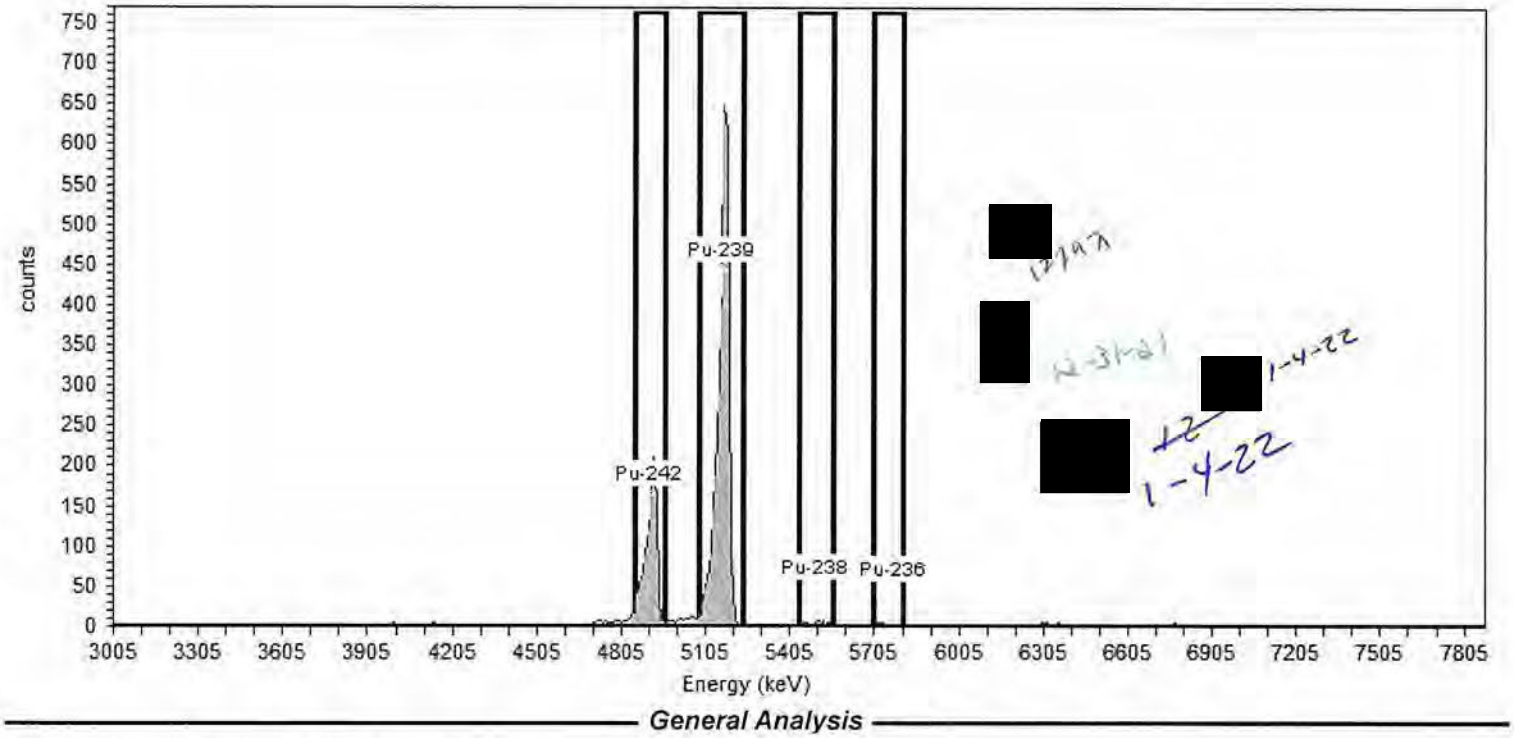
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D4, SN: 5402927, ID: 4
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D4; Det: 14314612 - D4; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 4

Energy Calibration: D4 calib 10-14-18
Efficiency Calibration:D4 calib 10-14-18
Calibration Date: 10/25/2018 6:23:58AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 26.16% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4852.822	4958.618	42.3	100.4	953.00	4.5000	948.50	5.016E+000	2.099E-001	2.260E-002	5.952E-002
Pu-239	5155.993	5083.487	5236.928	36.7	99.9	2,961.00	14.0000	2947.00	1.566E+001	5.028E-001	4.007E-002	9.452E-002
Pu-238	5498.999	5437.914	5562.103	102.2	99.9	29.00	10.0000	19.00	1.010E-001	3.111E-002	3.386E-002	8.211E-002
Pu-236	5769.999	5705.178	5809.950	24.0	99.9	9.00	8.0000	1.00	5.315E-003	1.916E-002	3.029E-002	7.496E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,804 1:01:35AM 12/29/2021

Sample

Sample: S-0329-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

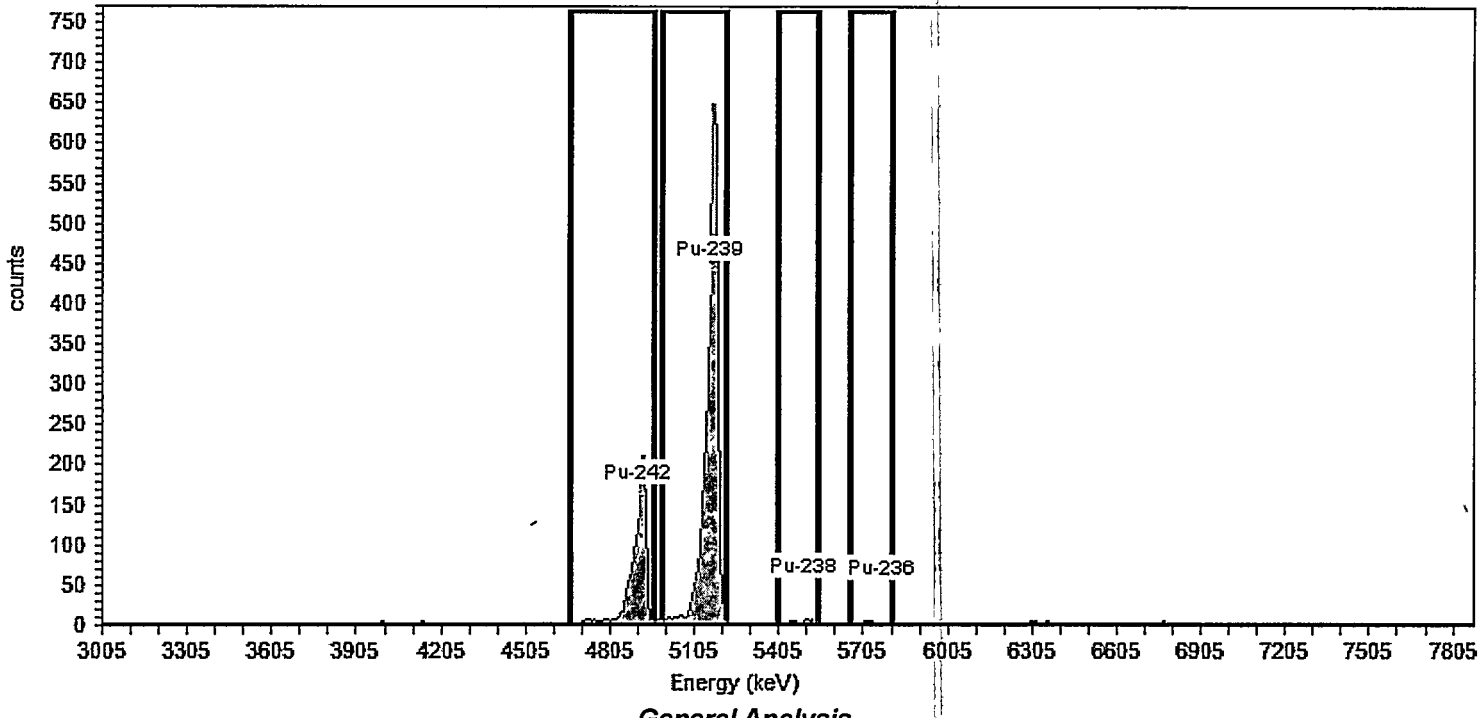
Tracer Name: Undefined
Tracer Activity: .
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D4, SN: 5402927, ID: 4
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D4; Det: 14314612 - D4; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 4

Energy Calibration: D4 calib 10-14-18
Efficiency Calibration:D4 calib 10-14-18
Calibration Date: 10/25/2018 6:23:58AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.16% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	37.1	100.5	1,024.99	17.9927	1006.99	5.320E+000	2.199E-001	4.515E-002	1.046E-001
Pu-239	5156.000	4988.000	5219.000	37.1	100.0	3,025.57	14.0645	3011.51	1.599E+001	5.114E-001	4.012E-002	9.460E-002
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	28.78	11.0000	17.78	9.449E-002	3.122E-002	3.552E-002	8.542E-002
Pu-236	5770.000	5662.000	5810.000	24.0	99.9	10.53	10.4759	0.05	2.839E-004	2.111E-002	3.466E-002	8.370E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 23,812 7:18:19AM 12/29/2021

Sample

Sample: S-0329-V2 Type: Sample
Spectrum #1 Analysis #1
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
Description:

Client Name: Undefined
Client Contact:

Tracer

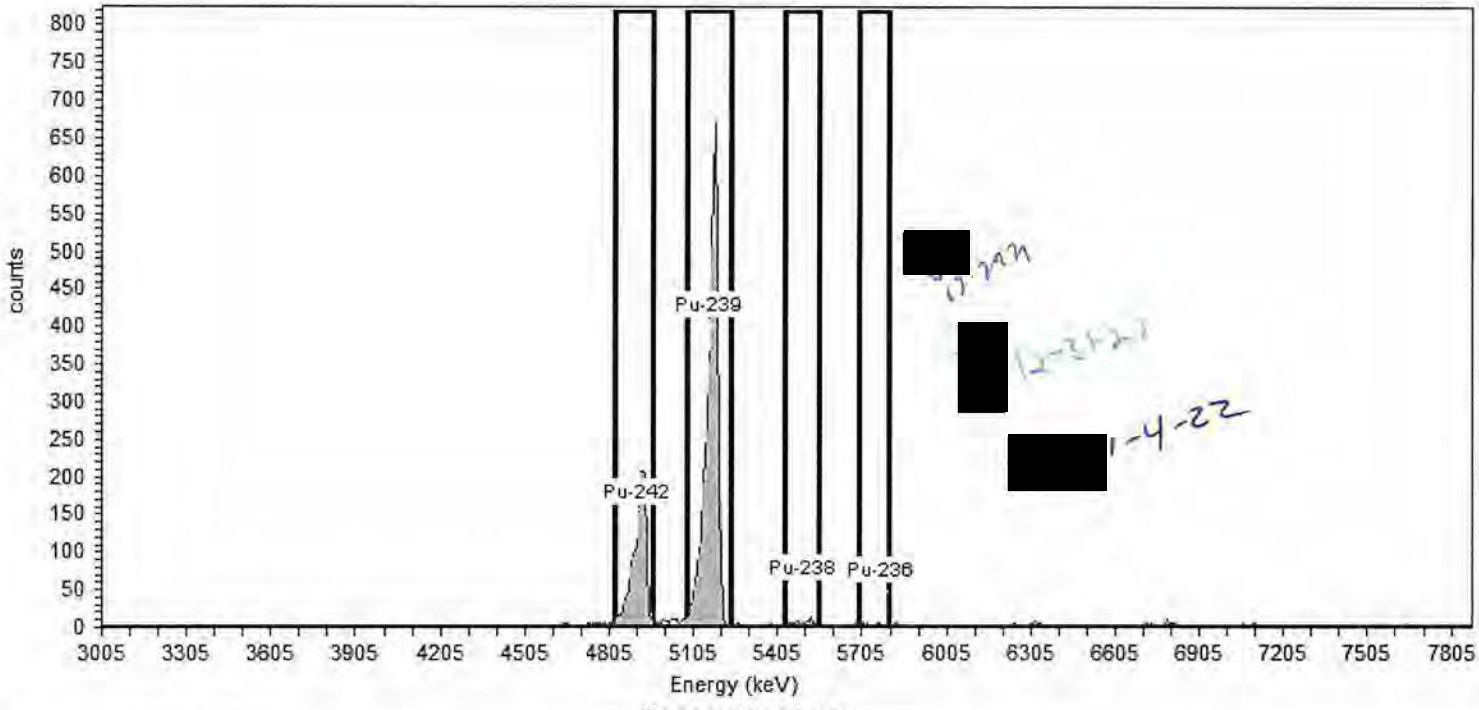
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D5, SN: 5402928, ID: 5
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D5; Det: 14314613 - D5; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 5

Energy Calibration: D5 calib 10-10-18
Efficiency Calibration:D5 calib 10-10-18
Calibration Date: 10/15/2018 9:50:48AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.74% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4958.618	47.2	100.4	1,071.00	1.0000	1070.00	5.751E+000	2.117E-001	1.083E-002	3.620E-002
Pu-239	5155.993	5083.487	5236.928	38.3	99.9	3,014.00	8.5000	3005.50	1.623E+001	4.454E-001	3.173E-002	7.807E-002
Pu-238	5498.999	5428.354	5552.556	32.2	99.9	39.00	11.0000	28.00	1.512E-001	3.617E-002	3.609E-002	8.681E-002
Pu-236	5769.999	5695.646	5800.430	30.8	99.9	12.00	11.0000	1.00	5.402E-003	2.260E-002	3.609E-002	8.681E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,800 1:00:56AM 12/29/2021

Sample

Sample: S-0329-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

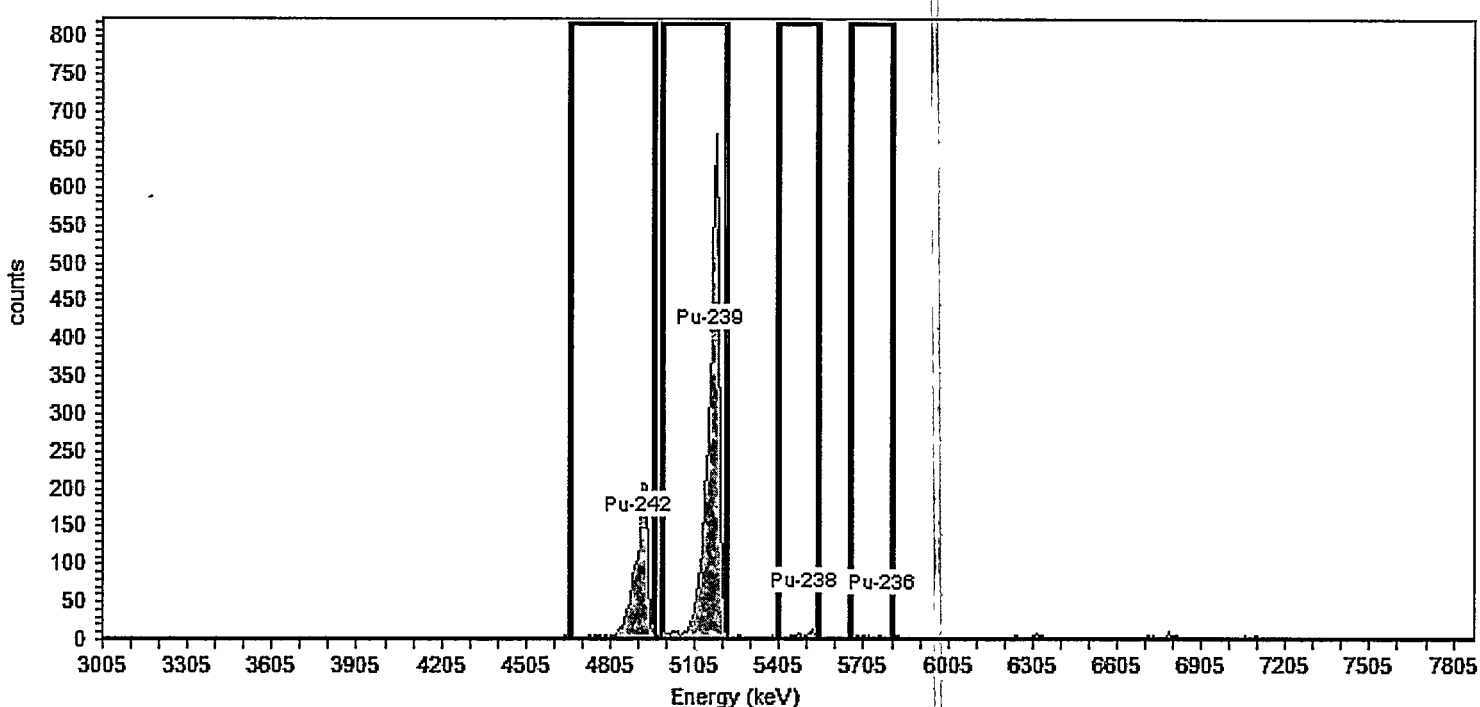
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D5, SN: 5402928, ID: 5
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D5; Det: 14314613 - D5; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 5

Energy Calibration: D5 calib 10-10-18
Efficiency Calibration:D5 calib 10-10-18
Calibration Date: 10/15/2018 9:50:48AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.74% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	38.3	100.5	1,096.16	5.0000	1091.16	5.859E+000	2.146E-001	2.419E-002	6.291E-002
Pu-239	5156.000	4988.000	5219.000	43.7	100.0	3,071.27	9.0645	3062.21	1.652E+001	4.515E-001	3.273E-002	8.006E-002
Pu-238	5499.000	5396.000	5539.000	29.6	99.9	38.42	12.5751	25.84	1.396E-001	3.623E-002	3.859E-002	9.180E-002
Pu-236	5770.000	5662.000	5810.000	51.2	99.9	15.00	13.5026	1.50	8.088E-003	2.519E-002	3.999E-002	9.460E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 23,813 7:18:33AM 12/29/2021

Sample

Sample: S-0329-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

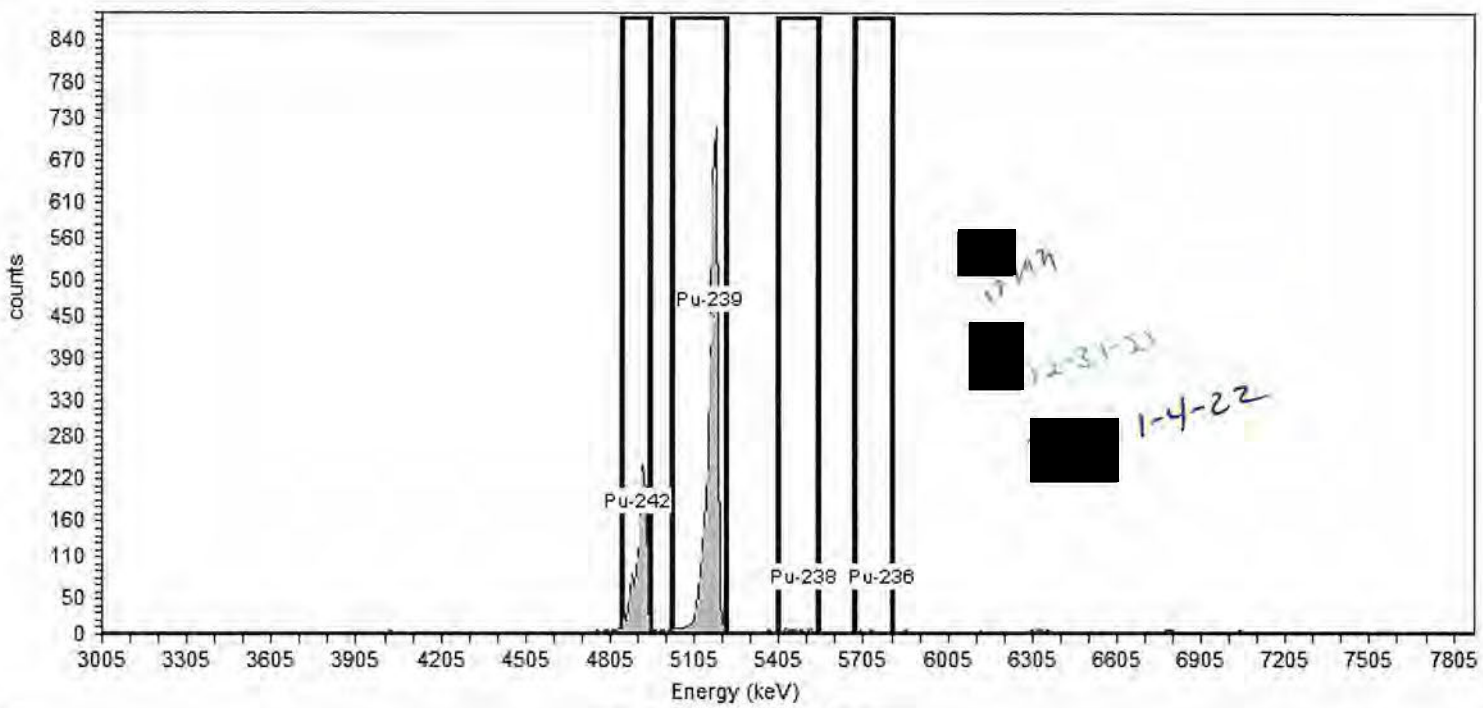
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D6, SN: 5403002, ID: 6
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D6; Det: 14314613 - D6; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 6

Energy Calibration: 10-18-18 D6
Efficiency Calibration:10-18-18 D6
Calibration Date: 10/19/2018 6:42:33AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.53% +/- 1.04% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4843.198	4949.006	32.1	100.4	1,013.00	0.5000	1012.50	5.487E+000	2.058E-001	7.720E-003	3.010E-002
Pu-239	5155.993	5025.877	5217.763	32.8	99.9	2,829.00	14.5000	2814.50	1.533E+001	4.272E-001	4.178E-002	9.830E-002
Pu-238	5498.999	5396.000	5539.000	0.0	99.9	30.42	9.8083	20.61	1.123E-001	3.245E-002	3.436E-002	8.347E-002
Pu-236	5769.999	5676.582	5809.950	55.7	99.9	8.00	7.5000	0.50	2.723E-003	1.867E-002	3.005E-002	7.484E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,801 1:01:07AM 12/29/2021

Sample

Sample: S-0329-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

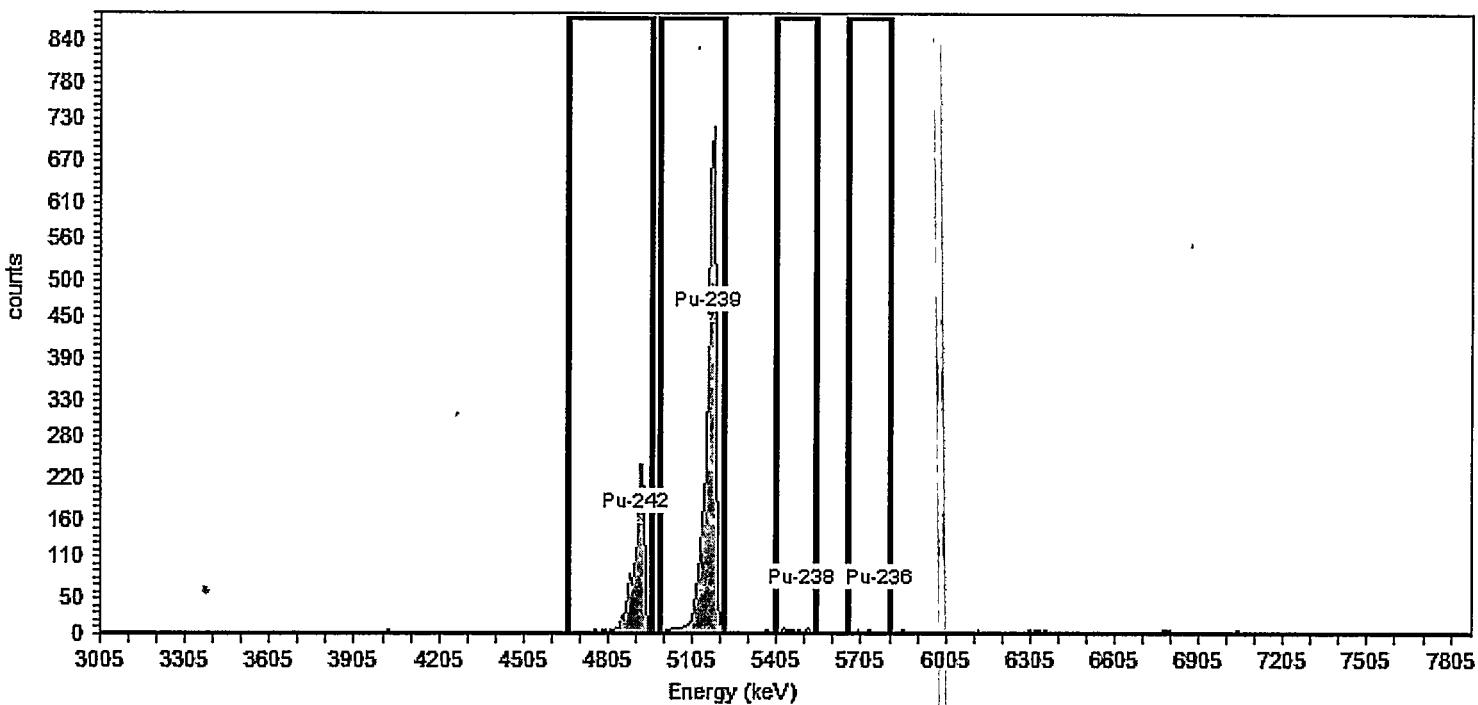
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D6, SN: 5403002, ID: 6
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:02PM
Bkgd Info: Sample: D6; Det: 14314613 - D6; Spectrum #1; 12/23/2021 1:25:02 PM; Live Time: 1440.000(min.); ID: 6

Energy Calibration: 10-18-18 D6
Efficiency Calibration:10-18-18 D6
Calibration Date: 10/19/2018 6:42:33AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.53% +/- 1.04% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	32.1	100.5	1,040.05	13.4927	1026.56	5.558E+000	2.088E-001	4.007E-002	9.478E-002
Pu-239	5156.000	4988.000	5219.000	32.8	100.0	2,837.89	14.5286	2823.36	1.536E+001	4.278E-001	4.178E-002	9.828E-002
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	30.42	9.8083	20.61	1.123E-001	3.245E-002	3.436E-002	8.347E-002
Pu-236	5770.000	5662.000	5810.000	53.8	99.9	8.00	7.7647	0.24	1.282E-003	1.877E-002	3.058E-002	7.589E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,814 7:18:46AM 12/29/2021

Sample

Sample: S-0329-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

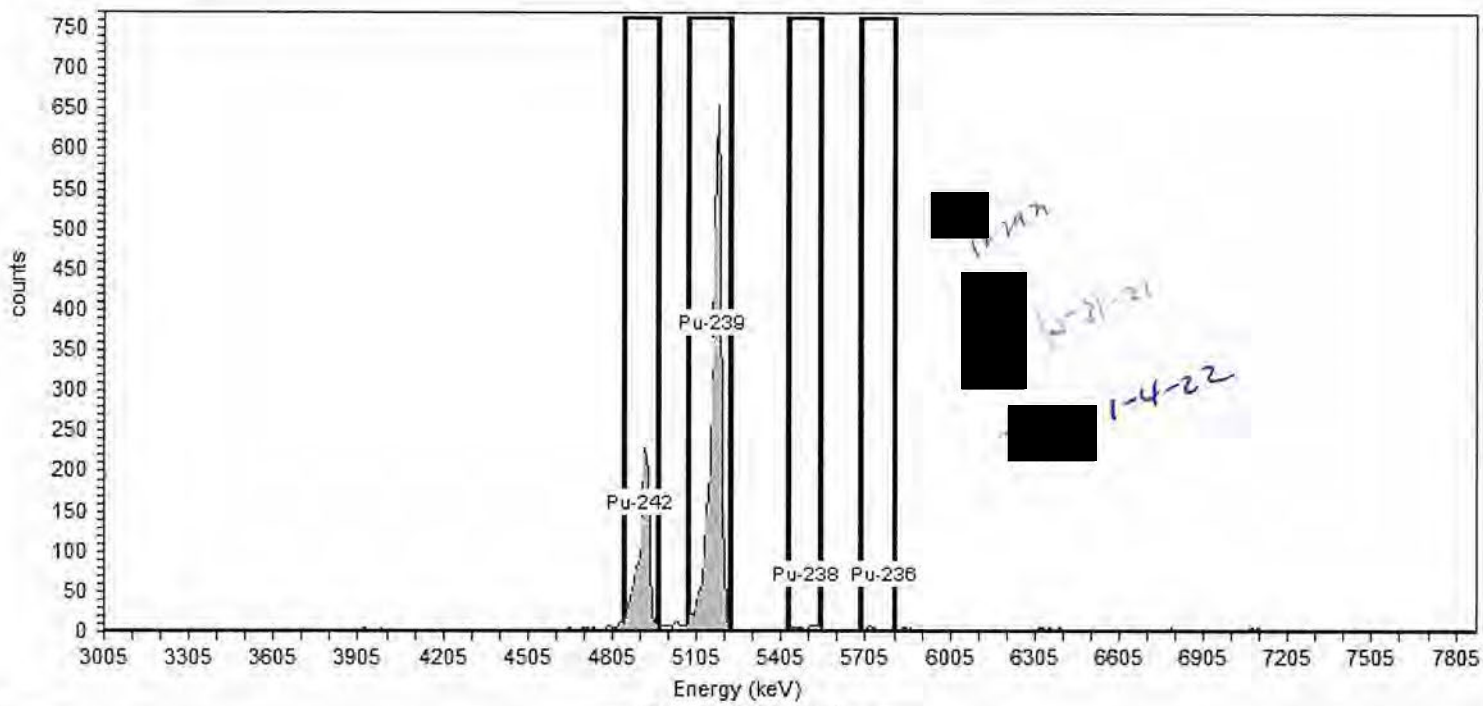
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D7, SN: 5403003, ID: 7
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D7; Det: 14314614 - D7; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 7

Energy Calibration: D7 calib 10-22-18
Efficiency Calibration:D7 calib 10-22-18
Calibration Date: 10/23/2018 6:29:02AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.02% +/- 1.02% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4843.198	4968.230	34.6	100.4	1,008.00	2.0000	1006.00	5.561E+000	2.093E-001	1.575E-002	4.646E-002
Pu-239	5155.993	5073.888	5227.346	34.8	99.9	2,787.00	17.5000	2769.50	1.539E+001	4.307E-001	4.683E-002	1.087E-001
Pu-238	5498.999	5428.354	5543.008	0.0	99.9	31.00	10.0000	21.00	1.167E-001	3.342E-002	3.540E-002	8.583E-002
Pu-236	5769.999	5686.115	5809.950	24.1	99.9	10.00	7.5000	2.50	1.389E-002	2.060E-002	3.066E-002	7.635E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,803 1:01:26AM 12/29/2021

Sample

Sample: S-0329-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

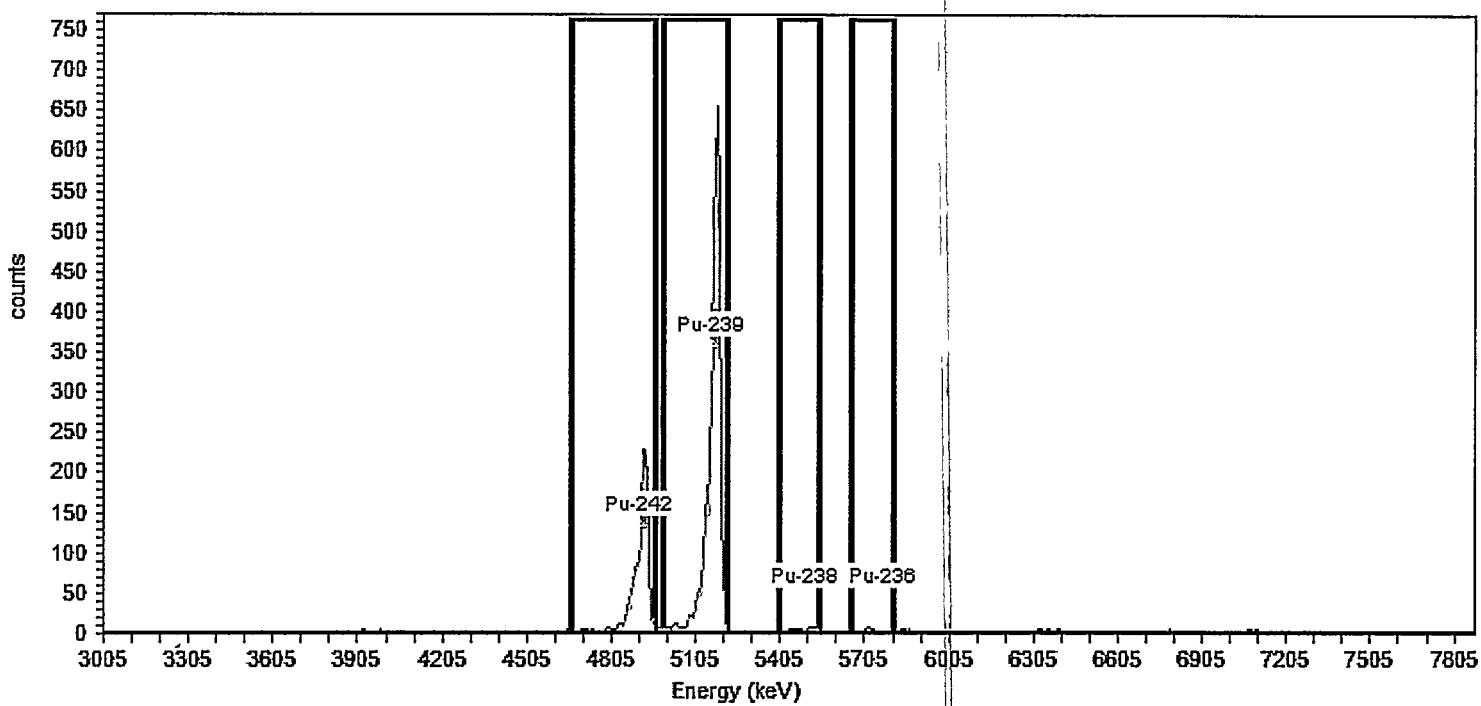
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D7, SN: 5403003, ID: 7
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D7; Det: 14314614 - D7; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 7

Energy Calibration: D7 calib 10-22-18
Efficiency Calibration:D7 calib 10-22-18
Calibration Date: 10/23/2018 6:29:02AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.02% +/- 1.02% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	32.0	100.5	1,042.90	16.0073	1026.89	5.671E+000	2.134E-001	4.452E-002	1.040E-001
Pu-239	5156.000	4988.000	5219.000	39.6	100.0	2,829.93	19.6005	2810.33	1.560E+001	4.352E-001	4.950E-002	1.140E-001
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	29.22	11.1166	18.11	1.006E-001	3.283E-002	3.732E-002	8.968E-002
Pu-236	5770.000	5662.000	5810.000	24.0	99.9	10.48	7.9974	2.48	1.377E-002	2.114E-002	3.166E-002	7.835E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 23,815 7:19:01AM 12/29/2021

Sample

Sample: S-0329-V5 Type: Sample
Spectrum #1 Analysis #1
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
Description:

Client Name: Undefined
Client Contact:

Tracer

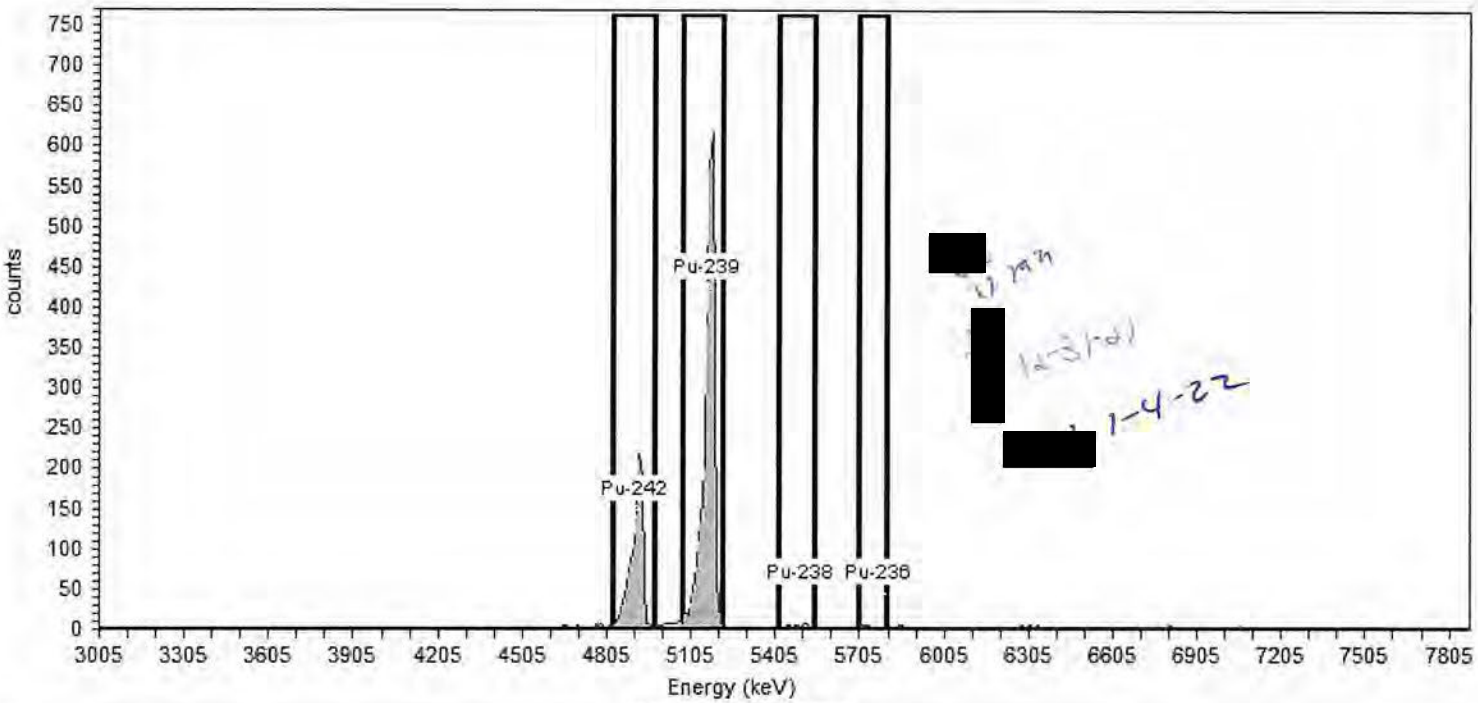
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D8, SN: 5403004, ID: 8
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D8; Det: 14314614 - D8; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 8

Energy Calibration: D8 calib 10-24-18
Efficiency Calibration:D8 calib 10-24-18
Calibration Date: 10/25/2018 6:25:10AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.21% +/- 1.03% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4901.995	4823.947	4977.840	35.8	100.4	992.00	3.5000	988.50	5.424E+000	2.055E-001	2.068E-002	5.621E-002
Pu-239	5155.993	5073.888	5217.763	34.8	99.9	2,626.00	25.0000	2601.00	1.434E+001	4.080E-001	5.555E-002	1.260E-001
Pu-238	5498.999	5418.792	5543.008	20.6	99.9	24.00	12.0000	12.00	6.617E-002	3.023E-002	3.849E-002	9.189E-002
Pu-236	5769.999	5705.178	5800.430	25.4	99.9	8.00	14.0000	-6.00	0.000E+000	2.137E-002	4.157E-002	9.806E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 23,802 1:01:17AM 12/29/2021

Sample

Sample: S-0329-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment:

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0329
:
Description:

Client Name: Undefined
Client Contact:

Tracer

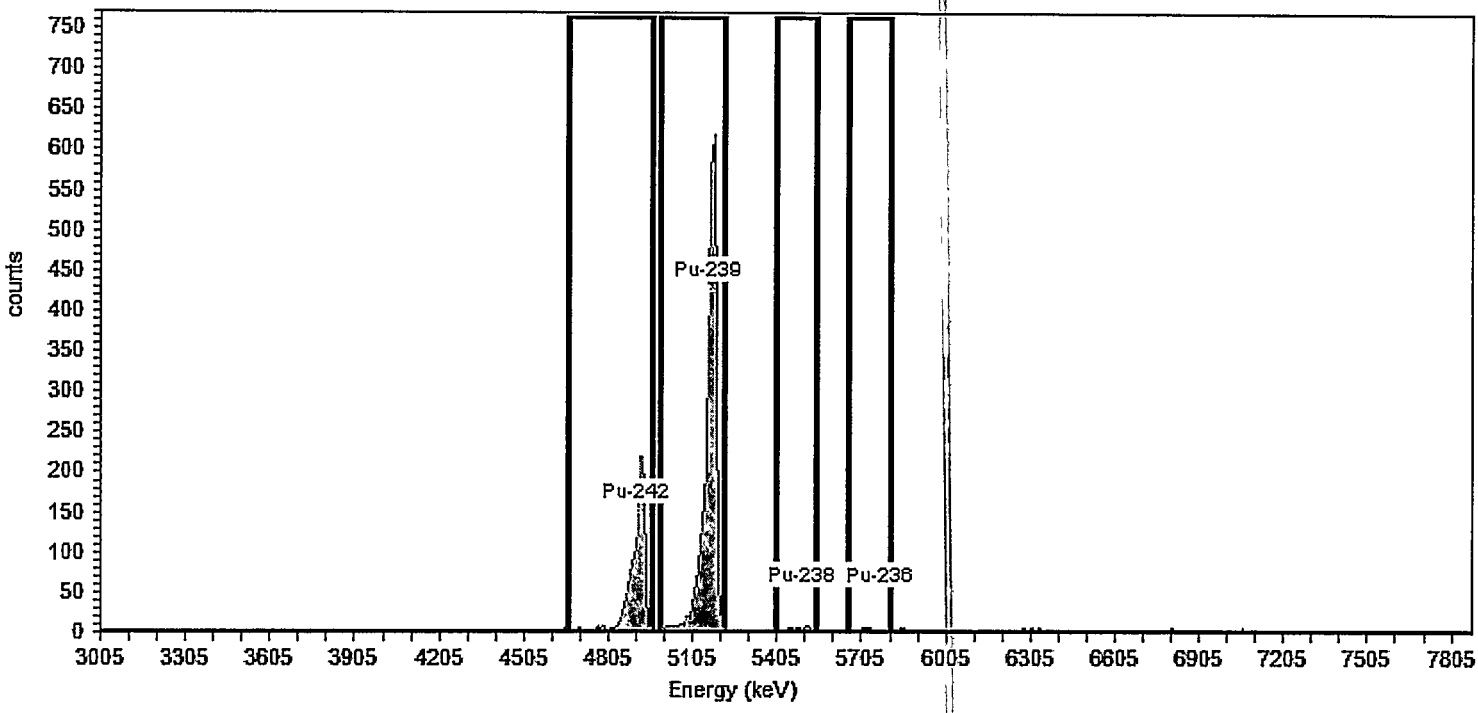
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D8, SN: 5403004, ID: 8
Acquisition Start Date: 12/28/2021 1:00:53PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 12/23/2021 1:25:03PM
Bkgd Info: Sample: D8; Det: 14314614 - D8; Spectrum #1; 12/23/2021 1:25:03 PM; Live Time: 1440.000(min.); ID: 8

Energy Calibration: D8 calib 10-24-18
Efficiency Calibration:D8 calib 10-24-18
Calibration Date: 10/25/2018 6:25:10AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.21% +/- 1.03% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Pu
Decay Correction:12/28/2021 12:58:34PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Plutonium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
Pu-242	4902.000	4660.000	4959.000	33.8	100.5	1,005.95	14.0617	991.88	5.437E+000	2.069E-001	4.141E-002	9.766E-002
Pu-239	5156.000	4988.000	5219.000	34.8	100.0	2,660.00	27.6291	2632.37	1.450E+001	4.114E-001	5.833E-002	1.316E-001
Pu-238	5499.000	5396.000	5539.000	0.0	99.9	23.80	12.4067	11.40	6.284E-002	3.023E-002	3.913E-002	9.319E-002
Pu-236	5770.000	5662.000	5810.000	24.0	99.9	11.00	14.2353	-3.24	0.000E+000	2.347E-002	4.192E-002	9.876E-002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 116597
Source Description: 1.0 Liter Liquid in 1 Liter Flame Sealed Glass Reagent Bottle
Product Code: 8242
Customer: ARS International, LLC
P.O. Number: 20-0214 PA LAB, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution calibrated by the National Institute of Standards and Technology (NIST). The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to NIST through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 17-July-2020 12:00 PM EST

Isotope	Half-Life, d	Activity, Bq	Uncertainty u_A, %	Uncertainty u_B, %	Uncertainty U, %*	Calibration Method**
Pu-242	1.362E+08	9.932E+01	0.4	1.0	2.2	4π LS

***Uncertainty:** U - Relative expanded uncertainty, $k = 2$. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results." ****Calibration Methods:** 4π LS - 4π Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber.

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

SRS Number: 116597

Comments:

1090.1 g of 3 M HNO_3 solution, carrier free.

Master solution: NIST SRM 4334j

Impurities:

α-impurities: Am-241 8.6E-03 Bq

β-impurities: Pu-241 1.3E-01 Bq

γ-impurities < 0.1%

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Prepared by [redacted] _____

[redacted] Radiochemist

QC Approved by: [redacted] _____ Date: 13-JUL-20

[redacted] Spectroscopist

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

COPY

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62919A-526

Mixed Alpha Source on Stainless Steel Disk

This standard radionuclide source was prepared by electro-deposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: January 18, 2002 12:00 EST

Total Activity: 482.5 dpm
Expanded Uncertainty (dpm [k=3]): 16.0

ISOTOPE:	U-238	U-234	Pu-239	Am-241
ACTIVITY (DPM):	120.9	117.5	119.7	119.3
HALF-LIFE:	4.468 E9 y	2.455 E5 y	2.41 E4 y	4.322 E2 y
EXPANDED UNCERTAINTY DPM (k=3):	5.2	5.1	5.2	5.2
ENERGY RANGE (keV):	3900-4290	4640-4980	4950-5260	5260-5590

Impurities: U-235 <4.7 dpm.
Disk diameter: 19.3 mm; disk thickness: 0.75 mm; diameter of active area: 16 mm.

P O Number: 01-0192, Item 2

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: [redacted] 1/23/02

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

COPY

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70719-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 507
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	122	2.455 E5 y	4	4580-4860
Pu-239	127	2.41 E4 y	4	4950-5240
Am-241	127	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈5.3 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: [redacted] 05-19-2005

ANALYTICS

1380 Seaboard Industrial Blvd
Atlanta, Georgia 30318 • U.S.A

Phone (404) 352-8677
Fax (404) 352-2837

COPY

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70720-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 509
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	123	2.455 E5 y	4	4580-4860
Pu-239	128	2.41 E4 y	4	4950-5240
Am-241	127	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈4.9 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: [redacted] 05-19-2005

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

COPY

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70721-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 509
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	125	2.455 E5 y	4	4580-4860
Pu-239	127	2.41 E4 y	4	4950-5240
Am-241	125	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈5.0 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: [redacted] 05-19-2005

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Alpha Spec U-Raw Data

Analytical Batch Report

Analysis Batch ID ARS1-B22-01102

Procedure PALA-RAD-026 **Analysis** ASP-U-AF **Prep** N/A

Description Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01102-01	LCS	B-31720										
ARS1-B22-01102-02	LCSD	B-31721										
ARS1-B22-01102-03	MBL											
ARS1-B22-01102-04	TRG				**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01102-05	TRG				**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01102-06	TRG				**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01102-07	TRG				**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01102-08	TRG				**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01102-09	TRG				**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01102-10	TRG				**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/22/22

LCS Report
Analytical Batch: ARS1-B22-01102

Blind ID	ABatch Sample ID	Blind Group	Std ID	Isotope	Exp Addition (g)	Expected Value (pCi/g)	Empty Wt (g)	Gross Wt (g)	Net Wt (g)	Expected Value CT (pCi/g)	Mid Point Count Date	Known Value (pCi)	User ID	Mod Date
B-31720	ARS1-B22-01102-01	B-U238	S-0359	U-238	0.5	15.75422	4.162	4.683	0.5210	15.75422	08/16/2022	8.20795	[redacted]	08/08/2022
B-31721	ARS1-B22-01102-02	B-U238	S-0359	U-238	0.5	15.75422	4.17	4.69	0.5200	15.75422	08/16/2022	8.19220		08/08/2022

Tracer Report
Analytical Batch: ARS1-B22-01102

ABatch Sample ID	Sample Type	Empty Wt	Filled Wt	Net Wt	Exp Val	Std ID	Isotope	Tracer Date	HL Days	Ref Date	Cert dpm/g	Curr ACT	User ID
ARS1-B22-01102-01	LCS	2.022	3.058	1.036	8.970	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	[redacted]
ARS1-B22-01102-02	LCSD	2.034	3.069	1.035	8.961	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-03	MBL	2.042	3.076	1.034	8.953	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-04	TRG	2.041	3.072	1.031	8.927	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-05	TRG	2.005	3.039	1.034	8.953	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-06	TRG	2.078	3.110	1.032	8.935	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-07	TRG	2.032	3.064	1.032	8.935	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-08	TRG	2.017	3.046	1.029	8.909	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-09	TRG	2.038	3.064	1.026	8.883	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	
ARS1-B22-01102-10	TRG	2.063	3.089	1.026	8.883	S-0369	U-232	08/08/2022	25162.037	07/27/2021	8.749	8.658	

Calculation Report
ARS1-B22-01102

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01102-01	LCS					U-232	4.04053E-6	2.62726E-7	5.14943E-7	4.14241E-8	1.84242E-8	8.33534E-8	1.63373E-7		uCi/sample
ARS1-B22-01102-01	LCS					U-238	8.08862E-6	5.12365E-7	1.00424E-6	4.21158E-8	1.87774E-8	1.17233E-7	2.29777E-7		uCi/sample
ARS1-B22-01102-02	LCSD					U-232	4.03663E-6	2.61986E-7	5.13493E-7	3.66151E-8	1.60976E-8	8.17272E-8	1.60185E-7		uCi/sample
ARS1-B22-01102-02	LCSD					U-238	8.34307E-6	5.27570E-7	1.03404E-6	3.64968E-8	1.60456E-8	1.16869E-7	2.29064E-7		uCi/sample
ARS1-B22-01102-03	MBL					U-232	4.03273E-6	2.74900E-7	5.38805E-7	7.75477E-8	3.43059E-8	1.17186E-7	2.29684E-7		uCi/sample
ARS1-B22-01102-03	MBL					U-234	-6.58669E-9	2.94594E-8	5.77404E-8	1.07041E-7	4.90580E-8	2.94566E-8	5.77349E-8		uCi/sample
ARS1-B22-01102-03	MBL					U-235	-3.81737E-9	1.37658E-8	2.69809E-8	5.73372E-8	2.34960E-8	1.37637E-8	2.69769E-8		uCi/sample
ARS1-B22-01102-03	MBL					U-238	-4.60146E-8	2.47590E-8	4.85276E-8	9.93788E-8	4.52359E-8	2.45959E-8	4.82079E-8		uCi/sample
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	FB-070722	1	U-232	2.01230E-5	1.40584E-6	2.75546E-6	4.69606E-7	2.06459E-7	6.60819E-7	1.29520E-6		uCi/sample
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	FB-070722	1	U-234	-2.92230E-7	1.19446E-7	2.34114E-7	5.22338E-7	2.32885E-7	1.18079E-7	2.31435E-7		uCi/sample
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	FB-070722	1	U-235	4.83899E-8	3.43467E-8	6.73194E-8	6.55682E-8	0.00000	3.42168E-8	6.70649E-8		uCi/sample
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	FB-070722	1	U-238	-6.24955E-8	9.99803E-8	1.95961E-7	4.05924E-7	1.74735E-7	9.99060E-8	1.95816E-7		uCi/sample
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	MSB01-070722	1	U-232	2.01810E-5	1.40743E-6	2.75856E-6	3.17070E-7	1.29931E-7	6.57461E-7	1.28862E-6		uCi/sample
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	MSB01-070722	1	U-234	-1.26394E-7	6.70700E-8	1.31457E-7	3.34313E-7	1.38612E-7	6.66156E-8	1.30567E-7		uCi/sample
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	MSB01-070722	1	U-235	-7.32529E-8	5.47860E-8	1.07381E-7	2.93391E-7	1.13609E-7	5.45995E-8	1.07015E-7		uCi/sample
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	MSB01-070722	1	U-238	0.00000	8.91955E-8	1.74823E-7	3.50427E-7	1.46727E-7	8.91955E-8	1.74823E-7		uCi/sample
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	MSB02-070722	1	U-232	2.01419E-5	1.39174E-6	2.72781E-6	3.94653E-7	1.71531E-7	6.27956E-7	1.23079E-6		uCi/sample
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	MSB02-070722	1	U-234	-3.79960E-8	1.00555E-7	1.97088E-7	3.93830E-7	1.71173E-7	1.00528E-7	1.97035E-7		uCi/sample
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	MSB02-070722	1	U-235	0.00000	3.11422E-8	6.10388E-8	1.62135E-7	5.12290E-8	3.11422E-8	6.10388E-8		uCi/sample
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	MSB02-070722	1	U-238	-1.70640E-7	7.41817E-8	1.45396E-7	3.56972E-7	1.52795E-7	7.34317E-8	1.43926E-7		uCi/sample
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	U-232	2.01419E-5	1.46503E-6	2.87146E-6	7.60333E-7	3.42470E-7	7.76980E-7	1.52288E-6		uCi/sample
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	U-234	-1.94336E-7	1.44754E-7	2.83717E-7	6.07822E-7	2.66293E-7	1.44257E-7	2.82743E-7		uCi/sample
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	U-235	3.21797E-8	8.51626E-8	1.66919E-7	3.46537E-7	1.29665E-7	8.51395E-8	1.66873E-7		uCi/sample
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	U-238	-2.21654E-7	1.11666E-7	2.18866E-7	5.21652E-7	2.23283E-7	1.10827E-7	2.17221E-7		uCi/sample
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	MSB01-071122	1	U-232	2.00795E-5	1.33606E-6	2.61868E-6	1.34640E-7	5.03789E-8	5.01984E-7	9.83889E-7		uCi/sample
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	MSB01-071122	1	U-234	-2.49582E-8	1.11627E-7	2.18789E-7	4.05598E-7	1.85890E-7	1.11616E-7	2.18768E-7		uCi/sample
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	MSB01-071122	1	U-235	-2.89295E-8	5.01391E-8	9.82726E-8	2.17261E-7	8.90308E-8	5.01073E-8	9.82103E-8		uCi/sample
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	MSB01-071122	1	U-238	4.98166E-8	1.05722E-7	2.07214E-7	3.71632E-7	1.68941E-7	1.05677E-7	2.07127E-7		uCi/sample
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	MSB02-071122	1	U-232	2.00210E-5	1.39238E-6	2.72906E-6	4.16703E-7	1.81114E-7	6.43872E-7	1.26199E-6		uCi/sample
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	MSB02-071122	1	U-234	0.00000	8.51212E-8	1.66838E-7	3.34420E-7	1.40024E-7	8.51212E-8	1.66838E-7		uCi/sample
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	MSB02-071122	1	U-235	2.32557E-8	4.03055E-8	7.89988E-8	1.71226E-7	5.41015E-8	4.02800E-8	7.89488E-8		uCi/sample
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	MSB02-071122	1	U-238	-2.00231E-8	6.64207E-8	1.30185E-7	2.82464E-7	1.14101E-7	6.64092E-8	1.30162E-7		uCi/sample
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	U-232	2.00210E-5	1.37961E-6	2.70403E-6	2.64204E-7	1.06724E-7	6.15772E-7	1.20691E-6		uCi/sample

Calculated By: [redacted] on 9/1/2022 1:20:41 PM

Calculation Report
ARS1-B22-01102

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	U-234	0.00000	8.35984E-8	1.63853E-7	3.25697E-7	1.37519E-7	8.35984E-8	1.63853E-7		uCi/sample
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	U-235	0.00000	4.33352E-8	8.49369E-8	2.01292E-7	7.12863E-8	4.33352E-8	8.49369E-8		uCi/sample
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	U-238	-9.32789E-8	7.71345E-8	1.51184E-7	3.38443E-7	1.43943E-7	7.69198E-8	1.50763E-7		uCi/sample

Calculated By [redacted] on 9/1/2022 1:20:41 PM

Calculation Report
ARS1-B22-01102

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01102-01	LCS			69.3%		2415.000000	1440	22.000000	1440	0.26820	1	8/8/2022	8/16/2022
ARS1-B22-01102-01	LCS			69.3%		4829.000000	1440	23.000000	1440	0.26820	1	8/8/2022	8/16/2022
ARS1-B22-01102-02	LCSD			73.9%		2493.000000	1440	18.000000	1440	0.26048	1	8/8/2022	8/16/2022
ARS1-B22-01102-02	LCSD			73.9%		5150.000000	1440	18.000000	1440	0.26048	1	8/8/2022	8/16/2022
ARS1-B22-01102-03	MBL			35.6%		1243.000000	1440	20.000000	1440	0.26711	1	8/8/2022	8/16/2022
ARS1-B22-01102-03	MBL			35.6%		39.000000	1440	41.000000	1440	0.26711	1	8/8/2022	8/16/2022
ARS1-B22-01102-03	MBL			35.6%		6.000000	1440	7.000000	1440	0.26711	1	8/8/2022	8/16/2022
ARS1-B22-01102-03	MBL			35.6%		21.000000	1440	35.000000	1440	0.26711	1	8/8/2022	8/16/2022
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	28.7%		980.000000	1440	18.000000	1440	0.26157	0.2	7/7/2022	8/16/2022
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	28.7%		9.000000	1440	23.000000	1440	0.26157	0.2	7/7/2022	8/16/2022
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	28.7%		2.000000	1440	0.000000	1440	0.26157	0.2	7/7/2022	8/16/2022
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	28.7%		10.000000	1440	13.000000	1440	0.26157	0.2	7/7/2022	8/16/2022
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	28.9%		963.000000	1440	7.000000	1440	0.25738	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	28.9%		2.000000	1440	8.000000	1440	0.25738	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	28.9%		1.000000	1440	4.000000	1440	0.25738	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	28.9%		9.000000	1440	9.000000	1440	0.25738	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	32.3%		1073.000000	1440	15.000000	1440	0.25527	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	32.3%		13.000000	1440	15.000000	1440	0.25527	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	32.3%		1.000000	1440	1.000000	1440	0.25527	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	32.3%		3.000000	1440	12.000000	1440	0.25527	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	22.6%		752.000000	1440	28.000000	1440	0.25023	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	22.6%		10.000000	1440	17.000000	1440	0.25023	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	22.6%		4.000000	1440	3.000000	1440	0.25023	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	22.6%		4.000000	1440	12.000000	1440	0.25023	0.2	7/8/2022	8/16/2022
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	49.7%		1609.000000	1440	3.000000	1440	0.25276	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	49.7%		39.000000	1440	41.000000	1440	0.25276	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	49.7%		5.000000	1440	7.000000	1440	0.25276	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	49.7%		38.000000	1440	34.000000	1440	0.25276	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	32.4%		1011.000000	1440	15.000000	1440	0.24149	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	32.4%		9.000000	1440	9.000000	1440	0.24149	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	32.4%		2.000000	1440	1.000000	1440	0.24149	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	32.4%		5.000000	1440	6.000000	1440	0.24149	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	36.5%		1075.000000	1440	6.000000	1440	0.23003	0.2	7/15/2022	8/16/2022

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Calculation Report
ARS1-B22-01102

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	36.5%		10.000000	1440	10.000000	1440	0.23003	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	36.5%		2.000000	1440	2.000000	1440	0.23003	0.2	7/15/2022	8/16/2022
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	36.5%		6.000000	1440	11.000000	1440	0.23003	0.2	7/15/2022	8/16/2022

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Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01102-01	LCS			2220000	1	1.67708	0.01528	1.66181	0.98	14314611 - D1		0.997	U-232	7/27/2021
ARS1-B22-01102-01	LCS			2220000	1	3.35347	0.01597	3.33750	0.98	14314611 - D1		1	U-232	7/27/2021
ARS1-B22-01102-02	LCSD			2220000	1	1.73125	0.01250	1.71875	0.98	14314611 - D2		0.997	U-232	7/27/2021
ARS1-B22-01102-02	LCSD			2220000	1	3.57639	0.01250	3.56389	0.98	14314611 - D2		1	U-232	7/27/2021
ARS1-B22-01102-03	MBL			2220000	1	0.86319	0.01389	0.84931	0.98	14314612 - D3		0.997	U-232	7/27/2021
ARS1-B22-01102-03	MBL			2220000	1	0.02708	0.02847	-0.00139	0.98	14314612 - D3		0.998	U-232	7/27/2021
ARS1-B22-01102-03	MBL			2220000	1	0.00417	0.00486	-0.00069	0.98	14314612 - D3		0.861	U-232	7/27/2021
ARS1-B22-01102-03	MBL			2220000	1	0.01458	0.02431	-0.00972	0.98	14314612 - D3		1	U-232	7/27/2021
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	2220000	1	0.68056	0.01250	0.66806	0.98	14314612 - D4		0.997	U-232	7/27/2021
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	2220000	1	0.00625	0.01597	-0.00972	0.98	14314612 - D4		0.998	U-232	7/27/2021
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	2220000	1	0.00139	0.00000	0.00139	0.98	14314612 - D4		0.861	U-232	7/27/2021
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	2220000	1	0.00694	0.00903	-0.00208	0.98	14314612 - D4		1	U-232	7/27/2021
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	2220000	1	0.66875	0.00486	0.66389	0.98	14314613 - D5		0.997	U-232	7/27/2021
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	2220000	1	0.00139	0.00556	-0.00417	0.98	14314613 - D5		0.998	U-232	7/27/2021
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	2220000	1	0.00069	0.00278	-0.00208	0.98	14314613 - D5		0.861	U-232	7/27/2021
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	2220000	1	0.00625	0.00625	0.00000	0.98	14314613 - D5		1	U-232	7/27/2021
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	2220000	1	0.74514	0.01042	0.73472	0.98	14314613 - D6		0.997	U-232	7/27/2021
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	2220000	1	0.00903	0.01042	-0.00139	0.98	14314613 - D6		0.998	U-232	7/27/2021
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	2220000	1	0.00069	0.00069	0.00000	0.98	14314613 - D6		0.861	U-232	7/27/2021
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	2220000	1	0.00208	0.00833	-0.00625	0.98	14314613 - D6		1	U-232	7/27/2021
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	2220000	1	0.52222	0.01944	0.50278	0.98	14314614 - D7		0.997	U-232	7/27/2021
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	2220000	1	0.00694	0.01181	-0.00486	0.98	14314614 - D7		0.998	U-232	7/27/2021
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	2220000	1	0.00278	0.00208	0.00069	0.98	14314614 - D7		0.861	U-232	7/27/2021
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	2220000	1	0.00278	0.00833	-0.00556	0.98	14314614 - D7		1	U-232	7/27/2021
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	2220000	1	1.11736	0.00208	1.11528	0.98	17166649 - E1		0.997	U-232	7/27/2021
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	2220000	1	0.02708	0.02847	-0.00139	0.98	17166649 - E1		0.998	U-232	7/27/2021
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	2220000	1	0.00347	0.00486	-0.00139	0.98	17166649 - E1		0.861	U-232	7/27/2021
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	2220000	1	0.02639	0.02361	0.00278	0.98	17166649 - E1		1	U-232	7/27/2021
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	2220000	1	0.70208	0.01042	0.69167	0.98	17166649 - E2		0.997	U-232	7/27/2021
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	2220000	1	0.00625	0.00625	0.00000	0.98	17166649 - E2		0.998	U-232	7/27/2021
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	2220000	1	0.00139	0.00069	0.00069	0.98	17166649 - E2		0.861	U-232	7/27/2021
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	2220000	1	0.00347	0.00417	-0.00069	0.98	17166649 - E2		1	U-232	7/27/2021
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	2220000	1	0.74653	0.00417	0.74236	0.98	17166650 - E3		0.997	U-232	7/27/2021

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Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	2220000	1	0.00694	0.00694	0.00000	0.98	17166650 - E3		0.998	U-232	7/27/2021
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	2220000	1	0.00139	0.00139	0.00000	0.98	17166650 - E3		0.861	U-232	7/27/2021
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	2220000	1	0.00417	0.00764	-0.00347	0.98	17166650 - E3		1	U-232	7/27/2021

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Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01102-01	LCS			25162.03704			8.32083			0.99977					
ARS1-B22-01102-01	LCS			1.63194E+12			8.32083			1.00000					
ARS1-B22-01102-02	LCSD			25162.03704			8.32083			0.99977					
ARS1-B22-01102-02	LCSD			1.63194E+12			8.32083			1.00000					
ARS1-B22-01102-03	MBL			25162.03704			8.32083			0.99977					
ARS1-B22-01102-03	MBL			8.97454E+7			8.32083			1.00000					
ARS1-B22-01102-03	MBL			2.57060E+11			8.32083			1.00000					
ARS1-B22-01102-03	MBL			1.63194E+12			8.32083			1.00000					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	25162.03704			40.52500			0.99888					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	8.97454E+7			40.52500			1.00000					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	2.57060E+11			40.52500			1.00000					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	1.63194E+12			40.52500			1.00000					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	25162.03704			39.51736			0.99891					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	8.97454E+7			39.51736			1.00000					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	2.57060E+11			39.51736			1.00000					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	1.63194E+12			39.51736			1.00000					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	25162.03704			39.48264			0.99891					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	8.97454E+7			39.48264			1.00000					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	2.57060E+11			39.48264			1.00000					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	1.63194E+12			39.48264			1.00000					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	25162.03704			39.50417			0.99891					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	8.97454E+7			39.50417			1.00000					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	2.57060E+11			39.50417			1.00000					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	1.63194E+12			39.50417			1.00000					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	25162.03704			32.50625			0.99910					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	8.97454E+7			32.50625			1.00000					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	2.57060E+11			32.50625			1.00000					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	1.63194E+12			32.50625			1.00000					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	25162.03704			32.52708			0.99910					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	8.97454E+7			32.52708			1.00000					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	2.57060E+11			32.52708			1.00000					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	1.63194E+12			32.52708			1.00000					
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	25162.03704			32.52014			0.99910					

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Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	8.97454E+7			32.52014			1.00000					
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	2.57060E+11			32.52014			1.00000					
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	1.63194E+12			32.52014			1.00000					

Calculated By: [redacted] on 9/1/2022 1:20:41 PM

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU F5	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01102-01	LCS			0	0.02	0.05833	0	0	0	0.06166	4.11284E+5	5.92249E+8	7.42078E-8	1.52673E-7	0.07069
ARS1-B22-01102-01	LCS			0	0.02	0.05833	0	0	0	0.06166	4.12617E+5	5.94168E+8	4.73781E-8	9.91139E-8	0.04514
ARS1-B22-01102-02	LCSD			0	0.02	0.05833	0	0	0	0.06166	4.25789E+5	6.13136E+8	7.42078E-8	1.52517E-7	0.07069
ARS1-B22-01102-02	LCSD			0	0.02	0.05833	0	0	0	0.06166	4.27168E+5	6.15122E+8	4.73781E-8	9.89585E-8	0.04514
ARS1-B22-01102-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.10603E+5	3.03269E+8	7.42078E-8	1.57033E-7	0.07069
ARS1-B22-01102-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.10863E+5	3.03643E+8	7.34762E-8	1.55562E-7	0.07001
ARS1-B22-01102-03	MBL			0	0.02	0.05833	0	0	0	0.06166	1.81917E+5	2.61960E+8	7.74312E-8	1.64875E-7	0.07378
ARS1-B22-01102-03	MBL			0	0.02	0.05833	0	0	0	0.06166	2.11285E+5	3.04251E+8	4.73781E-8	1.03460E-7	0.04514
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	33198.64713	4.78061E+7	3.71368E-7	7.97830E-7	0.07069
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	33269.05465	4.79074E+7	3.67381E-7	7.89753E-7	0.07001
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	28702.06915	4.13310E+7	3.87156E-7	8.38219E-7	0.07378
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	0	0.02	0.05833	0	0	0	0.06166	33335.73654	4.80035E+7	2.36891E-7	5.29219E-7	0.04514
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	32896.77981	4.73714E+7	3.71358E-7	7.98329E-7	0.07069
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	32965.63233	4.74705E+7	3.67381E-7	7.90274E-7	0.07001
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	28440.29869	4.09540E+7	3.87156E-7	8.38823E-7	0.07378
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	0	0.02	0.05833	0	0	0	0.06166	33031.70580	4.75657E+7	2.36891E-7	5.29738E-7	0.04514
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	36477.27777	5.25273E+7	3.71357E-7	7.92713E-7	0.07069
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	36553.58927	5.26372E+7	3.67381E-7	7.84670E-7	0.07001
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	31535.72140	4.54114E+7	3.87156E-7	8.32327E-7	0.07378
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	0	0.02	0.05833	0	0	0	0.06166	36626.85412	5.27427E+7	2.36891E-7	5.24146E-7	0.04514
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	24961.75184	3.59449E+7	3.71358E-7	8.16515E-7	0.07069
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	25013.98736	3.60201E+7	3.67381E-7	8.08421E-7	0.07001
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	21580.21010	3.10755E+7	3.87156E-7	8.59858E-7	0.07378
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	0	0.02	0.05833	0	0	0	0.06166	25064.12324	3.60923E+7	2.36891E-7	5.47850E-7	0.04514
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	55543.09540	7.99821E+7	3.71286E-7	7.74861E-7	0.07069
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	55648.60050	8.01340E+7	3.67381E-7	7.67004E-7	0.07001
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	48009.47601	6.91336E+7	3.87156E-7	8.11850E-7	0.07378
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	0	0.02	0.05833	0	0	0	0.06166	55760.13474	8.02946E+7	2.36891E-7	5.06515E-7	0.04514
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	34547.10352	4.97478E+7	3.71286E-7	7.95454E-7	0.07069
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	34612.74622	4.98424E+7	3.67381E-7	7.87557E-7	0.07001
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	29861.30459	4.30003E+7	3.87156E-7	8.35674E-7	0.07378
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	0	0.02	0.05833	0	0	0	0.06166	34682.11915	4.99423E+7	2.36891E-7	5.27027E-7	0.04514
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	37079.17744	5.33940E+7	3.71286E-7	7.91734E-7	0.07069

Calculated By: [redacted] on 9/1/2022 1:20:41 PM

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU F5	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	37149.62421	5.34955E+7	3.67381E-7	7.83844E-7	0.07001
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	32049.93434	4.61519E+7	3.87156E-7	8.31370E-7	0.07378
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	0	0.02	0.05833	0	0	0	0.06166	37224.08170	5.36027E+7	2.36891E-7	5.23322E-7	0.04514

Calculated By: [redacted] on 9/1/2022 1:20:41 PM

Calculation Report
ARS1-B22-01102

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01102-01	LCS								
ARS1-B22-01102-01	LCS				8.20795E-6	98.5%			
ARS1-B22-01102-02	LCSD								
ARS1-B22-01102-02	LCSD				8.19220E-6	101.8%	3.1%	0.24467	0.34598
ARS1-B22-01102-03	MBL								
ARS1-B22-01102-03	MBL			U					
ARS1-B22-01102-03	MBL			U					
ARS1-B22-01102-03	MBL			U					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	B					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	UQ					
ARS1-B22-01102-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	B					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	UQ					
ARS1-B22-01102-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	B					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01102-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	B					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	UQ					
ARS1-B22-01102-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	B					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01102-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	B					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01102-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	B					

Calculated By: [redacted] on 9/1/2022 1:20:41 PM

Analytical Batch ID	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	U					
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	U					
ARS1-B22-01102-10	TRG	ARS1-22-01492	007	U					

Calculated By: [redacted] on 9/1/2022 1:20:41 PM

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Preparation Date: 08/08/2022 12:54

Prepared By: LCOPELAND

Procedure Data

ABatch Sample ID	Type	SDG/Fraction	IC_ID	Aliquot VolWt (L/g)	Aliquot Units
ARS1-B22-01102-01	LCS			1.0000	Sample
ARS1-B22-01102-02	LCSD			1.0000	Sample
ARS1-B22-01102-03	MBL			1.0000	Sample
ARS1-B22-01102-04	TRG	ARS1-22-01492-001	422015	0.2000	Sample
ARS1-B22-01102-05	TRG	ARS1-22-01492-002	422016	0.2000	Sample
ARS1-B22-01102-06	TRG	ARS1-22-01492-003	422017	0.2000	Sample
ARS1-B22-01102-07	TRG	ARS1-22-01492-004	422018	0.2000	Sample
ARS1-B22-01102-08	TRG	ARS1-22-01492-005	422019	0.2000	Sample
ARS1-B22-01102-09	TRG	ARS1-22-01492-006	422020	0.2000	Sample
ARS1-B22-01102-10	TRG	ARS1-22-01492-007	422021	0.2000	Sample

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Reagent Amounts

ABatch Sample ID	Type	SDG/Fraction	14.5.7.6. Condition Columns - Nitric Acid 3N (mL)
ARS1-B22-01102-01	LCS		5.00
ARS1-B22-01102-02	LCSD		5.00
ARS1-B22-01102-03	MBL		5.00
ARS1-B22-01102-04	TRG	ARS1-22-01492-001	5.00
ARS1-B22-01102-05	TRG	ARS1-22-01492-002	5.00
ARS1-B22-01102-06	TRG	ARS1-22-01492-003	5.00
ARS1-B22-01102-07	TRG	ARS1-22-01492-004	5.00
ARS1-B22-01102-08	TRG	ARS1-22-01492-005	5.00
ARS1-B22-01102-09	TRG	ARS1-22-01492-006	5.00
ARS1-B22-01102-10	TRG	ARS1-22-01492-007	5.00

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Reagent Tracking

Procedure Section	Reagent ID
14.1. Air Filter Leaching	R22-00553
14.5.2. Dissolve Reside in Load Solution	R22-00514
14.5.8.6. Recondition Column	R22-00552
14.5.8.7. Np-Th Flush	R22-00515
14.5.8.9. Elude Uranium	R22-00516
14.5.4. Add Reducing Agent	R22-00556
14.5.5. Add Indicator	R22-00114
14.5.6. Valence Adjustment	R22-00555
14.5.7. Set Up Vacuum Box System	R22-00474
14.5.7. Set Up Vacuum Box System (2)	R21-00979
14.5.7.6. Condition Columns	R22-00553
14.5.8.2. Beaker Rinse	R22-00553
14.5.8.3. Post Load Column Rinse	R22-00553
14.5.8.5. High Po Rinse	R22-00553
14.6.1. Rinse Planchet	R22-00529
14.6.4. Electrolyte Solution	R22-00405
14.6.4. Electrolyte Solution (2)	R22-00435
14.6.6. Add Plating Solution	R22-00506
14.6.10. Quench Electrolysis	R22-00073
14.6.12. Rinse Electrolysis Cell	R22-00261
14.6.13. Rinse Planchet	R22-00261
14.6.13. Rinse Planchet (2)	R21-00357
14.6.13. Rinse Planchet (3)	R22-00210

Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum

Support Equipment

Equipment Type	Serial/Batch/Lot	Comments
Fume Hood	030807171-B (WET LAB)	
Hot Block	#12 SN 145414 (Radiochem)	
Balance	T0350192 (Soil LAB)	
Pipette	SH39912	
Pipette	RU07688	
Pipette Tip	5mL VWR 19480271	
Eichrom Outer Tip	22011733001	
Eichrom Support Tube	21012629781	
Planchette	Lot 12-10-21 (3/4 inch)	

Samples to be counted:

Sample 22-01102-01 to detector 14314611 - D1, marked to be counted
Sample 22-01102-02 to detector 14314611 - D2, marked to be counted
Sample 22-01102-03 to detector 14314612 - D3, marked to be counted
Sample 22-01102-04 to detector 14314612 - D4, marked to be counted
Sample 22-01102-05 to detector 14314613 - D5, marked to be counted
Sample 22-01102-06 to detector 14314613 - D6, marked to be counted
Sample 22-01102-07 to detector 14314614 - D7, marked to be counted
Sample 22-01102-08 to detector 17166649 - E1, marked to be counted
Sample 22-01102-09 to detector 17166649 - E2, marked to be counted
Sample 22-01102-10 to detector 17166650 - E3, marked to be counted

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,624 9:09:45AM 8/17/2022

Sample

Sample: 22-01102-01 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCS

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

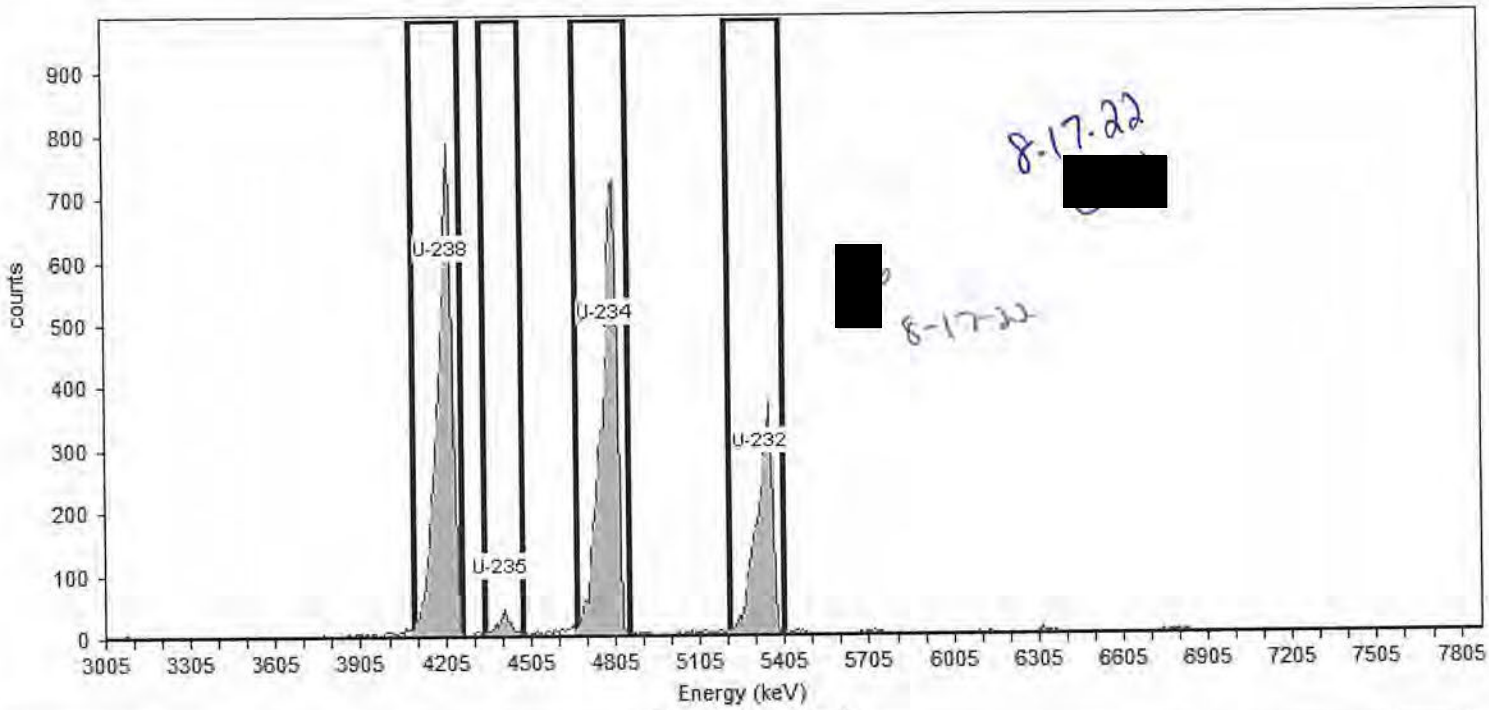
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314611 - D1, SN: 5402924, ID: 1
Acquisition Start Date: 8/16/2022 8:35:50AM
Live Time: 1,440.00 min.
Real Time: 1,440.01 min.
Background Date: 8/12/2022 3:03:06PM
Bkgd Info: Sample: D1; Det: 14314611 - D1; Spectrum #1; 8/12/2022 3:03:06 PM; Live Time: 1440.000(min.); ID: 1

Energy Calibration: D1 10-9-18
Efficiency Calibration:D1 10-9-18
Calibration Date: 10/10/2018 8:57:56AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 26.82% +/- 1.41% TPU(2 sigma)



8-17-22 [redacted]

[redacted] 8-17-22

General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4089.295	4263.837	55.3	100.0	4,829.00	23.0000	4806.00	1.244E+001	3.729E-001	2.889E-002	6.478E-002
U-235	4397.995	4341.303	4476.707	37.9	76.3	207.00	1.0000	206.00	6.991E-001	5.226E-002	7.895E-003	2.497E-002
U-234	4773.999	4669.785	4852.822	47.4	99.8	4,673.00	15.0000	4658.00	1.208E+001	3.634E-001	2.338E-002	5.377E-002
U-232	5321.992	5208.179	5399.667	55.4	99.8	2,415.00	22.0000	2393.00	6.208E+000	2.072E-001	2.831E-002	6.364E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,597 8:37:40AM 8/17/2022

Sample

Sample: 22-01102-01 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCS

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

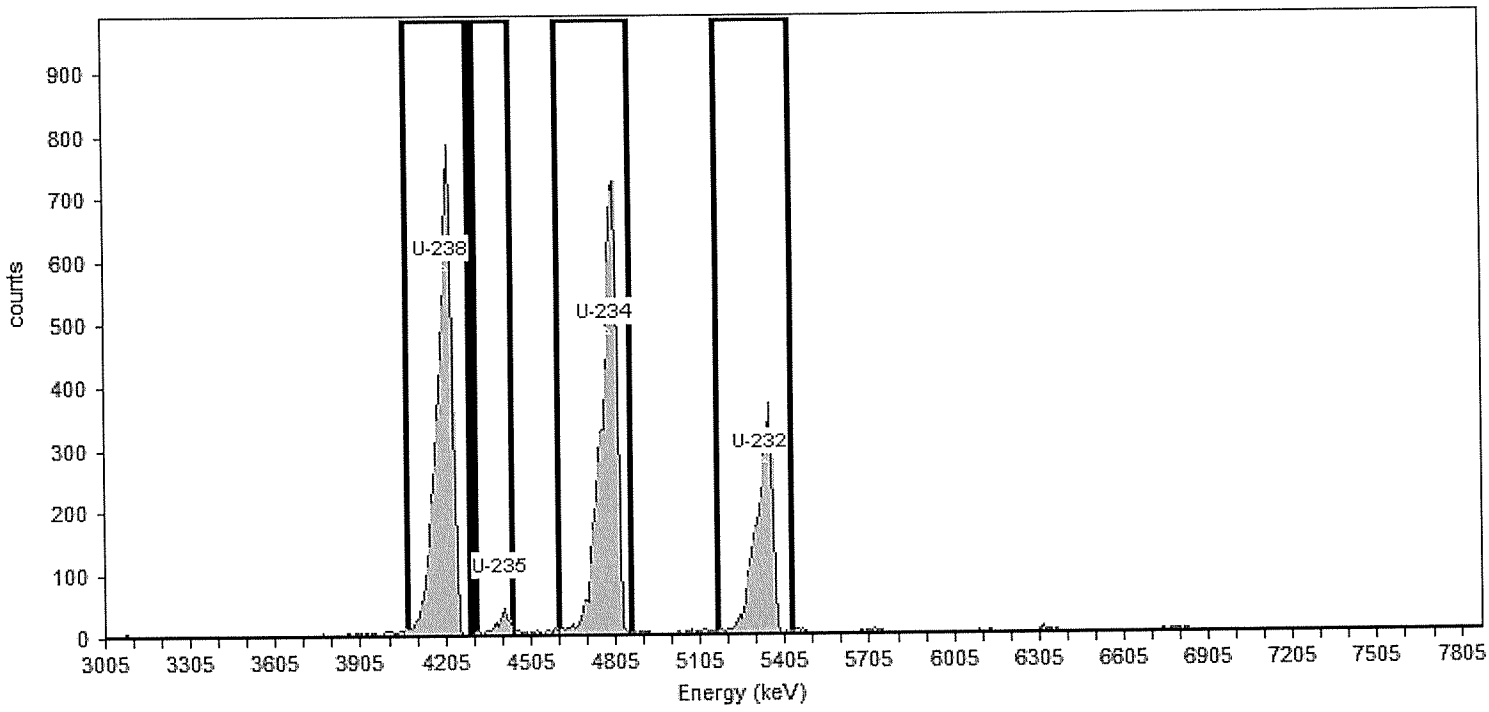
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314611 - D1, SN: 5402924, ID: 1
Acquisition Start Date: 8/16/2022 8:35:50AM
Live Time: 1,440.00 min.
Real Time: 1,440.01 min.
Background Date: 8/12/2022 3:03:06PM
Bkgd Info: Sample: D1; Det: 14314611 - D1; Spectrum #1; 8/12/2022 3:03:06 PM; Live Time: 1440.000(min.); ID: 1

Energy Calibration: D1 10-9-18
Efficiency Calibration:D1 10-9-18
Calibration Date: 10/10/2018 8:57:56AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.82% +/- 1.41% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	55.3	100.0	4,842.00	23.0000	4819.00	1.248E+001	3.738E-001	2.889E-002	6.478E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	176.64	1.0000	175.64	5.622E-001	4.513E-002	7.446E-003	2.355E-002
U-234	4774.000	4598.000	4867.000	47.4	100.0	4,744.09	20.0000	4724.09	1.223E+001	3.671E-001	2.693E-002	6.086E-002
U-232	5322.000	5174.000	5433.000	55.5	99.8	2,432.95	29.9719	2402.98	6.234E+000	2.081E-001	3.304E-002	7.311E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 32,625 9:11:09AM 8/17/2022

Sample

Sample: 22-01102-02 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCSD

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

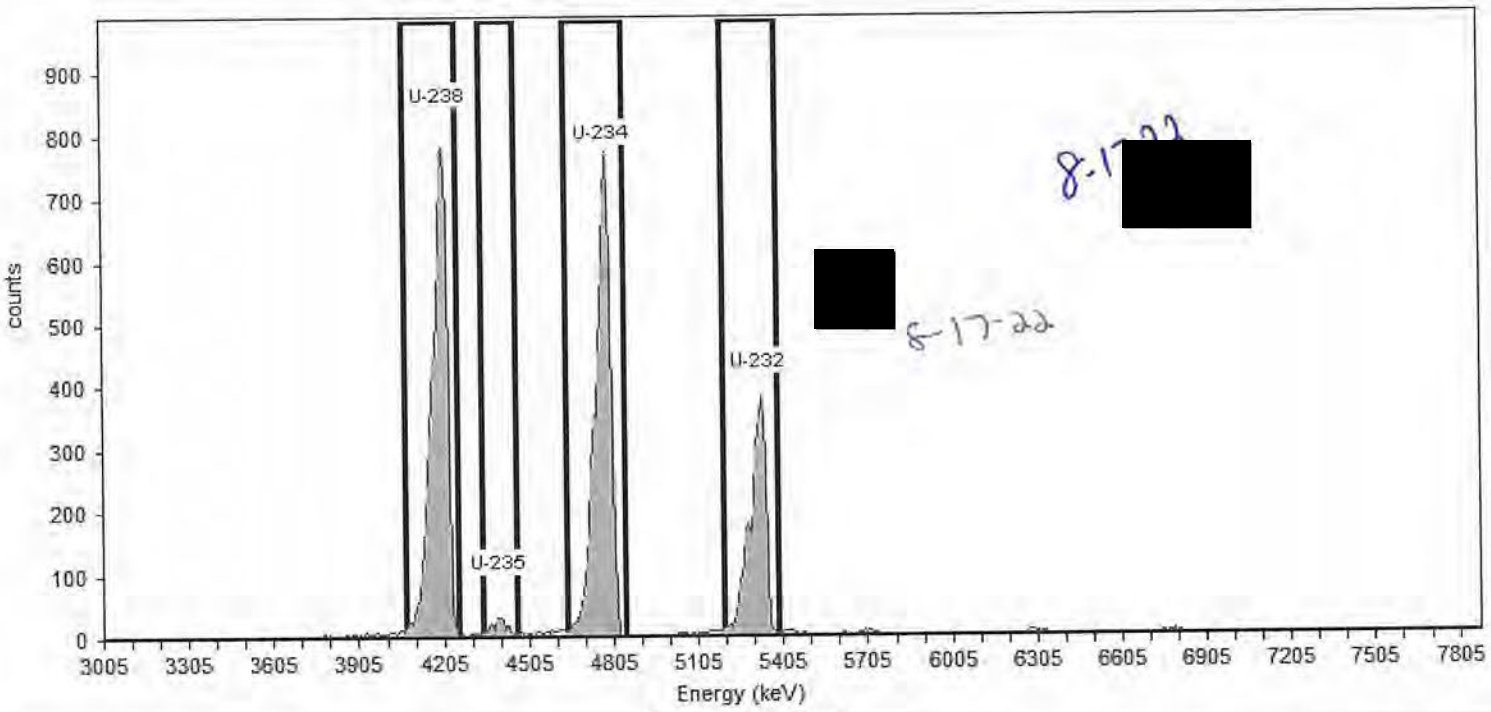
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314611 - D2, SN: 5402925, ID: 2
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.01 min.
Background Date: 8/12/2022 3:03:07PM
Bkgd Info: Sample: D2; Det: 14314611 - D2; Spectrum #1; 8/12/2022 3:03:07 PM; Live Time: 1440.000(min.); ID: 2

Energy Calibration: D2 Calib 10.10.18
Efficiency Calibration:D2 Calib 10.10.18
Calibration Date: 10/11/2018 8:01:38AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 26.05% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4069.880	4254.149	56.0	100.0	5,150.00	18.0000	5132.00	1.368E+001	4.070E-001	2.631E-002	5.984E-002
U-235	4397.995	4341.303	4457.376	43.6	76.3	181.00	1.0000	180.00	6.289E-001	4.994E-002	8.129E-003	2.571E-002
U-234	4773.999	4640.850	4843.198	52.8	99.8	4,922.00	19.0000	4903.00	1.310E+001	3.917E-001	2.709E-002	6.141E-002
U-232	5321.992	5198.593	5390.103	48.7	99.8	2,493.00	18.0000	2475.00	6.612E+000	2.191E-001	2.637E-002	5.996E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,598 8:37:58AM 8/17/2022

Sample

Sample: 22-01102-02 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: LCSD

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

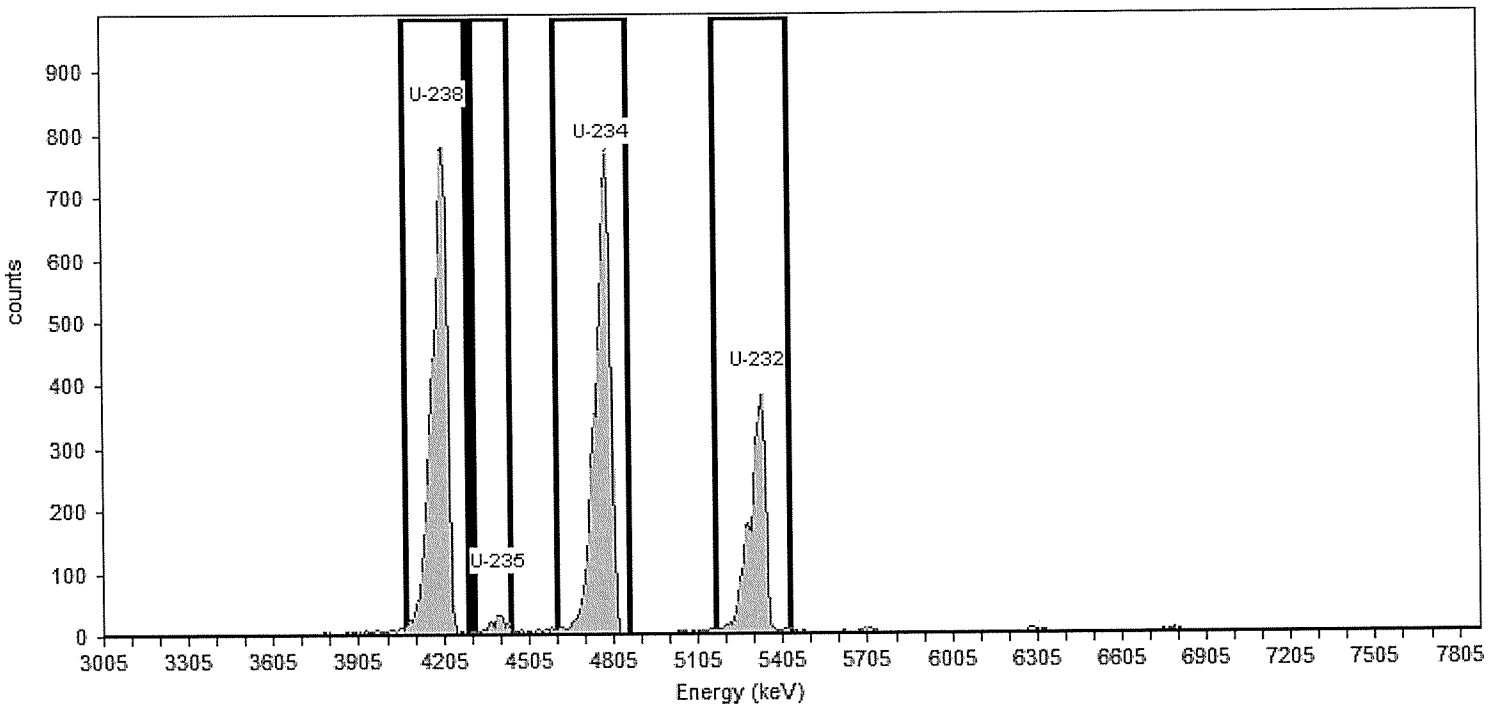
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314611 - D2, SN: 5402925, ID: 2
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.01 min.
Background Date: 8/12/2022 3:03:07PM
Bkgd Info: Sample: D2; Det: 14314611 - D2; Spectrum #1; 8/12/2022 3:03:07 PM; Live Time: 1440.000(min.); ID: 2

Energy Calibration: D2 Calib 10.10.18
Efficiency Calibration:D2 Calib 10.10.18
Calibration Date: 10/11/2018 8:01:38AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.05% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	56.1	100.0	5,131.92	16.2307	5115.69	1.364E+001	4.058E-001	2.499E-002	5.719E-002
U-235	4398.000	4317.000	4436.000	54.4	80.9	162.69	1.0000	161.69	5.328E-001	4.442E-002	7.667E-003	2.425E-002
U-234	4774.000	4598.000	4867.000	52.8	100.0	4,953.03	21.0000	4932.03	1.314E+001	3.928E-001	2.841E-002	6.403E-002
U-232	5322.000	5174.000	5433.000	48.6	99.8	2,524.30	29.0281	2495.28	6.666E+000	2.210E-001	3.348E-002	7.419E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 32,626 9:19:14AM 8/17/2022

Sample

Sample: 22-01102-03 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: MBL

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

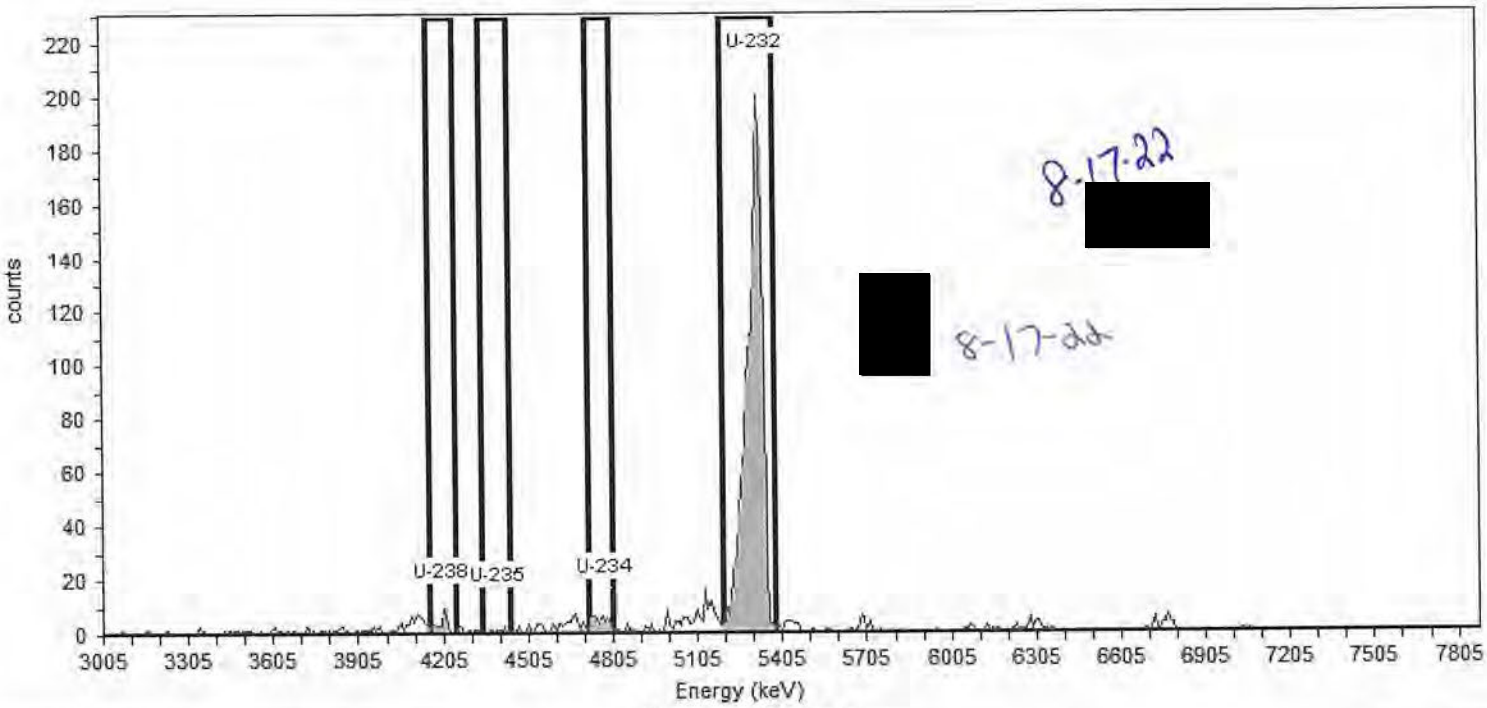
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D3, SN: 5500820, ID: 3
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D3; Det: 14314612 - D3; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 3

Energy Calibration: E3 calib 5-27-21
Efficiency Calibration:E3 calib 5-27-21
Calibration Date: 5/28/2021 7:29:15AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.71% +/- 1.09% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4157.213	4244.460	48.7	77.0	21.00	35.0000	-14.00	0.000E+000	2.529E-002	4.647E-002	1.021E-001
U-235	4397.995	4341.303	4438.041	19.1	76.3	6.00	7.0000	-1.00	0.000E+000	1.229E-002	2.097E-002	5.117E-002
U-234	4773.999	4717.989	4804.691	72.1	99.8	39.00	41.0000	-2.00	0.000E+000	2.330E-002	3.880E-002	8.466E-002
U-232	5321.992	5198.593	5380.537	56.1	99.8	1,243.00	20.0000	1223.00	3.186E+000	1.132E-001	2.710E-002	6.125E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,593 8:36:31AM 8/17/2022

Sample

Sample: 22-01102-03 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: MBL

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

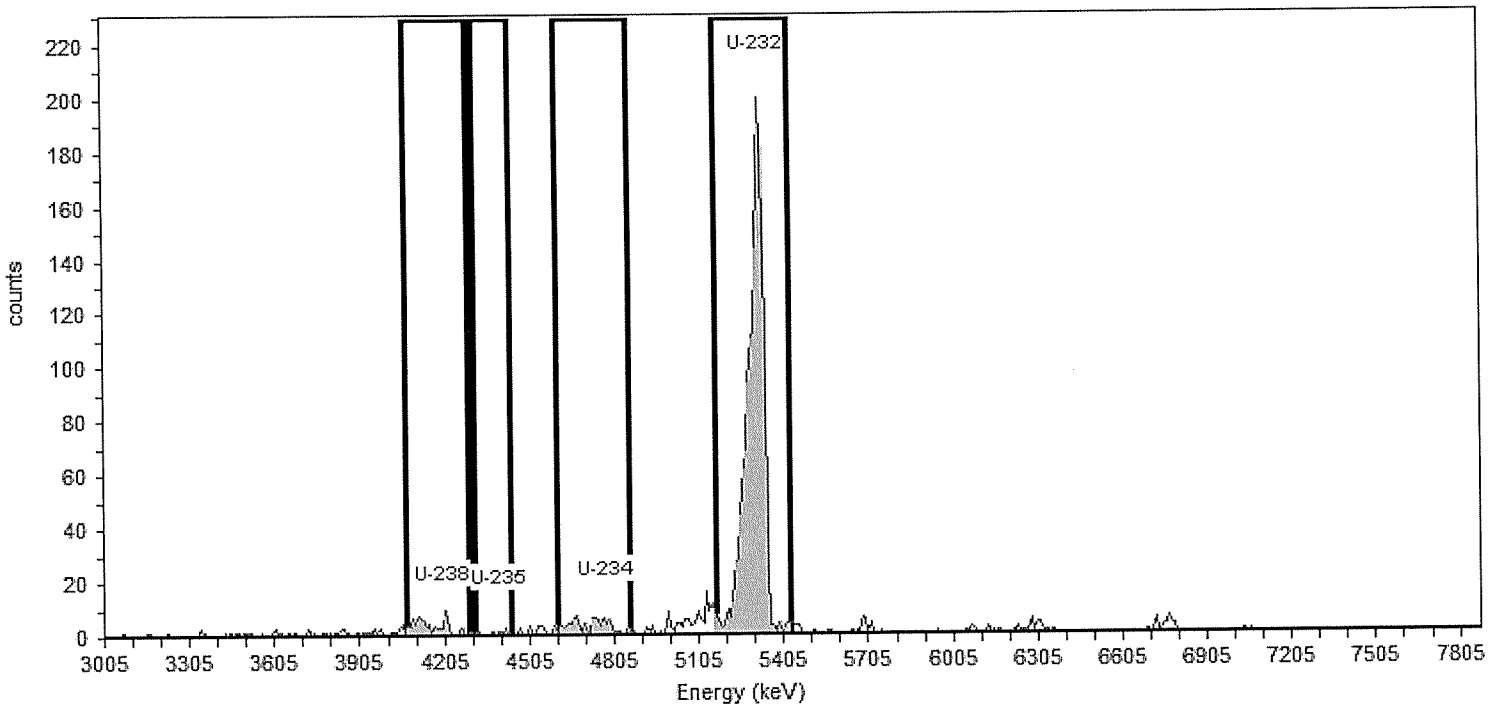
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D3, SN: 5500820, ID: 3
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D3; Det: 14314612 - D3; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 3

Energy Calibration: E3 calib 5-27-21
Efficiency Calibration:E3 calib 5-27-21
Calibration Date: 5/28/2021 7:29:15AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.71% +/- 1.09% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	70.8	100.0	62.80	65.5737	-2.77	0.000E+000	2.946E-002	4.898E-002	1.050E-001
U-235	4398.000	4317.000	4436.000	0.0	80.9	6.21	9.2783	-3.07	0.000E+000	1.265E-002	2.277E-002	5.424E-002
U-234	4774.000	4598.000	4867.000	43.3	100.0	83.88	83.9467	-0.06	0.000E+000	3.367E-002	5.539E-002	1.178E-001
U-232	5322.000	5174.000	5433.000	56.1	99.8	1,264.26	32.0512	1232.21	3.210E+000	1.145E-001	3.431E-002	7.567E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,627 9:20:44AM 8/17/2022

Sample

Sample: 22-01102-04 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-001

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

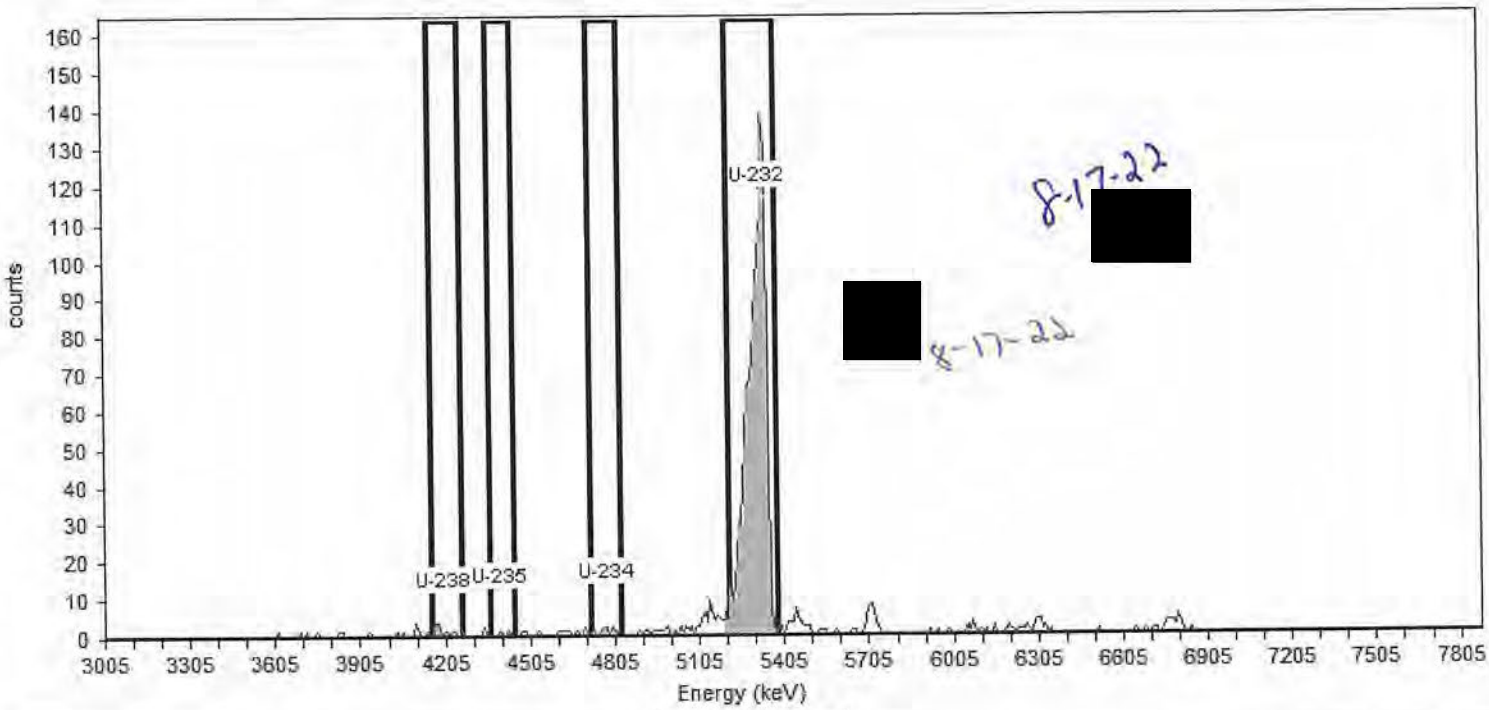
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D4, SN: 5402927, ID: 4
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D4; Det: 14314612 - D4; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 4

Energy Calibration: D4 calib 10-14-18
Efficiency Calibration:D4 calib 10-14-18
Calibration Date: 10/25/2018 6:23:58AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.16% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4157.213	4263.837	19.7	77.0	10.00	13.0000	-3.00	0.000E+000	1.654E-002	2.892E-002	6.717E-002
U-235	4397.995	4360.659	4447.709	13.8	74.8	2.00	0.0000	2.00	7.099E-003	6.151E-003	0.000E+000	9.605E-003
U-234	4773.999	4717.989	4823.947	53.2	99.8	9.00	23.0000	-14.00	0.000E+000	1.508E-002	2.968E-002	6.656E-002
U-232	5321.992	5208.179	5380.537	64.5	99.8	980.00	18.0000	962.00	2.559E+000	1.076E-001	2.626E-002	5.971E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,591 8:35:54AM 8/17/2022

Sample

Sample: 22-01102-04 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-001

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

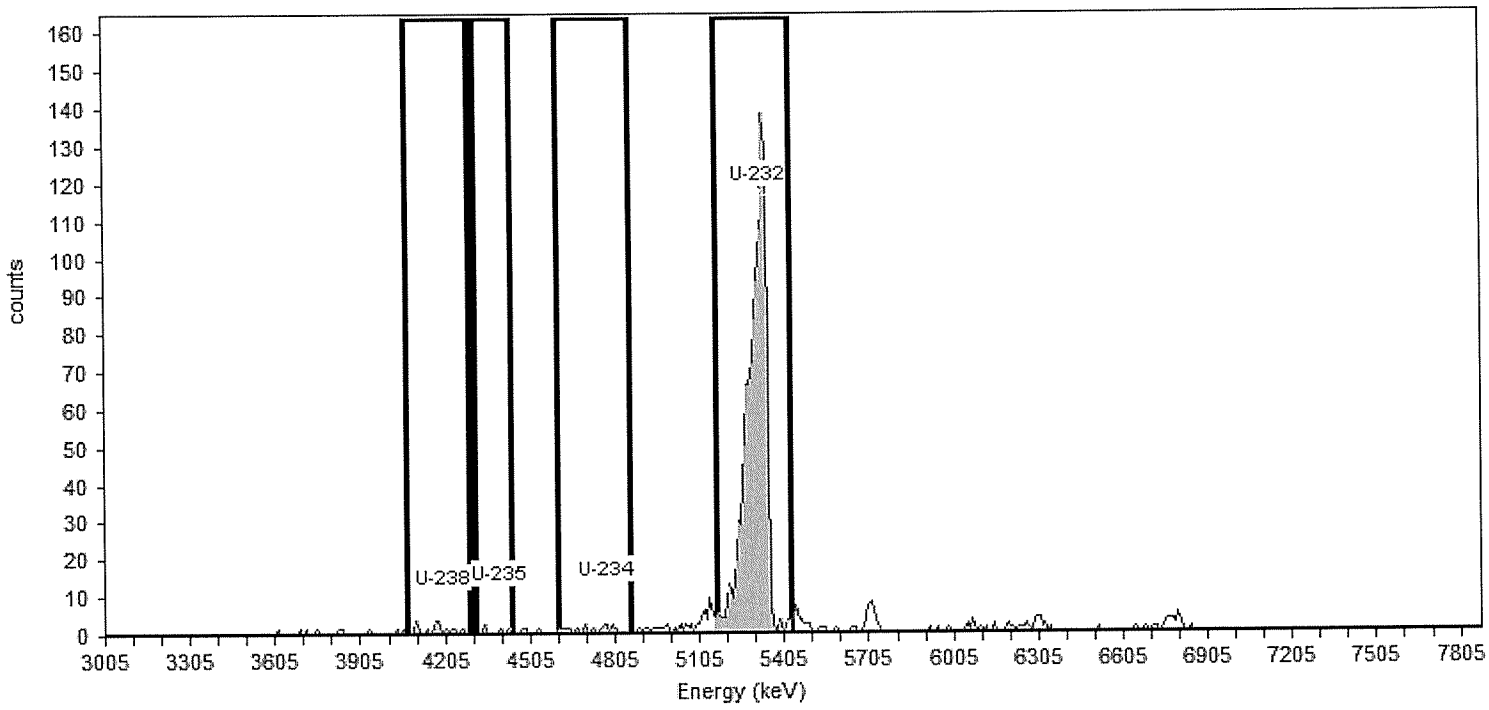
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314612 - D4, SN: 5402927, ID: 4
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D4; Det: 14314612 - D4; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 4

Energy Calibration: D4 calib 10-14-18
Efficiency Calibration:D4 calib 10-14-18
Calibration Date: 10/25/2018 6:23:58AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.16% +/- 1.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	89.3	100.0	15.00	16.4263	-1.43	0.000E+000	1.488E-002	2.503E-002	5.725E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	3.21	0.0000	3.21	1.054E-002	6.740E-003	0.000E+000	8.880E-003
U-234	4774.000	4598.000	4867.000	201.0	100.0	16.56	34.0000	-17.44	0.000E+000	1.891E-002	3.600E-002	7.918E-002
U-232	5322.000	5174.000	5433.000	64.7	99.8	1,002.57	30.0511	972.51	2.587E+000	1.092E-001	3.393E-002	7.505E-002

AlphaVision v6.0 — Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,628 9:22:05AM 8/17/2022

Sample

Sample: 22-01102-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

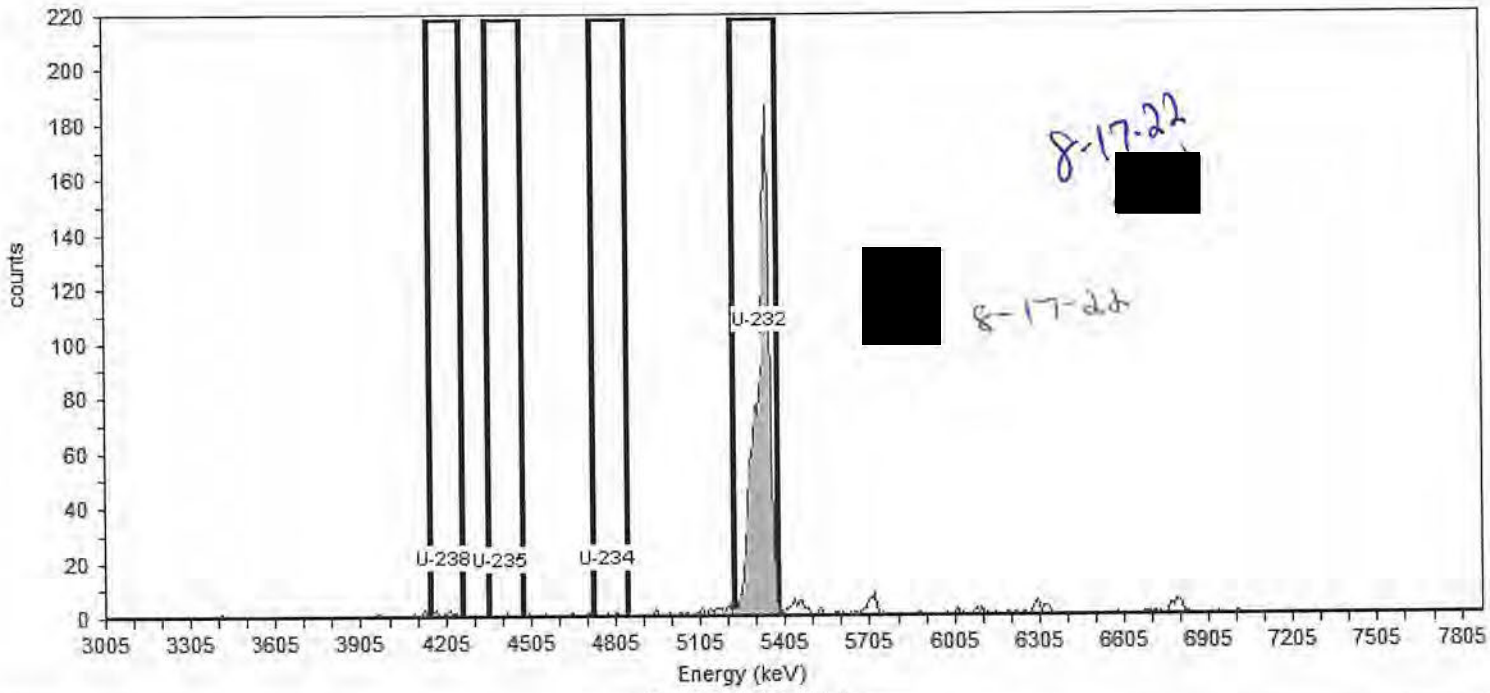
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D5, SN: 5402928, ID: 5
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D5; Det: 14314613 - D5; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 5

Energy Calibration: D5 calib 10-10-18
Efficiency Calibration:D5 calib 10-10-18
Calibration Date: 10/15/2018 9:50:48AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.74% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4147.513	4263.837	21.6	77.0	9.00	9.0000	0.00	0.000E+000	1.487E-002	2.446E-002	5.839E-002
U-235	4397.995	4350.981	4476.707	23.7	74.8	1.00	4.0000	-3.00	0.000E+000	8.069E-003	1.678E-002	4.333E-002
U-234	4773.999	4727.627	4843.198	21.7	72.4	2.00	8.0000	-6.00	0.000E+000	1.179E-002	2.452E-002	5.913E-002
U-232	5321.992	5227.346	5380.537	43.1	99.8	963.00	7.0000	956.00	2.585E+000	9.943E-002	1.664E-002	4.060E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,594 8:36:48AM 8/17/2022

Sample

Sample: 22-01102-05 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-002

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

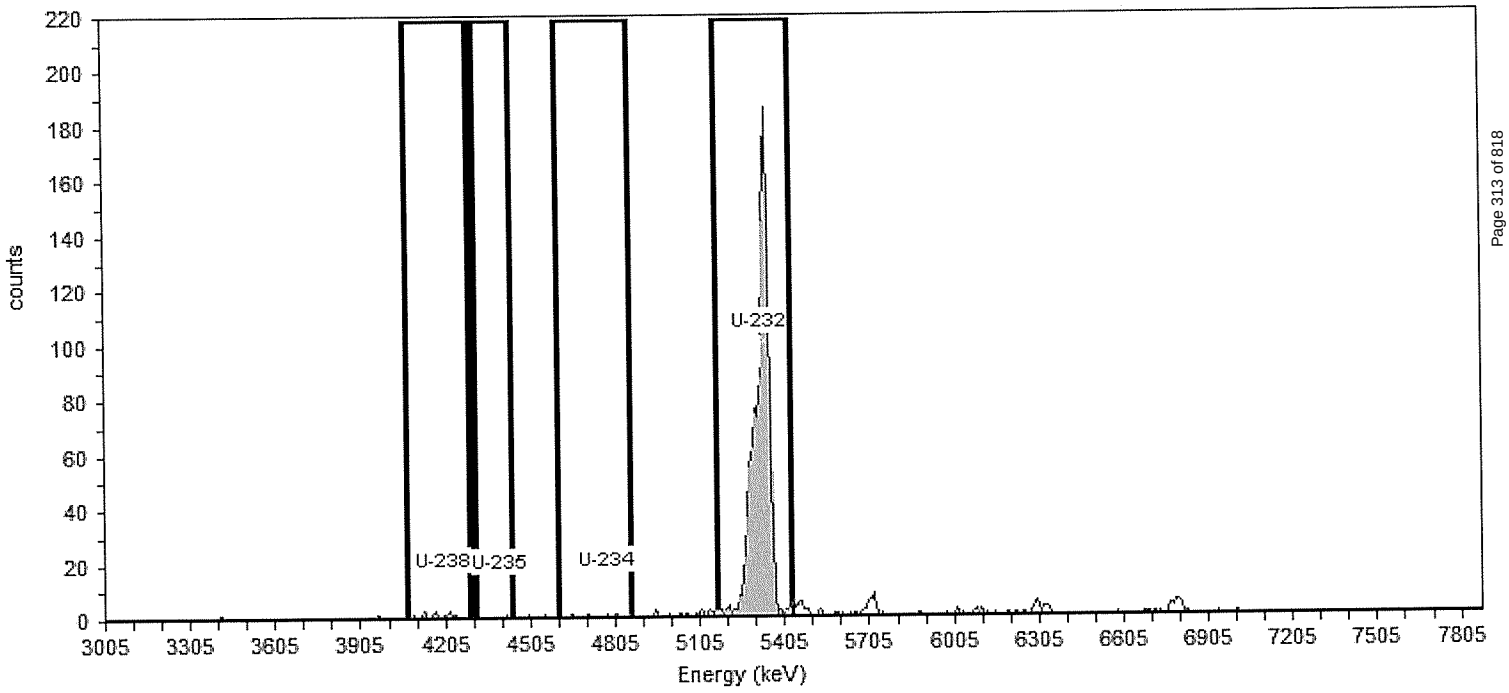
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D5, SN: 5402928, ID: 5
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D5; Det: 14314613 - D5; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 5

Energy Calibration: D5 calib 10-10-18
Efficiency Calibration:D5 calib 10-10-18
Calibration Date: 10/15/2018 9:50:48AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.74% +/- 1.05% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	114.1	100.0	12.00	10.8847	1.12	3.009E-003	1.291E-002	2.071E-002	4.872E-002
U-235	4398.000	4317.000	4436.000	13.1	80.9	1.00	2.7889	-1.79	0.000E+000	6.493E-003	1.296E-002	3.494E-002
U-234	4774.000	4598.000	4867.000	0.0	100.0	5.00	12.0000	-7.00	0.000E+000	1.113E-002	2.174E-002	5.077E-002
U-232	5322.000	5174.000	5433.000	36.8	99.8	982.97	14.4860	968.49	2.618E+000	1.008E-001	2.394E-002	5.519E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 32,629 9:23:17AM 8/17/2022

Sample

Sample: 22-01102-06 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-003

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

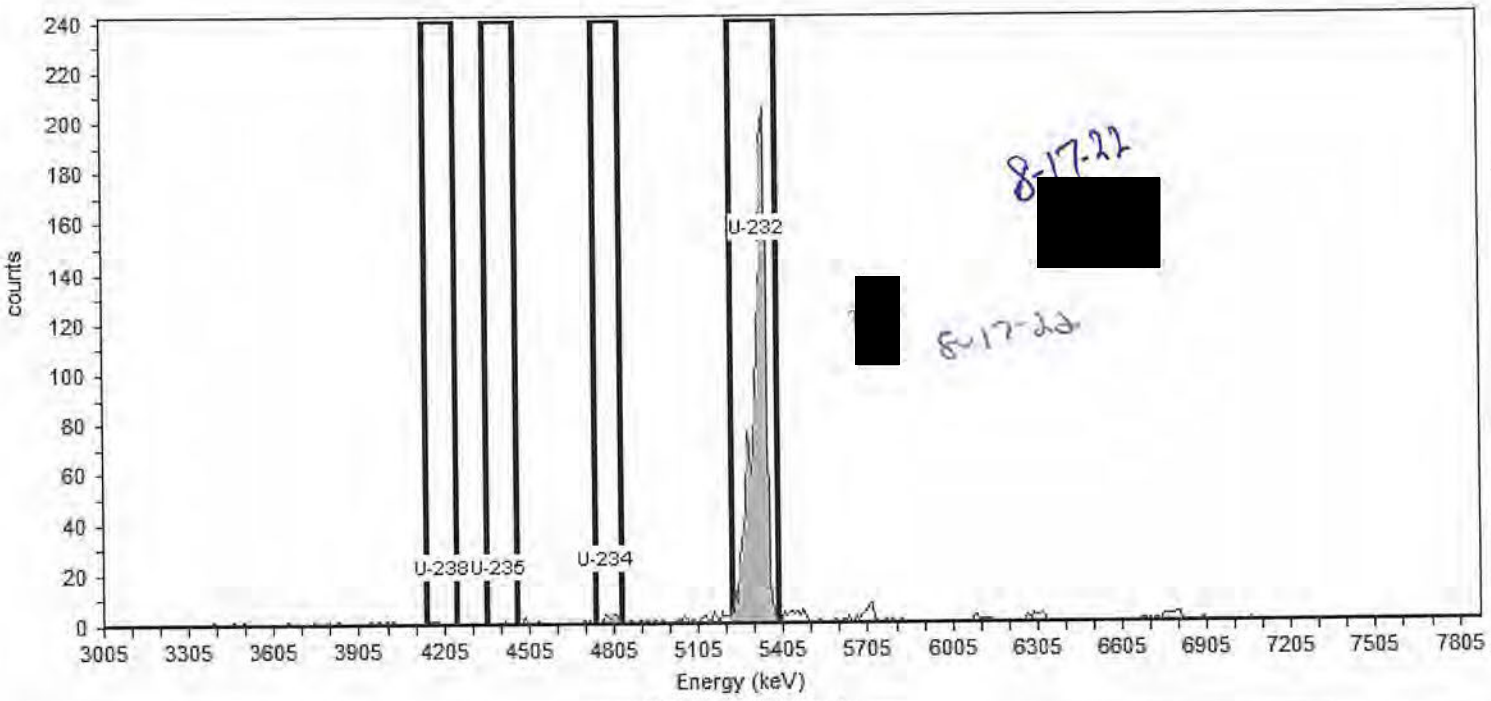
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D6, SN: 5403002, ID: 6
Acquisition Start Date: 8/16/2022 8:35:52AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D6; Det: 14314613 - D6; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 6

Energy Calibration: 10-18-18 D6
Efficiency Calibration:10-18-18 D6
Calibration Date: 10/19/2018 6:42:33AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.53% +/- 1.04% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4137.813	4244.460	25.2	100.0	3.00	12.0000	-9.00	0.000E+000	1.055E-002	2.192E-002	5.121E-002
U-235	4397.995	4350.981	4457.376	23.7	74.8	1.00	1.0000	0.00	0.000E+000	5.143E-003	8.461E-003	2.676E-002
U-234	4773.999	4737.264	4833.573	49.0	72.4	13.00	15.0000	-2.00	0.000E+000	1.988E-002	3.386E-002	7.788E-002
U-232	5321.992	5227.346	5390.103	37.0	99.8	1,073.00	15.0000	1058.00	2.884E+000	1.076E-001	2.456E-002	5.650E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,592 8:36:14AM 8/17/2022

Sample

Sample: 22-01102-06 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-003

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

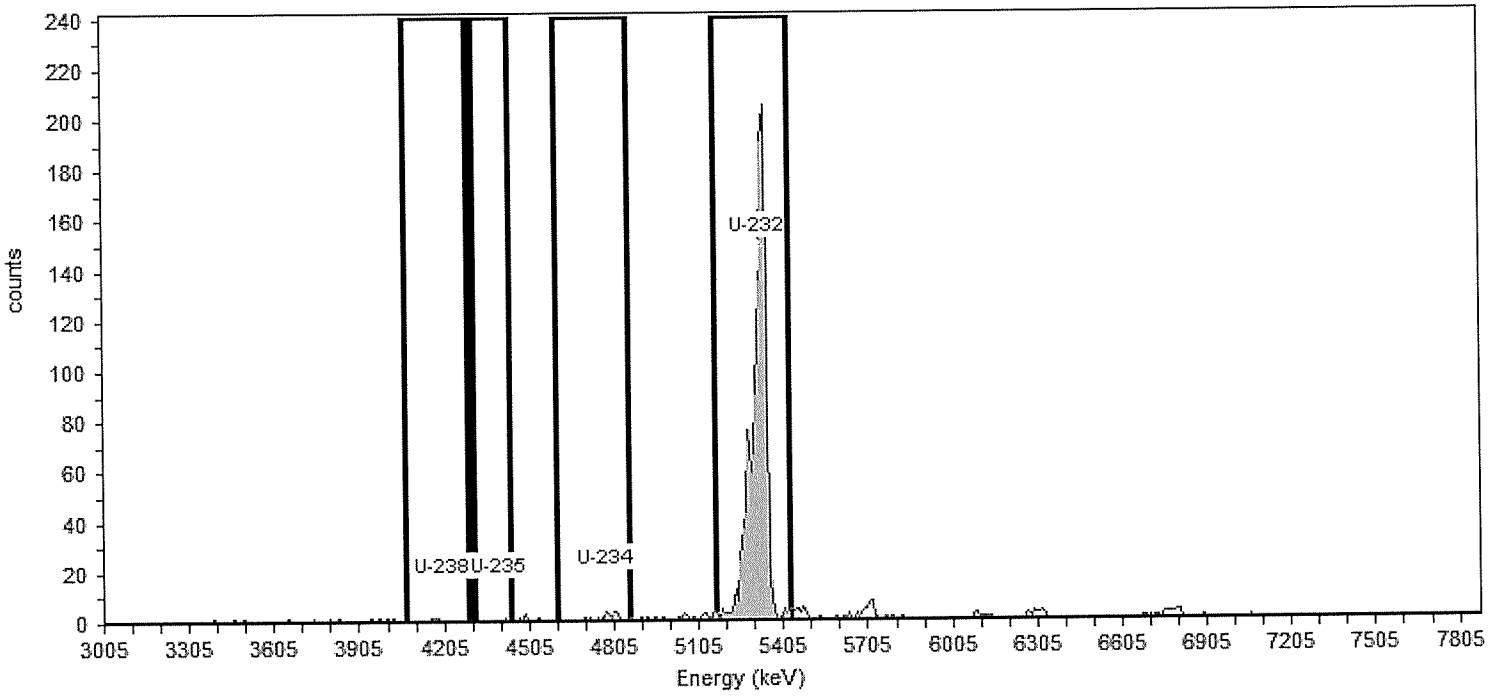
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314613 - D6, SN: 5403002, ID: 6
Acquisition Start Date: 8/16/2022 8:35:52AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:04PM
Bkgd Info: Sample: D6; Det: 14314613 - D6; Spectrum #1; 8/12/2022 3:03:04 PM; Live Time: 1440.000(min.); ID: 6

Energy Calibration: 10-18-18 D6
Efficiency Calibration:10-18-18 D6
Calibration Date: 10/19/2018 6:42:33AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.53% +/- 1.04% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	25.1	100.0	3.00	18.1153	-15.12	0.000E+000	1.253E-002	2.694E-002	6.123E-002
U-235	4398.000	4317.000	4436.000	13.1	80.9	1.00	0.7889	0.21	7.098E-004	4.498E-003	6.948E-003	2.300E-002
U-234	4774.000	4598.000	4867.000	53.2	100.0	15.53	21.0000	-5.47	0.000E+000	1.644E-002	2.899E-002	6.534E-002
U-232	5322.000	5174.000	5433.000	37.0	99.8	1,095.13	24.6675	1070.46	2.918E+000	1.090E-001	3.150E-002	7.037E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,630 9:24:32AM 8/17/2022

Sample

Sample: 22-01102-07 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-004

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

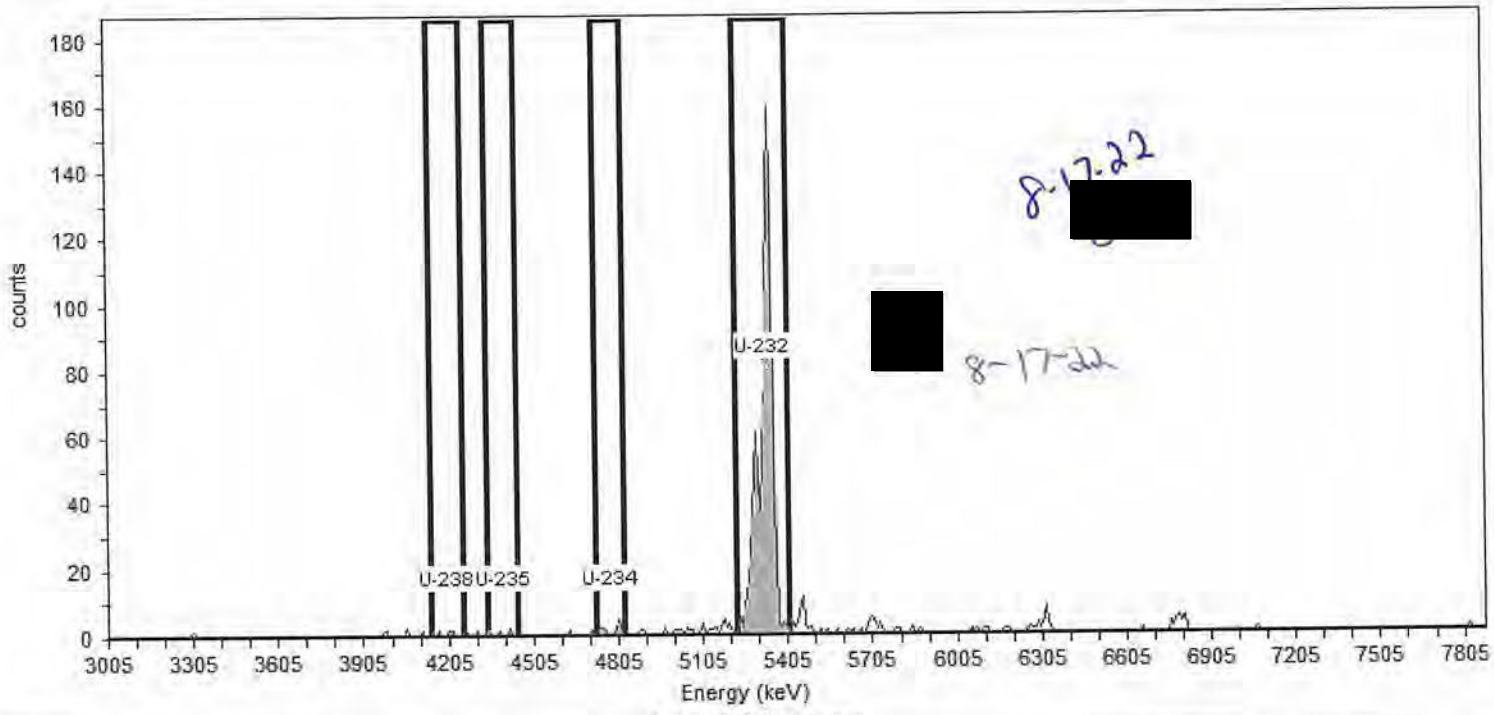
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D7, SN: 5403003, ID: 7
Acquisition Start Date: 8/16/2022 8:35:52AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: D7; Det: 14314614 - D7; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 7

Energy Calibration: D7 calib 10-22-18
Efficiency Calibration:D7 calib 10-22-18
Calibration Date: 10/23/2018 6:29:02AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.02% +/- 1.02% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4137.813	4254.149	73.1	100.0	4.00	12.0000	-8.00	0.000E+000	1.111E-002	2.236E-002	5.224E-002
U-235	4397.995	4341.303	4447.709	0.0	76.3	4.00	3.0000	1.00	3.637E-003	9.624E-003	1.466E-002	3.915E-002
U-234	4773.999	4727.627	4823.947	14.4	72.4	10.00	17.0000	-7.00	0.000E+000	1.993E-002	3.677E-002	8.391E-002
U-232	5321.992	5227.346	5409.230	33.2	99.8	752.00	28.0000	724.00	2.013E+000	8.792E-002	3.423E-002	7.599E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,596 8:37:23AM 8/17/2022

Sample

Sample: 22-01102-07 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-004

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

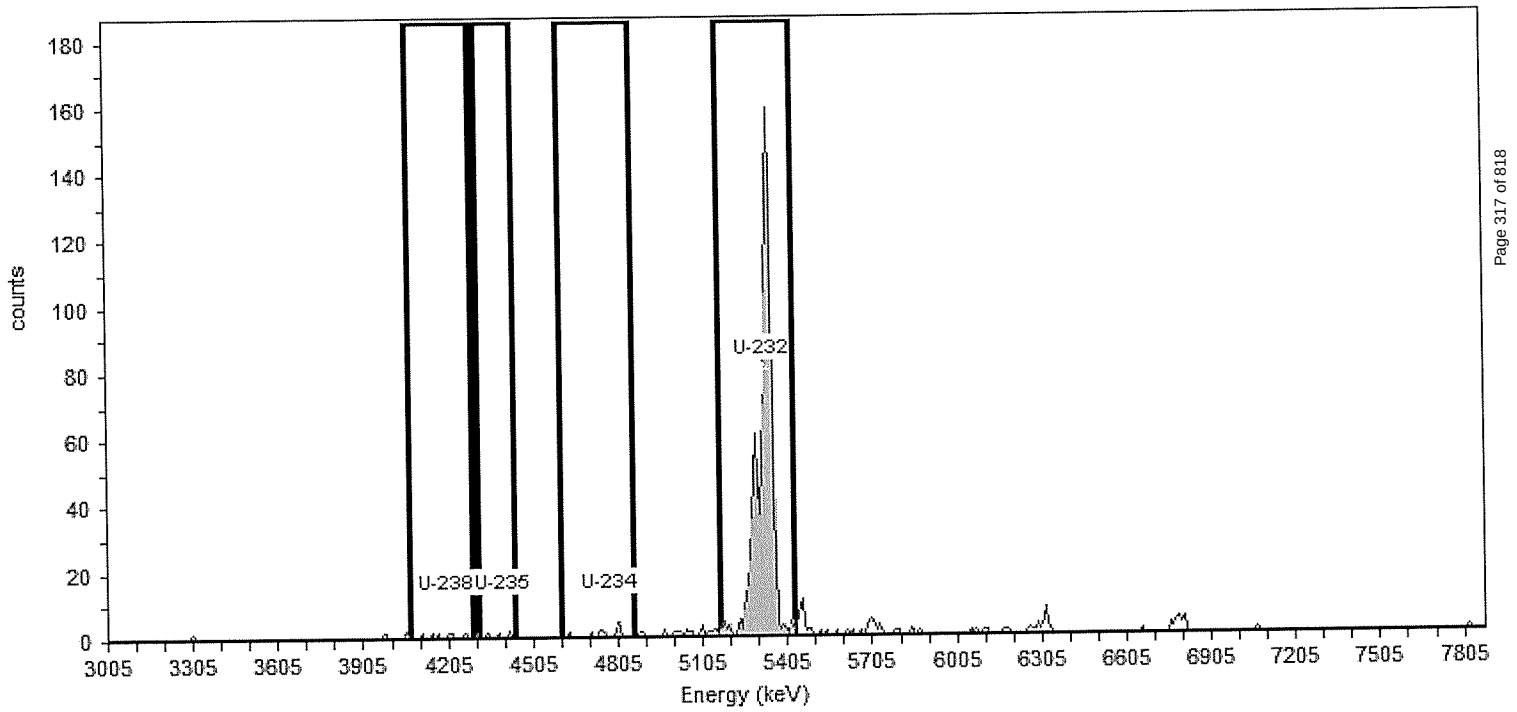
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 14314614 - D7, SN: 5403003, ID: 7
Acquisition Start Date: 8/16/2022 8:35:52AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: D7; Det: 14314614 - D7; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 7

Energy Calibration: D7 calib 10-22-18
Efficiency Calibration:D7 calib 10-22-18
Calibration Date: 10/23/2018 6:29:02AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.02% +/- 1.02% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	67.6	100.0	6.00	15.1153	-9.12	0.000E+000	1.276E-002	2.510E-002	5.771E-002
U-235	4398.000	4317.000	4436.000	13.1	80.9	4.00	3.0000	1.00	3.430E-003	9.076E-003	1.382E-002	3.693E-002
U-234	4774.000	4598.000	4867.000	80.9	100.0	12.00	24.4409	-12.44	0.000E+000	1.676E-002	3.191E-002	7.132E-002
U-232	5322.000	5174.000	5433.000	33.2	99.8	766.36	38.4348	727.92	2.024E+000	8.911E-002	4.011E-002	8.774E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,631 9:26:11AM 8/17/2022

Sample

Sample: 22-01102-08 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-005

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

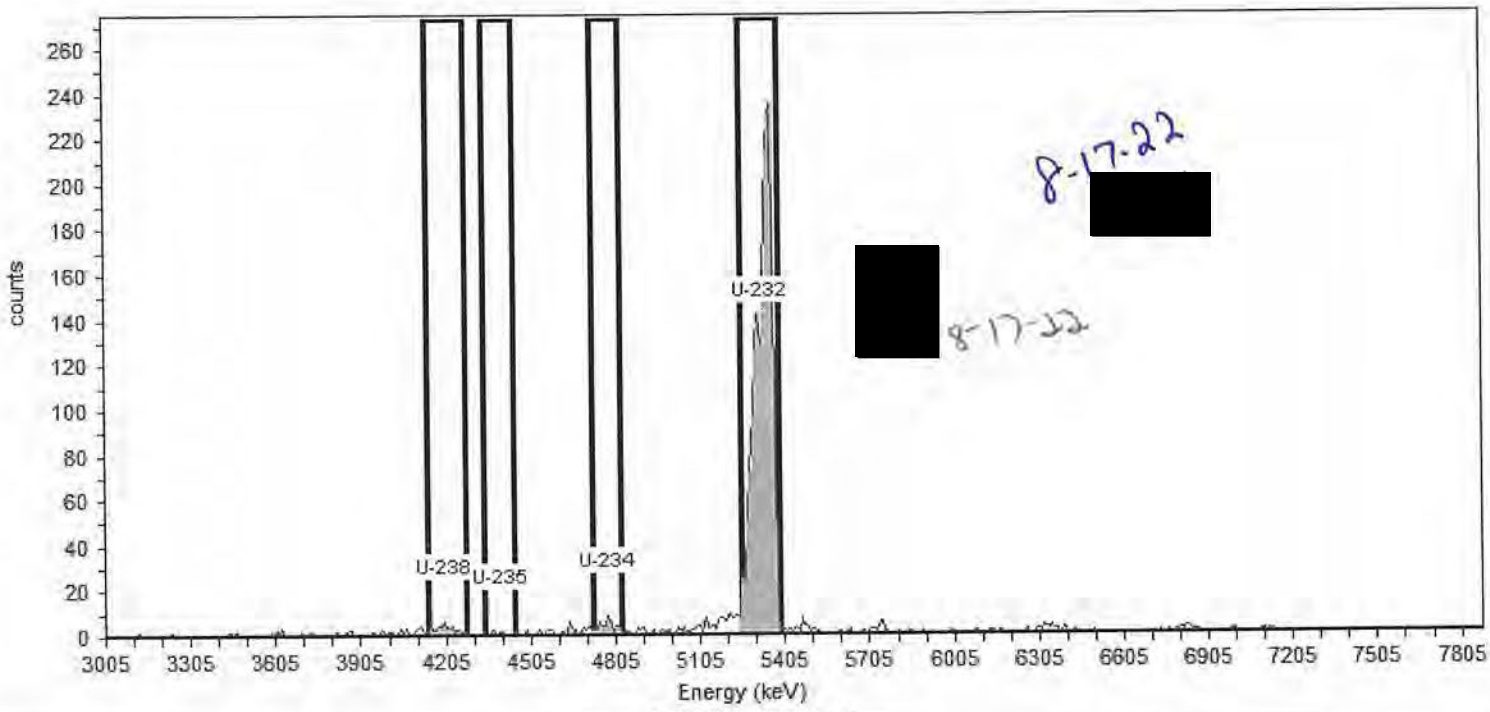
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E1, SN: 5702125, ID: 9
Acquisition Start Date: 8/16/2022 8:35:52AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: E1; Det: 17166649 - E1; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 9

Energy Calibration: E1 calib 5-19-21
Efficiency Calibration:E1 calib 5-19-21
Calibration Date: 5/20/2021 6:18:40AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 25.28% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4137.813	4273.524	91.7	100.0	38.00	34.0000	4.00	1.099E-002	2.331E-002	3.727E-002	8.197E-002
U-235	4397.995	4341.303	4447.709	0.0	76.3	5.00	7.0000	-2.00	0.000E+000	1.248E-002	2.216E-002	5.407E-002
U-234	4773.999	4727.627	4823.947	75.3	72.4	39.00	41.0000	-2.00	0.000E+000	3.394E-002	5.653E-002	1.233E-001
U-232	5321.992	5256.090	5390.103	72.8	99.8	1,609.00	3.0000	1606.00	4.421E+000	1.603E-001	1.109E-002	2.963E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,595 8:37:06AM 8/17/2022

Sample

Sample: 22-01102-08 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-005

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

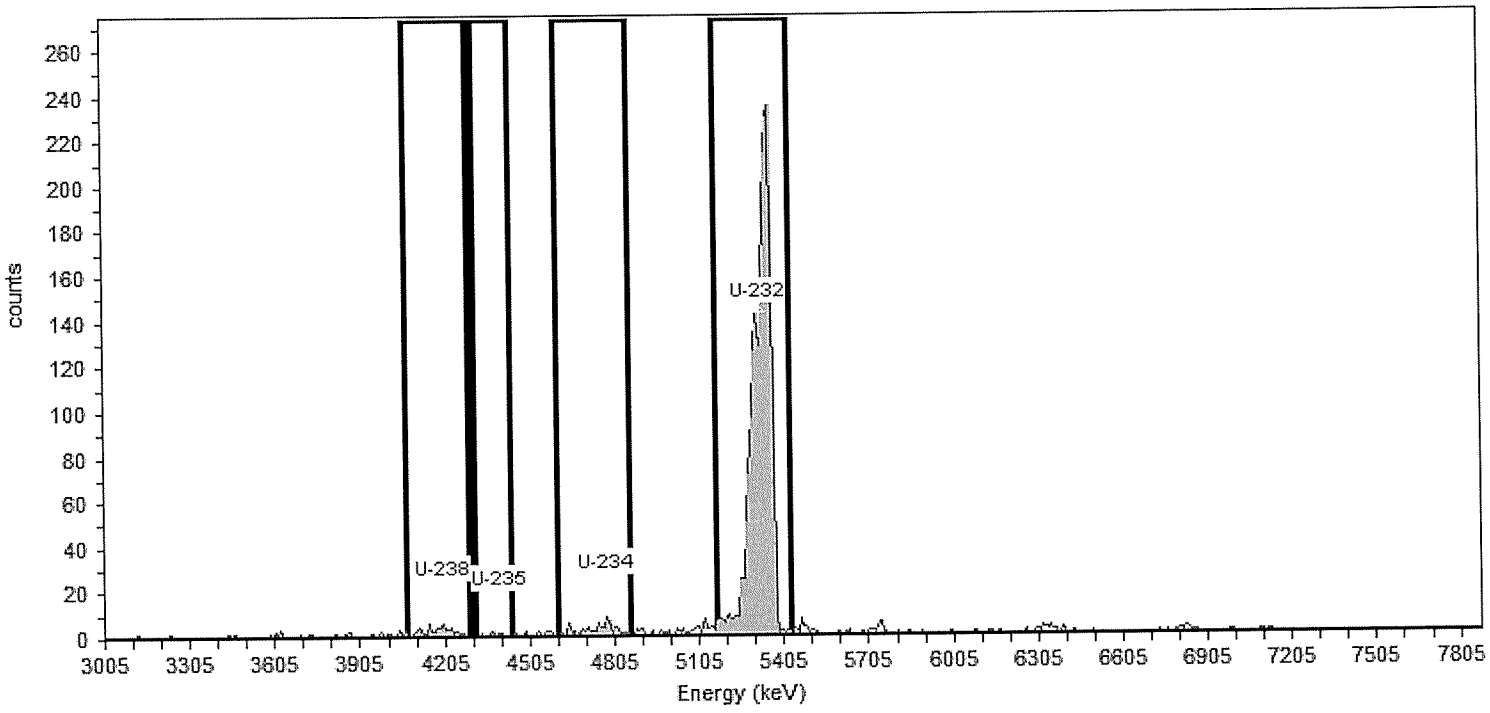
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E1, SN: 5702125, ID: 9
Acquisition Start Date: 8/16/2022 8:35:52AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: E1; Det: 17166649 - E1; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 9

Energy Calibration: E1 calib 5-19-21
Efficiency Calibration:E1 calib 5-19-21
Calibration Date: 5/20/2021 6:18:40AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.28% +/- 1.33% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	135.0	100.0	49.00	44.3110	4.69	1.288E-002	2.654E-002	4.255E-002	9.253E-002
U-235	4398.000	4317.000	4436.000	81.9	80.9	5.00	4.7889	0.21	7.169E-004	1.063E-002	1.729E-002	4.377E-002
U-234	4774.000	4598.000	4867.000	51.3	100.0	64.00	63.4409	0.56	1.535E-003	3.100E-002	5.089E-002	1.092E-001
U-232	5322.000	5174.000	5433.000	67.2	99.8	1,671.92	30.4067	1641.51	4.519E+000	1.642E-001	3.532E-002	7.808E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 32,632 9:27:14AM 8/17/2022

Sample

Sample: 22-01102-09 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-006

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

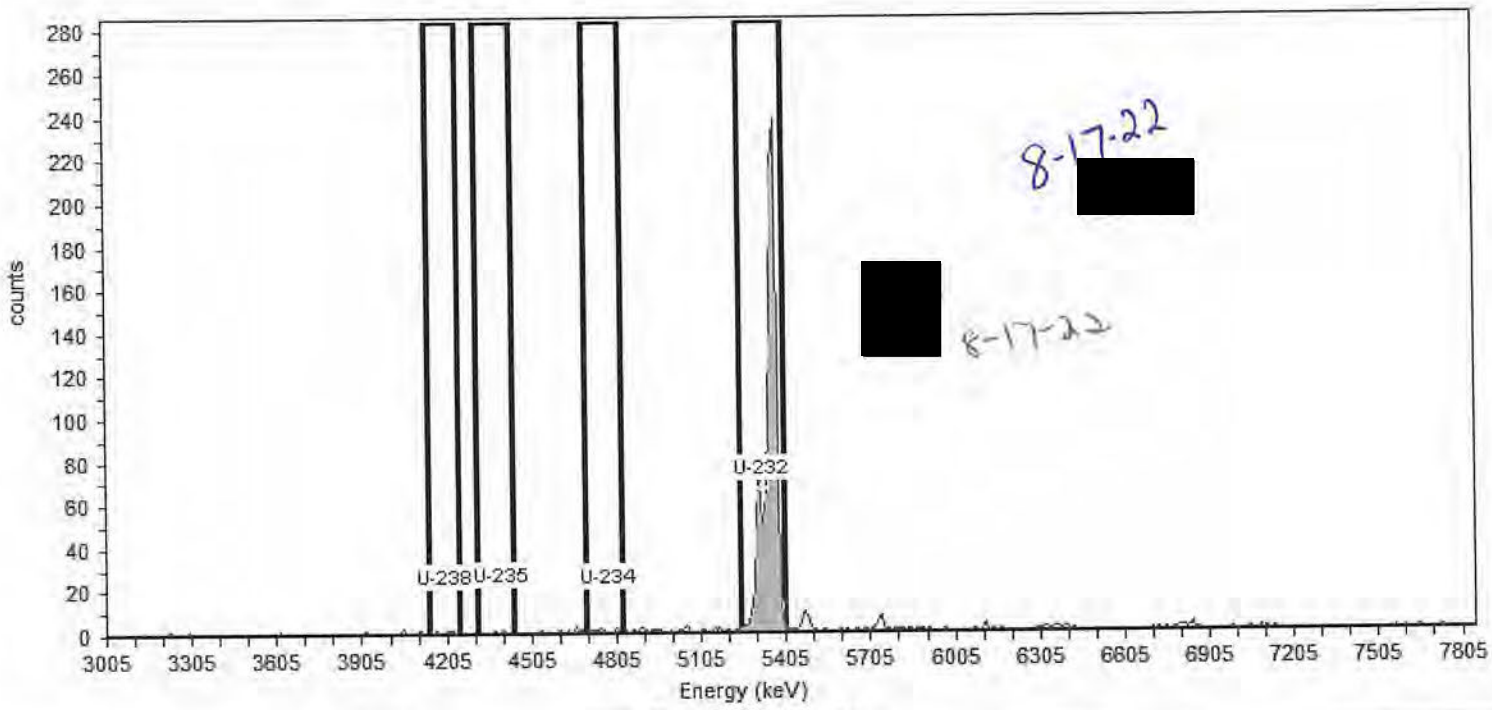
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E2, SN: 5702126, ID: 10
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: E2; Det: 17166649 - E2; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 10

Energy Calibration: E2 calib 5-19-21
Efficiency Calibration:E2 calib 5-19-21
Calibration Date: 5/20/2021 6:21:31AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.15% +/- 0.99% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4137.813	4244.460	21.0	100.0	5.00	6.0000	-1.00	0.000E+000	9.538E-003	1.639E-002	4.055E-002
U-235	4397.995	4317.000	4436.000	52.0	80.9	2.00	1.0000	1.00	3.555E-003	6.157E-003	8.269E-003	2.616E-002
U-234	4773.999	4698.711	4823.947	71.4	99.8	9.00	9.0000	0.00	0.000E+000	1.222E-002	2.011E-002	4.802E-002
U-232	5321.992	5246.510	5399.667	36.1	99.8	1,011.00	15.0000	996.00	2.870E+000	1.094E-001	2.596E-002	5.972E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,599 8:38:16AM 8/17/2022

Sample

Sample: 22-01102-09 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-006

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

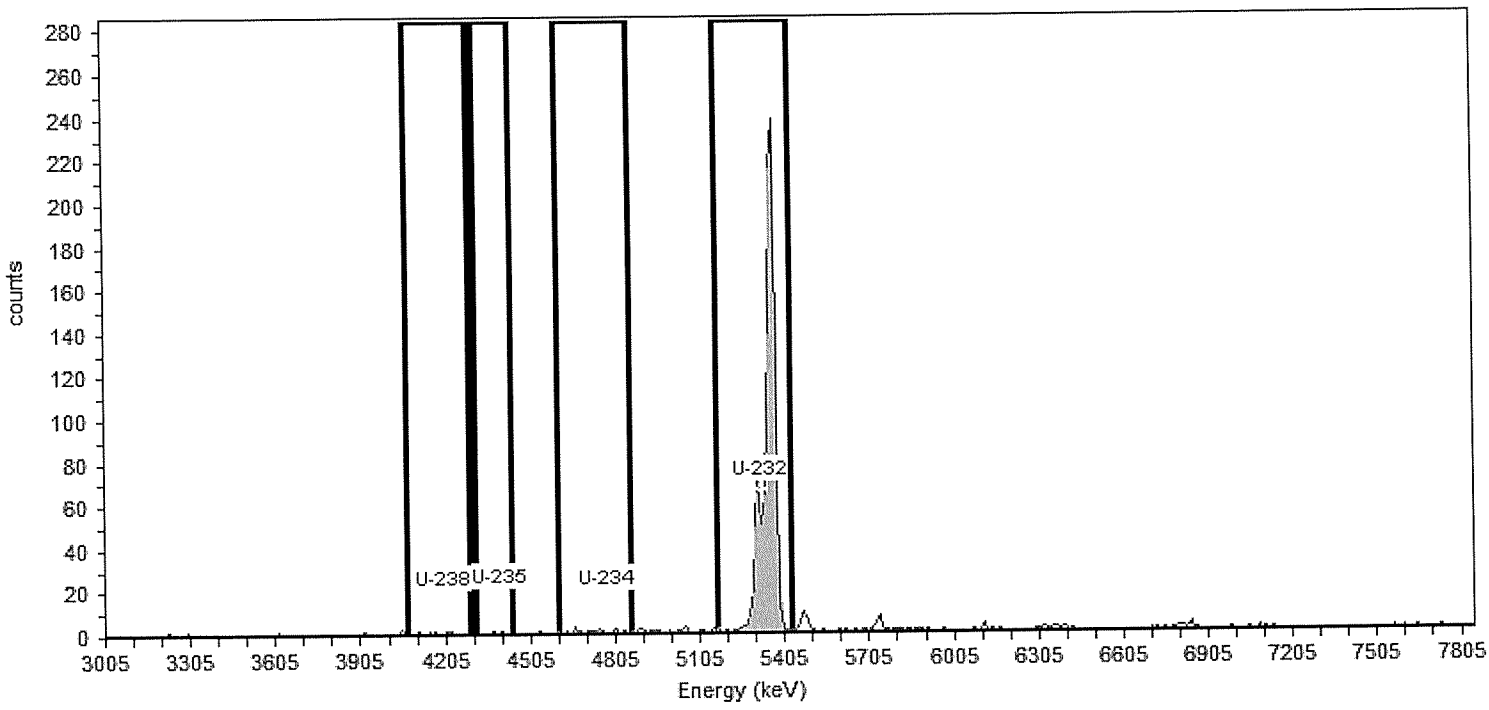
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166649 - E2, SN: 5702126, ID: 10
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: E2; Det: 17166649 - E2; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 10

Energy Calibration: E2 calib 5-19-21
Efficiency Calibration:E2 calib 5-19-21
Calibration Date: 5/20/2021 6:21:31AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.15% +/- 0.99% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	74.9	100.0	6.00	6.0000	0.00	0.000E+000	9.961E-003	1.639E-002	4.055E-002
U-235	4398.000	4317.000	4436.000	52.0	80.9	2.00	1.0000	1.00	3.555E-003	6.157E-003	8.269E-003	2.616E-002
U-234	4774.000	4598.000	4867.000	110.5	100.0	16.09	13.4734	2.61	7.509E-003	1.563E-002	2.455E-002	5.687E-002
U-232	5322.000	5174.000	5433.000	30.8	99.8	1,017.13	22.5652	994.57	2.866E+000	1.099E-001	3.184E-002	7.148E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 32,633 9:28:20AM 8/17/2022

Sample

Sample: 22-01102-10 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-007

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

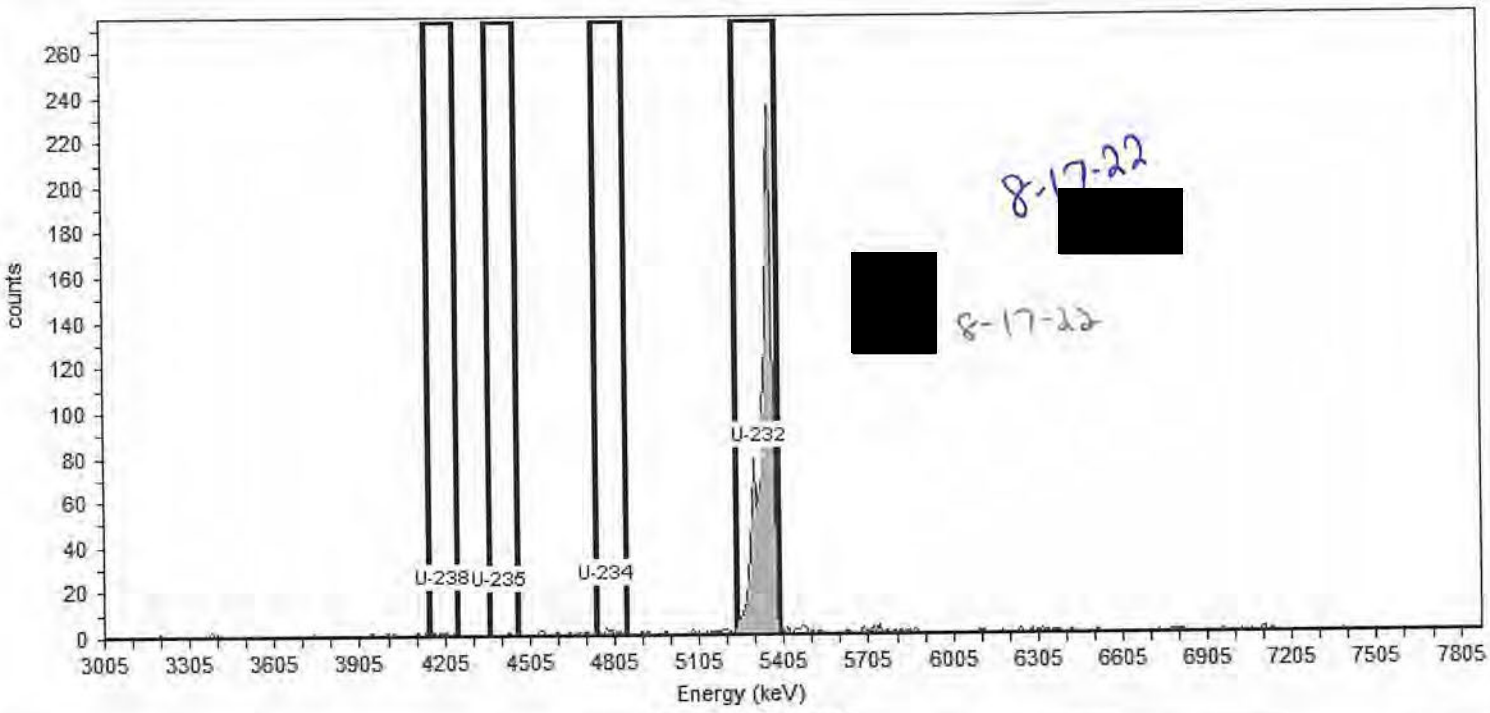
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E3, SN: 21251286, ID: 11
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: E3; Det: 17166650 - E3; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 11

Energy Calibration: E3 calib 2-3-22
Efficiency Calibration:E3 calib 2-3-22
Calibration Date: 2/4/2022 10:44:46AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.00% +/- 0.94% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4147.513	4244.460	87.2	77.0	6.00	11.0000	-5.00	0.000E+000	1.617E-002	3.025E-002	7.111E-002
U-235	4397.995	4360.659	4457.376	0.0	74.8	2.00	2.0000	0.00	0.000E+000	8.072E-003	1.328E-002	3.748E-002
U-234	4773.999	4737.264	4843.198	24.7	72.4	10.00	10.0000	0.00	0.000E+000	1.865E-002	3.068E-002	7.264E-002
U-232	5321.992	5236.928	5390.103	40.3	99.8	1,075.00	6.0000	1069.00	3.234E+000	1.196E-001	1.724E-002	4.266E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 32,600 8:38:33AM 8/17/2022

Sample

Sample: 22-01102-10 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: ARS1-22-01492-007

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: B22-01102 RR
:
Description:

Client Name: Undefined
Client Contact:

Tracer

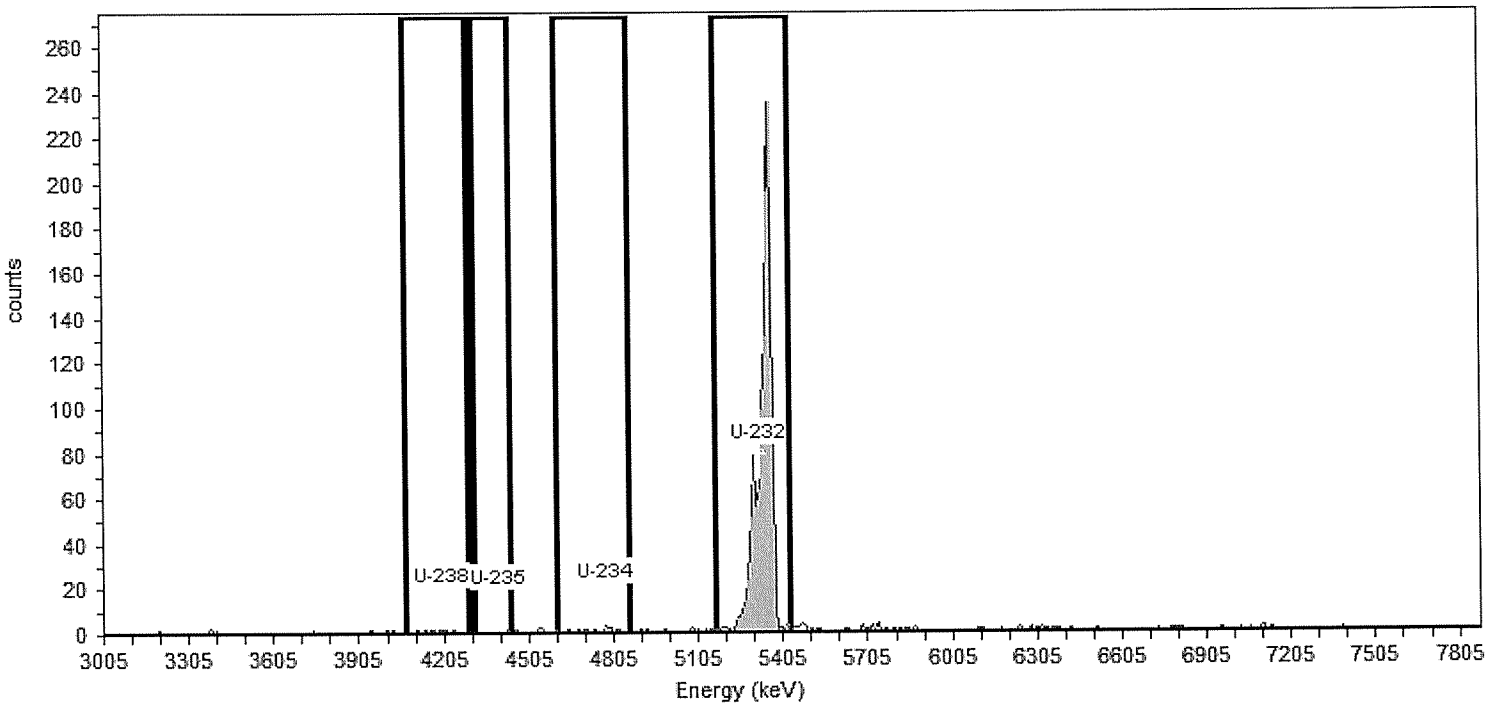
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E3, SN: 21251286, ID: 11
Acquisition Start Date: 8/16/2022 8:35:51AM
Live Time: 1,440.00 min.
Real Time: 1,440.00 min.
Background Date: 8/12/2022 3:03:05PM
Bkgd Info: Sample: E3; Det: 17166650 - E3; Spectrum #1; 8/12/2022 3:03:05 PM; Live Time: 1440.000(min.); ID: 11

Energy Calibration: E3 calib 2-3-22
Efficiency Calibration:E3 calib 2-3-22
Calibration Date: 2/4/2022 10:44:46AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 23.00% +/- 0.94% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:8/16/2022 8:33:40AM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	61.0	100.0	8.00	19.8847	-11.88	0.000E+000	1.596E-002	3.132E-002	7.081E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	0.21	3.0000	-2.79	0.000E+000	6.690E-003	1.504E-002	4.017E-002
U-234	4774.000	4598.000	4867.000	24.8	100.0	14.56	20.0000	-5.44	0.000E+000	1.774E-002	3.140E-002	7.096E-002
U-232	5322.000	5174.000	5433.000	35.0	99.8	1,087.05	14.4860	1072.57	3.245E+000	1.205E-001	2.678E-002	6.175E-002

Technical Note Report

ABATCH	ARS1-B22-01102
Analysis Code	ASP-U-AF
Procedure No	PALA-RAD-026
Matrix	Air Filter

#	Date	Dept	Technical Note	User ID
1	08/17/2022 10:56 AM	COUNTROOM	ROI's adjusted to better fit the peaks of interest.	[redacted]

Ortec Ensembles

Date	Time	Batch ID	Fraction	Detector(s)	Procedure	File #	Tech
08-16-2022	08:17	daily	QA	all	pulser	N/A	[redacted]
08-16-2022	08:31	weekly	QA	E4,F8	source	N/A	
08-16-2022	08:36	22-01102	1	D1	U	32624	
08-16-2022	08:36	22-01102	2	D2	U	32625	
08-16-2022	08:36	22-01102	3	D3	U	32626	
08-16-2022	08:36	22-01102	4	D4	U	32627	
08-16-2022	08:36	22-01102	5	D5	U	32628	
08-16-2022	08:36	22-01102	6	D6	U	32629	
08-16-2022	08:36	22-01102	7	D7	U	32630	
08-16-2022	08:36	22-01102	8	E1	U	32631	
08-16-2022	08:36	22-01102	9	E2	U	32632	
08-16-2022	08:36	22-01102	10	E3	U	32633	
08-16-2022	14:56	22-01137	1	F1	Th	32634	
08-16-2022	14:56	22-01137	2	F2	Th	32635	
08-16-2022	14:56	22-01137	3	F3	Th	32636	
08-16-2022	14:56	22-01137	4	F4	Th	32637	
08-16-2022	14:56	22-01137	5	F5	Th	32638	
08-16-2022	14:56	22-01137	6	F6	Th	32639	
08-16-2022	14:56	22-01137	7	F7	Th	32640	
08-17-2022	08:47	daily	QA	all	pulser	N/A	

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

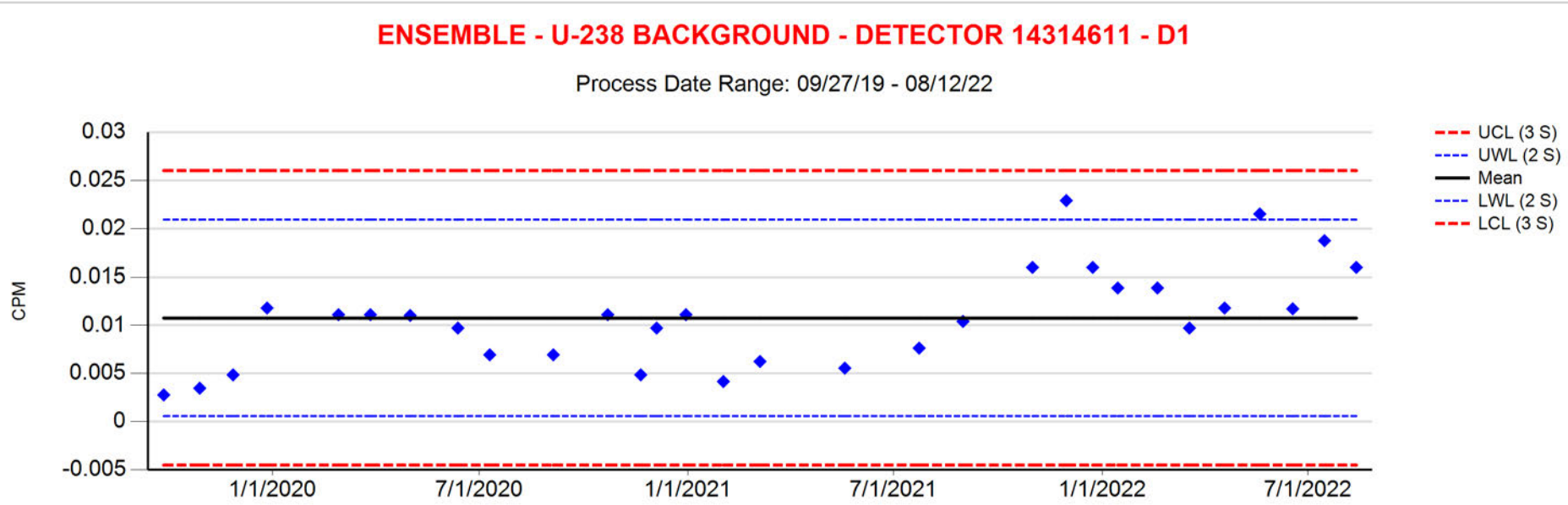
for

Gilbane Federal

Alpha Spec U-Backgrounds

U-238 Background - ARS1-B22-01102-01

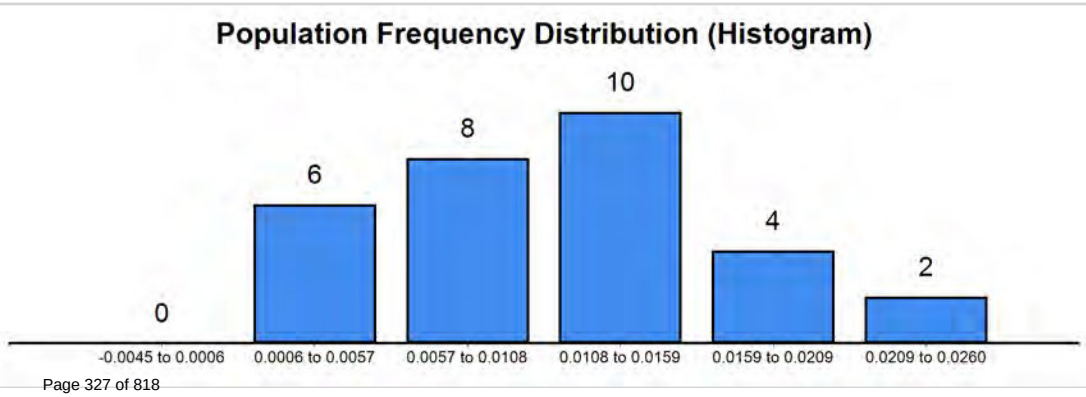
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0108	CPM	0.0160	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0051	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0260	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0045	CPM	0.0188	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0045 to 0.0006	0
0.0006 to 0.0057	6
0.0057 to 0.0108	8
0.0108 to 0.0159	10
0.0159 to 0.0209	4
0.0209 to 0.0260	2

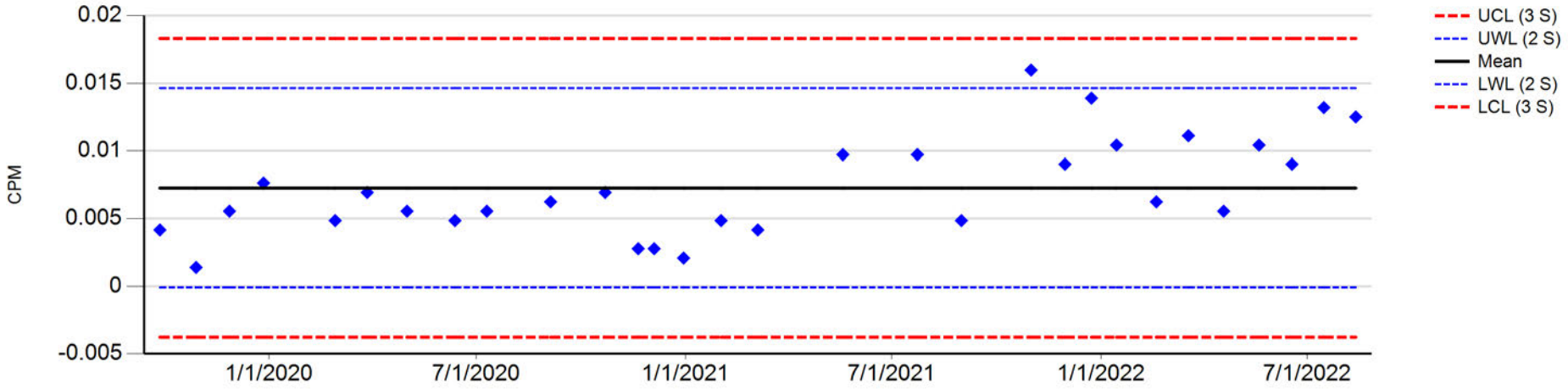


U-238 Background - ARS1-B22-01102-02

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0073	CPM	0.0125	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0037	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0183	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0038	CPM	0.0132	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-238 BACKGROUND - DETECTOR 14314611 - D2

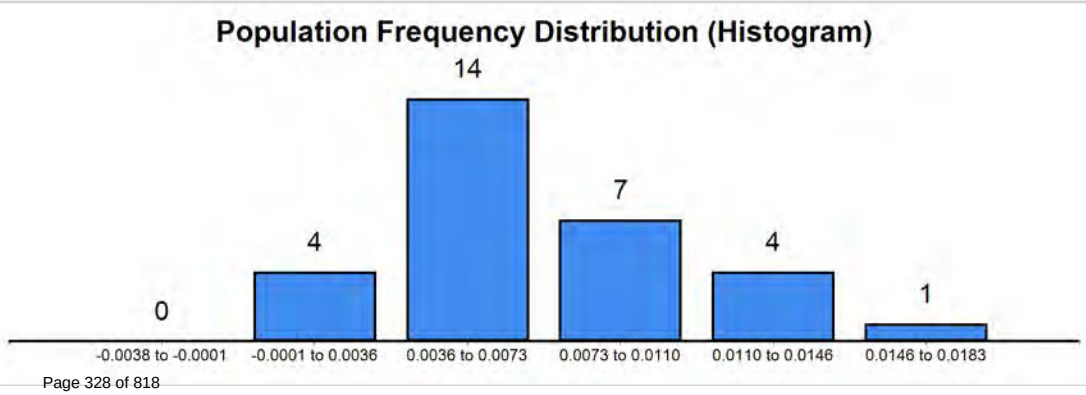
Process Date Range: 09/27/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0038 to -0.0001	0
-0.0001 to 0.0036	4
0.0036 to 0.0073	14
0.0073 to 0.0110	7
0.0110 to 0.0146	4
0.0146 to 0.0183	1

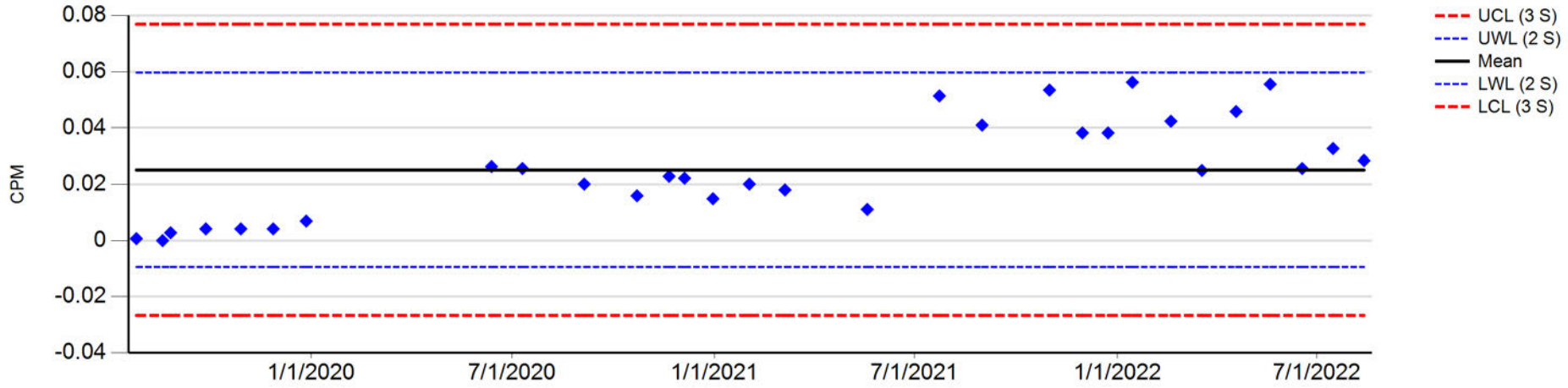


U-234 Background - ARS1-B22-01102-03

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0251	CPM	0.0285	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0173	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0770	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0267	CPM	0.0326	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-234 BACKGROUND - DETECTOR 14314612 - D3

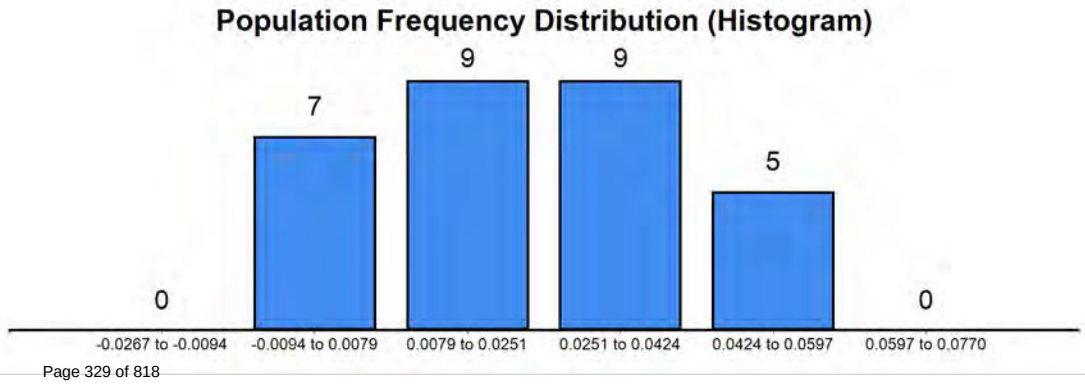
Process Date Range: 07/26/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0267 to -0.0094	0
-0.0094 to 0.0079	7
0.0079 to 0.0251	9
0.0251 to 0.0424	9
0.0424 to 0.0597	5
0.0597 to 0.0770	0

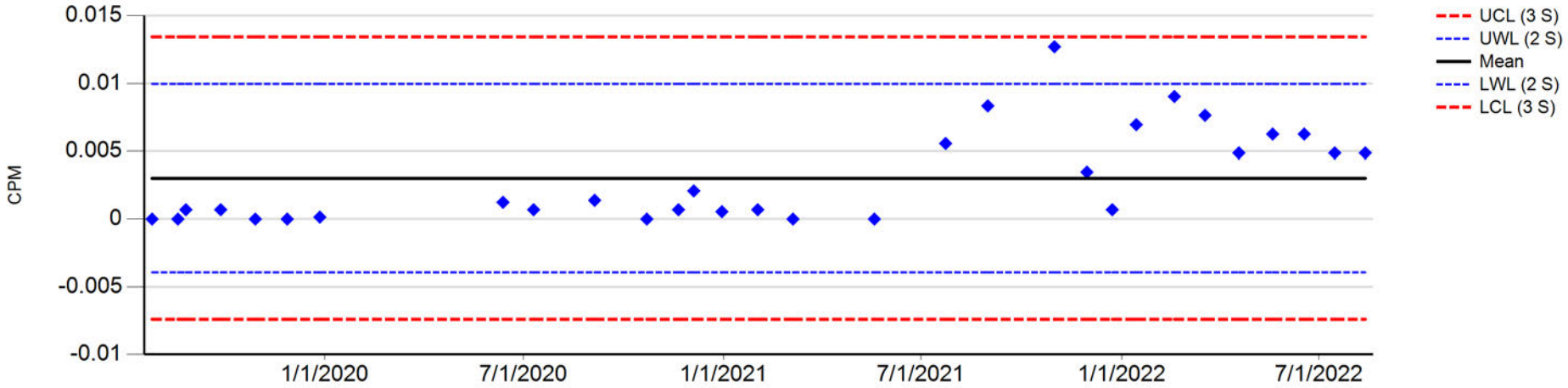


U-235 Background - ARS1-B22-01102-03

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0030	CPM	0.0049	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0035	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0134	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0074	CPM	0.0049	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-235 BACKGROUND - DETECTOR 14314612 - D3

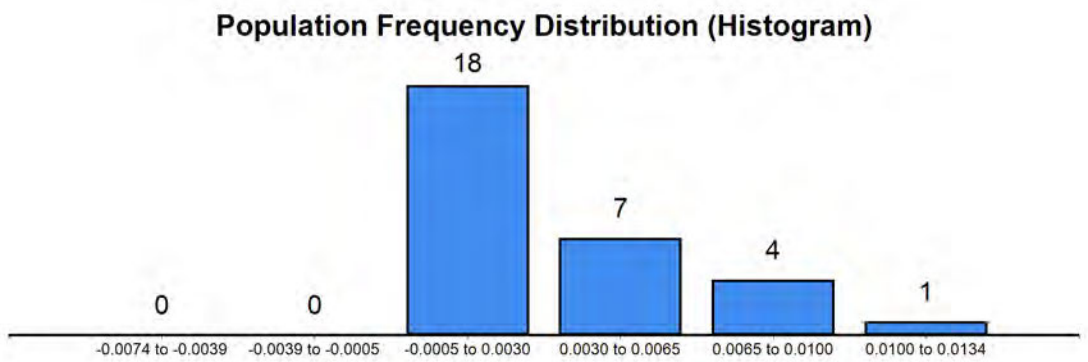
Process Date Range: 07/26/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0074 to -0.0039	0
-0.0039 to -0.0005	0
-0.0005 to 0.0030	18
0.0030 to 0.0065	7
0.0065 to 0.0100	4
0.0100 to 0.0134	1

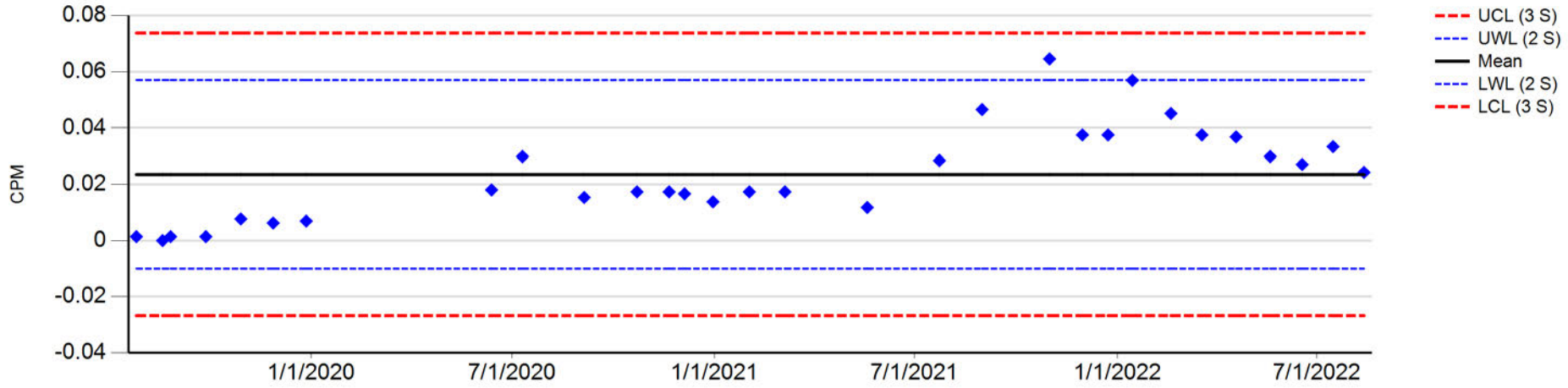


U-238 Background - ARS1-B22-01102-03

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0235	CPM	0.0243	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0168	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0738	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0268	CPM	0.0333	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-238 BACKGROUND - DETECTOR 14314612 - D3

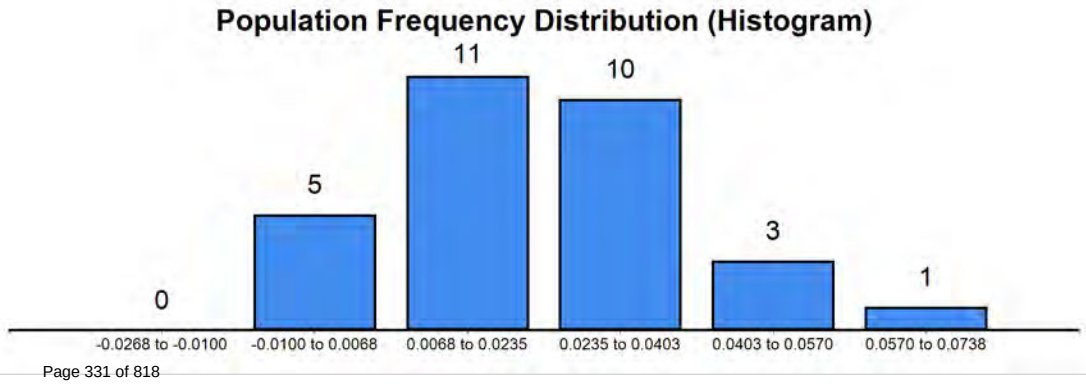
Process Date Range: 07/26/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0268 to -0.0100	0
-0.0100 to 0.0068	5
0.0068 to 0.0235	11
0.0235 to 0.0403	10
0.0403 to 0.0570	3
0.0570 to 0.0738	1

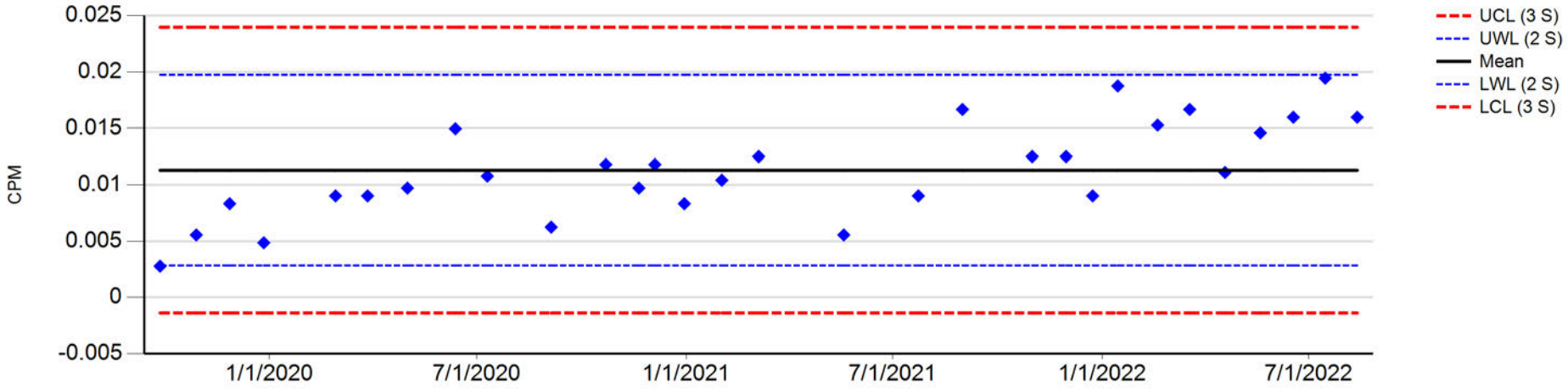


U-234 Background - ARS1-B22-01102-04

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0113	CPM	0.0160	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0042	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0240	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0014	CPM	0.0194	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-234 BACKGROUND - DETECTOR 14314612 - D4

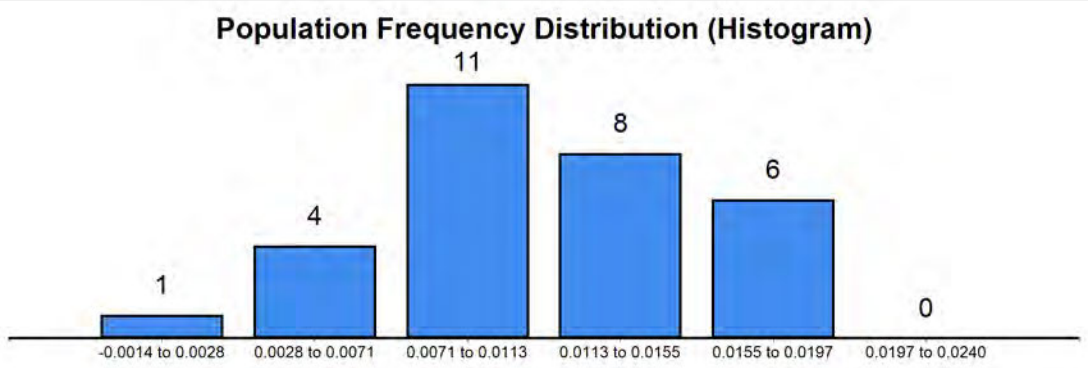
Process Date Range: 09/27/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0014 to 0.0028	1
0.0028 to 0.0071	4
0.0071 to 0.0113	11
0.0113 to 0.0155	8
0.0155 to 0.0197	6
0.0197 to 0.0240	0

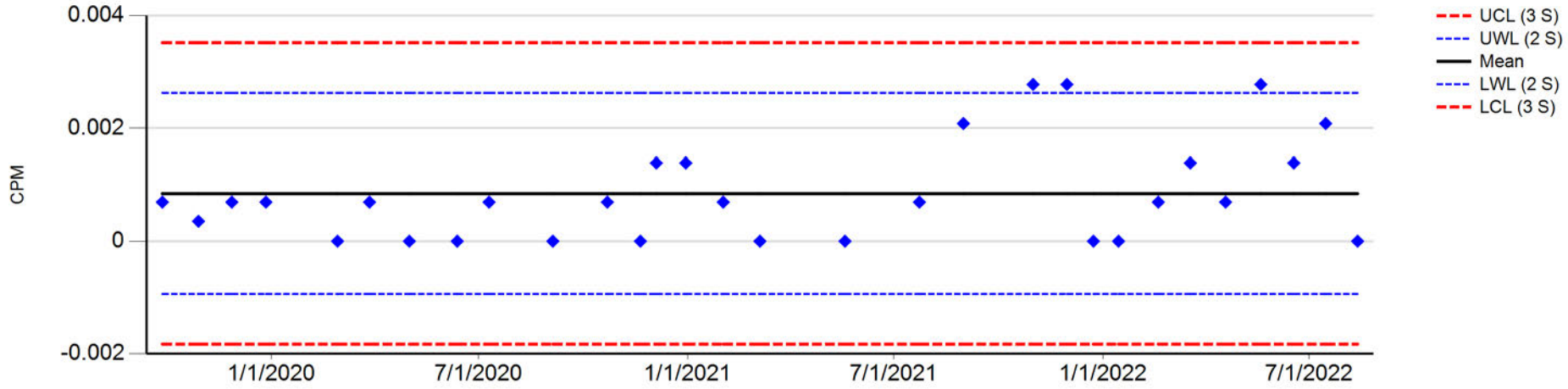


U-235 Background - ARS1-B22-01102-04

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0008	CPM	0.0000	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0009	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0035	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0018	CPM	0.0021	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-235 BACKGROUND - DETECTOR 14314612 - D4

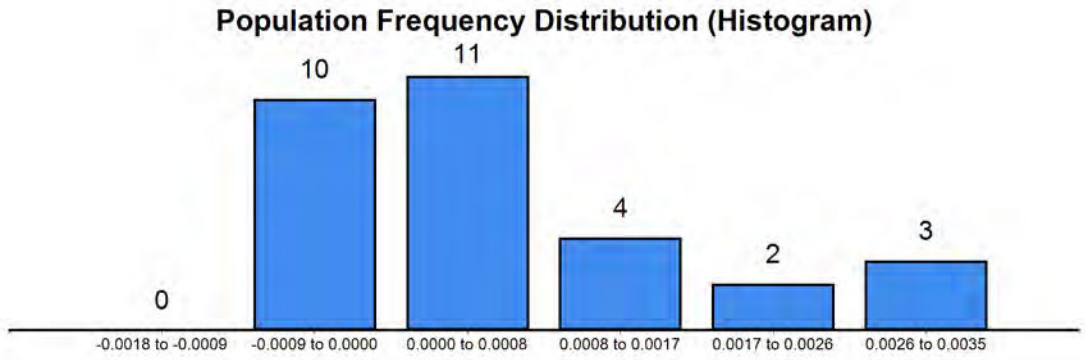
Process Date Range: 09/27/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0018 to -0.0009	0
-0.0009 to 0.0000	10
0.0000 to 0.0008	11
0.0008 to 0.0017	4
0.0017 to 0.0026	2
0.0026 to 0.0035	3

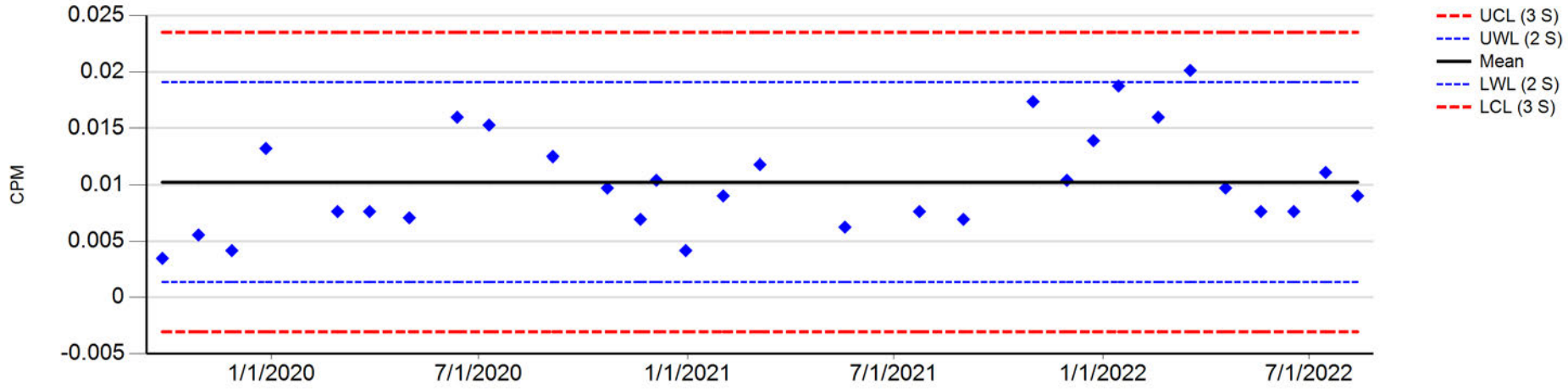


U-238 Background - ARS1-B22-01102-04

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0102	CPM	0.0090	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0044	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0235	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0031	CPM	0.0111	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-238 BACKGROUND - DETECTOR 14314612 - D4

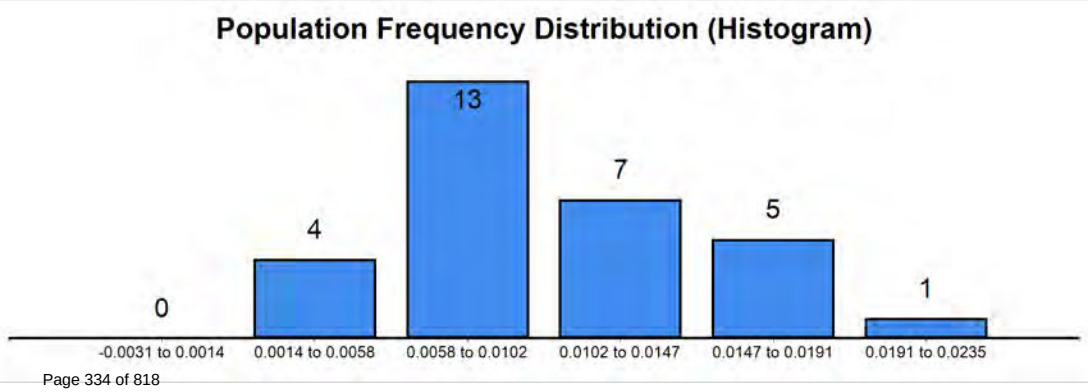
Process Date Range: 09/27/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0031 to 0.0014	0
0.0014 to 0.0058	4
0.0058 to 0.0102	13
0.0102 to 0.0147	7
0.0147 to 0.0191	5
0.0191 to 0.0235	1

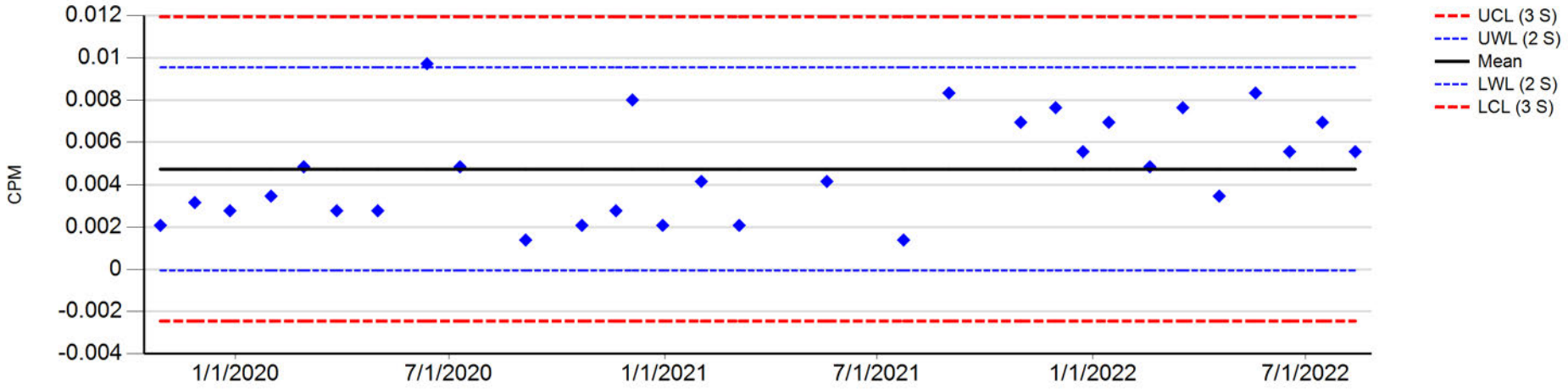


U-234 Background - ARS1-B22-01102-05

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0047	CPM	0.0056	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0024	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0120	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0025	CPM	0.0069	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-234 BACKGROUND - DETECTOR 14314613 - D5

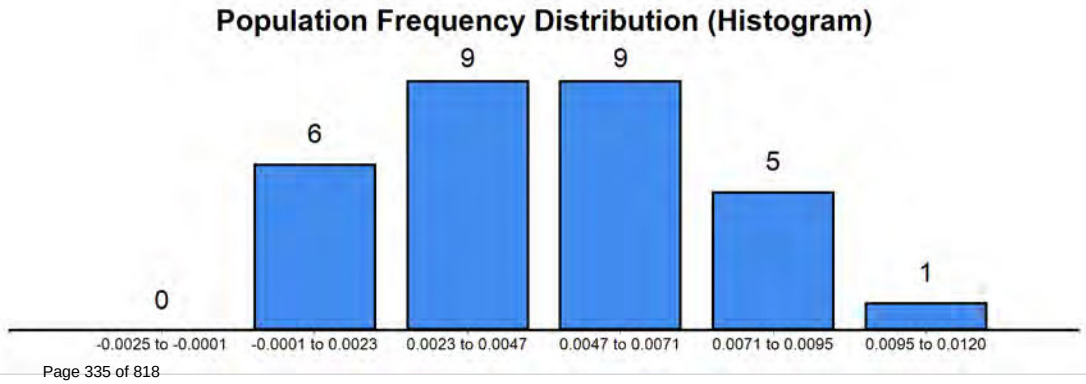
Process Date Range: 10/29/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0025 to -0.0001	0
-0.0001 to 0.0023	6
0.0023 to 0.0047	9
0.0047 to 0.0071	9
0.0071 to 0.0095	5
0.0095 to 0.0120	1

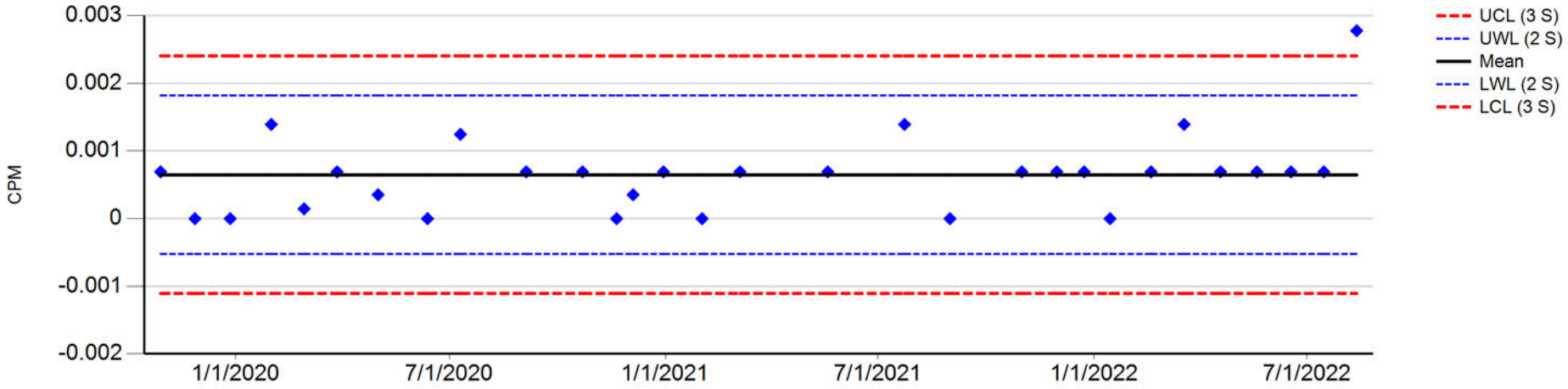


U-235 Background - ARS1-B22-01102-05

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**INVESTIGATE**
Average	0.0006	CPM	0.0028	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0006	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0024	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0011	CPM	0.0007	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

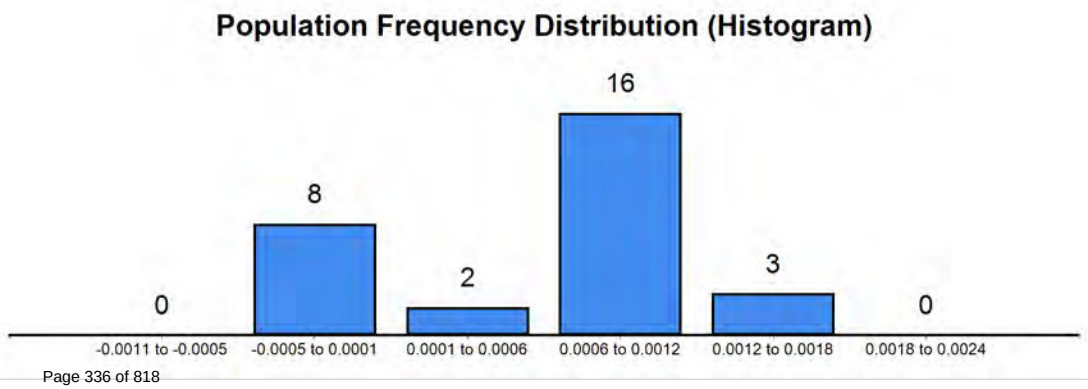
ENSEMBLE - U-235 BACKGROUND - DETECTOR 14314613 - D5

Process Date Range: 10/29/19 - 08/12/22



Statistical Process Control

Bin	Frequency
-0.0011 to -0.0005	0
-0.0005 to 0.0001	8
0.0001 to 0.0006	2
0.0006 to 0.0012	16
0.0012 to 0.0018	3
0.0018 to 0.0024	0

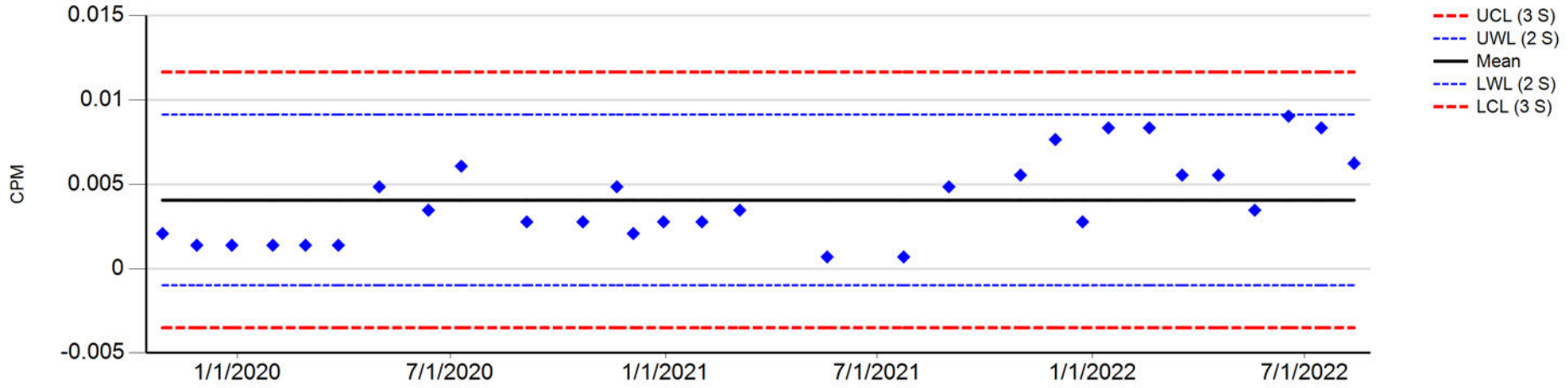


U-238 Background - ARS1-B22-01102-05

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0041	CPM	0.0063	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0025	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0117	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0035	CPM	0.0083	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

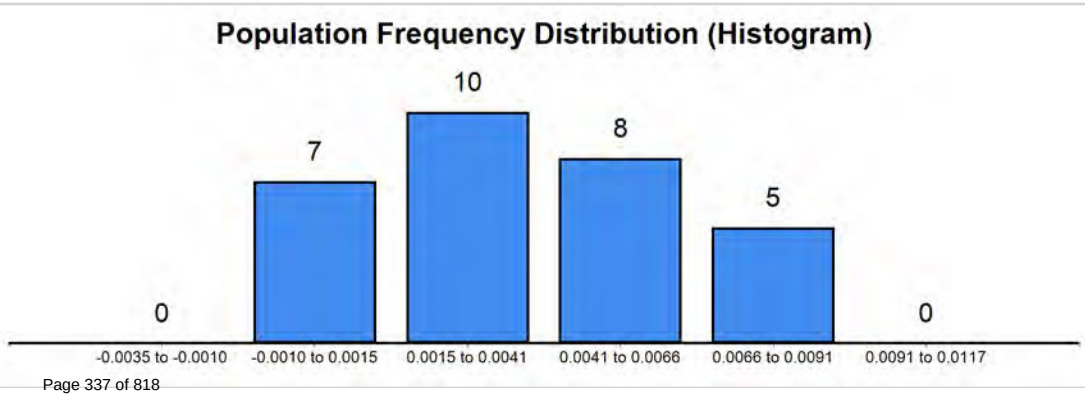
ENSEMBLE - U-238 BACKGROUND - DETECTOR 14314613 - D5

Process Date Range: 10/29/19 - 08/12/22



Statistical Process Control

Bin	Frequency
-0.0035 to -0.0010	0
-0.0010 to 0.0015	7
0.0015 to 0.0041	10
0.0041 to 0.0066	8
0.0066 to 0.0091	5
0.0091 to 0.0117	0

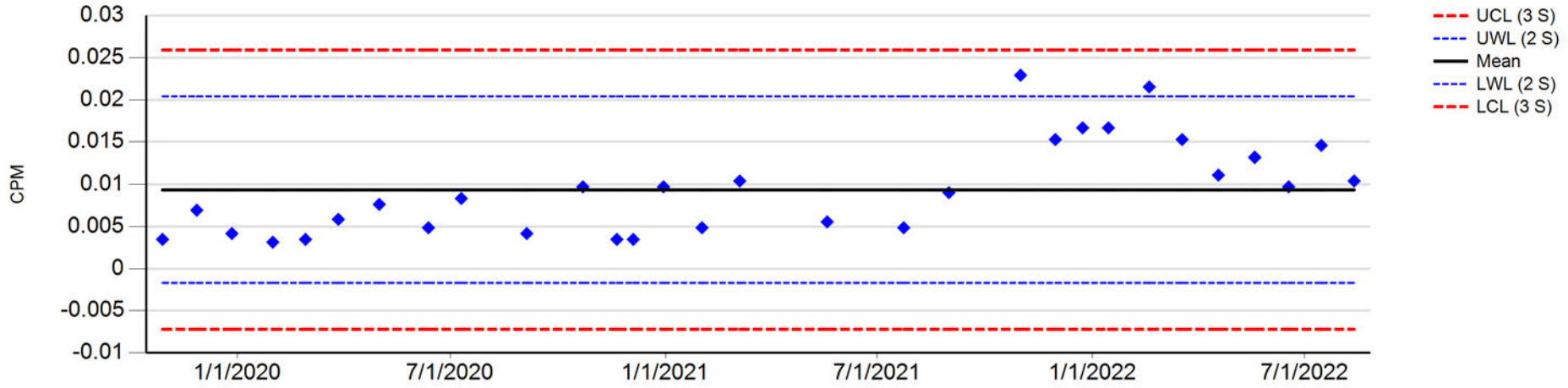


U-234 Background - ARS1-B22-01102-06

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0094	CPM	0.0104	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0055	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0259	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0072	CPM	0.0146	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-234 BACKGROUND - DETECTOR 14314613 - D6

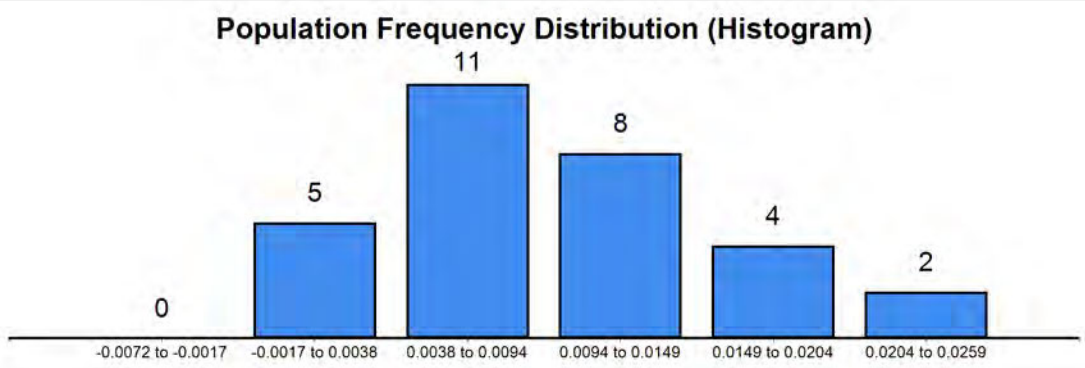
Process Date Range: 10/29/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0072 to -0.0017	0
-0.0017 to 0.0038	5
0.0038 to 0.0094	11
0.0094 to 0.0149	8
0.0149 to 0.0204	4
0.0204 to 0.0259	2

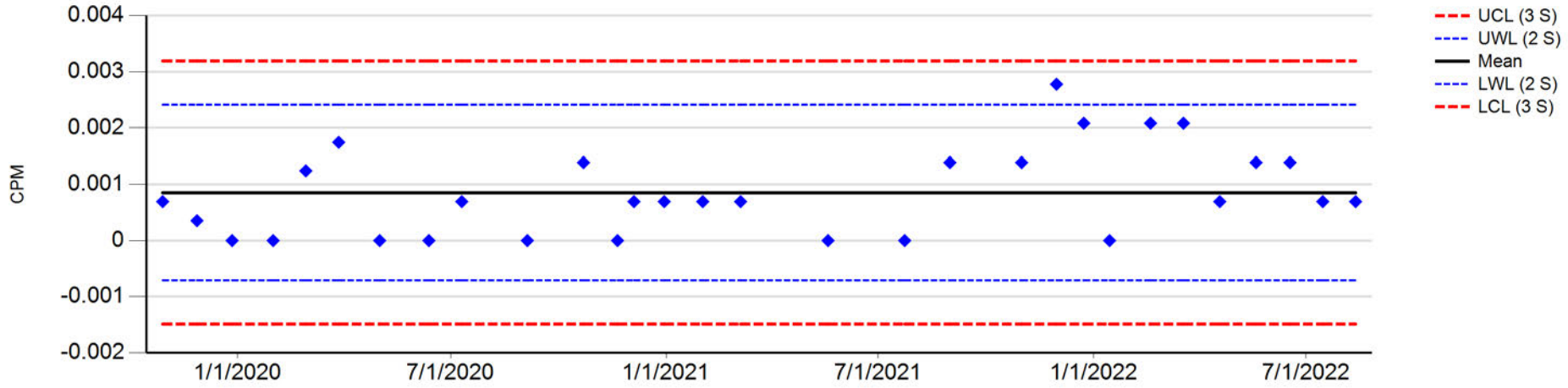


U-235 Background - ARS1-B22-01102-06

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0009	CPM	0.0007	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0008	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0032	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0015	CPM	0.0007	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-235 BACKGROUND - DETECTOR 14314613 - D6

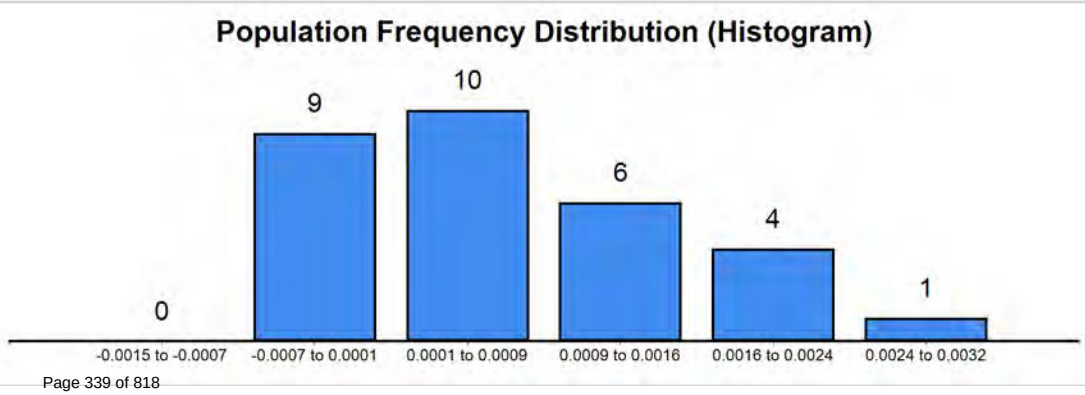
Process Date Range: 10/29/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0015 to -0.0007	0
-0.0007 to 0.0001	9
0.0001 to 0.0009	10
0.0009 to 0.0016	6
0.0016 to 0.0024	4
0.0024 to 0.0032	1

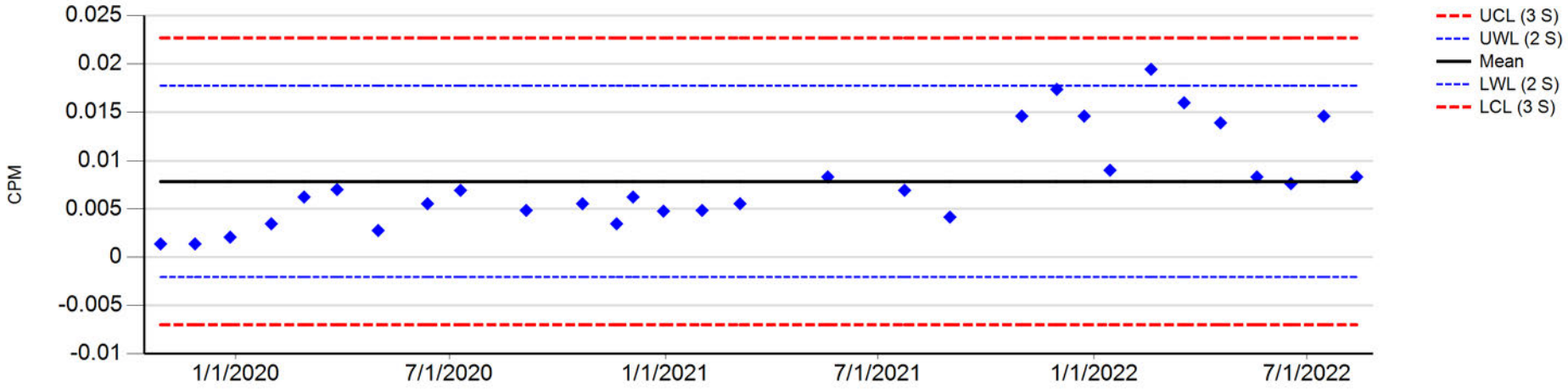


U-238 Background - ARS1-B22-01102-06

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0078	CPM	0.0083	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0049	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0227	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0070	CPM	0.0146	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-238 BACKGROUND - DETECTOR 14314613 - D6

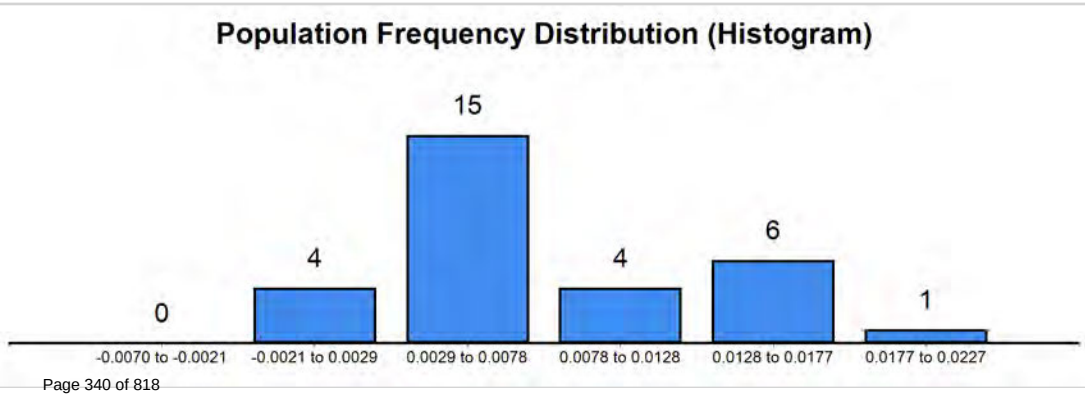
Process Date Range: 10/29/19 - 08/12/22



ARS Aleut Analytical

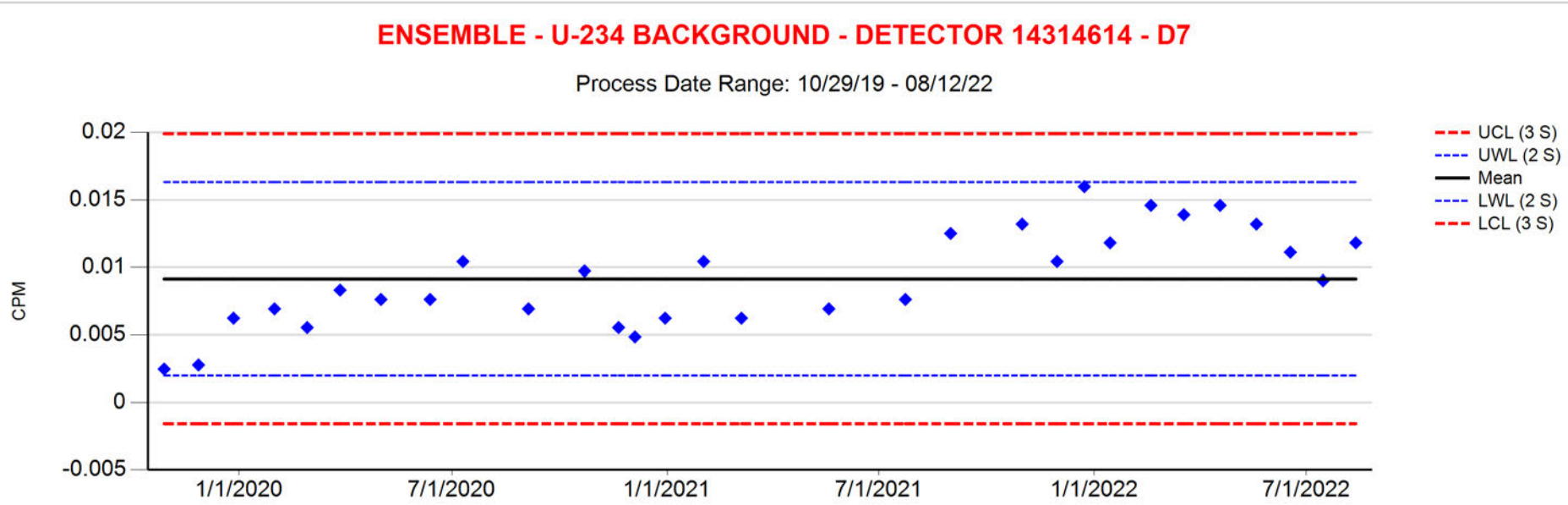
Statistical Process Control

Bin	Frequency
-0.0070 to -0.0021	0
-0.0021 to 0.0029	4
0.0029 to 0.0078	15
0.0078 to 0.0128	4
0.0128 to 0.0177	6
0.0177 to 0.0227	1



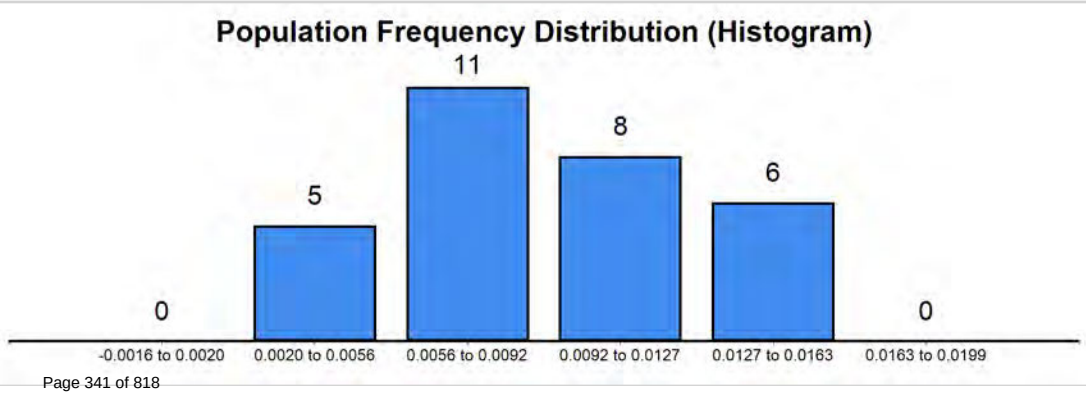
U-234 Background - ARS1-B22-01102-07

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0092	CPM	0.0118	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0036	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0199	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0016	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
-0.0016 to 0.0020	0
0.0020 to 0.0056	5
0.0056 to 0.0092	11
0.0092 to 0.0127	8
0.0127 to 0.0163	6
0.0163 to 0.0199	0

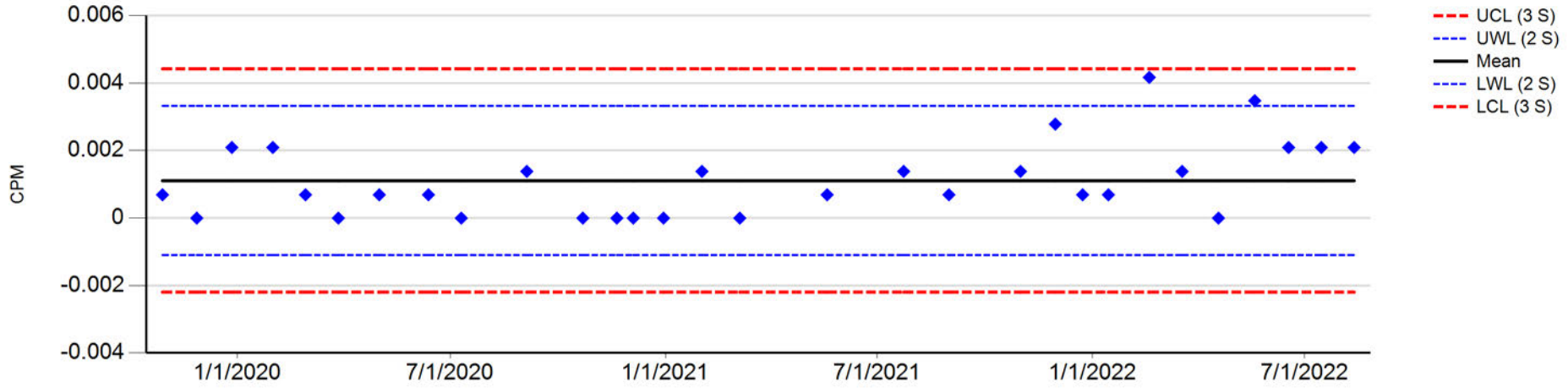


U-235 Background - ARS1-B22-01102-07

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0011	CPM	0.0021	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0011	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0044	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0022	CPM	0.0021	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-235 BACKGROUND - DETECTOR 14314614 - D7

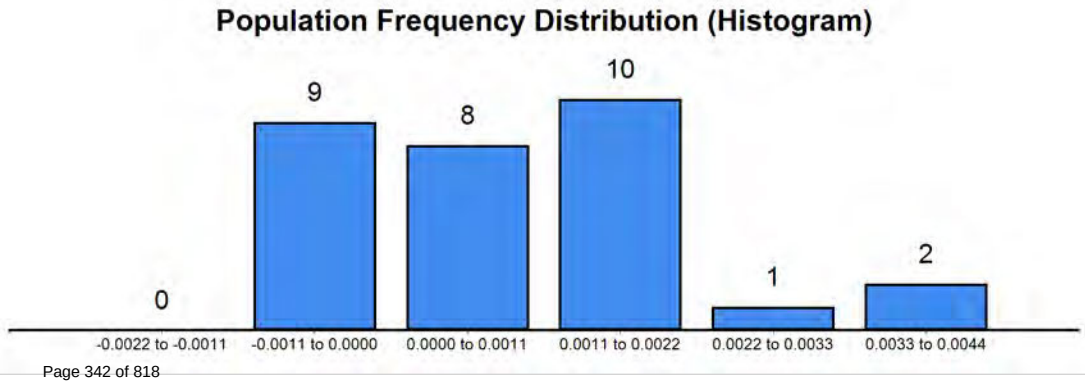
Process Date Range: 10/29/19 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0022 to -0.0011	0
-0.0011 to 0.0000	9
0.0000 to 0.0011	8
0.0011 to 0.0022	10
0.0022 to 0.0033	1
0.0033 to 0.0044	2

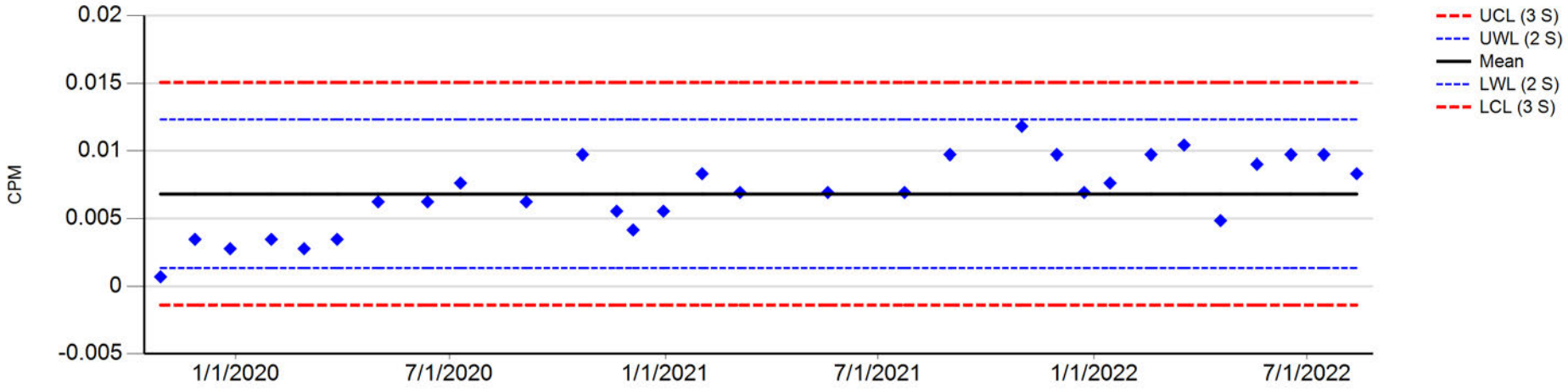


U-238 Background - ARS1-B22-01102-07

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0068	CPM	0.0083	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0027	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0151	Date	7/15/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0014	CPM	0.0097	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

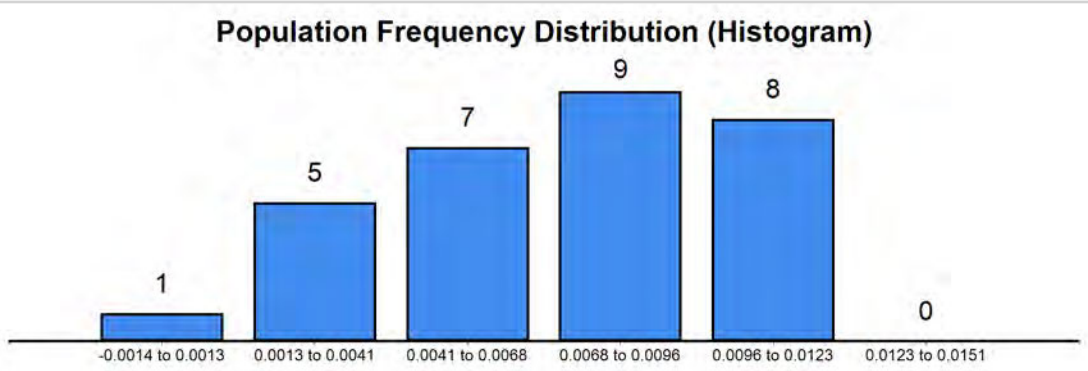
ENSEMBLE - U-238 BACKGROUND - DETECTOR 14314614 - D7

Process Date Range: 10/29/19 - 08/12/22



Statistical Process Control

Bin	Frequency
-0.0014 to 0.0013	1
0.0013 to 0.0041	5
0.0041 to 0.0068	7
0.0068 to 0.0096	9
0.0096 to 0.0123	8
0.0123 to 0.0151	0

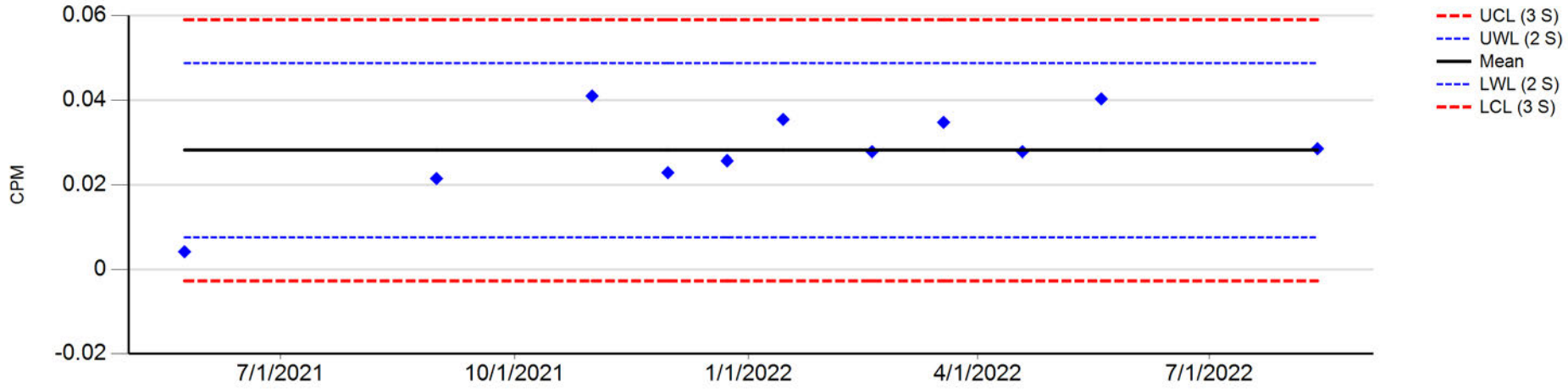


U-234 Background - ARS1-B22-01102-08

Population Statistics				Trending Analysis	
Population Size	**11**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0282	CPM	0.0285	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0103	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0590	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0027	CPM	0.0403	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

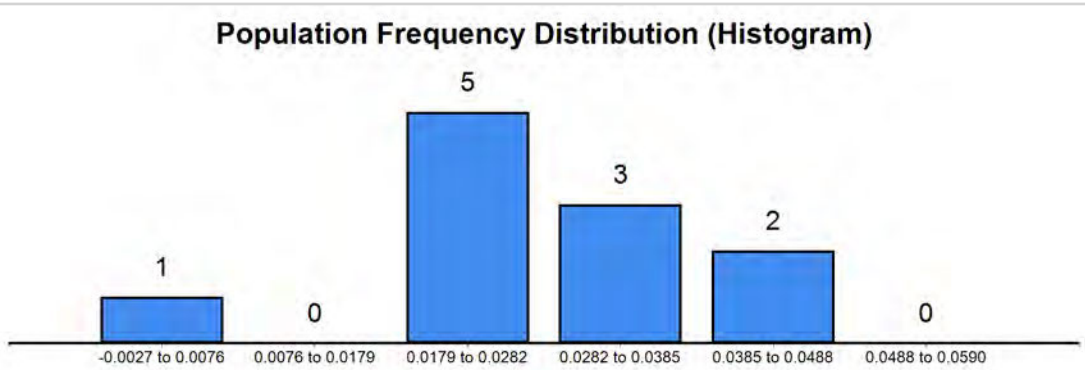
ENSEMBLE - U-234 BACKGROUND - DETECTOR 17166649 - E1

Process Date Range: 05/24/21 - 08/12/22



Statistical Process Control

Bin	Frequency
-0.0027 to 0.0076	1
0.0076 to 0.0179	0
0.0179 to 0.0282	5
0.0282 to 0.0385	3
0.0385 to 0.0488	2
0.0488 to 0.0590	0

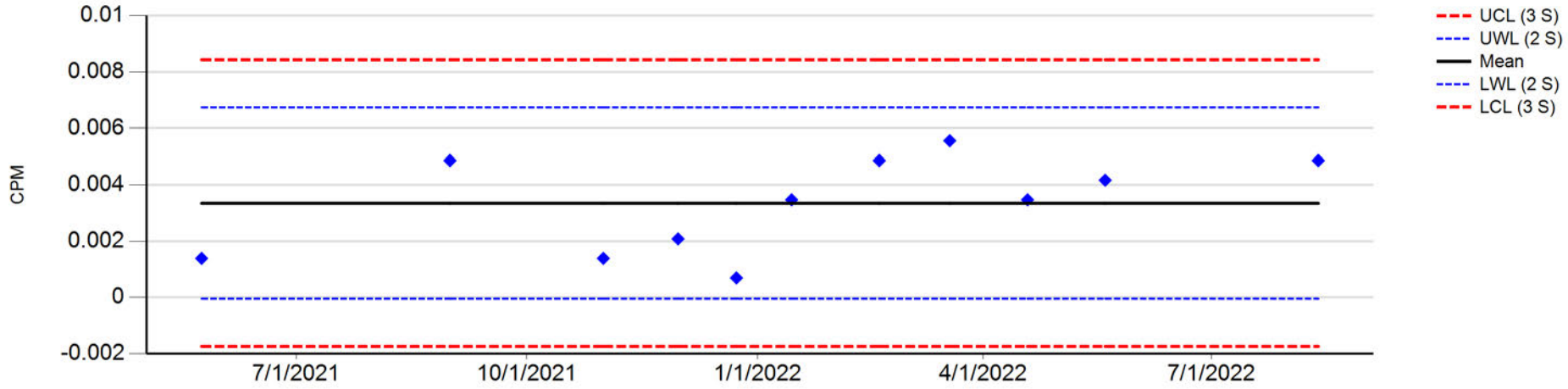


U-235 Background - ARS1-B22-01102-08

Population Statistics				Trending Analysis	
Population Size	**11**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0033	CPM	0.0049	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0017	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0084	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0017	CPM	0.0042	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

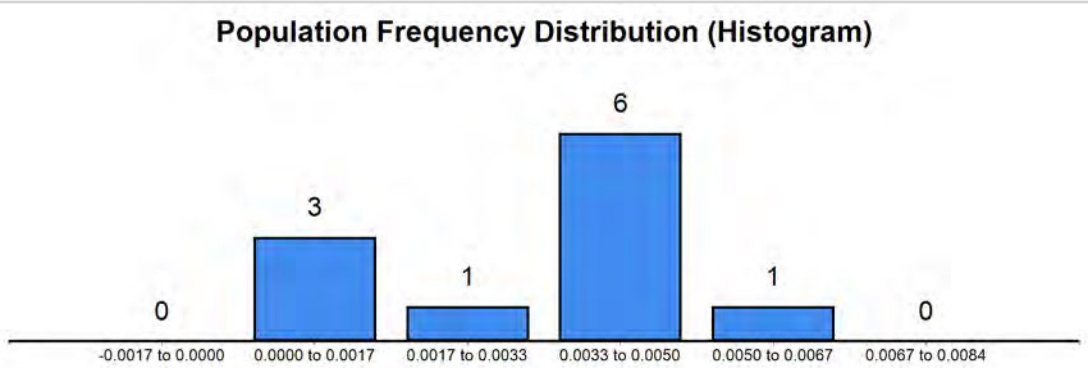
ENSEMBLE - U-235 BACKGROUND - DETECTOR 17166649 - E1

Process Date Range: 05/24/21 - 08/12/22



Statistical Process Control

Bin	Frequency
-0.0017 to 0.0000	0
0.0000 to 0.0017	3
0.0017 to 0.0033	1
0.0033 to 0.0050	6
0.0050 to 0.0067	1
0.0067 to 0.0084	0

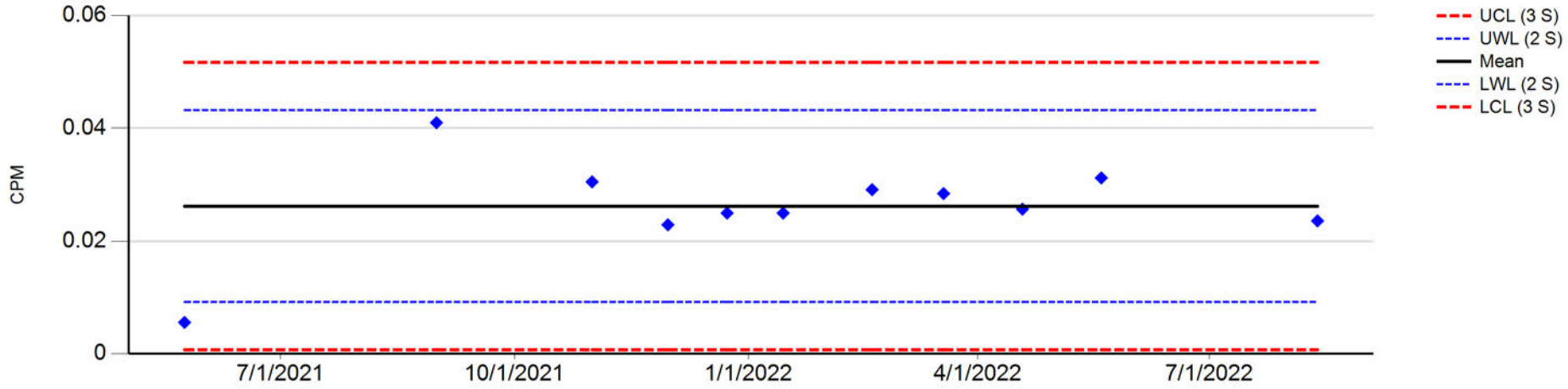


U-238 Background - ARS1-B22-01102-08

Population Statistics				Trending Analysis	
Population Size	**11**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0262	CPM	0.0236	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0085	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0517	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0007	CPM	0.0313	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

ENSEMBLE - U-238 BACKGROUND - DETECTOR 17166649 - E1

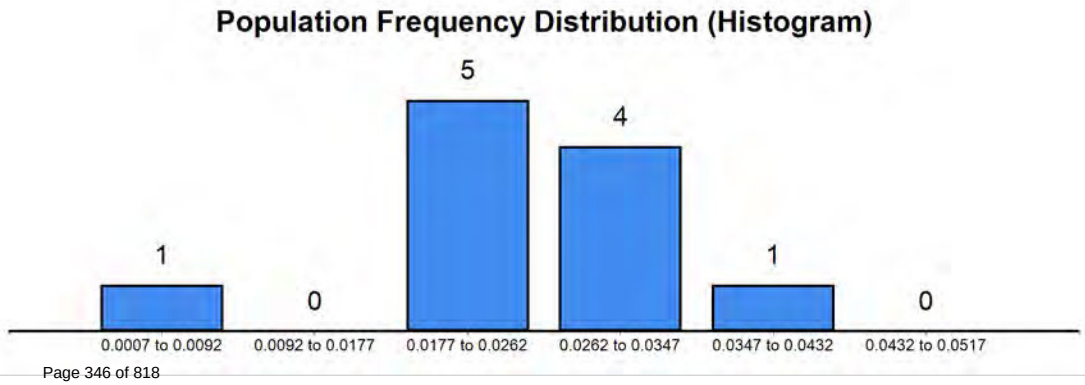
Process Date Range: 05/24/21 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.0007 to 0.0092	1
0.0092 to 0.0177	0
0.0177 to 0.0262	5
0.0262 to 0.0347	4
0.0347 to 0.0432	1
0.0432 to 0.0517	0

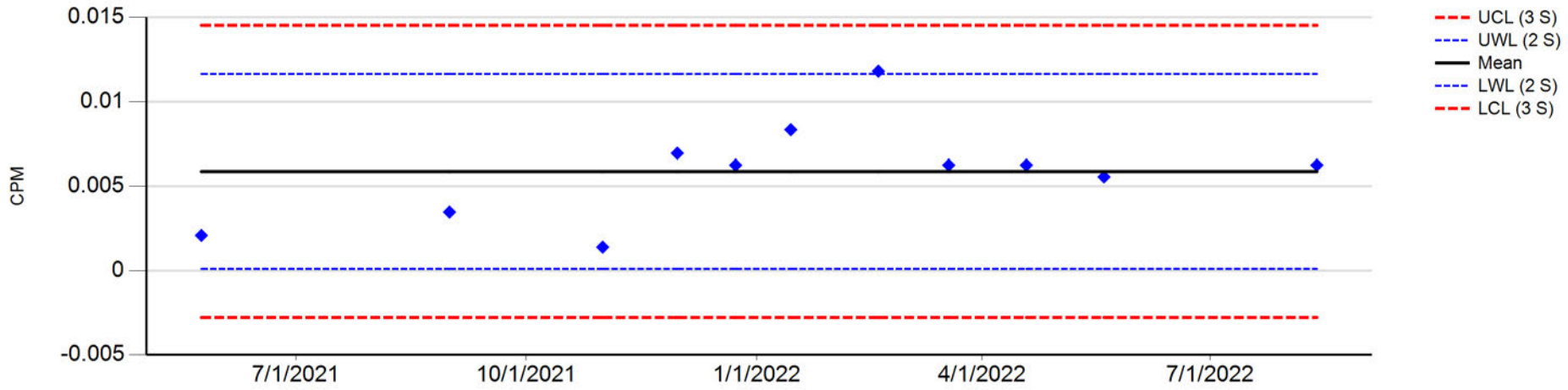


U-234 Background - ARS1-B22-01102-09

Population Statistics				Trending Analysis	
Population Size	**11**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0059	CPM	0.0063	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0029	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0145	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0028	CPM	0.0056	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

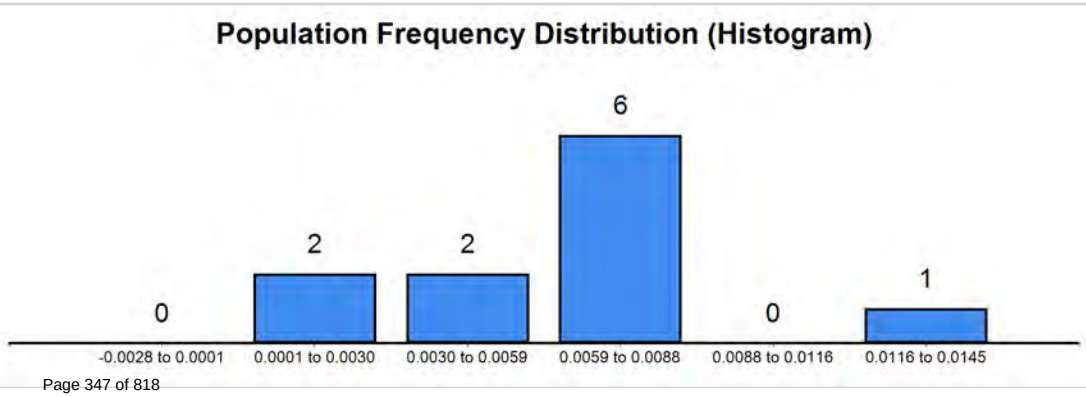
ENSEMBLE - U-234 BACKGROUND - DETECTOR 17166649 - E2

Process Date Range: 05/24/21 - 08/12/22



Statistical Process Control

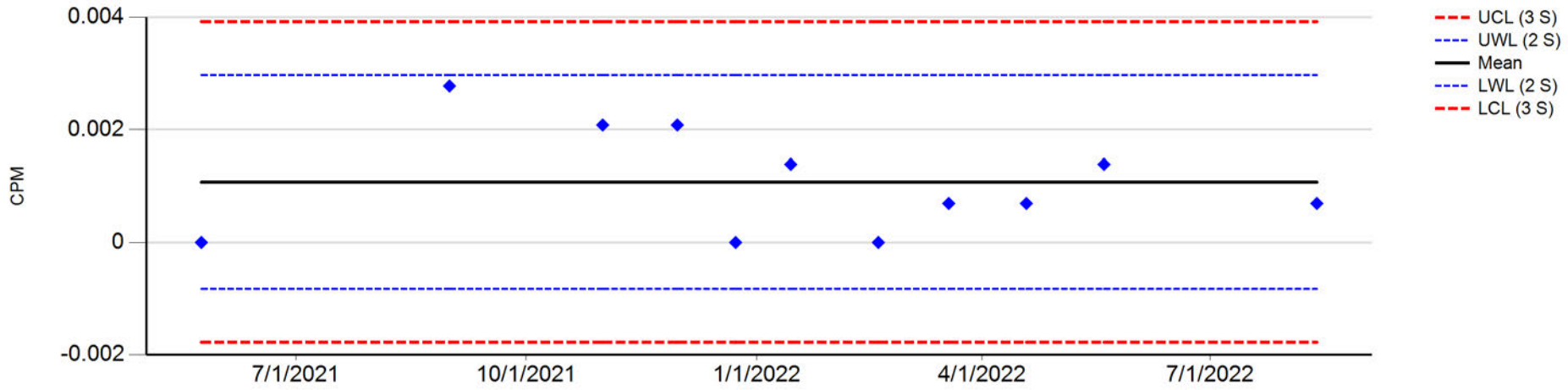
Bin	Frequency
-0.0028 to 0.0001	0
0.0001 to 0.0030	2
0.0030 to 0.0059	2
0.0059 to 0.0088	6
0.0088 to 0.0116	0
0.0116 to 0.0145	1



Population Statistics				Trending Analysis	
Population Size	**11**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0011	CPM	0.0007	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0010	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0039	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0018	CPM	0.0014	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

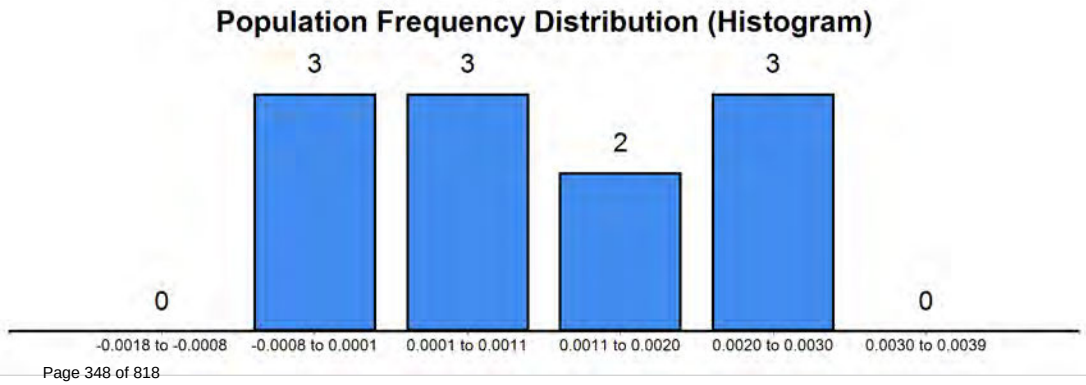
ENSEMBLE - U-235 BACKGROUND - DETECTOR 17166649 - E2

Process Date Range: 05/24/21 - 08/12/22



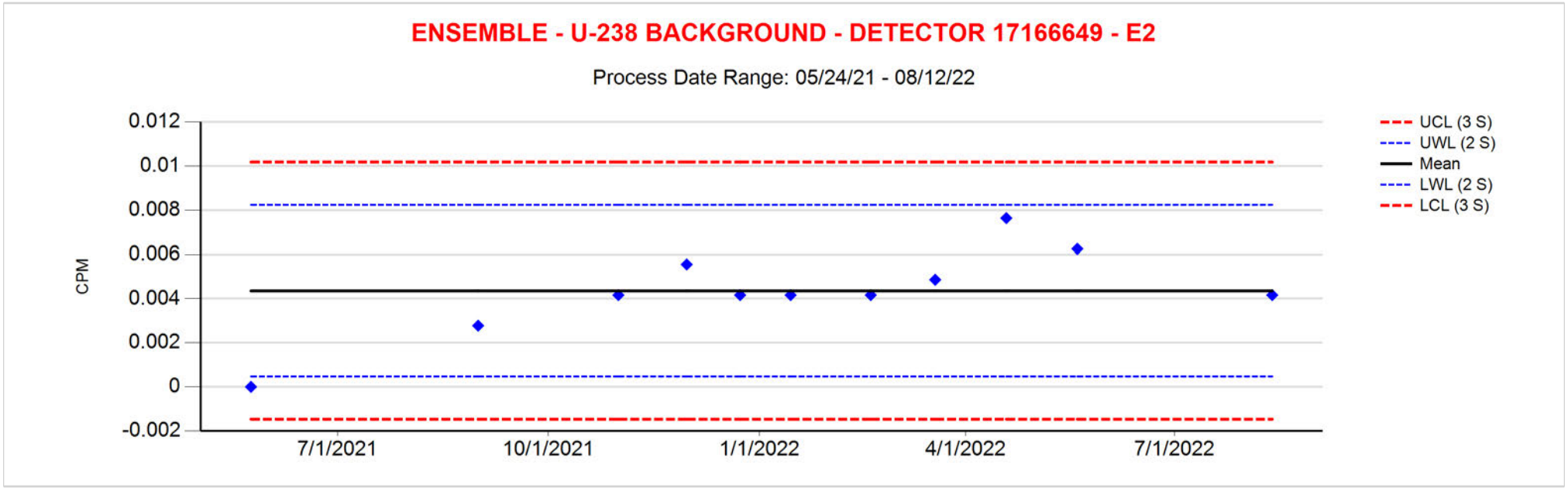
Statistical Process Control

Bin	Frequency
-0.0018 to -0.0008	0
-0.0008 to 0.0001	3
0.0001 to 0.0011	3
0.0011 to 0.0020	2
0.0020 to 0.0030	3
0.0030 to 0.0039	0



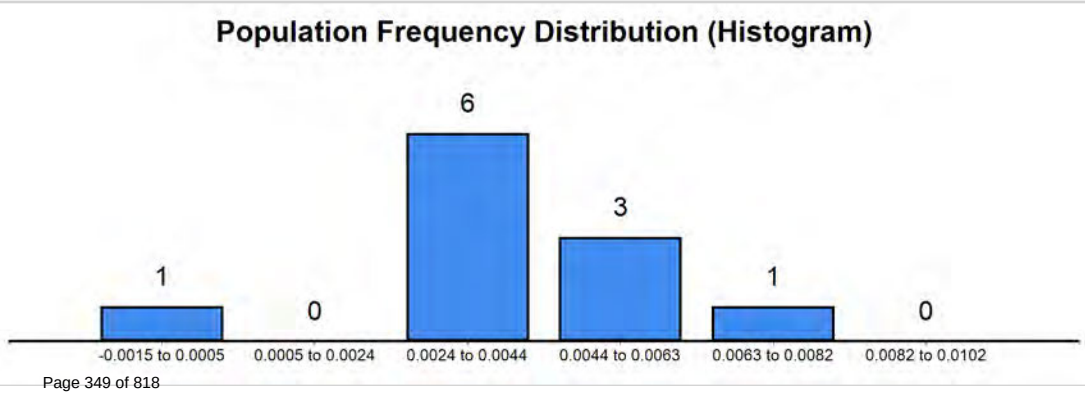
U-238 Background - ARS1-B22-01102-09

Population Statistics				Trending Analysis	
Population Size	**11**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0044	CPM	0.0042	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0019	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0102	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0015	CPM	0.0063	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
-0.0015 to 0.0005	1
0.0005 to 0.0024	0
0.0024 to 0.0044	6
0.0044 to 0.0063	3
0.0063 to 0.0082	1
0.0082 to 0.0102	0

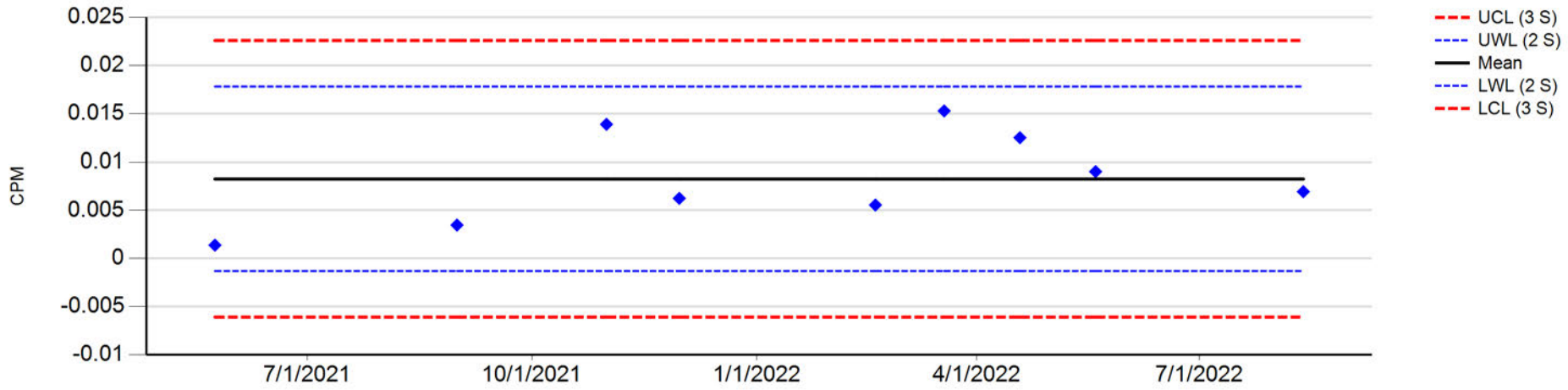


U-234 Background - ARS1-B22-01102-10

Population Statistics				Trending Analysis	
Population Size	**9**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0083	CPM	0.0069	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0048	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0226	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0061	CPM	0.0090	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

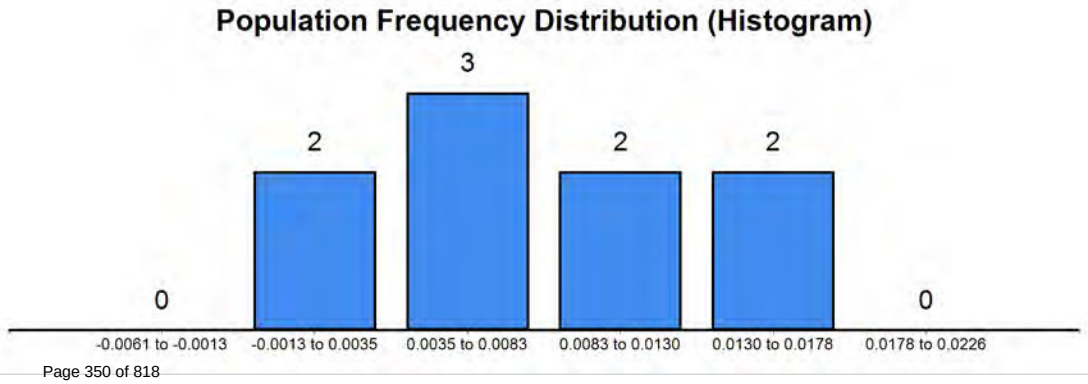
ENSEMBLE - U-234 BACKGROUND - DETECTOR 17166650 - E3

Process Date Range: 05/24/21 - 08/12/22



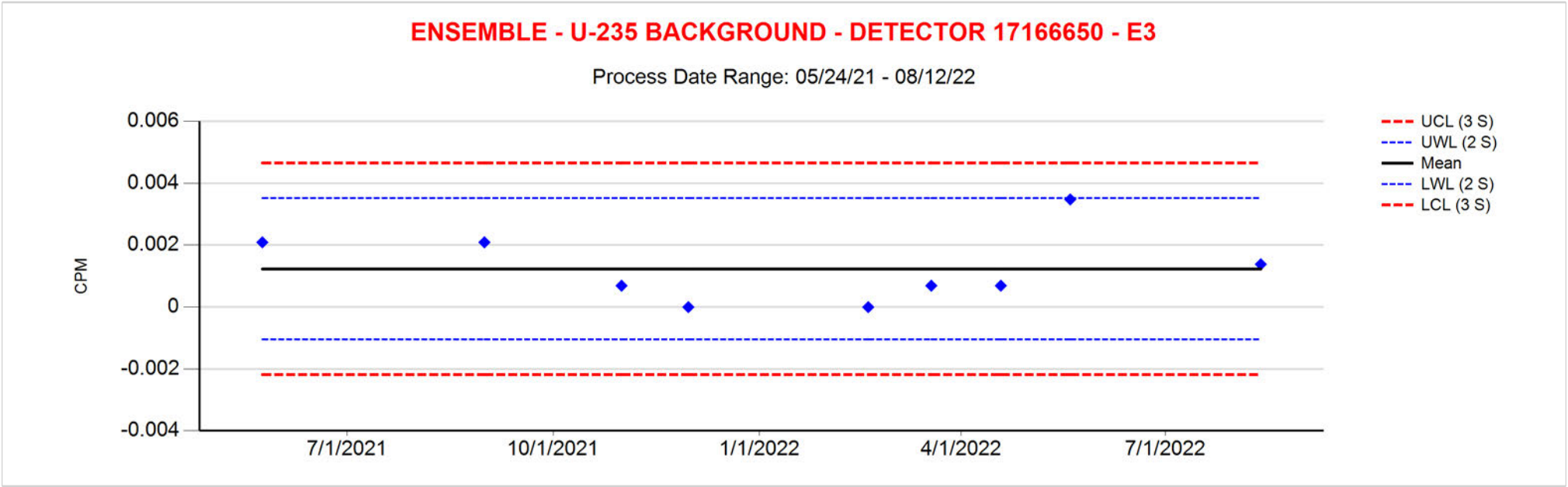
Statistical Process Control

Bin	Frequency
-0.0061 to -0.0013	0
-0.0013 to 0.0035	2
0.0035 to 0.0083	3
0.0083 to 0.0130	2
0.0130 to 0.0178	2
0.0178 to 0.0226	0



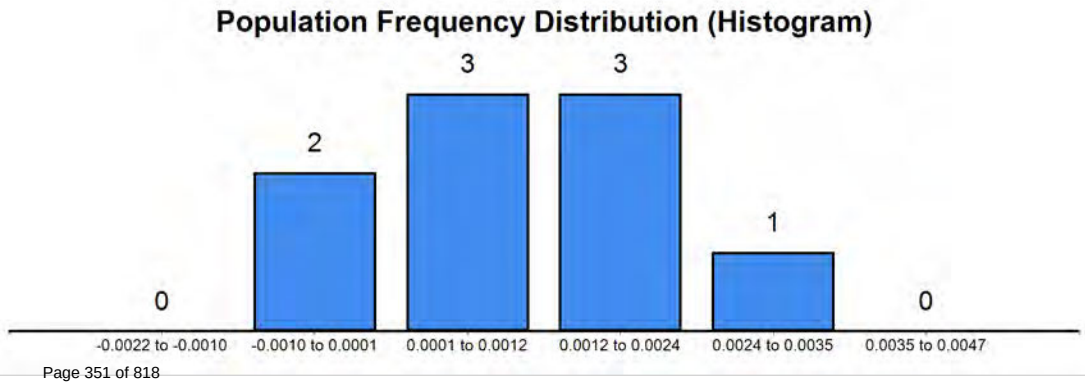
U-235 Background - ARS1-B22-01102-10

Population Statistics				Trending Analysis	
Population Size	**9**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0012	CPM	0.0014	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0011	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0047	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0022	CPM	0.0035	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

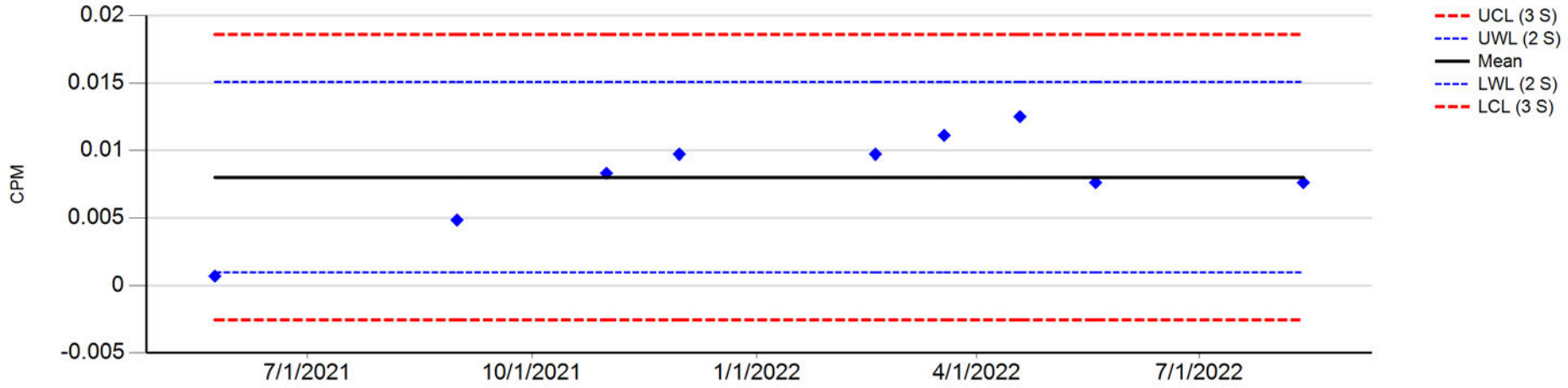
Bin	Frequency
-0.0022 to -0.0010	0
-0.0010 to 0.0001	2
0.0001 to 0.0012	3
0.0012 to 0.0024	3
0.0024 to 0.0035	1
0.0035 to 0.0047	0



Population Statistics				Trending Analysis	
Population Size	**9**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0080	CPM	0.0076	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0035	Count Mins	1440.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0186	Date	5/19/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0026	CPM	0.0076	7 trending most recent points in a row.	**OK**
		Count Mins	1440.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

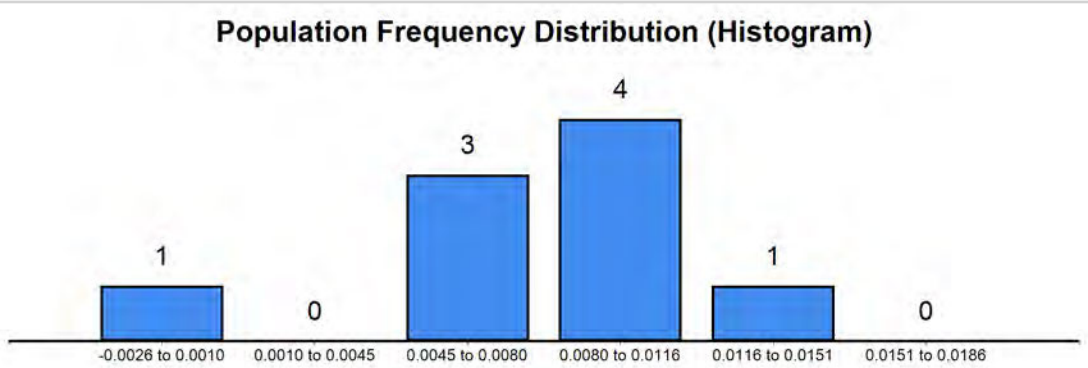
ENSEMBLE - U-238 BACKGROUND - DETECTOR 17166650 - E3

Process Date Range: 05/24/21 - 08/12/22



Statistical Process Control

Bin	Frequency
-0.0026 to 0.0010	1
0.0010 to 0.0045	0
0.0045 to 0.0080	3
0.0080 to 0.0116	4
0.0116 to 0.0151	1
0.0151 to 0.0186	0



2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Alpha Spec U-Standards

ARS Aleut Analytical

Alpa Spec Standard Verification

	Std. ID	Isotope
Analyte	**S-0359**	**U-238**
Tracer	**S-0369**	**U-232**

Expires: 7/28/2023

S-0359 Net	S-0369 Net	Grams of S-0369	S-0369 dpm/g	S-0369 dpm added	S-0359 dpm	Grams of S-0359	S-0359 dpm/g
2985	1520	1.051	8.6612	9.1029212	17.876	0.524	34.11538241
2872	1455	1.036	8.6612	8.9730032	17.712	0.522	33.930383
3060	1462	1.038	8.6612	8.9903256	18.817	0.519	36.25618605
2986	1477	1.038	8.6612	8.9903256	18.175	0.522	34.81883418
3019	1444	1.038	8.6612	8.9903256	18.796	0.522	36.00815236

Average	35.026
Known Value	34.974
Average/stdev	3.045%
% Bias	0.147%

Performed by: [redacted] Date: 7/28/2022

Reviewed by: [redacted] Date: 7-28-22

QA Approval: [redacted] Date: 7-28-22

ARS-038-003 r0.2
Revision Date: 01/23/2019

ARS Aleut Analytical

Weight Spreadsheet for Standard Verification

Verification Weights

Tech:	LC
Pippete:	PU29204
Scale ID;	Soil-T0350192
Standard ID:	S-0359
Tracer ID:	S-0369

Sample ID	Std. Weight(g)	Tracer Weight(g)
S-0359-V1	0.524	1.051
S-0359-V2	0.522	1.036
S-0359-V3	0.519	1.038
S-0359-V4	0.522	1.038
S-0359-V5	0.522	1.038

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,731 7:59:25AM 7/28/2022

Sample

Sample: S-0359-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

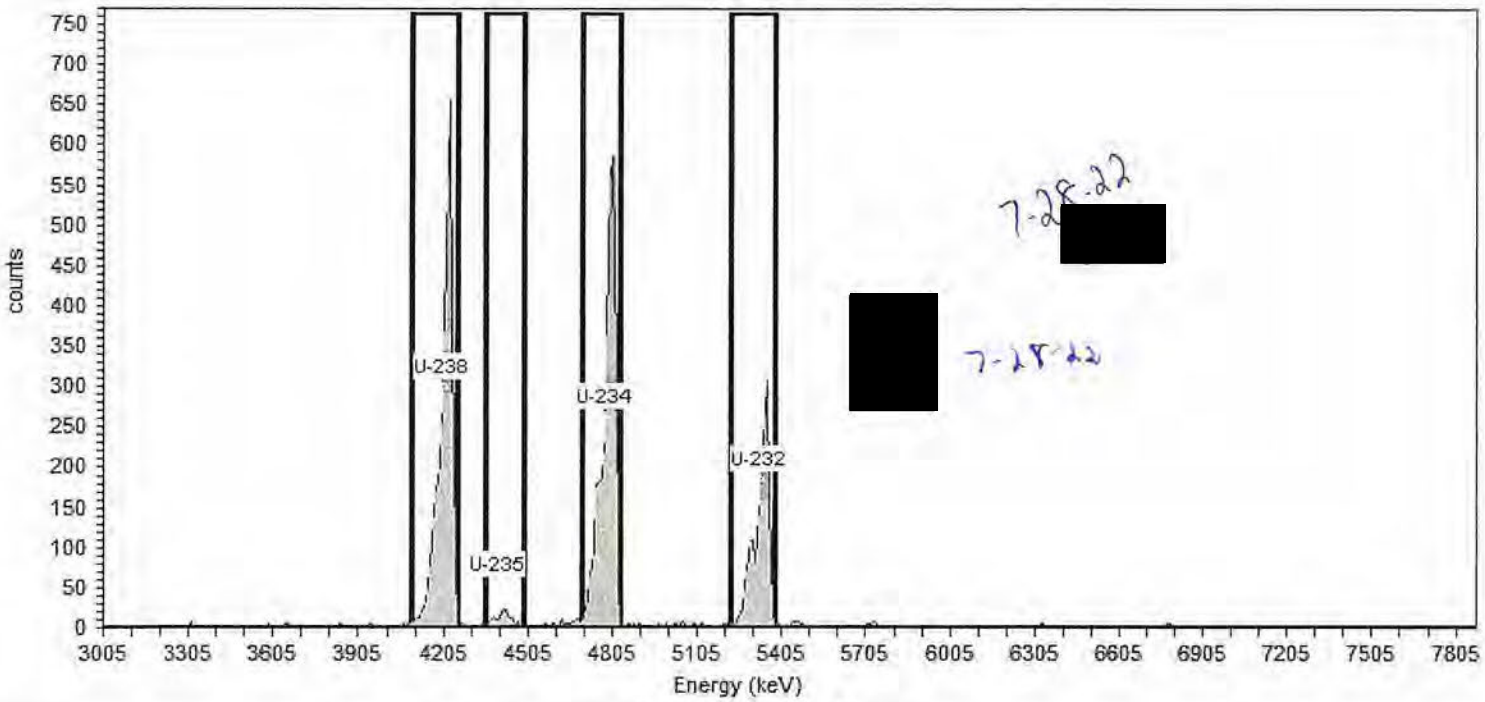
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4089.295	4254.149	33.7	100.0	2,996.00	11.0000	2985.00	1.573E+001	4.322E-001	3.521E-002	8.468E-002
U-235	4397.995	4350.981	4486.371	38.2	74.8	113.00	3.5000	109.50	7.714E-001	7.710E-002	2.655E-002	7.217E-002
U-234	4773.999	4698.711	4833.573	34.8	99.8	2,864.00	10.0000	2854.00	1.507E+001	4.183E-001	3.364E-002	8.157E-002
U-232	5321.992	5227.346	5380.537	38.5	99.8	1,527.00	6.5000	1520.50	8.028E+000	2.639E-001	2.712E-002	6.853E-002

AlphaVision v6.0

Alpha Spectroscopy Analysis Report

Analyst: countroom Results ID: 31,725 2:42:29AM 7/28/2022

Sample

Sample: S-0359-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

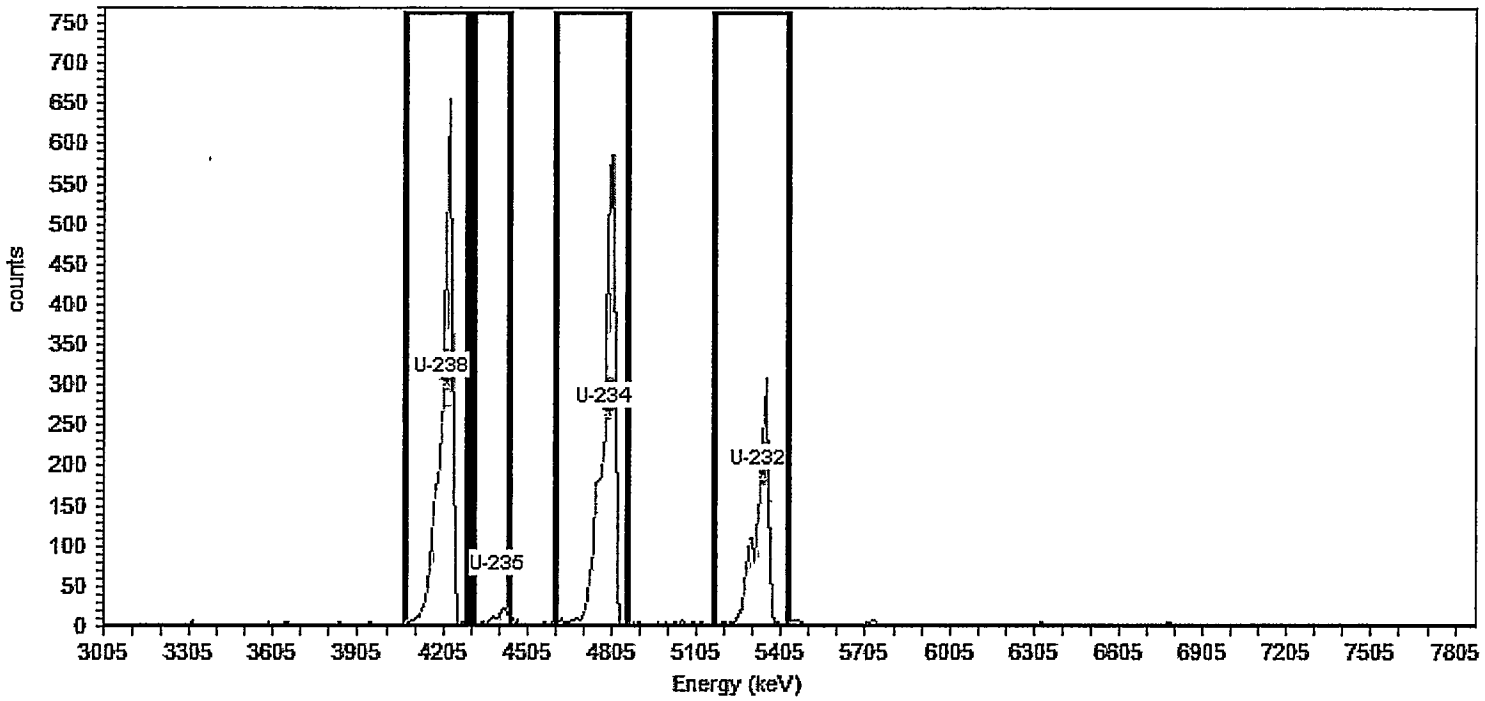
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	36.4	100.0	3,004.11	11.1153	2993.00	1.577E+001	4.331E-001	3.540E-002	8.505E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	81.32	2.8945	78.43	5.109E-001	6.017E-002	2.233E-002	6.228E-002
U-234	4774.000	4598.000	4867.000	35.2	100.0	2,902.41	16.8386	2885.57	1.520E+001	4.212E-001	4.355E-002	1.013E-001
U-232	5322.000	5174.000	5433.000	37.3	99.8	1,534.92	12.4604	1522.46	8.039E+000	2.646E-001	3.755E-002	8.939E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom Results ID: 31,732 8:00:26AM 7/28/2022

Sample

Sample: S-0359-V2 Type: Sample
Spectrum #1 Analysis #1

Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver

Description:

Client Name: Undefined
Client Contact:

Tracer

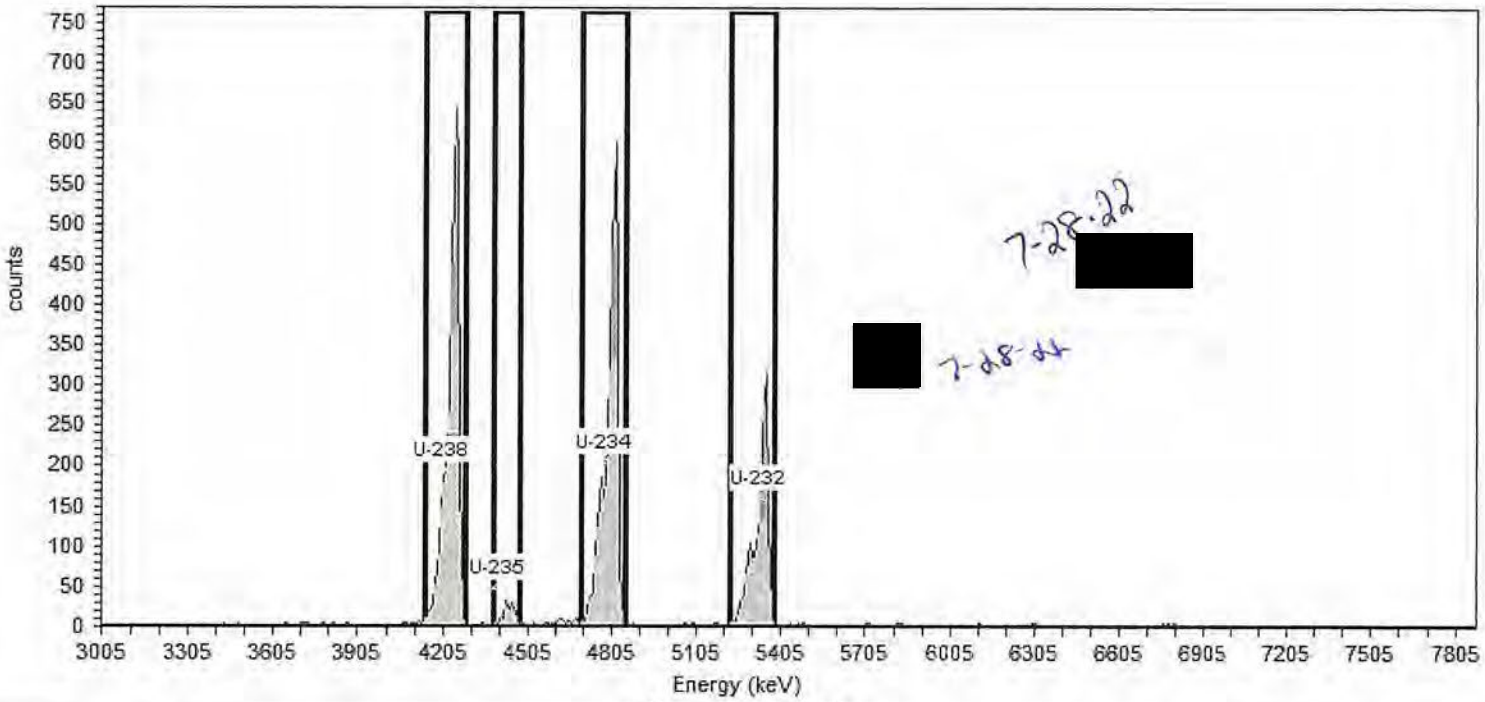
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4137.813	4283.210	39.7	100.0	2,879.00	7.0000	2872.00	1.599E+001	5.156E-001	2.969E-002	7.444E-002
U-235	4397.995	4380.011	4476.707	45.2	57.8	125.00	1.0000	124.00	1.195E+000	1.124E-001	1.941E-002	6.490E-002
U-234	4773.999	4698.711	4852.822	36.0	99.8	2,702.00	5.0000	2697.00	1.505E+001	4.903E-001	2.514E-002	6.538E-002
U-232	5321.992	5227.346	5380.537	37.8	99.8	1,462.00	7.0000	1455.00	8.120E+000	3.018E-001	2.975E-002	7.459E-002

AlphaVision v6.0

Alpha Spectroscopy Analysis Report

Analyst: countroom

Results ID: 31,728 2:43:10AM 7/28/2022

Sample

Sample: S-0359-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

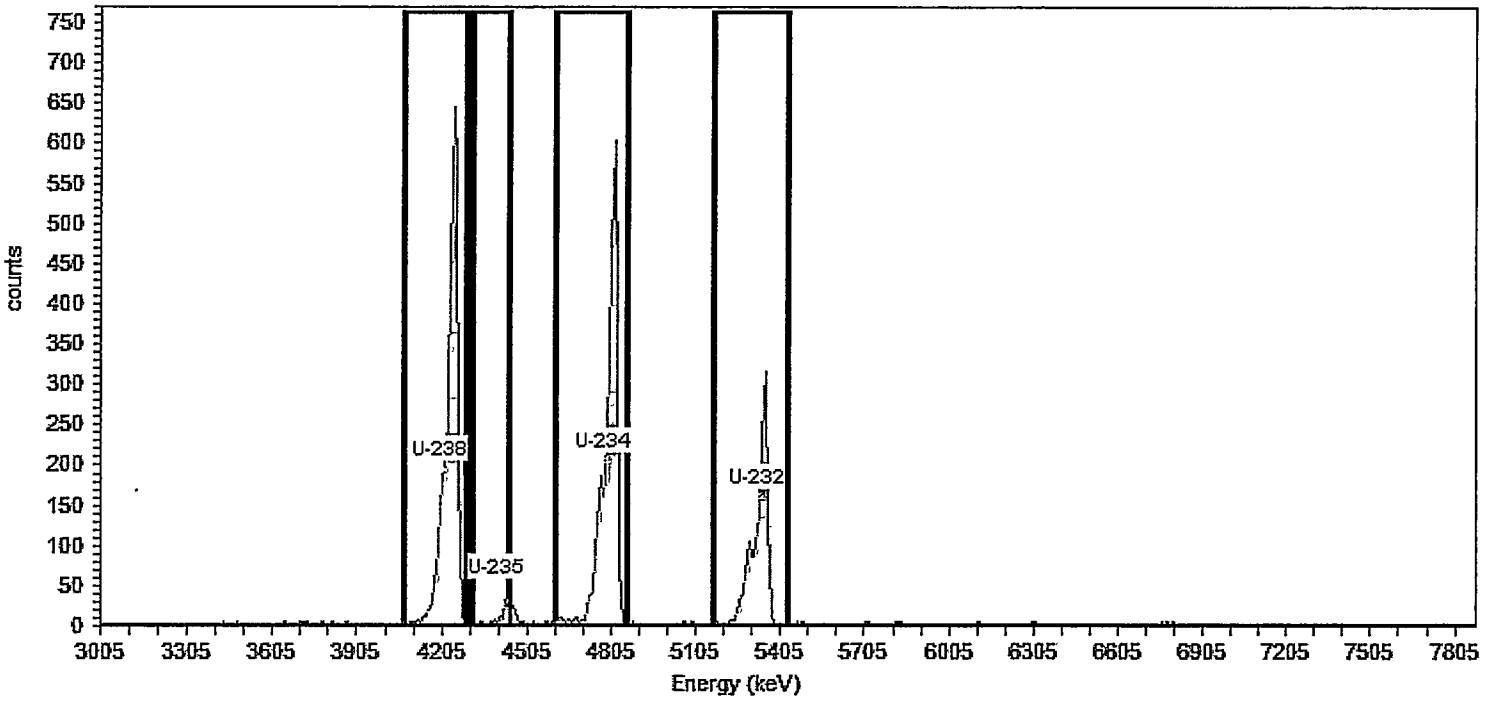
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	39.7	100.0	2,893.77	7.9022	2885.87	1.607E+001	5.177E-001	3.154E-002	7.815E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	55.62	1.6055	54.02	3.719E-001	5.262E-002	1.757E-002	5.378E-002
U-234	4774.000	4598.000	4867.000	36.0	100.0	2,742.44	7.2205	2735.22	1.523E+001	4.950E-001	3.014E-002	7.534E-002
U-232	5322.000	5174.000	5433.000	33.1	99.8	1,468.97	12.5396	1456.43	8.128E+000	3.025E-001	3.981E-002	9.473E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,733 8:01:26AM 7/28/2022

Sample

Sample: S-0359-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

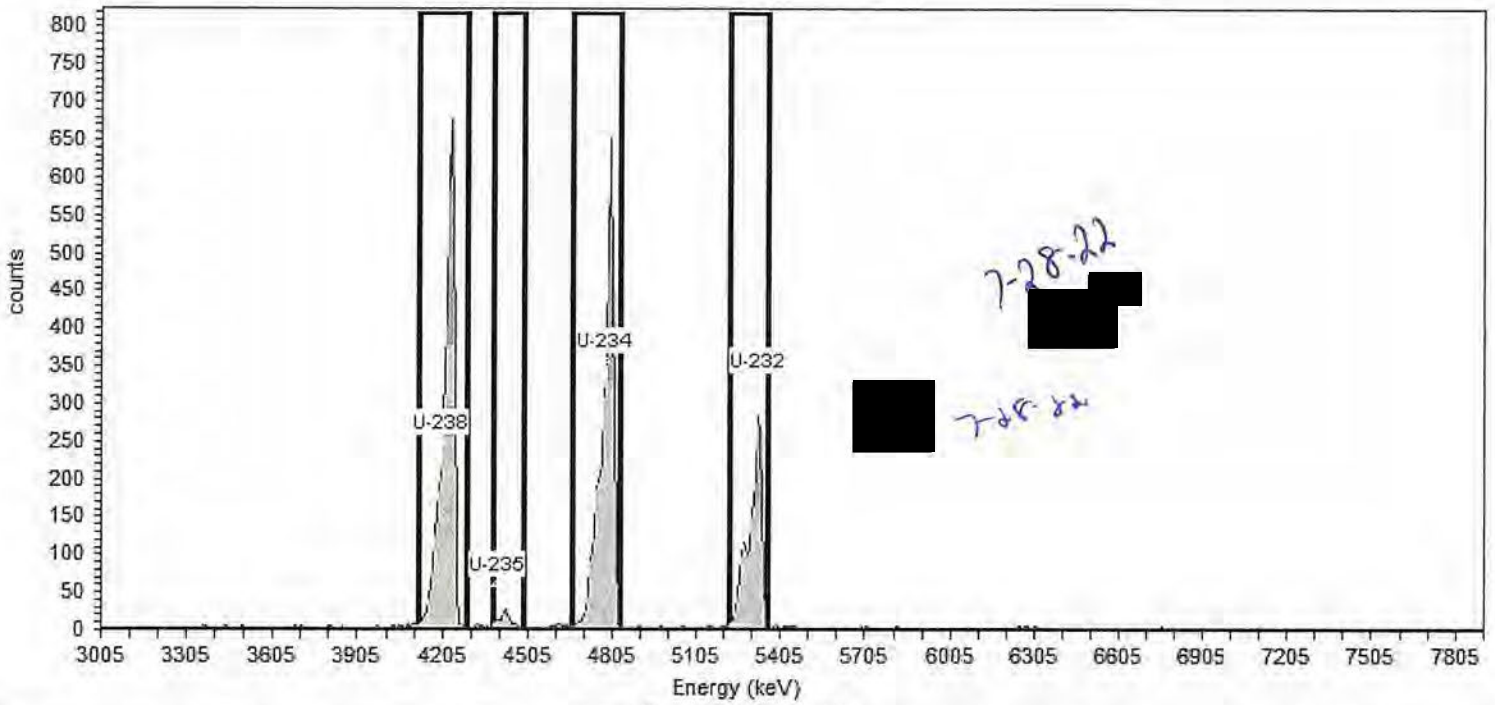
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4118.409	4292.895	37.1	100.0	3,067.00	7.0000	3060.00	1.744E+001	4.768E-001	3.038E-002	7.618E-002
U-235	4397.995	4380.011	4486.371	36.6	57.8	112.00	2.0000	110.00	1.085E+000	1.071E-001	2.809E-002	8.287E-002
U-234	4773.999	4660.141	4833.573	38.3	99.8	2,919.00	7.0000	2912.00	1.663E+001	4.598E-001	3.044E-002	7.634E-002
U-232	5321.992	5227.346	5361.403	41.2	99.8	1,467.00	5.0000	1462.00	8.349E+000	2.778E-001	2.573E-002	6.691E-002

AlphaVision v6.0 **Alpha Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,727 2:42:57AM 7/28/2022

Sample

Sample: S-0359-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

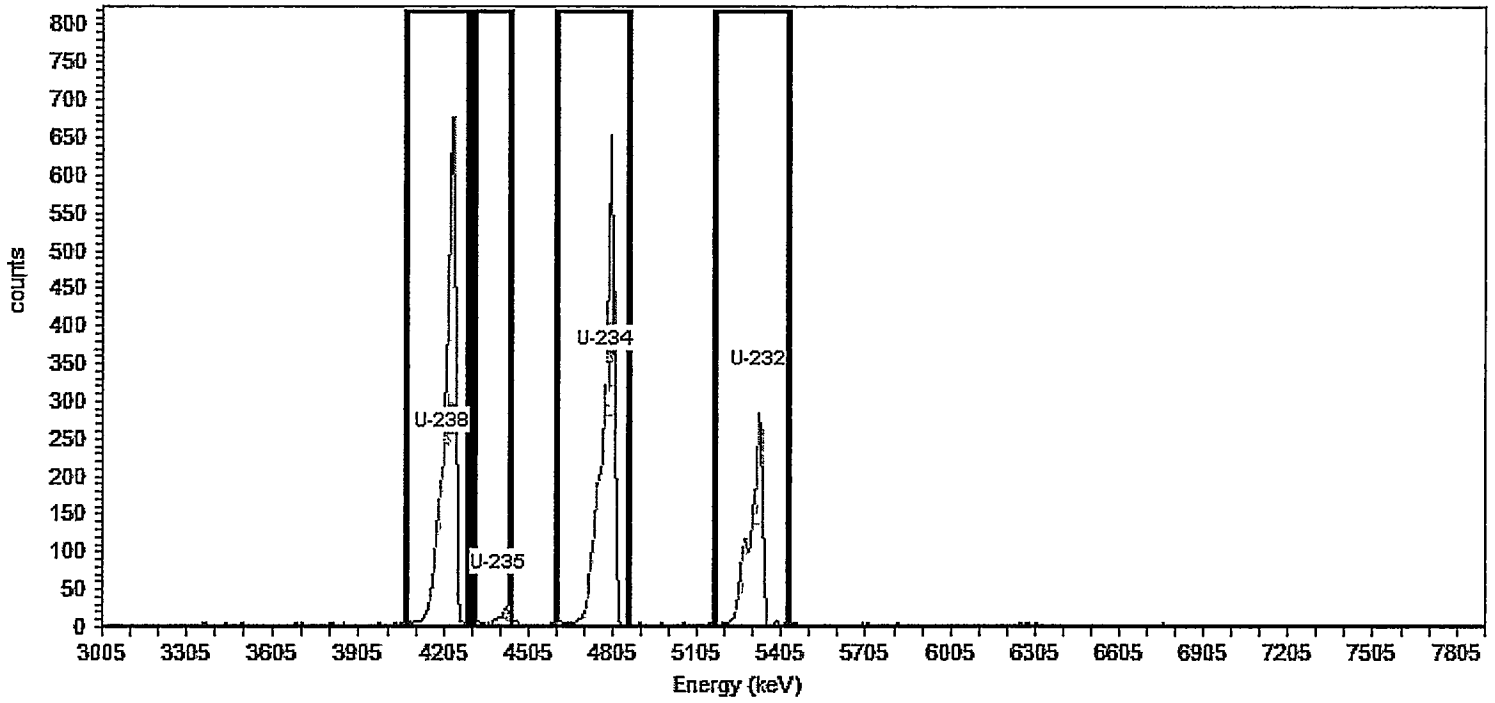
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	37.1	100.0	3,079.66	7.3445	3072.31	1.751E+001	4.784E-001	3.112E-002	7.766E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	87.77	0.8945	86.87	6.120E-001	6.735E-002	1.342E-002	4.591E-002
U-234	4774.000	4598.000	4867.000	34.7	100.0	2,938.00	7.7367	2930.26	1.669E+001	4.609E-001	3.193E-002	7.927E-002
U-232	5322.000	5174.000	5433.000	36.6	99.8	1,490.51	12.7941	1477.72	8.439E+000	2.805E-001	4.115E-002	9.776E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 31,734 8:02:23AM 7/28/2022

Sample

Sample: S-0359-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

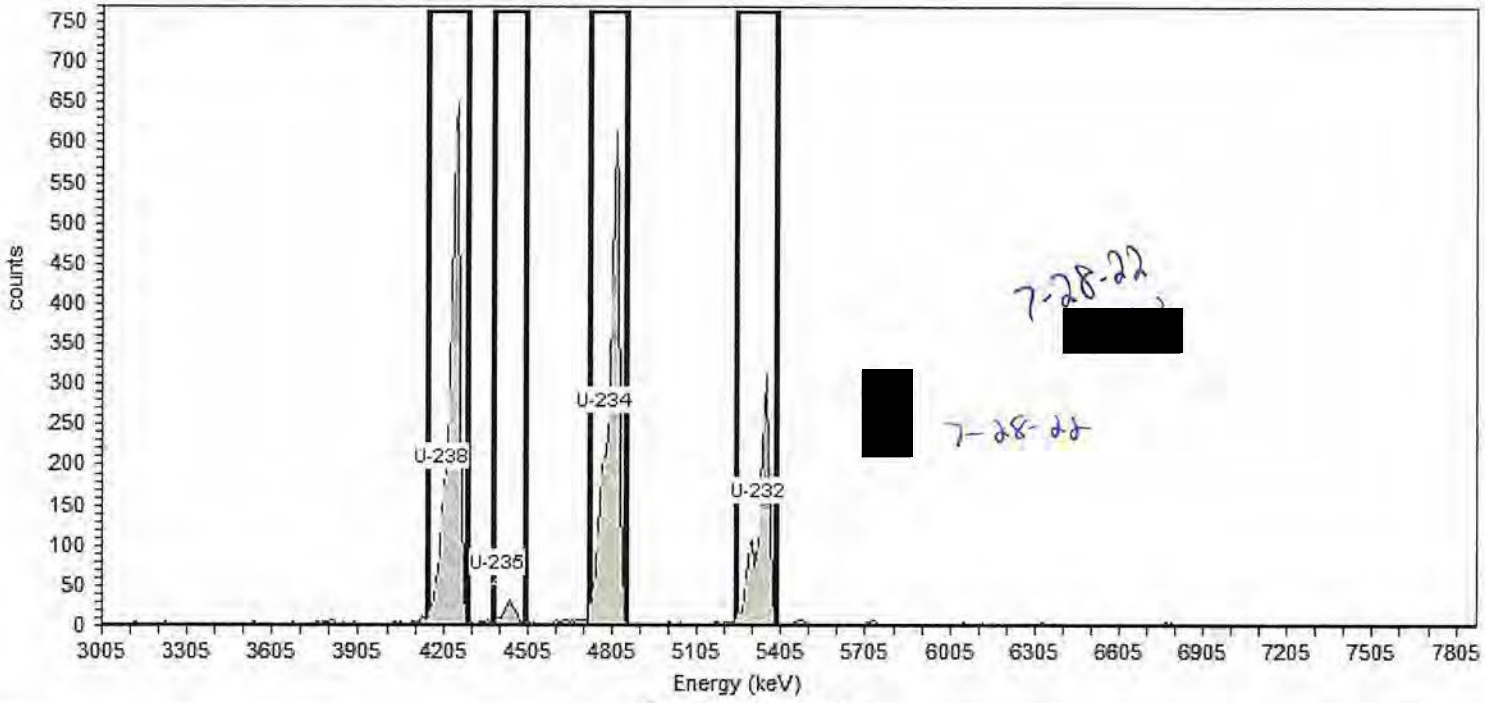
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4147.513	4292.895	36.1	77.0	2,995.00	9.0000	2986.00	2.038E+001	5.599E-001	4.126E-002	1.010E-001
U-235	4397.995	4380.011	4496.034	41.6	57.8	134.00	1.0000	133.00	1.210E+000	1.083E-001	1.832E-002	6.125E-002
U-234	4773.999	4727.627	4852.822	39.7	72.4	2,884.00	7.5000	2876.50	2.088E+001	5.784E-001	4.006E-002	9.977E-002
U-232	5321.992	5246.510	5390.103	36.3	99.8	1,482.00	5.0000	1477.00	7.780E+000	2.578E-001	2.373E-002	6.171E-002

AlphaVision v6.0 **Alpha Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,726 2:42:43AM 7/28/2022

Sample

Sample: S-0359-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

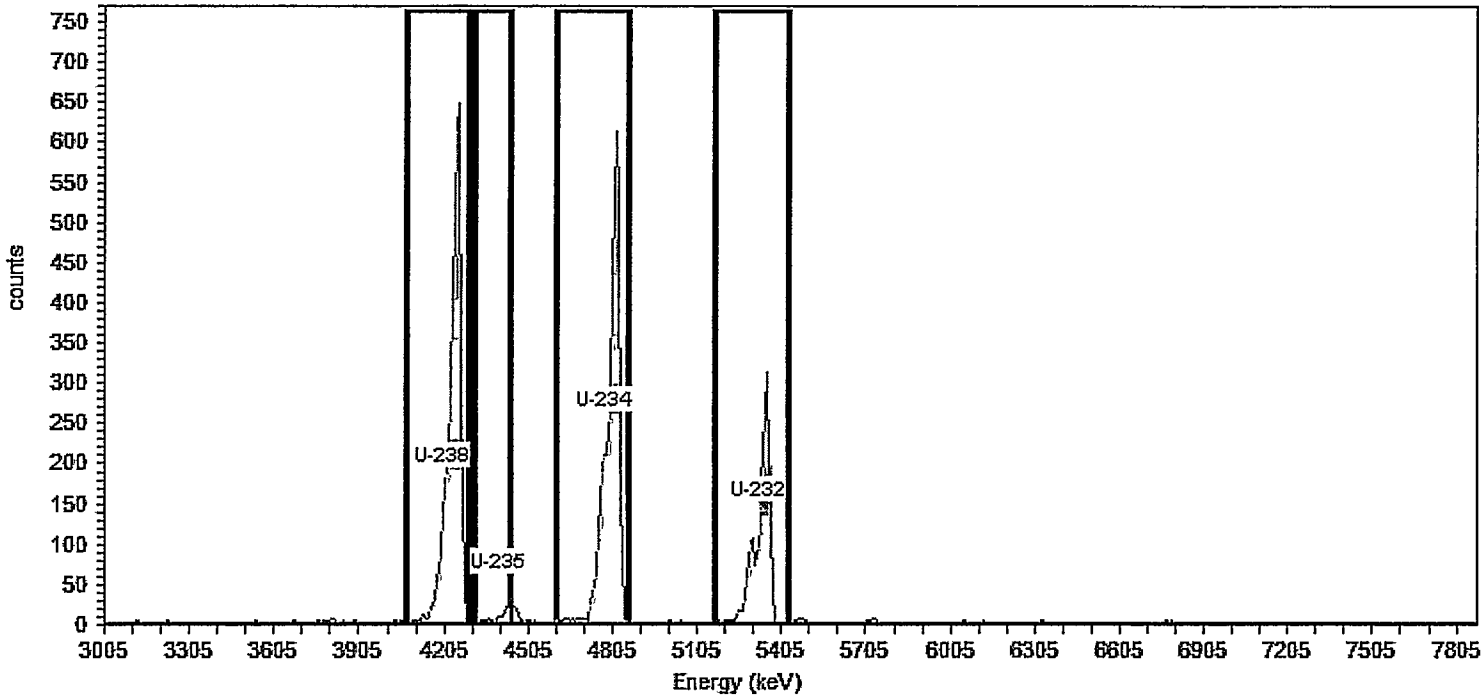
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	41.6	100.0	3,014.39	11.4423	3002.95	1.579E+001	4.331E-001	3.582E-002	8.587E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	71.17	1.2447	69.92	4.543E-001	5.583E-002	1.460E-002	4.679E-002
U-234	4774.000	4598.000	4867.000	39.7	100.0	2,932.24	10.0000	2922.24	1.535E+001	4.239E-001	3.348E-002	8.117E-002
U-232	5322.000	5174.000	5433.000	34.5	99.8	1,497.43	11.5652	1485.87	7.826E+000	2.594E-001	3.609E-002	8.643E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,735 8:03:20AM 7/28/2022

Sample

Sample: S-0359-V5 Type: Sample
Spectrum #1 Analysis #1
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
Description:

Client Name: Undefined
Client Contact:

Tracer

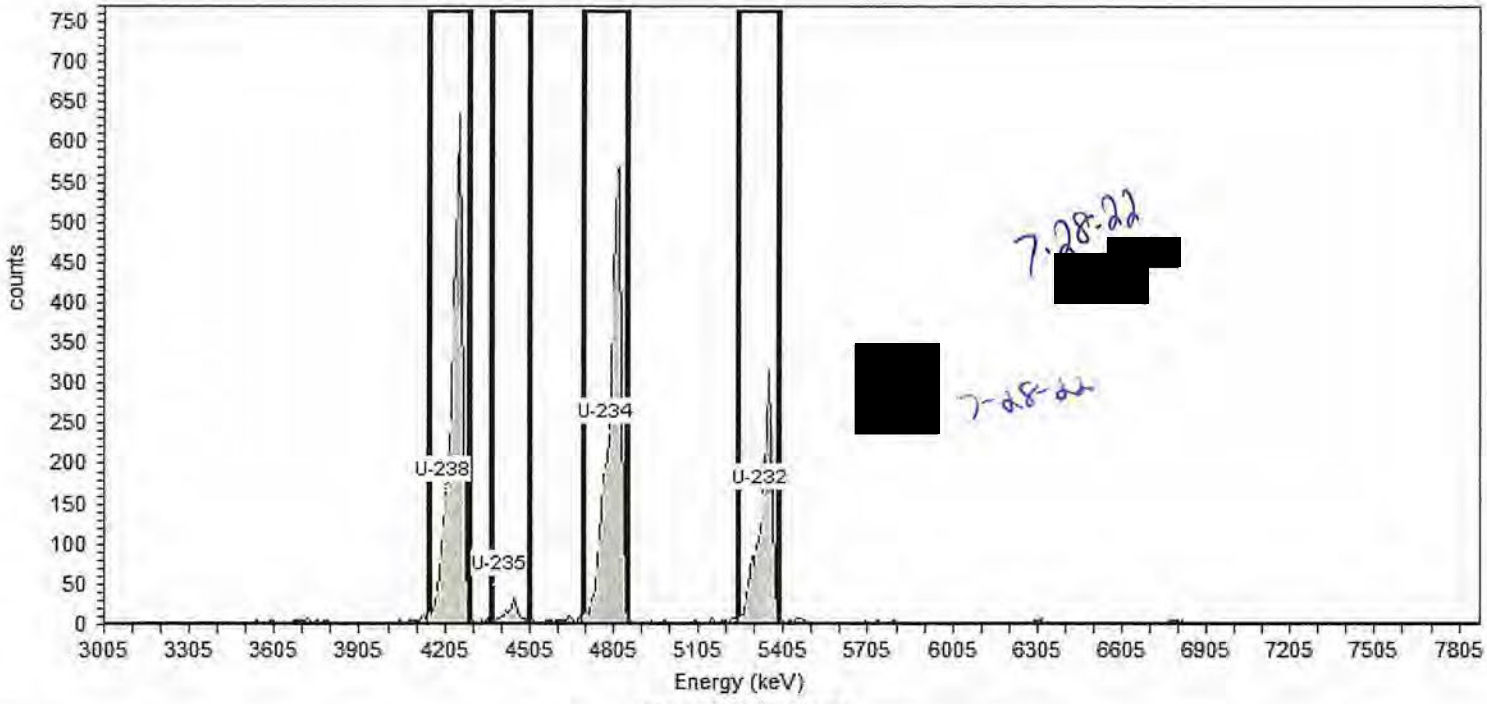
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 7/27/2022 2:42:07PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4147.513	4292.895	42.0	77.0	3,030.00	11.0000	3019.00	2.109E+001	5.781E-001	4.667E-002	1.122E-001
U-235	4397.995	4370.335	4505.695	46.2	59.5	130.00	1.0000	129.00	1.166E+000	1.060E-001	1.821E-002	6.088E-002
U-234	4773.999	4698.711	4852.822	43.4	99.8	2,960.00	8.5000	2951.50	1.590E+001	4.381E-001	3.165E-002	7.789E-002
U-232	5321.992	5246.510	5390.103	39.4	99.8	1,452.00	8.0000	1444.00	7.781E+000	2.600E-001	3.071E-002	7.600E-002

AlphaVision v6.0 — Alpha Spectroscopy Analysis Report

Analyst: countroom Results ID: 31,724 2:42:14AM 7/28/2022

Sample

Sample: S-0359-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

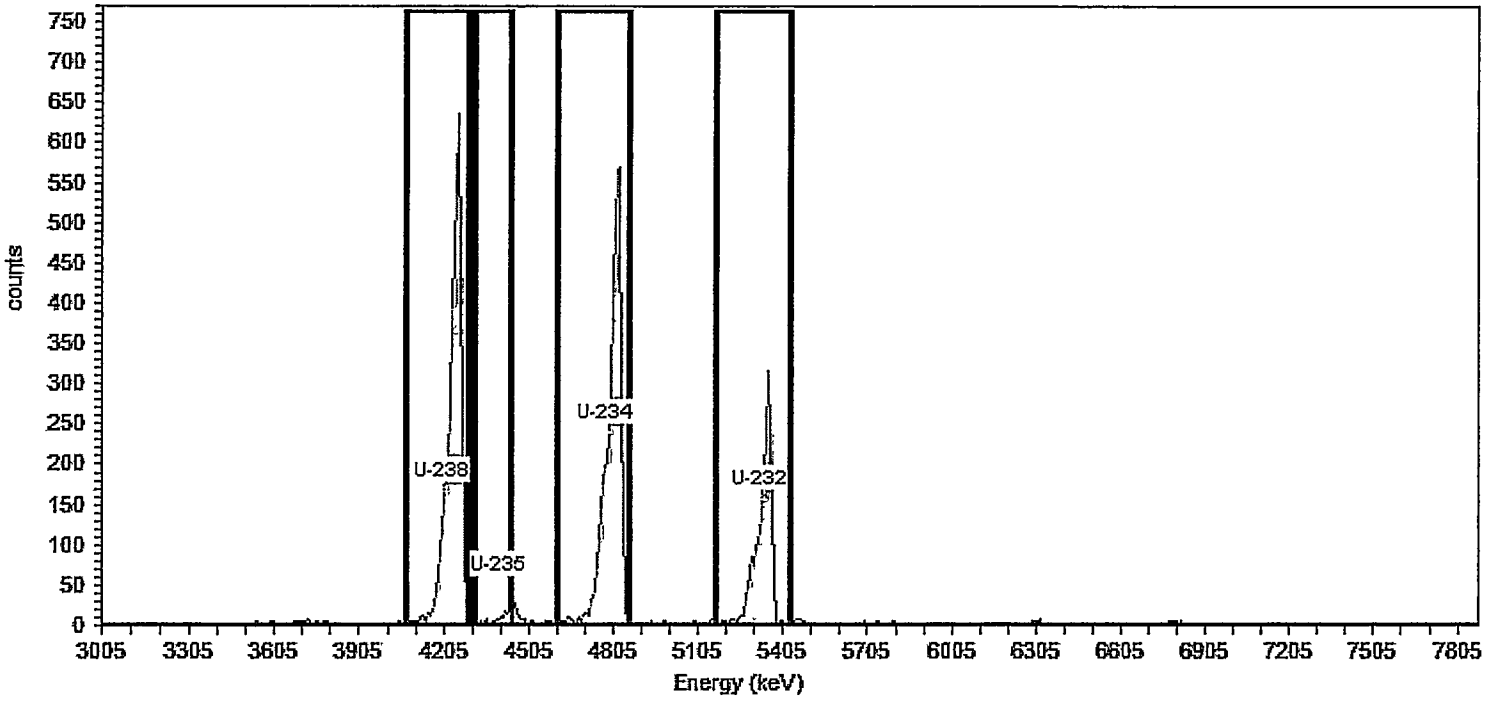
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 7/27/2022 2:42:07PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	37.6	100.0	3,047.40	13.0175	3034.39	1.632E+001	4.470E-001	3.909E-002	9.274E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	60.46	2.0336	58.42	3.884E-001	5.272E-002	1.910E-002	5.619E-002
U-234	4774.000	4598.000	4867.000	43.4	100.0	2,993.64	13.5162	2980.13	1.602E+001	4.406E-001	3.982E-002	9.418E-002
U-232	5322.000	5174.000	5433.000	35.8	99.8	1,471.51	15.6126	1455.90	7.845E+000	2.621E-001	4.290E-002	1.004E-001

National Institute of Standards & Technology

Certificate

Standard Reference Material® 4321d

Natural Uranium Radioactivity Standard

This Standard Reference Material (SRM) consists of a solution of standardized and certified massic activities of radioactive uranium-238, uranium-235, and uranium-234 in a suitably stable and homogeneous matrix. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. A unit of SRM 4321d consists of approximately 5 mL of a solution, whose composition is specified in Tables 1 and 2, contained in a flame-sealed borosilicate-glass ampoule [1].

The certified massic activities for the uranium isotopes at a **Reference Time of 1200 EST, 15 March 2017**, are:

Uranium-238:	**(228.93 ± 0.56)**	**Bq•g^{-1}**
Uranium-235:	**(10.540 ± 0.032)**	**Bq•g^{-1}**
Uranium-234:	**(220.16 ± 1.15)**	**Bq•g^{-1}**

A NIST certified value, as used within the context of this certificate, is a value for which NIST has the highest confidence in its uncertainty assessment. It is a "measurement result" [2] obtained directly or indirectly from a "primary reference measurement procedure" [3]. The certified value is traceable to the derived SI unit, becquerel (Bq).

Additional physical, chemical, and radiological properties for this SRM, as well as details on the standardization method, are given in Tables 1 and 2. Uncertainties for the certified quantities are expanded ($k = 2$). The uncertainties are calculated according to the ISO/JCGM and NIST Guides [4,5]. Table 3 contains a specification of the components that comprise the uncertainty analysis.

Expiration of Certification: The certification of **SRM 4321d** is valid indefinitely, within the measurement uncertainty specified, provided that the SRM is handled and stored properly and that no evaporation or change in composition has occurred. The solution matrix, in an unopened ampoule, is homogeneous and stable within its half-life-dependent useful lifetime provided the SRM is handled in accordance with instructions given in this certificate (see "Instructions for Handling and Storage"). Periodic recertification of this SRM is not required. The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification, NIST will notify the purchaser. Registration (see attached sheet or register online) will facilitate notification.

Radiological and chemical hazard: Consult the Safety Data Sheet (SDS), enclosed with the SRM shipment, for radiological and chemical hazard information.

This SRM was prepared in the NIST Physical Measurement Laboratory, Radiation Physics Division, under the direction of M.P. Unterweger, Group Leader of the Radioactivity Group. Overall technical direction and physical measurement leading to certification were provided by R. Collé and L. Laureano-Perez of the NIST Radiation Physics Division, Radioactivity Group. Additional technical support and assistance was provided by J. LaRosa, S. Nour, L. Pibida, D. Bergeron, R. Fitzgerald and B. Zimmerman of the NIST Radiation Physics Division, Radioactivity Group.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

Michael G. Mitch, Acting Chief
Radiation Physics Division

Gaithersburg, Maryland 20899
Certificate Issue Date: 29 November 2017

Steven J. Choquette, Director
Office of Reference Materials

Table 1. Certified Massic Activity of SRM 4321d

Radionuclides	**Natural Uranium (Mixture of ^{238}U, ^{235}U, and ^{234}U)**
Reference time	**1200 EST, 15 March 2017**
Massic activities of the solution	**^{238}U: 228.93 Bq•g^{-1}** **^{235}U: 10.540 Bq•g^{-1}** **^{234}U: 220.16 Bq•g^{-1}**
Relative expanded uncertainties ($k = 2$)	**^{238}U: 0.25 %[a]** **^{235}U: 0.31 %[a]** **^{234}U: 0.52 %[a]**

[a] The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO/JCGM and NIST Guides [4,5]. The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain an approximate 95 % level of confidence.

Table 2. Uncertified information of SRM 4321d

Source description	Liquid in flame-sealed, 5 mL borosilicate glass ampoule [1]
Solution composition	(1.06 ± 0.01) mol•L^{-1} HNO_3 with 21 mg UO_2^{+2} per gram of solution[a]
Solution density	(1.057 ± 0.001) g•mL^{-1} at 21.6 °C[a]
Solution mass	(5.284 ± 0.001) g[a]
Photon-emitting impurities	None detected [b]
Half-lives used	^{238}U : (4.468 ± 0.005) x 10^9 a[c] [6] ^{235}U : (7.04 ± 0.01) x 10^8 a[c] [7] ^{234}U : (2.455 ± 0.006) x 10^5 a[c] [8]
Other Uranium isotopes	^{233}U and ^{236}U were not detected[d]
Calibration method (and instruments)	Quantitative dissolution of a uranium (normal) metal assay and isotopic standard (CRM 112-A)[e] with conversion to massic activity values using assumed half-lifes of ^{234}U, ^{235}U and ^{238}U. The uranium assay for CRM 112-A was determined by coulometry. The certified isotopic atom fractions were determined by mass spectrometry. Solution homogeneity measurements were made with a NaI(Tl) well counter. Confirmatory measurements for total massic activity and ^{234}U and ^{238}U isotopic massic activity were performed by 4παβ liquid scintillation counting[f] and by isotope dilution alpha spectrometry (IDAS)[g], respectively.

[a] The stated uncertainty is two times the standard uncertainty. See reference 5.

[b] The estimated lower limits of detection for photon-emitting impurities, expressed as massic photon emission rate, as of April 2017, were:

1.4 s^{-1}•g^{-1} in the region	15 keV ≤ E ≤	20 keV;
0.36 s^{-1}•g^{-1} in the region	25 keV ≤ E ≤	105 keV;
0.25 s^{-1}•g^{-1} in the region	110 keV ≤ E ≤	490 keV, and
0.32 s^{-1}•g^{-1} in the region	500 keV ≤ E ≤	2000 keV;

[c] The stated uncertainty is the standard uncertainty. See reference 5.

[d] From the CRM 112-A Certificate of Analysis [9] the limit of detection of uranium isotope ratios for the technique used is 5 x 10^{-9}.

[e] This CRM was originally issued in 1972 by the National Bureau of Standards (NBS) (now National Institute of Standards and Technology, NIST) as SRM 960. The assay measurements leading to the certification of the uranium concentration were performed by NBS. In 1987, the technical and administrative aspects regarding this material were transferred to the U.S. Department of Energy, New Brunswick Laboratory (NBL). In 1998, the standard material was repackaged and verified for uranium assay and atomic mass by NBL. In 2010, the material was again repackaged and isotopic certification and assay verification measurements were performed at NBL.

[f] The total massic activity in SRM 4321d was confirmed by consistency with measured 4παβ liquid scintillation counting rates, taken in combination with known alpha detection efficiency and with calculated beta detection efficiencies for the ^{231}Th, ^{234}Th and ^{234m}Pa daughter radionuclides as obtained from the MICELLE2 code for ^{234}U, ^{235}U and ^{238}U using ^3H as an efficiency tracing monitor. The relative agreement was within 0.8 % of the certified massic activity, well within the uncertainty of the efficiency calculations.

[g] Aliquots of a gravimetric dilution of SRM 4321d were taken and spiked with known activities of ^{232}U from SRM 4324b to radiochemically prepare thin electrodeposited sources for alpha-particle spectrometry. The results for the ^{234}U and ^{238}U massic activities in SRM 4321d from this isotope dilution analysis were within -0.12 % and +0.25 % respectively, of the certified values, which is well within the uncertainty of the massic activity of the SRM 4324b ^{234}U tracer.

Table 3. Uncertainty evaluation for the massic activity for SRM 4321d

	Uncertainty component	Assessment Type[(a)]	Relative standard uncertainty contribution on massic activity of Natural Uranium (%)		
			^{238}U	^{235}U	^{234}U
1	Uranium mass fraction in CRM 112-A; from CRM 112-A certificate [9]	B	0.003	0.003	0.003
2	Isotopic uranium atom fraction in CRM 112-A; from CRM 112-A certificate [9]	B	0.00020	0.0271	0.077
3	Half-life; standard uncertainty of the half-life [6,7,8]	B	0.112	0.142	0.244
4	Mass of uranium metal	B	0.05	0.05	0.05
5	Quantitative dissolution of metal	B	0.05	0.05	0.05
6	Mass of SRM master solution	B	0.005	0.005	0.005
Relative combined standard uncertainty			**0.123**	**0.153**	**0.261**
Relative expanded uncertainty ($k = 2$)			**0.25**	**0.31**	**0.52**

[(a)] B denotes evaluation by other methods.

INSTRUCTIONS FOR HANDLING AND STORAGE

Handling: If the ampoule is transported, it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity. Only persons qualified to handle both radioactive material and alkaline and/or acidic solutions, should open the ampoule. To minimize personnel exposure, appropriate shielding and/or distance should be used. Refer to the SDS for further information.

Storage: SRM 4321d should be stored and used at a temperature between 5 °C and 65 °C. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material.

REFERENCES

[1] NIST Physical Measurement Laboratory; *Storage and Handling of Radioactive Standard Reference Materials, Ampoule Specifications and Opening Procedure*, available at http://www.nist.gov/pml/div682/grp04/srm.cfm (accessed Nov 2017). Note: This SRM is contained in a generic borosilicate-glass ampoule and not in the standard NIST ampoule.

[2] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 19 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2017).

[3] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 18 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2017).

[4] JCGM 100:2008; *Guide to the Expression of Uncertainty in Measurement;* (GUM 1995 with Minor Corrections), Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Nov 2017).

[5] Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office: Washington, DC (1994); available at http://www.nist.gov/pml/pubs/index.cfm (accessed Nov 2017).

[6] Chisté, V. and M.M. Bé; *LNE-LNHB/CEA Table of Radionuclides*, ^{238}U; (April 2006); available at http://www.nucleide.org/DDEP_WG/Nuclides/U-238_tables.pdf (accessed Nov 2017).

[7] Huang Xiaolong and Wang Baosong; *LNE-LNHB/CEA Table of Radionuclides*, ^{235}U; (February 2014); available at http://www.nucleide.org/DDEP_WG/Nuclides/U-235_tables.pdf (accessed Nov 2017).

[8] Chisté, V. and M.M. Bé; *LNE-LNHB/CEA Table of Radionuclides*, ^{234}U; (September 2006); available at http://www.nucleide.org/DDEP_WG/Nuclides/U-234_tables.pdf (accessed Nov 2017).

[9] Certificate of Analysis CRM 112-A, Uranium (Normal) Metal Assay and Isotopic Standard, New Brunswick Laboratory, U.S. Department of Energy, (September, 2010); available at https://science.energy.gov/~/media/nbl/pdf/price-lists/certificates/CRM_112A_Uranium_Metal_Sept_2010.pdf (accessed Nov 2017).

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

ARS Aleut Analytical

Alpa Spec Standard Verification

	Std. ID	Isotope
Analyte	**S-0359**	**U-238**
Tracer	**S-0369**	**U-232**

Expires: 7/28/2023

S-0359 Net	S-0369 Net	Grams of S-0369	S-0369 dpm/g	S-0369 dpm added	S-0359 dpm	Grams of S-0359	S-0359 dpm/g
2985	1520	1.051	8.6612	9.1029212	17.876	0.524	34.11538241
2872	1455	1.036	8.6612	8.9730032	17.712	0.522	33.930383
3060	1462	1.038	8.6612	8.9903256	18.817	0.519	36.25618605
2986	1477	1.038	8.6612	8.9903256	18.175	0.522	34.81883418
3019	1444	1.038	8.6612	8.9903256	18.796	0.522	36.00815236

Average	35.026
Known Value	34.974
Average/stdev	3.045%
% Bias	0.147%

Performed by: [redacted] Date: 7/28/2022

Reviewed by: [redacted] Date: 7-28-22

QA Approval: [redacted] Date: 7-28-22

ARS-038-003 r0.2
Revision Date: 01/23/2019

ARS Aleut Analytical

Weight Spreadsheet for Standard Verification

Verification Weights

Tech:	LC
Pippete:	PU29204
Scale ID:	Soil-T0350192
Standard ID:	S-0359
Tracer ID:	S-0369

Sample ID	Std. Weight(g)	Tracer Weight(g)
S-0359-V1	0.524	1.051
S-0359-V2	0.522	1.036
S-0359-V3	0.519	1.038
S-0359-V4	0.522	1.038
S-0359-V5	0.522	1.038

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,731 7:59:25AM 7/28/2022

Sample

Sample: S-0359-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

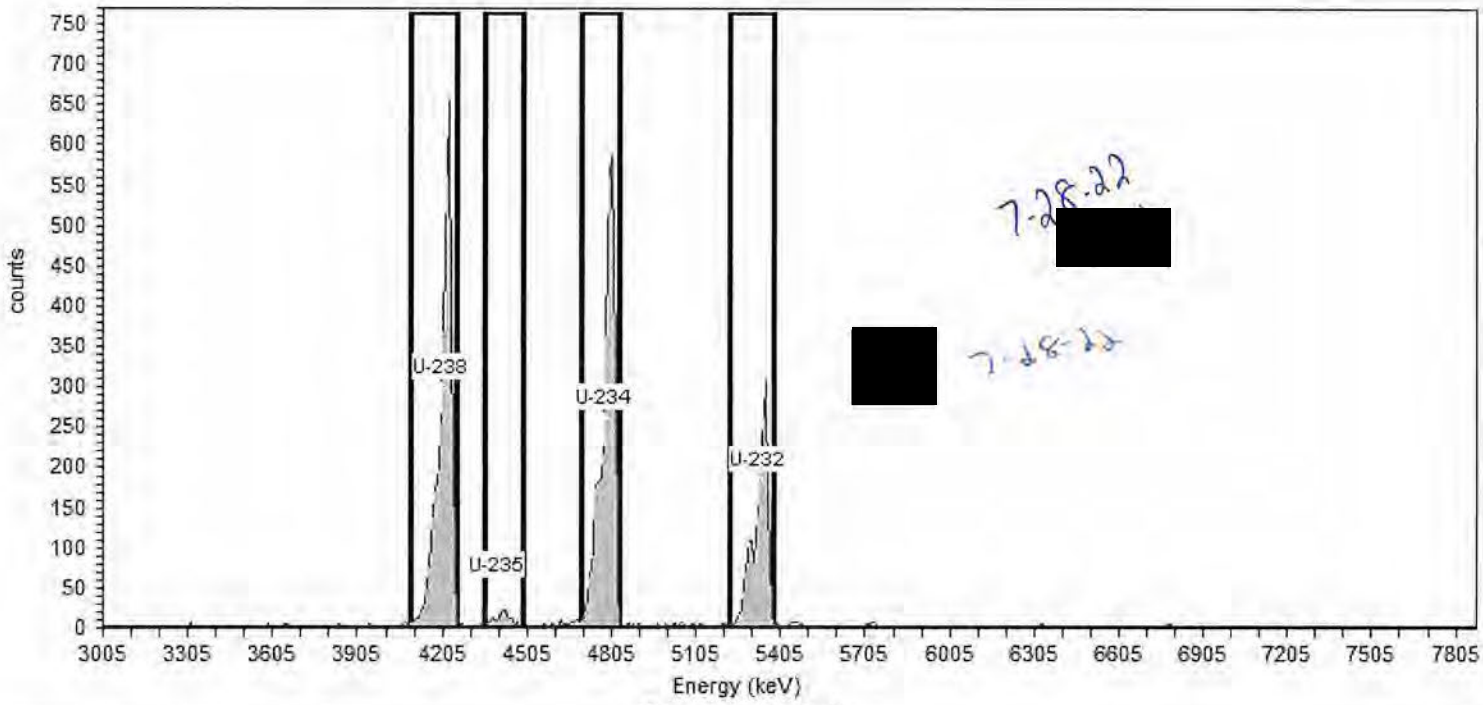
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4089.295	4254.149	33.7	100.0	2,996.00	11.0000	2985.00	1.573E+001	4.322E-001	3.521E-002	8.468E-002
U-235	4397.995	4350.981	4486.371	38.2	74.8	113.00	3.5000	109.50	7.714E-001	7.710E-002	2.655E-002	7.217E-002
U-234	4773.999	4698.711	4833.573	34.8	99.8	2,864.00	10.0000	2854.00	1.507E+001	4.183E-001	3.364E-002	8.157E-002
U-232	5321.992	5227.346	5380.537	38.5	99.8	1,527.00	6.5000	1520.50	8.028E+000	2.639E-001	2.712E-002	6.853E-002

AlphaVision v6.0

Alpha Spectroscopy Analysis Report

Analyst: countroom

Results ID: 31,725 2:42:29AM 7/28/2022

Sample

Sample: S-0359-V1 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

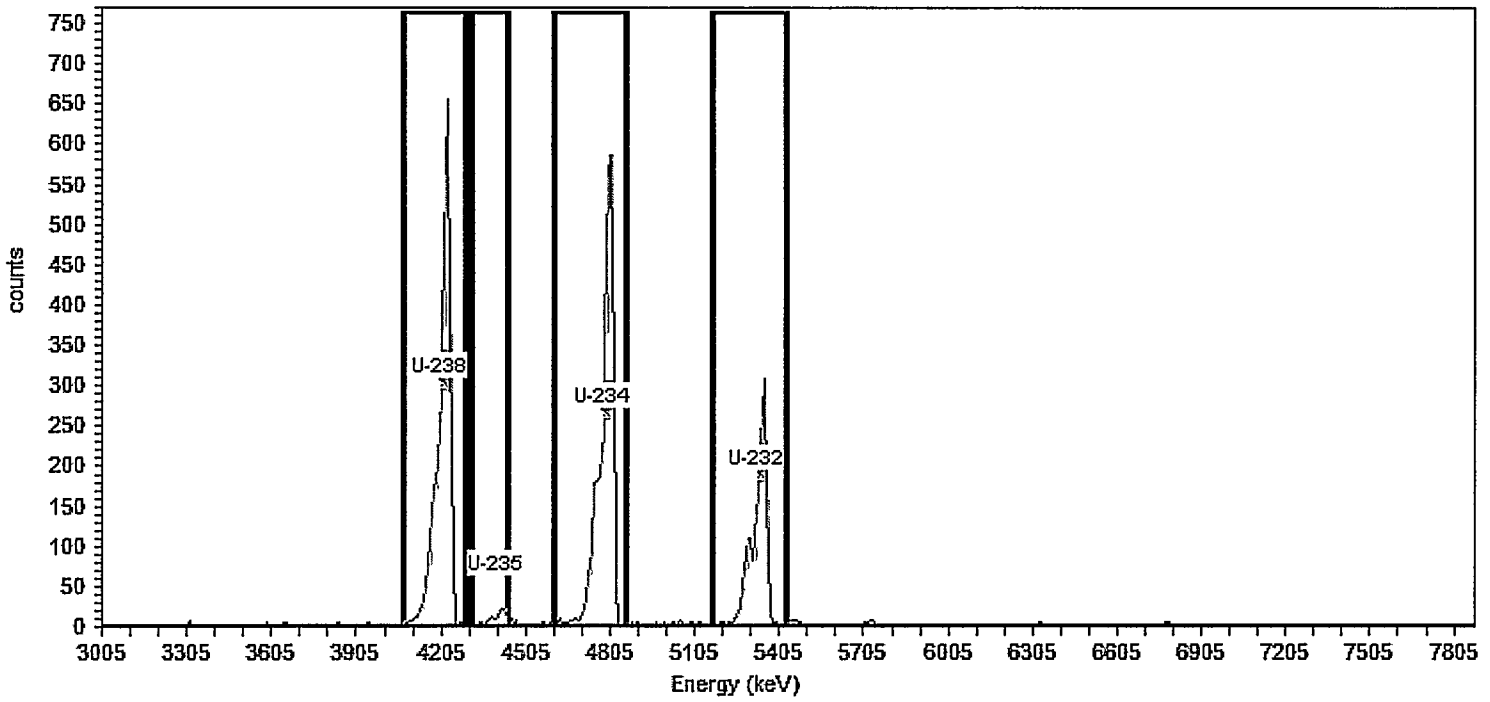
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166650 - E4, SN: 5702131, ID: 12
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E4; Det: 17166650 - E4; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 12

Energy Calibration: E4 calib 5-19-21
Efficiency Calibration:E4 calib 5-19-21
Calibration Date: 5/20/2021 6:23:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.36% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	36.4	100.0	3,004.11	11.1153	2993.00	1.577E+001	4.331E-001	3.540E-002	8.505E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	81.32	2.8945	78.43	5.109E-001	6.017E-002	2.233E-002	6.228E-002
U-234	4774.000	4598.000	4867.000	35.2	100.0	2,902.41	16.8386	2885.57	1.520E+001	4.212E-001	4.355E-002	1.013E-001
U-232	5322.000	5174.000	5433.000	37.3	99.8	1,534.92	12.4604	1522.46	8.039E+000	2.646E-001	3.755E-002	8.939E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 31,732 8:00:26AM 7/28/2022

Sample

Sample: S-0359-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

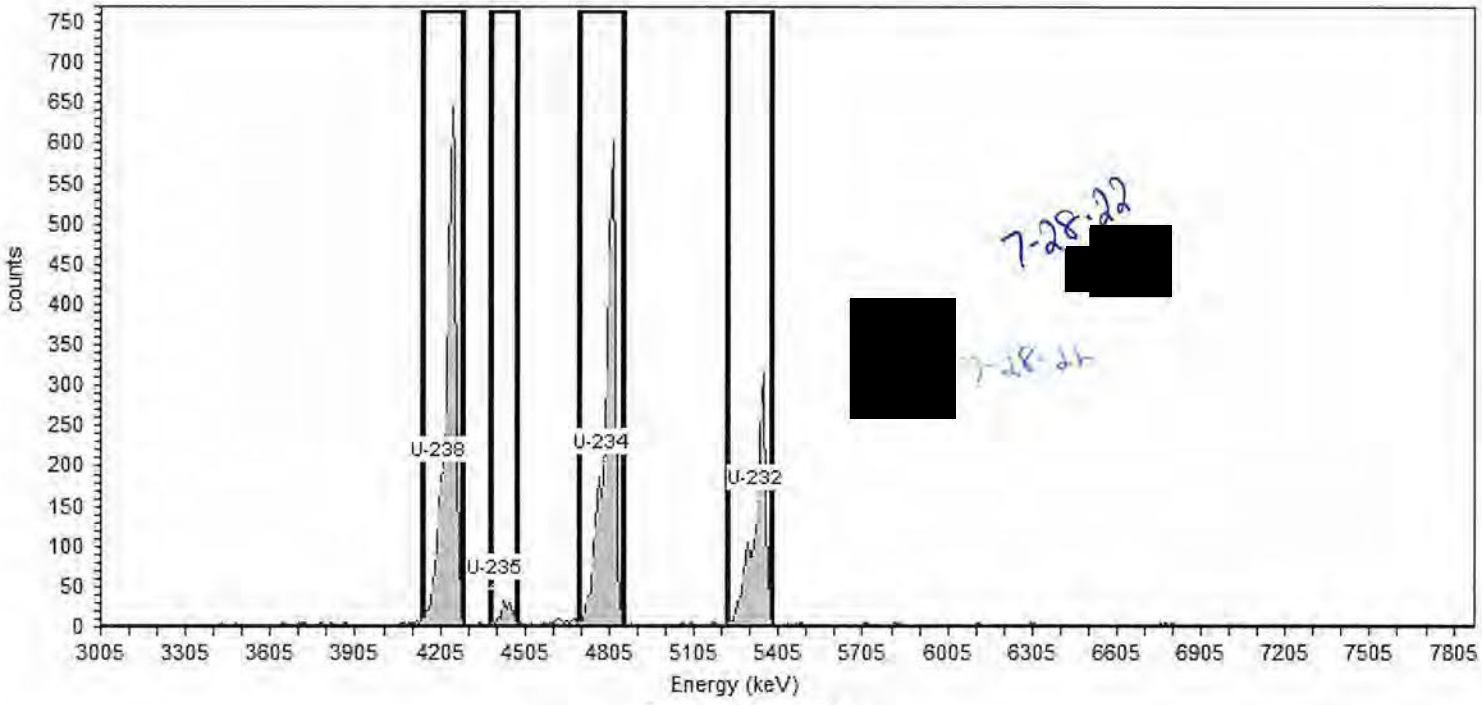
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4137.813	4283.210	39.7	100.0	2,879.00	7.0000	2872.00	1.599E+001	5.156E-001	2.969E-002	7.444E-002
U-235	4397.995	4380.011	4476.707	45.2	57.8	125.00	1.0000	124.00	1.195E+000	1.124E-001	1.941E-002	6.490E-002
U-234	4773.999	4698.711	4852.822	36.0	99.8	2,702.00	5.0000	2697.00	1.505E+001	4.903E-001	2.514E-002	6.538E-002
U-232	5321.992	5227.346	5380.537	37.8	99.8	1,462.00	7.0000	1455.00	8.120E+000	3.018E-001	2.975E-002	7.459E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,728 2:43:10AM 7/28/2022

Sample

Sample: S-0359-V2 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

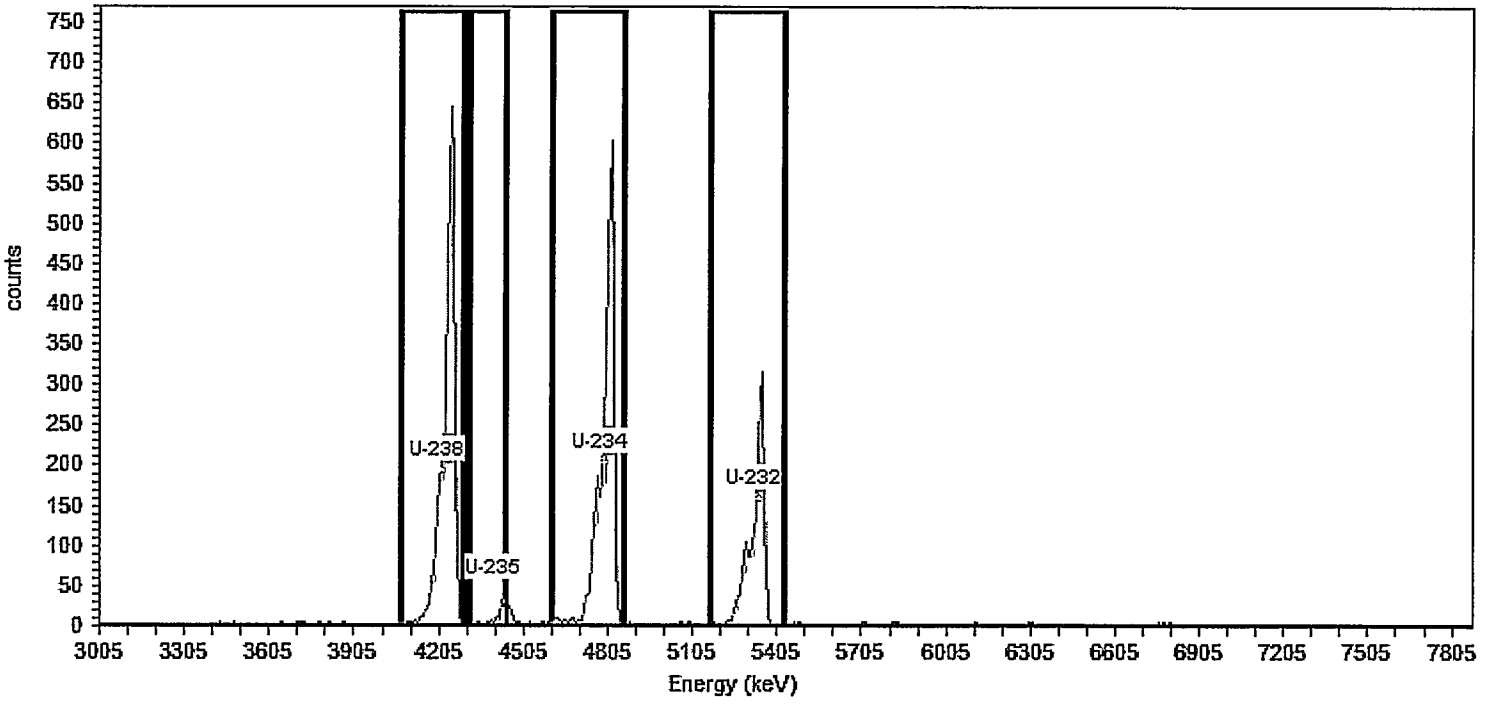
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E5, SN: 5702132, ID: 13
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E5; Det: 17166651 - E5; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 13

Energy Calibration: E5 CALIB 5-20-21
Efficiency Calibration:E5 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:08AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.94% +/- 1.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	39.7	100.0	2,893.77	7.9022	2885.87	1.607E+001	5.177E-001	3.154E-002	7.815E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	55.62	1.6055	54.02	3.719E-001	5.262E-002	1.757E-002	5.378E-002
U-234	4774.000	4598.000	4867.000	36.0	100.0	2,742.44	7.2205	2735.22	1.523E+001	4.950E-001	3.014E-002	7.534E-002
U-232	5322.000	5174.000	5433.000	33.1	99.8	1,468.97	12.5396	1456.43	8.128E+000	3.025E-001	3.981E-002	9.473E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 31,733 8:01:26AM 7/28/2022

Sample

Sample: S-0359-V3 Type: Sample
Spectrum #1 Analysis #1
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
Description:

Client Name: Undefined
Client Contact:

Tracer

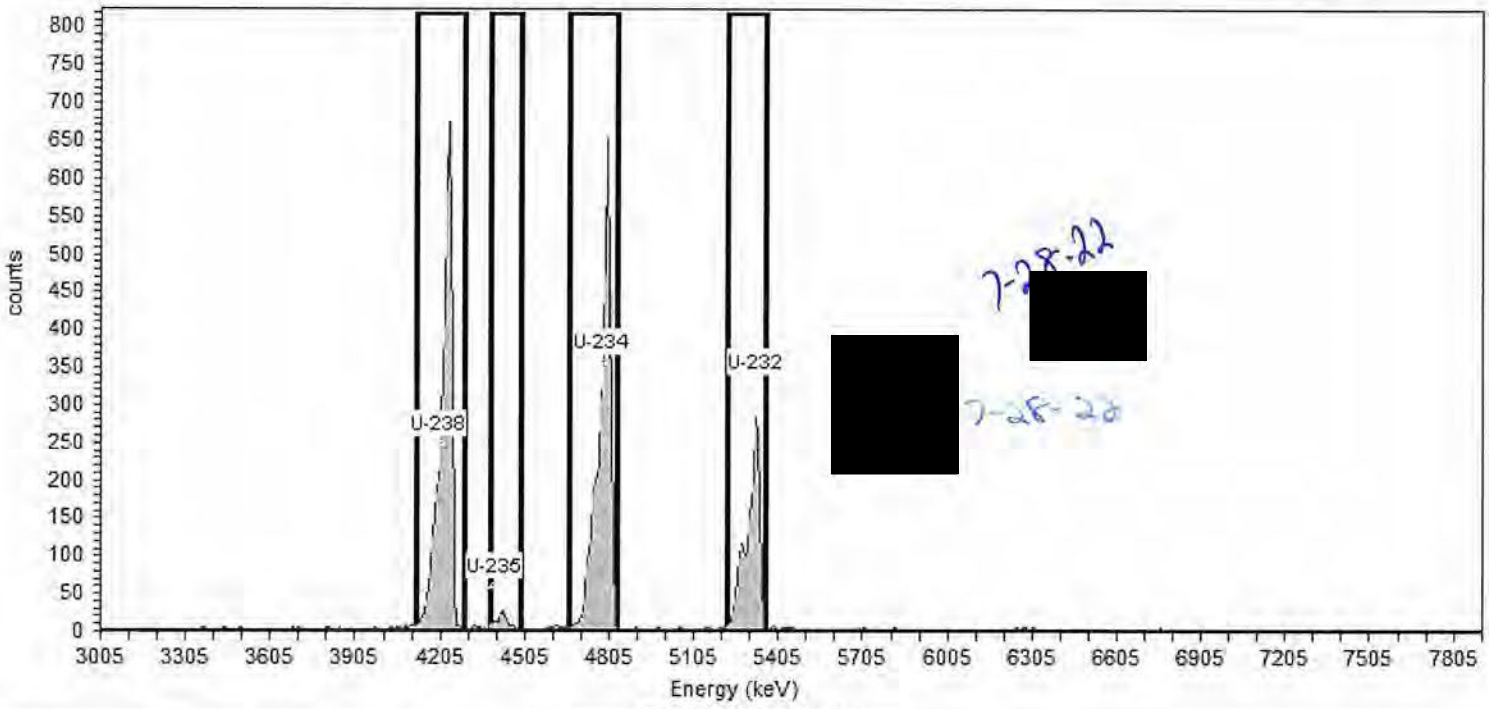
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch²
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4118.409	4292.895	37.1	100.0	3,067.00	7.0000	3060.00	1.744E+001	4.768E-001	3.038E-002	7.618E-002
U-235	4397.995	4380.011	4486.371	36.6	57.8	112.00	2.0000	110.00	1.085E+000	1.071E-001	2.809E-002	8.287E-002
U-234	4773.999	4660.141	4833.573	38.3	99.8	2,919.00	7.0000	2912.00	1.663E+001	4.598E-001	3.044E-002	7.634E-002
U-232	5321.992	5227.346	5361.403	41.2	99.8	1,467.00	5.0000	1462.00	8.349E+000	2.778E-001	2.573E-002	6.691E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,727 2:42:57AM 7/28/2022

Sample

Sample: S-0359-V3 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

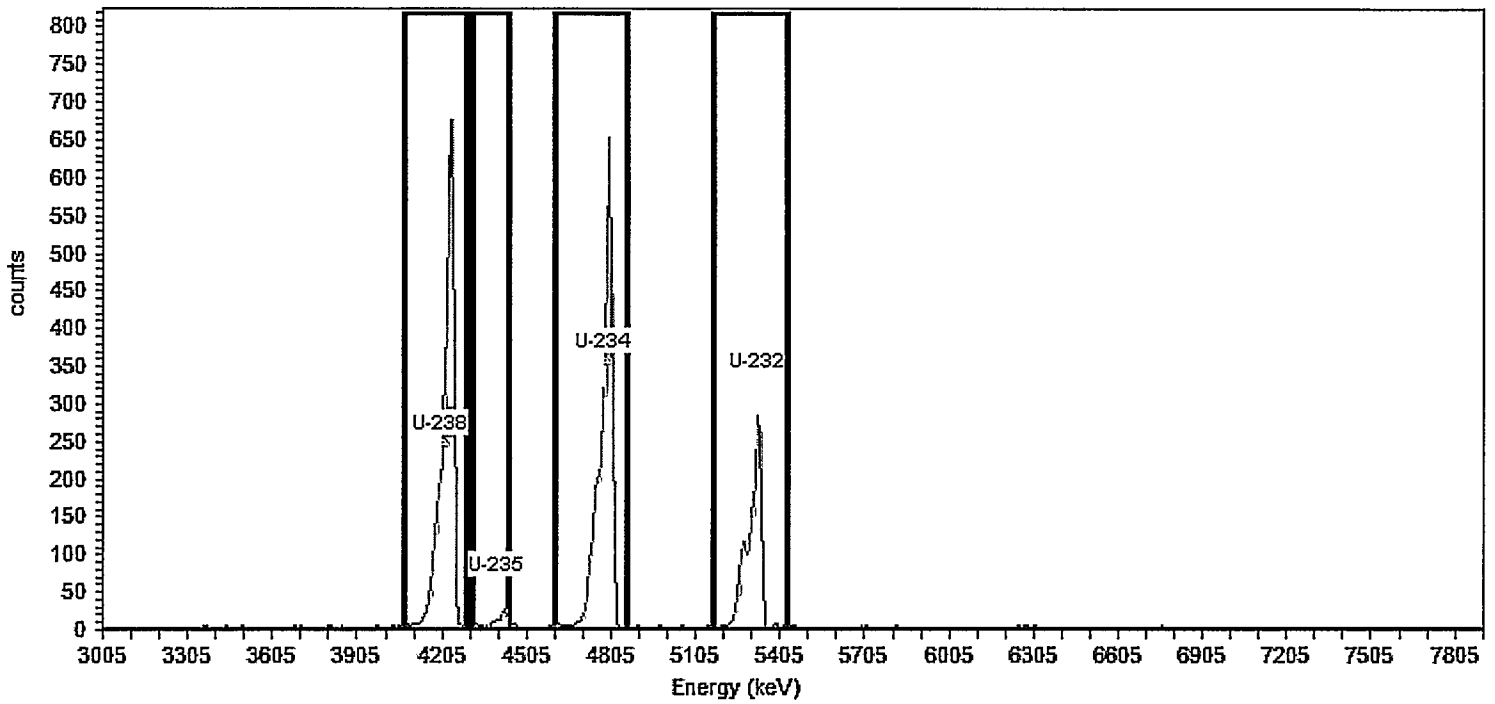
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166651 - E6, SN: 5702133, ID: 14
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E6; Det: 17166651 - E6; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 14

Energy Calibration: E6 CALIB 5-20-21
Efficiency Calibration:E6 CALIB 5-20-21
Calibration Date: 5/21/2021 7:28:53AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 24.37% +/- 1.00% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	37.1	100.0	3,079.66	7.3445	3072.31	1.751E+001	4.784E-001	3.112E-002	7.766E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	87.77	0.8945	86.87	6.120E-001	6.735E-002	1.342E-002	4.591E-002
U-234	4774.000	4598.000	4867.000	34.7	100.0	2,938.00	7.7367	2930.26	1.669E+001	4.609E-001	3.193E-002	7.927E-002
U-232	5322.000	5174.000	5433.000	36.6	99.8	1,490.51	12.7941	1477.72	8.439E+000	2.805E-001	4.115E-002	9.776E-002

AlphaVision v6.0

Alpha-Spectroscopy Analysis Report

Analyst: countroom

Results ID: 31,734 8:02:23AM 7/28/2022

Sample

Sample: S-0359-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

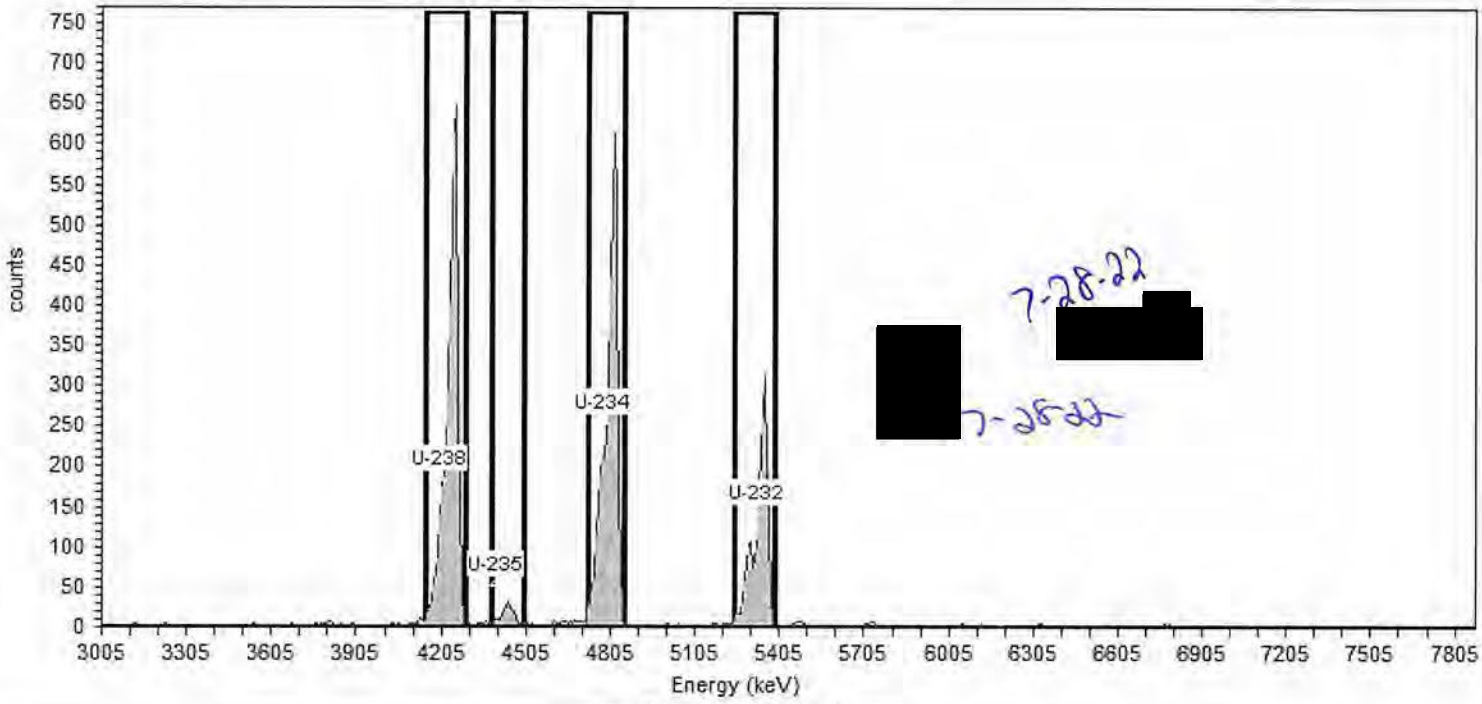
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4147.513	4292.895	36.1	77.0	2,995.00	9.0000	2986.00	2.038E+001	5.599E-001	4.126E-002	1.010E-001
U-235	4397.995	4380.011	4496.034	41.6	57.8	134.00	1.0000	133.00	1.210E+000	1.083E-001	1.832E-002	6.125E-002
U-234	4773.999	4727.627	4852.822	39.7	72.4	2,884.00	7.5000	2876.50	2.088E+001	5.784E-001	4.006E-002	9.977E-002
U-232	5321.992	5246.510	5390.103	36.3	99.8	1,482.00	5.0000	1477.00	7.780E+000	2.578E-001	2.373E-002	6.171E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,726 2:42:43AM 7/28/2022

Sample

Sample: S-0359-V4 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

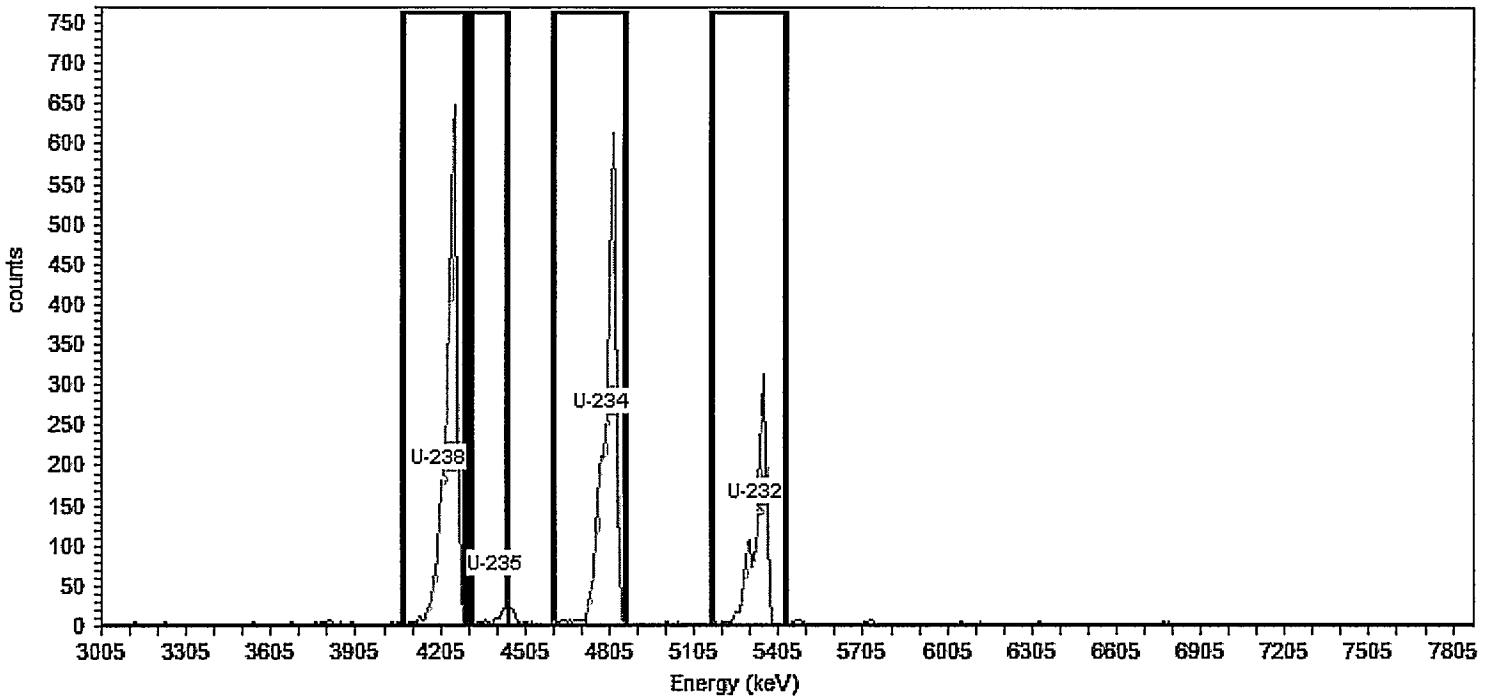
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E7, SN: 5702136, ID: 15
Acquisition Start Date: 7/27/2022 2:42:06PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:10PM
Bkgd Info: Sample: E7; Det: 17166652 - E7; Spectrum #1; 7/15/2022 2:23:10 PM; Live Time: 1440.000(min.); ID: 15

Energy Calibration: E7 CALIB 5-20-21
Efficiency Calibration:E7 CALIB 5-20-21
Calibration Date: 5/21/2021 7:29:29AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 26.42% +/- 1.08% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	41.6	100.0	3,014.39	11.4423	3002.95	1.579E+001	4.331E-001	3.582E-002	8.587E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	71.17	1.2447	69.92	4.543E-001	5.583E-002	1.460E-002	4.679E-002
U-234	4774.000	4598.000	4867.000	39.7	100.0	2,932.24	10.0000	2922.24	1.535E+001	4.239E-001	3.348E-002	8.117E-002
U-232	5322.000	5174.000	5433.000	34.5	99.8	1,497.43	11.5652	1485.87	7.826E+000	2.594E-001	3.609E-002	8.643E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom Results ID: 31,735 8:03:20AM 7/28/2022

Sample

Sample: S-0359-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

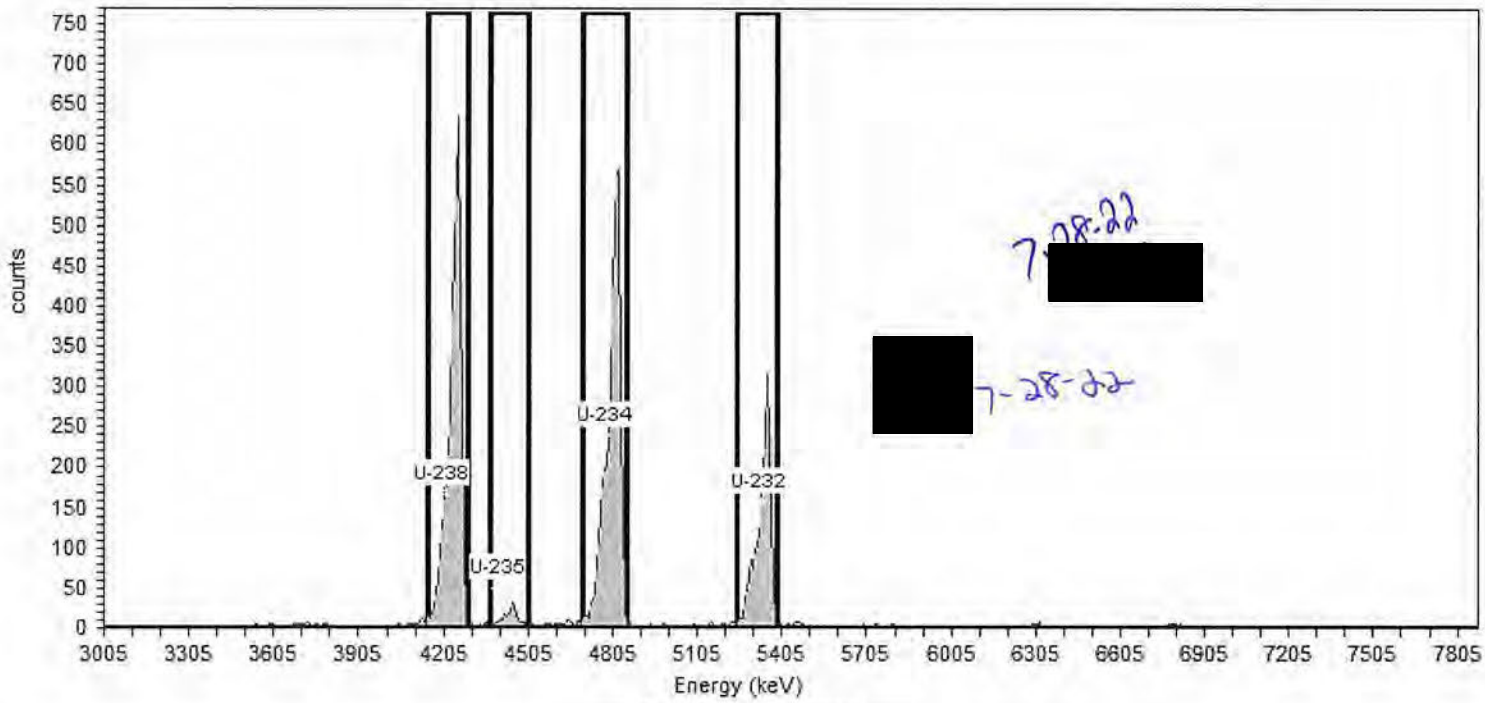
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 7/27/2022 2:42:07PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: Interactive ROI Analysis
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4197.997	4147.513	4292.895	42.0	77.0	3,030.00	11.0000	3019.00	2.109E+001	5.781E-001	4.667E-002	1.122E-001
U-235	4397.995	4370.335	4505.695	46.2	59.5	130.00	1.0000	129.00	1.166E+000	1.060E-001	1.821E-002	6.088E-002
U-234	4773.999	4698.711	4852.822	43.4	99.8	2,960.00	8.5000	2951.50	1.590E+001	4.381E-001	3.165E-002	7.789E-002
U-232	5321.992	5246.510	5390.103	39.4	99.8	1,452.00	8.0000	1444.00	7.781E+000	2.600E-001	3.071E-002	7.600E-002

AlphaVision v6.0 **Alpha-Spectroscopy Analysis Report**

Analyst: countroom

Results ID: 31,724 2:42:14AM 7/28/2022

Sample

Sample: S-0359-V5 Type: Sample
Spectrum #1 Analysis #1
:
Sample Collection Date:
Comment: S-0359/S-0369 Verification

Sample Volume : 1.00 Sample Units: mL
First Stage Dilution: N/A
Aliquot: N/A Aliquot Fraction: N/A
Dilution 2: N/A
Lab Preparation:

Batch

Batch Name: S-0359/S-0369 Ver
:
Description:

Client Name: Undefined
Client Contact:

Tracer

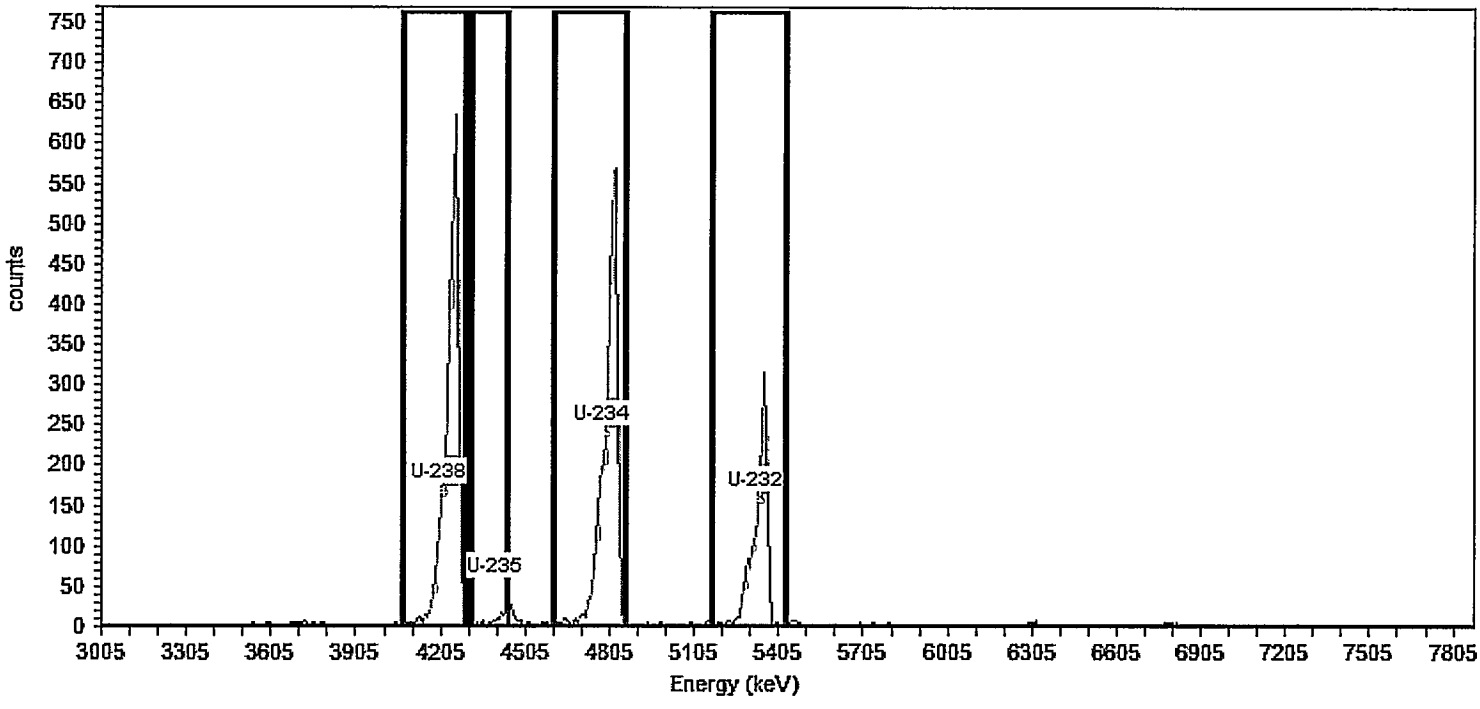
Tracer Name: Undefined
Tracer Activity:
Tracer Ref. Date:

Tracer Nuclide: External Recovery
Tracer Recovery: 100.00%

Acquisition

Detector: 17166652 - E8, SN: 5702209, ID: 16
Acquisition Start Date: 7/27/2022 2:42:07PM
Live Time: 720.00 min.
Real Time: 720.00 min.
Background Date: 7/15/2022 2:23:11PM
Bkgd Info: Sample: E8; Det: 17166652 - E8; Spectrum #1; 7/15/2022 2:23:11 PM; Live Time: 1440.000(min.); ID: 16

Energy Calibration: E8 CALIB 5-20-21
Efficiency Calibration:E8 CALIB 5-20-21
Calibration Date: 5/21/2021 7:30:06AM
Energy Cal: Gain = 9.8234 keV / Ch
Offset = 2,995.64 keV
Quadratic = -0.0005 keV / Ch^2
Efficiency: 25.83% +/- 1.06% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = U
Decay Correction:7/27/2022 2:40:31PM
MDA Constants: Kα = 1.64 , Kβ = 1.64

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity DPM	1.00Sigma TPU DPM	Critical Level DPM	MDA DPM
U-238	4198.000	4071.000	4291.000	37.6	100.0	3,047.40	13.0175	3034.39	1.632E+001	4.470E-001	3.909E-002	9.274E-002
U-235	4398.000	4317.000	4436.000	0.0	80.9	60.46	2.0336	58.42	3.884E-001	5.272E-002	1.910E-002	5.619E-002
U-234	4774.000	4598.000	4867.000	43.4	100.0	2,993.64	13.5162	2980.13	1.602E+001	4.406E-001	3.982E-002	9.418E-002
U-232	5322.000	5174.000	5433.000	35.8	99.8	1,471.51	15.6126	1455.90	7.845E+000	2.621E-001	4.290E-002	1.004E-001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

75188-526

U-232 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 23236.

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

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

ISOTOPE:	U-232
ACTIVITY (Bq):	4.512 E3
HALF-LIFE:	68.9 years
CALIBRATION DATE:	May 15, 2007 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	5.0%

Impurities: γ-impurities <0.1%
U-233 <0.3%
Am-241 <0.15%

5.42103 grams 1M HNO_3 solution.

PO NUMBER 07-0329, Item 3

SOURCE PREPARED BY: M Taskaeva
M. I. Taskaeva, Radiochemist

Q A APPROVED: 5-17-07

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
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COPY

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62919A-526

Mixed Alpha Source on Stainless Steel Disk

This standard radionuclide source was prepared by electro-deposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: January 18, 2002 12:00 EST

Total Activity: 482.5 dpm
Expanded Uncertainty (dpm [k=3]): 16.0

ISOTOPE:	U-238	U-234	Pu-239	Am-241
ACTIVITY (DPM):	120.9	117.5	119.7	119.3
HALF-LIFE:	4.468 E9 y	2.455 E5 y	2.41 E4 y	4.322 E2 y
EXPANDED UNCERTAINTY DPM (k=3):	5.2	5.1	5.2	5.2
ENERGY RANGE (keV):	3900-4290	4640-4980	4950-5260	5260-5590

Impurities: U-235 <4.7 dpm.
Disk diameter: 19.3 mm; disk thickness: 0.75 mm; diameter of active area: 16 mm.

P O Number: 01-0192, Item 2

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: [redacted] 1/23/02

ANALYTICS

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Atlanta, Georgia 30318 • U.S.A.

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70719-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 507
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	122	2.455 E5 y	4	4580-4860
Pu-239	127	2.41 E4 y	4	4950-5240
Am-241	127	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈5.3 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: [redacted] 05-19-2005

ANALYTICS

1380 Seaboard Industrial Blvd
Atlanta, Georgia 30318 • U.S.A

Phone (404) 352-8677
Fax (404) 352-2837

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70720-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 509
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	123	2.455 E5 y	4	4580-4860
Pu-239	128	2.41 E4 y	4	4950-5240
Am-241	127	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈4.9 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: [redacted], Radiochemist

Q A APPROVED: [redacted] 05-19-2005

ANALYTICS

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Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
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COPY

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70721-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 509
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	125	2.455 E5 y	4	4580-4860
Pu-239	127	2.41 E4 y	4	4950-5240
Am-241	125	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈5.0 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: [redacted] Radiochemist

Q A APPROVED: 05-19-2005

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Gamma Spec - Raw Data

Analysis Batch ID **ARS1-B22-01012**

Procedure	PALA-RAD-007	Analysis	GAM-A-AF	Prep	N/A
Description	Gamma Spec (Short) in (Air Filters, Smears [AF])				

ABatch Sample ID	Type	Blinds	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01012-01	LCS	76927-526					76927-526 - GAMMA GEOMETRY: 47 mm Air Filter			
ARS1-B22-01012-02	LCSD	76927-526					76927-526 - GAMMA GEOMETRY: 47 mm Air Filter			
ARS1-B22-01012-03	MBL									
ARS1-B22-01012-04	TRG		**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-05	TRG		**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-06	TRG		**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-07	TRG		**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-08	TRG		**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-09	TRG		**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-10	TRG		**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/14/22
ARS1-B22-01012-11	DUP		Parent: ARS1-22-01492-007							

LCS Report
Analytical Batch: ARS1-B22-01012

ABatch Sample ID	Isotope	Source ID	Ref Date	Ref ACT dpm	Expected Value CT	Mid Point Count Date	User ID	Mod Date
ARS1-B22-01012-01	Am-241	76927-526	01/01/2008	73403.9	33064.81982	07/28/2022	[redacted]	07/22/2022
ARS1-B22-01012-02	Am-241	76927-526	01/01/2008	73403.9	33064.81982	07/28/2022		07/22/2022
ARS1-B22-01012-01	Co-60	76927-526	01/01/2008	46460.08	20927.96396	07/28/2022		07/22/2022
ARS1-B22-01012-02	Co-60	76927-526	01/01/2008	46460.08	20927.96396	07/28/2022		07/22/2022
ARS1-B22-01012-01	Cs-137	76927-526	01/01/2008	28850.76	12995.83784	07/28/2022		07/22/2022
ARS1-B22-01012-02	Cs-137	76927-526	01/01/2008	28850.76	12995.83784	07/28/2022		07/22/2022

Calculation Report
ARS1-B22-01012

ARS Aleut Analytical

Analytical Batch ID ARS1-B22-01012
Analysis Code GAM-A-AF
Procedure No PALA-RAD-007
Matrix Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01012-01	LCS					Am-241	32454.00000	1285.50000	2519.58000	79.13000	39.56500	125.27000	245.52920		pCi/mL
ARS1-B22-01012-01	LCS					Co-60	20902.00000	648.59000	1271.23640	414.30000	207.15000	460.45000	902.48200		pCi/mL
ARS1-B22-01012-01	LCS					Cs-137	13111.00000	356.39000	698.52440	75.00000	37.50000	124.84000	244.68640		pCi/mL
ARS1-B22-01012-02	LCSD					Am-241	31496.00000	1248.30000	2446.66800	120.50000	60.25000	129.29000	253.40840		pCi/mL
ARS1-B22-01012-02	LCSD					Co-60	21537.00000	662.28000	1298.06880	391.90000	195.95000	465.94000	913.24240		pCi/mL
ARS1-B22-01012-02	LCSD					Cs-137	13147.00000	357.57000	700.83720	76.41000	38.20500	125.75000	246.47000		pCi/mL
ARS1-B22-01012-03	MBL					Co-60	0.55013	0.82648	1.61990	1.66000	0.83000	0.82643	1.61980		pCi/mL
ARS1-B22-01012-03	MBL					Cs-137	-0.82575	0.79230	1.55290	1.73000	0.86500	0.79199	1.55230		pCi/mL
ARS1-B22-01012-03	MBL					Ra-226	-80.23600	12.38112	24.26700	31.60000	15.80000	12.18776	23.88800		pCi/mL
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	FB-070722	1	Co-60	-2.93480E-7	8.74388E-7	1.71380E-6	1.76100E-6	8.80500E-7	8.74337E-7	1.71370E-6		uCi/sample
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	FB-070722	1	Cs-137	7.08940E-7	6.78469E-7	1.32980E-6	1.48600E-6	7.43000E-7	6.78265E-7	1.32940E-6		uCi/sample
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	FB-070722	1	Ra-226	-8.46920E-5	1.61255E-5	3.16060E-5	3.11100E-5	1.55550E-5	1.59607E-5	3.12830E-5		uCi/sample
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Co-60	-3.92330E-7	4.66638E-7	9.14610E-7	9.32200E-7	4.66100E-7	4.66556E-7	9.14450E-7		uCi/sample
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Cs-137	-1.03770E-7	3.43388E-7	6.73040E-7	7.32300E-7	3.66150E-7	3.43378E-7	6.73020E-7		uCi/sample
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Ra-226	2.07770E-6	3.67719E-6	7.20730E-6	9.11000E-6	4.55500E-6	3.67668E-6	7.20630E-6		uCi/sample
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Co-60	8.09660E-7	6.83776E-7	1.34020E-6	1.36800E-6	6.84000E-7	6.83520E-7	1.33970E-6		uCi/sample
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Cs-137	-3.85180E-7	5.73776E-7	1.12460E-6	1.87900E-6	9.39500E-7	5.73673E-7	1.12440E-6		uCi/sample
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Ra-226	-9.02060E-5	1.60582E-5	3.14740E-5	3.09500E-5	1.54750E-5	1.58699E-5	3.11050E-5		uCi/sample
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Co-60	1.84540E-7	4.54429E-7	8.90680E-7	9.78800E-7	4.89400E-7	4.54403E-7	8.90630E-7		uCi/sample
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Cs-137	7.09970E-7	2.77944E-7	5.44770E-7	7.21400E-7	3.60700E-7	2.77005E-7	5.42930E-7		uCi/sample
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Ra-226	-1.25050E-5	7.56939E-6	1.48360E-5	1.55200E-5	7.76000E-6	7.51276E-6	1.47250E-5		uCi/sample
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Co-60	1.23470E-7	4.13602E-7	8.10660E-7	8.36100E-7	4.18050E-7	4.13592E-7	8.10640E-7		uCi/sample
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Cs-137	6.38420E-8	3.21082E-7	6.29320E-7	6.86900E-7	3.43450E-7	3.21077E-7	6.29310E-7		uCi/sample
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Ra-226	-4.00370E-6	3.97852E-6	7.79790E-6	9.80400E-6	4.90200E-6	3.97673E-6	7.79440E-6		uCi/sample
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Co-60	-3.83830E-7	5.11173E-7	1.00190E-6	1.09100E-6	5.45500E-7	5.11071E-7	1.00170E-6		uCi/sample
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Cs-137	3.86540E-7	3.68362E-7	7.21990E-7	8.38400E-7	4.19200E-7	3.68153E-7	7.21580E-7		uCi/sample
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Ra-226	-9.25050E-6	7.59949E-6	1.48950E-5	1.56300E-5	7.81500E-6	7.56888E-6	1.48350E-5		uCi/sample
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Co-60	-1.84110E-7	4.93413E-7	9.67090E-7	1.06000E-6	5.30000E-7	4.93393E-7	9.67050E-7		uCi/sample
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Cs-137	9.32920E-9	4.01709E-7	7.87350E-7	9.25500E-7	4.62750E-7	4.01709E-7	7.87350E-7		uCi/sample
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Ra-226	-9.33490E-6	7.37296E-6	1.44510E-5	1.49600E-5	7.48000E-6	7.34082E-6	1.43880E-5		uCi/sample
ARS1-B22-01012-11	DUP					Co-60	-2.04430E-7	4.21383E-7	8.25910E-7	8.48800E-7	4.24400E-7	4.21357E-7	8.25860E-7		uCi/sample
ARS1-B22-01012-11	DUP					Cs-137	3.40380E-7	3.07015E-7	6.01750E-7	6.49500E-7	3.24750E-7	3.06888E-7	6.01500E-7		uCi/sample
ARS1-B22-01012-11	DUP					Ra-226	-3.83250E-6	4.01903E-6	7.87730E-6	9.90800E-6	4.95400E-6	4.01745E-6	7.87420E-6		uCi/sample

Calculated By: [redacted] on 9/1/2022 4:05:05 PM

Calculation Report
ARS1-B22-01012

ARS Aleut Analytical

Analytical Batch ID ARS1-B22-01012
Analysis Code GAM-A-AF
Procedure No PALA-RAD-007
Matrix Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Detector ID	Library	Geometry	Nuclide Energy (keV)	Peak Energy (keV)	FWHM	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01012-01	LCS			ARS06 MCB	LCS Fission.Lib	117495 47mm AF					7/28/2022	7/28/2022
ARS1-B22-01012-01	LCS			ARS06 MCB	LCS Fission.Lib	117495 47mm AF					7/28/2022	7/28/2022
ARS1-B22-01012-01	LCS			ARS06 MCB	LCS Fission.Lib	117495 47mm AF					7/28/2022	7/28/2022
ARS1-B22-01012-02	LCSD			ARS06 MCB	LCS Fission.Lib	117495 47mm AF					7/28/2022	7/28/2022
ARS1-B22-01012-02	LCSD			ARS06 MCB	LCS Fission.Lib	117495 47mm AF					7/28/2022	7/28/2022
ARS1-B22-01012-02	LCSD			ARS06 MCB	LCS Fission.Lib	117495 47mm AF					7/28/2022	7/28/2022
ARS1-B22-01012-03	MBL			(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/30/2022	7/30/2022
ARS1-B22-01012-03	MBL			(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/30/2022	7/30/2022
ARS1-B22-01012-03	MBL			(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/30/2022	7/30/2022
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/7/2022	7/28/2022
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/7/2022	7/28/2022
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/7/2022	7/28/2022
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/8/2022	7/28/2022
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/8/2022	7/28/2022
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/8/2022	7/28/2022
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/8/2022	7/29/2022
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/8/2022	7/29/2022
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	(ARS02) MC	ITSI COUNT.Lib	47 AF 117495					7/8/2022	7/29/2022
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/8/2022	7/29/2022
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/8/2022	7/29/2022
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/8/2022	7/29/2022
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/15/2022	7/29/2022
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/15/2022	7/29/2022
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/15/2022	7/29/2022
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/15/2022	7/30/2022
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/15/2022	7/30/2022
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/15/2022	7/30/2022
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/15/2022	7/28/2022
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/15/2022	7/28/2022
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	(ARS03) MC	ITSI COUNT.Lib	47mm AF 117495					7/15/2022	7/28/2022
ARS1-B22-01012-11	DUP			ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/30/2022	7/30/2022
ARS1-B22-01012-11	DUP			ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/30/2022	7/30/2022
ARS1-B22-01012-11	DUP			ARS06 MCB	ITSI COUNT.Lib	117495 47mm AF					7/30/2022	7/30/2022

Calculated By: [redacted] on 9/1/2022 4:05:05 PM

Calculation Report
ARS1-B22-01012

Analytical Batch ID	**ARS1-B22-01012**
Analysis Code	**GAM-A-AF**
Procedure No	**PALA-RAD-007**
Matrix	**Air Filter**

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01012-01	LCS				33064.81982	98.2%			
ARS1-B22-01012-01	LCS				20927.96396	99.9%			
ARS1-B22-01012-01	LCS				12995.83784	100.9%			
ARS1-B22-01012-02	LCSD				33064.81982	95.3%	3.0%	0.37809	0.53464
ARS1-B22-01012-02	LCSD				20927.96396	102.9%	3.0%	0.48441	0.68502
ARS1-B22-01012-02	LCSD				12995.83784	101.2%	0.3%	0.05042	0.07131
ARS1-B22-01012-03	MBL			U					
ARS1-B22-01012-03	MBL			U					
ARS1-B22-01012-03	MBL			U					
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01012-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01012-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01012-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01012-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01012-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01012-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	U					
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	U					
ARS1-B22-01012-10	TRG	ARS1-22-01492	007	U					
ARS1-B22-01012-11	DUP			U				0.02221	0.03132
ARS1-B22-01012-11	DUP			U				0.46711	0.65477
ARS1-B22-01012-11	DUP			U				0.48301	0.65527

Calculated By [redacted] on 9/1/2022 4:05:05 PM

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	ARS1-B22-01012-01		
Analytical Batch	ARS1-B22-01012	Analysis Date	7/28/2022 13:58
Analysis Code	GAM-A-AF	SDG	
Detector	ARS06 MCB 133	Fraction	
Library	LCS Fission.Lib	Run	
Geometry	117495 47mm AF		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	3.2454E+004	pCi/mL	1.2855E+003	7.9130E+001	3.9565E+001
Co-60	2.0902E+004	pCi/mL	6.4859E+002	4.1430E+002	2.0715E+002
Cs-137	1.3111E+004	pCi/mL	3.5639E+002	7.5000E+001	3.7500E+001

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:08:27 PM
AAA Spectrum name: ARS06295.An1

Sample description
Batch ID: 22-01012-01
SDG ID: 76927-526 Tech: [redacted]

Spectrum Filename: C:\User\ARS06295.An1

Acquisition information
Start time: 7/28/2022 1:58:00 PM
Live time: 600
Real time: 619
Dead time: 3.13 %
Detector ID: 21

Detector system
ARS06 MCB 133

Calibration
Filename: 117495 47mm AF calib 7-3-21 .Clb
117495 47mm AF
EEC 7-3-21

Energy Calibration
Created: 7/3/2021 9:44:58 AM
Zero offset: 0.085 keV
Gain: 0.250 keV/channel
Quadratic: -3.365E-08 keV/channel^2

Efficiency Calibration
Created: 7/3/2021 3:18:09 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.77 %
Log(Eff): -2.894388E+00 + (1.055530E+00*Log(E)) +
(-1.582298E-01*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.99 %
Log(Eff): -7.116829E+00 + (2.826979E+00*Log(E)) +
(-3.434918E-01*Log(E)^2)

Library Files
Main analysis library: LCS Fission.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 115 (28.84keV)
Stop channel: 8000 (1997.96keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:08:27 PM
AAA Spectrum name: ARS06295.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2008 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	LCS.LCSD.Pbc 7/2/2022 12:06:34 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1113

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/mL	Nuc
32.17	3316.	3.33	1.02	2.363E-01				
36.62	1533.	5.08	0.91	2.488E-01				
40.56	775.	9.88	0.92	2.570E-01				
43.46	850.	9.94	0.92	2.617E-01				
46.65	70114.	0.39	0.93	2.656E-01				
49.77	740.	9.93	0.93	2.685E-01				
56.27	234.	26.80	0.94	2.718E-01				
59.62	69594.	0.39	0.94	2.724E-01	59.54	36.300	3.245E+04	AM241
73.48	233.	15.93	0.96	2.694E-01				
77.14	340.	12.25	0.96	2.676E-01				
80.20	99.	37.63	0.97	2.658E-01				
661.82	11768.	0.95	1.57	6.630E-02	661.66	85.210	1.311E+04	CS137
1173.54	2422.	2.20	2.21	3.551E-02	1173.24	99.900	2.090E+04	CO60
1288.66	27.	24.24	0.54	3.174E-02				
1332.79	2238.	2.17	1.97	3.047E-02	1332.50	99.982	2.248E+04	CO60

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:08:27 PM
AAA Spectrum name: ARS06295.An1

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
128.32	32.16	3068.	3316.	1.403E+04	3.33	1.019	-	
146.15	36.62	2274.	1533.	6.164E+03	5.08	0.914	-	sD
161.89	40.55	2542.	775.	3.014E+03	9.88	0.919	-	sD
173.50	43.45	3145.	850.	3.249E+03	9.94	0.922	-	sD
186.25	46.64	2037.	70114.	2.640E+05	0.39	0.926	-	D
198.72	49.76	2333.	740.	2.758E+03	9.93	0.930	-	sD
225.00	56.25	1844.	245.	9.015E+02	25.59	0.939	-	sD
293.59	73.39	570.	233.	8.636E+02	15.93	0.960	-	D
308.24	77.06	695.	340.	1.270E+03	12.25	0.965	-	sD
320.46	80.11	648.	99.	3.734E+02	37.63	0.969	-	sD
5157.79	1288.66	3.	27.	8.381E+02	24.24	0.538	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: LCS Fission.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.82	59.54	1284.	69594.	115.990	0.39	0.943D
CS-137	2647.82	661.82	192.	11768.	19.613	0.95	1.574
CO-60	4696.71	1173.54	94.	2422.	4.037	2.20	2.209
CO-60	5334.56	1332.79	14.	2238.	3.730	2.17	1.968

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/mL	Peak Energy keV	Peak Activity pCi/mL	Code	MDA Value pCi/mL	COMMENTS
AM-241		3.2454E+04				1.58E+05	
			59.54	3.245E+04	(	7.913E+01	3.86E-01 3.63E+01 G

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:08:27 PM
AAA Spectrum name: ARS06295.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	1.3111E+04					1.10E+04	
		661.66	1.311E+04	(	7.500E+01	9.52E-01	8.52E+01 G
CO-60	2.0902E+04					1.93E+03	
		1173.24	2.090E+04	(	4.143E+02	2.20E+00	9.99E+01 G
		1332.50	2.248E+04	+	2.024E+02	2.17E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:08:27 PM
AAA Spectrum name: ARS06295.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/mL	Time Corrected Activity pCi/mL	Uncertainty 1 Sigma Counting pCi/mL	Total pCi/mL	MDA pCi/mL
AM-241	3.1704E+04	3.2454E+04	1.2527E+02	1.2855E+03	7.913E+01
CS-137	9.3814E+03	1.3111E+04	1.2484E+02	3.5639E+02	7.500E+01
CO-60	3.0761E+03	2.0902E+04	4.6045E+02	6.4859E+02	4.143E+02

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (28.8 to 1998.0 keV) 4.416E+04 pCi/mL
Total Decayed Activity (28.8 to 1998.0 keV) 6.6467594E+04 pCi/mL

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	ARS1-B22-01012-02				
Analytical Batch	ARS1-B22-01012	Analysis Date	7/28/2022 14:09		
Analysis Code	GAM-A-AF	SDG			
Detector	ARS06 MCB 133	Fraction			
Library	LCS Fission.Lib	Run			
Geometry	117495 47mm AF				

Isotope	Activity	Units	CSU	MDA	DL
Am-241	3.1496E+004	pCi/mL	1.2483E+003	1.2050E+002	6.0250E+001
Co-60	2.1537E+004	pCi/mL	6.6228E+002	3.9190E+002	1.9595E+002
Cs-137	1.3147E+004	pCi/mL	3.5757E+002	7.6410E+001	3.8205E+001

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:20:06 PM
AAA Spectrum name: ARS06296.An1

Sample description
Batch ID: 22-01012-02
SDG ID: 76927-526 Tech: [redacted]

Spectrum Filename: C:\User\ARS06296.An1

Acquisition information
Start time: 7/28/2022 2:09:40 PM
Live time: 600
Real time: 619
Dead time: 3.13 %
Detector ID: 21

Detector system
ARS06 MCB 133

Calibration
Filename: 117495 47mm AF calib 7-3-21 .Clb
117495 47mm AF
EEC 7-3-21

Energy Calibration
Created: 7/3/2021 9:44:58 AM
Zero offset: 0.085 keV
Gain: 0.250 keV/channel
Quadratic: -3.365E-08 keV/channel^2

Efficiency Calibration
Created: 7/3/2021 3:18:09 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.77 %
Log(Eff): -2.894388E+00 + (1.055530E+00*Log(E)) + (-1.582298E-01*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.99 %
Log(Eff): -7.116829E+00 + (2.826979E+00*Log(E)) + (-3.434918E-01*Log(E)^2)

Library Files
Main analysis library: LCS Fission.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 115 (28.84keV)
Stop channel: 8000 (1997.96keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) = 1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:20:06 PM
AAA Spectrum name: ARS06296.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2008 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	LCS.LCSD.Pbc 7/2/2022 12:06:34 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1030

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/mL	Nuc
32.19	3317.	3.16	0.91	2.363E-01				
36.61	1727.	4.42	0.91	2.487E-01				
40.54	722.	10.53	0.92	2.570E-01				
43.79	910.	8.99	0.92	2.621E-01				
46.65	70510.	0.39	0.93	2.656E-01				
49.69	631.	12.08	0.93	2.684E-01				
59.61	67540.	0.41	0.90	2.724E-01	59.54	36.300	3.150E+04	AM241
73.41	202.	20.48	0.96	2.694E-01				
77.14	370.	11.46	0.96	2.675E-01				
78.93	116.	35.51	0.97	2.665E-01				
80.53	137.	27.56	0.97	2.655E-01				
661.81	11800.	0.96	1.58	6.630E-02	661.66	85.210	1.315E+04	CS137
880.68	36.	39.40	0.27	4.918E-02				
889.33	34.	39.58	0.82	4.866E-02				
1092.96	53.	30.46	0.30	3.858E-02				
1123.77	38.	37.63	0.50	3.736E-02				
1173.53	2496.	2.16	2.11	3.550E-02	1173.24	99.900	2.154E+04	CO60
1332.62	2184.	2.21	2.33	3.047E-02	1332.50	99.982	2.193E+04	CO60

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:20:06 PM
AAA Spectrum name: ARS06296.An1

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
128.42	32.17	2740.	3317.	1.404E+04	3.16	0.907	-	s
146.08	36.60	2046.	1727.	6.942E+03	4.42	0.914	-	D
161.81	40.53	2526.	722.	2.809E+03	10.53	0.919	-	D
174.81	43.78	2887.	910.	3.470E+03	8.99	0.923	-	sD
186.24	46.64	2207.	70510.	2.655E+05	0.39	0.926	-	D
198.42	49.69	2593.	631.	2.352E+03	12.08	0.930	-	D
293.30	73.47	751.	202.	7.483E+02	20.48	0.960	-	sD
308.21	77.20	715.	370.	1.384E+03	11.46	0.965	-	D
315.39	78.99	796.	116.	4.368E+02	35.51	0.967	-	sD
321.77	80.59	643.	137.	5.154E+02	27.56	0.969	-	sD
3523.98	880.65	55.	36.	7.401E+02	39.40	0.268	-	s
3558.64	889.27	49.	34.	6.904E+02	39.58	0.816	-	s
4374.02	1092.97	57.	53.	1.369E+03	30.46	0.299	-	s
4497.38	1123.63	47.	38.	1.023E+03	37.63	0.496	-	s
5339.33	1333.91	1569.	706.	2.320E+04	8.78	2.198	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: LCS Fission.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.11	59.61	3009.	67540.	112.566	0.41	0.901
CS-137	2647.79	661.81	200.	11800.	19.667	0.96	1.584
CO-60	4696.68	1173.53	84.	2496.	4.160	2.16	2.113
CO-60	5333.40	1332.50	1021.	1531.	2.552	3.90	2.197D

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:20:06 PM
AAA Spectrum name: ARS06296.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/mL	Peak Energy keV	Peak Activity pCi/mL	Code	MDA Value pCi/mL			COMMENTS
AM-241		3.1496E+04				1.58E+05			
			59.54	3.150E+04	(	1.205E+02	4.11E-01	3.63E+01	G
CS-137		1.3147E+04				1.10E+04			
			661.66	1.315E+04	(	7.641E+01	9.56E-01	8.52E+01	G
CO-60		2.1537E+04				1.93E+03			
			1173.24	2.154E+04	(	3.919E+02	2.16E+00	9.99E+01	G
			1332.50	1.538E+04	-	1.523E+03	3.90E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

ORTEC g v - i (3263) Env32 G800W064 7/28/2022 2:20:06 PM
AAA Spectrum name: ARS06296.An1

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/mL	Time Corrected Activity pCi/mL	Uncertainty 1 Sigma Counting pCi/mL	Total pCi/mL	MDA pCi/mL
AM-241	3.0768E+04	3.1496E+04	1.2929E+02	1.2483E+03	1.205E+02
CS-137	9.4072E+03	1.3147E+04	1.2575E+02	3.5757E+02	7.641E+01
CO-60	3.1695E+03	2.1537E+04	4.6594E+02	6.6228E+02	3.919E+02

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (28.8 to 1998.0 keV) 4.335E+04 pCi/mL
Total Decayed Activity (28.8 to 1998.0 keV) 6.6180047E+04 pCi/mL

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	ARS1-B22-01012-03		
Analytical Batch	ARS1-B22-01012	Analysis Date	7/30/2022 11:24
Analysis Code	GAM-A-AF	SDG	
Detector	(ARS02) MCB 131	Fraction	
Library	ITSI COUNT.Lib	Run	
Geometry	47 AF 117495		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	4.8756E-001	pCi/mL	1.2735E+000	2.1100E+000	1.0550E+000
Bi-212	-4.1538E+000	pCi/mL	1.1996E+001	1.2700E+001	6.3500E+000
Bi-214	-5.8267E+000	pCi/mL	4.0276E+000	4.1000E+000	2.0500E+000
Co-60	5.5013E-001	pCi/mL	1.6199E+000	1.6600E+000	8.3000E-001
Cs-137	-8.2575E-001	pCi/mL	1.5529E+000	1.7300E+000	8.6500E-001
Eu-152	-2.1142E-001	pCi/mL	1.3225E+000	1.7600E+000	8.8000E-001
Eu-154	-5.3213E-001	pCi/mL	1.0704E+000	1.4100E+000	7.0500E-001
K-40	-1.2264E+001	pCi/mL	2.2555E+001	2.3200E+001	1.1600E+001
Pa-234	7.6819E-001	pCi/mL	1.6208E+000	2.1400E+000	1.0700E+000
Pb-210	3.9616E+000	pCi/mL	1.5151E+001	1.6500E+001	8.2500E+000
Pb-212	-1.8330E+000	pCi/mL	2.2989E+000	2.4400E+000	1.2200E+000
Pb-214	-3.0421E+000	pCi/mL	3.3005E+000	3.3400E+000	1.6700E+000
Ra-226	-8.0236E+001	pCi/mL	2.4267E+001	3.1600E+001	1.5800E+001
Ra-228	6.9260E+000	pCi/mL	3.0958E+000	3.8100E+000	1.9050E+000
Tl-208	6.5714E-001	pCi/mL	1.5055E+000	1.5200E+000	7.6000E-001
U-235	2.7957E+000	pCi/mL	5.3721E+000	6.0500E+000	3.0250E+000
U-238	-8.0845E+000	pCi/mL	1.5670E+001	1.7000E+001	8.5000E+000

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

Sample description
Batch ID: 22-01012-03
SDG ID: MBL Tech: [redacted]

Spectrum Filename: C:\User\ARS02502.An1

Acquisition information
Start time: 7/30/2022 11:24:46 AM
Live time: 60000
Real time: 60170
Dead time: 0.28 %
Detector ID: 19

Detector system
(ARS02) MCB 131

Calibration
Filename: 47 AF 117495 calib 1-5-21.Clb
47 AF 117495
1-5-21 EEC

Energy Calibration
Created: 1/5/2021 11:19:08 AM
Zero offset: 0.367 keV
Gain: 0.250 keV/channel
Quadratic: -3.175E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2021 12:08:57 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -4.127091E-01 + (-4.601949E-02*Log(E)) +
(-6.502150E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.92 %
Log(Eff): -5.121235E+00 + (1.633498E+00*Log(E)) +
(-2.099107E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 120 (30.37keV)
Stop channel: 8000 (1998.42keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:22:34 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1009

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/mL	Nuc
46.64	1030.	5.24	0.80	1.432E-01	46.52	4.000	PBC<MDA	PB210
63.34	739.	6.89	0.94	1.413E-01	63.29	3.900	PBC<MDA	U238
74.98	132.	29.65	0.99	1.379E-01				
84.38	169.	22.23	0.92	1.346E-01				
87.26	102.	35.04	0.93	1.336E-01				
92.66	1042.	5.57	1.13	1.315E-01	92.38	2.570	7.013E+01	U238
					92.80	3.000	5.777E+01	U238
143.55	147.	26.68	0.61	1.059E-01	143.76	10.500	PBC<MDA	U235
185.55	583.	9.23	0.83	8.832E-02	186.21	3.640	PBC<MDA	RA226
238.38	303.	13.87	1.04	7.330E-02	238.63	43.100	PBC<MDA	PB212
351.64	183.	20.41	1.17	5.407E-02	351.92	35.800	PBC<MDA	PB214
510.93	1882.	3.88	2.50	3.962E-02	510.72	22.500	PBC<MDA	TL208
569.52	64.	39.46	0.47	3.608E-02	569.26	10.400	PBC<MDA	PA234
582.96	184.	18.75	0.84	3.534E-02	583.14	86.000	PBC<MDA	TL208
609.47	164.	18.29	1.32	3.400E-02	609.31	44.791	PBC<MDA	BI214
726.95	79.	34.60	1.83	2.904E-02	727.17	11.800	PBC<MDA	BI212
757.79	62.	30.56	1.61	2.798E-02	756.70	4.100	2.447E+01	EU154
763.13	54.	34.80	1.61	2.780E-02	763.30	1.700	5.167E+01	TL208
898.98	67.	31.06	1.61	2.391E-02	898.60	4.000	PBC<MDA	PA234
911.25	105.	22.10	1.95	2.361E-02	911.07	29.000	6.926E+00	Ra228
969.81	84.	35.09	1.23	2.229E-02	968.90	17.460	9.675E+00	Ra228
1460.87	174.	13.78	1.84	1.499E-02	1460.75	10.700	PBC<MDA	K40

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1731.31	36.	30.35	0.29	1.264E-02				
1764.51	117.	19.39	1.14	1.239E-02	1764.49	15.357	2.778E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
185.08	46.63	752.	1030.	7.358E+03	10.48	0.802	PB-210	l
251.87	63.32	771.	739.	5.250E+03	13.78	0.942	TH-234	l
298.46	74.87	669.	132.	9.586E+02	59.30	0.988	TH-234	
336.04	84.30	622.	169.	1.256E+03	44.45	0.923	HG-203	sD
347.56	87.17	582.	102.	7.605E+02	70.07	0.926	PB-212	sD
369.16	92.68	860.	1042.	8.287E+03	11.14	1.132	TH-234	l
740.78	185.47	798.	583.	6.601E+03	18.47	0.834	U-235	sM
952.15	238.50	585.	303.	3.540E+03	27.73	1.035	PB-212	l
1405.27	351.68	434.	183.	3.674E+03	40.82	1.169	PB-214	l
2042.72	510.95	649.	1882.	4.750E+04	7.75	2.503	NA-22	M
2277.17	569.33	219.	64.	1.768E+03	78.91	0.468	CS-134	s
2907.28	727.17	194.	79.	3.856E+03	69.20	1.828	TE-131	l
3052.10	763.19	151.	54.	2.938E+03	69.60	1.610	TL-208	lD
3595.94	899.20	122.	67.	2.803E+03	62.12	1.612	K-42	
5846.10	1460.85	82.	174.	1.283E+04	27.56	1.838	K-40	l
6929.60	1731.20	31.	36.	2.880E+03	60.71	0.286	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
RA-226	743.41	186.21	2274.	-571.	-0.010	29.77	1.031
TL-208	2041.86	510.72	4725.	-2105.	-0.035	14.95	2.615
BI-214	2436.43	609.31	849.	-197.	-0.003	68.79	1.462
Ra-228	3645.07	911.25	141.	105.	0.002	44.20	1.952

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/mL	Peak Energy keV	Peak Activity pCi/mL	Code	MDA Value pCi/mL		COMMENTS
U-235		2.7957E+00				1.39E+09		
			143.76	2.796E+00 %	(P	6.053E+00	9.60E+01	1.05E+01 G
			205.31	1.282E+01 %		1.582E+01	4.95E+01	4.70E+00 G
			163.35	2.146E+00 %		1.469E+01	2.71E+02	4.70E+00 G
RA-226		-8.0236E+01				5.84E+05		
			186.21	-8.024E+01	(P	3.161E+01	1.49E+01	3.64E+00 G K
Ra-228		6.9260E+00				2.10E+03		
			911.07	6.926E+00	(	3.814E+00	2.21E+01	2.90E+01 G
			968.90	4.757E+00 %		8.680E+00	8.72E+01	1.75E+01 G
			338.40	-3.093E+00 %		8.843E+00	1.19E+02	1.20E+01 G
			964.60	4.921E-01 %		3.186E+01	3.06E+03	5.45E+00 G
Am-241	T	4.8756E-01				1.58E+05		
			59.54	4.876E-01 %(		2.110E+00	1.31E+02	3.59E+01 G K
PB-210		3.9616E+00				7.45E+03		
			46.52	3.962E+00 %(P		1.651E+01	1.91E+02	4.00E+00 G
U-238		-8.0845E+00				1.63E+12		
			63.29	-8.085E+00 %(P		1.703E+01	9.68E+01	3.90E+00 G
			92.80	-1.600E-01 } P		2.439E+01	6.89E+03	3.00E+00 G
			92.38	3.340E+00 } P		2.928E+01	2.27E+02	2.57E+00 G
K-40		-1.2264E+01				4.68E+11		
			1460.75	-1.226E+01 %(P		2.319E+01	9.19E+01	1.07E+01 G
PB-214		-3.0421E+00				5.84E+05		
			351.92	-3.042E+00 %(P		3.344E+00	5.41E+01	3.58E+01 G
			295.21	-3.881E+00 % P		5.636E+00	7.48E+01	1.85E+01 G
			241.98	-4.774E+00 %		1.305E+01	1.09E+02	7.50E+00 G
BI-214		-5.8267E+00				5.84E+05		
			609.31	-5.827E+00	(P	4.096E+00	3.44E+01	4.48E+01 G
			1764.49	7.866E+00 %		1.167E+01	7.86E+01	1.54E+01 G
			1120.29	-2.213E+01 % P		1.497E+01	5.59E+01	1.48E+01 G
			1238.11	-8.356E+00 % P		3.091E+01	1.90E+02	5.86E+00 G
			768.36	1.382E+01 %		2.813E+01	9.10E+01	4.80E+00 G
			1377.67	2.305E+01 %		3.701E+01	8.08E+01	3.92E+00 G
			934.06	9.024E+00 %		4.690E+01	2.38E+02	3.03E+00 G

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	-4.1538E+00					2.10E+03	
		727.17	-4.154E+00	%(P	1.271E+01	1.44E+02	1.18E+01 G
		1620.56	6.648E+01	%	5.259E+01	4.18E+01	2.75E+00 G
		785.42	-9.592E+01	% P	8.321E+01	4.47E+01	2.00E+00 G
PB-212	-1.8330E+00					2.10E+03	
		238.63	-1.833E+00	%(P	2.440E+00	6.26E+01	4.31E+01 G
		300.09	4.333E-01	&	2.988E+01	2.84E+03	3.27E+00 G
TL-208	6.5714E-01					2.10E+03	
		583.14	6.571E-01	%(P	1.518E+00	1.14E+02	8.60E+01 G
		510.72	-1.063E+02	+ P	1.632E+01	7.48E+00	2.25E+01 G
		860.47	-4.824E+00	%	1.362E+01	1.30E+02	1.20E+01 G
		277.36	1.097E+00	%	1.365E+01	4.90E+02	6.50E+00 G
		763.30	-5.719E+00	&	8.205E+01	6.34E+02	1.70E+00 G
PA-234	7.6819E-01					1.65E+12	
						Energy duplication	
		98.44	7.682E-01	%(	2.141E+00	1.05E+02	2.51E+01 G
		946.00	3.568E+00	%	6.427E+00	8.31E+01	2.00E+01 G
		131.28	-1.149E+00	&	2.942E+00	9.69E+01	2.00E+01 G
		94.67	-2.165E+00	%	6.673E+00	1.17E+02	1.55E+01 G
		883.24	6.346E+00	&	1.191E+01	8.68E+01	1.20E+01 G
		926.70	3.700E+00	%	1.194E+01	1.48E+02	1.10E+01 G
		569.26	-1.614E+01	% P	1.372E+01	1.21E+02	1.04E+01 G
		111.00	2.216E+00	%	6.056E+00	1.03E+02	8.55E+00 G
		733.00	-1.826E+01	& P	1.765E+01	5.49E+01	8.50E+00 G
		949.00	-1.115E+01	%	2.249E+01	9.35E+01	7.80E+00 G
		880.51	-5.686E+00	%	2.428E+01	1.96E+02	6.50E+00 G
		226.87	3.247E+00	&	1.249E+01	1.52E+02	6.50E+00 G
		831.10	-7.404E+00	%	2.683E+01	1.67E+02	5.60E+00 G
		808.10	8.362E+00	%	2.821E+01	1.55E+02	4.90E+00 G
		99.70	-1.390E+00	&	1.083E+01	2.93E+02	4.70E+00 G
		699.10	-1.823E+01	%	3.493E+01	8.61E+01	4.60E+00 G
		898.60	-6.136E+01	% P	4.501E+01	5.28E+01	4.00E+00 G
		1394.10	2.423E+01	&	3.860E+01	8.02E+01	3.90E+00 G
CS-137	-8.2575E-01					1.10E+04	
		661.66	-8.257E-01	%(	1.731E+00	9.40E+01	8.52E+01 G
CO-60	5.5013E-01					1.93E+03	
		1173.24	5.501E-01	&(	1.659E+00	1.47E+02	9.99E+01 K
		1332.50	-3.660E-02	&	1.689E+00	2.29E+03	1.00E+02 K
EU-152	-2.1142E-01					4.64E+03	
		40.12	-2.114E-01	%(	1.755E+00	3.13E+02	3.00E+01 G
		121.78	1.214E-01	&	1.823E+00	5.64E+02	2.92E+01 G
		344.30	-1.092E+00	%	3.746E+00	1.42E+02	2.70E+01 G

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1408.08	3.006E+00 %		8.322E+00	1.39E+02	2.12E+01 G
		39.52	-3.043E-01 &		3.249E+00	4.02E+02	1.60E+01 G
		964.00	-1.747E+00 %		1.178E+01	3.20E+02	1.46E+01 G
		1112.07	2.261E-01 &		1.215E+01	2.52E+03	1.36E+01 G
		778.90	2.711E+00 &		9.850E+00	1.67E+02	1.30E+01 G
		1085.80	1.677E+00 %		1.491E+01	4.18E+02	1.03E+01 G
		45.40	-1.919E+00 %		8.180E+00	1.29E+02	9.00E+00 G
		244.67	4.628E+00 &		1.147E+01	9.85E+01	7.62E+00 G
		867.39	1.309E+00 %		3.906E+01	1.37E+03	4.18E+00 G
EU-154	-5.3213E-01					3.10E+03	
		123.10	-5.321E-01 &(		1.414E+00	1.00E+02	4.05E+01 G
		1274.80	-1.283E+00 %		5.059E+00	1.92E+02	3.55E+01 G
		723.30	-3.761E+00 %		9.380E+00	7.54E+01	1.97E+01 G
		1004.80	-5.572E+00 %		9.718E+00	8.35E+01	1.76E+01 G
		43.00	9.265E-01 &		6.083E+00	1.98E+02	1.31E+01 G
		873.20	-1.947E+00 %		1.259E+01	2.96E+02	1.13E+01 G
		996.30	-9.543E+00 &		1.669E+01	8.38E+01	1.07E+01 G
		42.31	2.324E+00 %		1.099E+01	1.43E+02	7.30E+00 G
		248.04	-5.715E+00 %		1.405E+01	9.77E+01	6.60E+00 G
		591.70	-3.649E+00 %		2.571E+01	3.01E+02	4.60E+00 G
		48.70	-7.348E+00 %		2.311E+01	1.19E+02	4.20E+00 G
		756.70	-1.778E+01 &		3.554E+01	8.95E+01	4.10E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

ORTEC g v - i (3263) Env32 G800W064 7/31/2022 4:07:47 AM
AAA Spectrum name: ARS02502.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity	
RA-226	186.21	2274.	-571.	-0.010	29.77	-8.024E+01	P
TL-208	510.72	4725.	-2105.	-0.035	14.95	-1.063E+02	P
BI-214	609.31	849.	-197.	-0.003	68.79	-5.827E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/mL	Uncertainty 2 Sigma Counting pCi/mL	Total pCi/mL	MDA pCi/mL
U-235	A	2.7957E+00	5.3683E+00	5.3721E+00	0.605E+01
RA-226	#A	-8.0236E+01	2.3888E+01	2.4267E+01	0.316E+02
Ra-228		6.9260E+00	3.0610E+00	3.0958E+00	0.381E+01
Am-241	#B	4.8756E-01	1.2731E+00	1.2735E+00	0.211E+01
PB-210	A	3.9616E+00	1.5145E+01	1.5151E+01	0.165E+02
U-238	#A	-8.0845E+00	1.5656E+01	1.5670E+01	0.170E+02
K-40	#A	-1.2264E+01	2.2538E+01	2.2555E+01	0.232E+02
PB-214	#A	-3.0421E+00	3.2896E+00	3.3005E+00	0.334E+01
BI-214	#A	-5.8267E+00	4.0082E+00	4.0276E+00	0.410E+01
BI-212	#A	-4.1538E+00	1.1992E+01	1.1996E+01	0.127E+02
PB-212	#A	-1.8330E+00	2.2957E+00	2.2989E+00	0.244E+01
TL-208	A	6.5714E-01	1.5048E+00	1.5055E+00	0.152E+01
PA-234	#A	7.6819E-01	1.6197E+00	1.6208E+00	0.214E+01
CS-137	#A	-8.2575E-01	1.5523E+00	1.5529E+00	0.173E+01
CO-60	#B	5.5013E-01	1.6198E+00	1.6199E+00	0.166E+01
EU-152	#A	-2.1142E-01	1.3221E+00	1.3225E+00	0.176E+01
EU-154	#A	-5.3213E-01	1.0696E+00	1.0704E+00	0.141E+01

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (30.4 to 1998.4 keV) 6.926E+00 pCi/mL

The library has energies which are not separable.

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-04**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/28/2022 14:00
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	(ARS02) MCB 131	**Fraction**	001
Library	ITSI COUNT.Lib	**Run**	1
Geometry	47 AF 117495		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	-5.1406E-007	uCi/sample	1.3316E-006	2.2060E-006	1.1030E-006
Bi-212	-6.6300E-006	uCi/sample	1.2084E-005	1.2860E-005	6.4300E-006
Bi-214	-1.5676E-006	uCi/sample	3.8779E-006	3.8570E-006	1.9285E-006
Co-60	-2.9348E-007	uCi/sample	1.7138E-006	1.7610E-006	8.8050E-007
Cs-137	7.0894E-007	uCi/sample	1.3298E-006	1.4860E-006	7.4300E-007
Eu-152	5.9746E-007	uCi/sample	1.2974E-006	1.7100E-006	8.5500E-007
Eu-154	-5.3084E-007	uCi/sample	1.0430E-006	1.3770E-006	6.8850E-007
K-40	-2.2656E-005	uCi/sample	2.3064E-005	2.3870E-005	1.1935E-005
Pa-234	-7.4380E-007	uCi/sample	1.6610E-006	2.1950E-006	1.0975E-006
Pb-210	-3.8647E-006	uCi/sample	1.5375E-005	1.6980E-005	8.4900E-006
Pb-212	-1.8507E-006	uCi/sample	2.3469E-006	2.5050E-006	1.2525E-006
Pb-214	-4.3460E-007	uCi/sample	3.2661E-006	3.2570E-006	1.6285E-006
Ra-226	-8.4692E-005	uCi/sample	3.1606E-005	3.1110E-005	1.5555E-005
Ra-228	7.5046E-006	uCi/sample	3.3809E-006	4.0680E-006	2.0340E-006
Tl-208	4.0801E-007	uCi/sample	1.5579E-006	1.5910E-006	7.9550E-007
U-235	-2.5069E-006	uCi/sample	5.5782E-006	8.3060E-006	4.1530E-006
U-238	2.8240E-006	uCi/sample	1.5939E-005	1.7300E-005	8.6500E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

Sample description
Batch ID: 22-01012-04
SDG ID: ARS1-22-01492-001 Tech: [redacted]

Spectrum Filename: C:\User\ARS02493.An1

Acquisition information
Start time: 7/28/2022 2:00:33 PM
Live time: 60000
Real time: 60214
Dead time: 0.35 %
Detector ID: 19

Detector system
(ARS02) MCB 131

Calibration
Filename: 47 AF 117495 calib 1-5-21.Clb
47 AF 117495
1-5-21 EEC

Energy Calibration
Created: 1/5/2021 11:19:08 AM
Zero offset: 0.367 keV
Gain: 0.250 keV/channel
Quadratic: -3.175E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2021 12:08:57 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -4.127091E-01 + (-4.601949E-02*Log(E)) +
(-6.502150E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.92 %
Log(Eff): -5.121235E+00 + (1.633498E+00*Log(E)) +
(-2.099107E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.87keV)
Stop channel: 8000 (1998.42keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/7/2022 7:59:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:22:34 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1933

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
13.31	1279.	3.75	0.85	1.005E-01				
16.35	966.	6.72	0.85	1.114E-01				
19.42	304.	17.60	0.85	1.198E-01				
23.96	182.	27.61	1.07	1.289E-01				
46.55	917.	6.48	0.91	1.432E-01	46.52	4.000	PBC<MDA	PB210
63.24	778.	7.73	0.95	1.413E-01	63.29	3.900	PBC<MDA	U238
74.65	179.	21.97	0.91	1.380E-01				
77.20	228.	17.17	0.92	1.371E-01				
84.27	170.	22.67	0.92	1.346E-01				
87.28	129.	27.65	0.93	1.335E-01				
89.71	100.	34.65	0.93	1.326E-01				
92.58	1008.	4.62	0.93	1.315E-01	92.38	2.570	6.561E-05	U238
					92.80	3.000	5.389E-05	U238
139.53	116.	29.97	0.98	1.079E-01				
143.87	170.	20.18	0.99	1.057E-01	143.76	10.500	PBC<MDA	U235
185.59	539.	9.79	1.02	8.823E-02	186.21	3.640	PBC<MDA	RA226
198.17	102.	36.85	0.89	8.415E-02				
238.37	353.	12.46	1.21	7.335E-02	238.63	43.100	PBC<MDA	PB212
351.68	225.	15.94	1.38	5.406E-02	351.92	35.800	PBC<MDA	PB214
510.90	1926.	3.89	2.52	3.963E-02	510.72	22.500	PBC<MDA	TL208
583.40	140.	24.99	1.49	3.531E-02	583.14	86.000	PBC<MDA	TL208
609.32	220.	16.75	1.15	3.400E-02	609.31	44.791	PBC<MDA	BI214

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
803.42	99.	27.45	1.48	2.653E-02				
860.31	89.	31.16	2.45	2.490E-02	860.47	12.000	1.354E-05	TL208
911.52	113.	22.28	1.33	2.361E-02	911.07	29.000	7.505E-06	Ra228
1460.88	107.	20.96	1.88	1.499E-02	1460.75	10.700	PBC<MDA	K40
1764.50	63.	26.54	2.19	1.239E-02	1764.49	15.357	1.486E-05	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.78	13.35	511.	1279.	1.273E+04	7.50	0.846	SE-75	sD
63.95	16.39	1623.	966.	8.672E+03	13.44	0.849	KR-85	sD
76.21	19.45	1275.	304.	2.534E+03	35.21	0.853	U-235	sD
94.35	24.10	1113.	182.	1.411E+03	55.22	1.075	AG-110M	s
184.72	46.55	932.	917.	6.491E+03	12.96	0.914	PB-210	l
251.49	63.21	1013.	778.	5.738E+03	15.46	0.948	LU-177	l
297.12	74.63	684.	179.	1.298E+03	43.94	0.912	TL-208	D
307.34	77.18	653.	228.	1.664E+03	34.33	0.915	PB-212	D
335.71	84.28	657.	171.	1.271E+03	45.06	0.923	HG-203	sD
347.77	87.30	576.	128.	9.585E+02	55.91	0.926	PB-212	sD
357.49	89.73	619.	101.	7.637E+02	72.26	0.929	AC-228	sD
368.86	92.60	578.	1008.	8.079E+03	9.23	0.932	TH-234	lD
557.23	139.64	534.	120.	1.114E+03	57.31	0.982	CE-143	sD
574.02	143.97	500.	170.	2.115E+03	40.37	0.987	U-235	lD
740.95	185.74	773.	539.	6.106E+03	19.58	1.024	U-235	sM
791.27	198.18	546.	102.	1.212E+03	73.69	0.895	SE-75	s
952.08	238.28	610.	353.	5.558E+03	24.92	1.213	PB-212	l
1405.45	351.81	410.	225.	5.494E+03	31.87	1.378	PB-214	l
2042.58	510.84	658.	1926.	4.861E+04	7.78	2.520	TL-208	sM
2436.47	609.40	365.	220.	7.109E+03	33.49	1.147	BI-214	l
3213.39	803.42	187.	99.	3.725E+03	54.89	1.479	CS-134	M
3441.12	860.42	190.	89.	3.582E+03	62.32	2.452	TL-208	sM
5846.15	1460.97	99.	107.	8.741E+03	41.92	1.883	K-40	l

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
RA-226	743.41	186.21	2202.	-603.	-0.010	36.94	1.031s
TL-208	2041.86	510.72	4718.	-2050.	-0.034	12.03	2.615
Ra-228	3646.17	911.52	159.	113.	0.002	44.55	1.327s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Peak Code	Peak MDA Value uCi/sample	COMMENTS
U-235		-2.5069E-06				1.39E+09	
			143.76	-2.507E-06	%(P	8.306E-06	1.11E+02 1.05E+01 G
			205.31	5.182E-06	%	1.661E-05	1.27E+02 4.70E+00 G
			163.35	-2.279E-06	%	1.503E-05	2.61E+02 4.70E+00 G
RA-226		-8.4692E-05				5.84E+05	
			186.21	-8.469E-05	&(P	3.111E-05	1.85E+01 3.64E+00 G K
Ra-228		7.5046E-06				2.10E+03	
			911.07	7.505E-06	(	4.068E-06	2.23E+01 2.90E+01 G
			968.90	5.304E-07	%	9.776E-06	8.71E+02 1.75E+01 G
			338.40	3.568E-06	&	8.216E-06	9.56E+01 1.20E+01 G
			964.60	1.627E-05	%	3.048E-05	8.96E+01 5.45E+00 G
Am-241	T	-5.1406E-07				1.58E+05	
			59.54	-5.141E-07	%(	2.206E-06	1.29E+02 3.59E+01 G K
PB-210		-3.8647E-06				7.45E+03	
			46.52	-3.865E-06	%(P	1.698E-05	1.99E+02 4.00E+00 G
U-238		2.8240E-06				1.63E+12	
			63.29	2.824E-06	%(P	1.730E-05	2.82E+02 3.90E+00 G
			92.80	2.824E-06	} P	3.307E-05	2.26E+02 3.00E+00 G
			92.38	2.824E-06	} P	3.964E-05	2.66E+02 2.57E+00 G
K-40		-2.2656E-05				4.68E+11	
			1460.75	-2.266E-05	%(P	2.387E-05	5.08E+01 1.07E+01 G
PB-214		-4.3460E-07				5.84E+05	
			351.92	-4.346E-07	%(P	3.257E-06	3.76E+02 3.58E+01 G
			295.21	-2.161E-06	% P	5.465E-06	1.32E+02 1.85E+01 G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
		241.98	-4.638E-06 %		1.277E-05 1.09E+02 7.50E+00	G
BI-214	-1.5676E-06				5.84E+05	
		609.31	-1.568E-06 %(P		3.857E-06 1.24E+02 4.48E+01	G
		1764.49	7.323E-06 %		1.091E-05 7.88E+01 1.54E+01	G
		1120.29	-1.599E-05 % P		1.411E-05 4.24E+01 1.48E+01	G
		1238.11	-4.302E-05 % P		3.642E-05 5.26E+01 5.86E+00	G
		768.36	-2.220E-06 %		2.909E-05 5.79E+02 4.80E+00	G
		1377.67	5.066E-06 %		4.488E-05 4.41E+02 3.92E+00	G
		934.06	-5.157E-07 %		4.964E-05 4.38E+03 3.03E+00	G
BI-212	-6.6300E-06				2.10E+03	
		727.17	-6.630E-06 %(P		1.286E-05 9.11E+01 1.18E+01	G
		1620.56	-2.930E-05 %		7.345E-05 1.29E+02 2.75E+00	G
		785.42	-6.569E-05 % P		7.589E-05 6.12E+01 2.00E+00	G
PB-212	-1.8507E-06				2.10E+03	
		238.63	-1.851E-06 %(P		2.505E-06 6.33E+01 4.31E+01	G
		300.09	-1.240E-05 &		3.134E-05 1.05E+02 3.27E+00	G
TL-208	4.0801E-07				2.10E+03	
		583.14	4.080E-07 %(P		1.591E-06 1.91E+02 8.60E+01	G
		510.72	-1.043E-04 + P		1.642E-05 6.02E+00 2.25E+01	G
		860.47	-6.726E-06 %		1.434E-05 6.46E+01 1.20E+01	G
		277.36	-5.132E-06 %		1.421E-05 1.10E+02 6.50E+00	G
		763.30	3.059E-05 &		8.640E-05 1.26E+02 1.70E+00	G
PA-234	-7.4380E-07				1.65E+12	
		98.44	-7.438E-07 %(		2.195E-06 1.12E+02 2.51E+01	G
		946.00	3.966E-06 %		6.939E-06 8.09E+01 2.00E+01	G
		131.28	4.534E-07 %		2.809E-06 2.33E+02 2.00E+01	G
		94.67	1.210E-06 %		6.880E-06 1.72E+02 1.55E+01	G
		883.24	-7.050E-06 %		1.419E-05 9.33E+01 1.20E+01	G
		926.70	-7.399E-07 %		1.301E-05 8.01E+02 1.10E+01	G
		569.26	-1.374E-05 % P		1.366E-05 1.14E+02 1.04E+01	G
		111.00	1.552E-07 %		6.457E-06 1.56E+03 8.55E+00	G
		733.00	-1.838E-05 % P		1.745E-05 5.45E+01 8.50E+00	G
		949.00	-1.200E-05 %		2.220E-05 8.58E+01 7.80E+00	G
		880.51	2.701E-06 %		2.280E-05 3.86E+02 6.50E+00	G
		226.87	8.194E-07 %		1.243E-05 5.98E+02 6.50E+00	G
		831.10	-1.525E-05 %		2.812E-05 8.56E+01 5.60E+00	G
		808.10	-4.808E-06 %		3.803E-05 2.36E+02 4.90E+00	G
		99.70	-4.044E-06 %		1.132E-05 1.06E+02 4.70E+00	G
		699.10	0.000E+00 %		3.348E-05 1.00E+03 4.60E+00	G
		898.60	-6.385E-05 % P		4.508E-05 4.88E+01 4.00E+00	G
		1394.10	-5.886E-06 %		4.722E-05 4.00E+02 3.90E+00	G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	7.0894E-07				1.10E+04		
		661.66	7.089E-07 %(		1.486E-06	9.38E+01	8.52E+01 G
CO-60	-2.9348E-07				1.93E+03		
		1173.24	-2.935E-07 %(		1.761E-06	2.92E+02	9.99E+01 K
		1332.50	-1.172E-06 %		2.128E-06	9.21E+01	1.00E+02 K
EU-152	5.9746E-07				4.64E+03		
		40.12	5.975E-07 %(		1.710E-06	1.08E+02	3.00E+01 G
		121.78	8.697E-08 %		1.816E-06	7.83E+02	2.92E+01 G
		344.30	7.911E-07 &		3.801E-06	1.98E+02	2.70E+01 G
		1408.08	-3.358E-06 %		9.233E-06	1.38E+02	2.12E+01 G
		39.52	-2.854E-07 %		3.299E-06	4.35E+02	1.60E+01 G
		964.00	-3.920E-06 %		1.172E-05	1.42E+02	1.46E+01 G
		1112.07	1.701E-07 %		1.189E-05	3.28E+03	1.36E+01 G
		778.90	-5.811E-06 %		1.184E-05	9.45E+01	1.30E+01 G
		1085.80	-7.315E-07 %		1.553E-05	9.97E+02	1.03E+01 G
		45.40	-1.772E-06 %		8.115E-06	1.38E+02	9.00E+00 G
		244.67	-1.240E-06 %		1.226E-05	3.91E+02	7.62E+00 G
		867.39	1.764E-05 %		4.668E-05	7.98E+01	4.18E+00 G
EU-154	-5.3084E-07				3.10E+03		
		123.10	-5.308E-07 &(		1.377E-06	9.82E+01	4.05E+01 G
		1274.80	-1.438E-06 %		4.645E-06	1.57E+02	3.55E+01 G
		723.30	-2.385E-06 %		7.273E-06	1.36E+02	1.97E+01 G
		1004.80	-5.493E-06 &		9.588E-06	8.36E+01	1.76E+01 G
		43.00	-4.182E-07 %		6.134E-06	4.41E+02	1.31E+01 G
		873.20	-4.778E-06 %		1.316E-05	1.27E+02	1.13E+01 G
		996.30	2.337E-06 &		1.411E-05	2.85E+02	1.07E+01 G
		42.31	-2.449E-06 &		1.154E-05	1.42E+02	7.30E+00 G
		248.04	-1.830E-06 &		1.336E-05	2.88E+02	6.60E+00 G
		591.70	-1.222E-05 %		2.771E-05	9.78E+01	4.60E+00 G
		48.70	-6.973E-06 &		2.195E-05	1.20E+02	4.20E+00 G
		756.70	-1.689E-05 %		3.507E-05	9.29E+01	4.10E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity	
RA-226	186.21	2202.	-603.	-0.010	36.94	-8.469E-05	P
TL-208	510.72	4718.	-2050.	-0.034	12.03	-1.043E-04	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity uCi/sample	Time Corrected Activity uCi/sample	Uncertainty 2 Sigma Counting uCi/sample	Total uCi/sample	MDA uCi/sample
U-235	#A	-2.5069E-06	-2.5069E-06	5.5753E-06	5.5782E-06	8.306E-06
RA-226	#A	-8.4690E-05	-8.4692E-05	3.1283E-05	3.1606E-05	3.111E-05
Ra-228		7.4521E-06	7.5046E-06	3.3435E-06	3.3809E-06	4.068E-06
Am-241	#B	-5.1401E-07	-5.1406E-07	1.3312E-06	1.3316E-06	2.206E-06
PB-210	#A	-3.8571E-06	-3.8647E-06	1.5370E-05	1.5375E-05	1.698E-05
U-238	A	2.8240E-06	2.8240E-06	1.5937E-05	1.5939E-05	1.730E-05
K-40	#A	-2.2656E-05	-2.2656E-05	2.3009E-05	2.3064E-05	2.387E-05
PB-214	#A	-4.3459E-07	-4.3460E-07	3.2659E-06	3.2661E-06	3.257E-06
BI-214	#A	-1.5676E-06	-1.5676E-06	3.8765E-06	3.8779E-06	3.857E-06
BI-212	#A	-6.5837E-06	-6.6300E-06	1.2075E-05	1.2084E-05	1.286E-05
PB-212	#A	-1.8378E-06	-1.8507E-06	2.3436E-06	2.3469E-06	2.505E-06
TL-208	A	4.0516E-07	4.0801E-07	1.5576E-06	1.5579E-06	1.591E-06
PA-234	#A	-7.4380E-07	-7.4380E-07	1.6600E-06	1.6610E-06	2.195E-06
CS-137	#A	7.0800E-07	7.0894E-07	1.3294E-06	1.3298E-06	1.486E-06
CO-60	#B	-2.9125E-07	-2.9348E-07	1.7137E-06	1.7138E-06	1.761E-06
EU-152	#A	5.9556E-07	5.9746E-07	1.2940E-06	1.2974E-06	1.710E-06
EU-154	#A	-5.2833E-07	-5.3084E-07	1.0421E-06	1.0430E-06	1.377E-06

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:34:05 PM
AAA Spectrum name: ARS02493.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.9 to 1998.4 keV) 7.452E-06 uCi/sample
Total Decayed Activity (2.9 to 1998.4 keV) 7.5045932E-06 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-05**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/28/2022 14:22
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	ARS06 MCB 133	**Fraction**	002
Library	ITSI COUNT.Lib	**Run**	1
Geometry	117495 47mm AF		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	-2.5179E-007	uCi/sample	5.2101E-007	6.8850E-007	3.4425E-007
Bi-212	1.0695E-006	uCi/sample	4.8156E-006	5.2460E-006	2.6230E-006
Bi-214	1.9882E-006	uCi/sample	1.0559E-006	1.3310E-006	6.6550E-007
Co-60	-3.9233E-007	uCi/sample	9.1461E-007	9.3220E-007	4.6610E-007
Cs-137	-1.0377E-007	uCi/sample	6.7304E-007	7.3230E-007	3.6615E-007
Eu-152	4.0984E-007	uCi/sample	1.1620E-006	1.9200E-006	9.6000E-007
Eu-154	2.4496E-007	uCi/sample	4.9995E-007	6.2940E-007	3.1470E-007
K-40	-2.7076E-005	uCi/sample	1.7218E-005	1.5370E-005	7.6850E-006
Pa-234	8.3037E-008	uCi/sample	7.1825E-007	9.1170E-007	4.5585E-007
Pb-210	-1.1405E-006	uCi/sample	9.3990E-006	1.5580E-005	7.7900E-006
Pb-212	-3.9414E-007	uCi/sample	7.9475E-007	9.5550E-007	4.7775E-007
Pb-214	1.9237E-006	uCi/sample	6.4366E-007	9.3520E-007	4.6760E-007
Ra-226	2.0777E-006	uCi/sample	7.2073E-006	9.1100E-006	4.5550E-006
Ra-228	6.2706E-007	uCi/sample	2.3424E-006	2.4720E-006	1.2360E-006
Tl-208	6.2541E-007	uCi/sample	5.4159E-007	5.9370E-007	2.9685E-007
U-235	1.0262E-006	uCi/sample	2.1582E-006	3.5760E-006	1.7880E-006
U-238	2.3832E-006	uCi/sample	4.8767E-006	6.4410E-006	3.2205E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

Sample description
Batch ID: 22-01012-05
SDG ID: ARS1-22-01492-002 Tech: [redacted]

Spectrum Filename: C:\User\ARS06297.An1

Acquisition information
Start time: 7/28/2022 2:22:25 PM
Live time: 60000
Real time: 60035
Dead time: 0.06 %
Detector ID: 21

Detector system
ARS06 MCB 133

Calibration
Filename: 117495 47mm AF calib 7-3-21 .Clb
117495 47mm AF
EEC 7-3-21

Energy Calibration
Created: 7/3/2021 9:44:58 AM
Zero offset: 0.085 keV
Gain: 0.250 keV/channel
Quadratic: -3.365E-08 keV/channel^2

Efficiency Calibration
Created: 7/3/2021 3:18:09 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.77 %
Log(Eff): -2.894388E+00 + (1.055530E+00*Log(E)) +
(-1.582298E-01*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.99 %
Log(Eff): -7.116829E+00 + (2.826979E+00*Log(E)) +
(-3.434918E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.59keV)
Stop channel: 8000 (1997.96keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/7/2022 9:03:00 PM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:06:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1135

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
12.21	2245.	3.41	0.88	1.115E-01				
16.34	925.	8.58	0.89	1.495E-01				
24.96	233.	29.91	1.51	2.062E-01				
36.48	280.	19.66	0.91	2.481E-01				
40.09	246.	20.89	0.92	2.559E-01	39.52	16.000	2.726E-06	EU152
					40.12	30.000	1.447E-06	EU152
42.91	267.	17.66	0.92	2.606E-01	42.31	7.300	6.364E-06	EU154
					43.00	13.100	3.532E-06	EU154
74.87	131.	24.15	0.96	2.687E-01				
77.04	110.	28.62	0.96	2.676E-01				
139.63	109.	31.62	1.06	2.143E-01				
198.14	141.	25.77	1.14	1.759E-01				
348.93	68.	35.94	1.29	1.178E-01				
351.77	186.	15.52	1.29	1.171E-01	351.92	35.800	1.998E-06	PB214
511.12	2066.	4.30	2.55	8.494E-02	510.72	22.500	4.899E-05	TL208
558.35	155.	20.59	0.95	7.821E-02				
570.05	77.	36.36	1.96	7.673E-02	569.26	10.400	4.354E-06	PA234
583.12	52.	36.67	0.96	7.507E-02	583.14	86.000	3.668E-07	TL208
609.21	142.	26.33	2.19	7.194E-02	609.31	44.791	1.988E-06	BI214
700.45	70.	35.24	0.32	6.259E-02	699.10	4.600	1.099E-05	PA234
791.03	70.	34.82	4.63	5.517E-02				
803.19	114.	30.75	1.11	5.431E-02				

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1231.38	50.	33.19	0.40	3.353E-02				
1260.83	57.	36.68	0.24	3.260E-02				
1286.60	46.	39.38	0.40	3.180E-02				
1420.33	56.	36.88	1.38	2.815E-02				
1461.02	122.	18.90	1.05	2.719E-02	1460.75	10.700	PBC<MDA	K40
1508.76	52.	26.04	2.31	2.612E-02				
1515.56	39.	31.78	2.32	2.597E-02				
1766.23	68.	28.92	0.41	2.133E-02	1764.49	15.357	9.284E-06	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV		Suspected Nuclide
48.51	12.21	1813.	2245.	2.013E+04	6.83	0.883	-	sD
65.00	16.34	2690.	925.	6.186E+03	17.17	0.888	-	sD
99.51	24.88	2018.	233.	1.132E+03	59.82	1.506	-	sM
145.56	36.33	1374.	280.	1.128E+03	39.32	0.914	-	sD
160.03	39.94	1199.	246.	9.621E+02	41.77	0.918	-	sD
171.30	42.76	977.	267.	1.024E+03	35.32	0.922	-	sD
299.14	74.85	437.	131.	4.883E+02	48.31	0.962	-	sD
307.82	77.02	437.	110.	4.097E+02	57.23	0.965	-	sD
558.22	139.51	465.	109.	5.068E+02	63.24	1.059	-	M
792.29	198.15	493.	141.	8.028E+02	51.54	1.140	-	M
1395.40	349.01	269.	67.	5.691E+02	73.43	1.290	-	sD
2044.69	511.10	800.	2066.	2.432E+04	8.61	2.545	-	M
2233.71	558.39	239.	155.	1.979E+03	41.18	0.950	-	s
2280.53	569.75	254.	77.	1.006E+03	72.72	1.961	-	s
2802.48	700.60	210.	70.	1.125E+03	70.47	0.315	-	s
3165.06	791.33	148.	70.	1.260E+03	69.65	4.626	-	sM
3213.75	803.16	261.	114.	2.105E+03	61.50	1.109	-	sM
4928.35	1231.37	71.	50.	1.479E+03	66.37	0.405	-	sM
5046.33	1260.49	101.	57.	1.755E+03	73.36	0.242	-	sM
5149.55	1286.76	82.	46.	1.462E+03	78.75	0.395	-	sM
5685.22	1421.15	90.	56.	2.004E+03	73.77	1.382	-	s
5848.26	1461.12	91.	122.	4.486E+03	37.79	1.045	-	sM
6039.50	1508.76	64.	52.	1.975E+03	52.09	2.315	-	sD
6066.74	1515.56	56.	39.	1.490E+03	63.56	2.319	-	sD
7071.21	1766.52	68.	68.	3.170E+03	57.84	0.411	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-214	1407.59	351.92	327.	179.	0.003	32.26	1.293D
BI-214	2437.27	609.21	394.	142.	0.002	52.67	2.192s
K-40	5847.17	1460.75	430.	-175.	-0.003	63.21	2.284s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Code	MDA Value uCi/sample	COMMENTS
U-235		1.0262E-06				1.39E+09	
			143.76	1.026E-06	&(	3.576E-06 1.05E+02	1.05E+01 G
			205.31	-3.318E-06	%	7.739E-06 9.27E+01	4.70E+00 G
			163.35	-2.700E-06	%	6.903E-06 1.02E+02	4.70E+00 G
RA-226		2.0777E-06				5.84E+05	
			186.21	2.078E-06	%(	9.110E-06 1.73E+02	3.64E+00 G K
Ra-228		6.2706E-07				2.10E+03	
			911.07	6.271E-07	&(	2.472E-06 1.87E+02	2.90E+01 G
			968.90	2.468E-06	&	4.368E-06 8.46E+01	1.75E+01 G
			338.40	1.639E-06	&	3.522E-06 8.92E+01	1.20E+01 G
			964.60	-4.988E-06	%	1.579E-05 1.51E+02	5.45E+00 G
Am-241	T	-2.5179E-07				1.58E+05	
			59.54	-2.518E-07	%(	6.885E-07 1.03E+02	3.59E+01 G K
PB-210		-1.1405E-06				7.45E+03	
			46.52	-1.140E-06	%(	1.558E-05 4.12E+02	4.00E+00 G
U-238		2.3832E-06				1.63E+12	
			63.29	2.383E-06	%(	6.441E-06 1.02E+02	3.90E+00 G
			92.80	-3.036E-06	%	8.463E-06 1.11E+02	3.00E+00 G
			92.38	-3.506E-06	%	1.006E-05 1.14E+02	2.57E+00 G
K-40		-2.7076E-05				4.68E+11	
			1460.75	-2.708E-05	(P	1.537E-05 3.16E+01	1.07E+01 G
PB-214		1.9237E-06				5.84E+05	
			351.92	1.924E-06	(	9.352E-07 1.61E+01	3.58E+01 G
			295.21	1.944E-06	&	2.136E-06 4.61E+01	1.85E+01 G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		241.98	2.133E-06	%	5.200E-06	1.01E+02	7.50E+00 G
BI-214	1.9882E-06					5.84E+05	
		609.31	1.988E-06	(	1.331E-06	2.63E+01	4.48E+01 G
		1764.49	-2.966E-06	%	9.254E-06	9.34E+01	1.54E+01 G
		1120.29	3.862E-06	%	6.795E-06	8.69E+01	1.48E+01 G
		1238.11	-9.823E-06	%	2.143E-05	6.61E+01	5.86E+00 G
		768.36	9.897E-07	&	1.413E-05	6.54E+02	4.80E+00 G
		1377.67	-1.554E-05	%	2.581E-05	8.40E+01	3.92E+00 G
		934.06	-1.097E-05	%	2.580E-05	1.12E+02	3.03E+00 G
BI-212	1.0695E-06					2.10E+03	
		727.17	1.070E-06	&(	5.246E-06	2.25E+02	1.18E+01 G
		1620.56	-2.310E-05	%	4.113E-05	9.22E+01	2.75E+00 G
		785.42	-1.750E-05	%	4.427E-05	7.64E+01	2.00E+00 G
PB-212	-3.9414E-07					2.10E+03	
		238.63	-3.941E-07	%(	9.555E-07	1.01E+02	4.31E+01 G
		300.09	-6.013E-06	%	1.429E-05	9.87E+01	3.27E+00 G
TL-208	6.2541E-07					2.10E+03	
		583.14	6.254E-07	%(	5.937E-07	4.32E+01	8.60E+01 G
		510.72	-1.843E-06	%	6.142E-06	1.01E+02	2.25E+01 G
		860.47	-1.848E-06	%	6.177E-06	1.59E+02	1.20E+01 G
		277.36	1.492E-06	%	6.195E-06	1.72E+02	6.50E+00 G
		763.30	-5.587E-06	%	4.197E-05	3.45E+02	1.70E+00 G
PA-234	8.3037E-08					1.65E+12	
		98.44	8.304E-08	&(	9.117E-07	4.32E+02	2.51E+01 G
		946.00	-2.211E-06	%	3.860E-06	8.35E+01	2.00E+01 G
		131.28	-5.527E-07	%	1.455E-06	1.05E+02	2.00E+01 G
		94.67	-5.806E-07	&	1.572E-06	1.07E+02	1.55E+01 G
		883.24	-3.491E-06	%	7.180E-06	9.86E+01	1.20E+01 G
		926.70	1.162E-06	%	6.459E-06	2.62E+02	1.10E+01 G
		569.26	3.553E-07	%	6.016E-06	5.02E+02	1.04E+01 G
		111.00	-1.177E-06	&	3.104E-06	1.05E+02	8.55E+00 G
		733.00	-4.116E-06	&	8.293E-06	9.35E+01	8.50E+00 G
		949.00	6.749E-07	&	9.907E-06	6.92E+02	7.80E+00 G
		880.51	3.327E-06	&	1.067E-05	1.52E+02	6.50E+00 G
		226.87	4.254E-06	%	5.260E-06	5.18E+01	6.50E+00 G
		831.10	6.408E-06	%	1.151E-05	8.58E+01	5.60E+00 G
		808.10	-7.763E-06	%	2.006E-05	7.80E+01	4.90E+00 G
		99.70	-1.849E-06	%	5.196E-06	1.11E+02	4.70E+00 G
		699.10	-4.902E-06	&	1.718E-05	1.05E+02	4.60E+00 G
		898.60	7.412E-06	%	1.715E-05	1.10E+02	4.00E+00 G
		1394.10	-1.603E-06	%	2.349E-05	7.26E+02	3.90E+00 G

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AAA Spectrum name: ARS06297.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	-1.0377E-07				1.10E+04		
		661.66	-1.038E-07	%(	7.323E-07	3.24E+01	8.52E+01 G
CO-60	-3.9233E-07				1.93E+03		
		1173.24	-3.923E-07	&(	9.322E-07	1.17E+02	9.99E+01 K
		1332.50	-7.447E-09	%	9.306E-07	6.20E+03	1.00E+02 K
EU-152	4.0984E-07				4.64E+03		
		40.12	4.098E-07	%(	1.920E-06	1.42E+02	3.00E+01 G
		121.78	1.575E-08	%	8.996E-07	2.25E+03	2.92E+01 G
		344.30	-7.293E-07	%	2.541E-06	1.05E+02	2.70E+01 G
		1408.08	-5.985E-07	%	4.557E-06	3.79E+02	2.12E+01 G
		39.52	2.487E-06	%	3.533E-06	4.33E+01	1.60E+01 G
		964.00	2.205E-07	%	5.597E-06	1.20E+03	1.46E+01 G
		1112.07	-4.125E-06	&	7.105E-06	8.50E+01	1.36E+01 G
		778.90	-9.797E-07	&	5.408E-06	2.54E+02	1.30E+01 G
		1085.80	-9.790E-07	%	7.928E-06	3.93E+02	1.03E+01 G
		45.40	-1.288E-06	%	6.849E-06	1.61E+02	9.00E+00 G
		244.67	-2.290E-06	%	5.633E-06	1.02E+02	7.62E+00 G
		867.39	2.669E-06	&	1.642E-05	2.91E+02	4.18E+00 G
EU-154	2.4496E-07				3.10E+03		
		123.10	2.450E-07	&(	6.294E-07	1.02E+02	4.05E+01 G
		1274.80	-1.785E-06	%	2.891E-06	8.22E+01	3.55E+01 G
		723.30	-1.963E-06	%	4.078E-06	9.66E+01	1.97E+01 G
		1004.80	-6.255E-07	%	4.436E-06	3.35E+02	1.76E+01 G
		43.00	9.266E-07	%	4.386E-06	1.43E+02	1.31E+01 G
		873.20	-3.438E-06	&	7.228E-06	1.01E+02	1.13E+01 G
		996.30	1.282E-06	%	6.635E-06	2.44E+02	1.07E+01 G
		42.31	1.668E-06	&	7.846E-06	1.42E+02	7.30E+00 G
		248.04	8.359E-07	%	6.038E-06	2.98E+02	6.60E+00 G
		591.70	1.728E-06	%	1.148E-05	2.94E+02	4.60E+00 G
		48.70	2.234E-06	%	6.270E-06	1.06E+02	4.20E+00 G
		756.70	-4.200E-06	%	1.692E-05	1.85E+02	4.10E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:43:39 PM
AAA Spectrum name: ARS06297.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.6 to 1998.0 keV) 3.912E-06 uCi/sample
Total Decayed Activity (2.6 to 1998.0 keV) 3.9119441E-06 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-06**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/29/2022 14:22
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	(ARS02) MCB 131	**Fraction**	003
Library	ITSI COUNT.Lib	**Run**	1
Geometry	47 AF 117495		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	-4.6339E-007	uCi/sample	1.2927E-006	2.1430E-006	1.0715E-006
Bi-212	-8.4403E-006	uCi/sample	1.1889E-005	1.2680E-005	6.3400E-006
Bi-214	-1.9817E-006	uCi/sample	3.8439E-006	3.8220E-006	1.9110E-006
Co-60	8.0966E-007	uCi/sample	1.3402E-006	1.3680E-006	6.8400E-007
Cs-137	-3.8518E-007	uCi/sample	1.1246E-006	1.8790E-006	9.3950E-007
Eu-152	-1.4140E-007	uCi/sample	1.3995E-006	1.8580E-006	9.2900E-007
Eu-154	3.4245E-007	uCi/sample	1.0347E-006	1.3720E-006	6.8600E-007
K-40	-2.5184E-005	uCi/sample	2.4185E-005	2.4950E-005	1.2475E-005
Pa-234	6.9509E-007	uCi/sample	1.1935E-006	1.9750E-006	9.8750E-007
Pb-210	-7.0743E-007	uCi/sample	1.5582E-005	1.7260E-005	8.6300E-006
Pb-212	-5.2441E-007	uCi/sample	2.2595E-006	2.3540E-006	1.1770E-006
Pb-214	-4.3227E-006	uCi/sample	3.4271E-006	3.5330E-006	1.7665E-006
Ra-226	-9.0206E-005	uCi/sample	3.1474E-005	3.0950E-005	1.5475E-005
Ra-228	6.5849E-006	uCi/sample	3.1937E-006	3.8660E-006	1.9330E-006
Tl-208	6.5689E-007	uCi/sample	1.5216E-006	1.5360E-006	7.6800E-007
U-235	-2.4594E-006	uCi/sample	5.4947E-006	6.3320E-006	3.1660E-006
U-238	-5.8489E-006	uCi/sample	1.6035E-005	1.7590E-005	8.7950E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:49:43 PM
AAA Spectrum name: ARS02500.An1

Sample description
Batch ID: 22-01012-06
SDG ID: ARS1-22-01492-003 Tech: [redacted]

Spectrum Filename: C:\User\ARS02500.An1

Acquisition information
Start time: 7/29/2022 2:22:21 PM
Live time: 60000
Real time: 60175
Dead time: 0.29 %
Detector ID: 19

Detector system
(ARS02) MCB 131

Calibration
Filename: 47 AF 117495 calib 1-5-21.Clb
47 AF 117495
1-5-21 EEC

Energy Calibration
Created: 1/5/2021 11:19:08 AM
Zero offset: 0.367 keV
Gain: 0.250 keV/channel
Quadratic: -3.175E-08 keV/channel^2

Efficiency Calibration
Created: 1/5/2021 12:08:57 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -4.127091E-01 + (-4.601949E-02*Log(E)) + (-6.502150E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.92 %
Log(Eff): -5.121235E+00 + (1.633498E+00*Log(E)) + (-2.099107E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.87keV)
Stop channel: 8000 (1998.42keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:49:43 PM
AAA Spectrum name: ARS02500.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/7/2022 8:59:00 PM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:22:34 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1726

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
13.34	1251.	3.83	0.85	1.007E-01				
16.23	977.	6.39	0.85	1.111E-01				
19.20	351.	15.46	0.85	1.194E-01				
46.56	916.	7.04	0.88	1.432E-01	46.52	4.000	PBC<MDA	PB210
63.28	696.	7.72	0.88	1.413E-01	63.29	3.900	PBC<MDA	U238
70.95	94.	39.67	0.91	1.391E-01				
74.67	263.	15.32	0.91	1.380E-01				
77.23	219.	17.33	0.92	1.371E-01				
87.27	109.	35.41	0.97	1.335E-01				
92.61	946.	6.19	1.07	1.315E-01	92.38	2.570	5.737E-05	U238
					92.80	3.000	4.683E-05	U238
98.83	88.	39.18	1.59	1.292E-01	98.44	25.100	1.224E-06	PA234
					99.70	4.700	6.563E-06	PA234
185.61	508.	9.19	1.14	8.827E-02	186.21	3.640	PBC<MDA	RA226
198.40	134.	29.89	0.79	8.416E-02				
238.38	335.	11.69	0.98	7.332E-02	238.63	43.100	PBC<MDA	PB212
295.03	140.	25.80	1.37	6.220E-02	295.21	18.500	PBC<MDA	PB214
299.24	88.	34.89	1.15	6.148E-02				
351.51	222.	16.20	1.36	5.407E-02	351.92	35.800	PBC<MDA	PB214
511.00	2014.	3.94	2.44	3.962E-02	510.72	22.500	PBC<MDA	TL208
569.99	87.	39.25	1.86	3.607E-02	569.26	10.400	PBC<MDA	PA234
583.44	180.	16.83	1.19	3.532E-02	583.14	86.000	PBC<MDA	TL208

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:49:43 PM
AAA Spectrum name: ARS02500.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.52	224.	15.66	1.50	3.397E-02	609.31	44.791	PBC<MDA	BI214
657.35	48.	39.92	0.70	3.180E-02				
803.21	149.	18.52	1.63	2.653E-02				
899.26	51.	37.86	1.28	2.390E-02	898.60	4.000	PBC<MDA	PA234
910.68	99.	24.02	0.83	2.363E-02	911.07	29.000	6.585E-06	Ra228
968.52	63.	31.66	1.06	2.230E-02	968.90	17.460	7.355E-06	Ra228
1023.26	62.	33.44	2.73	2.118E-02				
1113.95	47.	35.52	1.93	1.953E-02				
1238.15	50.	36.44	3.66	1.763E-02	1238.11	5.859	PBC<MDA	BI214
1461.13	160.	17.41	1.32	1.498E-02	1460.75	10.700	PBC<MDA	K40
1696.41	29.	35.57	0.30	1.290E-02				
1764.17	68.	31.15	1.92	1.240E-02	1764.49	15.357	1.614E-05	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.90	13.41	520.	1251.	1.242E+04	7.65	0.846	BR-82	sD
63.46	16.30	1457.	977.	8.790E+03	12.77	0.849	KR-85	sD
75.35	19.28	1301.	351.	2.945E+03	30.92	0.852	U-235	D
184.78	46.61	1119.	916.	6.685E+03	14.09	0.883	PB-210	l
251.65	63.22	878.	696.	5.507E+03	15.44	0.885	LU-177	l
282.34	71.01	646.	94.	6.745E+02	79.35	0.908	AU-196	sD
297.20	74.72	679.	263.	1.906E+03	30.63	0.912	TH-234	sD
307.44	77.28	613.	219.	1.600E+03	34.66	0.915	PB-212	D
347.59	87.40	625.	109.	8.151E+02	70.82	0.966	PB-212	s
368.98	92.61	918.	946.	7.445E+03	12.37	1.073	TH-234	l
393.87	98.67	503.	88.	6.827E+02	78.37	1.594	PA-234M	sM
741.03	185.62	643.	508.	5.753E+03	18.39	1.144	U-235	M
792.19	198.15	584.	134.	1.586E+03	59.78	0.790	SE-75	s
952.11	238.38	500.	335.	4.571E+03	23.37	0.984	PB-212	l
1178.79	295.03	448.	140.	2.918E+03	51.60	1.370	RU-103	l
1195.62	299.40	425.	88.	1.428E+03	69.77	1.150	TH-227	sD
2042.99	511.00	678.	2014.	5.083E+04	7.88	2.439	NA-22	sM
2279.04	569.65	339.	87.	2.418E+03	78.50	1.859	BI-207	sM
2437.26	609.90	323.	224.	6.947E+03	31.32	1.502	RU-103	l
2628.69	657.27	133.	48.	1.510E+03	79.84	0.697	AS-76	sM
3212.55	803.14	175.	149.	5.616E+03	37.04	1.633	CS-134	sM
3597.07	899.28	125.	51.	2.142E+03	75.71	1.281	K-42	sM
3874.38	968.56	116.	63.	3.722E+03	63.33	1.060	SB-124	l
4093.52	1023.20	117.	62.	2.947E+03	66.89	2.732	K-42	s
4456.68	1113.91	114.	47.	2.392E+03	71.04	1.931	XE-138	sD
4954.05	1238.52	85.	50.	2.831E+03	72.89	3.665	CO-56	sM
5847.17	1461.21	116.	160.	1.159E+04	34.83	1.319	K-40	l
6789.73	1696.56	29.	29.	2.256E+03	71.14	0.303	-	s

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s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
RA-226	743.41	186.21	2179.	-642.	-0.011	34.48	1.031
PB-214	1406.41	351.92	1023.	-186.	-0.003	78.79	1.204
TL-208	2041.86	510.72	5044.	-2150.	-0.036	14.74	2.615
Ra-228	3642.80	910.68	143.	99.	0.002	48.04	0.831s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Code	Peak MDA Value uCi/sample		COMMENTS
U-235		-2.4594E-06				1.39E+09		
			143.76	-2.459E-06	%(P	6.332E-06	1.12E+02 1.05E+01 G	
			205.31	6.623E-06	%	1.648E-05	9.89E+01 4.70E+00 G	
			163.35	-2.543E-06	%	1.497E-05	2.33E+02 4.70E+00 G	
RA-226		-9.0206E-05				5.84E+05		
			186.21	-9.021E-05	(P	3.095E-05	1.72E+01 3.64E+00 G K	
Ra-228		6.5849E-06				2.10E+03		
			911.07	6.585E-06	(	3.866E-06	2.40E+01 2.90E+01 G	
			968.90	-7.265E-07	%	9.343E-06	6.07E+02 1.75E+01 G	
			338.40	6.773E-07	&	8.815E-06	5.36E+02 1.20E+01 G	
			964.60	1.125E-06	&	3.638E-05	9.56E+02 5.45E+00 G	
Am-241	T	-4.6339E-07				1.58E+05		
			59.54	-4.634E-07	&(	2.143E-06	1.39E+02 3.59E+01 G K	
PB-210		-7.0743E-07				7.45E+03		
			46.52	-7.074E-07	%(P	1.726E-05	1.10E+03 4.00E+00 G	

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-238	-5.8489E-06					1.63E+12	
		63.29-5.849E-06	%(P	1.759E-05	1.37E+02	3.90E+00	G
		92.80-1.970E-06	} P	2.439E-05	5.59E+02	3.00E+00	G
		92.38-1.044E-05	} P	3.002E-05	1.14E+02	2.57E+00	G
K-40	-2.5184E-05					4.68E+11	
		1460.75-2.518E-05	%(P	2.495E-05	4.79E+01	1.07E+01	G
PB-214	-4.3227E-06					5.84E+05	
		351.92-4.323E-06	(P	3.533E-06	3.94E+01	3.58E+01	G
		295.21-3.968E-06	% P	6.901E-06	7.00E+01	1.85E+01	G
		241.98-4.659E-06	&	1.335E-05	1.14E+02	7.50E+00	G
BI-214	-1.9817E-06					5.84E+05	
		609.31-1.982E-06	%(P	3.822E-06	9.69E+01	4.48E+01	G
		1764.49 1.278E-05	%	1.167E-05	4.91E+01	1.54E+01	G
		1120.29-9.104E-06	% P	1.619E-05	6.72E+01	1.48E+01	G
		1238.11-4.377E-05	% P	3.820E-05	4.82E+01	5.86E+00	G
		768.36 1.597E-05	%	3.153E-05	8.85E+01	4.80E+00	G
		1377.67 1.447E-06	%	4.243E-05	1.45E+03	3.92E+00	G
		934.06-2.862E-05	&	5.387E-05	8.72E+01	3.03E+00	G
BI-212	-8.4403E-06					2.10E+03	
		727.17-8.440E-06	%(P	1.268E-05	7.03E+01	1.18E+01	G
		1620.56-2.035E-06	%	6.235E-05	1.55E+03	2.75E+00	G
		785.42-6.116E-05	& P	8.707E-05	7.34E+01	2.00E+00	G
PB-212	-5.2441E-07					2.10E+03	
		238.63-5.244E-07	%(P	2.354E-06	2.15E+02	4.31E+01	G
		300.09-6.555E-06	%	4.125E-05	1.89E+02	3.27E+00	G
TL-208	6.5689E-07					2.10E+03	
		583.14 6.569E-07	%(P	1.536E-06	1.16E+02	8.60E+01	G
		510.72-1.094E-04	+ P	1.697E-05	7.37E+00	2.25E+01	G
		860.47 6.228E-06	%	1.137E-05	8.45E+01	1.20E+01	G
		277.36 3.493E-06	%	1.358E-05	1.54E+02	6.50E+00	G
		763.30-4.533E-05	%	8.859E-05	8.76E+01	1.70E+00	G
PA-234	6.9509E-07					1.65E+12	
		98.44 6.951E-07	%(	1.975E-06	8.58E+01	2.51E+01	G
		946.00-2.470E-06	%	7.832E-06	1.46E+02	2.00E+01	G
		131.28-3.734E-07	%	2.852E-06	2.87E+02	2.00E+01	G
		94.67-2.118E-06	%	8.129E-06	1.16E+02	1.55E+01	G
		883.24 6.480E-06	%	1.235E-05	8.83E+01	1.20E+01	G
		926.70 7.249E-06	%	1.290E-05	8.23E+01	1.10E+01	G
		569.26-5.016E-06	% P	1.344E-05	1.03E+02	1.04E+01	G
		111.00 2.365E-06	%	6.196E-06	9.91E+01	8.55E+00	G

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA		Comments
		733.00	-1.035E-05	% P	1.689E-05	9.56E+01	8.50E+00	G
		949.00	7.621E-06	%	1.978E-05	1.20E+02	7.80E+00	G
		880.51	-8.529E-06	%	2.447E-05	1.32E+02	6.50E+00	G
		226.87	-5.432E-06	%	1.355E-05	9.92E+01	6.50E+00	G
		831.10	-1.251E-05	%	2.697E-05	9.97E+01	5.60E+00	G
		808.10	-1.526E-05	%	4.208E-05	8.32E+01	4.90E+00	G
		99.70	5.581E-07	%	1.140E-05	6.10E+02	4.70E+00	G
		699.10	-1.856E-05	%	3.749E-05	9.08E+01	4.60E+00	G
		898.60	-6.475E-05	% P	4.711E-05	5.12E+01	4.00E+00	G
		1394.10	2.943E-06	%	4.314E-05	7.26E+02	3.90E+00	G
CS-137	-3.8518E-07					1.10E+04		
		661.66	-3.852E-07	%(	1.879E-06	1.46E+02	8.52E+01	G
CO-60	8.0966E-07					1.93E+03		
		1173.24	8.097E-07	%(	1.368E-06	8.27E+01	9.99E+01	K
		1332.50	-9.037E-07	%	2.020E-06	1.13E+02	1.00E+02	K
EU-152	-1.4140E-07					4.64E+03		
		40.12	-1.414E-07	%(	1.858E-06	4.95E+02	3.00E+01	G
		121.78	-2.870E-07	&	1.869E-06	2.45E+02	2.92E+01	G
		344.30	1.581E-06	%	3.624E-06	9.51E+01	2.70E+01	G
		1408.08	-5.483E-06	%	9.083E-06	8.39E+01	2.12E+01	G
		39.52	1.122E-06	&	3.361E-06	1.13E+02	1.60E+01	G
		964.00	5.333E-06	&	1.262E-05	7.15E+01	1.46E+01	G
		1112.07	5.825E-06	%	1.703E-05	8.80E+01	1.36E+01	G
		778.90	-6.325E-06	%	1.200E-05	8.81E+01	1.30E+01	G
		1085.80	2.414E-06	%	1.416E-05	2.76E+02	1.03E+01	G
		45.40	1.961E-06	&	7.991E-06	1.23E+02	9.00E+00	G
		244.67	-2.952E-06	%	1.220E-05	1.64E+02	7.62E+00	G
		867.39	-7.889E-06	%	3.599E-05	2.09E+02	4.18E+00	G
EU-154	3.4245E-07					3.10E+03		
		123.10	3.425E-07	%(	1.372E-06	1.51E+02	4.05E+01	G
		1274.80	-1.934E-06	&	5.153E-06	1.30E+02	3.55E+01	G
		723.30	2.388E-06	%	6.845E-06	1.28E+02	1.97E+01	G
		1004.80	-4.457E-06	&	1.011E-05	1.08E+02	1.76E+01	G
		43.00	-5.840E-07	%	6.397E-06	3.30E+02	1.31E+01	G
		873.20	-5.215E-06	%	1.441E-05	1.28E+02	1.13E+01	G
		996.30	-9.012E-06	&	1.658E-05	8.81E+01	1.07E+01	G
		42.31	-2.600E-06	%	1.203E-05	1.40E+02	7.30E+00	G
		248.04	5.067E-06	%	1.242E-05	9.73E+01	6.60E+00	G
		591.70	-1.360E-05	%	2.898E-05	9.20E+01	4.60E+00	G
		48.70	-7.178E-06	%	2.319E-05	1.23E+02	4.20E+00	G
		756.70	-8.276E-06	%	3.330E-05	1.79E+02	4.10E+00	G

(- This peak used in the nuclide activity average.

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* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity	
RA-226	186.21	2179.	-642.	-0.011	34.48	-9.021E-05	P
PB-214	351.92	1023.	-186.	-0.003	78.79	-4.323E-06	P
TL-208	510.72	5044.	-2150.	-0.036	14.74	-1.094E-04	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/sample	Time Corrected Activity uCi/sample	Uncertainty 2 Sigma Counting uCi/sample	Total uCi/sample	MDA uCi/sample
U-235 #A	-2.4594E-06	-2.4594E-06	5.4918E-06	5.4947E-06	6.332E-06
RA-226 #A	-9.0204E-05	-9.0206E-05	3.1105E-05	3.1474E-05	3.095E-05
Ra-228	6.5379E-06	6.5849E-06	3.1632E-06	3.1937E-06	3.866E-06
Am-241 #B	-4.6334E-07	-4.6339E-07	1.2924E-06	1.2927E-06	2.143E-06
PB-210 #A	-7.0600E-07	-7.0743E-07	1.5582E-05	1.5582E-05	1.726E-05
U-238 #A	-5.8489E-06	-5.8489E-06	1.6028E-05	1.6035E-05	1.759E-05
K-40 #A	-2.5184E-05	-2.5184E-05	2.4121E-05	2.4185E-05	2.495E-05
PB-214 #A	-4.3226E-06	-4.3227E-06	3.4059E-06	3.4271E-06	3.533E-06

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BI-214	#A	-1.9817E-06	-1.9817E-06	3.8416E-06	3.8439E-06	3.822E-06
BI-212	#A	-8.3800E-06	-8.4403E-06	1.1875E-05	1.1889E-05	1.268E-05
PB-212	#A	-5.2067E-07	-5.2441E-07	2.2593E-06	2.2595E-06	2.354E-06
TL-208	#A	6.5220E-07	6.5689E-07	1.5208E-06	1.5216E-06	1.536E-06
PA-234	A	6.9509E-07	6.9509E-07	1.1922E-06	1.1935E-06	1.975E-06
CS-137	#A	-3.8466E-07	-3.8518E-07	1.1244E-06	1.1246E-06	1.879E-06
CO-60	#B	8.0335E-07	8.0966E-07	1.3397E-06	1.3402E-06	1.368E-06
EU-152	#A	-1.4095E-07	-1.4140E-07	1.3994E-06	1.3995E-06	1.858E-06
EU-154	#A	3.4080E-07	3.4245E-07	1.0343E-06	1.0347E-06	1.372E-06

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.9 to 1998.4 keV) 6.538E-06 uCi/sample
Total Decayed Activity (2.9 to 1998.4 keV) 6.5849363E-06 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-07**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/29/2022 14:24
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	(ARS03) MCB 129	**Fraction**	004
Library	ITSI COUNT.Lib	**Run**	1
Geometry	47mm AF 117495		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	2.9183E-007	uCi/sample	8.5088E-007	1.4100E-006	7.0500E-007
Bi-212	3.7167E-007	uCi/sample	5.3860E-006	9.0710E-006	4.5355E-006
Bi-214	2.6310E-006	uCi/sample	2.0075E-006	2.7710E-006	1.3855E-006
Co-60	1.8454E-007	uCi/sample	8.9068E-007	9.7880E-007	4.8940E-007
Cs-137	7.0997E-007	uCi/sample	5.4477E-007	7.2140E-007	3.6070E-007
Eu-152	-1.1175E-007	uCi/sample	8.0407E-007	1.0670E-006	5.3350E-007
Eu-154	-1.0048E-007	uCi/sample	6.5882E-007	8.7500E-007	4.3750E-007
K-40	-1.4281E-005	uCi/sample	1.5849E-005	1.6610E-005	8.3050E-006
Pa-234	4.8909E-007	uCi/sample	1.0482E-006	1.3830E-006	6.9150E-007
Pb-210	-1.2769E-006	uCi/sample	9.1744E-006	9.9290E-006	4.9645E-006
Pb-212	1.0452E-006	uCi/sample	1.2904E-006	1.7460E-006	8.7300E-007
Pb-214	-1.6155E-006	uCi/sample	1.9969E-006	2.0690E-006	1.0345E-006
Ra-226	-1.2505E-005	uCi/sample	1.4836E-005	1.5520E-005	7.7600E-006
Ra-228	-8.1280E-008	uCi/sample	3.4928E-006	3.6020E-006	1.8010E-006
Tl-208	-1.0302E-008	uCi/sample	9.6515E-007	1.0030E-006	5.0150E-007
U-235	-2.3412E-006	uCi/sample	4.0065E-006	3.9330E-006	1.9665E-006
U-238	-3.2166E-005	uCi/sample	1.0057E-005	1.2330E-005	6.1650E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:52:18 PM
AAA Spectrum name: ARS03574.An1

Sample description
Batch ID: 22-01012-07
SDG ID: ARS1-22-01492-004 Tech: [redacted]

Spectrum Filename: C:\User\ARS03574.An1

Acquisition information
Start time: 7/29/2022 2:24:57 PM
Live time: 60000
Real time: 60045
Dead time: 0.08 %
Detector ID: 17

Detector system
(ARS03) MCB 129

Calibration
Filename: 47mm AF 117495 calib 1-6-21.Clb
47mm AF 117495
1-6-21 EEC

Energy Calibration
Created: 1/6/2021 9:40:20 AM
Zero offset: 0.213 keV
Gain: 0.250 keV/channel
Quadratic: -2.204E-08 keV/channel^2

Efficiency Calibration
Created: 1/6/2021 9:47:25 AM
Knee Energy: 130.00 keV
Above the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -3.057202E-01 + (1.575027E-01*Log(E)) + (-8.666885E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.63 %
Log(Eff): -4.598458E+00 + (1.629076E+00*Log(E)) + (-2.077827E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.71keV)
Stop channel: 8000 (1997.15keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:52:18 PM
AAA Spectrum name: ARS03574.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/7/2022 9:09:00 PM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:31:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.2044

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
20.75	477.	7.72	0.84	2.092E-01				
23.77	266.	17.99	0.84	2.188E-01				
46.58	862.	6.68	0.80	2.450E-01	46.52	4.000	PBC<MDA	PB210
63.39	632.	7.27	0.88	2.426E-01	63.29	3.900	PBC<MDA	U238
66.36	103.	37.86	0.88	2.415E-01				
74.87	346.	13.64	0.89	2.374E-01				
77.15	235.	18.94	0.89	2.362E-01				
84.48	215.	21.06	1.26	2.321E-01				
92.72	1005.	6.05	1.18	2.271E-01	92.38	2.570	4.439E-05	U238
					92.80	3.000	3.254E-05	U238
143.91	112.	38.12	0.83	1.895E-01	143.76	10.500	PBC<MDA	U235
185.85	450.	11.86	1.13	1.575E-01	186.21	3.640	PBC<MDA	RA226
198.18	132.	34.10	0.68	1.499E-01				
238.65	417.	10.22	0.93	1.299E-01	238.63	43.100	PBC<MDA	PB212
241.97	134.	26.86	1.04	1.284E-01	241.98	7.500	6.254E-06	PB214
295.28	260.	16.41	0.66	1.093E-01	295.21	18.500	PBC<MDA	PB214
351.99	371.	10.16	0.97	9.422E-02	351.92	35.800	PBC<MDA	PB214
511.22	1803.	4.52	2.35	6.757E-02	510.72	22.500	5.375E-05	TL208
569.99	112.	30.15	0.58	6.106E-02	569.26	10.400	7.951E-06	PA234
583.61	173.	19.47	1.19	5.969E-02	583.14	86.000	PBC<MDA	TL208
609.53	366.	11.35	1.11	5.725E-02	609.31	44.791	PBC<MDA	BI214
614.72	78.	31.99	1.35	5.685E-02				

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:52:18 PM
AAA Spectrum name: ARS03574.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
661.88	71.	38.24	0.69	5.292E-02	661.66	85.210	7.100E-07	CS137
723.04	77.	32.68	0.97	4.852E-02	723.30	19.700	3.655E-06	EU154
803.28	80.	31.50	1.54	4.373E-02				
911.68	165.	16.27	1.96	3.849E-02	911.07	29.000	PBC<MDA	Ra228
1117.05	37.	37.53	1.73	3.113E-02				
1120.95	84.	20.36	1.73	3.102E-02	1120.29	14.797	PBC<MDA	BI214
1135.17	47.	36.04	0.73	3.061E-02				
1428.10	40.	34.15	1.53	2.388E-02				
1461.21	215.	9.77	1.13	2.328E-02	1460.75	10.700	PBC<MDA	K40
1765.29	105.	20.27	0.39	1.883E-02	1764.49	15.357	PBC<MDA	BI214
1847.71	53.	27.14	3.29	1.788E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
82.22	21.01	440.	477.	2.282E+03	15.43	0.842	RH-106	sD
94.30	24.03	1016.	266.	1.218E+03	35.97	0.845	RH-106	D
185.64	46.60	946.	862.	3.590E+03	13.36	0.799	PB-210	l
264.94	66.30	706.	105.	4.329E+02	74.52	0.884	SE-75	sD
298.88	74.89	943.	346.	1.459E+03	27.28	0.891	TH-234	sD
308.00	77.17	873.	235.	9.951E+02	37.88	0.893	PB-212	D
337.34	84.35	834.	215.	9.262E+02	42.12	1.262	HG-203	s
370.33	92.72	1037.	1005.	4.545E+03	12.10	1.183	TH-234	l
575.31	143.93	738.	112.	6.587E+02	76.24	0.833	U-235	l
743.22	185.78	887.	450.	3.112E+03	23.73	1.135	U-235	l
792.59	198.36	752.	132.	8.774E+02	68.19	0.682	SE-75	sM
1181.36	295.38	576.	260.	3.173E+03	32.82	0.659	PB-214	l
1408.46	352.03	405.	371.	4.362E+03	20.33	0.974	PB-214	l
2046.08	511.22	818.	1803.	2.668E+04	9.03	2.354	NA-22	M
2281.45	569.84	313.	112.	1.838E+03	60.30	0.582	BI-207	s
2335.98	583.68	311.	173.	3.121E+03	38.93	1.188	TL-208	l
2460.59	614.41	275.	78.	1.378E+03	63.97	1.350	SB-122	sD
2894.45	723.48	200.	77.	1.591E+03	65.37	0.974	EU-154	s
3215.83	803.40	192.	80.	1.832E+03	63.00	1.538	CS-134	M
3650.04	911.21	153.	165.	3.975E+03	32.53	1.961	AC-228	l
4472.79	1117.03	77.	37.	1.185E+03	75.04	1.727	KR-89	sD
4488.43	1120.93	103.	84.	2.698E+03	40.72	1.730	TA-182	sD
4545.41	1135.15	80.	47.	1.536E+03	72.09	0.728	J-132	sM
5719.13	1428.08	49.	40.	1.659E+03	68.30	1.535	-	s
5851.82	1461.21	58.	215.	9.465E+03	19.54	1.127	K-40	l
7070.56	1765.22	74.	105.	5.576E+03	40.53	0.385	BI-214	sM
7400.91	1847.20	37.	53.	2.953E+03	54.28	3.293	BI-214	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
U-238	252.52	63.29	3026.	-676.	-0.011	30.23	0.881
PB-214	967.95	241.98	578.	134.	0.002	53.72	1.039D
BI-214	2438.93	609.31	1109.	150.	0.002	75.92	1.346s
CS-137	2649.47	661.88	222.	71.	0.001	76.47	0.691s
BI-214	7067.36	1764.49	330.	-136.	-0.002	77.61	2.142s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Code	MDA Value uCi/sample	COMMENTS
U-235		-2.3412E-06				1.39E+09	
			143.76	-2.341E-06	%(P	3.933E-06 8.49E+01 1.05E+01	G
			205.31	-4.097E-06	%	1.127E-05 1.09E+02 4.70E+00	G
			163.35	5.720E-07	%	8.847E-06 5.81E+02 4.70E+00	G
RA-226		-1.2505E-05				5.84E+05	
			186.21	-1.250E-05	%(P	1.552E-05 5.89E+01 3.64E+00	G K
Ra-228		-8.1280E-08				2.10E+03	
			911.07	-8.128E-08	%(P	3.602E-06 2.15E+03 2.90E+01	G
			968.90	-2.088E-06	% P	6.539E-06 1.94E+02 1.75E+01	G
			338.40	-6.124E-06	& P	5.472E-06 4.54E+01 1.20E+01	G
			964.60	3.057E-07	%	2.256E-05 2.18E+03 5.45E+00	G
Am-241	T	2.9183E-07				1.58E+05	
			59.54	2.918E-07	&(	1.410E-06 1.46E+02 3.59E+01	G K
PB-210		-1.2769E-06				7.45E+03	
			46.52	-1.277E-06	%(P	9.929E-06 3.59E+02 4.00E+00	G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:52:18 PM
AAA Spectrum name: ARS03574.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-238	-3.2166E-05					1.63E+12	
		63.29-3.217E-05		(P	1.233E-05	1.51E+01	3.90E+00 G
		92.80 1.876E-06		} P	1.484E-05	2.10E+02	3.00E+00 G
		92.38 4.614E-06		} P	1.758E-05	9.88E+01	2.57E+00 G
K-40	-1.4281E-05					4.68E+11	
		1460.75-1.428E-05		%(P	1.661E-05	5.54E+01	1.07E+01 G
PB-214	-1.6155E-06					5.84E+05	
		351.92-1.615E-06		%(P	2.069E-06	6.16E+01	3.58E+01 G
		295.21-1.507E-06		% P	3.475E-06	1.14E+02	1.85E+01 G
		241.98 6.254E-06		+	5.367E-06	2.69E+01	7.50E+00 G
BI-214	2.6310E-06					5.84E+05	
		609.31 2.631E-06		(P	2.771E-06	3.80E+01	4.48E+01 G
		1764.49-2.125E-05		- P	1.361E-05	3.88E+01	1.54E+01 G
		1120.29-1.005E-05		% P	9.389E-06	7.02E+01	1.48E+01 G
		1238.11 1.562E-06		% P	1.711E-05	7.50E+02	5.86E+00 G
		768.36-2.574E-06		&	1.806E-05	3.11E+02	4.80E+00 G
		1377.67 7.250E-06		%	2.461E-05	1.59E+02	3.92E+00 G
		934.06 1.410E-05		%	2.662E-05	8.42E+01	3.03E+00 G
BI-212	3.7167E-07					2.10E+03	
		727.17 3.717E-07		%(	9.071E-06	7.25E+02	1.18E+01 G
		1620.56-1.617E-05		&	4.447E-05	1.34E+02	2.75E+00 G
		785.42-1.488E-05		% P	4.341E-05	1.70E+02	2.00E+00 G
PB-212	1.0452E-06					2.10E+03	
		238.63 1.045E-06		%(P	1.746E-06	6.15E+01	4.31E+01 G
		300.09-1.373E-05		% P	1.932E-05	9.95E+01	3.27E+00 G
TL-208	-1.0302E-08					2.10E+03	
		583.14-1.030E-08		%(P	1.003E-06	4.68E+03	8.60E+01 G
		510.72-2.386E-06		%	7.447E-06	9.44E+01	2.25E+01 G
		860.47 3.444E-06		%	6.714E-06	8.70E+01	1.20E+01 G
		277.36-3.514E-06		%	9.153E-06	1.04E+02	6.50E+00 G
		763.30 2.351E-05		&	4.791E-05	9.11E+01	1.70E+00 G
PA-234	4.8909E-07					1.65E+12	
		98.44 4.891E-07		%(	1.383E-06	1.07E+02	2.51E+01 G
		946.00 3.243E-07		%	4.037E-06	5.45E+02	2.00E+01 G
		131.28-4.422E-07		&	1.831E-06	1.56E+02	2.00E+01 G
		94.67-2.021E-06		% P	3.941E-06	9.09E+01	1.55E+01 G
		883.24-4.123E-06		& P	7.696E-06	1.75E+02	1.20E+01 G
		926.70-1.046E-06		% P	7.871E-06	4.63E+02	1.10E+01 G
		569.26 1.630E-07		&	7.604E-06	1.38E+03	1.04E+01 G
		111.00-2.255E-06		% P	4.656E-06	2.06E+02	8.55E+00 G

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AAA Spectrum name: ARS03574.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		733.00	2.655E-06	&	9.155E-06	1.48E+02	8.50E+00 G
		949.00	2.712E-06	&	1.028E-05	1.67E+02	7.80E+00 G
		880.51	3.651E-06	%	1.297E-05	1.57E+02	6.50E+00 G
		226.87	3.086E-06	&	8.207E-06	1.06E+02	6.50E+00 G
		831.10	2.390E-06	& P	1.483E-05	5.18E+02	5.60E+00 G
		808.10	1.079E-06	% P	2.441E-05	9.25E+02	4.90E+00 G
		99.70	3.741E-06	% P	7.431E-06	1.93E+02	4.70E+00 G
		699.10	9.531E-06	%	1.966E-05	8.91E+01	4.60E+00 G
		898.60	7.271E-06	& P	2.335E-05	1.81E+02	4.00E+00 G
		1394.10	1.413E-06	%	2.611E-05	8.59E+02	3.90E+00 G
CS-137	7.0997E-07					1.10E+04	
		661.66	7.100E-07	(	7.214E-07	3.82E+01	8.52E+01 G
CO-60	1.8454E-07					1.93E+03	
		1173.24	1.845E-07	&(	9.788E-07	2.41E+02	9.99E+01 K
		1332.50	1.528E-07	%	1.058E-06	3.24E+02	1.00E+02 K
EU-152	-1.1175E-07					4.64E+03	
		40.12	1.117E-07	%(	1.067E-06	3.60E+02	3.00E+01 G
		121.78	3.703E-08	%	1.196E-06	1.21E+03	2.92E+01 G
		344.30	2.556E-07	&	2.140E-06	3.30E+02	2.70E+01 G
		1408.08	6.150E-07	&	5.151E-06	3.91E+02	2.12E+01 G
		39.52	1.710E-07	%	1.962E-06	4.32E+02	1.60E+01 G
		964.00	1.923E-06	&	8.774E-06	1.36E+02	1.46E+01 G
		1112.07	3.778E-06	%	1.171E-05	9.33E+01	1.36E+01 G
		778.90	3.857E-07	&	6.072E-06	6.93E+02	1.30E+01 G
		1085.80	3.422E-06	%	8.184E-06	1.10E+02	1.03E+01 G
		45.40	1.168E-06	%	4.843E-06	1.25E+02	9.00E+00 G
		244.67	2.393E-06	%	1.139E-05	1.44E+02	7.62E+00 G
		867.39	5.437E-06	%	2.309E-05	1.89E+02	4.18E+00 G
EU-154	-1.0048E-07					3.10E+03	
		123.10	1.005E-07	%(	8.750E-07	3.28E+02	4.05E+01 G
		1274.80	5.504E-07	%	3.000E-06	2.56E+02	3.55E+01 G
		723.30	7.907E-07	%	4.523E-06	1.70E+02	1.97E+01 G
		1004.80	3.172E-06	%	6.430E-06	9.39E+01	1.76E+01 G
		43.00	7.983E-07	&	3.661E-06	1.38E+02	1.31E+01 G
		873.20	3.488E-06	%	7.956E-06	1.02E+02	1.13E+01 G
		996.30	4.918E-06	%	1.047E-05	9.86E+01	1.07E+01 G
		42.31	9.481E-07	%	6.765E-06	2.15E+02	7.30E+00 G
		248.04	2.943E-06	%	7.507E-06	1.01E+02	6.60E+00 G
		591.70	5.566E-06	%	1.591E-05	1.23E+02	4.60E+00 G
		48.70	4.085E-06	%	1.292E-05	1.20E+02	4.20E+00 G
		756.70	5.233E-06	&	1.965E-05	1.67E+02	4.10E+00 G

(- This peak used in the nuclide activity average.

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AAA Spectrum name: ARS03574.An1

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

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AAA Spectrum name: ARS03574.An1

PB-212 A	1.0377E-06	1.0452E-06	1.2859E-06	1.2904E-06	1.746E-06
TL-208 #A	-1.0228E-08	-1.0302E-08	9.6515E-07	9.6515E-07	1.003E-06
PA-234 #A	4.8909E-07	4.8909E-07	1.0474E-06	1.0482E-06	1.383E-06
CS-137 A	7.0900E-07	7.0997E-07	5.4293E-07	5.4477E-07	7.214E-07
CO-60 #B	1.8311E-07	1.8454E-07	8.9063E-07	8.9068E-07	9.788E-07
EU-152 #A	-1.1139E-07	-1.1175E-07	8.0389E-07	8.0407E-07	1.067E-06
EU-154 #A	-9.9991E-08	-1.0048E-07	6.5878E-07	6.5882E-07	8.750E-07

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.7 to 1997.2 keV) 3.340E-06 uCi/sample
Total Decayed Activity (2.7 to 1997.2 keV) 3.3409622E-06 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-08**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/29/2022 14:28
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	ARS06 MCB 133	**Fraction**	005
Library	ITSI COUNT.Lib	**Run**	1
Geometry	117495 47mm AF		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	6.8333E-008	uCi/sample	5.3201E-007	7.0750E-007	3.5375E-007
Bi-212	2.6981E-006	uCi/sample	4.9249E-006	5.3140E-006	2.6570E-006
Bi-214	1.8818E-006	uCi/sample	7.9502E-007	1.2150E-006	6.0750E-007
Co-60	1.2347E-007	uCi/sample	8.1066E-007	8.3610E-007	4.1805E-007
Cs-137	6.3842E-008	uCi/sample	6.2932E-007	6.8690E-007	3.4345E-007
Eu-152	-4.6096E-009	uCi/sample	8.5698E-007	1.1380E-006	5.6900E-007
Eu-154	2.2933E-007	uCi/sample	4.8693E-007	6.1340E-007	3.0670E-007
K-40	-3.2499E-006	uCi/sample	1.5365E-005	1.2250E-005	6.1250E-006
Pa-234	3.5546E-007	uCi/sample	7.7120E-007	9.7090E-007	4.8545E-007
Pb-210	1.1054E-005	uCi/sample	4.1510E-006	5.7660E-006	2.8830E-006
Pb-212	9.3217E-008	uCi/sample	8.0028E-007	9.6870E-007	4.8435E-007
Pb-214	-5.7420E-007	uCi/sample	1.1491E-006	1.3820E-006	6.9100E-007
Ra-226	-4.0037E-006	uCi/sample	7.7979E-006	9.8040E-006	4.9020E-006
Ra-228	-1.3522E-006	uCi/sample	2.6092E-006	2.7270E-006	1.3635E-006
Tl-208	5.3562E-007	uCi/sample	5.7515E-007	6.3480E-007	3.1740E-007
U-235	-9.6234E-007	uCi/sample	2.2423E-006	2.8240E-006	1.4120E-006
U-238	-2.6507E-006	uCi/sample	5.4720E-006	7.2200E-006	3.6100E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:55:06 PM
AAA Spectrum name: ARS06304.An1

Sample description
Batch ID: 22-01012-08
SDG ID: ARS1-22-01492-005 Tech: [redacted]

Spectrum Filename: C:\User\ARS06304.An1

Acquisition information
Start time: 7/29/2022 2:28:26 PM
Live time: 60000
Real time: 60035
Dead time: 0.06 %
Detector ID: 21

Detector system
ARS06 MCB 133

Calibration
Filename: 117495 47mm AF calib 7-3-21 .Clb
117495 47mm AF
EEC 7-3-21

Energy Calibration
Created: 7/3/2021 9:44:58 AM
Zero offset: 0.085 keV
Gain: 0.250 keV/channel
Quadratic: -3.365E-08 keV/channel^2

Efficiency Calibration
Created: 7/3/2021 3:18:09 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.77 %
Log(Eff): -2.894388E+00 + (1.055530E+00*Log(E)) +
(-1.582298E-01*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.99 %
Log(Eff): -7.116829E+00 + (2.826979E+00*Log(E)) +
(-3.434918E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.59keV)
Stop channel: 8000 (1997.96keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:55:06 PM
AAA Spectrum name: ARS06304.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/13/2022 8:05:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:06:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1789

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
11.71	1390.	4.21	0.88	1.048E-01				
13.17	1436.	5.99	0.88	1.196E-01				
14.76	1527.	5.56	0.89	1.346E-01				
16.49	1138.	7.51	0.89	1.496E-01				
45.43	260.	18.09	1.63	2.641E-01				
46.52	260.	18.09	1.63	2.655E-01	46.52	4.000	1.105E-05	PB210
77.50	109.	34.14	1.43	2.672E-01				
87.38	134.	24.06	1.20	2.609E-01				
198.21	201.	20.05	0.88	1.759E-01				
477.53	160.	21.79	1.12	9.034E-02				
511.12	2036.	4.16	2.90	8.494E-02	510.72	22.500	4.823E-05	TL208
558.53	111.	27.71	1.79	7.820E-02				
609.64	135.	20.83	1.57	7.187E-02	609.31	44.791	1.884E-06	BI214
615.12	70.	34.76	1.58	7.125E-02				
803.79	93.	28.45	1.10	5.426E-02				
835.49	74.	38.35	1.83	5.200E-02				
949.00	52.	30.37	1.89	4.530E-02	949.00	7.800	6.638E-06	PA234
953.15	53.	31.06	1.90	4.508E-02				
962.86	76.	36.13	1.42	4.458E-02	964.00	14.580	5.260E-06	EU152
					964.60	5.452	1.412E-05	Ra228
1142.13	60.	33.70	1.89	3.665E-02				
1273.22	42.	35.95	0.38	3.219E-02	1274.80	35.500	1.663E-06	EU154

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:55:06 PM
AAA Spectrum name: ARS06304.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1349.39	51.	38.13	0.51	2.997E-02				
1461.19	138.	17.28	2.88	2.720E-02	1460.75	10.700	PBC<MDA	K40
1572.95	37.	38.24	0.70	2.478E-02				
1685.54	85.	25.69	0.44	2.268E-02				
1739.07	38.	37.85	0.31	2.177E-02				
1763.78	79.	22.83	2.84	2.137E-02	1764.49	15.357	1.089E-05	BI214
1936.86	57.	27.91	4.86	1.888E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV		Suspected Nuclide
46.48	11.56	1014.	1390.	1.326E+04	8.41	0.882	-	sD
52.33	13.02	2985.	1436.	1.201E+04	11.99	0.884	-	sD
58.71	14.62	2842.	1527.	1.134E+04	11.12	0.886	-	sD
65.63	16.35	3080.	1138.	7.605E+03	15.02	0.888	-	D
309.68	77.80	558.	109.	4.091E+02	68.27	1.429	-	sM
349.18	87.34	413.	134.	5.143E+02	48.12	1.200	-	sM
792.56	198.12	527.	201.	1.143E+03	40.10	0.876	-	M
1910.24	477.53	330.	160.	1.771E+03	43.59	1.125	-	s
2044.67	511.13	770.	2036.	2.398E+04	8.33	2.904	-	
2234.43	558.53	253.	111.	1.420E+03	55.42	1.794	-	s
2462.80	615.28	229.	62.	8.702E+02	73.56	1.577	-	D
3216.14	803.84	184.	93.	1.714E+03	56.91	1.102	-	s
3343.09	836.47	197.	74.	1.421E+03	76.70	1.833	-	s
3797.55	948.82	99.	52.	1.149E+03	60.73	1.893	-	sD
3814.14	952.97	107.	53.	1.168E+03	62.12	1.897	-	sD
3853.05	962.59	176.	76.	1.696E+03	72.25	1.419	-	sM
4570.90	1142.11	96.	60.	1.632E+03	67.40	1.889	-	M
5095.97	1273.60	62.	42.	1.305E+03	71.90	0.382	-	sM
5401.06	1350.73	87.	51.	1.708E+03	76.25	0.506	-	sM
5848.92	1460.85	99.	138.	5.502E+03	34.57	2.876	-	l
6296.68	1572.98	48.	37.	1.493E+03	76.48	0.701	-	sM
6747.83	1685.28	67.	85.	3.740E+03	51.38	0.440	-	sM
6962.34	1739.08	46.	38.	1.750E+03	75.69	0.309	-	sM
7061.39	1763.50	51.	79.	3.710E+03	45.66	2.836	-	sM
7755.06	1936.66	44.	57.	3.008E+03	55.82	4.863	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:55:06 PM
AAA Spectrum name: ARS06304.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	181.36	45.43	815.	260.	0.004	36.18	1.626
BI-214	2437.67	609.31	326.	135.	0.002	41.70	1.571D

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Peak Code	Peak MDA Value uCi/sample	COMMENTS
U-235		-9.6234E-07				1.39E+09	
			143.76-9.623E-07	%(	2.824E-06	1.16E+02 1.05E+01	G
			205.31-3.246E-06	%	7.879E-06	9.65E+01 4.70E+00	G
			163.35-2.736E-06	%	7.290E-06	1.06E+02 4.70E+00	G
RA-226		-4.0037E-06				5.84E+05	
			186.21-4.004E-06	%(	9.804E-06	9.73E+01 3.64E+00	G K
Ra-228		-1.3522E-06				2.10E+03	
			911.07-1.352E-06	&(	2.727E-06	9.64E+01 2.90E+01	G
			968.90-2.755E-06	&	6.756E-06	7.41E+01 1.75E+01	G
			338.40 1.093E-06	%	3.495E-06	1.32E+02 1.20E+01	G
			964.60-3.144E-06	%	1.773E-05	1.68E+02 5.45E+00	G
Am-241	T	6.8333E-08				1.58E+05	
			59.54 6.833E-08	&(	7.075E-07	3.89E+02 3.59E+01	G K
PB-210		1.1054E-05				7.45E+03	
			46.52 1.105E-05	?(	5.766E-06	1.81E+01 4.00E+00	G
U-238		-2.6507E-06				1.63E+12	
			63.29-2.651E-06	%(	7.220E-06	1.03E+02 3.90E+00	G
			92.80-1.169E-07	%	8.209E-06	2.76E+03 3.00E+00	G
			92.38 2.772E-06	&	9.349E-06	1.34E+02 2.57E+00	G
K-40		-3.2499E-06				4.68E+11	
			1460.75-3.250E-06	%(P	1.225E-05	2.36E+02 1.07E+01	G
PB-214		-5.7420E-07				5.84E+05	
			351.92-5.742E-07	%(	1.382E-06	1.00E+02 3.58E+01	G
			295.21 6.055E-09	%	2.390E-06	1.62E+04 1.85E+01	G
			241.98-2.349E-06	%	5.903E-06	1.05E+02 7.50E+00	G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:55:06 PM
AAA Spectrum name: ARS06304.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	1.8818E-06				5.84E+05		
		609.31	1.882E-06	(	1.215E-06	2.08E+01	4.48E+01 G
		1764.49	-4.711E-06	%	9.763E-06	6.29E+01	1.54E+01 G
		1120.29	4.167E-07	%	6.238E-06	7.28E+02	1.48E+01 G
		1238.11	-6.155E-06	%	1.686E-05	1.38E+02	5.86E+00 G
		768.36	-2.914E-06	%	1.417E-05	2.23E+02	4.80E+00 G
		1377.67	-1.682E-05	%	2.777E-05	8.37E+01	3.92E+00 G
		934.06	5.054E-06	&	2.708E-05	2.54E+02	3.03E+00 G
BI-212	2.6981E-06				2.10E+03		
		727.17	2.698E-06	&(	5.314E-06	9.12E+01	1.18E+01 G
		1620.56	1.611E-05	&	3.217E-05	1.02E+02	2.75E+00 G
		785.42	1.375E-05	&	3.439E-05	1.16E+02	2.00E+00 G
PB-212	9.3217E-08				2.10E+03		
		238.63	9.322E-08	%(	9.687E-07	4.29E+02	4.31E+01 G
		300.09	-6.234E-06	&	1.569E-05	1.05E+02	3.27E+00 G
TL-208	5.3562E-07				2.10E+03		
		583.14	5.356E-07	%(	6.348E-07	5.36E+01	8.60E+01 G
		510.72	-1.575E-06	%	6.068E-06	1.16E+02	2.25E+01 G
		860.47	3.267E-06	&	5.839E-06	8.55E+01	1.20E+01 G
		277.36	2.324E-06	%	6.438E-06	1.15E+02	6.50E+00 G
		763.30	4.184E-06	%	3.910E-05	4.28E+02	1.70E+00 G
PA-234	3.5546E-07				1.65E+12		
		98.44	3.555E-07	%(	9.709E-07	1.08E+02	2.51E+01 G
		946.00	-1.983E-06	&	4.931E-06	7.51E+01	2.00E+01 G
		131.28	4.657E-07	%	1.343E-06	1.14E+02	2.00E+01 G
		94.67	-6.100E-07	%	1.651E-06	1.08E+02	1.55E+01 G
		883.24	-3.305E-06	&	6.710E-06	9.72E+01	1.20E+01 G
		926.70	-1.878E-06	%	6.859E-06	1.73E+02	1.10E+01 G
		569.26	1.993E-06	%	5.915E-06	1.33E+02	1.04E+01 G
		111.00	-1.160E-06	&	3.203E-06	1.10E+02	8.55E+00 G
		733.00	-4.149E-06	&	8.052E-06	9.00E+01	8.50E+00 G
		949.00	6.782E-07	%	1.082E-05	4.71E+02	7.80E+00 G
		880.51	-1.503E-06	%	1.157E-05	3.65E+02	6.50E+00 G
		226.87	-2.526E-06	&	6.241E-06	1.03E+02	6.50E+00 G
		831.10	-2.919E-07	%	1.613E-05	1.64E+03	5.60E+00 G
		808.10	2.953E-06	%	1.765E-05	1.78E+02	4.90E+00 G
		99.70	-1.677E-06	%	5.397E-06	1.28E+02	4.70E+00 G
		699.10	-5.823E-06	%	1.708E-05	1.36E+02	4.60E+00 G
		898.60	-1.065E-05	%	1.999E-05	8.99E+01	4.00E+00 G
		1394.10	4.006E-07	%	2.395E-05	2.96E+03	3.90E+00 G

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AAA Spectrum name: ARS06304.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA		Comments
CS-137	6.3842E-08					1.10E+04		
		661.66	6.384E-08	&(	6.869E-07	4.93E+01	8.52E+01	G
CO-60	1.2347E-07					1.93E+03		
		1173.24	1.235E-07	%(	8.361E-07	3.28E+01	9.99E+01	K
		1332.50	-2.974E-07	%	1.059E-06	1.79E+02	1.00E+02	K
EU-152	-4.6096E-09					4.64E+03		
		40.12	-4.610E-09	%(	1.138E-06	9.30E+03	3.00E+01	G
		121.78	-3.693E-07	%	9.470E-07	1.02E+02	2.92E+01	G
		344.30	-6.881E-07	&	1.679E-06	1.01E+02	2.70E+01	G
		1408.08	8.224E-07	%	4.383E-06	2.65E+02	2.12E+01	G
		39.52	7.537E-07	%	2.083E-06	1.05E+02	1.60E+01	G
		964.00	-9.347E-07	%	6.421E-06	2.04E+02	1.46E+01	G
		1112.07	-4.027E-06	%	7.145E-06	8.76E+01	1.36E+01	G
		778.90	-2.650E-06	%	5.100E-06	8.91E+01	1.30E+01	G
		1085.80	3.989E-06	%	7.278E-06	8.96E+01	1.03E+01	G
		45.40	1.109E-06	%	3.285E-06	8.94E+01	9.00E+00	G
		244.67	-2.389E-06	%	5.603E-06	9.75E+01	7.62E+00	G
		867.39	-2.162E-06	%	1.724E-05	3.77E+02	4.18E+00	G
EU-154	2.2933E-07					3.10E+03		
		123.10	2.293E-07	&(	6.134E-07	1.06E+02	4.05E+01	G
		1274.80	-1.572E-06	%	2.782E-06	5.40E+01	3.55E+01	G
		723.30	-1.515E-06	&	3.633E-06	1.11E+02	1.97E+01	G
		1004.80	3.366E-06	%	3.787E-06	5.42E+01	1.76E+01	G
		43.00	5.275E-07	%	2.767E-06	1.58E+02	1.31E+01	G
		873.20	-1.195E-06	%	6.376E-06	2.53E+02	1.13E+01	G
		996.30	-4.039E-06	%	7.612E-06	9.01E+01	1.07E+01	G
		42.31	-1.543E-06	%	5.697E-06	1.11E+02	7.30E+00	G
		248.04	-7.693E-07	&	6.257E-06	3.36E+02	6.60E+00	G
		591.70	1.527E-06	%	1.285E-05	3.74E+02	4.60E+00	G
		48.70	-2.184E-06	%	8.585E-06	1.19E+02	4.20E+00	G
		756.70	-6.611E-06	%	1.732E-05	1.21E+02	4.10E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.

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AAA Spectrum name: ARS06304.An1

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity uCi/sample	Time Corrected Activity uCi/sample	Uncertainty 2 Sigma Counting uCi/sample	Total uCi/sample	MDA uCi/sample
U-235	#A	-9.6234E-07	-9.6234E-07	2.2410E-06	2.2423E-06	2.824E-06
RA-226	#B	-4.0036E-06	-4.0037E-06	7.7944E-06	7.7979E-06	9.804E-06
Ra-228	#A	-1.3450E-06	-1.3522E-06	2.6077E-06	2.6092E-06	2.727E-06
Am-241	#B	6.8328E-08	6.8333E-08	5.3199E-07	5.3201E-07	7.075E-07
PB-210	#	1.1038E-05	1.1054E-05	3.9996E-06	4.1510E-06	5.766E-06
U-238	#A	-2.6507E-06	-2.6507E-06	5.4677E-06	5.4720E-06	7.220E-06
K-40	#A	-3.2499E-06	-3.2499E-06	1.5363E-05	1.5365E-05	1.225E-05
PB-214	#A	-5.7419E-07	-5.7420E-07	1.1480E-06	1.1491E-06	1.382E-06
BI-214		1.8817E-06	1.8818E-06	7.8467E-07	7.9502E-07	1.215E-06
BI-212	#A	2.6836E-06	2.6981E-06	4.9213E-06	4.9249E-06	5.314E-06
PB-212	#A	9.2718E-08	9.3217E-08	8.0025E-07	8.0028E-07	9.687E-07
TL-208	#A	5.3275E-07	5.3562E-07	5.7389E-07	5.7515E-07	6.348E-07
PA-234	#A	3.5546E-07	3.5546E-07	7.7069E-07	7.7120E-07	9.709E-07
CS-137	#A	6.3776E-08	6.3842E-08	6.2931E-07	6.2932E-07	6.869E-07
CO-60	#B	1.2275E-07	1.2347E-07	8.1064E-07	8.1066E-07	8.361E-07
EU-152	#A	-4.5985E-09	-4.6096E-09	8.5698E-07	8.5698E-07	1.138E-06
EU-154	#A	2.2850E-07	2.2933E-07	4.8653E-07	4.8693E-07	6.134E-07

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:55:06 PM
AAA Spectrum name: ARS06304.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.6 to 1998.0 keV) 1.292E-05 uCi/sample
Total Decayed Activity (2.6 to 1998.0 keV) 1.2936116E-05 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-09**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/30/2022 11:26
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	(ARS03) MCB 129	**Fraction**	006
Library	ITSI COUNT.Lib	**Run**	1
Geometry	47mm AF 117495		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	-2.7168E-007	uCi/sample	8.0235E-007	1.3300E-006	6.6500E-007
Bi-212	3.1111E-006	uCi/sample	5.4420E-006	9.0210E-006	4.5105E-006
Bi-214	1.0015E-006	uCi/sample	2.0101E-006	2.2250E-006	1.1125E-006
Co-60	-3.8383E-007	uCi/sample	1.0019E-006	1.0910E-006	5.4550E-007
Cs-137	3.8654E-007	uCi/sample	7.2199E-007	8.3840E-007	4.1920E-007
Eu-152	-3.7309E-007	uCi/sample	8.3396E-007	1.0990E-006	5.4950E-007
Eu-154	-3.2901E-007	uCi/sample	6.7296E-007	8.8820E-007	4.4410E-007
K-40	-5.3430E-005	uCi/sample	2.4186E-005	2.2010E-005	1.1005E-005
Pa-234	4.6455E-007	uCi/sample	9.9992E-007	1.3200E-006	6.6000E-007
Pb-210	-2.1335E-007	uCi/sample	9.1875E-006	9.9360E-006	4.9680E-006
Pb-212	-1.4682E-007	uCi/sample	1.2654E-006	1.7370E-006	8.6850E-007
Pb-214	-3.3300E-007	uCi/sample	2.0407E-007	2.1180E-006	1.0590E-006
Ra-226	-9.2505E-006	uCi/sample	1.4895E-005	1.5630E-005	7.8150E-006
Ra-228	4.9993E-006	uCi/sample	2.3359E-006	2.7150E-006	1.3575E-006
Tl-208	-1.3960E-007	uCi/sample	9.5847E-007	9.9780E-007	4.9890E-007
U-235	-2.3796E-006	uCi/sample	3.9556E-006	3.8410E-006	1.9205E-006
U-238	-2.4212E-006	uCi/sample	9.9027E-006	1.0310E-005	5.1550E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:58:38 PM
AAA Spectrum name: ARS03576.An1

Sample description
Batch ID: 22-01012-09
SDG ID: ARS1-22-01492-006 Tech: [redacted]

Spectrum Filename: C:\User\ARS03576.An1

Acquisition information
Start time: 7/30/2022 11:26:16 AM
Live time: 60000
Real time: 60046
Dead time: 0.08 %
Detector ID: 17

Detector system
(ARS03) MCB 129

Calibration
Filename: 47mm AF 117495 calib 1-6-21.Clb
47mm AF 117495
1-6-21 EEC

Energy Calibration
Created: 1/6/2021 9:40:20 AM
Zero offset: 0.213 keV
Gain: 0.250 keV/channel
Quadratic: -2.204E-08 keV/channel^2

Efficiency Calibration
Created: 1/6/2021 9:47:25 AM
Knee Energy: 130.00 keV
Above the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -3.057202E-01 + (1.575027E-01*Log(E)) + (-8.666885E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.63 %
Log(Eff): -4.598458E+00 + (1.629076E+00*Log(E)) + (-2.077827E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.71keV)
Stop channel: 8000 (1997.15keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:58:38 PM
AAA Spectrum name: ARS03576.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/13/2022 7:42:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:31:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1905

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
20.80	266.	15.36	1.51	2.084E-01				
46.60	891.	6.77	0.97	2.450E-01	46.52	4.000	PBC<MDA	PB210
63.32	696.	8.59	0.94	2.426E-01	63.29	3.900	PBC<MDA	U238
72.63	135.	28.61	0.89	2.386E-01				
74.89	391.	11.55	0.89	2.374E-01				
77.20	280.	15.67	0.89	2.362E-01				
84.63	228.	18.07	0.90	2.320E-01				
87.57	184.	22.10	0.90	2.302E-01				
92.65	1007.	6.21	1.06	2.271E-01	92.38	2.570	4.449E-05	U238
					92.80	3.000	3.264E-05	U238
185.85	491.	10.51	1.05	1.574E-01	186.21	3.640	PBC<MDA	RA226
238.55	422.	11.85	0.77	1.298E-01	238.63	43.100	PBC<MDA	PB212
242.01	112.	30.31	1.04	1.284E-01	241.98	7.500	5.236E-06	PB214
295.42	182.	21.24	1.37	1.093E-01	295.21	18.500	PBC<MDA	PB214
337.92	118.	31.90	0.87	9.755E-02	338.40	12.010	PBC<MDA	Ra228
352.05	351.	13.12	1.09	9.422E-02	351.92	35.800	PBC<MDA	PB214
477.87	96.	29.68	0.80	7.186E-02				
511.09	1851.	4.55	2.42	6.757E-02	510.72	22.500	5.511E-05	TL208
583.51	214.	12.46	1.25	5.971E-02	583.14	86.000	PBC<MDA	TL208
609.48	361.	10.56	1.30	5.728E-02	609.31	44.791	PBC<MDA	BI214
723.13	81.	27.62	1.44	4.855E-02	723.30	19.700	3.819E-06	EU154
728.03	76.	28.17	1.44	4.823E-02	727.17	11.800	6.045E-06	BI212

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:58:38 PM
AAA Spectrum name: ARS03576.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
803.27	83.	29.99	0.51	4.374E-02				
911.29	123.	23.05	1.56	3.849E-02	911.07	29.000	PBC<MDA	Ra228
1001.67	75.	37.05	2.49	3.490E-02				
1461.58	255.	9.71	1.53	2.327E-02	1460.75	10.700	PBC<MDA	K40
1496.94	75.	23.12	1.16	2.266E-02				
1531.39	57.	30.14	0.46	2.210E-02				
1764.95	131.	16.04	1.96	1.883E-02	1764.49	15.357	PBC<MDA	BI214
1901.79	56.	20.46	1.40	1.729E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
82.41	20.78	640.	266.	1.279E+03	30.71	1.508	MO-99	s
185.70	46.60	1018.	891.	3.905E+03	13.55	0.968	PB-210	l
252.63	63.40	1064.	696.	2.986E+03	17.17	0.936	TH-234	l
289.92	72.59	673.	135.	5.639E+02	57.22	0.889	AU-196	sD
298.95	74.84	824.	391.	1.647E+03	23.09	0.891	TH-234	D
308.23	77.16	819.	280.	1.183E+03	31.34	0.893	PB-212	D
337.95	84.61	737.	228.	9.843E+02	36.13	0.900	TA-182	sD
349.75	87.56	733.	184.	7.984E+02	44.20	0.903	PB-212	sD
743.21	185.84	835.	491.	3.296E+03	21.03	1.049	U-235	l
954.22	238.68	768.	422.	2.953E+03	23.70	0.775	PB-212	l
1181.92	295.37	525.	182.	1.721E+03	42.48	1.373	PB-214	l
1352.11	338.03	483.	118.	1.212E+03	63.80	0.869	AC-228	sM
1408.69	352.05	590.	351.	3.726E+03	26.24	1.089	PB-214	l
1912.55	478.02	290.	96.	1.343E+03	59.36	0.802	BE-7	sM
2045.58	511.21	862.	1851.	2.740E+04	9.11	2.420	NA-22	sM
2335.60	583.48	190.	214.	3.806E+03	24.93	1.254	TL-208	l
2439.61	609.51	341.	361.	6.678E+03	21.11	1.296	BI-214	l
2896.05	723.05	204.	78.	1.600E+03	56.79	1.436	J-131	D
3215.78	803.21	172.	83.	1.893E+03	59.98	0.515	-	sM
4010.57	1001.85	180.	75.	2.155E+03	74.11	2.493	TA-182	s
5853.31	1461.61	82.	255.	1.097E+04	19.41	1.535	K-40	M
5995.04	1497.49	53.	75.	3.319E+03	46.24	1.160	RH-106	sM
6133.08	1531.41	58.	57.	2.597E+03	60.28	0.463	-	sM
7069.19	1765.30	67.	131.	6.978E+03	32.09	1.965	BI-214	M
7617.69	1901.79	15.	56.	3.219E+03	40.93	1.404	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:58:38 PM
AAA Spectrum name: ARS03576.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
U-238	370.67	92.80	2093.	161.	0.003	71.82	0.907D
PB-214	967.95	241.98	520.	112.	0.002	60.62	1.039D
Ra-228	3648.50	911.29	190.	123.	0.002	46.10	1.559
K-40	5849.99	1460.75	653.	-296.	-0.005	44.72	1.957

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Code	MDA Value uCi/sample	COMMENTS
U-235		-2.3796E-06				1.39E+09	
			143.76	-2.380E-06	%(P	3.841E-06 8.24E+01 1.05E+01	G
			205.31	3.638E-06	%	9.711E-06 1.06E+02 4.70E+00	G
			163.35	-3.375E-06	%	9.489E-06 1.06E+02 4.70E+00	G
RA-226		-9.2505E-06				5.84E+05	
			186.21	-9.250E-06	%(P	1.563E-05 8.02E+01 3.64E+00	G K
Ra-228		4.9993E-06				2.10E+03	
			911.07	4.999E-06	(P	2.715E-06 2.31E+01 2.90E+01	G
			968.90	-3.631E-06	% P	6.601E-06 1.44E+02 1.75E+01	G
			338.40	-9.490E-06	% P	6.107E-06 5.26E+01 1.20E+01	G
			964.60	-2.218E-06	%	1.852E-05 3.69E+02 5.45E+00	G
Am-241	T	-2.7168E-07				1.58E+05	
			59.54	-2.717E-07	&(	1.330E-06 1.48E+02 3.59E+01	G K
PB-210		-2.1335E-07				7.45E+03	
			46.52	-2.133E-07	%(P	9.936E-06 2.15E+03 4.00E+00	G
U-238		-2.4212E-06				1.63E+12	
			63.29	-2.421E-06	%(P	1.031E-05 2.04E+02 3.90E+00	G
			92.80	1.062E-05	} P	1.428E-05 3.59E+01 3.00E+00	G
			92.38	-3.808E-06	} P	1.759E-05 1.75E+02 2.57E+00	G
K-40		-5.3430E-05				4.68E+11	
			1460.75	-5.343E-05	(P	2.201E-05 2.24E+01 1.07E+01	G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:58:38 PM
AAA Spectrum name: ARS03576.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	-3.3300E-07					5.84E+05	
		351.92-1.500E-06	%(P	2.118E-06	6.75E+01	3.58E+01	G
		295.21-2.324E-06	% P	3.463E-06	7.37E+01	1.85E+01	G
		241.98 5.236E-06	(	5.096E-06	3.03E+01	7.50E+00	G
BI-214	1.0015E-06					5.84E+05	
		609.31 1.002E-06	%(P	2.225E-06	1.00E+02	4.48E+01	G
		1764.49-2.285E-05	% P	1.401E-05	4.94E+01	1.54E+01	G
		1120.29-5.971E-06	% P	8.022E-06	7.25E+01	1.48E+01	G
		1238.11 5.938E-06	% P	1.764E-05	2.01E+02	5.86E+00	G
		768.36 7.207E-06	%	1.612E-05	9.98E+01	4.80E+00	G
		1377.67 1.439E-05	%	2.461E-05	8.12E+01	3.92E+00	G
		934.06 1.375E-05	%	2.599E-05	8.42E+01	3.03E+00	G
BI-212	3.1111E-06					2.10E+03	
		727.17 3.111E-06	&(	9.021E-06	8.74E+01	1.18E+01	G
		1620.56-2.607E-05	%	4.656E-05	8.75E+01	2.75E+00	G
		785.42-2.139E-05	& P	4.452E-05	1.79E+02	2.00E+00	G
PB-212	-1.4682E-07					2.10E+03	
		238.63-1.468E-07	%(P	1.737E-06	4.31E+02	4.31E+01	G
		300.09-1.406E-05	& P	1.967E-05	9.68E+01	3.27E+00	G
TL-208	-1.3960E-07					2.10E+03	
		583.14-1.396E-07	%(P	9.978E-07	3.43E+02	8.60E+01	G
		510.72 1.873E-06	%	7.348E-06	1.18E+02	2.25E+01	G
		860.47 3.022E-06	%	6.851E-06	1.01E+02	1.20E+01	G
		277.36-2.059E-06	&	8.485E-06	1.63E+02	6.50E+00	G
		763.30 1.930E-06	%	4.821E-05	1.10E+03	1.70E+00	G
PA-234	4.6455E-07					1.65E+12	
		98.44 4.646E-07	%(	1.320E-06	1.08E+02	2.51E+01	G
		946.00-1.804E-06	&	4.705E-06	1.16E+02	2.00E+01	G
		131.28-2.750E-07	%	1.823E-06	2.50E+02	2.00E+01	G
		94.67-2.024E-06	% P	3.958E-06	8.99E+01	1.55E+01	G
		883.24-4.406E-06	% P	8.077E-06	1.62E+02	1.20E+01	G
		926.70-1.920E-06	% P	7.906E-06	2.53E+02	1.10E+01	G
		569.26 3.075E-06	%	6.714E-06	9.41E+01	1.04E+01	G
		111.00-3.341E-07	% P	4.039E-06	6.42E+02	8.55E+00	G
		733.00 1.130E-06	&	9.152E-06	3.45E+02	8.50E+00	G
		949.00 1.408E-06	&	1.245E-05	3.90E+02	7.80E+00	G
		880.51-7.592E-06	%	1.566E-05	9.23E+01	6.50E+00	G
		226.87-3.214E-06	%	8.471E-06	1.05E+02	6.50E+00	G
		831.10-7.656E-06	% P	1.591E-05	1.60E+02	5.60E+00	G
		808.10-3.807E-07	& P	2.355E-05	2.58E+03	4.90E+00	G
		99.70 1.035E-06	% P	7.000E-06	3.63E+02	4.70E+00	G
		699.10 2.407E-06	%	1.808E-05	3.21E+02	4.60E+00	G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 3:58:38 PM
AAA Spectrum name: ARS03576.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		898.60	-1.313E-05	% P	2.470E-05	1.03E+02	4.00E+00 G
		1394.10	-1.777E-05	%	3.337E-05	8.96E+01	3.90E+00 G
CS-137	3.8654E-07					1.10E+04	
		661.66	3.865E-07	%(	8.384E-07	9.33E+01	8.52E+01 G
CO-60	-3.8383E-07					1.93E+03	
		1173.24	-3.838E-07	%(	1.091E-06	1.30E+02	9.99E+01 K
		1332.50	-6.987E-07	%	1.299E-06	8.88E+01	1.00E+02 K
EU-152	-3.7309E-07					4.64E+03	
		40.12	-3.731E-07	&(	1.099E-06	1.12E+02	3.00E+01 G
		121.78	2.640E-07	&	1.181E-06	1.69E+02	2.92E+01 G
		344.30	-9.220E-07	&	2.252E-06	9.70E+01	2.70E+01 G
		1408.08	4.683E-07	%	5.056E-06	5.04E+02	2.12E+01 G
		39.52	6.330E-07	%	1.948E-06	1.16E+02	1.60E+01 G
		964.00	3.328E-06	%	6.179E-06	8.29E+01	1.46E+01 G
		1112.07	1.488E-06	%	6.935E-06	2.12E+02	1.36E+01 G
		778.90	-2.996E-06	%	6.665E-06	9.94E+01	1.30E+01 G
		1085.80	2.326E-06	%	8.683E-06	1.70E+02	1.03E+01 G
		45.40	3.509E-07	%	4.763E-06	4.08E+02	9.00E+00 G
		244.67	2.686E-06	%	1.108E-05	1.24E+02	7.62E+00 G
		867.39	-3.028E-06	%	2.142E-05	3.13E+02	4.18E+00 G
EU-154	-3.2901E-07					3.10E+03	
		123.10	-3.290E-07	%(	8.882E-07	1.02E+02	4.05E+01 G
		1274.80	4.241E-07	%	2.906E-06	3.21E+02	3.55E+01 G
		723.30	9.125E-07	%	5.711E-06	1.87E+02	1.97E+01 G
		1004.80	1.979E-06	%	6.500E-06	9.85E+01	1.76E+01 G
		43.00	8.032E-07	%	3.633E-06	1.36E+02	1.31E+01 G
		873.20	-4.092E-06	%	8.459E-06	9.24E+01	1.13E+01 G
		996.30	-4.815E-06	%	1.307E-05	8.19E+01	1.07E+01 G
		42.31	-1.497E-06	%	6.903E-06	1.39E+02	7.30E+00 G
		248.04	-3.133E-06	%	8.437E-06	1.07E+02	6.60E+00 G
		591.70	-2.725E-06	%	1.563E-05	2.45E+02	4.60E+00 G
		48.70	-4.166E-06	%	1.328E-05	1.21E+02	4.20E+00 G
		756.70	-1.584E-07	%	1.978E-05	5.50E+03	4.10E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

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AAA Spectrum name: ARS03576.An1

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity	
K-40	1460.75	653.	-296.	-0.005	44.72	-5.343E-05	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity uCi/sample	Time Corrected Activity uCi/sample	Uncertainty Counting uCi/sample	2 Sigma Total uCi/sample	MDA uCi/sample
U-235	#A	-2.3796E-06	-2.3796E-06	3.9221E-06	3.9556E-06	3.841E-06
RA-226	#B	-9.2503E-06	-9.2505E-06	1.4835E-05	1.4895E-05	1.563E-05
Ra-228	#	4.9711E-06	4.9993E-06	2.3048E-06	2.3359E-06	2.715E-06
Am-241	#B	-2.7166E-07	-2.7168E-07	8.0219E-07	8.0235E-07	1.330E-06
PB-210	#A	-2.1301E-07	-2.1335E-07	9.1874E-06	9.1875E-06	9.936E-06
U-238	#A	-2.4212E-06	-2.4212E-06	9.9008E-06	9.9027E-06	1.031E-05
K-40	#A	-5.3430E-05	-5.3430E-05	2.3895E-05	2.4186E-05	2.201E-05
PB-214	#A	-3.3300E-07	-3.3300E-07	2.0188E-07	2.0407E-07	2.118E-06
BI-214	A	1.0015E-06	1.0015E-06	2.0086E-06	2.0101E-06	2.225E-06
BI-212	A	3.0936E-06	3.1111E-06	5.4364E-06	5.4420E-06	9.021E-06
PB-212	#A	-1.4599E-07	-1.4682E-07	1.2653E-06	1.2654E-06	1.737E-06
TL-208	#A	-1.3881E-07	-1.3960E-07	9.5841E-07	9.5847E-07	9.978E-07
PA-234	#A	4.6455E-07	4.6455E-07	9.9926E-07	9.9992E-07	1.320E-06
CS-137	#A	3.8612E-07	3.8654E-07	7.2158E-07	7.2199E-07	8.384E-07
CO-60	#B	-3.8147E-07	-3.8383E-07	1.0017E-06	1.0019E-06	1.091E-06
EU-152	#A	-3.7214E-07	-3.7309E-07	8.3205E-07	8.3396E-07	1.099E-06
EU-154	#A	-3.2775E-07	-3.2901E-07	6.7254E-07	6.7296E-07	8.882E-07

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- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.7 to 1997.2 keV) 4.971E-06 uCi/sample
Total Decayed Activity (2.7 to 1997.2 keV) 4.9993141E-06 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-10**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/28/2022 14:03
Analysis Code	GAM-A-AF	**SDG**	ARS1-22-01492
Detector	(ARS03) MCB 129	**Fraction**	007
Library	ITSI COUNT.Lib	**Run**	1
Geometry	47mm AF 117495		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	-3.1774E-007	uCi/sample	8.2626E-007	1.3680E-006	6.8400E-007
Bi-212	-3.5828E-006	uCi/sample	6.6247E-006	7.6710E-006	3.8355E-006
Bi-214	-5.8739E-007	uCi/sample	2.0513E-006	2.9830E-006	1.4915E-006
Co-60	-1.8411E-007	uCi/sample	9.6709E-007	1.0600E-006	5.3000E-007
Cs-137	9.3292E-009	uCi/sample	7.8735E-007	9.2550E-007	4.6275E-007
Eu-152	2.1088E-007	uCi/sample	7.8660E-007	1.0420E-006	5.2100E-007
Eu-154	-1.9529E-007	uCi/sample	6.7245E-007	8.9070E-007	4.4535E-007
K-40	-1.5125E-005	uCi/sample	1.6710E-005	1.7460E-005	8.7300E-006
Pa-234	4.6315E-007	uCi/sample	9.9698E-007	1.3160E-006	6.5800E-007
Pb-210	5.0643E-007	uCi/sample	9.1012E-006	9.7860E-006	4.8930E-006
Pb-212	8.1301E-007	uCi/sample	1.2753E-006	1.7270E-006	8.6350E-007
Pb-214	5.3819E-008	uCi/sample	3.5713E-008	2.0520E-006	1.0260E-006
Ra-226	-9.3349E-006	uCi/sample	1.4451E-005	1.4960E-005	7.4800E-006
Ra-228	-5.1300E-006	uCi/sample	4.9133E-006	4.2180E-006	2.1090E-006
Tl-208	-7.5104E-007	uCi/sample	8.2679E-007	1.0980E-006	5.4900E-007
U-235	-8.7453E-007	uCi/sample	3.9082E-006	3.7770E-006	1.8885E-006
U-238	-5.4101E-006	uCi/sample	9.8337E-006	1.0230E-005	5.1150E-006

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AAA Spectrum name: ARS03568.An1

Sample description
Batch ID: 22-01012-10
SDG ID: ARS1-22-01492-007 Tech: [redacted]

Spectrum Filename: C:\User\ARS03568.An1

Acquisition information
Start time: 7/28/2022 2:03:43 PM
Live time: 60000
Real time: 60047
Dead time: 0.08 %
Detector ID: 17

Detector system
(ARS03) MCB 129

Calibration
Filename: 47mm AF 117495 calib 1-6-21.Clb
47mm AF 117495
1-6-21 EEC

Energy Calibration
Created: 1/6/2021 9:40:20 AM
Zero offset: 0.213 keV
Gain: 0.250 keV/channel
Quadratic: -2.204E-08 keV/channel^2

Efficiency Calibration
Created: 1/6/2021 9:47:25 AM
Knee Energy: 130.00 keV
Above the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -3.057202E-01 + (1.575027E-01*Log(E)) +
(-8.666885E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.63 %
Log(Eff): -4.598458E+00 + (1.629076E+00*Log(E)) +
(-2.077827E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.71keV)
Stop channel: 8000 (1997.15keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

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AAA Spectrum name: ARS03568.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/13/2022 7:51:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:31:39 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.2061

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
20.70	486.	7.55	0.84	2.083E-01				
23.97	243.	18.50	0.85	2.188E-01				
46.55	845.	6.30	0.93	2.450E-01	46.52	4.000	PBC<MDA	PB210
63.32	668.	8.67	0.81	2.426E-01	63.29	3.900	PBC<MDA	U238
72.78	105.	38.21	0.89	2.385E-01				
74.87	313.	13.93	0.89	2.374E-01				
77.23	318.	13.87	0.89	2.362E-01				
84.67	195.	25.34	0.80	2.321E-01				
92.64	979.	6.28	1.11	2.271E-01	92.38	2.570	4.233E-05	U238
					92.80	3.000	3.079E-05	U238
185.80	528.	10.06	1.12	1.576E-01	186.21	3.640	PBC<MDA	RA226
238.60	473.	8.44	1.04	1.299E-01	238.63	43.100	PBC<MDA	PB212
241.94	110.	33.52	1.04	1.284E-01	241.98	7.500	5.163E-06	PB214
295.10	254.	16.70	1.13	1.093E-01	295.21	18.500	PBC<MDA	PB214
338.27	120.	27.70	1.00	9.749E-02	338.40	12.010	PBC<MDA	Ra228
352.06	394.	12.41	1.11	9.420E-02	351.92	35.800	PBC<MDA	PB214
446.53	95.	26.28	1.21	7.643E-02				
448.37	78.	30.94	1.21	7.615E-02				
511.34	1953.	3.92	2.52	6.763E-02	510.72	22.500	5.810E-05	TL208
583.47	224.	12.71	1.82	5.970E-02	583.14	86.000	PBC<MDA	TL208
609.64	350.	8.57	1.35	5.727E-02	609.31	44.791	PBC<MDA	BI214
614.94	91.	27.41	1.35	5.680E-02				

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AAA Spectrum name: ARS03568.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
803.48	105.	22.44	1.68	4.372E-02				
911.60	115.	24.56	1.34	3.847E-02	911.07	29.000	PBC<MDA	Ra228
1001.93	91.	26.70	1.72	3.490E-02				
1379.08	78.	24.08	0.90	2.481E-02	1377.67	3.919	3.591E-05	BI214
1461.47	224.	10.08	2.06	2.328E-02	1460.75	10.700	PBC<MDA	K40
1500.60	48.	32.80	3.71	2.261E-02				
1765.27	106.	21.98	2.89	1.884E-02	1764.49	15.357	PBC<MDA	BI214
1962.59	26.	28.61	0.52	1.667E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
82.03	20.76	430.	486.	2.334E+03	15.09	0.842	MO-99	sD
95.10	24.02	887.	243.	1.110E+03	36.99	0.845	RH-106	sD
185.49	46.57	795.	845.	3.558E+03	12.60	0.925	PB-210	l
252.64	63.31	1034.	668.	2.726E+03	17.33	0.812	TH-234	l
290.52	72.76	750.	105.	4.396E+02	76.42	0.889	TL-208	sD
298.87	74.84	794.	313.	1.318E+03	27.87	0.891	TH-234	D
308.34	77.21	813.	318.	1.346E+03	27.74	0.893	PB-212	D
338.10	84.48	972.	195.	8.386E+02	50.67	0.800	TA-182	s
370.03	92.65	1078.	979.	4.553E+03	12.57	1.105	TH-234	l
743.00	185.61	848.	528.	3.903E+03	20.12	1.123	U-235	l
954.44	238.65	560.	473.	3.358E+03	16.89	1.036	PB-212	lD
1180.66	295.12	571.	254.	2.430E+03	33.40	1.128	PB-214	l
1353.53	338.25	407.	120.	1.456E+03	55.40	0.998	AC-228	l
1408.71	352.10	605.	394.	4.620E+03	24.81	1.112	PB-214	l
1787.02	446.56	267.	95.	1.249E+03	52.56	1.213	AG-110M	sD
1794.40	448.40	256.	78.	1.031E+03	61.88	1.215	CE-143	sD
2046.58	510.70	686.	1953.	2.887E+04	7.84	2.516	TL-208	sM
2338.38	584.28	334.	101.	1.690E+03	55.05	1.326	TL-208	sD
2440.25	609.68	274.	350.	5.982E+03	17.14	1.346	BI-214	lD
2462.91	614.99	286.	75.	1.324E+03	67.64	1.351	SB-122	sD
3216.64	803.46	150.	105.	2.402E+03	44.87	1.680	CS-134	M
3649.74	911.65	195.	115.	2.989E+03	49.11	1.341	AC-228	sM
4011.61	1001.92	135.	91.	2.608E+03	53.41	1.716	TA-182	s
5522.70	1379.00	75.	78.	3.128E+03	48.15	0.904	BI-214	sM
5852.86	1461.44	76.	224.	1.002E+04	20.16	2.056	K-40	l
6009.69	1500.41	54.	48.	2.123E+03	65.59	3.712	RB-89	s
7074.54	1766.32	98.	59.	3.136E+03	54.21	2.143	RH-106	sD
7861.44	1962.59	8.	26.	1.559E+03	57.22	0.520	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

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This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-214	967.95	241.98	628.	112.	0.002	65.75	1.039D
BI-214	7067.36	1764.49	277.	-91.	-0.002	61.72	2.142s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Peak Activity uCi/sample	Peak Code	Peak MDA Value uCi/sample	COMMENTS
U-235		-8.7453E-07				1.39E+09	
			143.76	-8.745E-07	%(P	3.777E-06 2.23E+02 1.05E+01	G
			205.31	1.050E-06	%	1.066E-05 4.01E+02 4.70E+00	G
			163.35	1.716E-06	&	8.509E-06 1.87E+02 4.70E+00	G
RA-226		-9.3349E-06				5.84E+05	
			186.21	-9.335E-06	%(P	1.496E-05 7.71E+01 3.64E+00	G K
Ra-228		-5.1300E-06				2.10E+03	
			911.07	-5.130E-06	%(P	4.218E-06 4.77E+01 2.90E+01	G
			968.90	-2.242E-06	& P	5.979E-06 1.72E+02 1.75E+01	G
			338.40	-5.408E-06	% P	5.483E-06 5.15E+01 1.20E+01	G
			964.60	-9.913E-07	%	2.296E-05 6.86E+02 5.45E+00	G
Am-241	T	-3.1774E-07				1.58E+05	
			59.54	-3.177E-07	%(	1.368E-06 1.30E+02 3.59E+01	G K
PB-210		5.0643E-07				7.45E+03	
			46.52	5.064E-07	%(P	9.786E-06 8.99E+02 4.00E+00	G
U-238		-5.4101E-06				1.63E+12	
			63.29	-5.410E-06	%(P	1.023E-05 9.08E+01 3.90E+00	G
			92.80	9.096E-06	} P	1.456E-05 4.24E+01 3.00E+00	G
			92.38	-3.136E-06	} P	1.877E-05 2.22E+02 2.57E+00	G
K-40		-1.5125E-05				4.68E+11	
			1460.75	-1.512E-05	%(P	1.746E-05 5.51E+01 1.07E+01	G

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	5.3819E-08					5.84E+05	
		351.92	-1.037E-06	%(P	2.052E-06	9.59E+01	3.58E+01 G
		295.21	-5.124E-07	% P	3.363E-06	3.31E+02	1.85E+01 G
		241.98	5.260E-06	(	5.586E-06	3.29E+01	7.50E+00 G
BI-214	-5.8739E-07					5.84E+05	
		609.31	-5.874E-07	%(P	2.983E-06	1.75E+02	4.48E+01 G
		1764.49	-1.418E-05	+ P	1.249E-05	3.09E+01	1.54E+01 G
		1120.29	-5.649E-06	% P	8.480E-06	8.00E+01	1.48E+01 G
		1238.11	-8.820E-06	% P	1.914E-05	1.52E+02	5.86E+00 G
		768.36	8.541E-06	%	1.820E-05	9.53E+01	4.80E+00 G
		1377.67	1.111E-06	&	3.110E-05	8.18E+02	3.92E+00 G
		934.06	-1.559E-05	%	3.238E-05	9.28E+01	3.03E+00 G
BI-212	-3.5828E-06					2.10E+03	
		727.17	-3.583E-06	&(	7.671E-06	9.24E+01	1.18E+01 G
		1620.56	2.143E-05	%	3.625E-05	8.24E+01	2.75E+00 G
		785.42	-1.923E-05	& P	4.441E-05	2.02E+02	2.00E+00 G
PB-212	8.1301E-07					2.10E+03	
		238.63	8.130E-07	%(P	1.727E-06	7.83E+01	4.31E+01 G
		300.09	-1.379E-05	% P	1.986E-05	9.80E+01	3.27E+00 G
TL-208	-7.5104E-07					2.10E+03	
		583.14	-7.510E-07	%(P	1.098E-06	5.49E+01	8.60E+01 G
		510.72	-2.632E-06	%	7.487E-06	8.61E+01	2.25E+01 G
		860.47	2.903E-06	%	7.003E-06	1.07E+02	1.20E+01 G
		277.36	-1.574E-06	%	8.479E-06	2.13E+02	6.50E+00 G
		763.30	-1.852E-05	%	5.202E-05	1.25E+02	1.70E+00 G
PA-234	4.6315E-07					1.65E+12	
		98.44	4.632E-07	%(	1.316E-06	1.08E+02	2.51E+01 G
		946.00	-2.027E-06	&	4.494E-06	9.87E+01	2.00E+01 G
		131.28	3.976E-07	%	1.763E-06	1.67E+02	2.00E+01 G
		94.67	-2.018E-06	% P	3.938E-06	9.07E+01	1.55E+01 G
		883.24	-5.761E-06	& P	7.855E-06	1.00E+02	1.20E+01 G
		926.70	-6.221E-06	& P	8.783E-06	1.32E+02	1.10E+01 G
		569.26	-2.917E-06	%	7.511E-06	1.11E+02	1.04E+01 G
		111.00	-2.239E-06	% P	4.230E-06	1.36E+02	8.55E+00 G
		733.00	-2.617E-06	&	9.343E-06	1.53E+02	8.50E+00 G
		949.00	5.535E-06	%	1.124E-05	9.05E+01	7.80E+00 G
		880.51	9.273E-07	%	1.272E-05	6.03E+02	6.50E+00 G
		226.87	6.838E-08	&	7.680E-06	4.43E+03	6.50E+00 G
		831.10	5.888E-06	% P	1.468E-05	1.50E+02	5.60E+00 G
		808.10	-1.272E-05	& P	2.617E-05	1.49E+02	4.90E+00 G
		99.70	-3.920E-07	% P	7.067E-06	9.62E+02	4.70E+00 G
		699.10	3.253E-06	&	1.798E-05	2.36E+02	4.60E+00 G

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AAA Spectrum name: ARS03568.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		898.60	-1.135E-05	% P	2.427E-05	1.18E+02	4.00E+00 G
		1394.10	-1.036E-05	&	2.878E-05	1.31E+02	3.90E+00 G
CS-137	9.3292E-09					1.10E+04	
		661.66	9.329E-09	%(	9.255E-07	4.22E+03	8.52E+01 G
CO-60	-1.8411E-07					1.93E+03	
		1173.24	-1.841E-07	%(	1.060E-06	2.63E+02	9.99E+01 K
		1332.50	2.462E-07	%	1.031E-06	1.97E+02	1.00E+02 K
EU-152	2.1088E-07					4.64E+03	
		40.12	2.109E-07	%(	1.042E-06	1.86E+02	3.00E+01 G
		121.78	-2.491E-07	&	1.188E-06	1.80E+02	2.92E+01 G
		344.30	2.090E-07	%	2.166E-06	4.08E+02	2.70E+01 G
		1408.08	-3.479E-06	&	5.826E-06	7.99E+01	2.12E+01 G
		39.52	-4.775E-07	%	1.994E-06	1.58E+02	1.60E+01 G
		964.00	3.097E-06	&	8.360E-06	8.14E+01	1.46E+01 G
		1112.07	-5.023E-06	&	9.062E-06	8.37E+01	1.36E+01 G
		778.90	1.978E-06	%	5.695E-06	1.28E+02	1.30E+01 G
		1085.80	-4.103E-07	%	9.518E-06	1.05E+03	1.03E+01 G
		45.40	-1.127E-06	%	4.565E-06	1.22E+02	9.00E+00 G
		244.67	-1.606E-06	&	1.128E-05	2.11E+02	7.62E+00 G
		867.39	-1.141E-05	&	2.332E-05	9.14E+01	4.18E+00 G
EU-154	-1.9529E-07					3.10E+03	
		123.10	-1.953E-07	%(	8.907E-07	1.72E+02	4.05E+01 G
		1274.80	1.146E-06	%	2.713E-06	1.12E+02	3.55E+01 G
		723.30	-1.516E-06	%	4.713E-06	1.34E+02	1.97E+01 G
		1004.80	-2.902E-06	%	7.398E-06	7.69E+01	1.76E+01 G
		43.00	7.536E-07	%	3.506E-06	1.40E+02	1.31E+01 G
		873.20	3.760E-06	&	7.908E-06	9.39E+01	1.13E+01 G
		996.30	2.166E-06	&	1.183E-05	1.63E+02	1.07E+01 G
		42.31	-1.456E-06	%	6.583E-06	1.36E+02	7.30E+00 G
		248.04	2.076E-06	%	7.978E-06	1.52E+02	6.60E+00 G
		591.70	-5.114E-06	%	1.519E-05	1.28E+02	4.60E+00 G
		48.70	-3.994E-06	%	1.284E-05	1.22E+02	4.20E+00 G
		756.70	-9.669E-06	&	2.096E-05	9.69E+01	4.10E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

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AAA Spectrum name: ARS03568.An1

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:00:14 PM
AAA Spectrum name: ARS03568.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.7 to 1997.2 keV) 0.000E+00 uCi/sample
Total Decayed Activity (2.7 to 1997.2 keV) 0.0000000E+00 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

ARS Aleut Analytical

Ortec Gamma

Batch Sample ID	**ARS1-B22-01012-11**		
Analytical Batch	ARS1-B22-01012	**Analysis Date**	7/30/2022 11:28
Analysis Code	GAM-A-AF	**SDG**	
Detector	ARS06 MCB 133	**Fraction**	
Library	ITSI COUNT.Lib	**Run**	
Geometry	117495 47mm AF		

Isotope	Activity	Units	CSU	MDA	DL
Am-241	-1.2438E-007	uCi/sample	4.7199E-007	6.2720E-007	3.1360E-007
Bi-212	1.3380E-006	uCi/sample	4.9362E-006	5.3670E-006	2.6835E-006
Bi-214	2.0889E-006	uCi/sample	1.1371E-006	1.3400E-006	6.7000E-007
Co-60	-2.0443E-007	uCi/sample	8.2591E-007	8.4880E-007	4.2440E-007
Cs-137	3.4038E-007	uCi/sample	6.0175E-007	6.4950E-007	3.2475E-007
Eu-152	-3.8069E-007	uCi/sample	8.0152E-007	1.0550E-006	5.2750E-007
Eu-154	1.0493E-006	uCi/sample	7.7576E-007	6.9410E-007	3.4705E-007
K-40	-1.5274E-005	uCi/sample	1.4322E-005	1.5160E-005	7.5800E-006
Pa-234	-7.8056E-008	uCi/sample	7.5503E-007	9.5780E-007	4.7890E-007
Pb-210	-4.9194E-007	uCi/sample	4.5069E-006	6.0040E-006	3.0020E-006
Pb-212	1.2611E-006	uCi/sample	4.5093E-007	6.8080E-007	3.4040E-007
Pb-214	1.6949E-006	uCi/sample	7.1574E-007	1.0070E-006	5.0350E-007
Ra-226	-3.8325E-006	uCi/sample	7.8773E-006	9.9080E-006	4.9540E-006
Ra-228	1.1685E-006	uCi/sample	2.1801E-006	2.2860E-006	1.1430E-006
Tl-208	-2.6929E-007	uCi/sample	6.2698E-007	7.0070E-007	3.5035E-007
U-235	-1.1232E-006	uCi/sample	2.3366E-006	2.9390E-006	1.4695E-006
U-238	2.0769E-006	uCi/sample	4.1738E-006	6.9160E-006	3.4580E-006

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:03:53 PM
AAA Spectrum name: ARS06306.An1

Sample description
Batch ID: 22-01012-11
SDG ID: ARS1-22-01492-007 DUP Tech: [redacted]

Spectrum Filename: C:\User\ARS06306.An1

Acquisition information
Start time: 7/30/2022 11:28:12 AM
Live time: 60000
Real time: 60035
Dead time: 0.06 %
Detector ID: 21

Detector system
ARS06 MCB 133

Calibration
Filename: 117495 47mm AF calib 7-3-21 .Clb
117495 47mm AF
EEC 7-3-21

Energy Calibration
Created: 7/3/2021 9:44:58 AM
Zero offset: 0.085 keV
Gain: 0.250 keV/channel
Quadratic: -3.365E-08 keV/channel^2

Efficiency Calibration
Created: 7/3/2021 3:18:09 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.77 %
Log(Eff): -2.894388E+00 + (1.055530E+00*Log(E)) +
(-1.582298E-01*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.99 %
Log(Eff): -7.116829E+00 + (2.826979E+00*Log(E)) +
(-3.434918E-01*Log(E)^2)

Library Files
Main analysis library: ITSI COUNT.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.59keV)
Stop channel: 8000 (1997.96keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.0000E+00 +/- 0.000E+00%
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:03:53 PM
AAA Spectrum name: ARS06306.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/13/2022 7:51:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	ITSI.Pbc 7/2/2022 12:06:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %

Energy Calibration
Normalized diff: 0.1469

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/samp	Nuc
11.69	1503.	4.03	0.88	1.051E-01				
13.62	2649.	3.45	0.88	1.243E-01				
17.46	885.	7.51	0.89	1.578E-01				
20.31	194.	30.48	0.89	1.785E-01				
27.08	137.	38.22	0.76	2.177E-01				
66.13	106.	33.05	1.33	2.719E-01				
198.23	165.	23.99	1.09	1.758E-01				
238.46	187.	17.51	1.16	1.561E-01	238.63	43.100	1.263E-06	PB212
241.90	83.	32.60	1.17	1.546E-01	241.98	7.500	3.238E-06	PB214
295.13	124.	32.11	2.54	1.340E-01	295.21	18.500	2.245E-06	PB214
351.67	131.	25.95	1.92	1.171E-01	351.92	35.800	1.411E-06	PB214
477.46	126.	24.70	2.10	9.035E-02				
510.99	2011.	4.25	2.62	8.506E-02	510.72	22.500	4.764E-05	TL208
558.67	116.	25.59	2.19	7.818E-02				
591.70	95.	36.71	1.55	7.400E-02	591.70	4.600	1.257E-05	EU154
609.32	149.	27.01	3.44	7.193E-02	609.31	44.791	2.089E-06	BI214
962.29	99.	28.26	3.38	4.461E-02	964.00	14.580	6.890E-06	EU152
1050.59	73.	29.87	0.73	4.048E-02				
1050.59	73.	29.87	0.73	4.048E-02				
1461.49	100.	15.78	2.28	2.719E-02	1460.75	10.700	PBC<MDA	K40
1467.31	47.	32.33	2.29	2.705E-02				
1482.07	42.	30.86	2.37	2.671E-02				

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AAA Spectrum name: ARS06306.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1728.72	69.	27.08	0.31	2.194E-02				
1758.82	35.	36.32	2.46	2.146E-02				
1765.36	50.	27.77	2.46	2.135E-02	1764.49	15.357	6.917E-06	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV		Suspected Nuclide
46.43	11.59	1086.	1503.	1.430E+04	8.07	0.882	-	sD
54.14	13.51	2856.	2649.	2.130E+04	6.90	0.884	-	sD
69.51	17.36	1762.	885.	5.607E+03	15.01	0.889	-	sD
80.88	20.20	1648.	194.	1.086E+03	60.96	0.893	-	sD
107.99	27.29	1242.	137.	6.299E+02	76.43	0.764	-	s
264.17	66.19	514.	106.	3.913E+02	66.09	1.330	-	s
792.63	198.25	541.	165.	9.396E+02	47.99	1.094	-	s
965.90	241.66	387.	83.	5.390E+02	70.25	1.165	-	sD
1909.94	477.49	293.	126.	1.399E+03	49.41	2.105	-	sM
2044.16	510.33	801.	2011.	2.365E+04	8.49	2.621	-	M
2234.96	558.67	248.	116.	1.486E+03	51.19	2.191	-	sM
3850.76	962.09	171.	99.	2.219E+03	56.53	3.384	-	s
4204.32	1048.28	115.	73.	1.803E+03	59.74	0.726	-	s
5850.12	1461.33	75.	100.	5.143E+03	31.56	2.285	-	lD
5872.82	1467.15	81.	47.	1.736E+03	61.58	2.288	-	sD
5932.56	1482.04	42.	42.	1.572E+03	61.72	2.371	-	sM
6920.87	1728.66	59.	69.	3.136E+03	54.15	0.314	-	sM
7041.51	1758.41	63.	35.	1.628E+03	72.65	2.459	-	sD
7067.72	1764.95	73.	50.	2.359E+03	55.54	2.463	-	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: ITSI COUNT.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-212	954.29	238.63	445.	187.	0.003	35.08	1.162D
PB-214	1180.35	295.13	518.	124.	0.002	64.22	2.538s
PB-214	1406.59	351.67	381.	131.	0.002	51.90	1.915s
EU-154	2367.17	591.70	247.	95.	0.002	73.42	1.553s
BI-214	2437.71	609.32	400.	149.	0.002	54.01	3.437s

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AAA Spectrum name: ARS06306.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/sample	Peak Energy keV	Activity uCi/sample	Code	MDA Value uCi/sample	COMMENTS
U-235		-1.1232E-06				1.39E+09	
			143.76-1.123E-06	%(2.939E-06		1.04E+02 1.05E+01	G
			205.31 6.871E-07	% 7.575E-06		4.35E+02 4.70E+00	G
			163.35-1.703E-06	& 6.749E-06		1.57E+02 4.70E+00	G
RA-226		-3.8325E-06				5.84E+05	
			186.21-3.833E-06	%(9.908E-06		1.03E+02 3.64E+00	G K
Ra-228		1.1685E-06				2.10E+03	
			911.07 1.169E-06	%(2.286E-06		9.32E+01 2.90E+01	G
			968.90 2.496E-06	% 5.925E-06		7.18E+01 1.75E+01	G
			338.40 1.589E-06	& 3.417E-06		8.92E+01 1.20E+01	G
			964.60-8.853E-06	& 1.908E-05		6.53E+01 5.45E+00	G
Am-241	T	-1.2438E-07				1.58E+05	
			59.54-1.244E-07	%(6.272E-07		1.90E+02 3.59E+01	G K
PB-210		-4.9194E-07				7.45E+03	
			46.52-4.919E-07	%(6.004E-06		4.58E+02 4.00E+00	G
U-238		2.0769E-06				1.63E+12	
			63.29 2.077E-06	%(6.916E-06		1.00E+02 3.90E+00	G
			92.80-1.325E-06	% 8.012E-06		2.39E+02 3.00E+00	G
			92.38 3.136E-06	& 9.000E-06		1.14E+02 2.57E+00	G
K-40		-1.5274E-05				4.68E+11	
			1460.75-1.527E-05	%(P 1.516E-05		4.68E+01 1.07E+01	G
PB-214		1.6949E-06				5.84E+05	
			351.92 1.411E-06	(1.007E-06		2.60E+01 3.58E+01	G
			295.21 2.245E-06	*(1.977E-06		3.21E+01 1.85E+01	G
			241.98-2.038E-06	% 7.148E-06		1.06E+02 7.50E+00	G
BI-214		2.0889E-06				5.84E+05	
			609.31 2.089E-06	*(1.340E-06		2.70E+01 4.48E+01	G
			1764.49-5.134E-06	% 1.123E-05		6.62E+01 1.54E+01	G
			1120.29 1.083E-08	% 6.820E-06		3.07E+04 1.48E+01	G
			1238.11-2.539E-06	% 1.530E-05		3.01E+02 5.86E+00	G
			768.36-1.584E-06	& 1.429E-05		4.14E+02 4.80E+00	G

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:03:53 PM
AAA Spectrum name: ARS06306.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1377.67	-1.022E-05	%	2.604E-05	1.28E+02	3.92E+00 G
		934.06	-6.022E-06	%	2.424E-05	1.91E+02	3.03E+00 G
BI-212	1.3380E-06					2.10E+03	
		727.17	1.338E-06	%(	5.367E-06	1.84E+02	1.18E+01 G
		1620.56	1.985E-05	&	2.993E-05	7.76E+01	2.75E+00 G
		785.42	-1.385E-05	%	3.453E-05	1.15E+02	2.00E+00 G
PB-212	1.2611E-06					2.10E+03	
		238.63	1.261E-06	(	6.808E-07	1.75E+01	4.31E+01 G
		300.09	-3.411E-06	%	1.852E-05	1.63E+02	3.27E+00 G
TL-208	-2.6929E-07					2.10E+03	
		583.14	-2.693E-07	%(	7.007E-07	1.16E+02	8.60E+01 G
		510.72	-1.150E-06	%	6.061E-06	1.59E+02	2.25E+01 G
		860.47	-7.484E-08	%	6.122E-06	3.86E+03	1.20E+01 G
		277.36	-1.490E-06	%	6.327E-06	1.76E+02	6.50E+00 G
		763.30	-2.046E-06	%	3.832E-05	8.56E+02	1.70E+00 G
PA-234	-7.8056E-08					1.65E+12	
		98.44	-7.806E-08	&(	9.578E-07	4.84E+02	2.51E+01 G
		946.00	1.123E-06	%	3.507E-06	1.48E+02	2.00E+01 G
		131.28	2.176E-07	&	1.414E-06	2.57E+02	2.00E+01 G
		94.67	-5.923E-07	&	1.653E-06	1.11E+02	1.55E+01 G
		883.24	-1.174E-06	%	6.117E-06	2.47E+02	1.20E+01 G
		926.70	2.964E-06	%	6.232E-06	1.00E+02	1.10E+01 G
		569.26	2.143E-06	&	5.628E-06	1.17E+02	1.04E+01 G
		111.00	-8.150E-07	&	3.008E-06	1.46E+02	8.55E+00 G
		733.00	-1.596E-06	%	7.528E-06	2.17E+02	8.50E+00 G
		949.00	-6.058E-06	%	1.064E-05	8.41E+01	7.80E+00 G
		880.51	9.391E-08	&	1.091E-05	5.47E+03	6.50E+00 G
		226.87	1.117E-06	%	5.723E-06	2.12E+02	6.50E+00 G
		831.10	-7.877E-06	&	1.405E-05	8.56E+01	5.60E+00 G
		808.10	-7.548E-06	%	1.554E-05	9.54E+01	4.90E+00 G
		99.70	-2.054E-06	%	5.580E-06	1.08E+02	4.70E+00 G
		699.10	-8.510E-06	%	1.676E-05	9.16E+01	4.60E+00 G
		898.60	-1.054E-05	&	2.159E-05	9.81E+01	4.00E+00 G
		1394.10	1.397E-05	%	2.154E-05	7.77E+01	3.90E+00 G
CS-137	3.4038E-07					1.10E+04	
		661.66	3.404E-07	&(	6.495E-07	8.84E+01	8.52E+01 G
CO-60	-2.0443E-07					1.93E+03	
		1173.24	-2.044E-07	&(	8.488E-07	2.02E+02	9.99E+01 K
		1332.50	-7.195E-07	&	1.153E-06	8.14E+01	1.00E+02 K

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:03:53 PM
AAA Spectrum name: ARS06306.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	-3.8069E-07					4.64E+03	
		40.12	-3.807E-07	%(	1.055E-06	1.05E+02	3.00E+01 G
		121.78	2.643E-07	&	8.992E-07	1.35E+02	2.92E+01 G
		344.30	-1.404E-07	&	1.620E-06	4.74E+02	2.70E+01 G
		1408.08	-3.043E-06	%	4.980E-06	8.29E+01	2.12E+01 G
		39.52	-7.429E-07	%	2.012E-06	1.03E+02	1.60E+01 G
		964.00	-3.028E-06	%	6.847E-06	6.84E+01	1.46E+01 G
		1112.07	-2.826E-06	%	6.510E-06	1.13E+02	1.36E+01 G
		778.90	1.735E-06	%	4.661E-06	1.24E+02	1.30E+01 G
		1085.80	-2.258E-06	%	8.215E-06	1.78E+02	1.03E+01 G
		45.40	-1.061E-06	%	3.005E-06	1.07E+02	9.00E+00 G
		244.67	1.135E-06	%	7.627E-06	2.02E+02	7.62E+00 G
		867.39	2.235E-06	&	1.756E-05	3.72E+02	4.18E+00 G
EU-154	1.0493E-06					3.10E+03	
		123.10	-2.610E-07	&(	6.941E-07	1.06E+02	4.05E+01 G
		1274.80	2.535E-06	%	2.179E-06	4.42E+01	3.55E+01 G
		723.30	3.789E-08	&	3.285E-06	3.96E+03	1.97E+01 G
		1004.80	-1.915E-06	%	4.481E-06	1.11E+02	1.76E+01 G
		43.00	7.106E-07	&	2.000E-06	1.06E+02	1.31E+01 G
		873.20	4.031E-07	%	6.287E-06	7.36E+02	1.13E+01 G
		996.30	-1.363E-06	%	7.013E-06	2.43E+02	1.07E+01 G
		42.31	1.272E-06	%	3.677E-06	1.09E+02	7.30E+00 G
		248.04	-2.583E-06	&	6.219E-06	1.00E+02	6.60E+00 G
		591.70	1.257E-05	*(	1.009E-05	3.67E+01	4.60E+00 G
		48.70	1.932E-06	&	5.426E-06	1.06E+02	4.20E+00 G
		756.70	-4.006E-06	%	1.591E-05	1.83E+02	4.10E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes: Peak Codes:

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:03:53 PM
AAA Spectrum name: ARS06306.An1

T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity uCi/sample	Time Corrected Activity uCi/sample	Uncertainty 2 Sigma Counting uCi/sample	Total uCi/sample	MDA uCi/sample
U-235	#A	-1.1232E-06	-1.1232E-06	2.3349E-06	2.3366E-06	2.939E-06
RA-226	#B	-3.8325E-06	-3.8325E-06	7.8742E-06	7.8773E-06	9.908E-06
Ra-228	#A	1.1619E-06	1.1685E-06	2.1787E-06	2.1801E-06	2.286E-06
Am-241	#B	-1.2437E-07	-1.2438E-07	4.7193E-07	4.7199E-07	6.272E-07
PB-210	#A	-4.9115E-07	-4.9194E-07	4.5067E-06	4.5069E-06	6.004E-06
U-238	#A	2.0769E-06	2.0769E-06	4.1703E-06	4.1738E-06	6.916E-06
K-40	#A	-1.5274E-05	-1.5274E-05	1.4282E-05	1.4322E-05	1.516E-05
PB-214		1.6948E-06	1.6949E-06	6.9975E-07	7.1574E-07	1.007E-06
BI-214	#	2.0888E-06	2.0889E-06	1.1282E-06	1.1371E-06	1.340E-06
BI-212	#A	1.3305E-06	1.3380E-06	4.9354E-06	4.9362E-06	5.367E-06
PB-212	#	1.2540E-06	1.2611E-06	4.4240E-07	4.5093E-07	6.808E-07
TL-208	#A	-2.6777E-07	-2.6929E-07	6.2669E-07	6.2698E-07	7.007E-07
PA-234	#A	-7.8056E-08	-7.8056E-08	7.5500E-07	7.5503E-07	9.578E-07
CS-137	#A	3.4001E-07	3.4038E-07	6.0150E-07	6.0175E-07	6.495E-07
CO-60	#B	-2.0317E-07	-2.0443E-07	8.2586E-07	8.2591E-07	8.488E-07
EU-152	#A	-3.7971E-07	-3.8069E-07	7.9926E-07	8.0152E-07	1.055E-06
EU-154	#C	1.0453E-06	1.0493E-06	7.7041E-07	7.7576E-07	6.941E-07

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

ORTEC g v - i (3263) Env32 G800W064 9/1/2022 4:03:53 PM
AAA Spectrum name: ARS06306.An1

---------- S U M M A R Y ----------

Total Activity (2.6 to 1998.0 keV) 5.038E-06 uCi/sample
Total Decayed Activity (2.6 to 1998.0 keV) 5.0448484E-06 uCi/sample

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA

Gamma Spectroscopy Logbook
ARS-02

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
7/21/2022	12:12	22-01004	5	1285.70	2446	FLCC	[redacted]
7/21/2022	13:24	22-00983	3	75.16	2447	90mm	
7/21/2022	14:49	22-01003	6	1.00	2448	1LM	
7/22/2022	7:18	CALVER	QA	119596.00	2449	500s	
7/22/2022	7:33	CALVER	QA	119596.00	2450	500s	
7/22/2022	7:53	CALVER	QA	119596.00	2451	500s	
7/22/2022	9:53	22-01012	10	347460.00	2452	47AF	
7/22/2022					2453		
7/22/2022	12:27	22-01016	4	41.26	2454	90mm	
7/22/2022	13:21	22-01016	8	81.85	2455	90mm	
7/22/2022	13:55	22-01016	10	68.21	2456	90mm	
7/22/2022	15:32	22-01012	8	348180.00	2457	47AF	
7/25/2022	9:53	CALVER	QA	119596.00	2458	500s	
7/25/2022	10:41	22-01021	6	256.28	2459	250j	
7/25/2022	11:24	22-01022	4	16.38	2460	47mm	
7/25/2022	12:01	22-01022	5	15.32	2461	47mm	
7/25/2022	13:01	22-01021	10	428.41	2462	250j	
7/25/2022	13:37	22-01024	7	348.56	2463	250j	
7/25/2022	14:13	22-01024	6	397.83	2464	250j	
7/25/2022	14:49	22-01023	1	121682.00	2465	1LM	
7/25/2022	15:04	22-01023	2	121982.00	2466	1LM	
7/25/2022	15:21	22-01023	4	1.00	2467	1LM	
7/26/2022	7:13	CALVER	QA	119596.00	2468	500s	
7/26/2022	7:55	22-01024	16	363.59	2469	250j	
7/26/2022	8:37	22-01024	19	344.40	2470	250j	
7/26/2022	9:30	22-01024	21	355.59	2471	250j	
7/26/2022	10:14	22-01028	1	76927-526	2472	47AF	
7/26/2022	10:26	22-01028	2	76927-526	2473	47AF	
7/26/2022	10:46	22-01028	4	900.00	2474	47AF	
7/26/2022	11:54	22-01028	6	1440.00	2475	47AF	
7/26/2022	13:21	22-01028	8	1500.00	2476	47AF	
7/27/2022	7:02	CALVER	QA	119596.00	2477	500s	
7/27/2022	8:27	22-01031	5	316.76	2478	250j	
7/27/2022	9:17	22-01031	9	392.73	2479	250j	
7/27/2022	10:00	22-01031	13	374.58	2480	250j	
7/27/2022	11:24	22-01032	6	364.31	2481	250j	
7/27/2022	12:10	22-01032	9	360.36	2482	250j	
7/27/2022	12:47	22-01032	12	421.08	2483	250j	
7/27/2022	13:28	22-01033	5	389.72	2484	250j	
7/27/2022	14:21	22-01033	7	412.09	2485	250j	
7/27/2022	14:54	22-01032	11	413.10	2486	250j	
7/28/2022	9:38	CALVER	QA	119596.00	2487	500s	
7/28/2022	10:02	22-01033	10	330.80	2488	250j	

Printed on:
8/16/2022 12:29 PM

Gamma Spectroscopy Logbook
ARS-02

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
7/28/2022	10:46	22-01033	12	383.46	2489	250j	[redacted]
7/28/2022	11:28	22-01033	7	448.28	2490	250j	
7/28/2022	12:26	22-01050	7	339.01	2491	250j	
7/28/2022	13:06	22-01050	10	317.52	2492	250j	
7/28/2022	14:00	22-01012	4	1.00	2493	47AF	
7/29/2022	7:18	CALVER	QA	119596.00	2494	500s	
7/29/2022	8:26	22-01055	1	76927-526	2495	47AF	
7/29/2022	8:46	22-01055	2	76927-526	2496	47AF	
7/29/2022	9:06	22-01055	4	6001.57	2497	47AF	
7/29/2022	10:37	22-01055	6	5972.56	2498	47AF	
7/29/2022	12:21	22-01057	7	307.26	2499	250j	
7/29/2022	14:22	22-01012	6	86580000.00	2500	47AF	
7/30/2022	11:07	CALVER	QA	119596.00	2501	500s	
7/30/2022	11:24	22-01012	3	1.00	2502	47AF	
8/1/2022	9:29	CALVER	QA	119596.00	2503	500s	
8/1/2022	10:37	22-01062	1	82009-526	2504	FLCC	
8/1/2022	10:49	22-01062	2	82009-526	2505	FLCC	
8/1/2022	11:02	22-01062	4	854.91	2506	FLCC	
8/1/2022	12:27	22-01062	5	854.27	2507	FLCC	
8/1/2022	14:09	Long Bkg	QA	1.00	2508	empty	
8/2/2022	8:05	CALVER	QA	119596.00	2509	500s	
8/2/2022	8:54	22-01062	7	426.80	2510	FLCC	
8/2/2022	12:29	22-01062	9	861.07	2511	FLCC	
8/2/2022	14:39	22-01012	6	86580000.00	2512	47AF	
8/3/2022	7:34	CALVER	QA	119596.00	2513	500s	
8/3/2022	7:49	CALVER	QA	119596.00	2514	500s	
8/3/2022	8:04	CALVER	QA	119596.00	2515	500s	
8/3/2022	8:18	22-01086	5	478.77	2516	250j	
8/3/2022	9:08	22-01086	6	351.56	2517	250j	
8/3/2022	12:09	22-01086	8	387.36	2518	250j	
8/4/2022	10:16	CALVER	QA	119596.00	2519	500s	
8/4/2022	10:40	22-01088	6	311.93	2520	250j	
8/4/2022	12:14	22-01088	9	266.05	2521	250j	
8/4/2022	13:35	22-01095	1	76927-526	2522	47AF	
8/4/2022	13:48	22-01095	2	76927-526	2523	47AF	
8/4/2022	14:04	22-01095	5	357960000.00	2524	47AF	
8/5/2022	7:21	CALVER	QA	119596.00	2525	500s	
8/5/2022	7:57	22-01096	4	252.99	2526	250j	
8/5/2022	8:40	22-01096	8	385.06	2527	250j	
8/5/2022	14:08	22-01095	6	356640000.00	2528	47AF	
8/8/2022	9:35	CALVER	QA	119596.00	2529	500s	
8/8/2022	9:56	22-01106	3	75.16	2530	90mm	
8/8/2022	11:03	22-01106	4	92.73	2531	90mm	

Printed on:
8/16/2022 12:29 PM

Gamma Spectroscopy Logbook
ARS-02

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
8/8/2022	12:33	22-01106	4	92.73	2532	90mm	[redacted]
8/8/2022	13:14	22-01108	1	121682.00	2533	1LM	
8/8/2022	13:32	22-01108	2	121682.00	2534	1LM	
8/8/2022	13:57	22-01108	4	1.00	2535	1LM	
8/9/2022	7:23	CALVER	QA	119596.00	2536	500s	
8/9/2022	9:05	22-01109	6	457.96	2537	250j	
8/9/2022	9:54	22-01109	8	369.56	2538	250j	

Printed on:
8/16/2022 12:29 PM

Gamma Spectroscopy Logbook
ARS-03

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
7/21/2022	13:23	22-01004	7	857.67	3532	FLCC	[redacted]
7/21/2022	14:46	22-01003	4	1.00	3533	1LM	
7/22/2022	7:19	CALVER	QA	1595-98-4	3534	tc	
7/22/2022	9:55	22-01012	5	80100.00	3535	47AF	
7/22/2022	12:28	22-01016	5	65.86	3536	90mm	
7/22/2022	13:08	22-01016	6	51.90	3537	90mm	
7/22/2022	13:41	22-01016	9	50.96	3538	90mm	
7/22/2022	14:15	22-01016	7	57.09	3539	90mm	
7/22/2022	15:27	22-01012	5	80100.00	3540	47AF	
7/25/2022	9:54	CALVER	QA	1595-98-4	3541	tc	
7/25/2022	10:40	22-01021	5	242.01	3542	250j	
7/25/2022	11:22	22-01021	6	256.28	3543	250j	
7/25/2022	12:00	22-01022	4	16.38	3544	47mm	
7/25/2022	12:47	22-01021	4	262.86	3545	250j	
7/25/2022	13:25	22-01022	5	15.32	3546	47mm	
7/25/2022	13:59	22-01024	9	282.76	3547	250j	
7/25/2022	14:36	22-01024	5	250.75	3548	250j	
7/25/2022	15:20	22-01023	3	1.00	3549	1LM	
7/26/2022	7:14	CALVER	QA	1595-98-4	3550	tc	
7/26/2022	7:53	22-01024	15	244.82	3551	250j	
7/26/2022	8:38	22-01024	20	326.16	3552	250j	
7/26/2022	9:17	22-01024	19	344.40	3553	250j	
7/26/2022	10:15	22-01028	3	1.00	3554	47AF	
7/26/2022	11:21	22-01028	5	1800.00	3555	47AF	
7/26/2022	12:27	22-01028	7	1200.00	3556	47AF	
7/26/2022	13:34	22-1028	9	1800.00	3557	47AF	
7/27/2022	7:03	CALVER	QA	1595-98-4	3558	tc	
7/27/2022	12:26	Cal Ver	QA	122746.00	3559	47AF	
7/27/2022	12:55	Cal Ver	QA	122746.00	3560	47AF	
7/27/2022	14:06	22-01012	8	348180.00	3561	47AF	
7/28/2022	9:39	CALVER	QA	1595-98-4	3562	tc	
7/28/2022	9:58	22-01032	11	413.10	3563	250j	
7/28/2022	10:47	22-01033	13	379.72	3564	250j	
7/28/2022	11:29	22-01034	8	382.70	3565	250j	
7/28/2022	12:21	22-01034	7	448.28	3566	250j	
7/28/2022	13:08	22-01050	11	252.48	3567	250j	
7/28/2022	14:03	22-01012	10	3.47460 E+8	3568	47AF	
7/29/2022	7:18	CALVER	QA	1595-98-4	3569	tc	
7/29/2022	8:28	22-01055	3	1.00	3570	47AF	
7/29/2022	9:32	22-01055	5	6002.42	3571	47AF	
7/29/2022	11:25	22-01057	6	252.29	3572	250j	
7/29/2022	12:23	22-01054	10	317.82	3573	250j	
7/29/2022	14:24	22-01012	7	81720000.00	3574	47AF	

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Gamma Spectroscopy Logbook
ARS-03

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
7/30/2022	11:08	CALVER	QA	1595-98-4	3575	tc	[redacted]
7/30/2022	11:26	22-01012	9	3.4734 E+8	3576	47AF	
8/1/2022	9:31	CALVER	QA	1595-98-4	3577	tc	
8/1/2022	10:21	22-01061	3	75.16	3578	90mm	
8/1/2022	10:59	22-01062	3	1.00	3579	FLCC	
8/1/2022	12:29	22-01061	4	55.96	3580	90mm	
8/1/2022	13:08	22-01062	6	426.75	3581	FLCC	
8/1/2022	14:11	Long Bkg	QA	1.00	3582	empty	
8/2/2022	8:06	CALVER	QA	1595-98-4	3583	tc	
8/2/2022	8:51	22-01063	5	252.23	3584	250j	
8/2/2022	9:42	22-01062	8	856.40	3585	FLCC	
8/3/2022	7:34	CALVER	QA	1595-98-4	3586	tc	
8/3/2022	7:55	22-01086	13	113.53	3587	250j	
8/3/2022	9:09	22-01086	7	290.93	3588	250j	
8/3/2022	10:33	22-01086	10	297.33	3589	250j	
8/3/2022	11:13	22-01086	9	222.22	3590	250j	
8/3/2022	13:50	22-01086	8	387.36	3591	250j	
8/4/2022	10:21	CALVER	QA	1595-98-4	3592	tc	

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8/16/2022 12:30 PM

Gamma Spectroscopy Logbook
ARS-06

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
7/20/2022	15:17	22-00997	8	126.64	6260	250j	[redacted]
7/21/2022	9:34	CALVER	QA	119600.00	6261	250j	
7/22/2022	7:17	CALVER	QA	119600.00	6262	250j	
7/22/2022	9:49	22-01012	1	76927-526	6263	47AF	
7/22/2022	10:01	22-01012	2	76927-526	6264	47AF	
7/22/2022	10:14	22-01012	6	86580.00	6265	47AF	
7/25/2022	9:52	CALVER	QA	119600.00	6266	250j	
7/25/2022	10:16	CALVER	QA	119600.00	6267	250j	
7/25/2022	10:32	CALVER	QA	119600.00	6268	250j	
7/25/2022	10:48	22-01021	4	262.86	6269	250j	
7/25/2022	11:57	22-01021	6	256.28	6270	250j	
7/25/2022	13:18	22-01024	4	116.34	6271	250j	
7/25/2022	13:54	22-01024	5	250.75	6272	250j	
7/25/2022	14:37	22-01024	12	389.70	6273	250j	
7/25/2022	15:24	22-01024	15	244.82	6274	250j	
7/26/2022	7:12	CALVER	QA	119600.00	6275	250j	
7/26/2022	12:15	22-01029	8	422.77	6276	250j	
7/27/2022	7:01	CALVER	QA	119600.00	6277	250j	
7/27/2022	7:17	CALVER	QA	119600.00	6278	250j	
7/27/2022	7:29	CALVER	QA	119600.00	6279	250j	
7/27/2022	8:26	22-01031	4	242.19	6280	250j	
7/27/2022	9:16	22-01031	8	393.45	6281	250j	
7/27/2022	9:59	22-01031	12	429.90	6282	250j	
7/27/2022	11:23	22-01032	5	408.86	6283	250j	
7/27/2022	12:08	22-01032	8	379.87	6284	250j	
7/27/2022	12:46	22-01032	11	413.10	6285	250j	
7/27/2022	13:27	22-01033	4	386.89	6286	250j	
7/27/2022	14:20	22-01033	6	437.46	6287	250j	
7/27/2022	14:57	22-01033	9	464.18	6288	250j	
7/28/2022	9:37	CALVER	QA	119600.00	6289	250j	
7/28/2022	10:05	22-01050	4	216.31	6290	250j	
7/28/2022	10:45	22-01033	11	446.15	6291	250j	
7/28/2022	11:26	22-01034	6	369.02	6292	250j	
7/28/2022	12:25	22-01050	6	233.66	6293	250j	
7/28/2022	13:05	22-01050	9	341.26	6294	250j	
7/28/2022	13:58	22-01012	1	76927-526	6295	47AF	
7/28/2022	14:09	22-01012	2	76927-526	6296	47AF	
7/28/2022	14:22	22-01012	5	80100000.00	6297	47AF	
7/29/2022	7:17	CALVER	QA	119600.00	6298	250j	
7/29/2022	7:57	22-01050	8	333.67	6299	250j	
7/29/2022	8:40	22-01054	6	56.35	6300	250j	
7/29/2022	9:20	22-01054	8	263.49	6301	250j	
7/29/2022	11:24	22-01057	5	140.20	6302	250j	

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Gamma Spectroscopy Logbook
ARS-06

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
7/29/2022	12:19	22-01057	6	252.29	6303	250j	[redacted]
7/29/2022	14:28	22-01012	8	3.4818 E+8	6304	47AF	
7/30/2022	11:06	CALVER	QA	119600.00	6305	250j	
7/30/2022	11:28	22-01012	11	3.4746 E+8	6306	47AF	
8/1/2022	9:28	CALVER	QA	119600.00	6307	250j	
8/1/2022	11:29	22-01063	4	136.77	6308	250j	
8/1/2022	13:40	22-01063	5	252.23	6309	250j	
8/1/2022	14:12	Long Bkg	QA	1.00	6310	empty	
8/2/2022	7:45	CALVER	QA	119600.00	6311	250j	
8/2/2022	7:58	22-01067	1	119600.00	6312	250j	
8/2/2022	8:10	22-01067	2	119600.00	6313	250j	
8/2/2022	8:49	22-01063	11	429.59	6314	250j	
8/2/2022	9:44	22-01063	10	252.40	6315	250j	
8/3/2022	7:33	CALVER	QA	119600.00	6316	250j	
8/3/2022	7:54	22-01086	12	250.82	6317	250j	
8/3/2022	9:07	22-01086	5	478.77	6318	250j	
8/3/2022	10:32	22-01086	9	222.22	6319	250j	
8/3/2022	11:12	22-01086	8	387.36	6320	250j	
8/3/2022	12:08	22-01087	4	403.08	6321	250j	
8/3/2022	13:46	22-01012	10	3.4746 E+8	6322	47AF	
8/4/2022	10:15	CALVER	QA	119600.00	6323	250j	
8/4/2022	10:37	22-01088	4	483.79	6324	250j	
8/4/2022	12:14	22-01088	8	324.31	6325	250j	
8/4/2022	14:01	22-01095	4	60000.00	6326	47AF	
8/5/2022	7:20	CALVER	QA	119600.00	6327	250j	
8/5/2022	7:43	22-01088	12	120.76	6328	250j	
8/5/2022	8:18	22-01088	1	119600.00	6329	250j	
8/5/2022	8:31	22-01088	2	119600.00	6330	250j	
8/5/2022	8:43	22-01096	4	252.99	6331	250j	
8/5/2022	10:08	22-01096	9	349.74	6332	250j	
8/5/2022	14:11	22-01095	3	1.00	6333	47AF	
8/8/2022	9:34	CALVER	QA	119600.00	6334	250j	
8/8/2022	9:53	22-01105	1	119600.00	6335	250j	
8/8/2022	10:05	22-01105	2	119600.00	6336	250j	
8/8/2022	10:20	22-01105	5	421.55	6337	250j	
8/8/2022	10:55	22-01105	7	303.70	6338	250j	
8/8/2022	14:04	22-01095	8	3.5724 E+8	6339	47AF	
8/9/2022	7:22	CALVER	QA	119600.00	6340	250j	
8/9/2022	9:04	22-01109	5	44.80	6341	250j	
8/9/2022	12:37	22-01109	9	288.93	6342	250j	
8/9/2022	13:16	22-01109	12	234.35	6343	250j	
8/9/2022	14:29	22-01095	6	3.5664 E+8	6344	47AF	
8/10/2022	7:19	CALVER	QA	119600.00	6345	250j	

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Gamma Spectroscopy Logbook
ARS-06

Date	Time	ARS Batch ID	Batch Fraction Number	Weight (g) or Volume (L)	Spectrum File Number	Geometry	Tech. Initials
8/10/2022	8:18	22-01116	4	281.33	6346	250j	[redacted]
8/10/2022	10:02	22-01116	9	96.47	6347	250j	
8/10/2022	10:49	22-01116	7	267.45	6348	250j	
8/10/2022	11:53	22-01116	12	340.75	6349	250j	
8/10/2022	13:23	22-01122	6	325.46	6350	250j	
8/10/2022	14:42	22-01122	5	310.28	6351	250j	
8/11/2022	9:43	CALVER	QA	119600.00	6352	250j	
8/11/2022	11:31	22-01134	5	250.93	6353	250j	
8/11/2022	12:27	22-01134	4	248.04	6354	250j	
8/11/2022	13:33	22-01125	1	76927-526	6355	47AF	
8/11/2022	13:45	22-01125	2	76927-526	6356	47AF	
8/11/2022	13:57	22-01125	2	76927-526	6357	47AF	
8/11/2022	14:12	22-01125	5	3.5922 E+8	6358	47AF	

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Gamma Spec - Standards and Calibrations

ARS Aleut Analytical

Gamma Calibration Verification (Bq)

[redacted] 1-5-21 [redacted] 1-5-21

Instrument ID: ARS02

Calibration Verification

STD# **117495** **Geometry** 47mm AF **Ver. Date** 1/5/2021

Nuclide	Bq	pCi	Meas. Act.	Criteria	Dif.	%dif	Pass/Fail
Pb210	1.45E+04	391891.5	3.98E+05	10.00%	6328.5	1.61%	PASS
Am241	1.15E+03	30972.94	3.02E+04	5.00%	786.942	2.54%	PASS
Cd109	1.61E+04	434053.6	4.51E+05	10.00%	16826.38	3.88%	PASS
Co57	3.65E+02	9872.963	1.01E+04	10.00%	203.0369	2.06%	PASS
Ce139	5.51E+02	14883.77	1.44E+04	10.00%	529.7689	3.56%	PASS
Hg203	1.16E+03	31216.19	3.25E+04	10.00%	1329.815	4.26%	PASS
Sn113	9.71E+02	26240.51	2.64E+04	10.00%	208.4857	0.79%	PASS
Cs137	4.75E+02	12835.12	1.29E+04	5.00%	75.8777	0.59%	PASS
Y88	1.58E+03	42729.69	4.41E+04	10.00%	1398.313	3.27%	PASS
Co60	7.40E+02	19999.98	2.02E+04	5.00%	150.02	0.75%	PASS
Co60	7.40E+02	19999.98	2.02E+04	5.00%	150.02	0.75%	PASS

Independent Standard

STD# **113189** **Geometry** 47mm AF

Nuclide	Bq	pCi	Meas. Act.	Criteria	Dif.	%dif	Pass/Fail
Pb210	1.48E+04	401080.7	4.18E+05	10.00%	16779.32	4.18%	PASS
Am241	1.16E+03	31432.4	3.01E+04	5.00%	1349.401	4.29%	PASS
Cd109	1.62E+04	438107.7	4.82E+05	10.00%	43642.33	9.96%	PASS
Co57	3.80E+02	10264.85	1.00E+04	10.00%	245.8546	2.40%	PASS
Ce139	5.58E+02	15072.96	1.44E+04	10.00%	663.9579	4.40%	PASS
Hg203	1.13E+03	30513.48	-9.01E+03	10.00%	39526.483	129.54%	FAIL
Sn113	9.59E+02	25913.49	2.70E+04	10.00%	1130.5124	4.36%	PASS
Cs137	4.57E+02	12362.15	1.27E+04	5.00%	296.8502	2.40%	PASS
Y88	1.55E+03	41783.74	4.80E+04	10.00%	6249.258	14.96%	FAIL
Co60	7.51E+02	20289.17	2.03E+04	5.00%	25.8311	0.13%	PASS
Co60	7.51E+02	20289.17	2.03E+04	5.00%	25.8311	0.13%	PASS

Calibration Data from file: 47 AF 117495 calib 1-5-21.Clb
Energy Calibration Date: 01/05/21 Time: 11:19:08
Efficiency Calibration Date: 01/05/21 Time: 12:08:57

Calibration Description:
47 AF 117495
1-5-21 EEC

Energy Calibration Fit
Energy = 0.3672 +0.250010*Channel -3.1753e-008*Channel**2
FWHM (ch) = 3.3268 +0.001094*Channel -2.36133e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.20	46.52	46.67	-0.32%	0.87	0.88	-1.05%
237.02	59.54	59.62	-0.14%	0.88	0.90	-1.87%
350.86	88.03	88.08	-0.06%	0.92	0.93	-0.90%
486.87	122.07	122.08	-0.01%	0.97	0.96	0.24%
661.79	165.85	165.81	0.03%	1.01	1.01	0.29%
1114.41	279.17	278.94	0.08%	1.16	1.13	2.61%
1564.77	391.69	391.50	0.05%	1.26	1.24	1.19%
2646.09	661.66	661.69	-0.01%	1.51	1.51	-0.12%
3592.28	898.02	898.06	-0.00%	1.74	1.74	0.01%
4694.43	1173.24	1173.32	-0.01%	1.96	1.98	-1.40%
5332.26	1332.50	1332.58	-0.01%	2.12	2.12	0.24%
7348.81	1836.01	1835.93	0.00%	2.53	2.52	0.29%

Efficiency Calibration Fit
Knee Energy = 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.1327 %
Ln(Eff) = -0.4127 -0.046019*Ln(Eng) -0.0650215*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.9182 %
Ln(Eff) = -5.1212 +1.633498*Ln(Eng) -0.209911*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.52	1.4688E-001	1.4315E-001	2.54%
59.54	1.3674E-001	1.4208E-001	-3.91%
88.03	1.3913E-001	1.3324E-001	4.23%
120.00	========== Knee ==========		
122.07	1.1953E-001	1.1827E-001	1.05%
165.85	9.2571E-002	9.5705E-002	-3.39%
279.17	6.6971E-002	6.4946E-002	3.02%
391.69	4.9227E-002	4.9526E-002	-0.61%
661.66	3.1567E-002	3.1609E-002	-0.13%
1173.24	1.8349E-002	1.8578E-002	-1.25%
1332.50	1.6252E-002	1.6413E-002	-0.99%
1836.01	1.2062E-002	1.1902E-002	1.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.52	4.00	7.45E+003	14500.00	580.00	4.50%	10/01/20 11:00:00
Am-241	59.54	36.30	1.58E+005	1146.00	416.00	3.70%	10/01/20 11:00:00
Cd-109	88.03	3.61	4.36E+002	16060.00	579.77	4.20%	10/01/20 11:00:00
Co-57	122.07	85.60	2.72E+002	365.30	312.70	3.50%	10/01/20 11:00:00
Ce-139	165.85	80.00	1.38E+002	550.70	440.56	3.70%	10/01/20 11:00:00
Hg-203	279.17	81.50	4.66E+001	1155.00	941.33	3.50%	10/01/20 11:00:00
Sn-113	391.69	64.16	1.15E+002	970.90	622.93	4.10%	10/01/20 11:00:00
Cs-137	661.66	85.21	1.10E+004	474.90	404.66	4.10%	10/01/20 11:00:00
Y-88	898.02	95.00	1.07E+002	1581.00	1501.95	3.70%	10/01/20 11:00:00
Co-60	1173.24	99.90	1.93E+003	740.00	739.26	3.90%	10/01/20 11:00:00
Co-60	1332.50	99.98	1.93E+003	740.00	739.87	3.90%	10/01/20 11:00:00
Y-88	1836.01	99.35	1.07E+002	1581.00	1570.72	3.70%	10/01/20 11:00:00

American Radiation Services Spectrum name: ARS02150.An1

Sample description
Batch ID: Cal Ver
SDG ID: 117495 Tech: EEC

Spectrum Filename: C:\User\ARS02150.An1

Acquisition information
Start time: 05-Jan-2021 12:10:41
Live time: 600
Real time: 677
Dead time: 11.33 %
Detector ID: 1

Detector system
(ARS02) MCB 131

Calibration
Filename: 47 AF 117495 calib 1-5-21.Clb
47 AF 117495
1-5-21 EEC

Energy Calibration
Created: 05-Jan-2021 11:19:08
Zero offset: 0.367 keV
Gain: 0.250 keV/channel
Quadratic: -3.175E-08 keV/channel^2

Efficiency Calibration
Created: 05-Jan-2021 12:08:57
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -4.127091E-01 + (-4.601949E-02*Log(E)) + (-6.502150E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.92 %
Log(Eff): -5.121235E+00 + (1.633498E+00*Log(E)) + (-2.099107E-01*Log(E)^2)

Library Files
Main analysis library: northamericancal1.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 0 (0.37keV)
Stop channel: 8000 (1998.42keV)
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) = 1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	60.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	01-Oct-2020 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	cal filters.Pbc 04-Jan-2021 07:43:08
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %
Energy Calibration
Normalized diff: 0.0738

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/g	Nuc
13.23	74959.	0.48	0.85	1.008E-01				
15.50	28691.	1.07	0.85	1.092E-01				
17.77	7889.	2.49	0.85	1.160E-01				
22.32	815095.	0.12	0.86	1.257E-01				
25.19	182787.	0.29	0.86	1.305E-01				
27.56	6648.	2.89	0.86	1.336E-01				
33.30	17351.	1.46	1.06	1.388E-01				
37.87	3420.	5.41	0.91	1.413E-01				
44.06	817.	12.65	0.88	1.429E-01				
46.67	50711.	0.48	0.88	1.432E-01	46.52	4.000	4.024E+05	PB210
49.90	363.	26.83	0.76	1.432E-01				
59.62	34548.	0.63	0.87	1.421E-01	59.54	36.300	3.019E+04	AM241
66.62	375.	23.68	0.97	1.404E-01				
70.88	876.	7.88	0.91	1.392E-01				
73.02	1412.	5.22	0.91	1.385E-01				
82.43	526.	11.91	0.92	1.353E-01				
84.99	416.	15.29	0.92	1.344E-01				
88.09	41618.	0.51	0.93	1.332E-01	88.03	3.610	4.540E+05	CD109
122.08	17735.	0.87	0.97	1.183E-01	122.07	85.600	1.008E+04	CO57
136.48	2359.	3.43	1.04	1.097E-01				
165.81	15034.	0.92	1.02	9.572E-02	165.85	80.000	1.435E+04	CE139
199.00	1316.	5.96	1.21	8.390E-02				
254.88	430.	11.99	1.26	6.968E-02				
278.94	9162.	1.32	1.12	6.499E-02	279.17	81.500	3.255E+04	HG203
391.48	10463.	1.11	1.22	4.955E-02	391.69	64.160	2.645E+04	SN113
412.71	138.	29.66	0.94	4.743E-02				
456.24	89.	39.31	0.36	4.362E-02				
661.72	7674.	1.67	1.52	3.161E-02	661.66	85.210	1.291E+04	CS137
898.06	10566.	1.22	1.73	2.393E-02	898.02	95.000	3.907E+04	Y88
1173.33	8168.	1.26	1.89	1.858E-02	1173.24	99.900	2.052E+04	CO60
1332.57	6961.	1.43	2.08	1.641E-02	1332.50	99.982	1.978E+04	CO60
1835.97	6206.	1.39	2.38	1.190E-02	1836.01	99.350	4.413E+04	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid	Background	Net Area	Intensity	Uncert	FWHM	Suspected

Channel	Energy	Counts	Counts	Cts/Sec	1 Sigma %	keV	Nuclide	
52.22	13.42	38380.	76211.	127.018	0.58	0.992	SE-75	s
61.31	15.70	35850.	5832.	9.720	5.30	0.867	KR-85	s
70.37	17.96	14035.	4497.	7.496	4.29	0.737	MO-99	s
87.60	22.27	77885.	825379.	1375.631	0.13	0.871	RH-106	

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
99.07	25.14	59887.	178342.	297.236	0.34	0.967	RH-106	s
108.55	27.50	10712.	2310.	3.851	7.61	0.717	SB-124	s
131.74	33.30	10847.	17351.	28.919	1.46	1.061	CS-134	s
150.03	37.87	8047.	3420.	5.701	5.41	0.910	CS-134	s
174.77	44.06	4622.	656.	1.094	17.36	1.122	EU-154	sM
198.14	49.90	2884.	363.	0.605	26.83	0.764	EU-154	sM
265.02	66.62	2249.	375.	0.624	23.68	0.965	AU-196	s
282.05	70.86	1943.	876.	1.460	7.88	0.908	AU-196	D
290.62	73.01	2006.	1412.	2.353	5.22	0.911	TL-208	D
328.23	82.42	1790.	563.	0.939	14.01	1.393	AU-196	s
338.49	84.99	1540.	230.	0.383	28.63	0.959	TL-208	M
544.46	136.48	1338.	2359.	3.932	3.43	1.044	CO-57	
794.59	199.00	1286.	1316.	2.193	5.96	1.212	SE-75	s
1018.15	254.88	670.	430.	0.717	11.99	1.261	SN-113	
1649.66	412.71	442.	138.	0.231	29.66	0.940	AU-198	s
1823.83	456.24	412.	89.	0.148	39.31	0.356	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: northamericancal1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.19	46.67	4677.	50171.	83.618	0.51	0.890
AM-241	237.02	59.62	3237.	34548.	57.580	0.63	0.872
CD-109	350.90	88.09	2493.	41328.	68.880	0.55	0.925
CO-57	486.87	122.08	1790.	17735.	29.558	0.87	0.968
CE-139	661.81	165.81	1382.	15034.	25.057	0.92	1.018
HG-203	1114.41	278.94	794.	9161.	15.269	1.32	1.120
SN-113	1564.71	391.48	768.	10462.	17.437	1.11	1.223
CS-137	2646.18	661.72	1257.	7673.	12.789	1.67	1.520
Y-88	3592.26	898.06	852.	10566.	17.610	1.22	1.732
CO-60	4694.44	1173.33	405.	8168.	13.613	1.26	1.892
CO-60	5332.21	1332.57	374.	6961.	11.602	1.43	2.083
Y-88	7348.98	1835.97	121.	6206.	10.343	1.39	2.376

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/g	Peak Energy keV	Peak Activity pCi/g	Peak Code	Peak MDA Value pCi/g	COMMENTS
PB-210		3.9822E+05					
			46.52	3.982E+05	(P	2.551E+03 5.11E-01	G
AM-241		3.0186E+04					
			59.54	3.019E+04	(	2.340E+02 6.31E-01	G
CD-109		4.5088E+05					
			88.03	4.509E+05	(P	2.568E+03 5.50E-01	G
CO-57		1.0076E+04					
			122.07	1.008E+04	(P	1.136E+02 8.74E-01	G
CE-139		1.4354E+04					
			165.85	1.435E+04	(P	1.680E+02 9.21E-01	G
HG-203		3.2546E+04					
			279.17	3.255E+04	(P	4.760E+02 1.32E+00	G
SN-113		2.6449E+04					
			391.69	2.645E+04	(P	3.332E+02 1.11E+00	G
CS-137		1.2911E+04					
			661.66	1.291E+04	(P	2.825E+02 1.67E+00	G
CO-60		2.0150E+04					
			1173.24	2.052E+04	(	2.425E+02 1.26E+00	G
			1332.50	1.978E+04	(P	2.637E+02 1.43E+00	G
Y-88		4.4128E+04					
			1836.01	4.413E+04	(	3.843E+02 1.39E+00	G
			898.02	3.907E+04	- P	5.131E+02 1.22E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/g	Time Corrected Activity pCi/g	Uncertainty Counting pCi/g	1 Sigma Total pCi/g	MDA pCi/g
PB-210	3.9468E+05	3.9822E+05	2.0351E+03	2.0115E+04	2.551E+03
AM-241	3.0174E+04	3.0186E+04	1.9042E+02	1.2051E+03	2.340E+02
CD-109	3.8703E+05	4.5088E+05	2.4809E+03	1.9795E+04	2.568E+03
CO-57	7.8909E+03	1.0076E+04	8.8013E+01	4.1522E+02	1.136E+02
CE-139	8.8450E+03	1.4354E+04	1.3223E+02	5.0721E+02	1.680E+02
HG-203	7.7965E+03	3.2546E+04	4.2804E+02	1.1877E+03	4.760E+02
SN-113	1.4831E+04	2.6449E+04	2.9303E+02	1.0865E+03	3.332E+02
CS-137	1.2833E+04	1.2911E+04	2.1592E+02	3.9139E+02	2.825E+02
CO-60	1.9465E+04	2.0150E+04	1.9229E+02	4.7807E+02	2.425E+02
Y-88	2.3639E+04	4.4128E+04	6.1415E+02	1.5187E+03	3.843E+02

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1173.2 to 1998.4 keV) 9.072E+05 pCi/g
Total Decayed Activity (1173.2 to 1998.4 keV) 1.0399064E+06 pCi/g

American Radiation Services Spectrum name: ARS02151.An1

Sample description
Batch ID: Calibration Verification
SDG ID: 113189 Tech: EEC

Spectrum Filename: C:\User\ARS02151.An1

Acquisition information
Start time: 05-Jan-2021 12:26:31
Live time: 600
Real time: 641
Dead time: 6.40 %
Detector ID: 1

Detector system
(ARS02) MCB 131

Calibration
Filename: 47 AF 117495 calib 1-5-21.Clb
47 AF 117495
1-5-21 EEC

Energy Calibration
Created: 05-Jan-2021 11:19:08
Zero offset: 0.367 keV
Gain: 0.250 keV/channel
Quadratic: -3.175E-08 keV/channel^2

Efficiency Calibration
Created: 05-Jan-2021 12:08:57
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -4.127091E-01 + (-4.601949E-02*Log(E)) + (-6.502150E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.92 %
Log(Eff): -5.121235E+00 + (1.633498E+00*Log(E)) + (-2.099107E-01*Log(E)^2)

Library Files
Main analysis library: northamericancal1.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 0 (0.37keV)
Stop channel: 8000 (1998.42keV)
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) = 1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	60.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	01-Jul-2019 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	cal filters.Pbc 04-Jan-2021 07:43:08
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.0706

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/g	Nuc
13.26	66912.	0.43	0.85	1.004E-01				
15.70	20918.	1.09	0.85	1.094E-01				
17.90	9267.	1.88	0.85	1.160E-01				
22.32	418823.	0.17	0.86	1.257E-01				
25.27	86953.	0.40	0.86	1.306E-01				
32.17	1888.	5.09	0.87	1.380E-01				
33.60	1353.	7.30	0.87	1.390E-01				
36.84	1084.	10.24	0.98	1.408E-01				
40.55	480.	22.28	1.28	1.422E-01				
46.66	51370.	0.47	0.88	1.432E-01	46.52	4.000	4.254E+05	PB210
49.85	511.	17.18	1.08	1.432E-01				
59.63	34360.	0.58	0.87	1.421E-01	59.54	36.300	3.008E+04	AM241
88.08	21320.	0.75	0.91	1.332E-01	88.03	3.610	4.817E+05	CD109
122.08	5499.	1.60	0.93	1.183E-01	122.07	85.600	1.002E+04	CO57
136.46	763.	6.93	0.92	1.097E-01				
165.83	1500.	3.81	1.08	9.571E-02	165.85	80.000	1.441E+04	CE139
391.51	678.	5.76	1.25	4.955E-02	391.69	64.160	2.704E+04	SN113
661.68	7310.	1.27	1.49	3.161E-02	661.66	85.210	1.266E+04	CS137
754.49	42.	36.96	0.66	2.809E-02				
898.26	706.	9.69	1.83	2.393E-02	898.02	95.000	5.124E+04	Y88
1173.30	6831.	1.34	2.05	1.858E-02	1173.24	99.900	2.024E+04	CO60
1332.59	6085.	1.34	2.03	1.641E-02	1332.50	99.982	2.039E+04	CO60
1835.91	322.	5.89	2.35	1.190E-02	1836.01	99.350	4.497E+04	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
51.84	13.33	15410.	64696.	107.827	0.51	1.004	SE-75	
61.59	15.77	21270.	10751.	17.918	2.42	0.916	KR-85	
70.40	17.97	11144.	5096.	8.493	3.56	0.718	MO-99	
87.58	22.26	29648.	434651.	724.418	0.17	0.875	RH-106	s
99.37	25.21	19437.	87299.	145.498	0.46	0.940	RH-106	

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
127.21	32.15	3674.	1888.	3.147	5.09	0.866	XE-138	D
132.91	33.58	4203.	1353.	2.255	7.30	0.868	CS-134	D
145.89	36.84	3212.	1084.	1.808	10.24	0.984	XE-138	s
160.74	40.55	3452.	480.	0.799	22.28	1.279	MO-99	s
197.91	49.85	2161.	511.	0.852	17.18	1.083	EU-154	sM
544.37	136.46	470.	763.	1.272	6.93	0.916	CO-57	
3017.53	754.49	73.	42.	0.069	36.96	0.661	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: northamericancal1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.17	46.66	3347.	50449.	84.081	0.49	0.860
AM-241	237.06	59.63	1635.	34360.	57.267	0.58	0.873
CD-109	350.86	88.08	1065.	21319.	35.532	0.75	0.908
CO-57	486.85	122.08	538.	5499.	9.164	1.60	0.930
CE-139	661.86	165.83	424.	1500.	2.499	3.81	1.081
SN-113	1564.80	391.51	283.	678.	1.130	5.76	1.248
CS-137	2646.04	661.68	216.	7310.	12.183	1.27	1.491
Y-88	3593.05	898.26	389.	706.	1.177	9.69	1.829
CO-60	4694.34	1173.30	207.	6831.	11.386	1.34	2.053
CO-60	5332.28	1332.59	75.	6085.	10.141	1.34	2.034
Y-88	7348.73	1835.91	6.	322.	0.537	5.89	2.352

s - Peak fails shape tests.
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A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/g	Peak Energy keV	Peak Activity pCi/g	Code	MDA Value pCi/g	COMMENTS
PB-210		4.1786E+05					
			46.52	4.179E+05	(P	2.256E+03	4.92E-01 G
AM-241		3.0083E+04					
			59.54	3.008E+04	(	1.673E+02	5.83E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	4.8175E+05						
		88.03	4.817E+05	(P	3.497E+03	7.53E-01	G
CO-57	1.0019E+04						
		122.07	1.002E+04	(P	2.020E+02	1.60E+00	G
CE-139	1.4409E+04						
		165.85	1.441E+04	(P	9.483E+02	3.81E+00	G
HG-203	-9.0130E+03						
		279.17	-9.013E+03	%(P	3.030E+05	1.01E+03	G
SN-113	2.7044E+04						
		391.69	2.704E+04	(P	3.234E+03	5.76E+00	G
CS-137	1.2659E+04						
		661.66	1.266E+04	(P	1.233E+02	1.27E+00	G
CO-60	2.0315E+04						
		1173.24	2.024E+04	(	2.065E+02	1.34E+00	G
		1332.50	2.039E+04	(P	1.445E+02	1.34E+00	G
Y-88	4.8033E+04						
		1836.01	4.497E+04	(	1.926E+03	5.89E+00	G
		898.02	5.124E+04	(P	6.862E+03	9.69E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
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? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
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Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

ARS Aleut Analytical

Gamma Calibration Verification (Bq)

[redacted] 1-6-21 [redacted] 1-6-21

Instrument ID: ARS03 — Calibration Verification

STD# 117495 **Geometry** 47mm AF **Ver. Date** 1/6/2021

Nuclide	Bq	pCi	Meas. Act.	Criteria	Dif.	%dif	Pass/Fail
Pb210	1.45E+04	391891.5	3.94E+05	10.00%	2278.5	0.58%	PASS
Am241	1.15E+03	30972.94	2.95E+04	5.00%	1511.942	4.88%	PASS
Cd109	1.61E+04	434053.6	4.50E+05	10.00%	15546.38	3.58%	PASS
Co57	3.65E+02	9872.963	9.67E+03	10.00%	204.2631	2.07%	PASS
Ce139	5.51E+02	14883.77	1.30E+04	10.00%	1907.7689	12.82%	FAIL
Hg203	1.16E+03	31216.19	3.15E+04	10.00%	277.815	0.89%	PASS
Sn113	9.71E+02	26240.51	2.62E+04	10.00%	12.5143	0.05%	PASS
Cs137	4.75E+02	12835.12	1.34E+04	5.00%	612.8777	4.78%	PASS
Y88	1.58E+03	42729.69	4.31E+04	10.00%	355.313	0.83%	PASS
Co60	7.40E+02	19999.98	2.05E+04	5.00%	520.02	2.60%	PASS
Co60	7.40E+02	19999.98	2.01E+04	5.00%	52.02	0.26%	PASS

Independent Standard

STD# 113189 **Geometry** 47mm AF

Nuclide	Bq	pCi	Meas. Act.	Criteria	Dif.	%dif	Pass/Fail
Pb210	1.48E+04	401080.7	4.19E+05	10.00%	18019.32	4.49%	PASS
Am241	1.16E+03	31432.4	3.02E+04	5.00%	1236.401	3.93%	PASS
Cd109	1.62E+04	438107.7	4.77E+05	10.00%	39252.33	8.96%	PASS
Co57	3.80E+02	10264.85	1.01E+04	10.00%	158.8546	1.55%	PASS
Ce139	5.58E+02	15072.96	1.35E+04	10.00%	1585.9579	10.52%	FAIL
Hg203	1.13E+03	30513.48	6.66E+03	10.00%	23854.883	78.18%	FAIL
Sn113	9.59E+02	25913.49	2.65E+04	10.00%	613.5124	2.37%	PASS
Cs137	4.57E+02	12362.15	1.26E+04	5.00%	260.8502	2.11%	PASS
Y88	1.55E+03	41783.74	4.47E+04	10.00%	2929.258	7.01%	PASS
Co60	7.51E+02	20289.17	2.03E+04	5.00%	58.8311	0.29%	PASS
Co60	7.51E+02	20289.17	2.03E+04	5.00%	58.8311	0.29%	PASS

Calibration Data from file: 47mm AF 117495 calib 1-6-21.Clb
Energy Calibration Date: 01/06/2021 Time: 09:40:20
Efficiency Calibration Date: 01/06/2021 Time: 09:47:25

Calibration Description:
47mm AF 117495
1-6-21 EEC

Energy Calibration Fit
Energy = 0.2126 +0.249794*Channel -2.2038e-008*Channel**2
FWHM (ch) = 3.2963 +0.000917*Channel -2.38705e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.52	46.61	-0.19%	0.85	0.87	-1.87%
237.71	59.54	59.59	-0.08%	0.86	0.88	-1.64%
351.62	88.03	88.04	-0.01%	0.91	0.90	1.13%
487.73	122.07	122.04	0.02%	0.93	0.93	-0.15%
663.17	165.85	165.86	-0.01%	0.97	0.97	-0.50%
1116.41	279.17	279.06	0.04%	1.10	1.07	2.44%
1566.97	391.69	391.58	0.03%	1.17	1.17	0.35%
2648.73	661.66	661.69	-0.01%	1.40	1.39	0.87%
3595.53	898.02	898.07	-0.01%	1.57	1.57	0.33%
4698.02	1173.24	1173.26	-0.00%	1.74	1.77	-1.58%
5336.15	1332.50	1332.52	-0.00%	1.87	1.87	-0.28%
7353.90	1836.01	1835.98	0.00%	2.19	2.18	0.47%

Efficiency Calibration Fit
Knee Energy = 130.00 keV
Above the Knee: Quadratic Uncertainty = 0.9649 %
Ln(Eff) = -0.3057 +0.157503*Ln(Eng) -0.0866688*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.6306 %
Ln(Eff) = -4.5985 +1.629076*Ln(Eng) -0.207783*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.52	2.5214E-001	2.4495E-001	2.85%
59.54	2.3366E-001	2.4387E-001	-4.37%
88.03	2.4089E-001	2.2994E-001	4.55%
122.07	2.0623E-001	2.0848E-001	-1.09%
130.00	========== Knee ==========		
279.17	1.1491E-001	1.1445E-001	0.40%
391.69	8.4415E-002	8.5881E-002	-1.74%
661.66	5.4278E-002	5.2938E-002	2.47%
1173.24	2.8870E-002	2.9550E-002	-2.36%
1332.50	2.5925E-002	2.5759E-002	0.64%
1836.01	1.8084E-002	1.8005E-002	0.44%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.52	4.00	7.45E+003	14500.00	580.00	4.50%	10/01/2020 11:00:00
Am-241	59.54	36.30	1.58E+005	1146.00	416.00	3.70%	10/01/2020 11:00:00
Cd-109	88.03	3.61	4.36E+002	16060.00	579.77	4.20%	10/01/2020 11:00:00
Co-57	122.07	85.60	2.72E+002	365.30	312.70	3.50%	10/01/2020 11:00:00
Ce-139	165.85	80.00	1.38E+002	550.70	440.56	3.70%	10/01/2020 11:00:00
Hg-203	279.17	81.50	4.66E+001	1155.00	941.33	3.50%	10/01/2020 11:00:00
Sn-113	391.69	64.16	1.15E+002	970.90	622.93	4.10%	10/01/2020 11:00:00
Cs-137	661.66	85.21	1.10E+004	474.90	404.66	4.10%	10/01/2020 11:00:00
Y-88	898.02	95.00	1.07E+002	1581.00	1501.95	3.70%	10/01/2020 11:00:00
Co-60	1173.24	99.90	1.93E+003	740.00	739.26	3.90%	10/01/2020 11:00:00
Co-60	1332.50	99.98	1.93E+003	740.00	739.87	3.90%	10/01/2020 11:00:00
Y-88	1836.01	99.35	1.07E+002	1581.00	1570.72	3.70%	10/01/2020 11:00:00

ARS Spectrum name: ARS03416.An1

Sample description
Batch ID: Cal Ver
SDG ID: 117495 Tech: EEC

Spectrum Filename: C:\User\ARS03416.An1

Acquisition information
Start time: 06-Jan-2021 09:50:32
Live time: 600
Real time: 729
Dead time: 17.69 %
Detector ID: 1

Detector system
(ARS03) MCB 129

Calibration
Filename: 47mm AF 117495 calib 1-6-21.Clb
47mm AF 117495
1-6-21 EEC

Energy Calibration
Created: 06-Jan-2021 09:40:20
Zero offset: 0.213 keV
Gain: 0.250 keV/channel
Quadratic: -2.204E-08 keV/channel^2

Efficiency Calibration
Created: 06-Jan-2021 09:47:25
Knee Energy: 130.00 keV
Above the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -3.057202E-01 + (1.575027E-01*Log(E)) +
(-8.666885E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.63 %
Log(Eff): -4.598458E+00 + (1.629076E+00*Log(E)) +
(-2.077827E-01*Log(E)^2)

Library Files
Main analysis library: northamericancal1.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 115 (28.94keV)
Stop channel: 8000 (1997.15keV)
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) =
1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

ARS Spectrum name: ARS03416.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	60.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	01-Oct-2020 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	cal filters.Pbc 04-Jan-2021 07:50:26
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.0453

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/g	Nuc
33.20	25607.	1.40	1.00	2.366E-01				
36.45	1207.	12.88	0.86	2.400E-01				
37.87	3736.	4.72	0.86	2.412E-01				
44.06	1742.	8.30	0.86	2.444E-01				
46.61	87069.	0.37	0.87	2.450E-01	46.52	4.000	4.039E+05	PB210
49.84	442.	24.27	0.87	2.453E-01				
59.60	58476.	0.44	0.88	2.439E-01	59.54	36.300	2.977E+04	AM241
66.56	667.	17.97	1.02	2.414E-01				
70.86	1544.	5.84	0.89	2.394E-01				
72.96	2357.	4.10	0.89	2.384E-01				
82.46	695.	11.95	0.90	2.332E-01				
84.90	444.	18.07	0.90	2.318E-01				
88.04	71859.	0.39	0.90	2.299E-01	88.03	3.610	4.549E+05	CD109
122.04	29932.	0.71	0.92	2.085E-01	122.07	85.600	9.669E+03	CO57
136.42	4021.	3.00	1.01	1.968E-01				
165.87	24205.	0.75	0.96	1.712E-01	165.85	80.000	1.298E+04	CE139
189.44	239.	33.88	0.67	1.552E-01				
193.27	149.	39.45	0.50	1.529E-01				
199.15	3392.	3.02	1.14	1.494E-01				
203.75	872.	10.23	1.13	1.468E-01				
254.92	689.	10.77	1.19	1.232E-01				
279.05	15415.	0.91	1.10	1.145E-01	279.17	81.500	3.149E+04	HG203
391.57	17894.	0.87	1.18	8.590E-02	391.69	64.160	2.623E+04	SN113
661.69	13385.	1.18	1.40	5.294E-02	661.66	85.210	1.345E+04	CS137
898.10	15178.	1.20	1.65	3.906E-02	898.02	95.000	3.459E+04	Y88
912.31	1558.	6.95	1.81	3.844E-02				
970.46	64.	36.27	0.47	3.607E-02				
1173.26	12490.	1.02	1.73	2.955E-02	1173.24	99.900	1.974E+04	CO60
1332.54	11247.	1.04	1.80	2.576E-02	1332.50	99.982	2.037E+04	CO60
1836.00	9112.	1.17	2.12	1.800E-02	1836.01	99.350	4.308E+04	Y88
1850.51	824.	6.23	2.11	1.784E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

132.06	33.20	24494.	25607.	42.678	1.40	1.004	CS-134	s
145.08	36.49	11476.	1207.	2.012	12.88	0.856	XE-138	D
150.74	37.90	13697.	3736.	6.227	4.72	0.858	CS-134	D
175.51	44.05	9924.	1403.	2.339	12.24	0.811	EU-154	M

ARS Spectrum name: ARS03416.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
198.65	49.83	5579.	589.	0.982	23.52	1.015	EU-154	sM
265.61	66.56	4114.	667.	1.112	17.97	1.025	AU-196	s
282.82	70.86	3296.	1544.	2.573	5.84	0.888	AU-196	D
291.24	72.97	3489.	2357.	3.928	4.10	0.890	TL-208	D
329.26	82.46	3132.	660.	1.100	15.19	1.223	AU-196	s
339.03	84.90	3002.	444.	0.741	18.07	0.900	TL-208	lD
545.32	136.42	2907.	4021.	6.701	3.00	1.007	CO-57	
757.58	189.44	1646.	239.	0.398	33.88	0.670	FE-59	s
772.91	193.27	1102.	149.	0.248	39.45	0.502	FE-59	s
796.46	199.15	2113.	3392.	5.653	3.02	1.135	SE-75	
814.88	203.75	1773.	872.	1.453	10.23	1.135	PU-239	s
1019.78	254.92	1256.	689.	1.148	10.77	1.189	SN-113	
3652.60	912.31	1488.	1558.	2.596	6.95	1.815	AC-228	s
3885.51	970.46	205.	64.	0.107	36.27	0.471	-	s
7412.16	1850.51	253.	824.	1.374	6.23	2.108	XE-138	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: northamericancal1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.73	46.61	9051.	84970.	141.616	0.40	0.856
AM-241	237.73	59.59	5112.	57874.	96.457	0.48	0.863
CD-109	351.63	88.05	4111.	71016.	118.360	0.42	0.910
CO-57	487.74	122.04	2682.	29932.	49.886	0.71	0.923
CE-139	663.21	165.87	2100.	24205.	40.342	0.75	0.961
HG-203	1116.38	279.05	1268.	15414.	25.691	0.91	1.105
SN-113	1566.95	391.57	1268.	17894.	29.823	0.87	1.182
CS-137	2648.72	661.69	1402.	13385.	22.309	1.18	1.400
Y-88	3595.64	898.10	1369.	15177.	25.296	1.20	1.654
CO-60	4698.03	1173.26	712.	12490.	20.817	1.02	1.726
CO-60	5336.21	1332.54	499.	11247.	18.744	1.04	1.799
Y-88	7353.99	1836.00	271.	9112.	15.186	1.17	2.118

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/g	Peak Energy keV	Peak Activity pCi/g	Peak Code	Peak MDA Value pCi/g	COMMENTS
PB-210		3.9417E+05					
			46.52	3.942E+05	(P	2.069E+03 3.99E-01	G
AM-241		2.9461E+04					
			59.54	2.946E+04	(	1.710E+02 4.78E-01	G
CD-109		4.4960E+05					
			88.03	4.496E+05	(P	1.909E+03 4.16E-01	G
CO-57		9.6687E+03					
			122.07	9.669E+03	(P	7.884E+01 7.12E-01	G
CE-139		1.2976E+04					
			165.85	1.298E+04	(	1.159E+02 7.54E-01	G
HG-203		3.1494E+04					
			279.17	3.149E+04	(P	3.445E+02 9.14E-01	G
SN-113		2.6228E+04					
			391.69	2.623E+04	(P	2.472E+02 8.70E-01	G
CS-137		1.3448E+04					
			661.66	1.345E+04	(P	1.780E+02 1.18E+00	G
CO-60		2.0052E+04					
			1173.24	1.974E+04	(P	2.008E+02 1.02E+00	G
			1332.50	2.037E+04	(P	1.935E+02 1.04E+00	G
Y-88		4.3085E+04					
			1836.01	4.308E+04	(	3.758E+02 1.17E+00	G
			898.02	3.459E+04	- P	3.991E+02 1.20E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.

ARS Spectrum name: ARS03416.An1

+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/g	Time Corrected Activity pCi/g	Uncertainty Counting pCi/g	1 Sigma Total pCi/g	MDA pCi/g
PB-210	3.9063E+05	3.9417E+05	1.5740E+03	1.9680E+04	2.069E+03
AM-241	2.9448E+04	2.9461E+04	1.4091E+02	1.1456E+03	1.710E+02
CD-109	3.8538E+05	4.4960E+05	1.8723E+03	1.9763E+04	1.909E+03
CO-57	7.5549E+03	9.6687E+03	6.8794E+01	3.5072E+02	7.884E+01
CE-139	7.9597E+03	1.2976E+04	9.7837E+01	1.1561E+03	1.159E+02
HG-203	7.4438E+03	3.1494E+04	2.8786E+02	1.3623E+03	3.445E+02
SN-113	1.4628E+04	2.6228E+04	2.2816E+02	1.0708E+03	2.472E+02
CS-137	1.3366E+04	1.3448E+04	1.5869E+02	4.5297E+02	1.780E+02
CO-60	1.9364E+04	2.0052E+04	1.4621E+02	5.1174E+02	2.008E+02
Y-88	2.2945E+04	4.3085E+04	5.0427E+02	1.5780E+03	3.758E+02

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.4 to 1997.2 keV) 8.987E+05 pCi/g
Total Decayed Activity (82.4 to 1997.2 keV) 1.0301839E+06 pCi/g

ARS Spectrum name: ARS03417.An1

Sample description
Batch ID: Calibration Verification
SDG ID: 113189 Tech: [redacted]

Spectrum Filename: C:\User\ARS03417.An1

Acquisition information
Start time: 06-Jan-2021 10:04:51
Live time: 600
Real time: 667
Dead time: 10.06 %
Detector ID: 1

Detector system
(ARS03) MCB 129

Calibration
Filename: 47mm AF 117495 calib 1-6-21.Clb
47mm AF 117495
1-6-21 EEC

Energy Calibration
Created: 06-Jan-2021 09:40:20
Zero offset: 0.213 keV
Gain: 0.250 keV/channel
Quadratic: -2.204E-08 keV/channel^2

Efficiency Calibration
Created: 06-Jan-2021 09:47:25
Knee Energy: 130.00 keV
Above the Knee: Quadratic Uncertainty = 0.96 %
Log(Eff): -3.057202E-01 + (1.575027E-01*Log(E)) + (-8.666885E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.63 %
Log(Eff): -4.598458E+00 + (1.629076E+00*Log(E)) + (-2.077827E-01*Log(E)^2)

Library Files
Main analysis library: northamericancal1.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.22
Start channel: 115 (28.94keV)
Stop channel: 8000 (1997.15keV)
Peak rejection level: 40.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.0000E+00) = 1.0000E+06
Detection limit method: Reg. Guide 4.16 Method

ARS Spectrum name: ARS03417.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	60.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	01-Jul-2019 11:00:00
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	cal filters.Pbc 04-Jan-2021 07:50:26
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff 20.00000 %

Energy Calibration

Normalized diff: 0.0353

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/g	Nuc
32.09	3146.	4.10	0.85	2.352E-01				
33.38	2191.	6.27	0.85	2.368E-01				
36.67	1874.	8.44	0.86	2.402E-01				
43.80	617.	17.22	0.86	2.443E-01				
46.60	88533.	0.35	0.87	2.450E-01	46.52	4.000	4.285E+05	PB210
49.72	451.	20.20	0.87	2.453E-01				
59.59	59198.	0.47	0.84	2.439E-01	59.54	36.300	3.020E+04	AM241
77.29	374.	17.33	1.32	2.361E-01				
88.04	36405.	0.58	0.91	2.299E-01	88.03	3.610	4.774E+05	CD109
122.03	9754.	1.19	0.95	2.085E-01	122.07	85.600	1.011E+04	CO57
136.42	1375.	4.47	0.99	1.968E-01				
165.88	2500.	2.81	0.96	1.712E-01	165.85	80.000	1.349E+04	CE139
199.17	398.	12.89	0.99	1.494E-01				
391.58	1148.	4.80	1.20	8.590E-02	391.69	64.160	2.653E+04	SN113
661.68	12208.	0.98	1.43	5.294E-02	661.66	85.210	1.262E+04	CS137
898.03	821.	6.50	1.27	3.907E-02	898.02	95.000	3.666E+04	Y88
1173.28	10758.	1.06	1.76	2.955E-02	1173.24	99.900	2.005E+04	CO60
1332.55	9668.	1.06	1.85	2.576E-02	1332.50	99.982	2.065E+04	CO60
1835.99	505.	5.32	2.12	1.800E-02	1836.01	99.350	4.685E+04	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
127.63	32.13	6736.	3146.	5.244	4.10	0.853	XE-138	D
132.79	33.42	8328.	2191.	3.651	6.27	0.854	CS-134	D
145.95	36.67	6605.	1874.	3.123	8.44	0.858	XE-138	s
174.47	43.79	5483.	463.	0.771	26.55	0.955	EU-154	M
198.17	49.71	3661.	731.	1.218	15.56	0.824	EU-154	sM

ARS Spectrum name: ARS03417.An1

Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	Suspected	
308.57	77.29	1348.	374.	0.623	17.33	1.318	PB-212	s
545.29	136.42	740.	1375.	2.291	4.47	0.991	CO-57	
796.56	199.17	584.	398.	0.664	12.89	0.990	SE-75	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: northamericancal1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.70	46.60	5708.	86574.	144.290	0.38	0.843
AM-241	237.71	59.59	3962.	59198.	98.663	0.47	0.843
CD-109	351.60	88.04	1838.	36404.	60.674	0.58	0.909
CO-57	487.71	122.03	887.	9754.	16.257	1.19	0.952
CE-139	663.25	165.88	606.	2500.	4.167	2.81	0.960
SN-113	1566.97	391.58	561.	1147.	1.912	4.80	1.204
CS-137	2648.67	661.68	500.	12208.	20.346	0.98	1.433
Y-88	3595.37	898.03	541.	820.	1.367	6.50	1.273
CO-60	4698.08	1173.28	380.	10758.	17.930	1.06	1.760
CO-60	5336.24	1332.55	105.	9668.	16.113	1.06	1.852
Y-88	7354.41	1836.11	22.	482.	0.803	5.19	2.119

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/g	Peak Energy keV	Peak Activity pCi/g	Peak Code	Peak MDA Value pCi/g	COMMENTS
PB-210		4.1910E+05					
			46.52	4.191E+05	(P	1.717E+03 3.75E-01	G
AM-241		3.0196E+04					
			59.54	3.020E+04	(	1.510E+02 4.69E-01	G
CD-109		4.7736E+05					
			88.03	4.774E+05	(P	2.655E+03 5.77E-01	G

ARS Spectrum name: ARS03417.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	1.0106E+04						
		122.07	1.011E+04	(P	1.466E+02	1.19E+00	G
CE-139	1.3487E+04						
		165.85	1.349E+04	(	6.335E+02	2.81E+00	G
HG-203	6.6586E+03						
		279.17	6.659E+03	%(P	2.369E+05	1.01E+03	G
SN-113	2.6527E+04						
		391.69	2.653E+04	(P	2.614E+03	4.80E+00	G
CS-137	1.2623E+04						
		661.66	1.262E+04	(P	1.106E+02	9.85E-01	G
CO-60	2.0348E+04						
		1173.24	2.005E+04	(P	1.743E+02	1.06E+00	G
		1332.50	2.065E+04	(P	1.078E+02	1.06E+00	G
Y-88	4.4713E+04						
		1836.01	4.471E+04	(	2.279E+03	5.19E+00	G
		898.02	3.666E+04	- P	4.967E+03	6.50E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape

ARS Spectrum name: ARS03417.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/g	Time Corrected Activity pCi/g	Uncertainty Counting pCi/g	1 Sigma Total pCi/g	MDA pCi/g
PB-210	3.9801E+05	4.1910E+05	1.5729E+03	2.0917E+04	1.717E+03
AM-241	3.0122E+04	3.0196E+04	1.4157E+02	1.1738E+03	1.510E+02
CD-109	1.9755E+05	4.7736E+05	2.7524E+03	2.1070E+04	2.655E+03
CO-57	2.4620E+03	1.0106E+04	1.2015E+02	3.7901E+02	1.466E+02
CE-139	8.2211E+02	1.3487E+04	3.7856E+02	1.2557E+03	6.335E+02
HG-203 #A	1.7284E+00	6.6586E+03	7.0448E+04	7.0449E+04	2.369E+05
SN-113	9.3783E+02	2.6527E+04	1.2748E+03	1.6567E+03	2.614E+03
CS-137	1.2190E+04	1.2623E+04	1.2434E+02	4.1720E+02	1.106E+02
CO-60	1.6663E+04	2.0348E+04	1.5217E+02	5.2038E+02	1.743E+02
Y-88	1.2138E+03	4.4713E+04	2.3191E+03	2.7904E+03	2.279E+03

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (36.4 to 1997.2 keV) 6.600E+05 pCi/g
Total Decayed Activity (36.4 to 1997.2 keV) 1.0544592E+06 pCi/g

ARS Aleut Analytical

FEL 7-28-21

Gamma Calibration Verification (Bq)

[redacted] 7-29-21

[redacted] 7-29-21

Instrument ID: ARS06 — Calibration Verification

STD# 117495 **Geometry** 47mm AF **Ver. Date** 7/6/2021

Nuclide	Bq	pCi	Meas. Act.	Criteria	Dif.	%dif	Pass/Fail
Pb210	14500	391891.5	4.09E+05	10.00%	17268.5	4.41%	PASS
Am241	1146	30972.94	2.94E+04	5.00%	1545.942	4.99%	PASS
Cd109	16060	434053.6	4.53E+05	10.00%	18836.38	4.34%	PASS
Co57	365.3	9872.963	9.85E+03	10.00%	20.0631	0.20%	PASS
Ce139	550.7	14883.77	1.25E+04	10.00%	2420.7689	16.26%	FAIL
Hg203	1155	31216.19	3.08E+04	10.00%	458.185	1.47%	PASS
Sn113	970.9	26240.51	2.46E+04	10.00%	1629.5143	6.21%	PASS
Cs137	474.9	12835.12	1.28E+04	5.00%	75.1223	0.59%	PASS
Y88	1581	42729.69	4.54E+04	10.00%	2711.313	6.35%	PASS
Co60	740	19999.98	1.97E+04	5.00%	341.98	1.71%	PASS
Co60	740	19999.98	1.97E+04	5.00%	341.98	1.71%	PASS

Independent Standard

STD# 113189 **Geometry** 47mm AF

Nuclide	Bq	pCi	Meas. Act.	Criteria	Dif.	%dif	Pass/Fail
Pb210	14840	401080.7	4.35E+05	10.00%	33939.32	8.46%	PASS
Am241	1163	31432.4	3.01E+04	5.00%	1374.401	4.37%	PASS
Cd109	16210	438107.7	4.75E+05	10.00%	37122.33	8.47%	PASS
Co57	379.8	10264.85	1.07E+04	10.00%	385.1454	3.75%	PASS
Ce139	557.7	15072.96	1.28E+04	10.00%	2230.9579	14.80%	FAIL
Hg203	1129	30513.48		10.00%	30513.483	100.00%	NOT MEASURED
Sn113	958.8	25913.49	2.58E+04	10.00%	130.4876	0.50%	PASS
Cs137	457.4	12362.15	1.22E+04	5.00%	144.1498	1.17%	PASS
Y88	1546	41783.74	6.15E+04	10.00%	19670.258	47.08%	FAIL
Co60	750.7	20289.17	2.03E+04	5.00%	48.8311	0.24%	PASS
Co60	750.7	20289.17	2.03E+04	5.00%	48.8311	0.24%	PASS

Calibration Data from file: 117495 47mm AF 7-3-21 calib.Clb
Energy Calibration Date: 7/3/2021 Time: 9:44:58 AM
Efficiency Calibration Date: 7/3/2021 Time: 3:18:09 PM

Calibration Description:
117495 47mm AF
EEC 7-3-21

Energy Calibration Fit
Energy = 0.0855 +0.250004*Channel -3.36455e-008*Channel**2
FWHM (ch) = 3.4679 +0.001289*Channel -5.42104e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.35	46.52	46.67	-0.33%	0.93	0.93	0.86%
238.20	59.54	59.63	-0.16%	0.94	0.94	-0.64%
351.92	88.03	88.06	-0.03%	0.97	0.98	-0.62%
487.87	122.07	122.05	0.02%	1.02	1.02	-0.17%
662.89	165.85	165.80	0.03%	1.09	1.07	1.38%
1115.74	279.17	278.98	0.07%	1.20	1.21	-0.79%
1566.01	391.69	391.51	0.04%	1.33	1.34	-0.45%
2647.34	661.66	661.70	-0.01%	1.63	1.62	0.09%
3593.71	898.02	898.09	-0.01%	1.87	1.85	1.01%
4695.73	1173.24	1173.30	-0.00%	2.06	2.08	-1.14%
5333.61	1332.50	1332.55	-0.00%	2.21	2.20	0.40%
7350.59	1836.01	1835.94	0.00%	2.50	2.50	0.03%

Efficiency Calibration Fit
Knee Energy = 120.00 keV
Above the Knee: Quadratic Uncertainty = 1.7691 %
Ln(Eff) = -2.8944 +1.055530*Ln(Eng) -0.15823*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.9876 %
Ln(Eff) = -7.1168 +2.826979*Ln(Eng) -0.343492*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.52	2.7290E-001	2.6547E-001	2.72%
59.54	2.6141E-001	2.7239E-001	-4.20%
88.03	2.7280E-001	2.6043E-001	4.53%
120.00	========== Knee ==========		
122.07	2.2816E-001	2.2864E-001	-0.21%
279.17	1.4489E-001	1.3967E-001	3.60%
391.69	1.0256E-001	1.0724E-001	-4.56%
661.66	6.6486E-002	6.6311E-002	0.26%
1173.24	3.5386E-002	3.5509E-002	-0.35%
1332.50	3.1402E-002	3.0475E-002	2.95%
1836.01	1.9951E-002	2.0270E-002	-1.60%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.52	4.00	7.45E+003	14500.00	580.00	4.50%	10/1/2020 1:00:00 PM
Am-241	59.54	36.30	1.58E+005	1146.00	416.00	3.70%	10/1/2020 1:00:00 PM
Cd-109	88.03	3.61	4.36E+002	16060.00	579.77	4.20%	10/1/2020 1:00:00 PM
Co-57	122.07	85.60	2.72E+002	365.30	312.70	3.50%	10/1/2020 1:00:00 PM
Ce-139	165.85	80.00	1.38E+002	550.70	440.56	3.70%	10/1/2020 1:00:00 PM
Hg-203	279.17	81.50	4.66E+001	1155.00	941.33	3.50%	10/1/2020 1:00:00 PM
Sn-113	391.69	64.16	1.15E+002	970.90	622.93	4.10%	10/1/2020 1:00:00 PM
Cs-137	661.66	85.21	1.10E+004	474.90	404.66	4.10%	10/1/2020 1:00:00 PM
Y-88	898.02	95.00	1.07E+002	1581.00	1501.95	3.70%	10/1/2020 1:00:00 PM
Co-60	1173.24	99.90	1.93E+003	740.00	739.26	3.90%	10/1/2020 1:00:00 PM
Co-60	1332.50	99.98	1.93E+003	740.00	739.87	3.90%	10/1/2020 1:00:00 PM
Y-88	1836.01	99.35	1.07E+002	1581.00	1570.72	3.70%	10/1/2020 1:00:00 PM

```
     ORTEC g v - i (3263) Env32  G810W091  7/6/2021 10:36:57 AM
AAAnalytical                    Spectrum name: ARS06012.An1

Sample description
     Batch ID:  Cal Ver
     SDG ID:  117495  Tech:  [redacted]

Spectrum Filename: C:\User\ARS06012.An1

Acquisition information
       Start time:                7/6/2021 10:25:07 AM
       Live time:                600
       Real time:                703
       Dead time:                 14.69 %
       Detector ID:                    1

Detector system
     ARS06  MCB 133


Calibration
       Filename:                  117495 47mm AF 7-3-21 calib.Clb
     117495 47mm AF
     EEC 7-3-21

       Energy Calibration
            Created:              7/3/2021 9:44:58 AM
            Zero offset:          0.085 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.365E-08 keV/channel^2

       Efficiency Calibration
            Created:              7/3/2021 3:18:09 PM
            Knee Energy:         120.00 keV
            Above the Knee:       Quadratic        Uncertainty =   1.77 %
            Log(Eff):            -2.894388E+00 + ( 1.055530E+00*Log(E) ) +
                                  ( -1.582298E-01*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   0.99 %
            Log(Eff):            -7.116829E+00 + ( 2.826979E+00*Log(E) ) +
                                  ( -3.434918E-01*Log(E)^2 )

Library Files
       Main analysis library:     northamericancal1.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G810W091
       Start channel:            10 (     2.59keV )
       Stop channel:           8000 (  1997.96keV )
       Peak rejection level:     40.000%
       Peak search sensitivity:   3
       Sample Size:               1.0000E+00 +/- 0.000E+00%
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  1.0000E+00) =
                                  1.0000E+06
       Detection limit method:    Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:36:57 AM
AAAnalytical Spectrum name: ARS06012.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	60.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2020 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	cal filters.Pbc 7/2/2021 11:45:51 AM PBC By Nuclide (0.200 * FWHM)
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %

Energy Calibration
Normalized diff: 0.0614

********** B A C K G R O U N D C O R R E C T I O N **********

Peak Energy	PBC Energy	Area Counts	Uncert (%)	PBC Area	Corr Area	Corr CR Cts/Sec	Corr Unc (%)	Nuc

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/g	Nuc
12.52	161990.	0.37	0.88	1.146E-01				
15.52	44459.	0.87	0.89	1.426E-01				
17.79	13893.	2.10	0.89	1.612E-01				
22.23	1153802.	0.10	0.90	1.914E-01				
25.03	251029.	0.25	0.90	2.069E-01				
27.37	4936.	6.28	0.90	2.180E-01				
32.03	4073.	4.88	0.91	2.358E-01				
33.49	9387.	2.16	0.91	2.404E-01				

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:36:57 AM
AAAnalytical Spectrum name: ARS06012.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
36.54	1374.	11.30	0.91	2.486E-01				
37.85	1158.	13.40	0.92	2.516E-01				
43.87	1724.	8.24	0.92	2.622E-01				
46.67	93992.	0.35	0.93	2.656E-01	46.52	4.000	4.092E+05	PB210
49.95	592.	17.60	0.93	2.686E-01				
59.64	64517.	0.45	0.93	2.724E-01	59.54	36.300	2.943E+04	AM241
67.01	601.	19.92	1.76	2.717E-01				
77.17	366.	27.00	1.76	2.675E-01				
88.06	60760.	0.44	0.97	2.604E-01	88.03	3.610	4.529E+05	CD109
122.05	21104.	0.80	1.03	2.287E-01	122.07	85.600	9.853E+03	CO57
136.42	3075.	2.86	1.05	2.167E-01				
165.79	10649.	1.20	1.08	1.954E-01	165.85	80.000	1.246E+04	CE139
199.04	1644.	3.82	1.11	1.754E-01				
203.68	400.	12.91	1.12	1.729E-01				
251.64	108.	33.80	1.18	1.504E-01				
254.95	288.	15.30	1.18	1.490E-01				
279.00	1243.	5.47	1.04	1.397E-01	279.17	81.500	3.076E+04	HG203
391.51	7047.	1.59	1.33	1.073E-01	391.69	64.160	2.461E+04	SN113
661.66	15728.	0.93	1.61	6.631E-02	661.66	85.210	1.276E+04	CS137
898.06	5637.	1.87	1.87	4.814E-02	898.02	95.000	3.380E+04	Y88
912.65	567.	13.32	1.72	4.730E-02				
1173.25	14007.	0.98	2.13	3.551E-02	1173.24	99.900	1.966E+04	CO60
1332.50	12767.	1.00	2.17	3.047E-02	1332.50	99.982	2.086E+04	CO60
1835.88	3316.	2.16	2.76	2.027E-02	1836.01	99.350	4.516E+04	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV		Suspected Nuclide
49.73	12.52	101945.	161990.	1.413E+06	0.75	0.883	-	sD
61.76	15.52	53120.	44459.	3.117E+05	1.75	0.887	-	D
70.82	17.79	35758.	13893.	8.620E+04	4.21	0.890	-	D
88.58	22.23	104294.	1153802.	6.027E+06	0.20	0.895	-	sD
99.79	25.03	67061.	251029.	1.213E+06	0.49	0.899	-	D
109.15	27.37	45531.	4936.	2.264E+04	12.55	0.902	-	sD
127.79	32.03	17728.	4073.	1.727E+04	9.76	0.908	-	sD
133.61	33.49	15910.	9387.	3.905E+04	4.33	0.910	-	sD
145.82	36.54	11369.	1374.	5.527E+03	22.60	0.914	-	D
151.04	37.85	11451.	1158.	4.602E+03	26.79	0.915	-	sD
175.73	44.02	9252.	1820.	6.933E+03	15.67	0.923	-	sD
200.09	50.11	4654.	547.	2.036E+03	36.29	0.931	-	D
267.69	67.01	4429.	601.	2.212E+03	39.83	1.762	-	s
308.35	77.17	3357.	366.	1.368E+03	54.00	1.755	-	s
545.38	136.42	1560.	3075.	1.419E+04	5.73	1.055	-	
795.88	199.04	1152.	1644.	9.375E+03	7.64	1.115	-	sD
814.44	203.68	1133.	400.	2.314E+03	25.81	1.120	-	sD

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:36:57 AM
AAAnalytical Spectrum name: ARS06012.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1006.33	251.64	616.	108.	7.203E+02	67.59	1.177	- sD
1019.59	254.95	829.	288.	1.935E+03	30.59	1.181	- D
3652.00	912.65	1226.	567.	1.200E+04	26.65	1.717	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: northamericancal1.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	185.74	46.52	6947.	93993.	156.656	0.70	0.927D
AM-241	238.21	59.64	5872.	64517.	107.529	0.89	0.932
CD-109	351.92	88.06	3673.	60760.	101.267	0.88	0.970
CO-57	487.89	122.05	2248.	21104.	35.173	1.59	1.027
CE-139	662.87	165.79	1707.	10649.	17.749	2.40	1.081
HG-203	1115.81	279.00	1090.	1243.	2.072	10.94	1.038
SN-113	1566.00	391.51	1431.	7047.	11.745	3.17	1.333
CS-137	2647.21	661.66	1284.	15728.	26.214	1.86	1.615
Y-88	3593.56	898.06	1267.	5637.	9.395	3.74	1.867
CO-60	4695.56	1173.25	953.	14007.	23.344	1.97	2.132
CO-60	5333.39	1332.50	669.	12767.	21.279	2.00	2.172
Y-88	7350.32	1835.88	256.	3336.	5.561	4.65	2.766s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/g	Peak Energy keV	Peak Activity pCi/g	Peak Code	Peak MDA Value pCi/g	COMMENTS
PB-210		4.0916E+05				7.45E+03	
			46.52	4.092E+05	(	1.703E+03 3.49E-01 4.00E+00	G
AM-241		2.9427E+04				1.58E+05	
			59.54	2.943E+04	(	1.641E+02 4.46E-01 3.63E+01	G
CD-109		4.5289E+05				4.36E+02	
			88.03	4.529E+05	(	2.125E+03 4.42E-01 3.61E+00	G

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:36:57 AM
AAAnalytical Spectrum name: ARS06012.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	9.8529E+03					2.72E+02	
		122.07	9.853E+03	(	1.044E+02	7.97E-01	8.56E+01 G
CE-139	1.2463E+04					1.38E+02	
		165.85	1.246E+04	(	2.285E+02	1.20E+00	8.00E+01 G
HG-203	3.0758E+04					4.66E+01	
		279.17	3.076E+04	(	3.874E+03	5.47E+00	8.15E+01 G
SN-113	2.4611E+04					1.15E+02	
		391.69	2.461E+04	(	6.250E+02	1.59E+00	6.42E+01 G
CS-137	1.2760E+04					1.10E+04	
		661.66	1.276E+04	(	1.377E+02	9.32E-01	8.52E+01 G
CO-60	1.9658E+04					1.93E+03	
		1173.24	1.966E+04	(	2.057E+02	9.83E-01	9.99E+01 G
		1332.50	2.086E+04	+	2.013E+02	1.00E+00	1.00E+02 G
Y-88	4.5441E+04					1.07E+02	
		1836.01	4.544E+04	*(	1.053E+03	2.33E+00	9.93E+01 G
		898.02	3.380E+04	-	1.011E+03	1.87E+00	9.50E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:36:57 AM
AAAnalytical Spectrum name: ARS06012.An1

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/g	Time Corrected Activity pCi/g	Uncertainty Counting pCi/g	2 Sigma Total pCi/g	MDA pCi/g
PB-210	3.9872E+05	4.0916E+05	2.8596E+03	4.2029E+04	1.703E+03
AM-241	2.9392E+04	2.9427E+04	2.6237E+02	2.4091E+03	1.641E+02
CD-109	2.9111E+05	4.5289E+05	4.0041E+03	4.0680E+04	2.125E+03
CO-57	4.8570E+03	9.8529E+03	1.5708E+02	8.7853E+02	1.044E+02
CE-139	3.0695E+03	1.2463E+04	2.9867E+02	9.6589E+02	2.285E+02
HG-203	4.9192E+02	3.0758E+04	3.3643E+03	4.0032E+03	3.874E+03
SN-113	4.6137E+03	2.4611E+04	7.8041E+02	2.1261E+03	6.250E+02
CS-137	1.2539E+04	1.2760E+04	2.3796E+02	7.0033E+02	1.377E+02
CO-60	1.7786E+04	1.9658E+04	3.8655E+02	9.5681E+02	2.057E+02
Y-88	7.4630E+03	4.5441E+04	2.1151E+03	3.5864E+03	1.053E+03

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.6 to 1998.0 keV) 7.700E+05 pCi/g
Total Decayed Activity (2.6 to 1998.0 keV) 1.0470205E+06 pCi/g

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAAnalytical

```
     ORTEC g v - i (3263) Env32  G810W091  7/6/2021 10:52:28 AM
AAAnalytical                    Spectrum name: ARS06013.An1

Sample description
     Batch ID:  Calibration Verification
     SDG ID:  113189  Tech:  [redacted]

Spectrum Filename: C:\User\ARS06013.An1

Acquisition information
       Start time:                7/6/2021 10:41:17 AM
       Live time:               600
       Real time:               664
       Dead time:                 9.58 %
       Detector ID:                  1

Detector system
     ARS06  MCB 133


Calibration
       Filename:                  117495 47mm AF 7-3-21 calib.Clb
     117495 47mm AF
     EEC 7-3-21

       Energy Calibration
            Created:              7/3/2021 9:44:58 AM
            Zero offset:          0.085 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.365E-08 keV/channel^2

       Efficiency Calibration
            Created:              7/3/2021 3:18:09 PM
            Knee Energy:         120.00 keV
            Above the Knee:       Quadratic        Uncertainty =   1.77 %
            Log(Eff):            -2.894388E+00 + ( 1.055530E+00*Log(E) ) +
                                 ( -1.582298E-01*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   0.99 %
            Log(Eff):            -7.116829E+00 + ( 2.826979E+00*Log(E) ) +
                                 ( -3.434918E-01*Log(E)^2 )

Library Files
       Main analysis library:     northamericancal1.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G810W091
       Start channel:            10 (     2.59keV )
       Stop channel:           8000 (  1997.96keV )
       Peak rejection level:     40.000%
       Peak search sensitivity:   3
       Sample Size:               1.0000E+00 +/- 0.000E+00%
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  1.0000E+00) =
                                  1.0000E+06
       Detection limit method:    Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:52:28 AM
AAAnalytical Spectrum name: ARS06013.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	60.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2019 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	cal filters.Pbc 7/2/2021 11:45:51 AM PBC By Nuclide (0.200 * FWHM)
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %

Energy Calibration

Normalized diff: 0.0587

********** B A C K G R O U N D C O R R E C T I O N **********

Peak Energy	PBC Energy	Area Counts	Uncert (%)	PBC Area	Corr Area	Corr CR Cts/Sec	Corr Unc (%)	Nuc

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/g	Nuc
11.34	40177.	0.96	0.88	1.025E-01				
13.05	127698.	0.41	0.88	1.199E-01				
15.63	36273.	0.89	0.89	1.435E-01				
17.81	16535.	1.55	0.89	1.613E-01				
22.24	591314.	0.14	0.90	1.915E-01				
25.08	123651.	0.34	0.90	2.072E-01				
32.36	3983.	3.86	1.14	2.369E-01				
36.68	1906.	7.67	0.98	2.489E-01				

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:52:28 AM
AAAnalytical Spectrum name: ARS06013.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
46.67	95765.	0.34	0.93	2.656E-01	46.52	4.000	4.350E+05	PB210
49.80	513.	18.53	0.93	2.685E-01				
59.63	65767.	0.43	0.91	2.724E-01	59.54	36.300	3.006E+04	AM241
77.46	480.	18.63	1.03	2.674E-01				
88.06	30782.	0.63	0.96	2.604E-01	88.03	3.610	4.752E+05	CD109
122.05	7112.	1.41	1.02	2.287E-01	122.07	85.600	1.065E+04	CO57
136.40	972.	6.04	0.98	2.167E-01				
165.79	1090.	5.20	1.13	1.954E-01	165.85	80.000	1.284E+04	CE139
199.01	156.	24.65	0.77	1.754E-01				
391.48	468.	12.47	1.09	1.073E-01	391.69	64.160	2.578E+04	SN113
661.67	14633.	0.91	1.62	6.631E-02	661.66	85.210	1.222E+04	CS137
898.26	284.	16.73	1.56	4.814E-02	898.02	95.000	3.336E+04	Y88
1173.26	12288.	0.99	1.97	3.551E-02	1173.24	99.900	2.034E+04	CO60
1332.46	11077.	1.02	2.20	3.048E-02	1332.50	99.982	2.134E+04	CO60
1835.93	230.	9.36	1.31	2.027E-02	1836.01	99.350	6.145E+04	Y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV		Suspected Nuclide
45.00	11.34	54784.	40177.	3.920E+05	1.93	0.881	-	sD
51.86	13.05	72954.	127698.	1.065E+06	0.82	0.884	-	sD
62.18	15.63	33611.	36273.	2.527E+05	1.77	0.887	-	D
70.91	17.81	24758.	16535.	1.025E+05	3.11	0.890	-	D
88.64	22.24	52701.	591314.	3.087E+06	0.28	0.895	-	sD
99.98	25.08	27864.	123651.	5.968E+05	0.69	0.899	-	D
129.08	32.36	7848.	3983.	1.681E+04	7.71	1.136	-	s
146.38	36.68	7205.	1906.	7.658E+03	15.33	0.984	-	
199.41	49.94	4258.	492.	1.831E+03	38.59	0.931	-	sD
309.52	77.46	2428.	480.	1.797E+03	37.25	1.032	-	s
545.30	136.40	886.	972.	4.487E+03	12.08	0.981	-	
795.78	199.01	576.	156.	8.899E+02	49.30	0.767	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: northamericancal1.Lib

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:52:28 AM
AAAnalytical Spectrum name: ARS06013.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	185.74	46.52	6218.	95765.	159.608	0.69	0.927D
AM-241	238.16	59.63	4412.	65767.	109.611	0.86	0.912
CD-109	351.90	88.06	2194.	30782.	51.304	1.26	0.963
CO-57	487.89	122.05	968.	7112.	11.853	2.81	1.021
CE-139	662.88	165.79	760.	1090.	1.817	10.40	1.134
SN-113	1565.87	391.48	864.	468.	0.780	24.94	1.087
CS-137	2647.24	661.67	697.	14633.	24.388	1.82	1.622
Y-88	3594.38	898.26	578.	284.	0.473	33.45	1.557
CO-60	4695.60	1173.26	476.	12288.	20.480	1.97	1.967
CO-60	5333.24	1332.46	265.	11040.	18.401	2.03	2.203
Y-88	7350.53	1835.93	25.	230.	0.383	18.72	1.306s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/g	Peak Energy keV	Peak Activity pCi/g	Code	MDA Value pCi/g		COMMENTS
PB-210		4.3502E+05				7.45E+03		
			46.52	4.350E+05	(	1.681E+03	3.43E-01	4.00E+00 G
AM-241		3.0058E+04				1.58E+05		
			59.54	3.006E+04	(	1.427E+02	4.29E-01	3.63E+01 G
CD-109		4.7523E+05				4.36E+02		
			88.03	4.752E+05	(	3.412E+03	6.30E-01	3.61E+00 G
CO-57		1.0650E+04				2.72E+02		
			122.07	1.065E+04	(	2.212E+02	1.41E+00	8.56E+01 G
CE-139		1.2842E+04				1.38E+02		
			165.85	1.284E+04	(	1.544E+03	5.20E+00	8.00E+01 G
HG-203		1.4642E+01				4.66E+01		
			279.17	1.464E+01	&(	5.627E+01	1.66E+02	8.15E+01 G
SN-113		2.5783E+04				1.15E+02		
			391.69	2.578E+04	(	7.696E+03	1.25E+01	6.42E+01 G

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:52:28 AM
AAAnalytical Spectrum name: ARS06013.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	1.2218E+04					1.10E+04	
		661.66	1.222E+04	(	1.050E+02	9.09E-01	8.52E+01 G
CO-60	2.0338E+04					1.93E+03	
		1173.24	2.034E+04	(	1.728E+02	9.86E-01	9.99E+01 G
		1332.50	2.127E+04	+	1.513E+02	1.02E+00	1.00E+02 G
Y-88	6.1454E+04					1.07E+02	
		1836.01	6.145E+04	@(	6.950E+03	9.36E+00	9.93E+01 G
		898.02	3.336E+04	-	1.350E+04	1.67E+01	9.50E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity

P - Peakbackground subtraction

ORTEC g v - i (3263) Env32 G810W091 7/6/2021 10:52:28 AM
AAAnalytical Spectrum name: ARS06013.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/g	Time Corrected Activity pCi/g	Uncertainty 2 Sigma Counting pCi/g	Total pCi/g	MDA pCi/g
PB-210	4.0623E+05	4.3502E+05	2.9885E+03	4.4681E+04	1.681E+03
AM-241	2.9961E+04	3.0058E+04	2.5764E+02	2.4596E+03	1.427E+02
CD-109	1.4749E+05	4.7523E+05	5.9860E+03	4.2899E+04	3.412E+03
CO-57	1.6368E+03	1.0650E+04	2.9973E+02	9.8120E+02	2.212E+02
CE-139	3.1429E+02	1.2842E+04	1.3360E+03	1.6373E+03	1.544E+03
HG-203 #A	1.4642E+01	>12 Halflives	4.8596E+01	4.8607E+01	5.627E+01
SN-113	3.0640E+02	2.5783E+04	6.4301E+03	6.7556E+03	7.696E+03
CS-137	1.1666E+04	1.2218E+04	2.2217E+02	6.6869E+02	1.050E+02
CO-60	1.5603E+04	2.0338E+04	4.0090E+02	9.9030E+02	1.728E+02
Y-88	5.1446E+02	6.1454E+04	1.1503E+04	1.2151E+04	6.950E+03

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.6 to 1998.0 keV) 6.137E+05 pCi/g
Total Decayed Activity (2.6 to 1998.0 keV) 1.0835904E+06 pCi/g

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAAnalytical

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.ezag.com

CERTIFICATE OF CALIBRATION
Standard Reference Source

SRS Number: 117495
Source Description: 47 mm Diameter Glass Fiber Filter in Tape
Product Code: 8403-GF-FP
Customer: ARS International, LLC
P.O. Number: 20-331 ARA PA, Item 2

This standard radionuclide source was prepared from an aliquot measured gravimetrically from a master radionuclide solution calibrated with a germanium gamma-ray spectrometer system. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using germanium gamma-ray spectrometry. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology (NIST) through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Reference Date: 01-October-2020 12:00 PM EST

MGS Mixture

Isotope	Gamma-Ray Energy, keV	Half-Life, d	Activity, Bq	Flux, s^{-1}	Uncertainty u_A, %	Uncertainty u_B, %	Uncertainty U, %*	Calibration Method**
Pb-210	46.5	8.109E+03	1.450E+04	6.161E+02	0.1	2.2	4.5	4π LS
Am-241	59.5	1.580E+05	1.146E+03	4.114E+02	0.1	1.8	3.7	4π LS
Cd-109	88.0	4.614E+02	1.606E+04	5.942E+02	0.5	2.0	4.2	HPGe
Co-57	122.1	2.717E+02	3.653E+02	3.127E+02	0.4	1.7	3.5	HPGe
Ce-139	165.9	1.376E+02	5.507E+02	4.406E+02	0.4	1.8	3.7	HPGe
Hg-203	279.2	4.659E+01	1.155E+03	9.418E+02	0.3	1.7	3.5	HPGe
Sn-113	391.7	1.151E+02	9.709E+02	6.308E+02	0.4	2.0	4.1	HPGe
Cs-137	661.7	1.099E+04	4.749E+02	4.041E+02	0.7	1.9	4.1	HPGe
Y-88	898.0	1.066E+02	1.581E+03	1.481E+03	0.7	1.7	3.7	HPGe
Y-88	1836.1	———	———	1.568E+03	0.7	1.7	3.7	———
Co-60	1173.2	1.925E+03	7.400E+02	7.389E+02	0.7	1.8	3.9	HPGe
Co-60	1332.5	———	———	7.398E+02	0.7	1.8	3.9	———

Mixed Gamma (MGS) master solution is EZA's eight isotope mixture which is calibrated quarterly and consists of Cd-109, Co-57, Ce-139, Hg-203, Sn-113, Cs-137, Y-88, and Co-60. ***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results." ****Calibration Methods:** 4π LS - 4π Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber.

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

SRS Number: 117495

Comments:
Diameter of active area: 47 mm

Expiration Date: 29-October-2021

This source was wipe tested in its inactive areas with leak test results < 185 Bq (5 nCi) of removable activity per ISO 9978:1992.

Source Prepared by [redacted] Radiochemist

QC Approved by: [redacted] Spectroscopist Date: 22-OCT-20

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

76927-526
47 mm Diameter Glass Fiber Filter in Tape

Customer: American Radiation Services
P.O. No.: 07-0622, Item 2
Calibration Date: 01-Jan-2008 12:00 EST **Grams of Master Source:** 0.0037367

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.1	———	6.661E+02	0.30	1.50	3.06	4π LS
Am-241	59.5	157860	———	4.392E+02	0.3	1.5	3.1	4π LS
Cd-109	88.0	462.60	1.671E+05	6.244E+02	0.9	1.7	3.8	HPGe
Co-57	122.1	271.79	8.639E+04	3.228E+02	0.6	1.3	2.9	HPGe
Ce-139	165.9	137.6	1.219E+05	4.555E+02	0.5	1.1	2.4	HPGe
Hg-203	279.2	46.61	2.884E+05	1.078E+03	0.5	1.1	2.4	HPGe
Sn-113	391.7	115.1	1.718E+05	6.420E+02	0.6	1.1	2.5	HPGe
Cs-137	661.7	10983	1.095E+05	4.092E+02	0.2	1.2	2.4	HPGe
Y-88	898.0	106.6	4.140E+05	1.547E+03	0.7	1.1	2.6	HPGe
Co-60	1173.2	1925.4	2.071E+05	7.739E+02	0.8	1.1	2.7	HPGe
Co-60	1332.5	1925.4	2.072E+05	7.742E+02	0.9	1.1	2.8	HPGe
Y-88	1836.1	106.6	4.376E+05	1.635E+03	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Diameter active area: 47 mm.
This standard will expire one year after the calibration date.

Source Prepared by: [redacted]
[redacted] Radiochemist

QA Approved: [redacted]
[redacted] QA Manager

Date: 3/17/08

End of Certificate

ANA Form005 Rev. ---

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Strontium - Raw Data

Analysis Batch ID ARS1-B22-01103

Procedure PALA-RAD-032 **Analysis** GPC-SR90-AF **Prep** N/A

Description Strontium-90 in (Air Filters, Smears [AF])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01103-01	LCS	B-31706										
ARS1-B22-01103-02	LCSD	B-31707										
ARS1-B22-01103-03	MBL											
ARS1-B22-01103-04	TRG				**ARS1-22-01492**	001	1	AF		FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-05	TRG				**ARS1-22-01492**	002	1	AF		MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-06	TRG				**ARS1-22-01492**	003	1	AF		MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-07	TRG				**ARS1-22-01492**	004	1	AF		MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-08	TRG				**ARS1-22-01492**	005	1	AF		MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-09	TRG				**ARS1-22-01492**	006	1	AF		MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-10	TRG				**ARS1-22-01492**	007	1	AF		MSB113A-071122	Parcel B Rad Sampling	08/22/22

Analysis Batch ID ARS1-B22-01103

Procedure PALA-RAD-032 **Analysis** GPC-SR90-AF **Prep** N/A

Description Strontium-90 in (Air Filters, Smears [AF])

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline (8/9/22)	Client ID	Group Name	Lab Deadline
ARS1-B22-01103-01	LCS	B-31706							8:16			
ARS1-B22-01103-02	LCSD	B-31707							8:17			
ARS1-B22-01103-03	MBL								8:17			
ARS1-B22-01103-04	TRG			421068	ARS1-22-01492	001	1	AF	8:19	FB-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-05	TRG			421069	ARS1-22-01492	002	1	AF	8:21	MSB01-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-06	TRG			421070	ARS1-22-01492	003	1	AF	8:17	MSB02-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-07	TRG			421071	ARS1-22-01492	004	1	AF	8:16	MSB113A-070722	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-08	TRG			421072	ARS1-22-01492	005	1	AF	8:17	MSB01-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-09	TRG			421073	ARS1-22-01492	006	1	AF	8:18	MSB02-071122	Parcel B Rad Sampling	08/22/22
ARS1-B22-01103-10	TRG			421074	ARS1-22-01492	007	1	AF	8:19	MSB113A-071122	Parcel B Rad Sampling	08/22/22

LCS Report
Analytical Batch: ARS1-B22-01103

Blind ID	ABatch Sample ID	Blind Group	Std ID	Isotope	Exp Addition (g)	Expected Value (pCi/g)	Empty Wt (g)	Gross Wt (g)	Net Wt (g)	Expected Value CT (pCi/g)	Mid Point Count Date	Known Value (pCi)	User ID	Mod Date
B-31706	ARS1-B22-01103-01	B-Sr90	S-0370	Sr-90	1	20.15474	0.964	1.974	1.0100	20.15076	08/09/2022	20.35227	[redacted]	08/08/2022
B-31707	ARS1-B22-01103-02	B-Sr90	S-0370	Sr-90	1	20.15474	0.929	1.932	1.0030	20.15076	08/09/2022	20.21122		08/08/2022

PALA-RAD-032

Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation

Preparation Date: 08/05/2022 09:26

Prepared By: [redacted]

Procedure Data

ABatch Sample ID	Type	SDG/Fraction	ICOC ID	Aliquot Vol/Wt	Strontium Carrier (5mg/ml)	Aliquot Units	Y Ingrowth Date 1	Disk Wt (g)	Disk Wt 2 (g)	Y Ingrowth Date 2
ARS1-B22-01103-01	LCS			1.0000	R22-00122	Sample	8/9/2022 8:16:00 AM	7.6716	7.6822	
ARS1-B22-01103-02	LCSD			1.0000	R22-00122	Sample	8/9/2022 8:17:00 AM	7.6235	7.6345	
ARS1-B22-01103-03	MBL			1.0000	R22-00122	Sample	8/9/2022 8:17:00 AM	7.6779	7.6890	
ARS1-B22-01103-04	TRG	ARS1-22-01492-001	421899	0.2000	R22-00122	Sample	8/9/2022 8:19:00 AM	7.6540	7.6653	
ARS1-B22-01103-05	TRG	ARS1-22-01492-002	421904	0.2000	R22-00122	Sample	8/9/2022 8:21:00 AM	7.6551	7.6662	
ARS1-B22-01103-06	TRG	ARS1-22-01492-003	421905	0.2000	R22-00122	Sample	8/9/2022 8:17:00 AM	7.6214	7.6321	
ARS1-B22-01103-07	TRG	ARS1-22-01492-004	421906	0.2000	R22-00122	Sample	8/9/2022 8:16:00 AM	7.7155	7.7272	
ARS1-B22-01103-08	TRG	ARS1-22-01492-005	421907	0.2000	R22-00122	Sample	8/9/2022 8:17:00 AM	7.6816	7.6929	
ARS1-B22-01103-09	TRG	ARS1-22-01492-006	421908	0.2000	R22-00122	Sample	8/9/2022 8:18:00 AM	7.6507	7.6627	
ARS1-B22-01103-10	TRG	ARS1-22-01492-007	421909	0.2000	R22-00122	Sample	8/9/2022 8:19:00 AM	7.6084	7.6196	

Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation

Reagent Amounts

ABatch Sample ID	Type	SDG/Fraction	14.3.4. Condition Sr Column - Nitric Acid 8N (mL)
ARS1-B22-01103-01	LCS		5.00
ARS1-B22-01103-02	LCSD		5.00
ARS1-B22-01103-03	MBL		5.00
ARS1-B22-01103-04	TRG	ARS1-22-01492-001	5.00
ARS1-B22-01103-05	TRG	ARS1-22-01492-002	5.00
ARS1-B22-01103-06	TRG	ARS1-22-01492-003	5.00
ARS1-B22-01103-07	TRG	ARS1-22-01492-004	5.00
ARS1-B22-01103-08	TRG	ARS1-22-01492-005	5.00
ARS1-B22-01103-09	TRG	ARS1-22-01492-006	5.00
ARS1-B22-01103-10	TRG	ARS1-22-01492-007	5.00

Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation

Reagent Tracking

Procedure Section	Reagent ID
14.0. Leach Air Filter Sample	R22-00553
14.1.4. Add Carrier	R22-00122
14.3.1. Set Up Vacuum Box System	R22-00467
14.3.4. Condition Sr Column	R22-00551
14.4.4. Elute Interferants	R22-00453
14.4.1. Dissolve Residue in Load Solution	R22-00551
14.4.3. Beaker Rinse	R22-00551
14.4.5. Final Column Rinse	R22-00551
14.4.8. Elute Strontium	R22-00554
14.6.6. Rinse Collection Tube	R22-00554

Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation

Support Equipment

Equipment Type	Serial/Batch/Lot	Comments
Fume Hood	030807173-B (WET LAB)	
Hot Block	#11 SN 143475 (Radiochem)	
Balance	T0350192 (Soil LAB)	
Pipette	PU29204	
Pipette Tip	5mL VWR 19480271	
Eichrom Outer Tip	22011733001	
Eichrom Support Tube	21012629781	
Planchette	Lot 05-06-2022 (2 inch)	

Calculation Report
ARS1-B22-01103

Analytical Batch ID	ARS1-B22-01103
Analysis Code	GPC-SR90-AF
Procedure No	PALA-RAD-032
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01103-01	LCS					SR-90	20.62441	1.61478	3.16496	0.39059	0.17942	0.50362	0.98710		pCi/sample
ARS1-B22-01103-02	LCSD					SR-90	21.59768	1.68596	3.30449	0.40900	0.18894	0.51109	1.00174		pCi/sample
ARS1-B22-01103-03	MBL					SR-90	0.02325	0.11218	0.21988	0.39750	0.18246	0.11217	0.21985		pCi/sample
ARS1-B22-01103-04	TRG	ARS1-22-01492	001	FB-070722	1	SR-90	-0.71541	0.50686	0.99344	1.93411	0.89172	0.50405	0.98794		pCi/sample
ARS1-B22-01103-05	TRG	ARS1-22-01492	002	MSB01-070722	1	SR-90	1.08359	0.81753	1.60235	2.70334	1.27357	0.81354	1.59455		pCi/sample
ARS1-B22-01103-06	TRG	ARS1-22-01492	003	MSB02-070722	1	SR-90	-0.34671	0.61357	1.20259	2.23622	1.03617	0.61302	1.20153		pCi/sample
ARS1-B22-01103-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	SR-90	-0.17028	0.54516	1.06851	1.97584	0.91101	0.54501	1.06822		pCi/sample
ARS1-B22-01103-08	TRG	ARS1-22-01492	005	MSB01-071122	1	SR-90	-0.30670	0.55343	1.08471	2.02424	0.93516	0.55296	1.08379		pCi/sample
ARS1-B22-01103-09	TRG	ARS1-22-01492	006	MSB02-071122	1	SR-90	0.58901	0.57089	1.11895	1.92432	0.88961	0.56921	1.11565		pCi/sample
ARS1-B22-01103-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	SR-90	0.84324	0.57521	1.12741	1.89149	0.87373	0.57178	1.12068		pCi/sample

Calculated By: [redacted] on 9/1/2022 2:12:56 PM

Calculation Report
ARS1-B22-01103

Analytical Batch ID	ARS1-B22-01103
Analysis Code	GPC-SR90-AF
Procedure No	PALA-RAD-032
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01103-01	LCS				87.8%	1836.000000	120	573.000000	900	0.35248	1	8/5/2022	8/9/2022
ARS1-B22-01103-02	LCSD				91.1%	1969.000000	120	662.000000	900	0.34674	1	8/5/2022	8/9/2022
ARS1-B22-01103-03	MBL				92.0%	77.000000	120	563.000000	900	0.32814	1	8/5/2022	8/9/2022
ARS1-B22-01103-04	TRG	ARS1-22-01492	001		93.6%	71.000000	120	629.000000	900	0.34868	0.2	7/7/2022	8/9/2022
ARS1-B22-01103-05	TRG	ARS1-22-01492	002		92.0%	178.000000	120	1194.000000	900	0.34254	0.2	7/8/2022	8/9/2022
ARS1-B22-01103-06	TRG	ARS1-22-01492	003		88.7%	90.000000	120	718.000000	900	0.33846	0.2	7/8/2022	8/9/2022
ARS1-B22-01103-07	TRG	ARS1-22-01492	004		96.9%	81.000000	120	630.000000	900	0.32972	0.2	7/8/2022	8/9/2022
ARS1-B22-01103-08	TRG	ARS1-22-01492	005		93.6%	83.000000	120	663.000000	900	0.34124	0.2	7/15/2022	8/9/2022
ARS1-B22-01103-09	TRG	ARS1-22-01492	006		99.4%	101.000000	120	675.000000	900	0.34089	0.2	7/15/2022	8/9/2022
ARS1-B22-01103-10	TRG	ARS1-22-01492	007		92.8%	104.000000	120	661.000000	900	0.36806	0.2	7/15/2022	8/9/2022

Calculated By [redacted] on 9/1/2022 2:12:56 PM

Calculation Report
ARS1-B22-01103

Analytical Batch ID	ARS1-B22-01103
Analysis Code	GPC-SR90-AF
Procedure No	PALA-RAD-032
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01103-01	LCS			2.22	1	15.30000	0.63667	14.66333	1	A1				
ARS1-B22-01103-02	LCSD			2.22	1	16.40833	0.73556	15.67278	1	A2				
ARS1-B22-01103-03	MBL			2.22	1	0.64167	0.62556	0.01611	1	A3				
ARS1-B22-01103-04	TRG	ARS1-22-01492	001	2.22	1	0.59167	0.69889	-0.10722	1	A4				
ARS1-B22-01103-05	TRG	ARS1-22-01492	002	2.22	1	1.48333	1.32667	0.15667	1	B1				
ARS1-B22-01103-06	TRG	ARS1-22-01492	003	2.22	1	0.75000	0.79778	-0.04778	1	B2				
ARS1-B22-01103-07	TRG	ARS1-22-01492	004	2.22	1	0.67500	0.70000	-0.02500	1	B3				
ARS1-B22-01103-08	TRG	ARS1-22-01492	005	2.22	1	0.69167	0.73667	-0.04500	1	B4				
ARS1-B22-01103-09	TRG	ARS1-22-01492	006	2.22	1	0.84167	0.75000	0.09167	1	C1				
ARS1-B22-01103-10	TRG	ARS1-22-01492	007	2.22	1	0.86667	0.73444	0.13222	1	C2				

Calculated By: [redacted] on 9/1/2022 2:12:56 PM

Calculation Report
ARS1-B22-01103

ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01103
Analysis Code	GPC-SR90-AF
Procedure No	PALA-RAD-032
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01103-01	LCS			2.66667			0.13542							1.03459	
ARS1-B22-01103-02	LCSD			2.66667			0.13472							1.03441	
ARS1-B22-01103-03	MBL			2.66667			0.13472							1.03441	
ARS1-B22-01103-04	TRG	ARS1-22-01492	001	2.66667			0.13333							1.03406	
ARS1-B22-01103-05	TRG	ARS1-22-01492	002	2.66667			0.13194							1.03371	
ARS1-B22-01103-06	TRG	ARS1-22-01492	003	2.66667			0.13472							1.03441	
ARS1-B22-01103-07	TRG	ARS1-22-01492	004	2.66667			0.13542							1.03459	
ARS1-B22-01103-08	TRG	ARS1-22-01492	005	2.66667			0.13472							1.03441	
ARS1-B22-01103-09	TRG	ARS1-22-01492	006	2.66667			0.13403							1.03424	
ARS1-B22-01103-10	TRG	ARS1-22-01492	007	2.66667			0.13333							1.03406	

Calculated By: [redacted] on 9/1/2022 2:12:56 PM

Calculation Report
ARS1-B22-01103

Analytical Batch ID	ARS1-B22-01103
Analysis Code	GPC-SR90-AF
Procedure No	PALA-RAD-032
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU FS	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01103-01	LCS			0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.71097	85.31636			
ARS1-B22-01103-02	LCSD			0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.72567	87.08034			
ARS1-B22-01103-03	MBL			0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.69299	83.15892			
ARS1-B22-01103-04	TRG	ARS1-22-01492	001	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.14988	17.98508			
ARS1-B22-01103-05	TRG	ARS1-22-01492	002	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.14458	17.34972			
ARS1-B22-01103-06	TRG	ARS1-22-01492	003	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.13780	16.53654			
ARS1-B22-01103-07	TRG	ARS1-22-01492	004	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.14682	17.61813			
ARS1-B22-01103-08	TRG	ARS1-22-01492	005	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.14672	17.60692			
ARS1-B22-01103-09	TRG	ARS1-22-01492	006	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.15563	18.67533			
ARS1-B22-01103-10	TRG	ARS1-22-01492	007	0.04133	0.02	0.05831	0.00505	0	0	0.07439	0.15680	18.81636			

Calculated By: [redacted] on 9/1/2022 2:12:56 PM

Calculation Report
ARS1-B22-01103

Analytical Batch ID	ARS1-B22-01103
Analysis Code	GPC-SR90-AF
Procedure No	PALA-RAD-032
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01103-01	LCS				20.35227	101.3%			
ARS1-B22-01103-02	LCSD				20.21122	106.9%	4.6%	0.29486	0.41690
ARS1-B22-01103-03	MBL			U					
ARS1-B22-01103-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01103-05	TRG	ARS1-22-01492	002	U					
ARS1-B22-01103-06	TRG	ARS1-22-01492	003	U					
ARS1-B22-01103-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01103-08	TRG	ARS1-22-01492	005	U					
ARS1-B22-01103-09	TRG	ARS1-22-01492	006	U					
ARS1-B22-01103-10	TRG	ARS1-22-01492	007	U					

Calculated By [redacted] 9/1/2022 2:12:56 PM

ARS Aleut Analytical

Sr Yield Calculation Sheet

Sample	Empty	Filled	Yield(mg)	% Recovery
1	7.6716	7.6822	10.6000	88
2	7.6235	7.6345	11.0000	91
3	7.6779	7.6890	11.1000	92
4	7.6540	7.6653	11.3000	94
5	7.6551	7.6662	11.1000	92
6	7.6214	7.6321	10.7000	89
7	7.7155	7.7272	11.7000	97
8	7.6816	7.6929	11.3000	94
9	7.6507	7.6627	12.0000	99
10	7.6084	7.6196	11.2000	93
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

Apex-Alpha/Beta™

CANBERRA

Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Standard	Count Time	Run Date & Time
LB 4200 A	4569	A1	B22-01103	22-01103-01	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 A	4569	A2	B22-01103	22-01103-02	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 A	4569	A3	B22-01103	22-01103-03	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 A	4569	A4	B22-01103	22-01103-04	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 B	4569	B1	B22-01103	22-01103-05	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 B	4569	B2	B22-01103	22-01103-06	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 B	4569	B3	B22-01103	22-01103-07	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 B	4569	B4	B22-01103	22-01103-08	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 C	4569	C1	B22-01103	22-01103-09	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM
LB 4200 C	4569	C2	B22-01103	22-01103-10	Sr-90, Sr-89/90		7200	8/9/2022 10:30:52 AM

GPC D 1155921 Batch Report

Batch Name: B22-01103
Procedure: Sr-90, Sr-89/90
Batch ID: 4569

Calibration: Fitted Efficiency
Preset Count Time (min): 120
Count Mode: Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
22-01103-01	A1	40	1836	0.14017445912964	37.5640965460282	7200	1230	8/9/2022 10:31:00 AM
22-01103-02	A2	46	1969	0.51275244720226	39.4340436942154	7200	1230	8/9/2022 10:31:00 AM
22-01103-03	A3	5	77	0.18591062517788	1.59172293190602	7200	1230	8/9/2022 10:31:00 AM
22-01103-04	A4	4	71	0.13060024142597	1.47691978485902	7200	1230	8/9/2022 10:31:00 AM
22-01103-05	B1	10	178	0.29198845051570	3.71542908193533	7200	1230	8/9/2022 10:31:00 AM
22-01103-06	B2	8	90	0.29273370483639	1.84149438721847	7200	1230	8/9/2022 10:31:00 AM
22-01103-07	B3	12	81	0.51145782667421	1.65073966397389	7200	1230	8/9/2022 10:31:00 AM
22-01103-08	B4	4	83	0.11229328291104	1.72541237547471	7200	1230	8/9/2022 10:31:00 AM
22-01103-09	C1	5	101	0.14099159285344	1.93271809628999	7200	1230	8/9/2022 10:31:00 AM
22-01103-10	C2	7	104	0.21316203731692	1.94127926252796	7200	1230	8/9/2022 10:31:00 AM

GPC Logbook

Date	Time	Batch ID	Fraction	Procedure	Gen File	Detector	Tech
08-09-2022	07:30	Daily	QA	bkg	4557-4560	all	[redacted]
08-09-2022	09:43	Daily	QA	eff	4561-4568	all	
08-09-2022	10:31	22-01103	1	Sr-90	4569	A1	
08-09-2022	10:31	22-01103	2	Sr-90	4569	A2	
08-09-2022	10:31	22-01103	3	Sr-90	4569	A3	
08-09-2022	10:31	22-01103	4	Sr-90	4569	A4	
08-09-2022	10:31	22-01103	5	Sr-90	4569	B1	
08-09-2022	10:31	22-01103	6	Sr-90	4569	B2	
08-09-2022	10:31	22-01103	7	Sr-90	4569	B3	
08-09-2022	10:31	22-01103	8	Sr-90	4569	B4	
08-09-2022	10:31	22-01103	9	Sr-90	4569	C1	
08-09-2022	10:31	22-01103	10	Sr-90	4569	C2	
08-09-2022	13:06	22-00757	3	Ra-226	4570	C1	
08-09-2022	13:06	22-00757	4	Ra-226	4570	C2	
08-09-2022	13:06	22-00757	6	Ra-226	4570	D1	
08-10-2022	07:28	Daily	QA	bkg	4571-4574	all	
08-10-2022	09:46	Daily	QA	eff	4575-4582	all	

ARS Aleut Analytical
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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

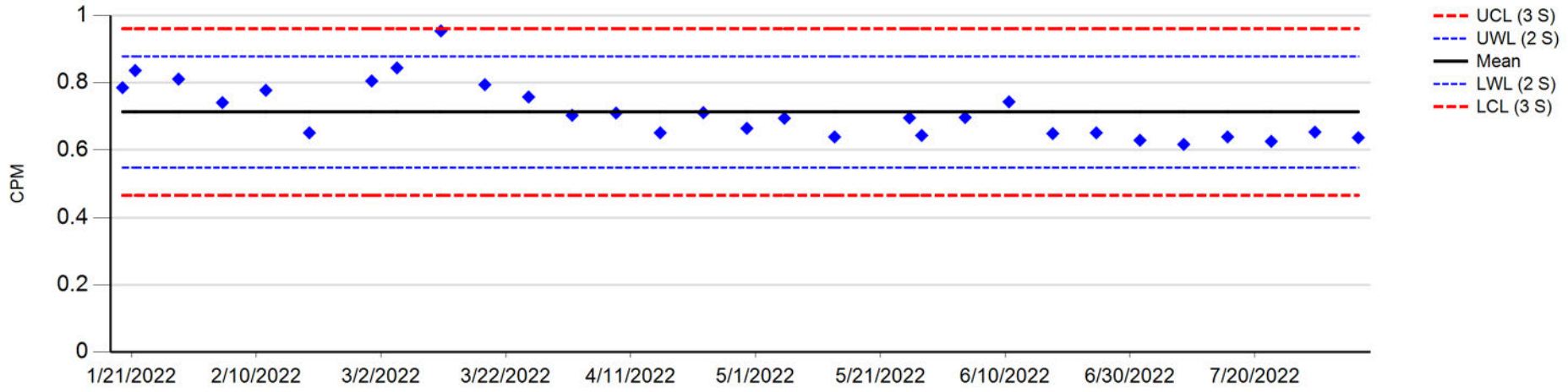
Strontium-Backgrounds & Efficiencies

Beta Long BKG - ARS1-B22-01103-01

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7137	CPM	0.6367	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0824	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9610	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4664	CPM	0.6533	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA LONG BACKGROUND - DETECTOR A1

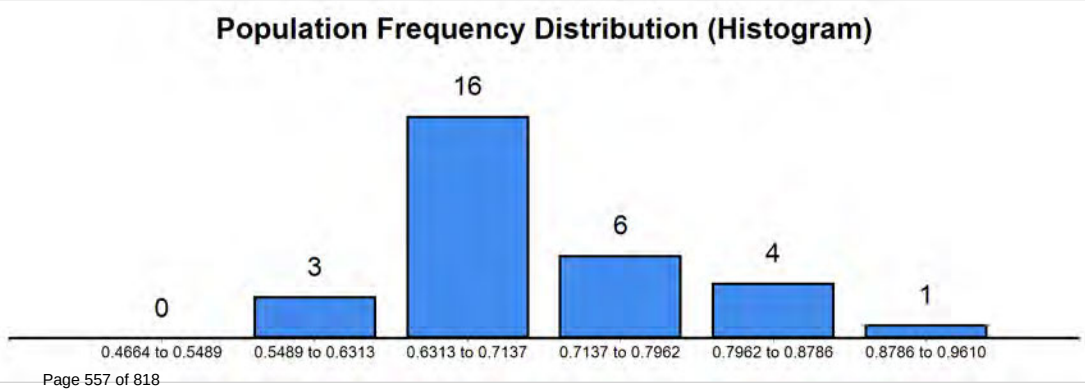
Process Date Range: 01/19/22 - 08/05/22



ARS Aleut Analytical

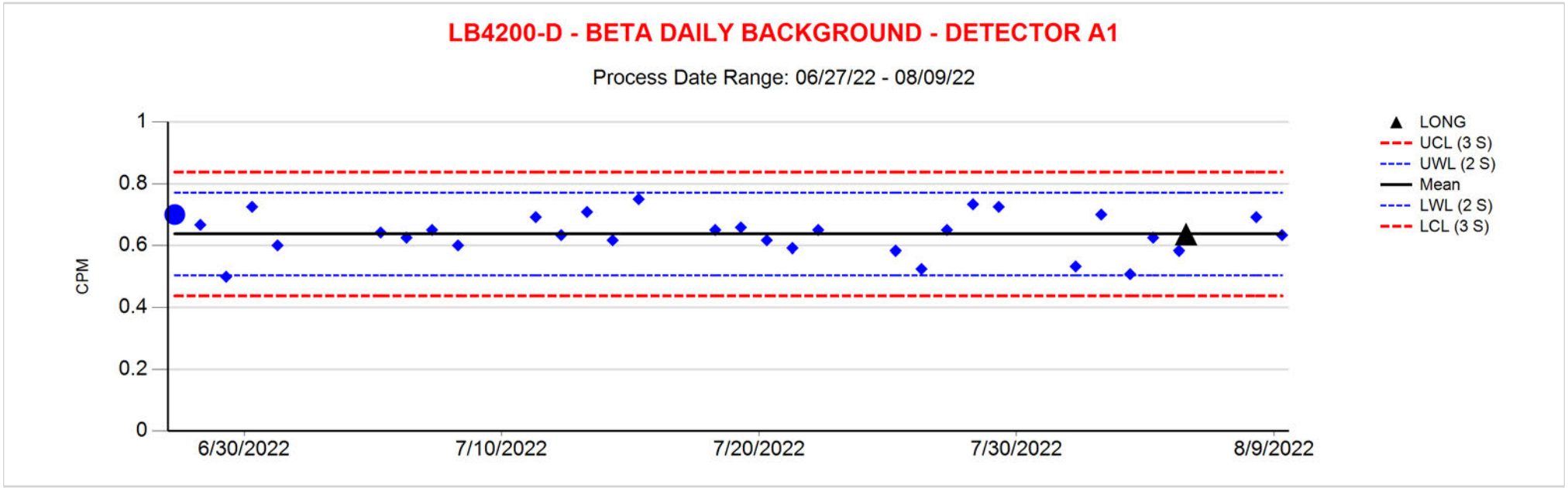
Statistical Process Control

Bin	Frequency
0.4664 to 0.5489	0
0.5489 to 0.6313	3
0.6313 to 0.7137	16
0.7137 to 0.7962	6
0.7962 to 0.8786	4
0.8786 to 0.9610	1



Beta Daily BKG - ARS1-B22-01103-01

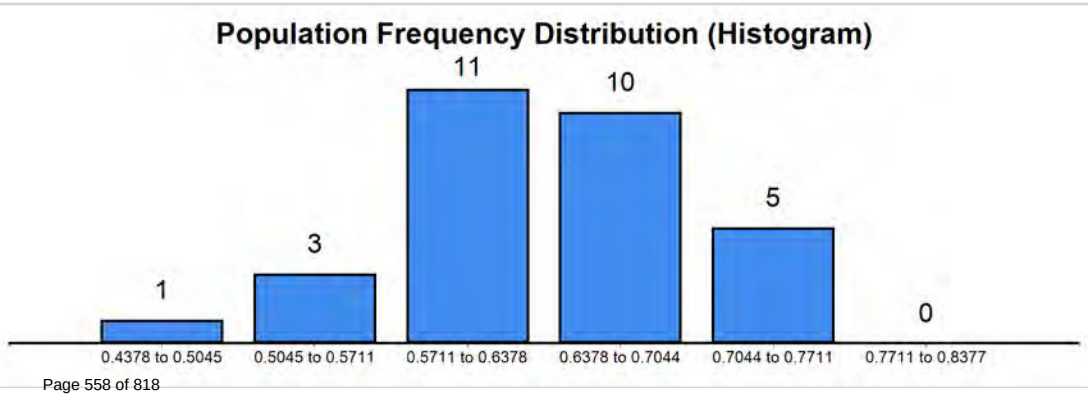
Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.6378	Long B CPM	0.6367	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0667	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.8377	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4378	CPM	0.6917	7 trending most recent points in a row.	**OK**
DER	0.6837	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

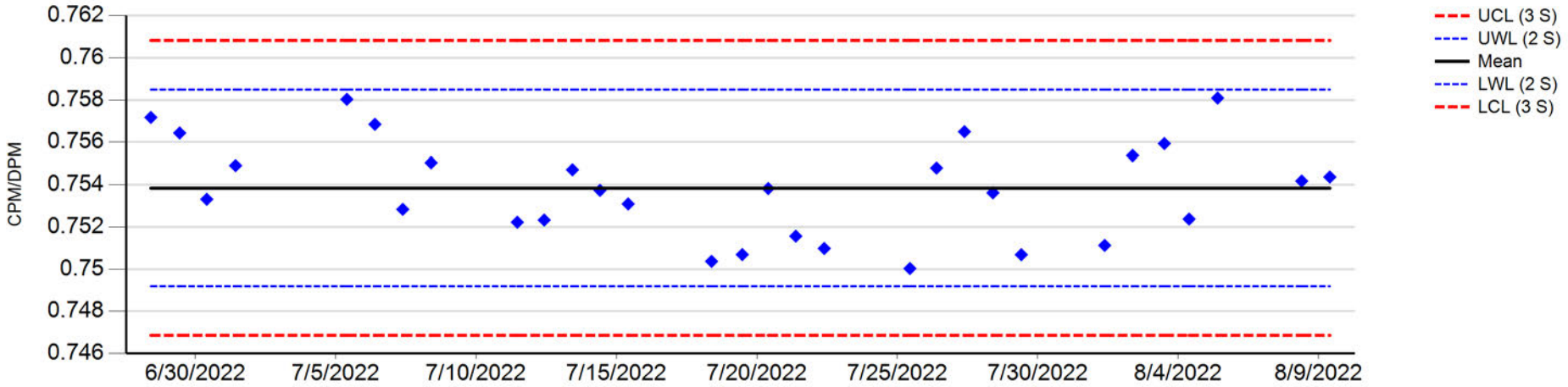
Bin	Frequency
0.4378 to 0.5045	1
0.5045 to 0.5711	3
0.5711 to 0.6378	11
0.6378 to 0.7044	10
0.7044 to 0.7711	5
0.7711 to 0.8377	0



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7538	CPM/DPM	0.7544	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0023			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7608			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7469			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

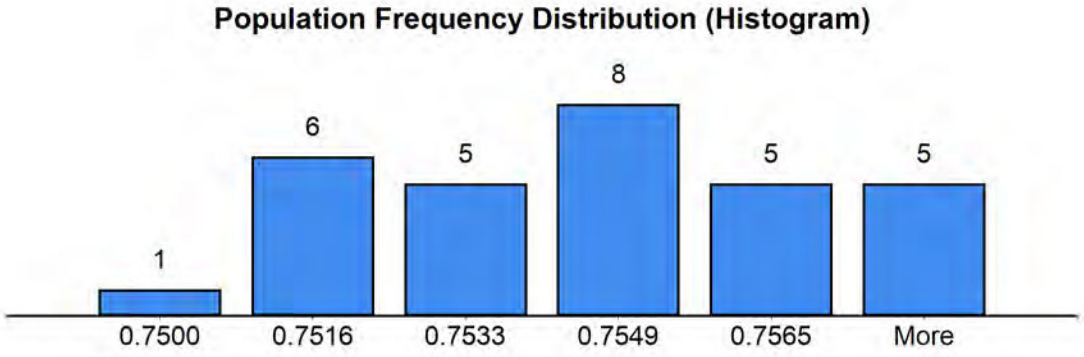
LB4200-D - BETA EFFICIENCY - DETECTOR A1

Process Date Range: 06/28/22 - 08/09/22



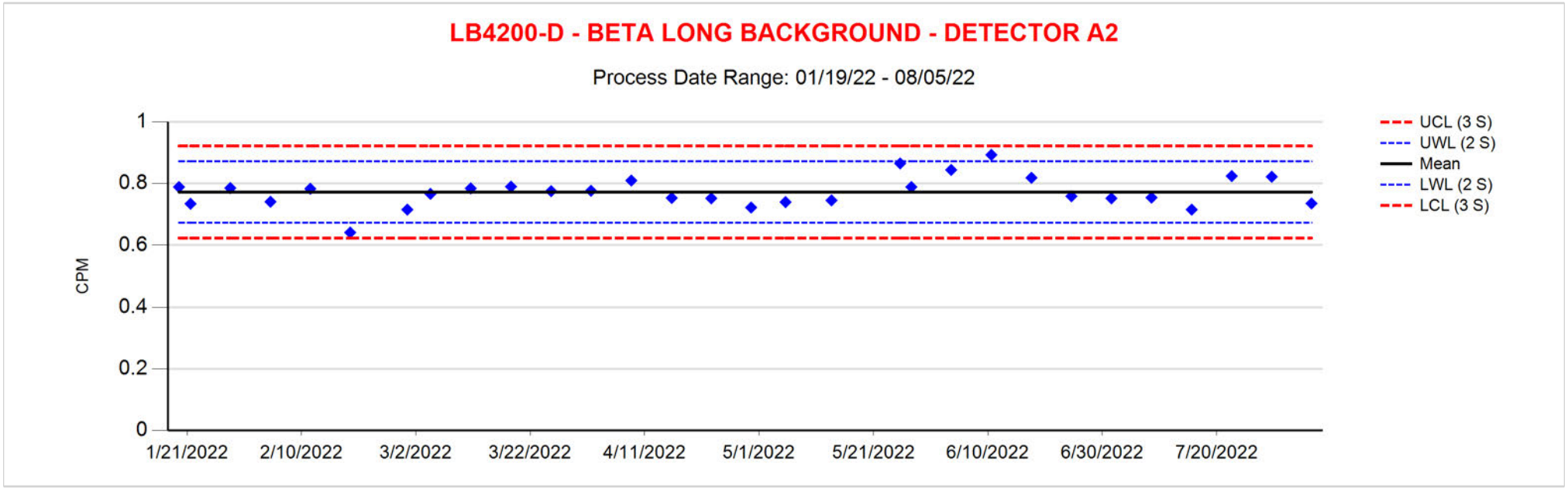
Statistical Process Control

Bin	Frequency
0.7500	1
0.7516	6
0.7533	5
0.7549	8
0.7565	5
More	5



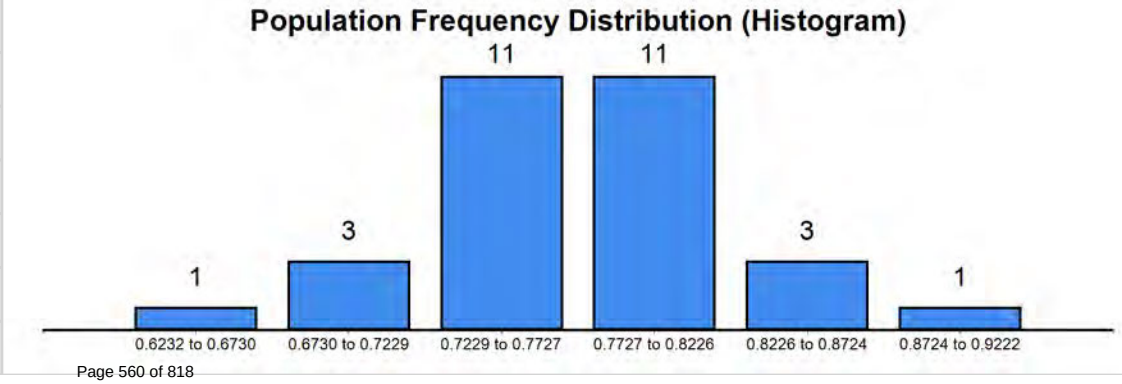
Beta Long BKG - ARS1-B22-01103-02

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7727	CPM	0.7356	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0498	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9222	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6232	CPM	0.8222	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.6232 to 0.6730	1
0.6730 to 0.7229	3
0.7229 to 0.7727	11
0.7727 to 0.8226	11
0.8226 to 0.8724	3
0.8724 to 0.9222	1

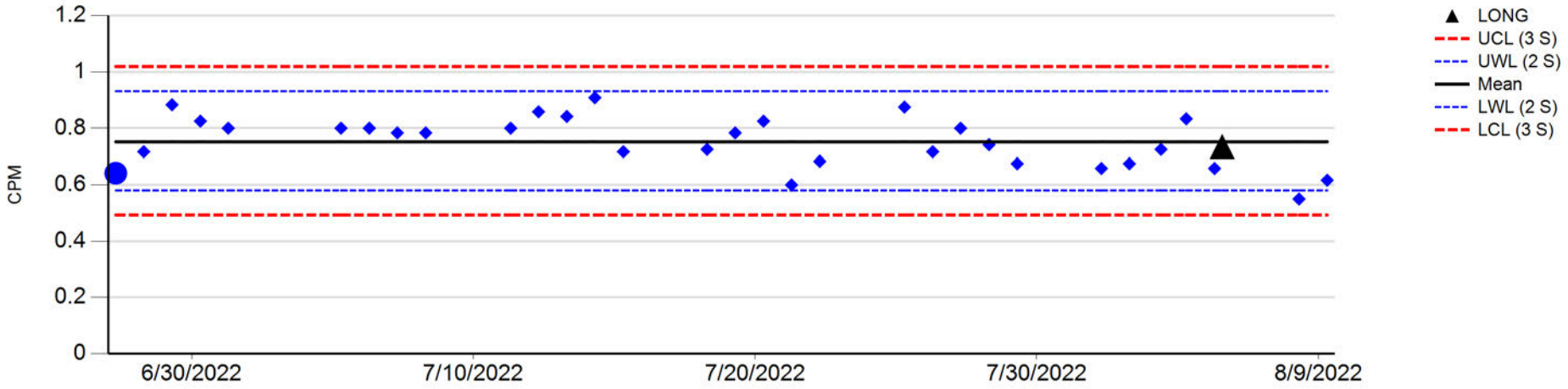


Beta Daily BKG - ARS1-B22-01103-02

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7561	Long B CPM	0.7356	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0877	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0191	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4931	CPM	0.5500	7 trending most recent points in a row.	**OK**
DER	2.5249	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

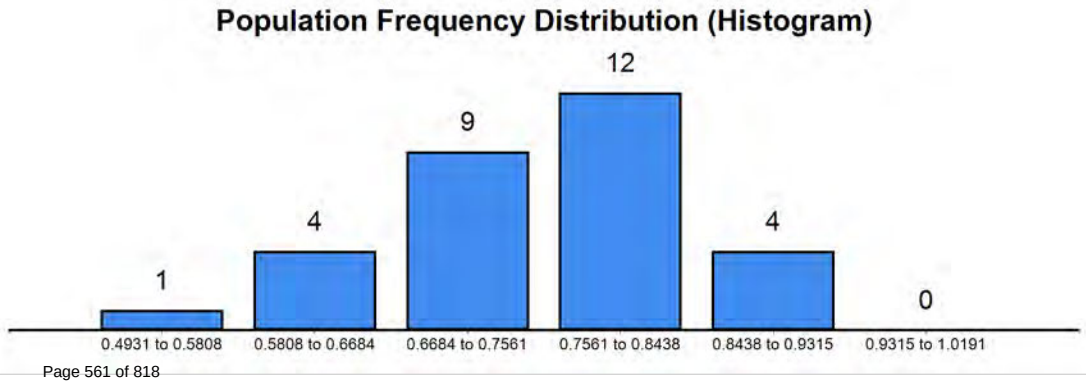
LB4200-D - BETA DAILY BACKGROUND - DETECTOR A2

Process Date Range: 06/27/22 - 08/09/22



Statistical Process Control

Bin	Frequency
0.4931 to 0.5808	1
0.5808 to 0.6684	4
0.6684 to 0.7561	9
0.7561 to 0.8438	12
0.8438 to 0.9315	4
0.9315 to 1.0191	0

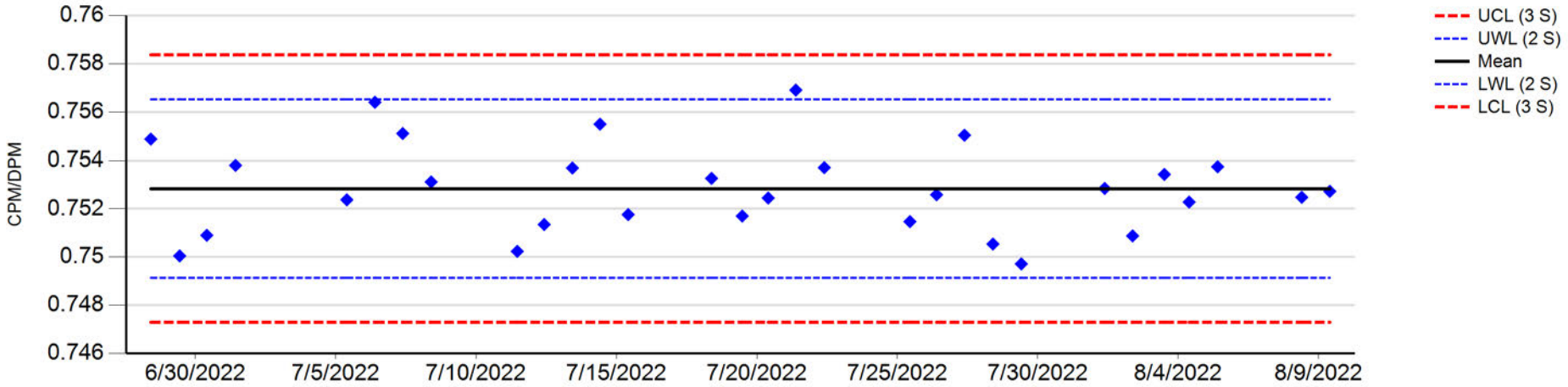


Beta Daily EFF - ARS1-B22-01103-02

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7528	CPM/DPM	0.7527	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0018			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7584			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7473			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

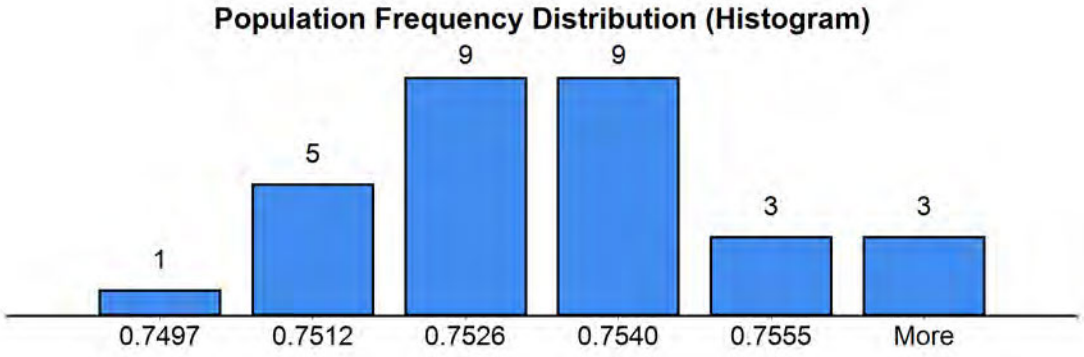
LB4200-D - BETA EFFICIENCY - DETECTOR A2

Process Date Range: 06/28/22 - 08/09/22



Statistical Process Control

Bin	Frequency
0.7497	1
0.7512	5
0.7526	9
0.7540	9
0.7555	3
More	3

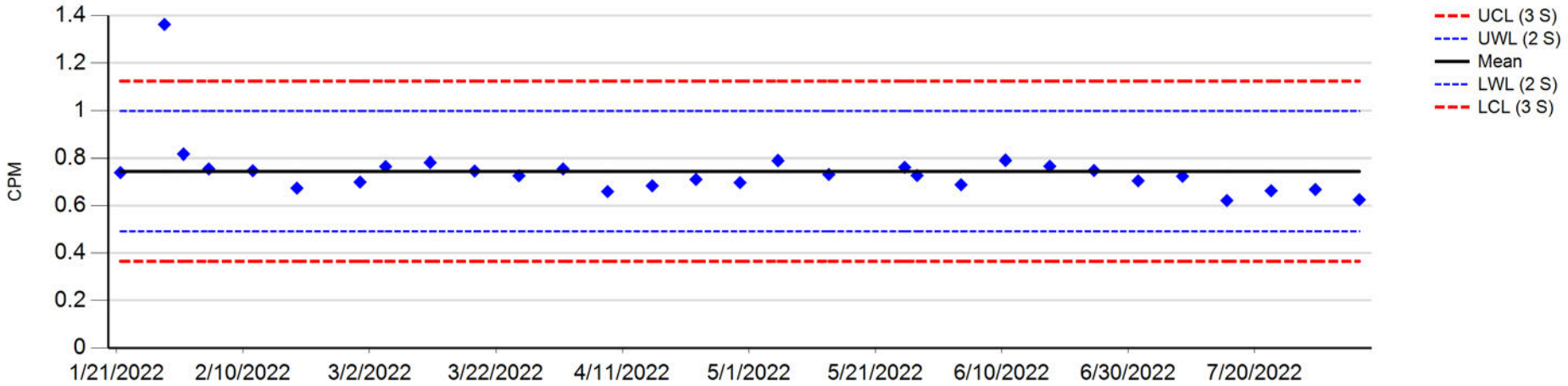


Beta Long BKG - ARS1-B22-01103-03

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7449	CPM	0.6256	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.1264	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.1241	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.3656	CPM	0.6689	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

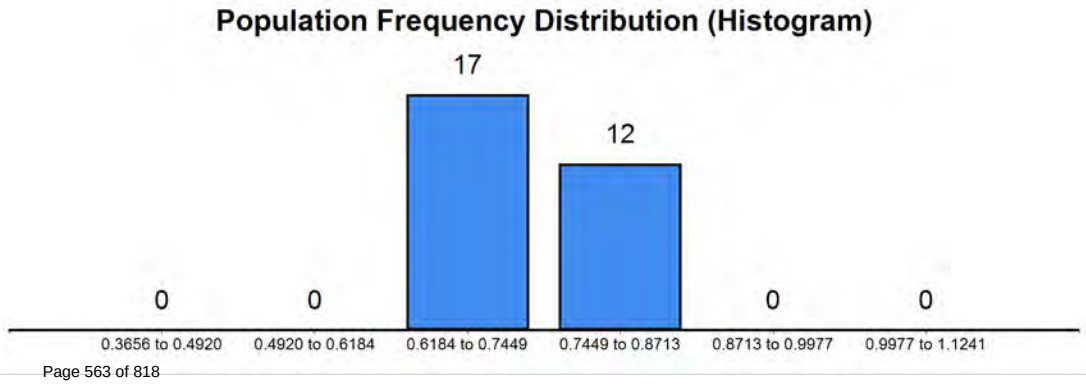
LB4200-D - BETA LONG BACKGROUND - DETECTOR A3

Process Date Range: 01/21/22 - 08/05/22



Statistical Process Control

Bin	Frequency
0.3656 to 0.4920	0
0.4920 to 0.6184	0
0.6184 to 0.7449	17
0.7449 to 0.8713	12
0.8713 to 0.9977	0
0.9977 to 1.1241	0

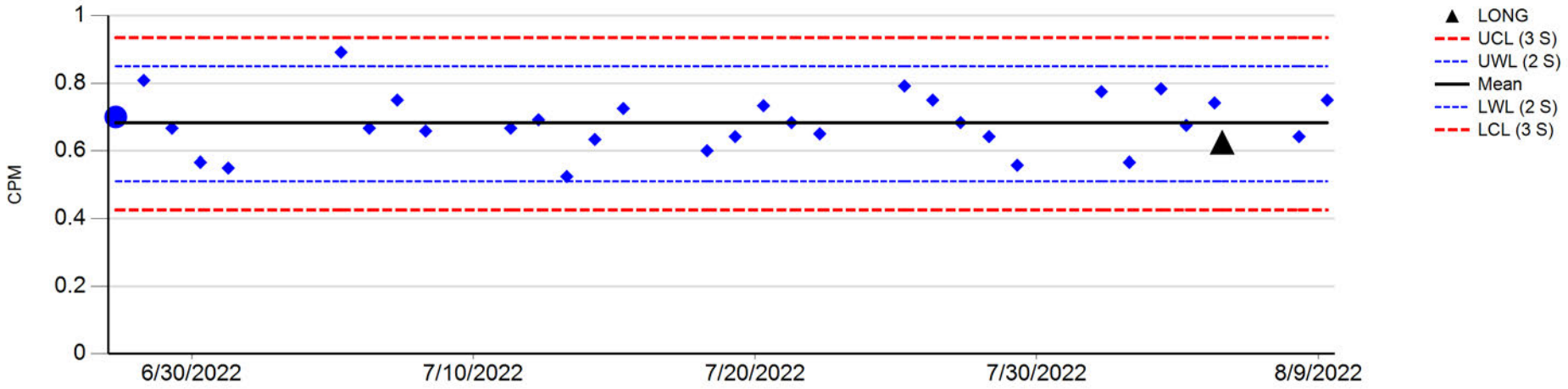


Beta Daily BKG - ARS1-B22-01103-03

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.6806	Long B CPM	0.6256	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0849	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9351	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4260	CPM	0.6417	7 trending most recent points in a row.	**OK**
DER	0.2073	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

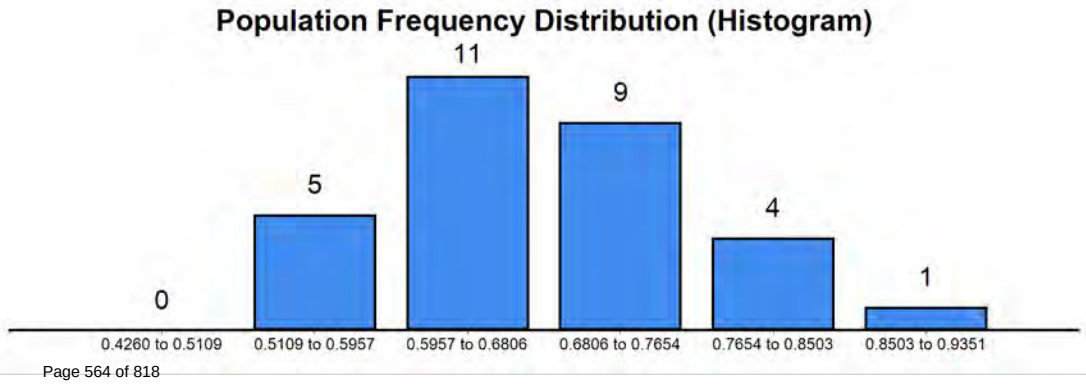
LB4200-D - BETA DAILY BACKGROUND - DETECTOR A3

Process Date Range: 06/27/22 - 08/09/22



Statistical Process Control

Bin	Frequency
0.4260 to 0.5109	0
0.5109 to 0.5957	5
0.5957 to 0.6806	11
0.6806 to 0.7654	9
0.7654 to 0.8503	4
0.8503 to 0.9351	1

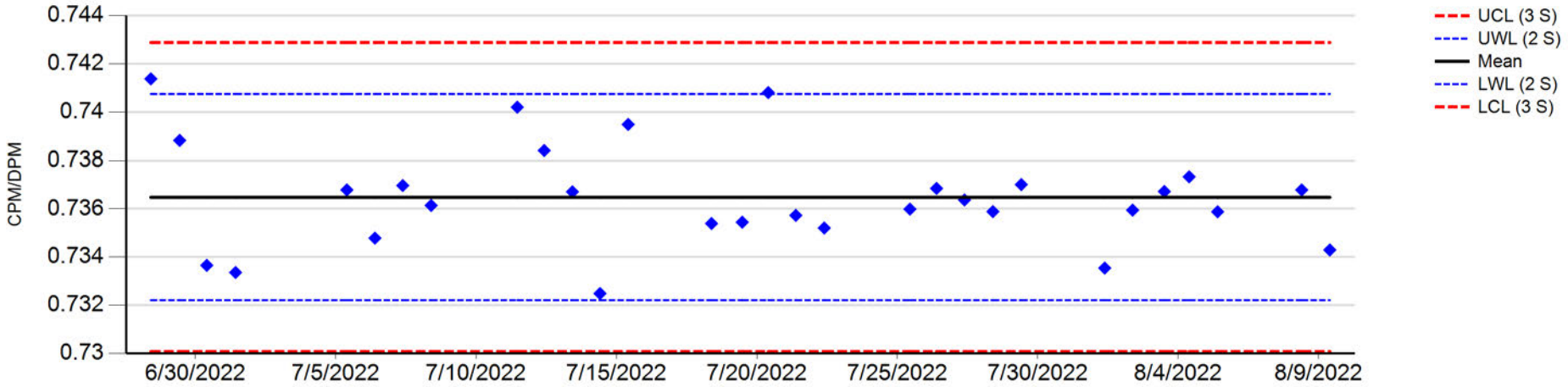


Beta Daily EFF - ARS1-B22-01103-03

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7365	CPM/DPM	0.7343	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0021			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7429			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7301			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

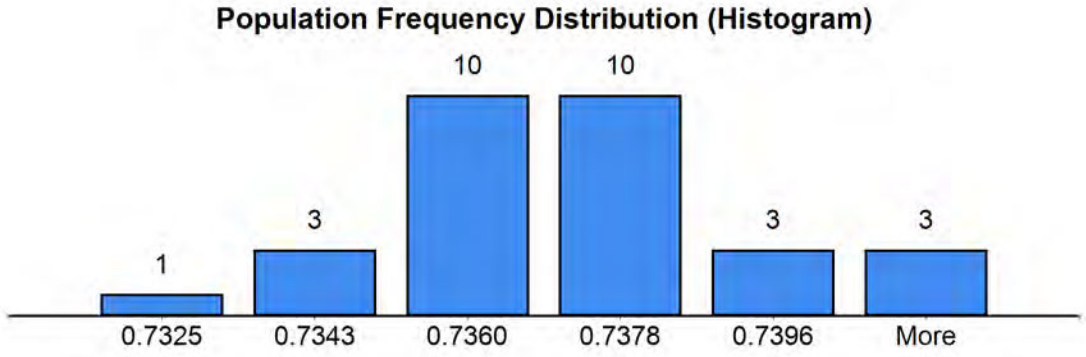
LB4200-D - BETA EFFICIENCY - DETECTOR A3

Process Date Range: 06/28/22 - 08/09/22



Statistical Process Control

Bin	Frequency
0.7325	1
0.7343	3
0.7360	10
0.7378	10
0.7396	3
More	3

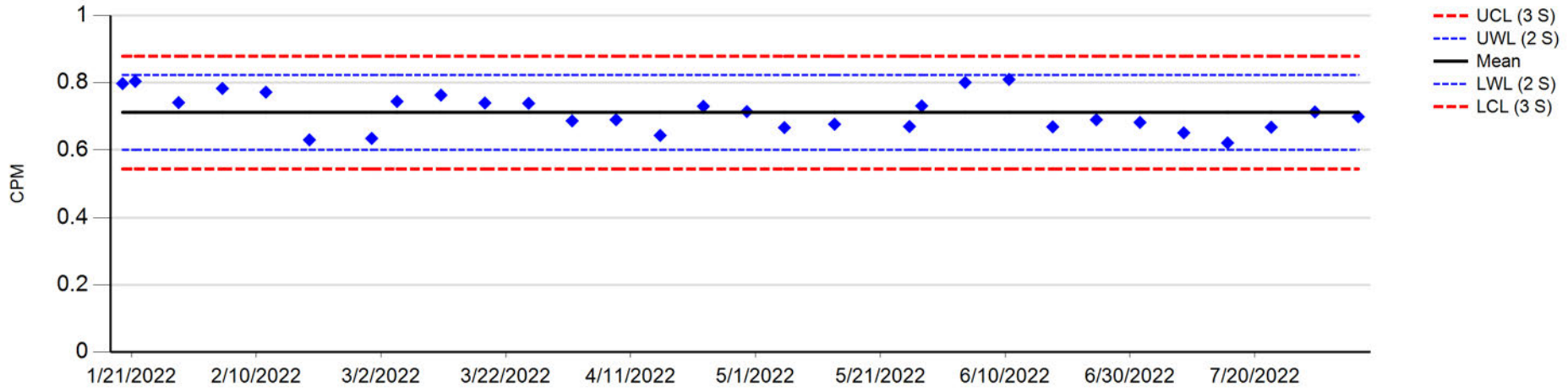


Beta Long BKG - ARS1-B22-01103-04

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7121	CPM	0.6989	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0557	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.8791	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5451	CPM	0.7133	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

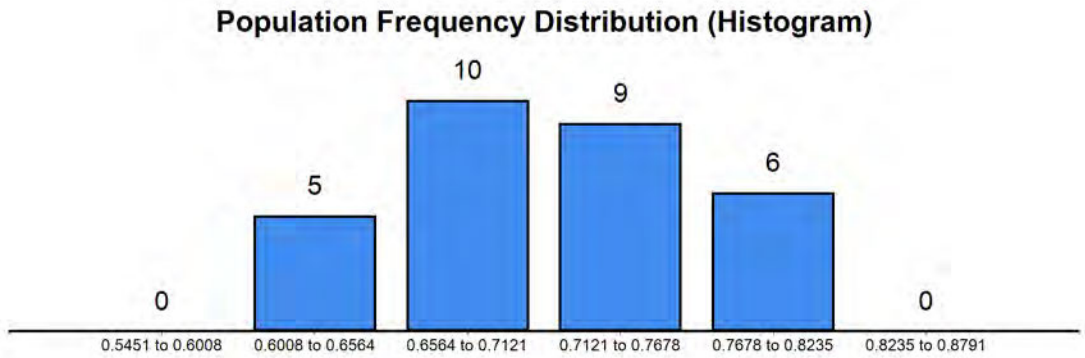
LB4200-D - BETA LONG BACKGROUND - DETECTOR A4

Process Date Range: 01/19/22 - 08/05/22



Statistical Process Control

Bin	Frequency
0.5451 to 0.6008	0
0.6008 to 0.6564	5
0.6564 to 0.7121	10
0.7121 to 0.7678	9
0.7678 to 0.8235	6
0.8235 to 0.8791	0

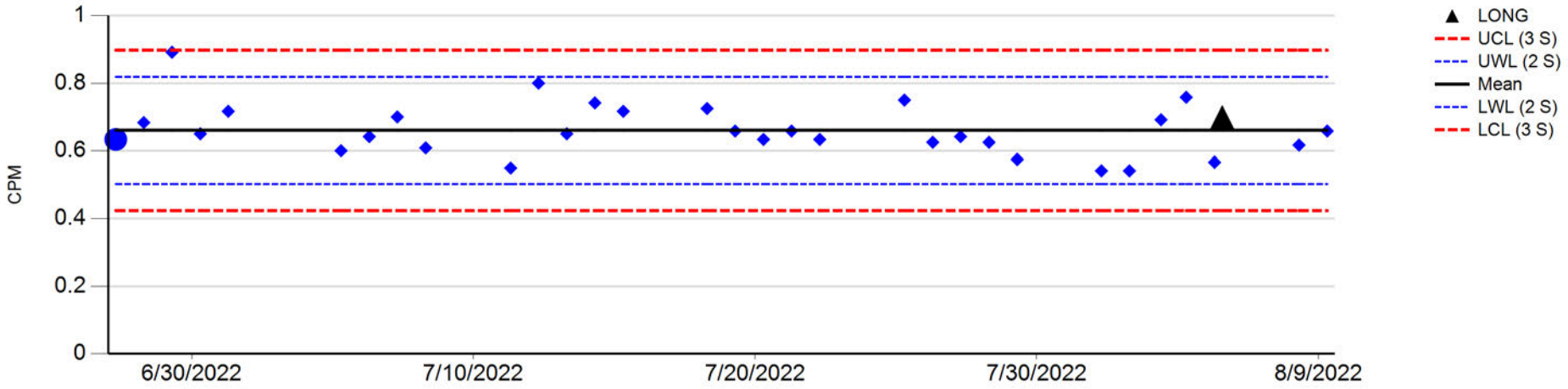


Beta Daily BKG - ARS1-B22-01103-04

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.6608	Long B CPM	0.6989	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0790	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.8979	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4237	CPM	0.6167	7 trending most recent points in a row.	**OK**
DER	1.0690	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR A4

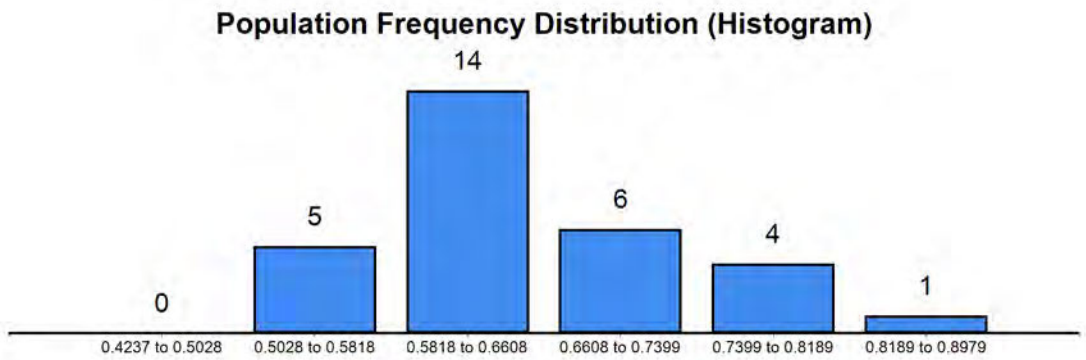
Process Date Range: 06/27/22 - 08/09/22



ARS Aleut Analytical

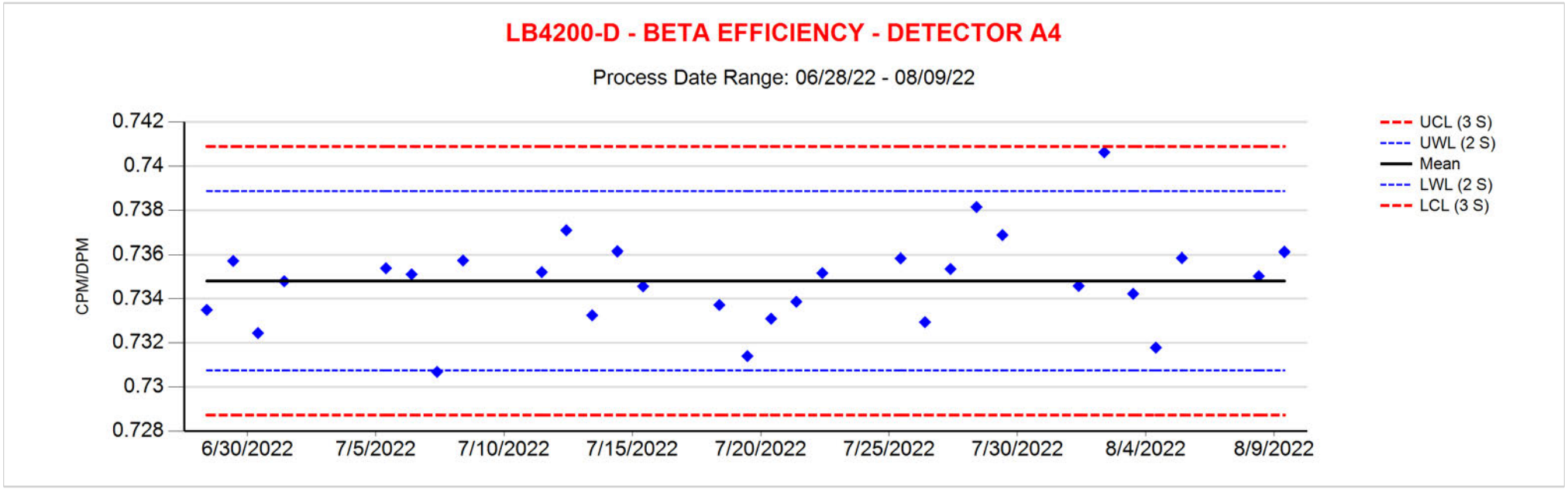
Statistical Process Control

Bin	Frequency
0.4237 to 0.5028	0
0.5028 to 0.5818	5
0.5818 to 0.6608	14
0.6608 to 0.7399	6
0.7399 to 0.8189	4
0.8189 to 0.8979	1



Beta Daily EFF - ARS1-B22-01103-04

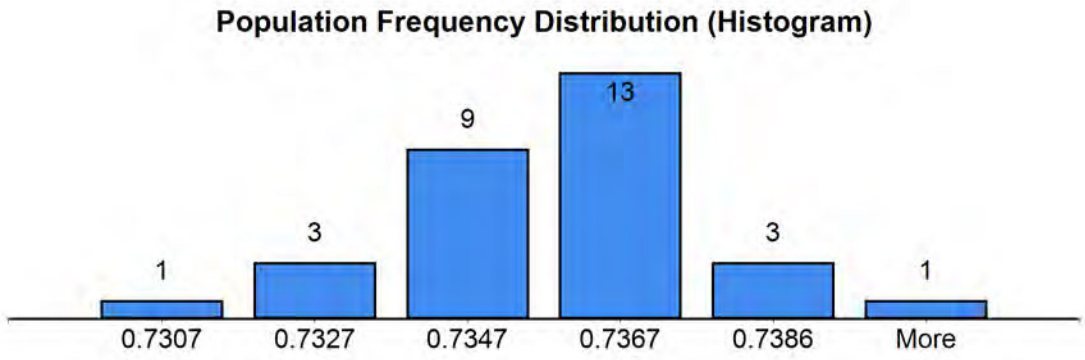
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7348	CPM/DPM	0.7361	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0020			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7409			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7287			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.7307	1
0.7327	3
0.7347	9
0.7367	13
0.7386	3
More	1

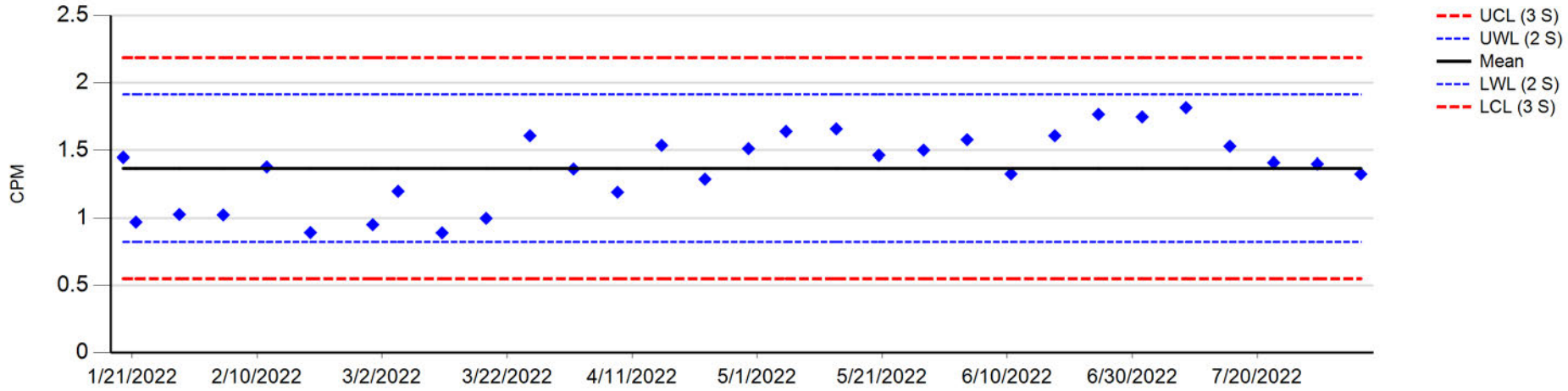


Beta Long BKG - ARS1-B22-01103-05

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	1.3687	CPM	1.3267	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.2731	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	2.1880	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5493	CPM	1.4011	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

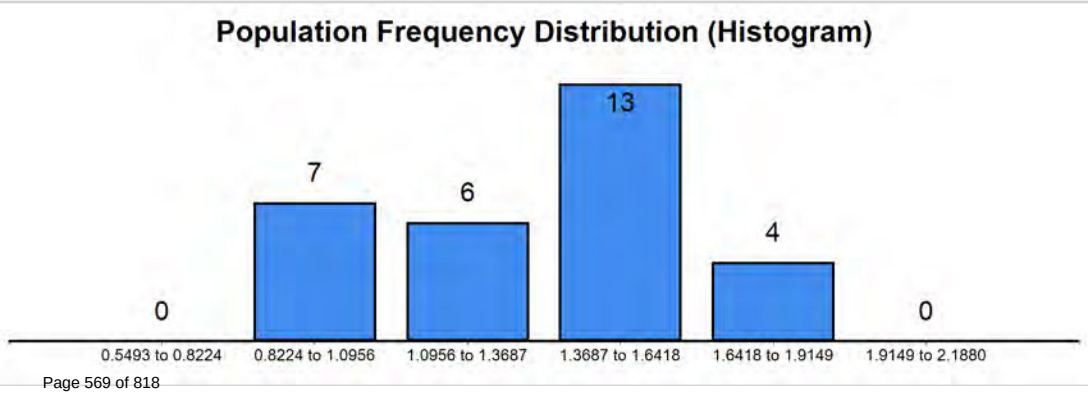
LB4200-D - BETA LONG BACKGROUND - DETECTOR B1

Process Date Range: 01/19/22 - 08/05/22



Statistical Process Control

Bin	Frequency
0.5493 to 0.8224	0
0.8224 to 1.0956	7
1.0956 to 1.3687	6
1.3687 to 1.6418	13
1.6418 to 1.9149	4
1.9149 to 2.1880	0

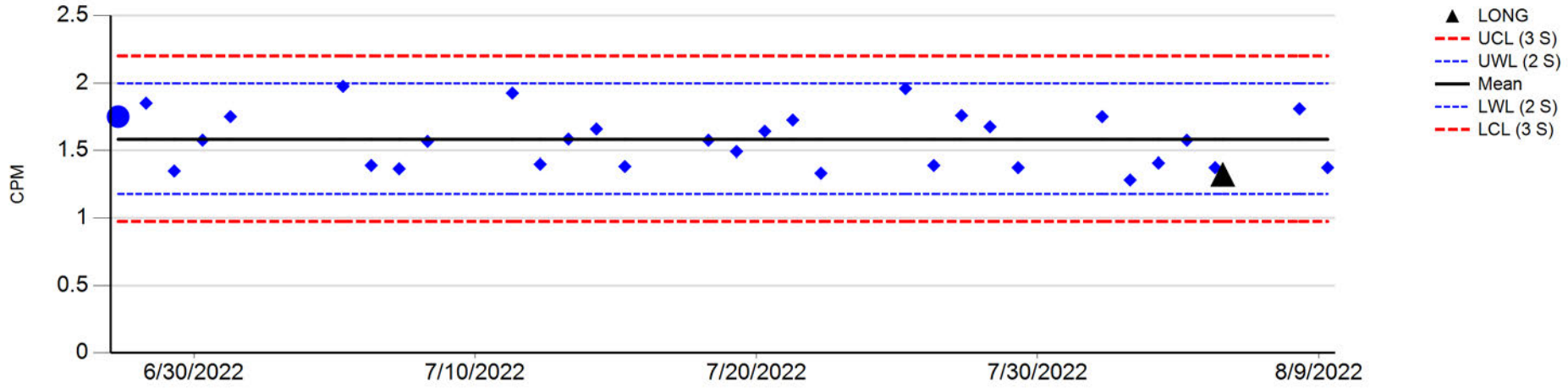


Beta Daily BKG - ARS1-B22-01103-05

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	1.5883	Long B CPM	1.3267	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.2043	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	2.2013	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.9754	CPM	1.8083	7 trending most recent points in a row.	**OK**
DER	3.7448	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**INVESTIGATE**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR B1

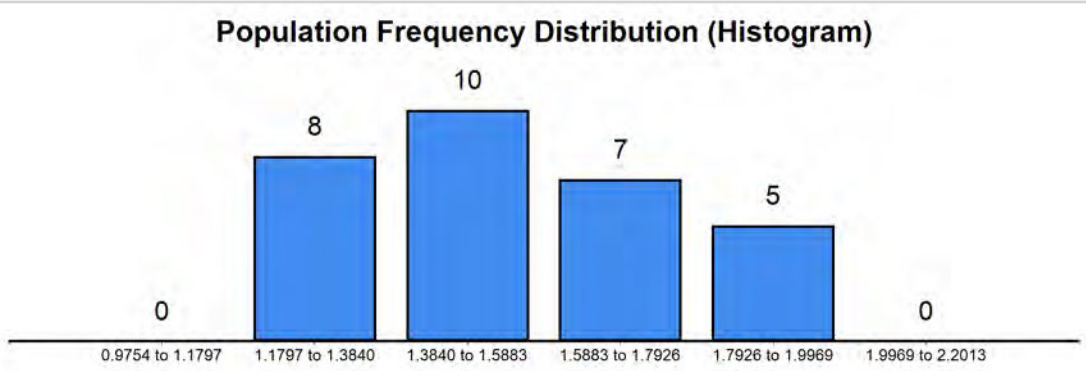
Process Date Range: 06/27/22 - 08/09/22



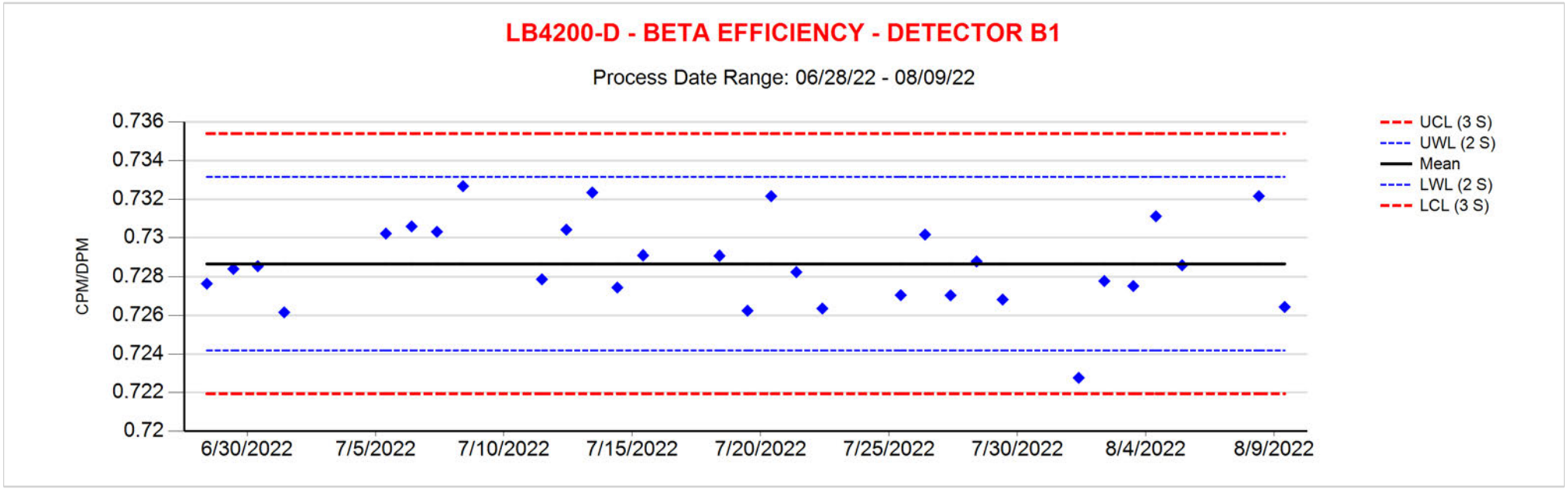
ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.9754 to 1.1797	0
1.1797 to 1.3840	8
1.3840 to 1.5883	10
1.5883 to 1.7926	7
1.7926 to 1.9969	5
1.9969 to 2.2013	0

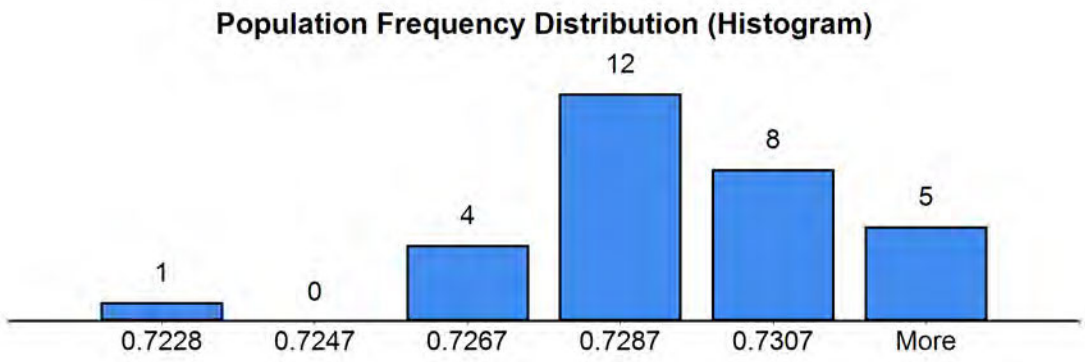


Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7287	CPM/DPM	0.7264	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0022			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7354			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7219			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.7228	1
0.7247	0
0.7267	4
0.7287	12
0.7307	8
More	5

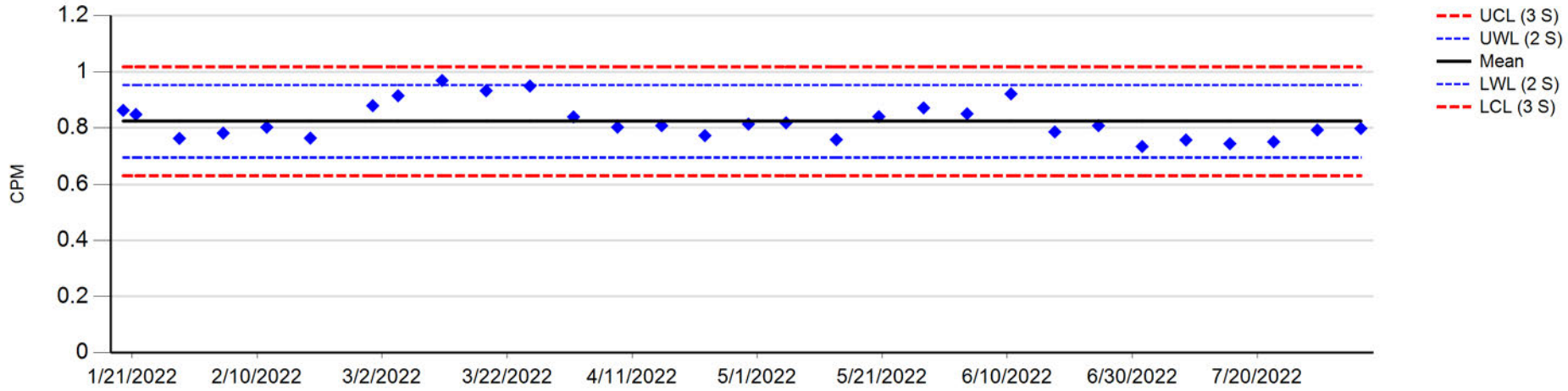


Beta Long BKG - ARS1-B22-01103-06

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8240	CPM	0.7978	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0644	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0172	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6308	CPM	0.7922	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA LONG BACKGROUND - DETECTOR B2

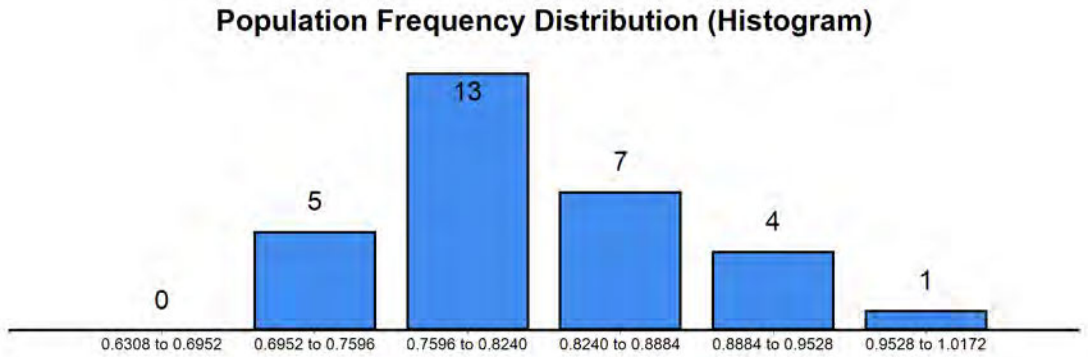
Process Date Range: 01/19/22 - 08/05/22



ARS Aleut Analytical

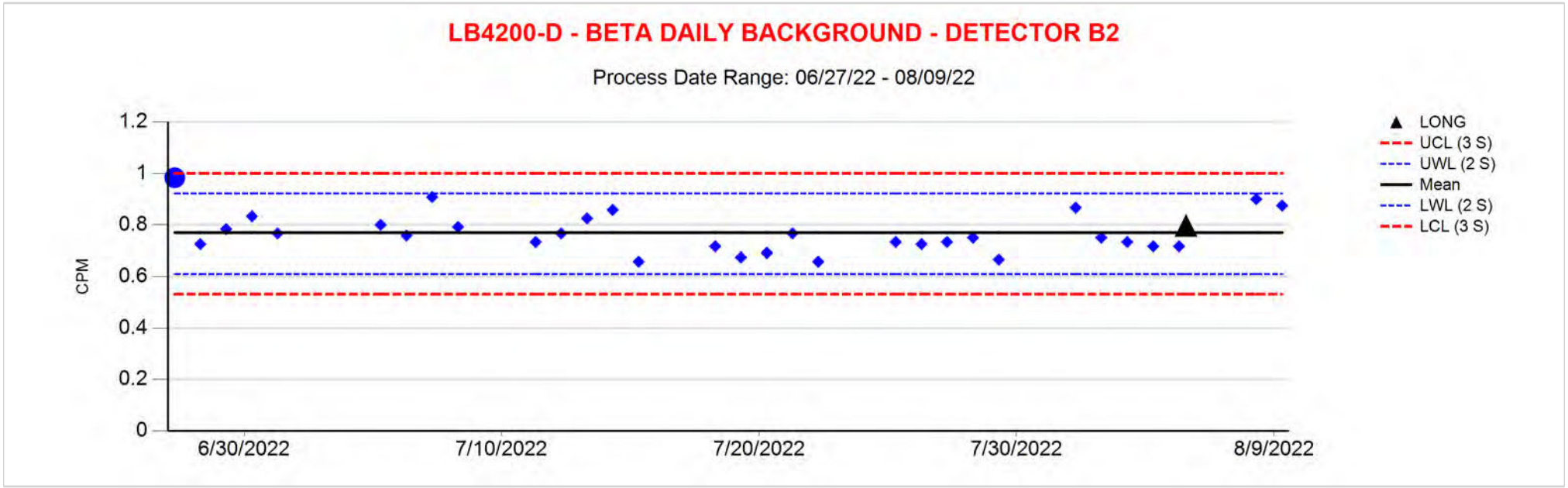
Statistical Process Control

Bin	Frequency
0.6308 to 0.6952	0
0.6952 to 0.7596	5
0.7596 to 0.8240	13
0.8240 to 0.8884	7
0.8884 to 0.9528	4
0.9528 to 1.0172	1



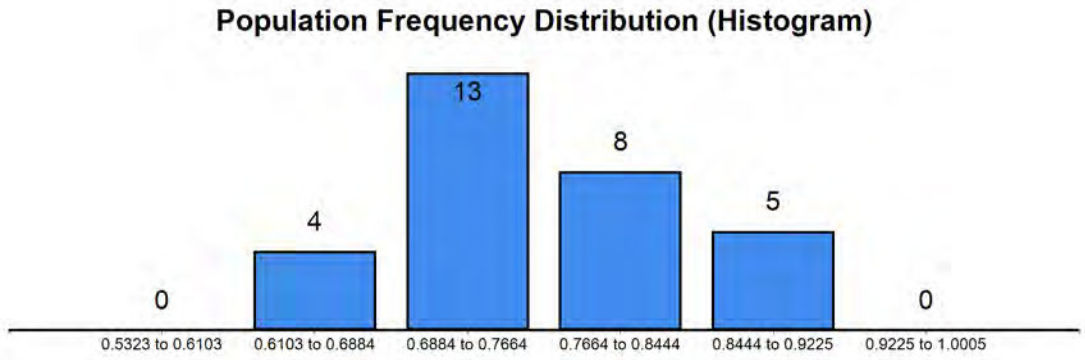
Beta Daily BKG - ARS1-B22-01103-06

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7664	Long B CPM	0.7978	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0780	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0005	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5323	CPM	0.9000	7 trending most recent points in a row.	**OK**
DER	1.1162	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



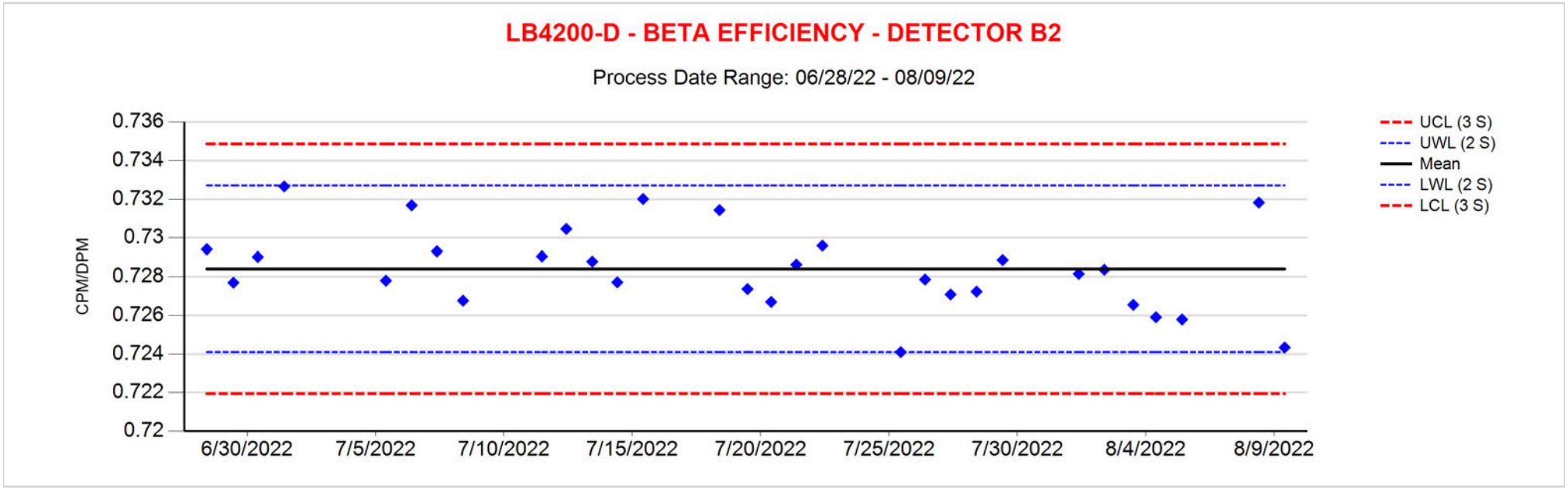
Statistical Process Control

Bin	Frequency
0.5323 to 0.6103	0
0.6103 to 0.6884	4
0.6884 to 0.7664	13
0.7664 to 0.8444	8
0.8444 to 0.9225	5
0.9225 to 1.0005	0



Beta Daily EFF - ARS1-B22-01103-06

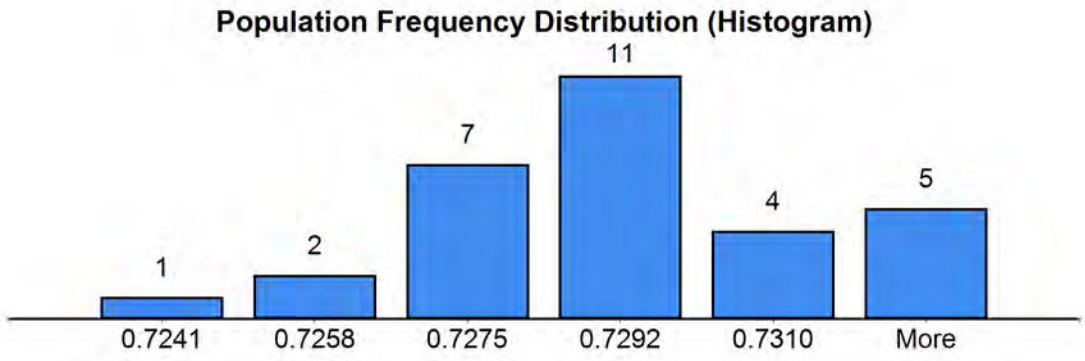
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7284	CPM/DPM	0.7243	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0022			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7349			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7219			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

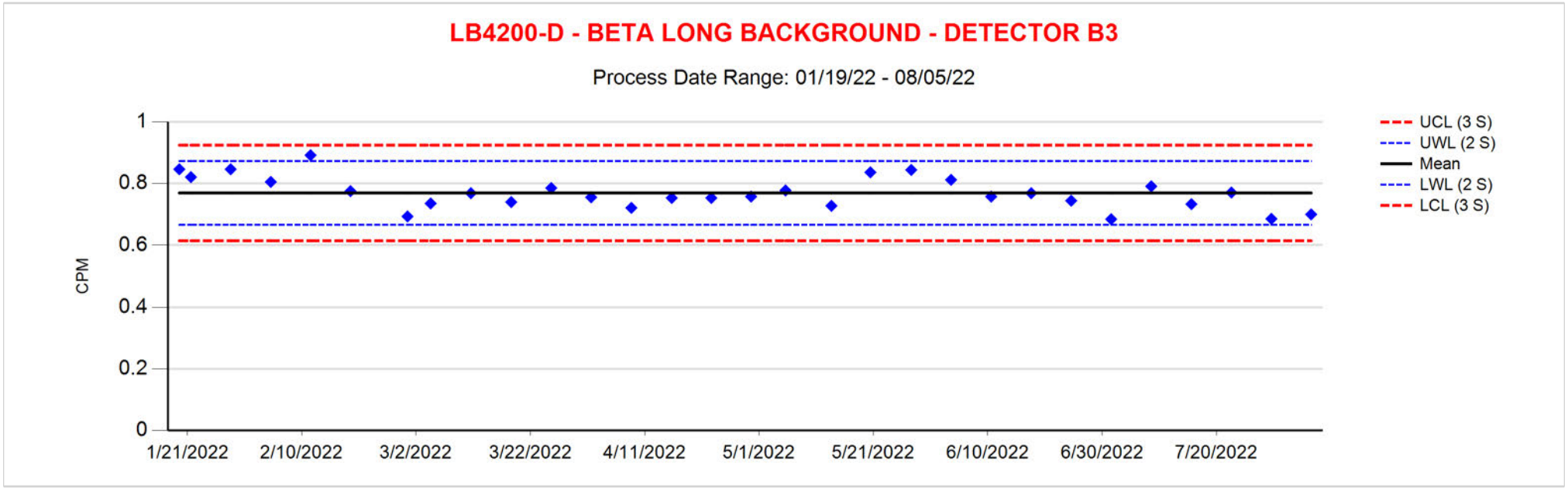
Statistical Process Control

Bin	Frequency
0.7241	1
0.7258	2
0.7275	7
0.7292	11
0.7310	4
More	5



Beta Long BKG - ARS1-B22-01103-07

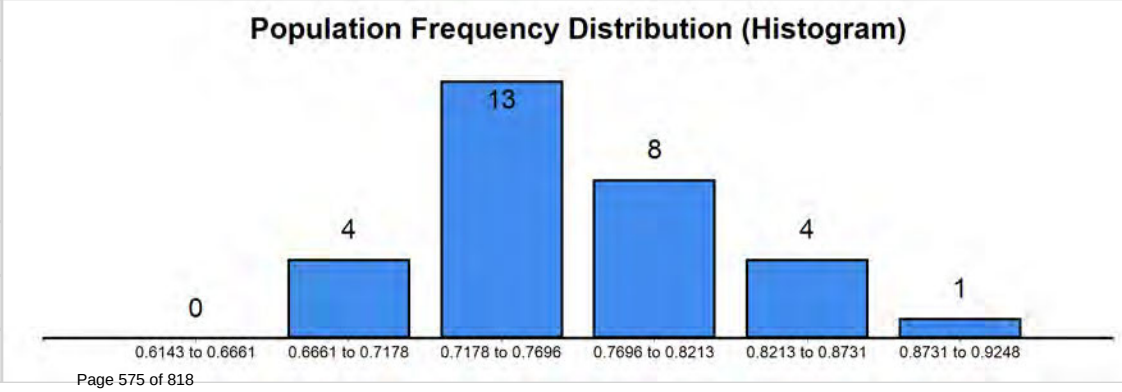
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7696	CPM	0.7000	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0518	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9248	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6143	CPM	0.6856	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

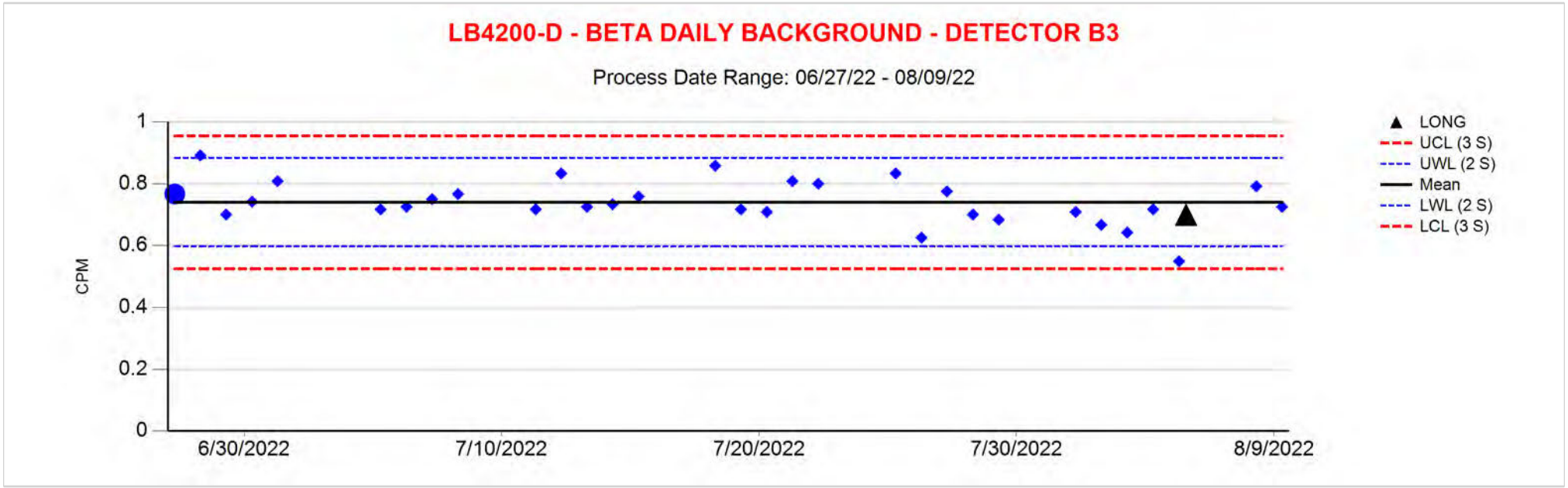
Statistical Process Control

Bin	Frequency
0.6143 to 0.6661	0
0.6661 to 0.7178	4
0.7178 to 0.7696	13
0.7696 to 0.8213	8
0.8213 to 0.8731	4
0.8731 to 0.9248	1



Beta Daily BKG - ARS1-B22-01103-07

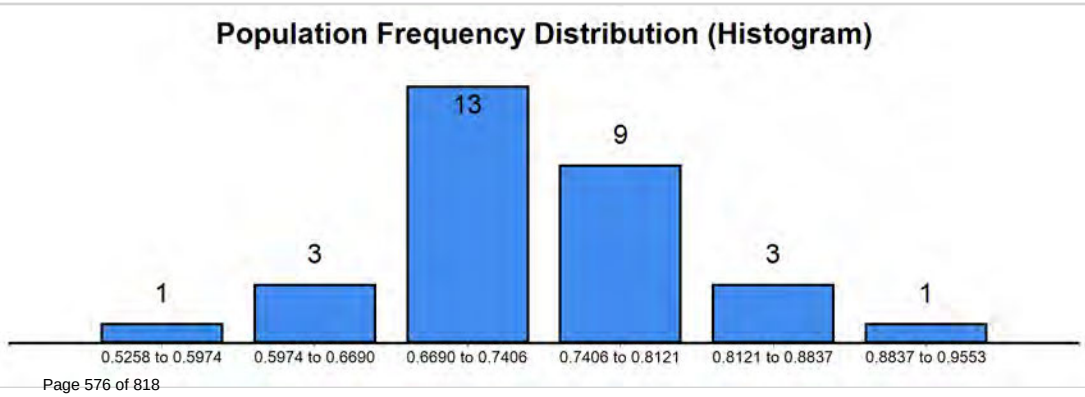
Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7406	Long B CPM	0.7000	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0716	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9553	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5258	CPM	0.7917	7 trending most recent points in a row.	**OK**
DER	1.0674	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.5258 to 0.5974	1
0.5974 to 0.6690	3
0.6690 to 0.7406	13
0.7406 to 0.8121	9
0.8121 to 0.8837	3
0.8837 to 0.9553	1

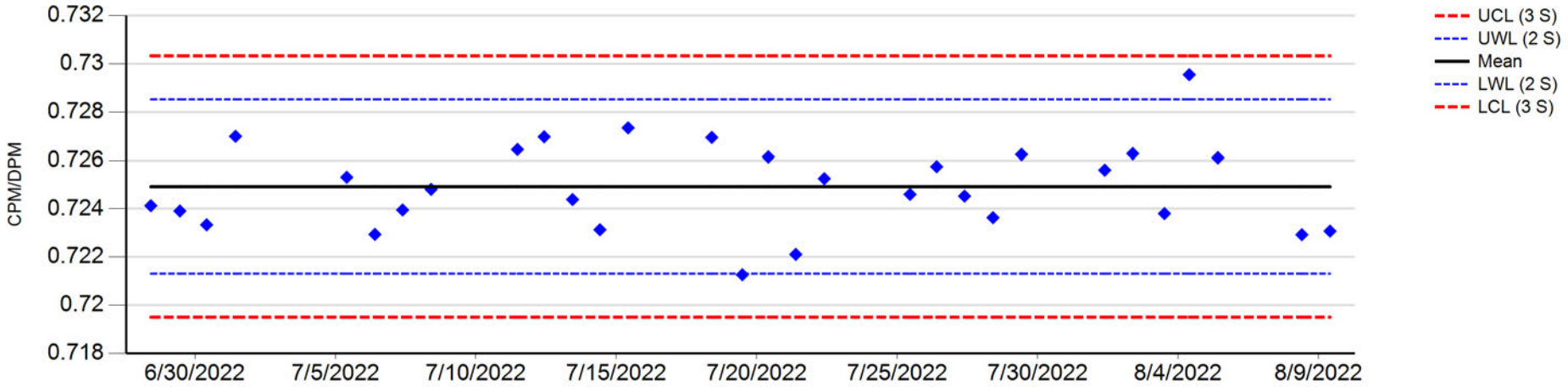


Beta Daily EFF - ARS1-B22-01103-07

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7249	CPM/DPM	0.7231	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0018			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7303			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7195			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

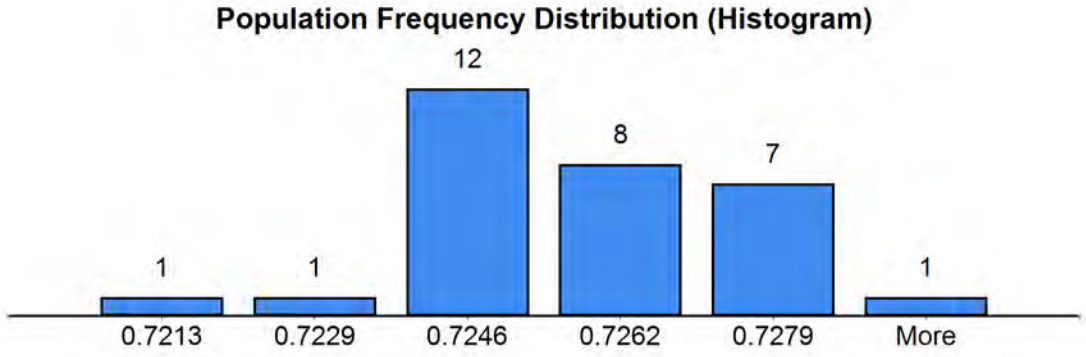
LB4200-D - BETA EFFICIENCY - DETECTOR B3

Process Date Range: 06/28/22 - 08/09/22



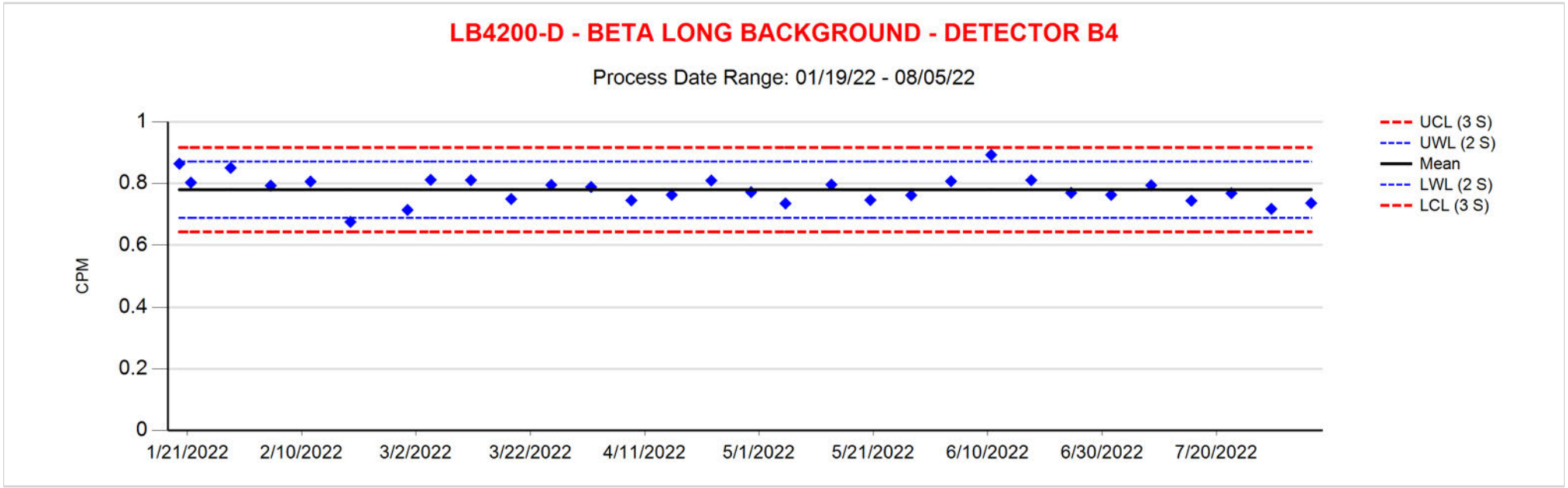
Statistical Process Control

Bin	Frequency
0.7213	1
0.7229	1
0.7246	12
0.7262	8
0.7279	7
More	1



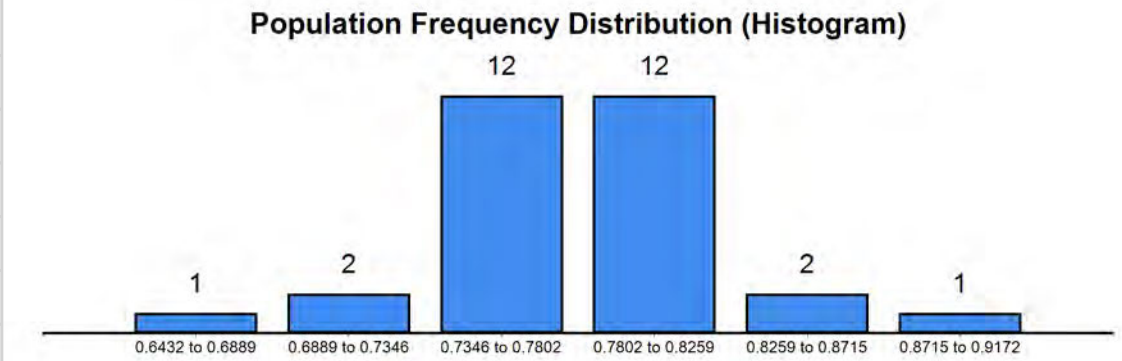
Beta Long BKG - ARS1-B22-01103-08

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7802	CPM	0.7367	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0457	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9172	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6432	CPM	0.7178	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.6432 to 0.6889	1
0.6889 to 0.7346	2
0.7346 to 0.7802	12
0.7802 to 0.8259	12
0.8259 to 0.8715	2
0.8715 to 0.9172	1

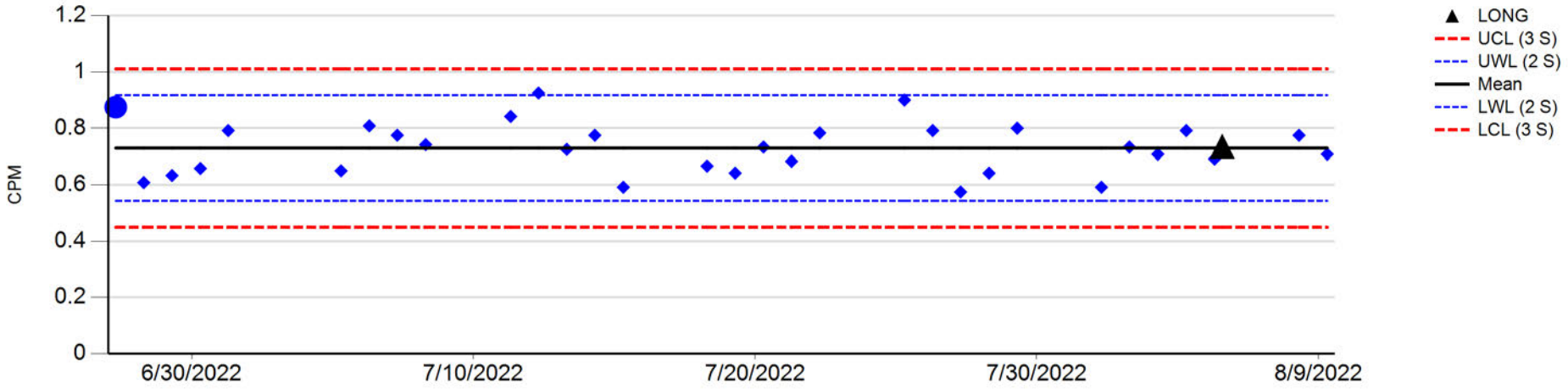


Beta Daily BKG - ARS1-B22-01103-08

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7303	Long B CPM	0.7367	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0935	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0109	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4497	CPM	0.7750	7 trending most recent points in a row.	**OK**
DER	0.4494	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR B4

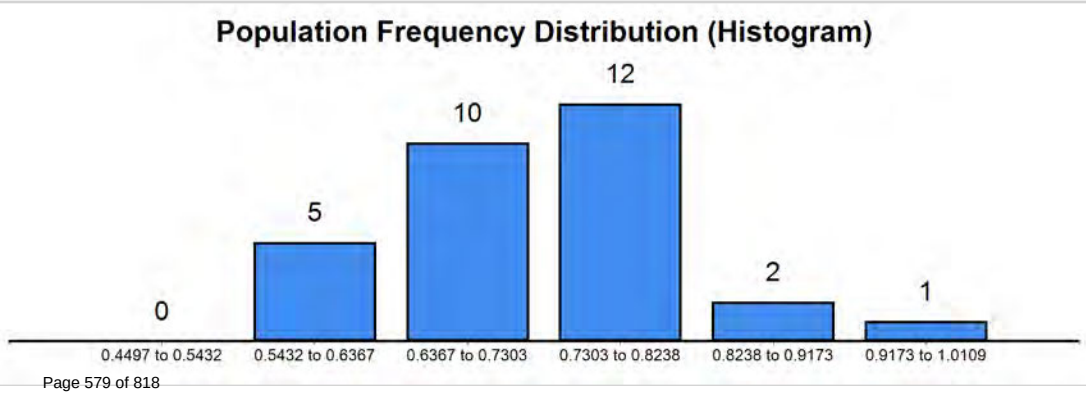
Process Date Range: 06/27/22 - 08/09/22



ARS Aleut Analytical

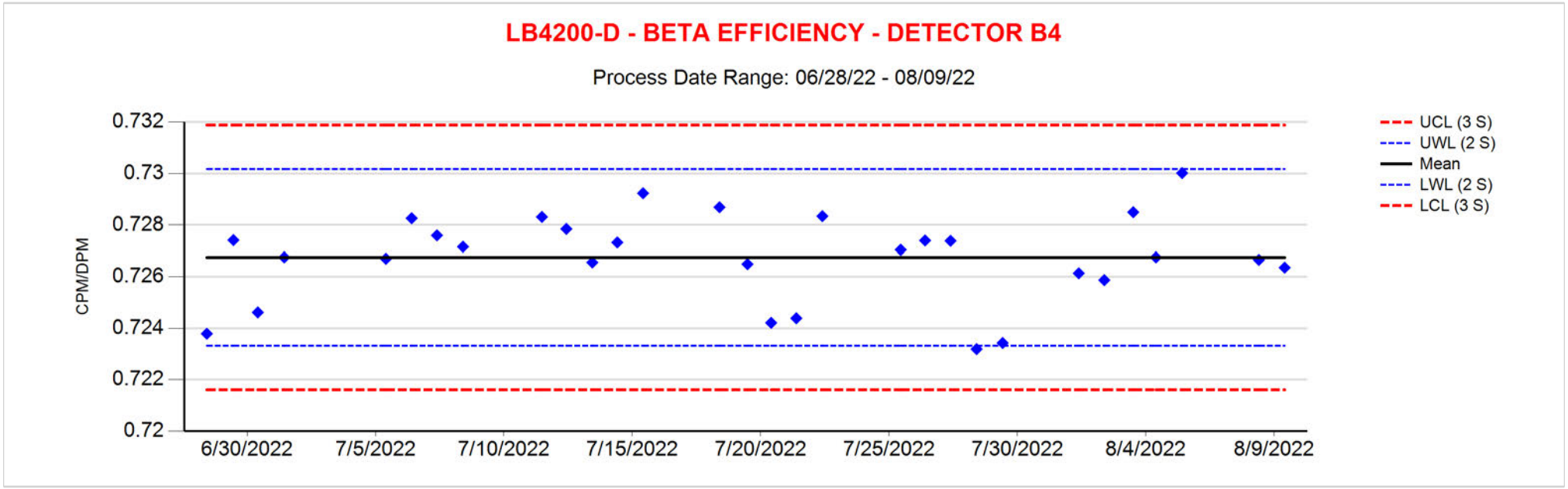
Statistical Process Control

Bin	Frequency
0.4497 to 0.5432	0
0.5432 to 0.6367	5
0.6367 to 0.7303	10
0.7303 to 0.8238	12
0.8238 to 0.9173	2
0.9173 to 1.0109	1



Beta Daily EFF - ARS1-B22-01103-08

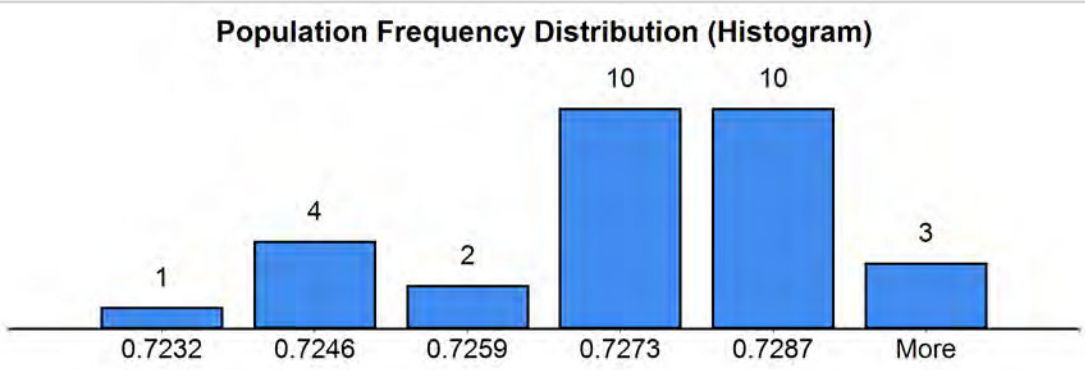
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7267	CPM/DPM	0.7264	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0017			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.7319			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7216			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

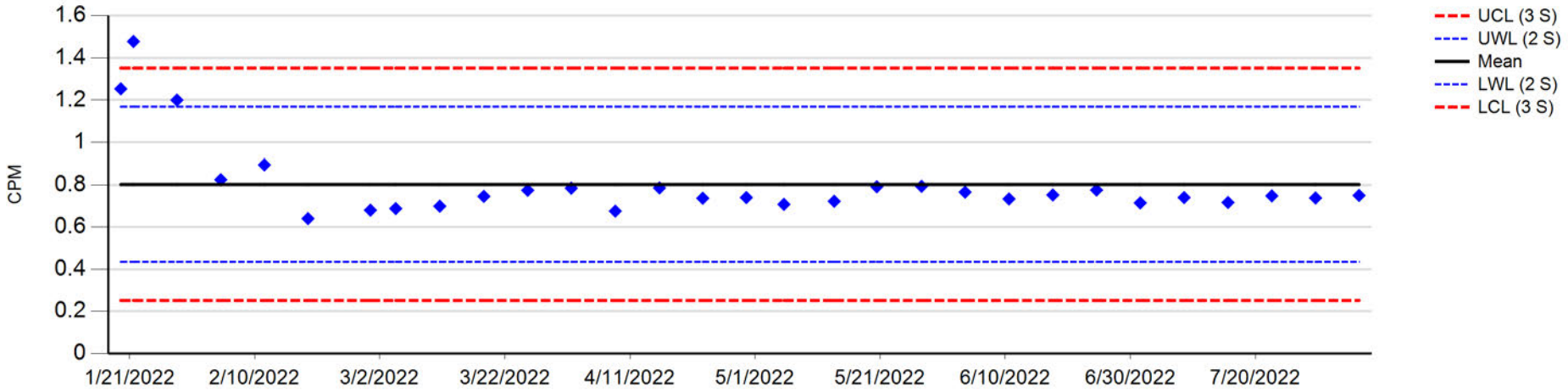
Bin	Frequency
0.7232	1
0.7246	4
0.7259	2
0.7273	10
0.7287	10
More	3



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8016	CPM	0.7500	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.1833	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.3515	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.2516	CPM	0.7378	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**INVESTIGATE**
				8 most recent points outside 1 sigma.	**OK**

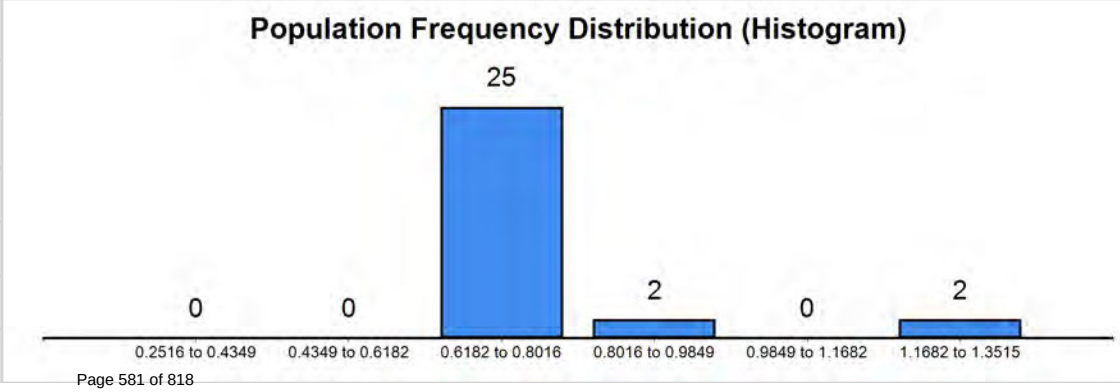
LB4200-D - BETA LONG BACKGROUND - DETECTOR C1

Process Date Range: 01/19/22 - 08/05/22



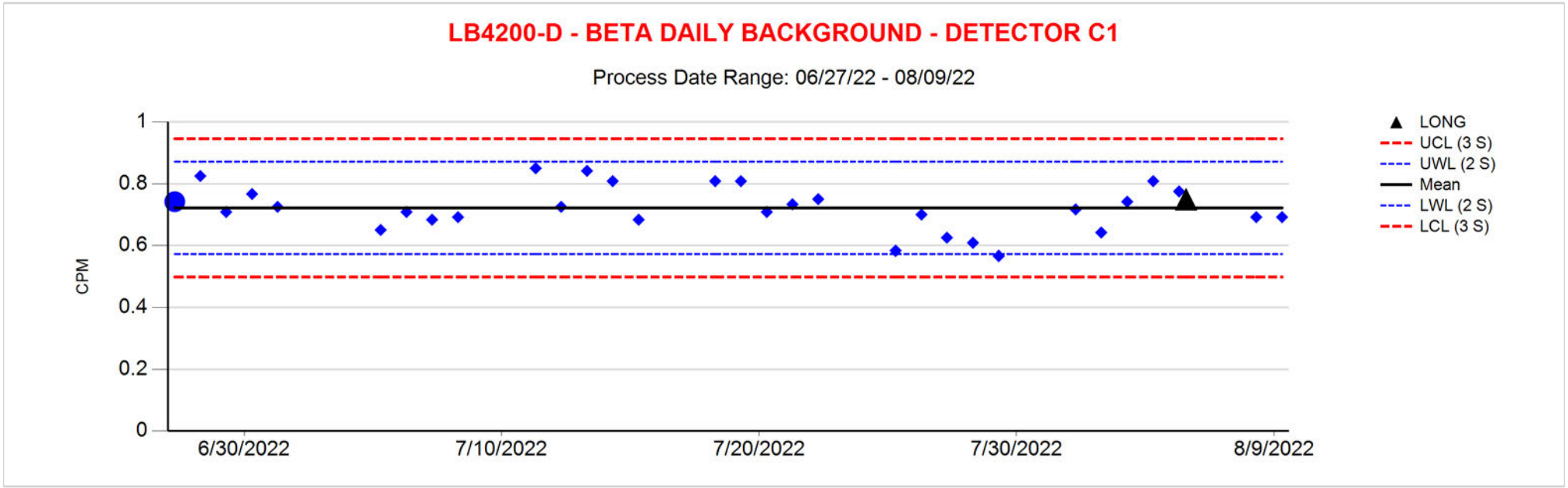
Statistical Process Control

Bin	Frequency
0.2516 to 0.4349	0
0.4349 to 0.6182	0
0.6182 to 0.8016	25
0.8016 to 0.9849	2
0.9849 to 1.1682	0
1.1682 to 1.3515	2



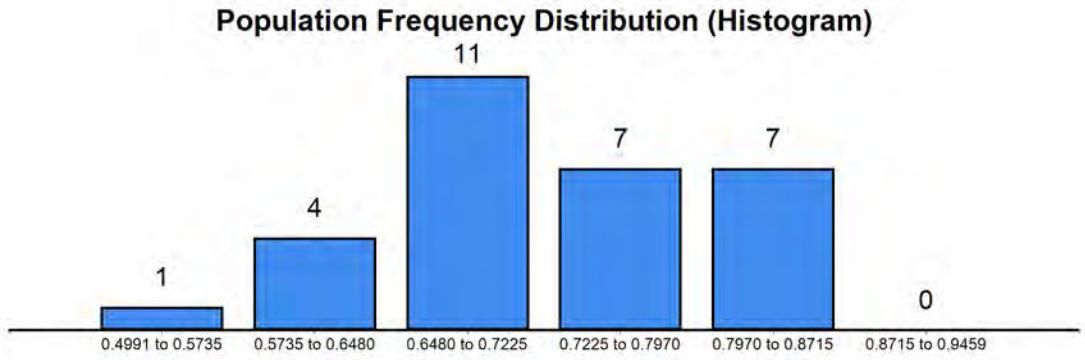
Beta Daily BKG - ARS1-B22-01103-09

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7225	Long B CPM	0.7500	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0745	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9459	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4991	CPM	0.6917	7 trending most recent points in a row.	**OK**
DER	0.7182	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



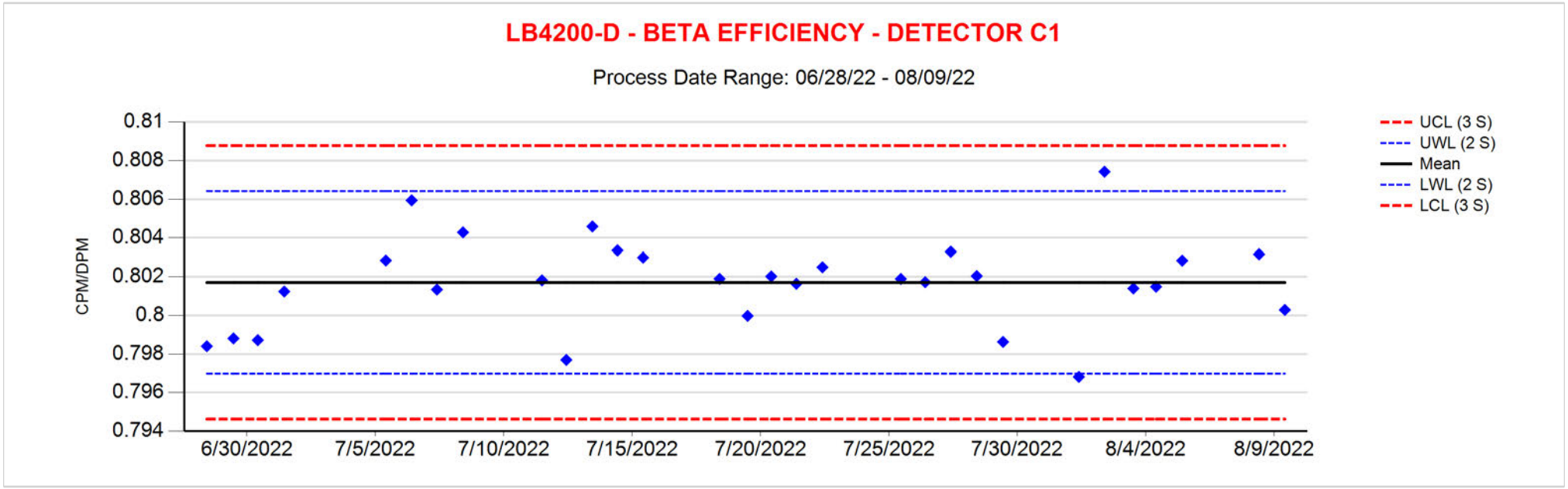
Statistical Process Control

Bin	Frequency
0.4991 to 0.5735	1
0.5735 to 0.6480	4
0.6480 to 0.7225	11
0.7225 to 0.7970	7
0.7970 to 0.8715	7
0.8715 to 0.9459	0



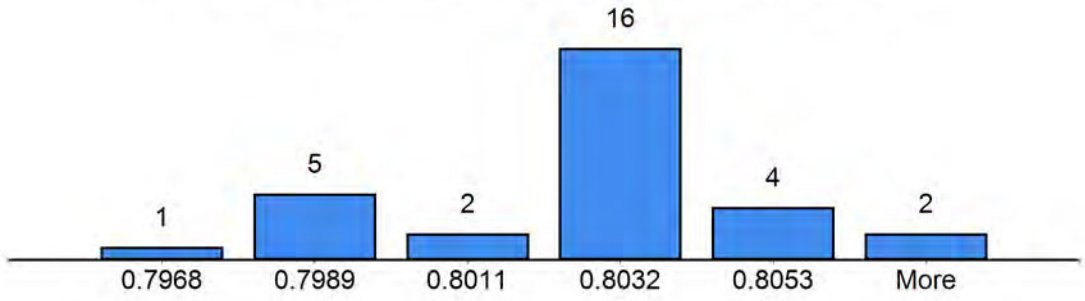
Beta Daily EFF - ARS1-B22-01103-09

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8017	CPM/DPM	0.8003	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0024			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.8088			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.7946			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



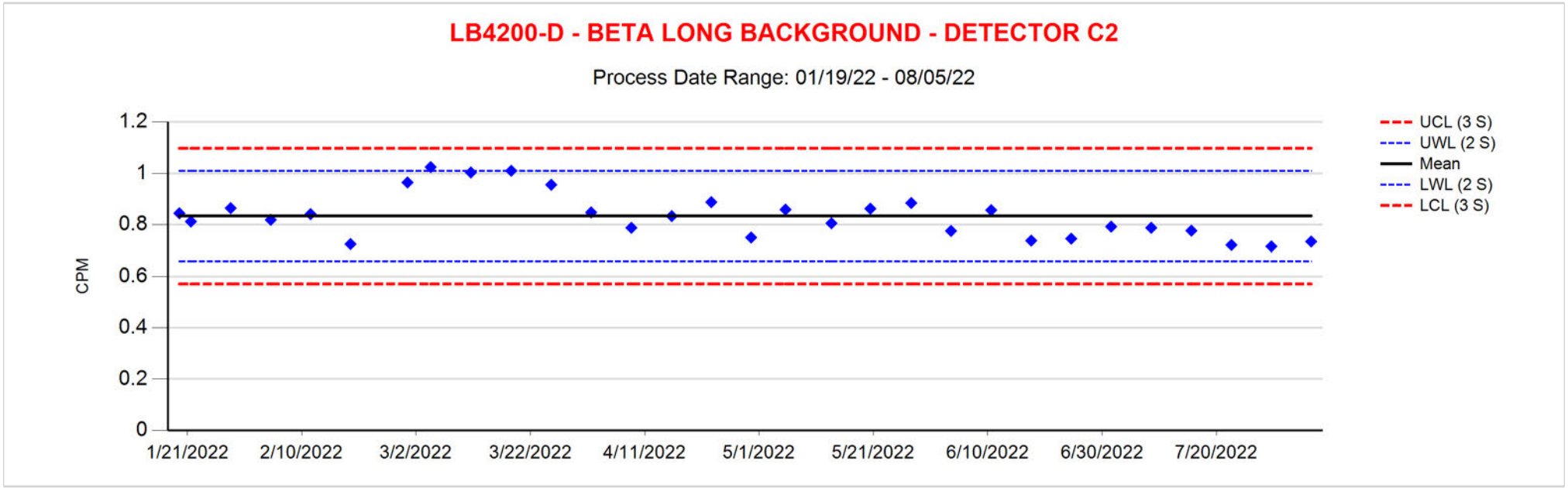
Statistical Process Control

Bin	Frequency
0.7968	1
0.7989	5
0.8011	2
0.8032	16
0.8053	4
More	2



Beta Long BKG - ARS1-B22-01103-10

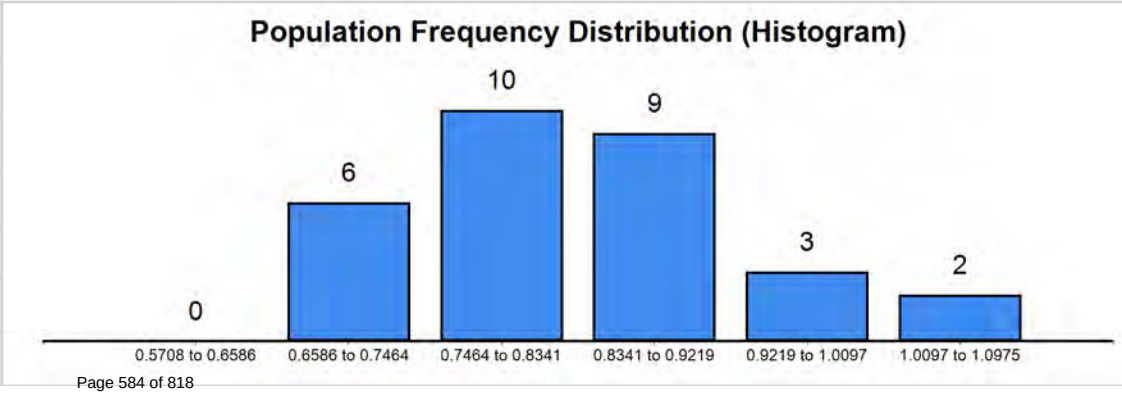
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8341	CPM	0.7344	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0878	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0975	Date	7/29/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5708	CPM	0.7156	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.5708 to 0.6586	0
0.6586 to 0.7464	6
0.7464 to 0.8341	10
0.8341 to 0.9219	9
0.9219 to 1.0097	3
1.0097 to 1.0975	2

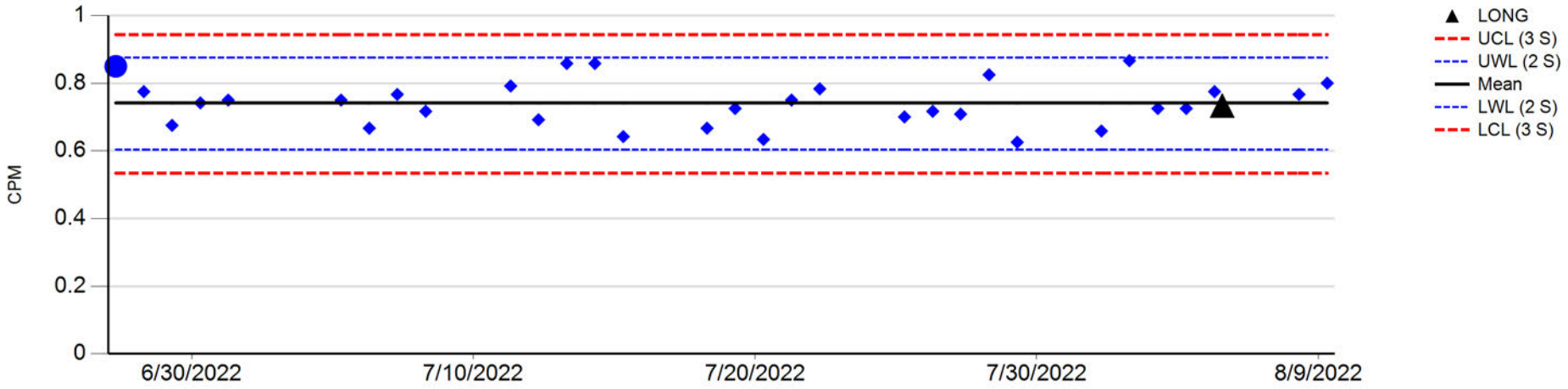


Beta Daily BKG - ARS1-B22-01103-10

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/5/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7394	Long B CPM	0.7344	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0682	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9439	Date	8/8/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5350	CPM	0.7667	7 trending most recent points in a row.	**OK**
DER	0.3796	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

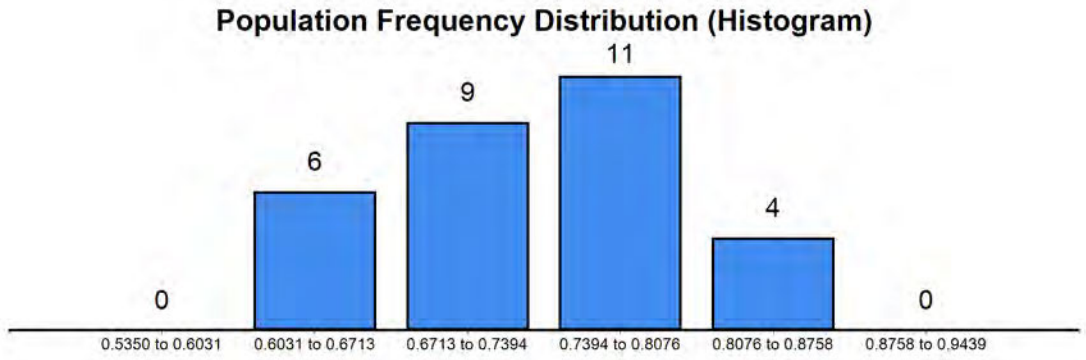
LB4200-D - BETA DAILY BACKGROUND - DETECTOR C2

Process Date Range: 06/27/22 - 08/09/22



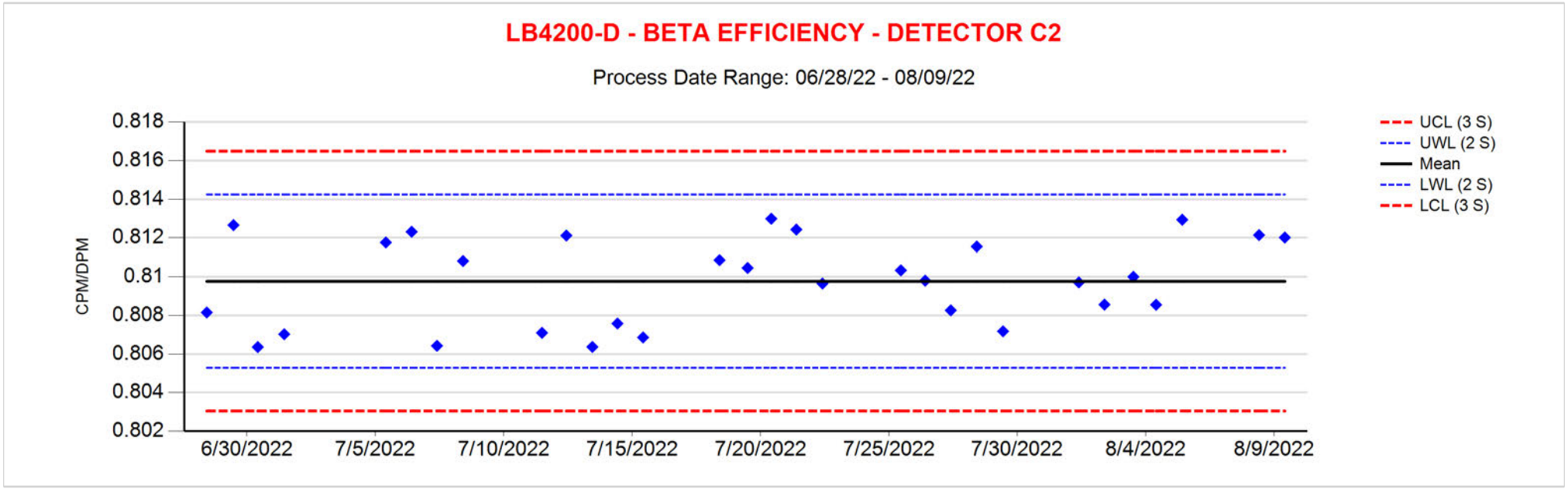
Statistical Process Control

Bin	Frequency
0.5350 to 0.6031	0
0.6031 to 0.6713	6
0.6713 to 0.7394	9
0.7394 to 0.8076	11
0.8076 to 0.8758	4
0.8758 to 0.9439	0



Beta Daily EFF - ARS1-B22-01103-10

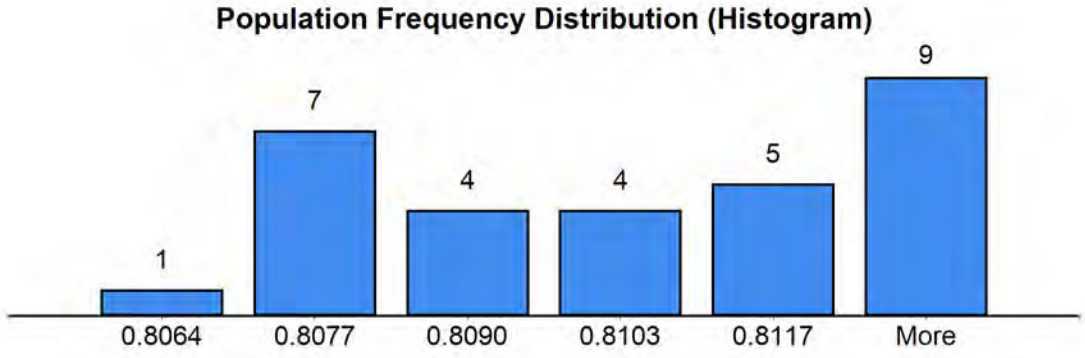
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/9/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8098	CPM/DPM	0.8120	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0022			2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.8165			4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.8030			7 trending most recent points in a row.	**OK**
				15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.8064	1
0.8077	7
0.8090	4
0.8103	4
0.8117	5
More	9



2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Strontium - Standards & Calibrations

ARS Aleut A

VERIFICATION DATE: 1/24/2022 9:55 *date counted*
STANDARD REFERENCE #: S-0370

Principal Radionuclide		Half Life, Years		Half Life, Days
Sr-90	*ENTER -->*		*OR -->*	1.04E+04
		2.850E+01		1.0410E+04

Radionuclide: Sr-90 — Dilution Reference Date: 1/24/2022 7:45

Dilution Activity: 20.42 pCi per gram ===> dpm/g: 45.33
Verif. Date Decay Corrected: 20.42 pCi per gram ===> dpm/g: 45.33

Minimum of 3 Required

Trial ID	Sample Counts	Count Time (min)	Detector	Efficiency	Bkg. (cpm)	Net Weight	Decay Corrected Activity Result (dpm/g)	Decay Corrected Activity Result (pCi/g)
S-0370-V1	2346.00	120	C2	0.4025	1.03	1.0068	45.71	20.59
S-0370-V2	2427.00	120	C3	0.4034	0.91	1.0062	47.59	21.44
S-0370-V3	2223.00	120	C4	0.4038	0.78	1.0059	43.69	19.68
S-0370-V4	2466.00	120	D1	0.4144	0.81	1.0073	47.30	21.30
S-0370-V5	2347.00	120	D2	0.4081	0.74	1.0071	45.79	20.62

Average	46.02	20.73
Two Sigma Uncertainty	3.05	1.37
10% Max *PASS* — Standard Deviation percent of known concentration	3.43%	3.43%
Target Activity	45.33	20.42
5% Max *PASS* — % Diff	1.52%	1.52%

Verification Expiration Date: January 24, 2023

Prepared & Counted By: [redacted] Date: 1-24-22

Verified & Approved By: [redacted] Date: 1-24-22

QC Approval: [redacted] Date: 1-24-22

Add / Edit *Secondary* Standards

Planning

Planning Comments	Create a Sr-90 LCS solution.
Target dpm/g (on dil. date)	45
Target Final Volume mL	1000.00
Appx mass g of Parent Sol'n	14.2119857325087
Appx vol ml of Parent Sol'n	
Expected Addition for Analysis g	1

Standards Preparation / Dilution

Secondary Solution #	S-0370
Dilution Date (New Ref Date)	01/24/2022 7:45
Ampoule, Empty (g)	
Ampoule/Solution Gross (g)	
Net Wt Removed (g)	
Transfer Container, empty (g)	13.139
Container Plus Solution(g)	27.438
Net Wt Transferred (g)	14.299
DPM Xferred On01/24/2022 7:45	45275.516884889
Diluent/matrix	0.1M HCl
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	262.77
Dilution Full Cont g (if measured)	1261.67
Dilution Final Volume ml (if measured)	1000
Final Dilution Density (g/mL)	0.9989
Final Dilution Measured Mass g	998.9

Parent Standard Data

Parent Solution Reference #	75186-526		
Parent Solution #	S-0160		
Parent Principal Radionuclide	Sr-90	Half Life (Days)	10409.625
Parent Reference Date	06/01/2007 12:00		
Parent Certified Act	4521.64378348029	Cert Act/Vol Units	dpm g
Parent Cert Act Uncert 1 Sigma	0.017		
Parent Sp. Gravity G/ML			
Parent Supplier	Analytics		
Parent Date Recvd	05/21/07		
Parent Received By	[redacted]		
Parent Cert Exp Date			
Parent Matrix	.1M HCL with 30 ug/g Sr carrier		
Certified dpm/g At Ref Date	4521.64378348029		
Certified dpm/g On 01/24/2022 7:45	3166.35026927525		
Parent Comments	Intermediate standard for creating LCS standards. Dilution performed as stated above by [redacted] -BJS 6/1/2007		
Parent Tech	[redacted]		
Is Primary	FALSE		
Is LCS	TRUE		
Is Tracer	FALSE		
Is Calib	FALSE		

Comments	Sr-90 LCS standard solution. Dilution performed as stated above by E Camp. -E Camp 1-24-2022
Final Dilution dpm/g	45.3253747971659
Final Dil New Ref Date/Time	01/24/2022 7:45

Add / Edit *Secondary* Standards

Planning

Planning Comments	
Target dpm/g (on dil. date)	45
Target Final Volume mL	1000.00
Appx mass g of Parent Sol'n	14.2119739033197
Appx vol ml of Parent Sol'n	
Expected Addition for Analysis g	1

Standards Preparation / Dilution

Secondary Solution #	S-0370
Dilution Date (New Ref Date)	1-24-22 0745
Ampoule, Empty (g)	
Ampoule/Solution Gross (g)	
Net Wt Removed (g)	
Transfer Container, empty (g)	13.139
Container Plus Solution(g)	27.436
Net Wt Transferred (g)	
DPM Xferred On01/24/2022 13:27	
Diluent/matrix	0.1M HCl
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	242.77
Dilution Full Cont g (if measured)	1261.47
Dilution Final Volume ml (if measured)	1000
Final Dilution Density (g/mL)	
Final Dilution Measured Mass g	
Comments	13.139 14.212 27.451 242.0057 0.1 HCl
Final Dilution dpm/g	
Final Dil New Ref Date/Time	01/24/2022 13:27

Parent Standard Data

Parent Solution Reference #	75186-526
Parent Solution #	S-0160
Parent Principal Radionuclide	Sr-90
Half Life (Days)	10409.625
Parent Reference Date	06/01/2007 12:00
Parent Certified Act	4521.64378348029
Cert Act/Vol Units	dpm g
Parent Cert Act Uncert 1 Sigma	0.017
Parent Sp. Gravity G/ML	
Parent Supplier	Analytics
Parent Date Recvd	05/21/07
Parent Received By	[redacted]
Parent Cert Exp Date	
Parent Matrix	.1M HCL with 30 ug/g Sr carrier
Certified dpm/g At Ref Date	4521.64378348029
Certified dpm/g On 01/24/2022 13:27	3166.30019559495
Parent Comments	Intermediate standard for creating LCS standards. Dilution performed as stated above by [redacted] -BJS 6/1/2007
Parent Tech	[redacted]
Is Primary	FALSE
Is LCS	TRUE
Is Tracer	FALSE
Is Calib	FALSE

ARS Aleut Analytical

Weight Spreadsheet for TWO Standards Verification

S-0121 Verification Weights

Tech:	GPR
Pippete:	RU07688
Scale ID:	P214062006
Standard 1 ID:	S-0121
Standard 2 ID:	S-0370

Sample ID	Std. Weight(g)
S-0121-V1	0.5075
S-0121-V2	0.5076
S-0121-V3	0.5077
S-0121-V4	0.5068
S-0121-V5	0.5066
S-0370-V1	1.0068
S-0370-V2	1.0062
S-0370-V3	1.0059
S-0370-V4	1.0073
S-0370-V5	1.0071

ARS Aleut Analytical

Weight Spreadsheet for TWO Standards Verification

Verification Weights	
Tech:	GPR
Pippete:	RU07688
Scale ID:	P214062006
Standard 1 ID:	S-0121
Standard 2 ID:	S-0370

Sample ID	Std. Weight(g)	
-V1	0.501	0.5075
-V2	0.504	0.5076
-V3	0.505	0.5077
-V4	0.508	0.5068
-V5	0.507	0.5066
-V1	0.999	1.0065
-V2	1.003	1.0062
-V3	1.005	1.0069
-V4	1.006	1.0073
-V5	1.002	1.0071

GEN 733
C 11160
Sr-90 STD VERIF
EEC

	Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
2344	C2	S-0370-V1	13	4692	120	1410	1/24/22 11:55
2427	C3	S-0370-V2	9	4854	120	1410	1/24/22 11:55
2223	C4	S-0370-V3	13	4446	120	1410	1/24/22 11:55
195582	A1	S-0121-V1	205	391764	120	1410	1/24/22 11:55
2466	D1	S-0370-V4	20	4932	120	1410	1/24/22 11:55
195071	A2	S-0121-V2	387	391002	120	1410	1/24/22 11:55
2347	D2	S-0370-V5	12	4694	120	1410	1/24/22 11:55
193731	A3	S-0121-V3	351	387462	120	1410	1/24/22 11:55
190540	A4	S-0121-V4	247	380860	120	1410	1/24/22 11:55
205187.5	C1	S-0121-V5	218	410375	120	1410	1/24/22 11:55

GEN 730
C 11160
LONG BKG
EEC

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
A1	A1-01	26	909	900	1410	1/22/22 5:31
A2	A2-01	40	825	900	1410	1/22/22 5:31
A3	A3-01	47	1020	900	1410	1/22/22 5:31
A4	A4-01	27	778	900	1410	1/22/22 5:31
C1	C1-01	38	780	900	1410	1/22/22 5:31
C2	C2-01	47	924	900	1410	1/22/22 5:31
C3	C3-01	33	816	900	1410	1/22/22 5:31
C4	C4-01	41	701	900	1410	1/22/22 5:31
D1	D1-01	59	727	900	1410	1/22/22 5:31
D2	D2-01	35	666	900	1410	1/22/22 5:31
D3	D3-01	29	784	900	1410	1/22/22 5:31
D4	D4-01	43	845	900	1410	1/22/22 5:32

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

75186-526

Sr-90 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

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

ISOTOPE:	Sr-90
ACTIVITY (Bq):	3.819 E4
HALF-LIFE:	28.79 years
CALIBRATION DATE:	May 15, 2007 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	1.7%

Impurities: γ-impurities <0.1%

5.02222 grams 0.1M HCl solution with 30 µg/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

P O NUMBER 07-0329, Item 1

SOURCE PREPARED BY: [redacted]

Q A APPROVED: [redacted]

Corporate Office Laboratory

LB4200
Sr/Y calibrations

Sr-90

ID	Standard ID	Standard Specific Activity (dpm/g)	reference date	Mass added (g)	Total Activtiy Added (Sr-90 in DPM) on reference date	carrier added (mg as Sr)	g SrNO3/ g Sr	carrier expected (mg SrNO3)	planchet gross (g)	planchet tare (g)	planchet net (mg)	Chemical Yield	separation date/time	count date/time	count midpoint	Sr-90 half life days
Sr- CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.4153	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 12:32	2/25/22 12:37 PM	10515.51
Sr- CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.4153	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 12:32	2/25/22 12:37 PM	10515.51
Sr- CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.4153	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 12:32	2/25/22 12:37 PM	10515.51
Sr- CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.4153	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 12:32	2/25/22 12:37 PM	10515.51
Sr- CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.4153	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 12:44	2/25/22 12:49 PM	10515.51
Sr- CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.4153	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 12:44	2/25/22 12:49 PM	10515.51
Sr- CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.4153	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 12:44	2/25/22 12:49 PM	10515.51
Sr- CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.4153	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 12:44	2/25/22 12:49 PM	10515.51
Sr- CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.4153	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 13:00	2/25/22 1:05 PM	10515.51
Sr- CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.4153	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 13:00	2/25/22 1:05 PM	10515.51
Sr- CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.4153	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 13:00	2/25/22 1:05 PM	10515.51
Sr- CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.4153	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 13:00	2/25/22 1:05 PM	10515.51
Sr- CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.4153	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 13:12	2/25/22 1:17 PM	10515.51
Sr- CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.4153	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 13:12	2/25/22 1:17 PM	10515.51
Sr- CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.4153	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 13:12	2/25/22 1:17 PM	10515.51
Sr- CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.4153	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 13:12	2/25/22 1:17 PM	10515.51
					7693.072			0.000			0.0	#DIV/0!			1/0/00 12:00 AM	10515.51
					7693.072			0.000			0.0	#DIV/0!			1/0/00 12:00 AM	10515.51

[redacted] 3-1-22

3-1-22

3-2-22

Sr-90

ID	Sr-90 decay days to count midpoint	Sr decay correction to count midpoint	Sr-90 activtiy at count midpoint (DPM)	Y-90 half-life days	Y-90 ingrowth days to count midpoint	Y-90 ingrowth	Y-90 Eff (from below)	sample counts	sample time	bkg counts	bkg time min	net CPM	Detector	Sr-90 Eff
Sr- CAL-01	0.53	0.99997	7640.7	2.667	0.1618	0.04119	0.43397	28089	10.0	585.999	900.0	2808.2489	A1	0.34966
Sr- CAL-02	0.53	0.99997	7666.9	2.667	0.1667	0.04240	0.44561	27778	10.0	576.999	900.0	2777.1589	A2	0.34334
Sr- CAL-03	0.53	0.99997	7723.1	2.667	0.1583	0.04032	0.42272	26415	10.0	606.996	900.0	2640.8256	A3	0.32489
Sr- CAL-04	0.53	0.99997	7771.4	2.667	0.1681	0.04274	0.42507	28314	10.0	567	900.0	2830.7700	A4	0.34608
Sr- CAL-01	0.53	0.99996	7640.7	2.667	0.1701	0.04326	0.41611	27391	10.0	802.998	900.0	2738.2078	B1	0.34006
Sr- CAL-02	0.53	0.99996	7666.9	2.667	0.1750	0.04447	0.42890	27176	10.0	686.997	900.0	2716.8367	B2	0.33535
Sr- CAL-03	0.53	0.99996	7723.1	2.667	0.1667	0.04240	0.42004	26597	10.0	698.004	900.0	2658.9244	B3	0.32660
Sr- CAL-04	0.53	0.99996	7771.4	2.667	0.1764	0.04481	0.42015	27758	10.0	608.004	900.0	2775.1244	B4	0.33852
Sr- CAL-01	0.55	0.99996	7640.7	2.667	0.1812	0.04602	0.39014	27310	10.0	576	900.0	2730.3600	C1	0.33920
Sr- CAL-02	0.55	0.99996	7666.9	2.667	0.1861	0.04722	0.48124	29696	10.0	651.996	900.0	2968.8756	C2	0.36420
Sr- CAL-03	0.55	0.99996	7723.1	2.667	0.1778	0.04516	0.45234	27793	10.0	561.996	900.0	2778.6756	C3	0.33958
Sr- CAL-04	0.55	0.99996	7771.4	2.667	0.1875	0.04757	0.45142	29175	10.0	627.003	900.0	2916.8033	C4	0.35414
Sr- CAL-01	0.55	0.99996	7640.7	2.667	0.1896	0.04808	0.44244	30110	10.0	610.002	900.0	3010.3222	D1	0.37248
Sr- CAL-02	0.55	0.99996	7666.9	2.667	0.1944	0.04929	0.46209	29501	10.0	604.998	900.0	2949.4278	D2	0.36161
Sr- CAL-03	0.55	0.99996	7723.1	2.667	0.1861	0.04722	0.42824	27011	10.0	566.001	900.0	2700.4711	D3	0.32966
Sr- CAL-04	0.55	0.99996	7771.4	2.667	0.1958	0.04963	0.42924	28636	10.0	613.998	900.0	2862.9178	D4	0.34737
	0.00	1.00000	#DIV/0!	2.667	0.0000	0.00000	0.42824					#DIV/0!		#DIV/0!
	0.00	1.00000	#DIV/0!	2.667	0.0000	0.00000	0.42924					#DIV/0!		#DIV/0!

Sr-90

ID	Standard ID	Standard Specific Activity (dpm/g)	reference date	Mass added (g)	Total Activtiy Added (Sr-90 in DPM) on reference date	carrier added (mg as Sr)	g SrNO3/ g Sr	carrier expected (mg SrNO3)	planchet gross (g)	planchet tare (g)	planchet net (mg)	Chemical Yield	separation date/time	count date/time	count midpoint	Sr-90 half-life days

Y-90

ID	Standard ID	Standard Specific Activity (dpm/g)	collection date	Mass added (g)	Total Activtiy Added (Sr-90 in DPM)	carrier added (mg)	g SrNO3/ g Sr	carrier expected (mg)	planchet gross (g)	planchet tare (g)	planchet net (mg)	Yield	separation date	count date	Sr-90 half-life days	Sr-90 decay days
Yt CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.4153	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 13:12	10515.51	0.36
Yt CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.415	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 13:12	10515.51	0.36
Yt CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.415	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 13:12	10515.51	0.37
Yt CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.415	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 13:12	10515.51	0.36
Yt CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.415	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 13:00	10515.51	0.36
Yt CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.415	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 13:00	10515.51	0.36
Yt CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.415	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 13:00	10515.51	0.37
Yt CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.415	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 13:00	10515.51	0.36
Yt CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.415	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 12:44	10515.51	0.36
Yt CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.415	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 12:44	10515.51	0.36
Yt CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.415	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 12:44	10515.51	0.37
Yt CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.415	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 12:44	10515.51	0.36
Yt CAL-01	S-0121	7662.422	2/25/2022	1.012	7754.371	5.0000	2.415	12.077	7.9511	7.9392	11.9	0.9854	2/25/2022 8:44	2/25/22 12:32	10515.51	0.36
Yt CAL-02	S-0121	7662.422	2/25/2022	1.007	7716.059	5.0000	2.415	12.077	7.9694	7.9574	12.0	0.9937	2/25/2022 8:37	2/25/22 12:32	10515.51	0.36
Yt CAL-03	S-0121	7662.422	2/25/2022	1.006	7708.397	5.0000	2.415	12.077	7.8872	7.8751	12.1	1.0019	2/25/2022 8:49	2/25/22 12:32	10515.51	0.37
Yt CAL-04	S-0121	7662.422	2/25/2022	1.004	7693.072	5.0000	2.415	12.077	7.8317	7.8195	12.2	1.0102	2/25/2022 8:35	2/25/22 12:32	10515.51	0.36

Sr-90

ID	Sr-90 decay days to count midpoint	Sr decay correction to count midpoint	Sr-90 activtiy at count midpoint (DPM)	Y-90 half-life days	Y-90 ingrowth days to count midpoint	Y-90 ingrowth	Y-90 Eff (from below)	sample counts	sample time	bkg counts	bkg time min	net CPM	Detector	Sr-90 Eff

Y-90

ID	Sr decay correction to separation	count midpoint	Sr-90 activtiy at count separation (DPM)	Y-90 decay days	Y-90 half-life days	Y-90 Decay	Y-90 Activity	sample counts	sample time	bkg counts	bkg time min	net CPM	Detector	Y-90 Eff
Yt CAL-01	0.99998	2/25/22 1:17 PM	7640.8	0.1896	2.667	0.951916	7273.587	31572	10.0	585.999	900.0	3156.5489	A1	0.43397
Yt CAL-02	0.99998	2/25/22 1:17 PM	7667.0	0.1944	2.667	0.950714	7289.254	32488	10.0	576.999	900.0	3248.1589	A2	0.44561
Yt CAL-03	0.99998	2/25/22 1:17 PM	7723.2	0.1861	2.667	0.952776	7358.621	31113	10.0	606.996	900.0	3110.6256	A3	0.42272
Yt CAL-04	0.99998	2/25/22 1:17 PM	7771.5	0.1958	2.667	0.950371	7385.997	31402	10.0	567	900.0	3139.5700	A4	0.42507
Yt CAL-01	0.99998	2/25/22 1:05 PM	7640.8	0.1812	2.667	0.953980	7289.359	30341	10.0	802.998	900.0	3033.2078	B1	0.41611
Yt CAL-02	0.99998	2/25/22 1:05 PM	7667.0	0.1861	2.667	0.952776	7305.061	31339	10.0	686.997	900.0	3133.1367	B2	0.42890
Yt CAL-03	0.99998	2/25/22 1:05 PM	7723.2	0.1778	2.667	0.954842	7374.578	30984	10.0	698.004	900.0	3097.6244	B3	0.42004
Yt CAL-04	0.99998	2/25/22 1:05 PM	7771.5	0.1875	2.667	0.952432	7402.013	31106	10.0	608.004	900.0	3109.9244	B4	0.42015
Yt CAL-01	0.99998	2/25/22 12:49 PM	7640.8	0.1701	2.667	0.956739	7310.442	28527	10.0	576	900.0	2852.0600	C1	0.39014
Yt CAL-02	0.99998	2/25/22 12:49 PM	7667.0	0.1750	2.667	0.955531	7326.189	35264	10.0	651.996	900.0	3525.6756	C2	0.48124
Yt CAL-03	0.99998	2/25/22 12:49 PM	7723.2	0.1667	2.667	0.957603	7395.907	33461	10.0	561.996	900.0	3345.4756	C3	0.45234
Yt CAL-04	0.99998	2/25/22 12:49 PM	7771.5	0.1764	2.667	0.955186	7423.422	33518	10.0	627.003	900.0	3351.1033	C4	0.45142
Yt CAL-01	0.99998	2/25/22 12:37 PM	7640.8	0.1618	2.667	0.958814	7326.294	32421	10.0	610.002	900.0	3241.4222	D1	0.44244
Yt CAL-02	0.99998	2/25/22 12:37 PM	7667.0	0.1667	2.667	0.957603	7342.075	33934	10.0	604.998	900.0	3392.7278	D2	0.46209
Yt CAL-03	0.99998	2/25/22 12:37 PM	7723.2	0.1583	2.667	0.959680	7411.945	31747	10.0	566.001	900.0	3174.0711	D3	0.42824
Yt CAL-04	0.99998	2/25/22 12:37 PM	7771.5	0.1681	2.667	0.957258	7439.519	31940	10.0	613.998	900.0	3193.3178	D4	0.42924

Sr Yield Calculation Sheet

ARS Aleut Analytical

Sample	Empty	Filled	Yield(mg)	% Recovery
1	7.9392	7.9511	11.9000	99
2	7.9574	7.9694	12.0000	99
3	7.8751	7.8872	12.1000	100
4	7.8195	7.8317	12.2000	101
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

Sr (5 ml)	Sr Spike	Time	Echeco	Pipette
	22-00122	2-25-22	1119341663	RU07688
1.012 g	1 mL	8:44		
1.007 g		8:37		
1.006 g		8:49		
1.004 g		8:35		

Apex-Alpha/Beta™

CANBERRA

Background Report

Batch Name: Batch_2843
Procedure: Background
Calibration: Background

Count Date: 2/18/2022 12:25:16 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A1	4.4444E-002 +/- 7.0273E-003	6.5111E-001 +/- 2.6897E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A2	3.8889E-002 +/- 6.5734E-003	6.4111E-001 +/- 2.6690E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A3	3.7778E-002 +/- 6.4788E-003	6.7444E-001 +/- 2.7375E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A4	6.0000E-002 +/- 8.1650E-003	6.3000E-001 +/- 2.6458E-002

Batch Name: Batch_2844
Procedure: Background
Calibration: Background

Count Date: 2/18/2022 12:25:17 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B1	6.4444E-002 +/- 8.4620E-003	8.9222E-001 +/- 3.1486E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B2	5.3333E-002 +/- 7.6980E-003	7.6333E-001 +/- 2.9123E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B3	5.5556E-002 +/- 7.8567E-003	7.7556E-001 +/- 2.9355E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B4	4.6667E-002 +/- 7.2008E-003	6.7556E-001 +/- 2.7397E-002

Batch Name: Batch_2845
Procedure: Background
Calibration: Background

Count Date: 2/18/2022 12:25:14 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C1	3.2222E-002 +/- 5.9835E-003	6.4000E-001 +/- 2.6667E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C2	5.2222E-002 +/- 7.6174E-003	7.2444E-001 +/- 2.8371E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C3	5.8889E-002 +/- 8.0890E-003	6.2444E-001 +/- 2.6341E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C4	4.2222E-002 +/- 6.8493E-003	6.9667E-001 +/- 2.7822E-002

Batch Name: Batch_2846
Procedure: Background
Calibration: Background

Count Date: 2/18/2022 12:25:18 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D1	6.1111E-002 +/- 8.2402E-003	6.7778E-001 +/- 2.7442E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D2	4.7778E-002 +/- 7.2860E-003	6.7222E-001 +/- 2.7330E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D3	3.0000E-002 +/- 5.7735E-003	6.2889E-001 +/- 2.6434E-002

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D4	6.3333E-002 +/- 8.3887E-003	6.8222E-001 +/- 2.7532E-002

Apex-Alpha/Beta™

CANBERRA

Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Standard	Count Time	Run Date & Time
LB 4200 A	2913	A1	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-01	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 A	2913	A2	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-02	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 A	2913	A3	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-03	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 A	2913	A4	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-04	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 D	2916	D1	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-05	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 D	2916	D2	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-06	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 D	2916	D3	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-07	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM
LB 4200 D	2916	D4	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-08	Sr-90/Y-90 Calibration		600	2/25/2022 12:32:19 PM

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Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Standard	Count Time	Run Date & Time
LB 4200 B	2913	B1	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-05	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 B	2913	B2	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-06	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 B	2913	B3	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-07	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 B	2913	B4	Sr-90 LB4200 calibration A & B - 2-25-22 2	Sr-90 cal-08	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 C	2916	C1	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-01	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 C	2916	C2	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-02	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 C	2916	C3	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-03	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM
LB 4200 C	2916	C4	Y-90 LB4200 calibration C & D - 2-25-22 2	Y-90 cal-04	Sr-90/Y-90 Calibration		600	2/25/2022 12:44:31 PM

Apex-Alpha/Beta™

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Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Standard	Count Time	Run Date & Time
LB 4200 B	2915	B1	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-05	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 B	2915	B2	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-06	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 B	2915	B3	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-07	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 B	2915	B4	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-08	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 C	2914	C1	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-01	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 C	2914	C2	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-02	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 C	2914	C3	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-03	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM
LB 4200 C	2914	C4	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-04	Sr-90/Y-90 Calibration		600	2/25/2022 1:00:32 PM

Apex-Alpha/Beta™

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Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Standard	Count Time	Run Date & Time
LB 4200 A	2915	A1	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-01	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 A	2915	A2	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-02	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 A	2915	A3	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-03	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 A	2915	A4	Y-90 LB4200 calibration A & B - 2-25-22 2	Y-90 cal-04	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 D	2914	D1	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-05	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 D	2914	D2	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-06	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 D	2914	D3	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-07	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM
LB 4200 D	2914	D4	Sr-90 LB4200 calibration C & D - 2-25-22 2	Sr-90 cal-08	Sr-90/Y-90 Calibration		600	2/25/2022 1:12:31 PM

GPC D 1155921 Batch Report

Batch Name: Sr-90 LB4200 calibration A & B - 2-25-22 2
Calibration: Background
Procedure: Sr-90/Y-90 Calibration
Preset Count Time (min): 10
Batch ID: 2913
Count Mode: Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
Sr-90 cal-01	A1	235	28089	132.543923910145	6872.98877721911	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-02	A2	257	27778	142.941053260257	6660.28235000946	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-03	A3	213	26415	126.698936057707	6620.78230461453	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-04	A4	247	28314	142.666787872403	7147.31445262781	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-05	B1	482	27391	278.752598117741	6920.71350579457	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-06	B2	448	27176	255.851590890306	6647.40743586032	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-07	B3	394	26597	229.381156488721	6782.30200996277	600	1230	2/25/2022 12:32:27 PM
Sr-90 cal-08	B4	442	27758	252.637319711151	6938.35524427931	600	1230	2/25/2022 12:32:27 PM

GPC D 1155921 Batch Report

Batch Name: Sr-90 LB4200 calibration C & D - 2-25-22 2 **Calibration:** Background

Procedure: Sr-90/Y-90 Calibration **Preset Count Time (min):** 10

Batch ID: 2914 **Count Mode:** Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
Sr-90 cal-01	C1	130	27310	70.8893028383472	6303.43817884813	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-02	C2	573	29696	327.076257051308	7124.71229135114	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-03	C3	424	27793	240.638148786547	6647.31074520444	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-04	C4	485	29175	248.379848884315	6601.12233456405	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-05	D1	482	30110	254.956379645119	7011.74389408193	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-06	D2	549	29501	283.426695487347	6727.52938002495	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-07	D3	506	27011	288.2068539221	6609.09324848414	600	1290	2/25/2022 1:00:39 PM
Sr-90 cal-08	D4	546	28636	310.660703828033	7094.09329005772	600	1290	2/25/2022 1:00:39 PM

GPC D 1155921 Batch Report

Batch Name: Y-90 LB4200 calibration A & B - 2-25-22 2
Calibration: Background
Procedure: Sr-90/Y-90 Calibration
Preset Count Time (min): 10
Batch ID: 2915
Count Mode: Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
Y-90 cal-01	A1	279	31572	157.360658599704	7725.23057689351	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-02	A2	214	32488	119.024845905428	7789.59079080954	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-03	A3	196	31113	116.586814400519	7798.31155947272	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-04	A4	265	31402	153.063557838813	7926.81953950055	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-05	B1	261	30341	150.94279690608	7666.07164686624	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-06	B2	281	31339	160.478341607536	7665.70141420469	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-07	B3	255	30984	148.457347473665	7900.99806281484	600	1230	2/25/2022 1:00:42 PM
Y-90 cal-08	B4	227	31106	129.748125734007	7775.21717085353	600	1230	2/25/2022 1:00:42 PM

GPC D 1155921 Batch Report

Batch Name: Y-90 LB4200 calibration C & D - 2-25-22 2 **Calibration:** Background

Procedure: Sr-90/Y-90 Calibration **Preset Count Time (min):** 10

Batch ID: 2916 **Count Mode:** Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
Y-90 cal-01	C1	60	28527	32.7181397715449	6584.33470992313	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-02	C2	251	35264	143.274241744989	8460.59584597948	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-03	C3	185	33461	104.995418692243	8002.93832422861	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-04	C4	231	33518	118.3005053449	7583.76755475297	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-05	D1	81	32421	42.8453667038478	7549.90862803156	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-06	D2	120	33934	61.9511902704583	7738.44893331638	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-07	D3	95	31747	54.1099824557302	7767.90505200199	600	1290	2/25/2022 12:32:27 PM
Y-90 cal-08	D4	95	31940	54.0526865634856	7912.60440300473	600	1290	2/25/2022 12:32:27 PM

R22-00122: Strontium Carrier (5mg/mL)

Supplier	Prepared at ARS	Expiration Date	02/09/23
Prepared Date	02/11/22	Prepared By	GPR
Volume	500	Vol. Units	mL
Is Secondary	TRUE		

Parent Reagents

Reagent ID	Name	Lot Number	Expiration Date	Amount	Units
R19-00518	Strontium Nitrate (Reagent Grade)	MKCK0006	5/8/2024	6.039	g
R22-00109	Nitric Acid (0.1N)		2/9/2023	500	mL

Support Equipment

Equipment Type	Lot/Serial/Batch	Comments
Balance	T0350192 (Soil LAB)	

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Radium-226 Raw Data

Analytical Batch Report

Analysis Batch ID ARS1-B22-01124

Procedure PALA-RAD-008 **Analysis** GPC-RA226-AF **Prep** N/A

Description Radium-226 in Air Filter

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01124-01	LCS	B-31724										
ARS1-B22-01124-02	LCSD	B-31725										
ARS1-B22-01124-03	MBL											
ARS1-B22-01124-04	TRG				**ARS1-22-01492**	001	1	AF		FB-070722		08/22/22
ARS1-B22-01124-05	TRG				**ARS1-22-01492**	002	1	AF		MSB01-070722		08/22/22
ARS1-B22-01124-06	TRG				**ARS1-22-01492**	003	1	AF		MSB02-070722		08/22/22
ARS1-B22-01124-07	TRG				**ARS1-22-01492**	004	1	AF		MSB113A-070722		08/22/22
ARS1-B22-01124-08	TRG				**ARS1-22-01492**	005	1	AF		MSB01-071122		08/22/22
ARS1-B22-01124-09	TRG				**ARS1-22-01492**	006	1	AF		MSB02-071122		08/22/22
ARS1-B22-01124-10	TRG				**ARS1-22-01492**	007	1	AF		MSB113A-071122		08/22/22

Analytical Batch Report

Analysis Batch ID ARS1-B22-01124

Procedure PALA-RAD-008 **Analysis** GPC-RA226-AF **Prep** N/A

Description Radium-226 in Air Filter

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Matrix	Holding Deadline	Client ID	Group Name	Lab Deadline
ARS1-B22-01124-01	LCS	B-31724										
ARS1-B22-01124-02	LCSD	B-31725										
ARS1-B22-01124-03	MBL											
ARS1-B22-01124-04	TRG		0.2	421068	**ARS1-22-01492**	001	1	AF		FB-070722		08/22/22
ARS1-B22-01124-05	TRG		16020	421069	**ARS1-22-01492**	002	1	AF		MSB01-070722		08/22/22
ARS1-B22-01124-06	TRG		17316	421070	**ARS1-22-01492**	003	1	AF		MSB02-070722		08/22/22
ARS1-B22-01124-07	TRG		16344	421071	**ARS1-22-01492**	004	1	AF		MSB113A-070722		08/22/22
ARS1-B22-01124-08	TRG		69636	421072	**ARS1-22-01492**	005	1	AF		MSB01-071122		08/22/22
ARS1-B22-01124-09	TRG		69468	421073	**ARS1-22-01492**	006	1	AF		MSB02-071122		08/22/22
ARS1-B22-01124-10	TRG		69492	421074	**ARS1-22-01492**	007	1	AF		MSB113A-071122		08/22/22

Technical Note Report

ABATCH	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

#	Date	Dept	Technical Note	User ID
1	08/12/2022 1:05 PM	CHEMISTRY	Gravimetric yield below acceptance limits for batch samples 8 and 10.	LCOPELAND

LCS Report
Analytical Batch: ARS1-B22-01124

Blind ID	ABatch Sample ID	Blind Group	Std ID	Isotope	Exp Addition (g)	Expected Value (pCi/g)	Empty Wt (g)	Gross Wt (g)	Net Wt (g)	Expected Value CT (pCi/g)	Mid Point Count Date	Known Value (pCi)	User ID	Mod Date
B-31724	ARS1-B22-01124-01	B-Ra226	S-0307	Ra-226	1	26.84274	0.952	1.983	1.0310	26.84248	08/19/2022	27.67460	[redacted]	08/11/2022
B-31725	ARS1-B22-01124-02	B-Ra226	S-0307	Ra-226	1	26.84274	0.97	2.001	1.0310	26.84248	08/19/2022	27.67460		08/11/2022

PALA-RAD-008

Alpha Emitting Radium Isotopes in Water

Preparation Date: 08/10/2022 14:10
Prepared By: LCOPELAND

Procedure Data

ABatch Sample ID	Type	SDG/Fraction	ICOC ID	Aliquot Vol	Aliquot Units	Barium Carrier (16mg/ml)	First Barium Precip Date	Second Barium Precip Date	Barium Yield Planchette Empty Wt (mg)	Barium Yield Planchette Filled Wt (mg)
ARS1-B22-01124-01	LCS			1.0000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6469	7.6908
ARS1-B22-01124-02	LCSD			1.0000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6279	7.6706
ARS1-B22-01124-03	MBL			1.0000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6665	7.7047
ARS1-B22-01124-04	TRG	ARS1-22-01492-001	422194	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6535	7.6812
ARS1-B22-01124-05	TRG	ARS1-22-01492-002	422195	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6511	7.6900
ARS1-B22-01124-06	TRG	ARS1-22-01492-003	422196	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6275	7.6530
ARS1-B22-01124-07	TRG	ARS1-22-01492-004	422197	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6482	7.6726
ARS1-B22-01124-08	TRG	ARS1-22-01492-005	422198	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6485	7.6699
ARS1-B22-01124-09	TRG	ARS1-22-01492-006	422199	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6326	7.6680
ARS1-B22-01124-10	TRG	ARS1-22-01492-007	422200	0.2000	Sample	R22-00412	8/11/2022 11:55:00 AM	8/12/2022 11:10:00 AM	7.6897	7.7094

Reagent Amounts

ABatch Sample ID	Type	SDG/Fraction	14.2 - 1L ALIQUOT - Buffering - Citric Acid 1M (mL)
ARS1-B22-01124-01	LCS		5.00
ARS1-B22-01124-02	LCSD		5.00
ARS1-B22-01124-03	MBL		5.00
ARS1-B22-01124-04	TRG	ARS1-22-01492-001	5.00
ARS1-B22-01124-05	TRG	ARS1-22-01492-002	5.00
ARS1-B22-01124-06	TRG	ARS1-22-01492-003	5.00
ARS1-B22-01124-07	TRG	ARS1-22-01492-004	5.00
ARS1-B22-01124-08	TRG	ARS1-22-01492-005	5.00
ARS1-B22-01124-09	TRG	ARS1-22-01492-006	5.00
ARS1-B22-01124-10	TRG	ARS1-22-01492-007	5.00

Reagent Tracking

Procedure Section	Reagent ID
14.1 - Air Filter Leaching	R22-00553
14.6 - Dissolve PPT	R22-00536
14.2 - 1L ALIQUOT - Buffering	R22-00449
14.2 - 1L ALIQUOT - Carrier 1	R22-00408
14.2 - 1L ALIQUOT - Carrier 2	R22-00412
14.7 - PPT	R22-00465
14.7 - Acidify (DROPWISE UNTIL RED + 1mL MORE)	R21-00078
14.3, 14.4 & 14.5 - PPT	R22-00476
14.6 - pH adjustment (A FEW DROPS)	R22-00565

Support Equipment

Equipment Type	Serial/Batch/Lot	Comments
Pipette	PU29204	
Pipette Tip	5mL VWR 19480271	
Balance	T0350192 (Soil LAB)	
Fume Hood	030807171-B (WET LAB)	
Hot Block	#10 SN 143474 (Radiochem)	
Planchette	Lot 05-06-2022 (2 inch)	
Hot Block	#12 SN 145414 (Radiochem)	
Balance	1114341668 (RAD LAB)	

Calculation Report
ARS1-B22-01124

ARS Aleut Analytical

Analytical Batch ID	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Client ID	Run	Isotope	ACT	CSU 1s	CSU 2s	MDC	DLC	CU 1s	CU 2s	MCL	Result Units
ARS1-B22-01124-01	LCS					Ra-226	26.18930	2.16608	4.24552	0.10222	0.03942	0.47605	0.93306		pCi/sample
ARS1-B22-01124-02	LCSD					Ra-226	28.24622	2.33291	4.57250	0.09201	0.03412	0.49820	0.97647		pCi/sample
ARS1-B22-01124-03	MBL					Ra-226	0.14708	0.04493	0.08807	0.09526	0.03434	0.04334	0.08494		pCi/sample
ARS1-B22-01124-04	TRG	ARS1-22-01492	001	FB-070722	1	Ra-226	0.44220	0.22547	0.44192	0.65638	0.24340	0.22263	0.43635		pCi/sample
ARS1-B22-01124-05	TRG	ARS1-22-01492	002	MSB01-070722	1	Ra-226	0.59570	0.20688	0.40548	0.49783	0.18585	0.20122	0.39438		pCi/sample
ARS1-B22-01124-06	TRG	ARS1-22-01492	003	MSB02-070722	1	Ra-226	0.91024	0.30764	0.60297	0.73306	0.27539	0.29874	0.58554		pCi/sample
ARS1-B22-01124-07	TRG	ARS1-22-01492	004	MSB113A-070722	1	Ra-226	0.20020	0.23404	0.45871	0.86130	0.32357	0.23348	0.45762		pCi/sample
ARS1-B22-01124-08	TRG	ARS1-22-01492	005	MSB01-071122	1	Ra-226	1.35982	0.45308	0.88803	1.09624	0.42075	0.43959	0.86160		pCi/sample
ARS1-B22-01124-09	TRG	ARS1-22-01492	006	MSB02-071122	1	Ra-226	0.82609	0.24444	0.47911	0.51974	0.19134	0.23518	0.46096		pCi/sample
ARS1-B22-01124-10	TRG	ARS1-22-01492	007	MSB113A-071122	1	Ra-226	1.16591	0.39405	0.77234	0.93897	0.35275	0.38266	0.75001		pCi/sample

Calculated By [redacted] on 9/1/2022 2:17:35 PM

Calculation Report
ARS1-B22-01124

Analytical Batch ID	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Tracer Recovery	Chem Recovery	Sample Counts	Sample Count Mins	BKG Counts	BKG Count Mins	EFF	ALIQ	Sample Coll Date	Mid Point Count Date
ARS1-B22-01124-01	LCS				80.2%	3041.000000	120	51.000000	900	0.17200	1	8/19/2022	8/19/2022
ARS1-B22-01124-02	LCSD				78.0%	3225.000000	120	37.000000	900	0.17400	1	8/19/2022	8/19/2022
ARS1-B22-01124-03	MBL				69.8%	19.000000	120	30.000000	900	0.17400	1	8/10/2022	8/19/2022
ARS1-B22-01124-04	TRG	ARS1-22-01492	001		50.6%	12.000000	120	37.000000	900	0.18800	0.2	7/7/2022	8/19/2022
ARS1-B22-01124-05	TRG	ARS1-22-01492	002		71.0%	18.000000	120	39.000000	900	0.18000	0.2	7/8/2022	8/19/2022
ARS1-B22-01124-06	TRG	ARS1-22-01492	003		46.6%	19.000000	120	41.000000	900	0.19000	0.2	7/8/2022	8/19/2022
ARS1-B22-01124-07	TRG	ARS1-22-01492	004		44.6%	8.000000	120	41.000000	900	0.16900	0.2	7/8/2022	8/19/2022
ARS1-B22-01124-08	TRG	ARS1-22-01492	005		39.1%	21.000000	120	49.000000	900	0.16200	0.2	7/15/2022	8/19/2022
ARS1-B22-01124-09	TRG	ARS1-22-01492	006		64.6%	21.000000	120	35.000000	900	0.18200	0.2	7/15/2022	8/19/2022
ARS1-B22-01124-10	TRG	ARS1-22-01492	007		36.0%	19.000000	120	41.000000	900	0.19200	0.2	7/15/2022	8/19/2022

Calculated By [redacted] on 9/1/2022 2:17:35 PM

Calculation Report
ARS1-B22-01124

Analytical Batch ID	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	UCF	ACF	Gross Count Rate	BKG Count Rate	Net Count Rate	Plating Recovery	Detector ID	Instrument keV	Nuclide Abundance	Tracer Isotope	Tracer Ref Date
ARS1-B22-01124-01	LCS			2.22	1	25.34167	0.05667	25.28500	1	B1				
ARS1-B22-01124-02	LCSD			2.22	1	26.87500	0.04111	26.83389	1	B2				
ARS1-B22-01124-03	MBL			2.22	1	0.15833	0.03333	0.12500	1	B3				
ARS1-B22-01124-04	TRG	ARS1-22-01492	001	2.22	1	0.10000	0.04111	0.05889	1	B4				
ARS1-B22-01124-05	TRG	ARS1-22-01492	002	2.22	1	0.15000	0.04333	0.10667	1	C1				
ARS1-B22-01124-06	TRG	ARS1-22-01492	003	2.22	1	0.15833	0.04556	0.11278	1	C2				
ARS1-B22-01124-07	TRG	ARS1-22-01492	004	2.22	1	0.06667	0.04556	0.02111	1	C3				
ARS1-B22-01124-08	TRG	ARS1-22-01492	005	2.22	1	0.17500	0.05444	0.12056	1	C4				
ARS1-B22-01124-09	TRG	ARS1-22-01492	006	2.22	1	0.17500	0.03889	0.13611	1	D1				
ARS1-B22-01124-10	TRG	ARS1-22-01492	007	2.22	1	0.15833	0.04556	0.11278	1	D2				

Calculated By: [redacted] on 9/1/2022 2:17:35 PM

Calculation Report
ARS1-B22-01124

Analytical Batch ID	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Halflife1	Halflife2	Halflife3	Delta T1	Delta T2	Delta T3	DF1	DF2	DF3	DF4	IF1	IF2
ARS1-B22-01124-01	LCS			0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-02	LCSD			0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-03	MBL			0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-04	TRG	ARS1-22-01492	001	0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-05	TRG	ARS1-22-01492	002	0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-06	TRG	ARS1-22-01492	003	0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-07	TRG	ARS1-22-01492	004	0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-08	TRG	ARS1-22-01492	005	0.25625	2100.00000	3.82000	6.97847			1.00000				3.15435	
ARS1-B22-01124-09	TRG	ARS1-22-01492	006	0.25625	2100.00000	3.82000	6.97917			1.00000				3.15445	
ARS1-B22-01124-10	TRG	ARS1-22-01492	007	0.25625	2100.00000	3.82000	6.97917			1.00000				3.15445	

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Calculation Report
ARS1-B22-01124

Analytical Batch ID	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	TPU F1	TPU F2	TPU F3	TPU F4	TPU F5	TPU F6	Sys Err	K Val	K MDC	BP_DL	BP_MDC	Sb
ARS1-B22-01124-01	LCS			0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.96547	115.85649			
ARS1-B22-01124-02	LCSD			0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.95000	113.99992			
ARS1-B22-01124-03	MBL			0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.84988	101.98587			
ARS1-B22-01124-04	TRG	ARS1-22-01492	001	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.13317	15.98067			
ARS1-B22-01124-05	TRG	ARS1-22-01492	002	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.17906	21.48718			
ARS1-B22-01124-06	TRG	ARS1-22-01492	003	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.12390	14.86795			
ARS1-B22-01124-07	TRG	ARS1-22-01492	004	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.10545	12.65418			
ARS1-B22-01124-08	TRG	ARS1-22-01492	005	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.08866	10.63864			
ARS1-B22-01124-09	TRG	ARS1-22-01492	006	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.16477	19.77182			
ARS1-B22-01124-10	TRG	ARS1-22-01492	007	0.04699	0.02	0.05831	0.02241	0	0	0.08069	0.09673	11.60752			

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Calculation Report
ARS1-B22-01124

Analytical Batch ID	ARS1-B22-01124
Analysis Code	GPC-RA226-AF
Procedure No	PALA-RAD-008
Matrix	Air Filter

ABatch Sample ID	Sample Type	SDG	Fracton	Qualifier	Expected Result	Percent Recovery	RPD	RER	DER
ARS1-B22-01124-01	LCS				27.67460	94.6%			
ARS1-B22-01124-02	LCSD				27.67460	102.1%	7.6%	0.45720	0.64613
ARS1-B22-01124-03	MBL								
ARS1-B22-01124-04	TRG	ARS1-22-01492	001	U					
ARS1-B22-01124-05	TRG	ARS1-22-01492	002	B					
ARS1-B22-01124-06	TRG	ARS1-22-01492	003	B					
ARS1-B22-01124-07	TRG	ARS1-22-01492	004	U					
ARS1-B22-01124-08	TRG	ARS1-22-01492	005	B					
ARS1-B22-01124-09	TRG	ARS1-22-01492	006	B					
ARS1-B22-01124-10	TRG	ARS1-22-01492	007	B					

Calculated By [redacted] on 9/1/2022 2:17:35 PM

ARS Aleut Analytical

Radium Gravimetric Yield Check

Printed:
8/12/2022
12:59 PM

Abatch SAMPLE	EMPTY Weight	FILLED Weight	YIELD	% RECOV.	Acceptance Range 40% - 110%
				Ra-228 Weights for 904.0 Method	Yttrium
1			0.000	0%	
2			0.000	0%	
3			0.000	0%	
4			0.000	0%	
5			0.000	0%	
6			0.000	0%	
7			0.000	0%	
8			0.000	0%	
9			0.000	0%	
10			0.000	0%	
11			0.000	0%	
12			0.000	0%	
13			0.000	0%	
14			0.000	0%	
15			0.000	0%	
16			0.000	0%	
17			0.000	0%	
18			0.000	0%	
19			0.000	0%	
20			0.000	0%	
21			0.000	0%	
22			0.000	0%	
23			0.000	0%	
				Ra-226 Weights for 903.0 Method	Barium
1	7.6469	7.6908	43.900	80%	PASSES
2	7.6279	7.6706	42.700	78%	PASSES
3	7.6665	7.7047	38.200	70%	PASSES
4	7.6535	7.6812	27.700	51%	PASSES
5	7.6511	7.69	38.900	71%	PASSES
6	7.6275	7.653	25.500	47%	PASSES
7	7.6482	7.6726	24.400	45%	PASSES
8	7.6485	7.6699	21.400	39%	FAILS
9	7.6326	7.668	35.400	65%	PASSES
10	7.6897	7.7094	19.700	36%	FAILS
11			0.000	0%	
12			0.000	0%	
13			0.000	0%	
14			0.000	0%	
15			0.000	0%	
16			0.000	0%	
17			0.000	0%	
18			0.000	0%	
19			0.000	0%	
20			0.000	0%	
21			0.000	0%	
22			0.000	0%	
23			0.000	0%	

BATCH ID: B22-00526

Yttrium Carrier 9mg/mL

R# R22-00156

MAX (mg)	
29.216	Verified Mass (mg)
MIN (mg)	26.560
10.624	

Barium Carrier 16mg/mL

R# R22-00412

MAX (mg)	
60.243	Verified Mass (mg)
MIN (mg)	54.767
21.907	

ARS-010-001 r1.0
Revision Date: 09/27/2019

Apex-Alpha/Beta™

CANBERRA

Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Standard	Count Time	Run Date & Time
LB 4200 B	4681	B1	B22-01124	22-01124-01	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 B	4681	B2	B22-01124	22-01124-02	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 B	4681	B3	B22-01124	22-01124-03	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 B	4681	B4	B22-01124	22-01124-04	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 C	4681	C1	B22-01124	22-01124-05	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 C	4681	C2	B22-01124	22-01124-06	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 C	4681	C3	B22-01124	22-01124-07	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 C	4681	C4	B22-01124	22-01124-08	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 D	4681	D1	B22-01124	22-01124-09	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM
LB 4200 D	4681	D2	B22-01124	22-01124-10	904/Ra-228 &/or 903/Ra-226		7200	8/19/2022 11:39:22 AM

GPC D 1155921 Batch Report

Batch Name: B22-01124
Procedure: 904/Ra-228 &/or 903/Ra-226
Batch ID: 4681

Calibration: Background
Preset Count Time (min): 120
Count Mode: Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
22-01124-01	B1	3041	4091	25.3416666666667	34.0916666666667	7200	1230	8/19/2022 11:39:30 AM
22-01124-02	B2	3225	4011	26.875	33.425	7200	1230	8/19/2022 11:39:30 AM
22-01124-03	B3	19	96	0.15833333333333:	0.8	7200	1230	8/19/2022 11:39:30 AM
22-01124-04	B4	12	100	0.1	0.83333333333333:	7200	1230	8/19/2022 11:39:30 AM
22-01124-05	C1	18	118	0.15	0.98333333333333:	7200	1230	8/19/2022 11:39:30 AM
22-01124-06	C2	19	108	0.15833333333333:	0.9	7200	1230	8/19/2022 11:39:30 AM
22-01124-07	C3	8	88	0.06666666666666(	0.73333333333333:	7200	1230	8/19/2022 11:39:30 AM
22-01124-08	C4	21	96	0.175	0.8	7200	1230	8/19/2022 11:39:30 AM
22-01124-09	D1	21	107	0.175	0.89166666666666'	7200	1230	8/19/2022 11:39:30 AM
22-01124-10	D2	19	115	0.15833333333333:	0.95833333333333:	7200	1230	8/19/2022 11:39:30 AM

GPC Logbook

Date	Time	Batch ID	Fraction	Procedure	Gen File	Detector	Tech
08-18-2022	11:26	22-01170	6	Sr-90	4668	B2	[redacted]
08-18-2022	11:26	22-01170	7	Sr-90	4668	B3	
08-19-2022	8:32	Daily	QA	bkg	4669-4672	all	
08-19-2022	10:50	Daily	QA	eff	4673-4680	all	
08-19-2022	11:39	22-01124	1	Ra-226	4681	B1	
08-19-2022	11:39	22-01124	2	Ra-226	4681	B2	
08-19-2022	11:39	22-01124	3	Ra-226	4681	B3	
08-19-2022	11:39	22-01124	4	Ra-226	4681	B4	
08-19-2022	11:39	22-01124	5	Ra-226	4681	C1	
08-19-2022	11:39	22-01124	6	Ra-226	4681	C2	
08-19-2022	11:39	22-01124	7	Ra-226	4681	C3	
08-19-2022	11:39	22-01124	8	Ra-226	4681	C4	
08-19-2022	11:39	22-01124	9	Ra-226	4681	D1	
08-19-2022	11:39	22-01124	10	Ra-226	4681	D2	
08-19-2022	14:17	Long Bkg	QA	bkg	4682-4685	all	
08-22-2022	7:22	Daily	QA	bkg	4686-4689	all	LC
08-22-2022	9:35	Daily	QA	eff	4690-4697	all	LC

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

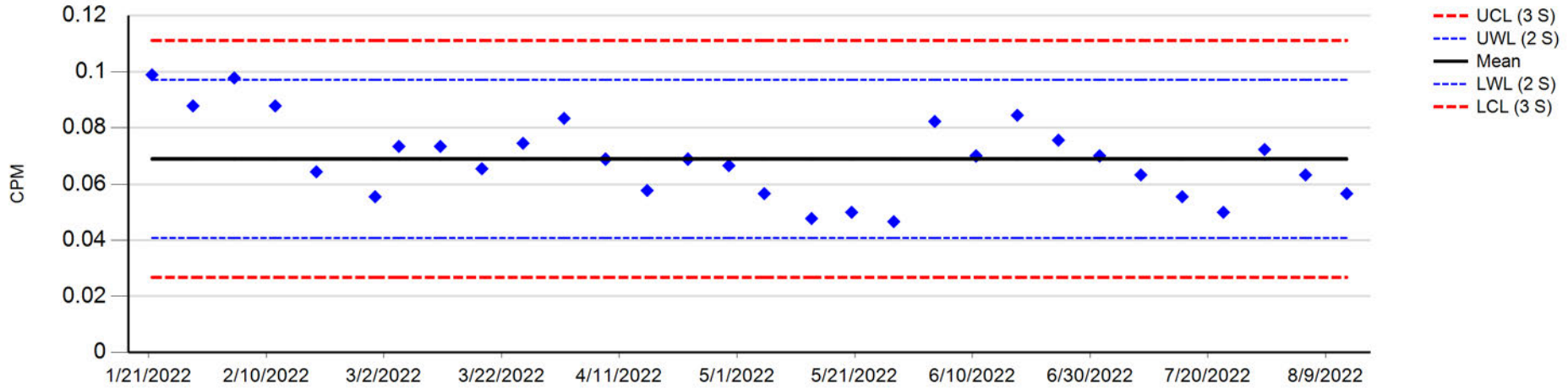
Gilbane Federal

Radium-226 Backgrounds

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0690	CPM	0.0567	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0141	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1111	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0268	CPM	0.0633	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

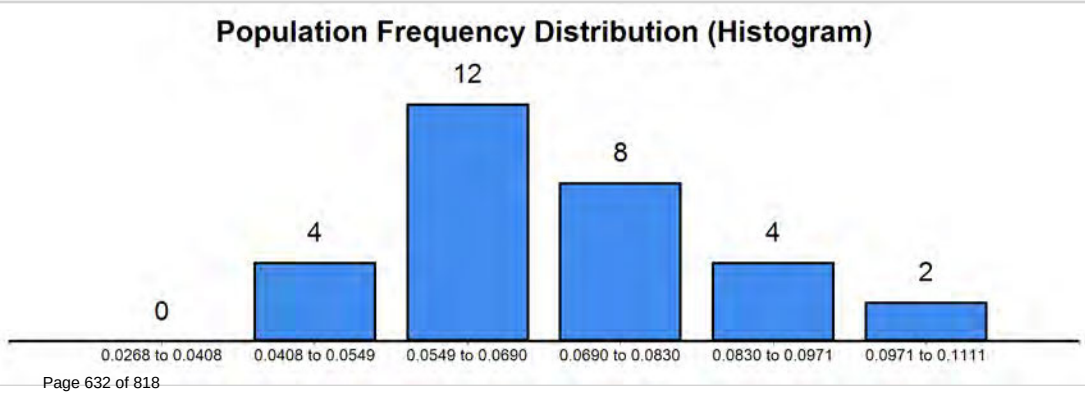
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR B1

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.0268 to 0.0408	0
0.0408 to 0.0549	4
0.0549 to 0.0690	12
0.0690 to 0.0830	8
0.0830 to 0.0971	4
0.0971 to 0.1111	2

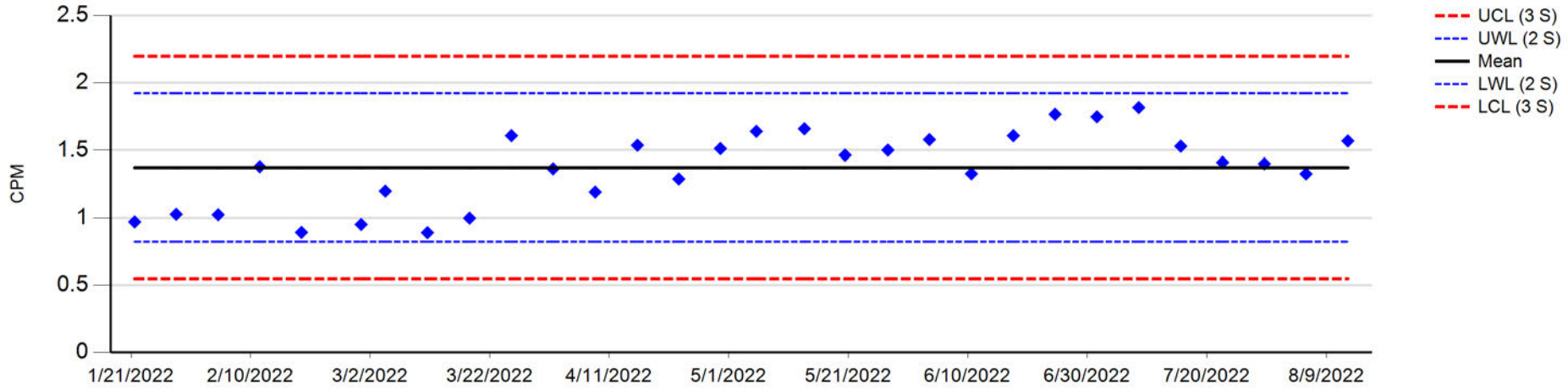


Beta Long BKG - ARS1-B22-01124-01

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	1.3727	CPM	1.5689	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.2752	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	2.1983	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5471	CPM	1.3267	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA LONG BACKGROUND - DETECTOR B1

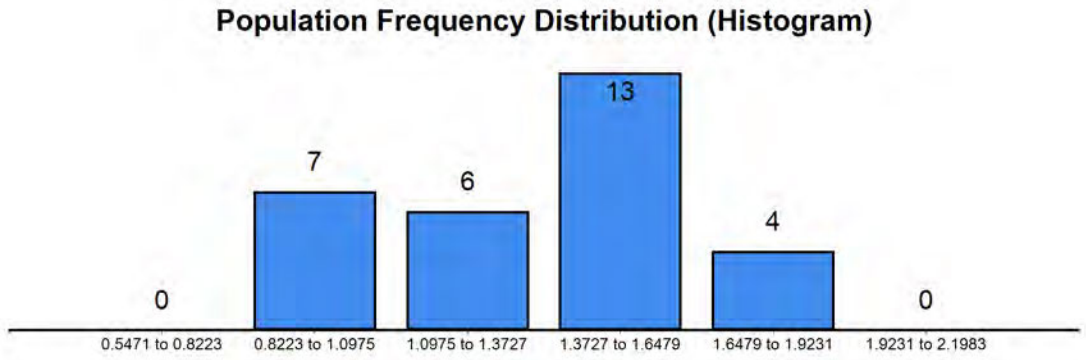
Process Date Range: 01/21/22 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.5471 to 0.8223	0
0.8223 to 1.0975	7
1.0975 to 1.3727	6
1.3727 to 1.6479	13
1.6479 to 1.9231	4
1.9231 to 2.1983	0

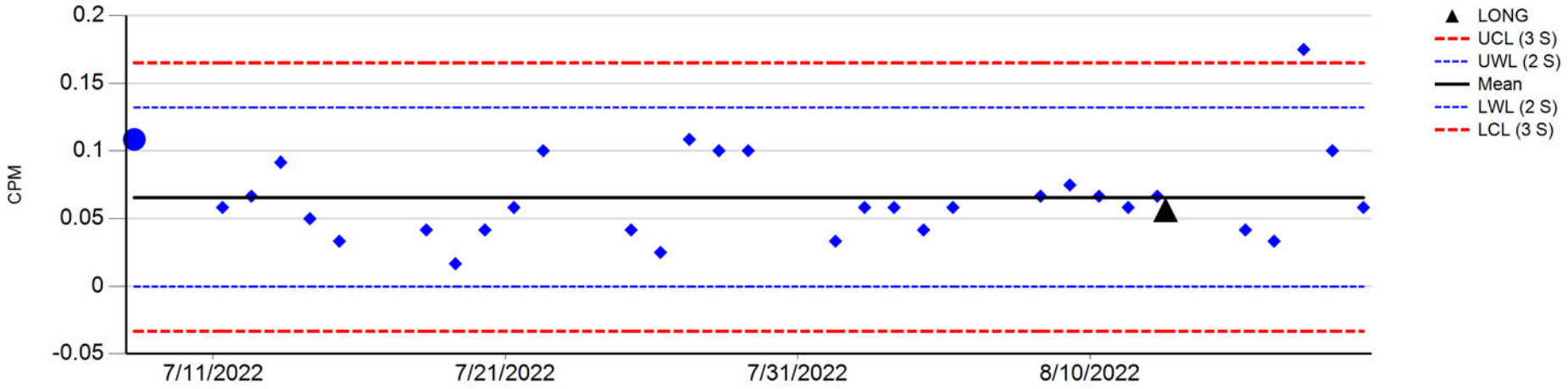


Alpha Daily BKG - ARS1-B22-01124-01

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0658	Long B CPM	0.0567	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0331	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1650	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0334	CPM	0.1000	7 trending most recent points in a row.	**OK**
DER	1.4474	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

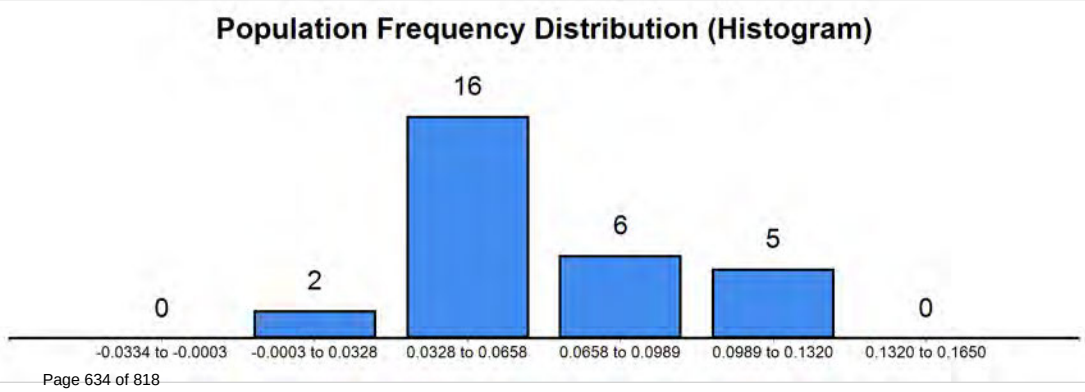
LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR B1

Process Date Range: 07/08/22 - 08/19/22



Statistical Process Control

Bin	Frequency
-0.0334 to -0.0003	0
-0.0003 to 0.0328	2
0.0328 to 0.0658	16
0.0658 to 0.0989	6
0.0989 to 0.1320	5
0.1320 to 0.1650	0

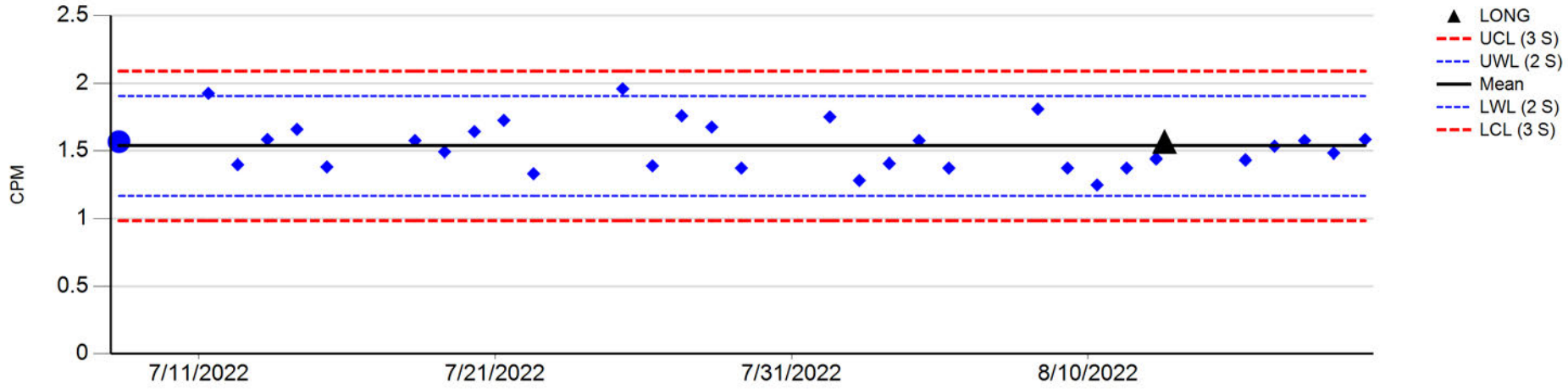


Beta Daily BKG - ARS1-B22-01124-01

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	1.5369	Long B CPM	1.5689	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.1840	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	2.0888	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.9850	CPM	1.4833	7 trending most recent points in a row.	**OK**
DER	0.7204	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR B1

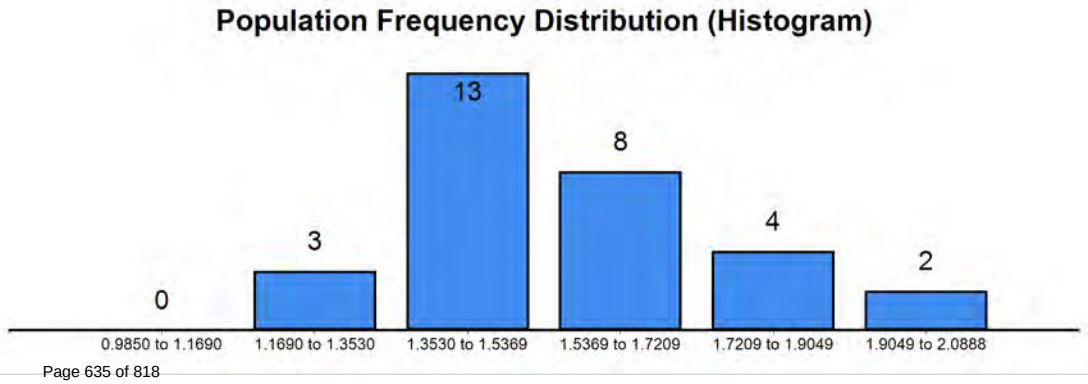
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

Statistical Process Control

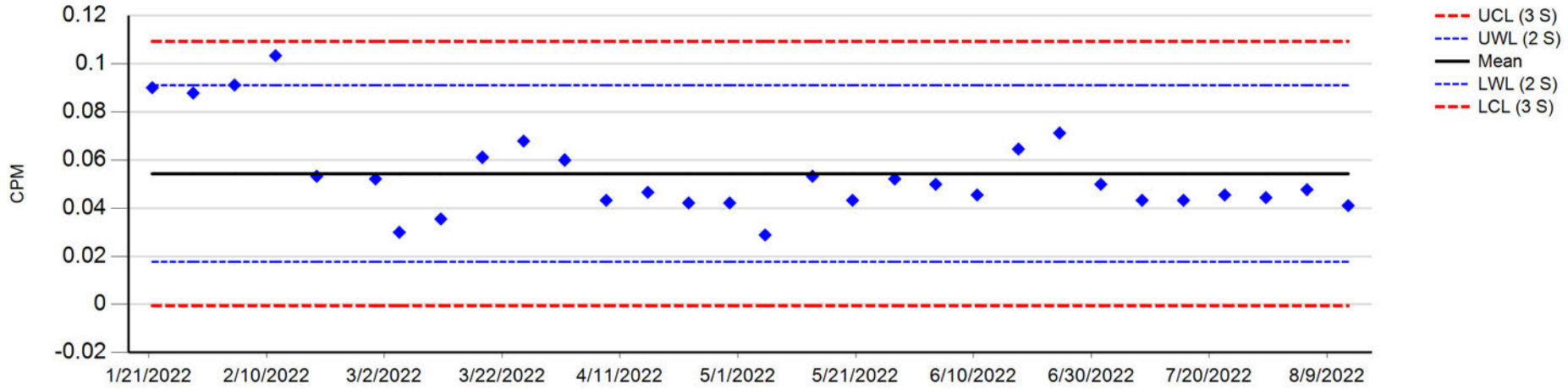
Bin	Frequency
0.9850 to 1.1690	0
1.1690 to 1.3530	3
1.3530 to 1.5369	13
1.5369 to 1.7209	8
1.7209 to 1.9049	4
1.9049 to 2.0888	2



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0544	CPM	0.0411	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0183	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1093	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0006	CPM	0.0478	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

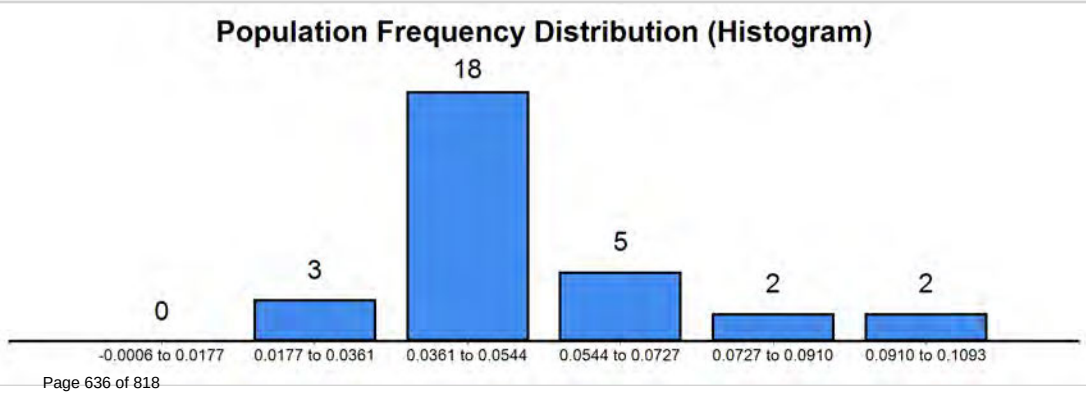
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR B2

Process Date Range: 01/21/22 - 08/12/22



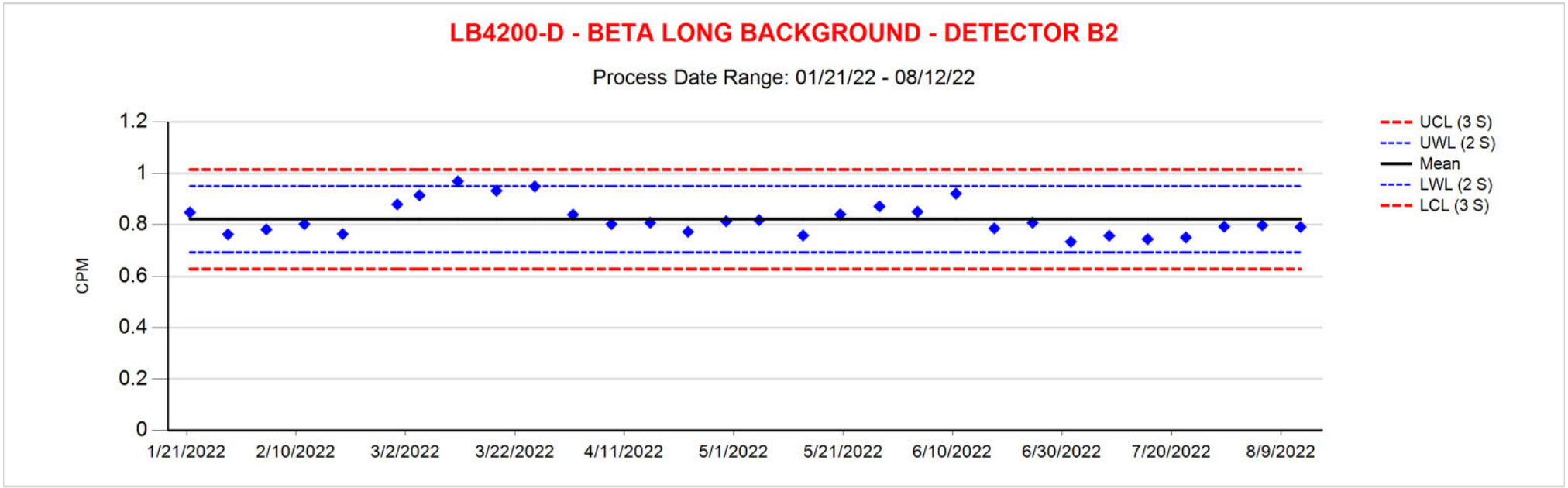
Statistical Process Control

Bin	Frequency
-0.0006 to 0.0177	0
0.0177 to 0.0361	3
0.0361 to 0.0544	18
0.0544 to 0.0727	5
0.0727 to 0.0910	2
0.0910 to 0.1093	2



Beta Long BKG - ARS1-B22-01124-02

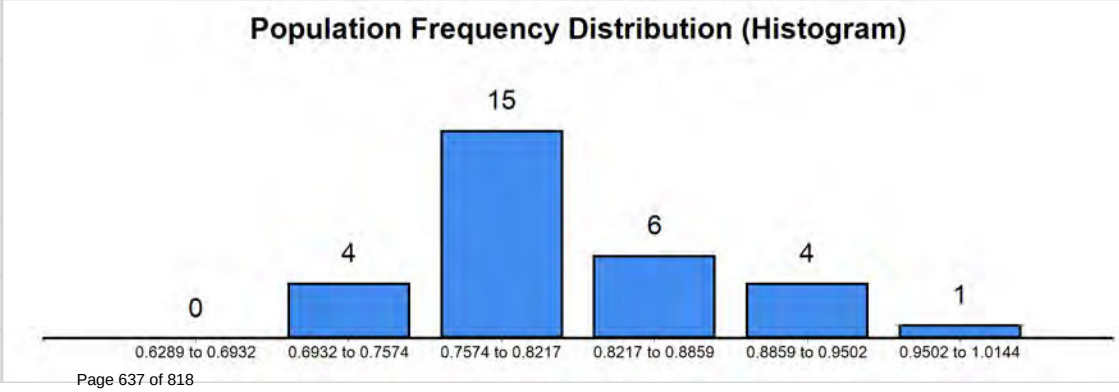
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8217	CPM	0.7911	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0643	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0144	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6289	CPM	0.7978	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.6289 to 0.6932	0
0.6932 to 0.7574	4
0.7574 to 0.8217	15
0.8217 to 0.8859	6
0.8859 to 0.9502	4
0.9502 to 1.0144	1

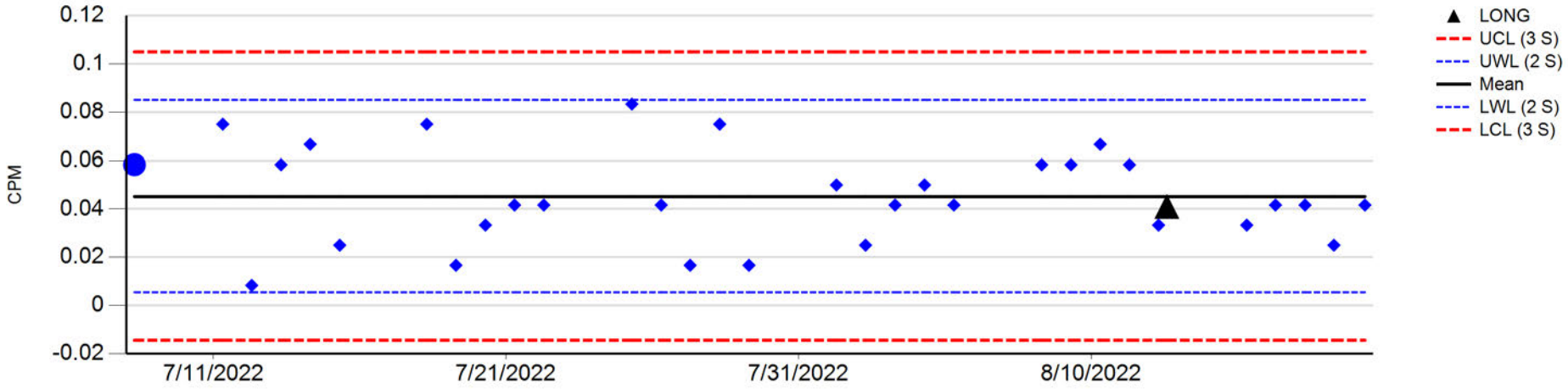


Alpha Daily BKG - ARS1-B22-01124-02

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0453	Long B CPM	0.0411	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0199	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1050	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0144	CPM	0.0250	7 trending most recent points in a row.	**OK**
DER	1.0109	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR B2

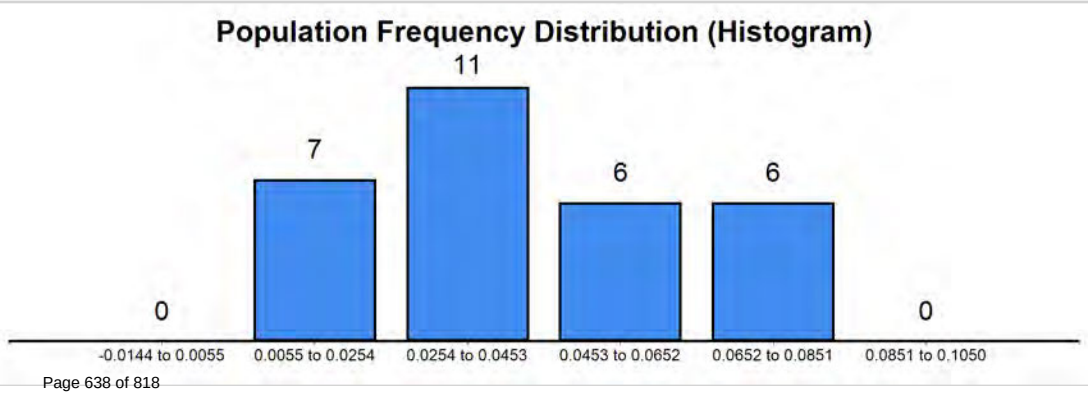
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0144 to 0.0055	0
0.0055 to 0.0254	7
0.0254 to 0.0453	11
0.0453 to 0.0652	6
0.0652 to 0.0851	6
0.0851 to 0.1050	0

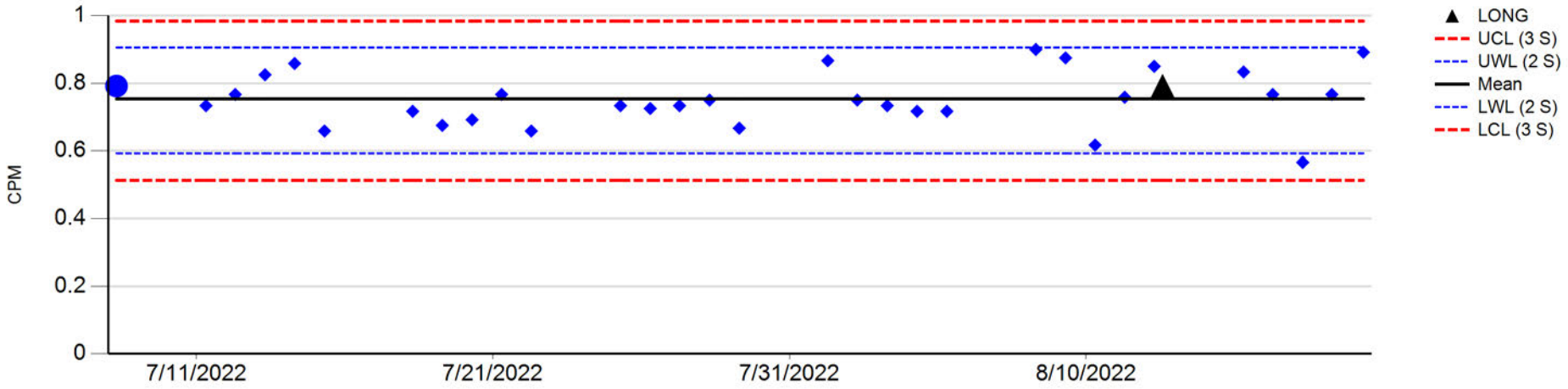


Beta Daily BKG - ARS1-B22-01124-02

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7489	Long B CPM	0.7911	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0784	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9840	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5138	CPM	0.7667	7 trending most recent points in a row.	**OK**
DER	0.2867	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR B2

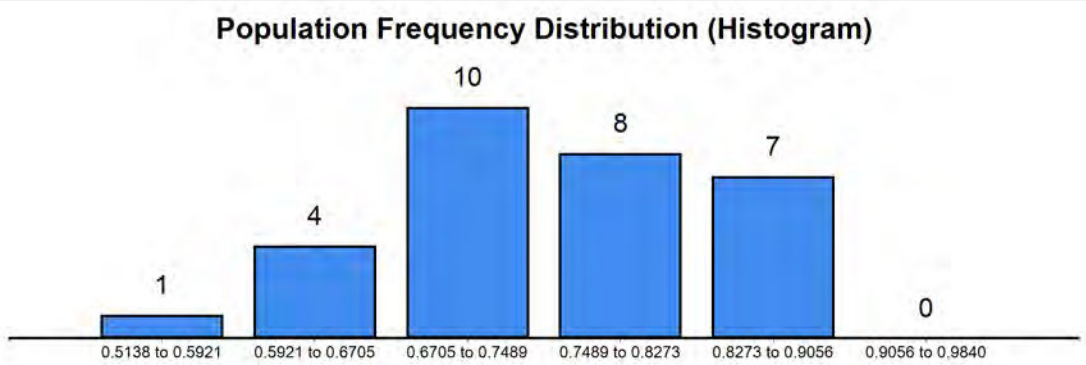
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

Statistical Process Control

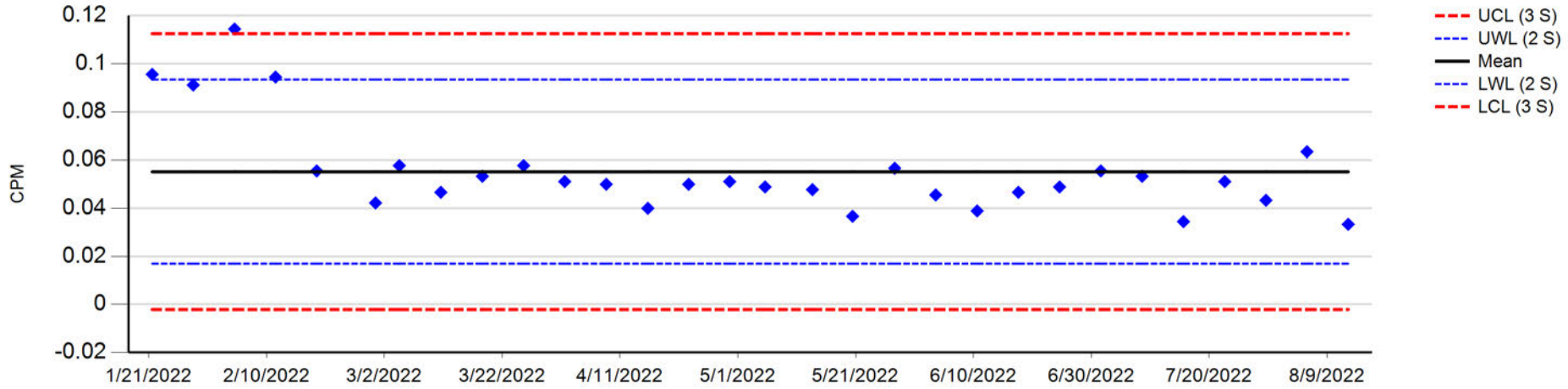
Bin	Frequency
0.5138 to 0.5921	1
0.5921 to 0.6705	4
0.6705 to 0.7489	10
0.7489 to 0.8273	8
0.8273 to 0.9056	7
0.9056 to 0.9840	0



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0552	CPM	0.0333	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0191	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1125	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0022	CPM	0.0633	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

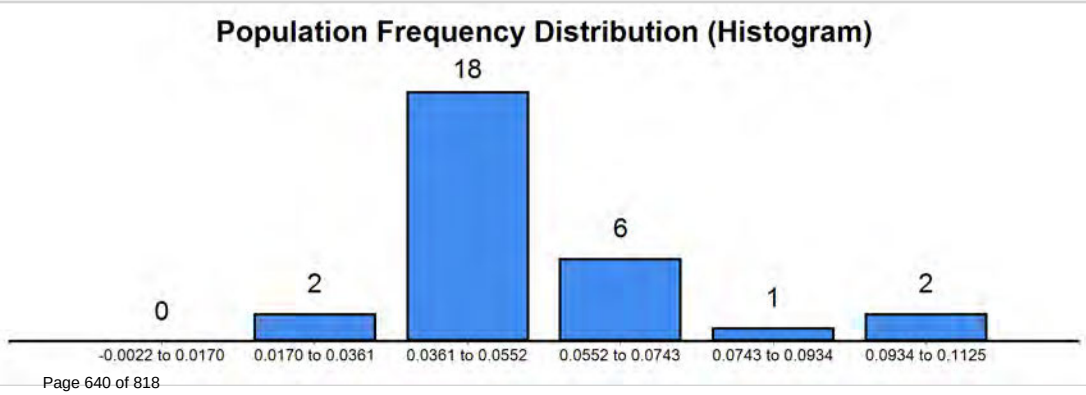
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR B3

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

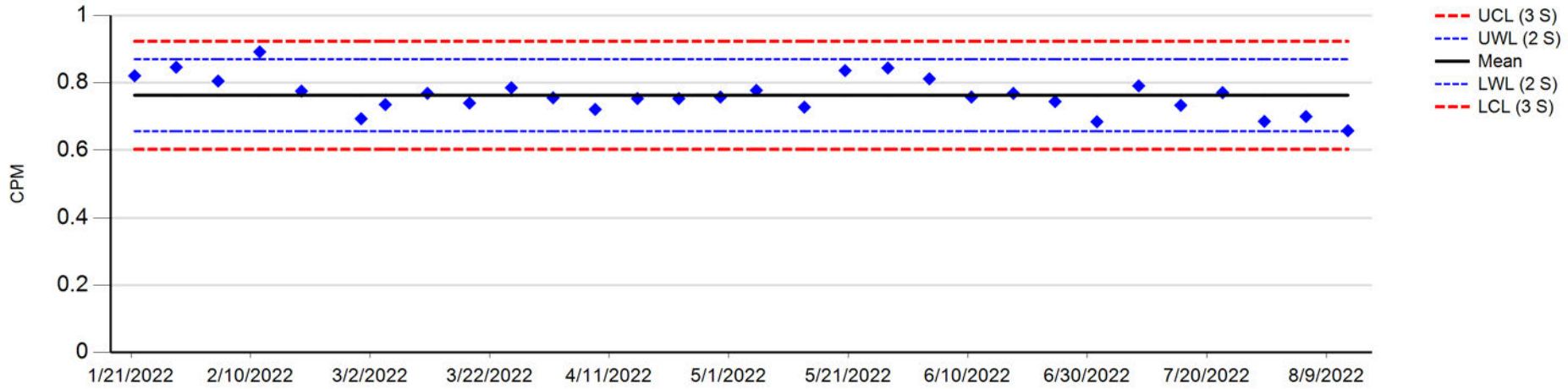
Bin	Frequency
-0.0022 to 0.0170	0
0.0170 to 0.0361	2
0.0361 to 0.0552	18
0.0552 to 0.0743	6
0.0743 to 0.0934	1
0.0934 to 0.1125	2



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7633	CPM	0.6578	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0535	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9238	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6028	CPM	0.7000	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

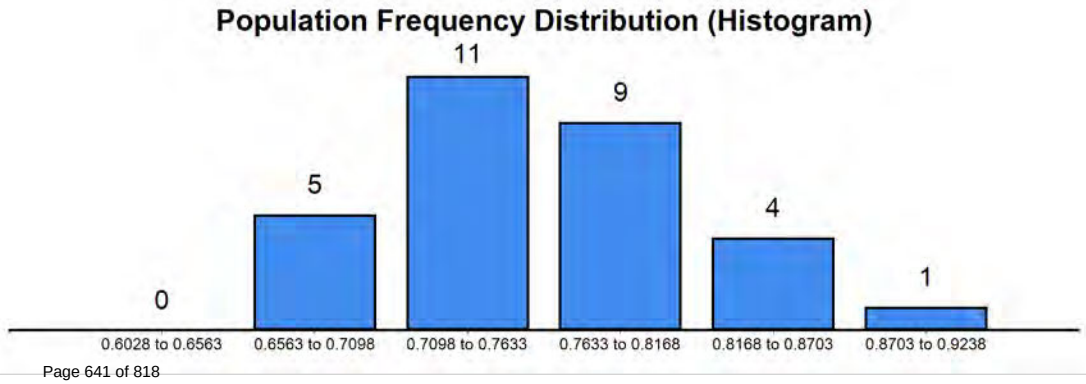
LB4200-D - BETA LONG BACKGROUND - DETECTOR B3

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.6028 to 0.6563	0
0.6563 to 0.7098	5
0.7098 to 0.7633	11
0.7633 to 0.8168	9
0.8168 to 0.8703	4
0.8703 to 0.9238	1

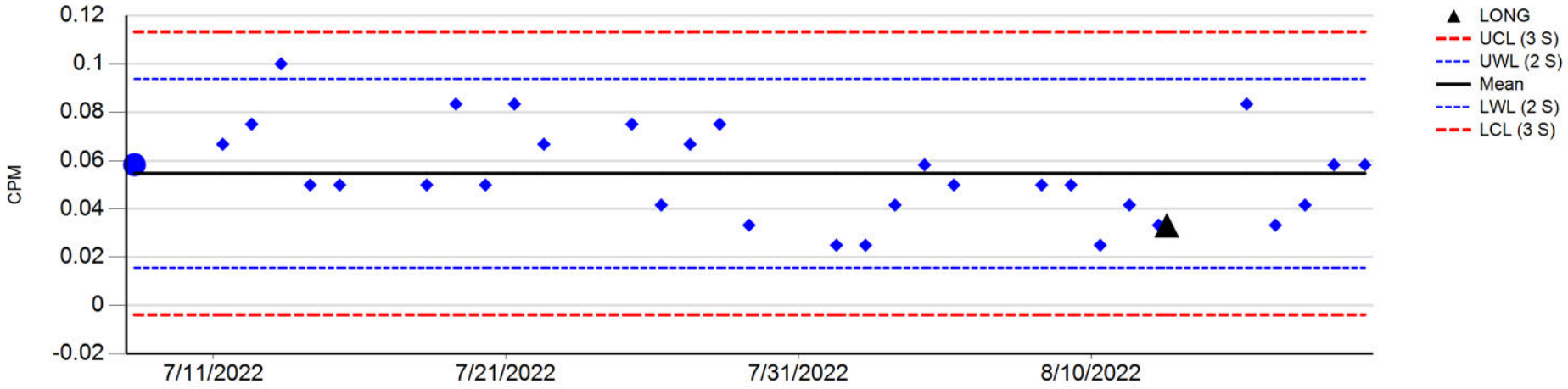


Alpha Daily BKG - ARS1-B22-01124-03

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0547	Long B CPM	0.0333	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0195	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1133	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0039	CPM	0.0583	7 trending most recent points in a row.	**OK**
DER	1.0930	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

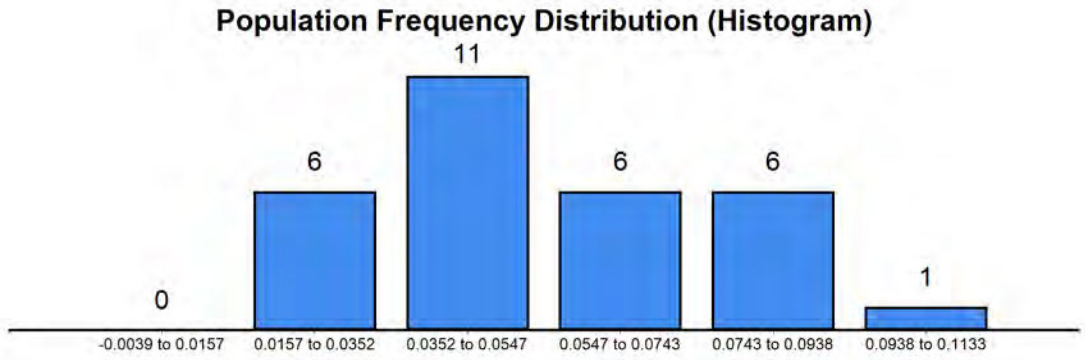
LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR B3

Process Date Range: 07/08/22 - 08/19/22



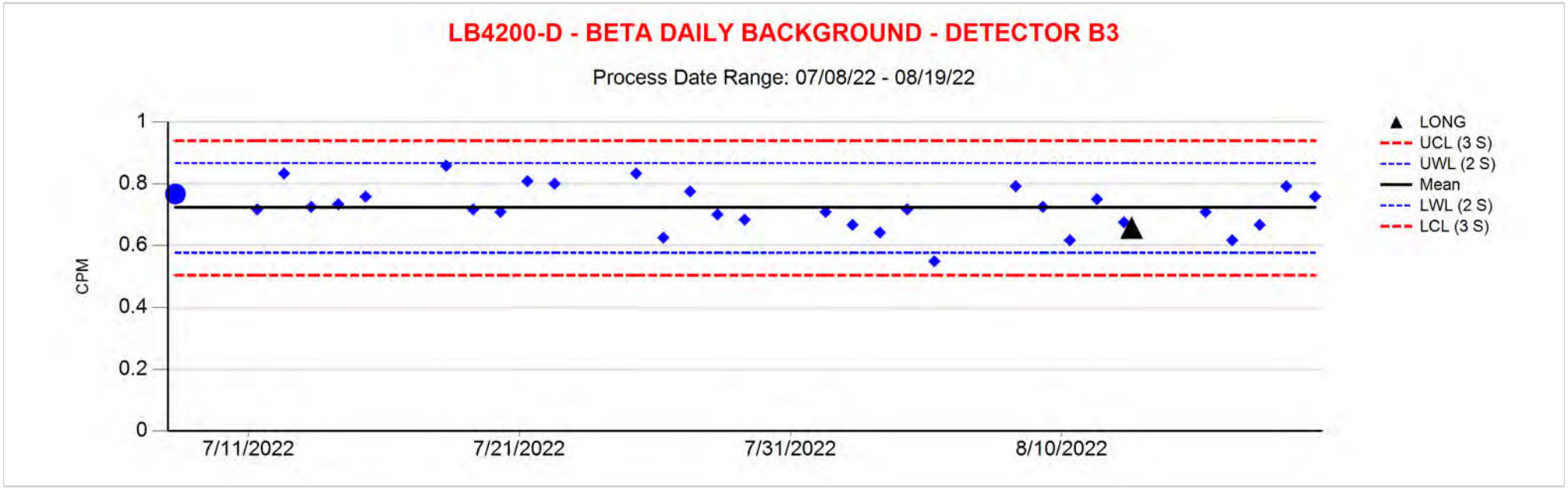
Statistical Process Control

Bin	Frequency
-0.0039 to 0.0157	0
0.0157 to 0.0352	6
0.0352 to 0.0547	11
0.0547 to 0.0743	6
0.0743 to 0.0938	6
0.0938 to 0.1133	1



Beta Daily BKG - ARS1-B22-01124-03

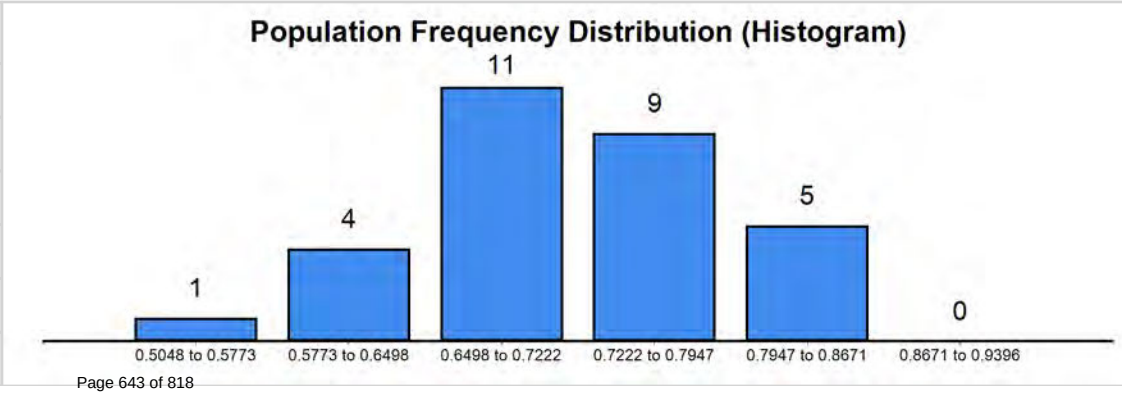
Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7222	Long B CPM	0.6578	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0725	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9396	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5048	CPM	0.7917	7 trending most recent points in a row.	**OK**
DER	1.5640	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.5048 to 0.5773	1
0.5773 to 0.6498	4
0.6498 to 0.7222	11
0.7222 to 0.7947	9
0.7947 to 0.8671	5
0.8671 to 0.9396	0

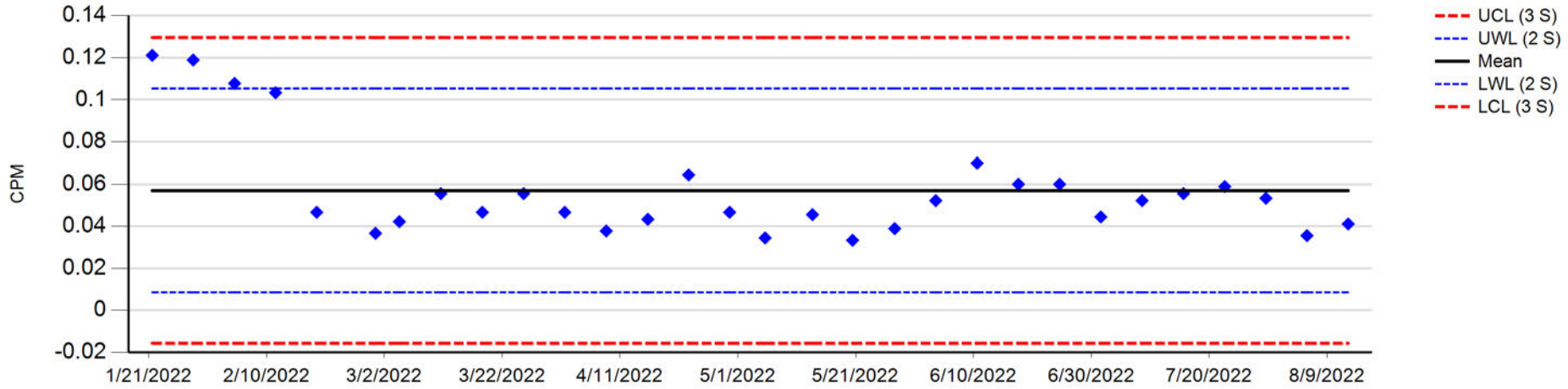


Alpha Long BKG - ARS1-B22-01124-04

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0570	CPM	0.0411	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0242	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1296	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0157	CPM	0.0356	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

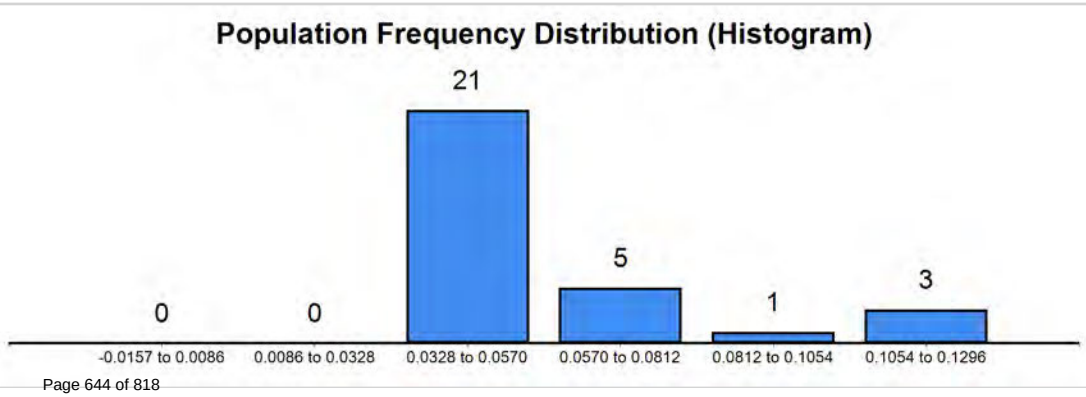
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR B4

Process Date Range: 01/21/22 - 08/12/22



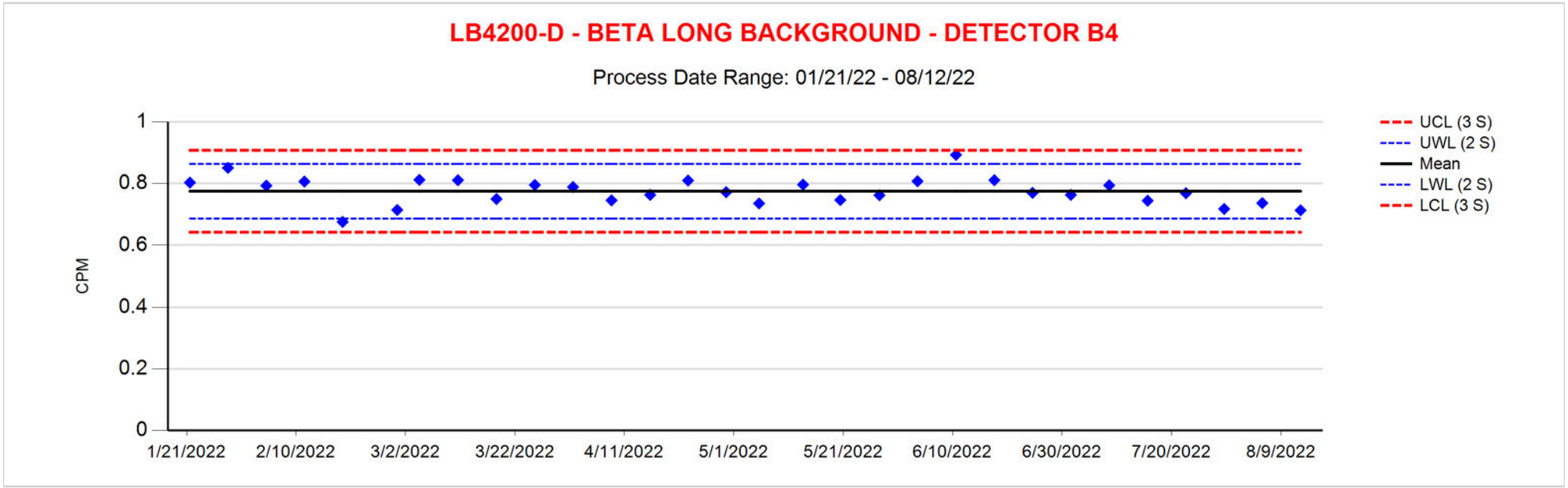
Statistical Process Control

Bin	Frequency
-0.0157 to 0.0086	0
0.0086 to 0.0328	0
0.0328 to 0.0570	21
0.0570 to 0.0812	5
0.0812 to 0.1054	1
0.1054 to 0.1296	3



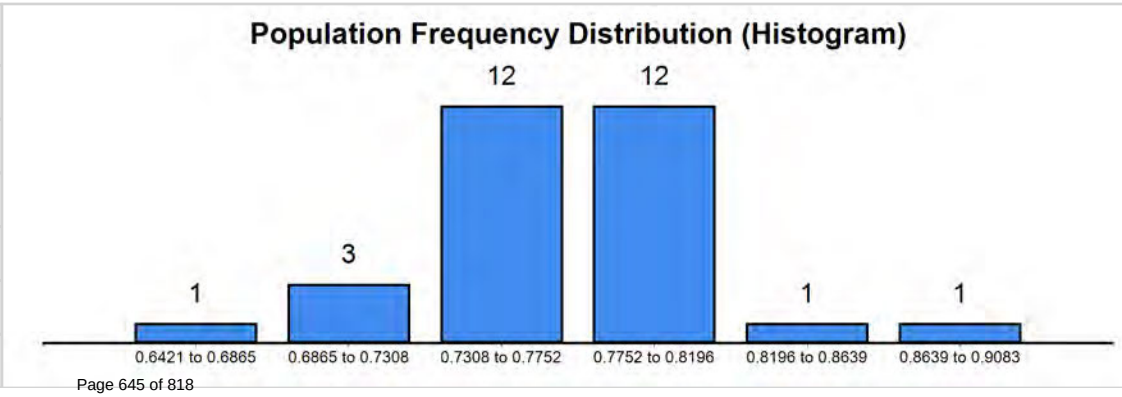
Beta Long BKG - ARS1-B22-01124-04

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7752	CPM	0.7133	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0444	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9083	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6421	CPM	0.7367	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.6421 to 0.6865	1
0.6865 to 0.7308	3
0.7308 to 0.7752	12
0.7752 to 0.8196	12
0.8196 to 0.8639	1
0.8639 to 0.9083	1

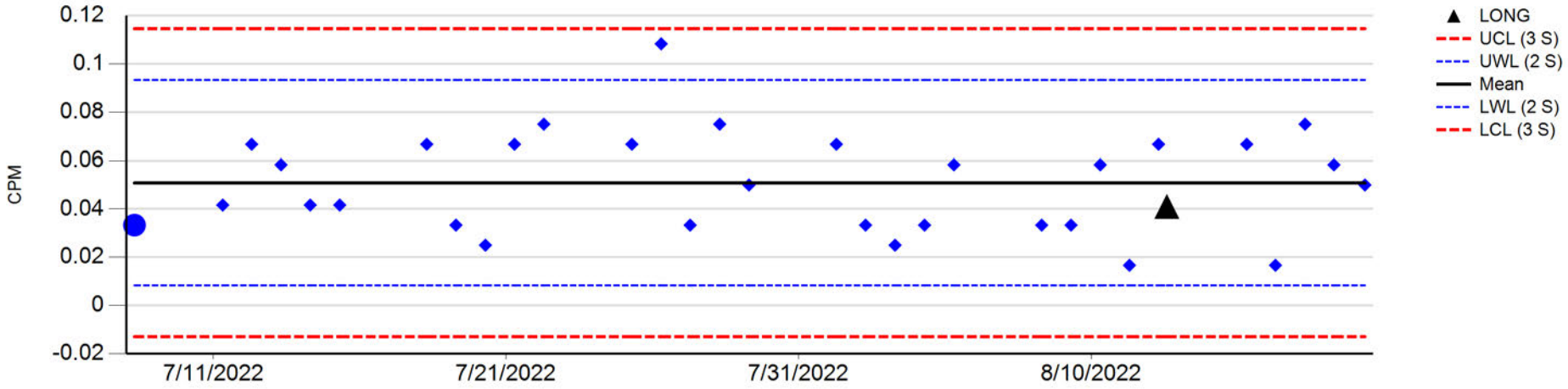


Alpha Daily BKG - ARS1-B22-01124-04

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0508	Long B CPM	0.0411	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0213	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1146	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0129	CPM	0.0583	7 trending most recent points in a row.	**OK**
DER	0.7468	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

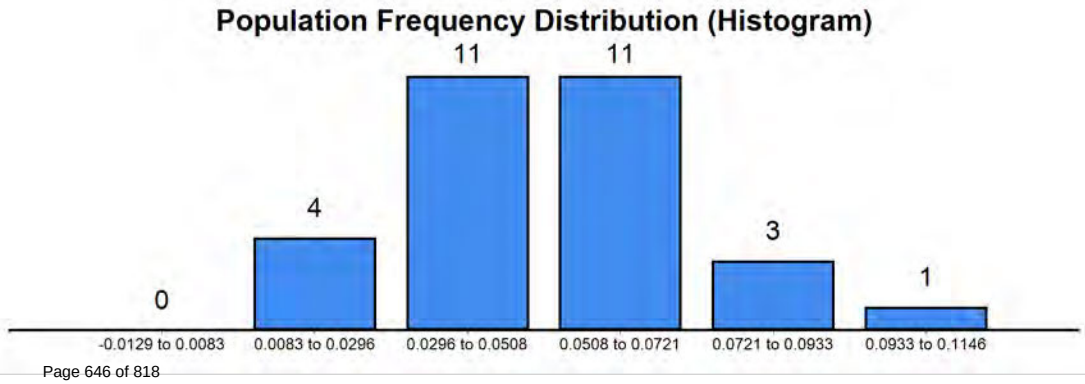
LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR B4

Process Date Range: 07/08/22 - 08/19/22



Statistical Process Control

Bin	Frequency
-0.0129 to 0.0083	0
0.0083 to 0.0296	4
0.0296 to 0.0508	11
0.0508 to 0.0721	11
0.0721 to 0.0933	3
0.0933 to 0.1146	1

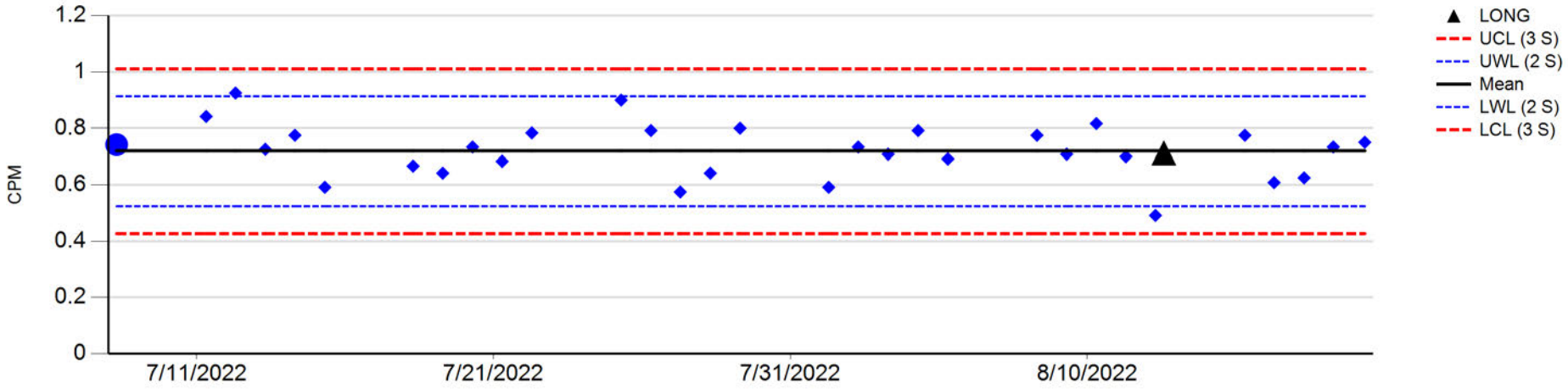


Beta Daily BKG - ARS1-B22-01124-04

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7189	Long B CPM	0.7133	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0974	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0109	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4268	CPM	0.7333	7 trending most recent points in a row.	**OK**
DER	0.2407	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR B4

Process Date Range: 07/08/22 - 08/19/22

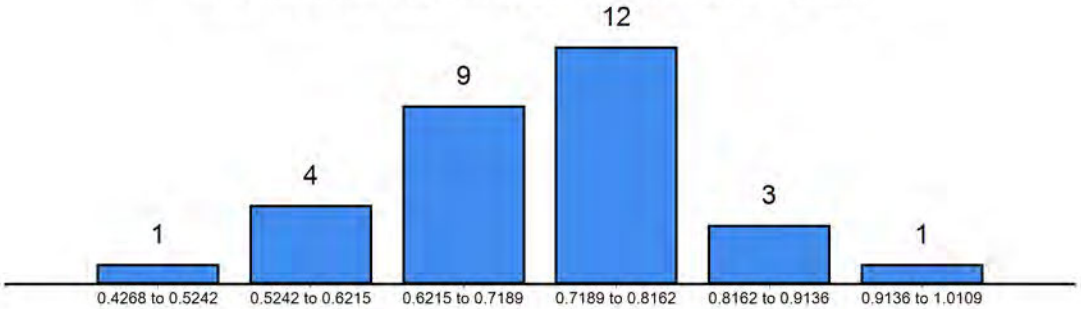


ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.4268 to 0.5242	1
0.5242 to 0.6215	4
0.6215 to 0.7189	9
0.7189 to 0.8162	12
0.8162 to 0.9136	3
0.9136 to 1.0109	1

Population Frequency Distribution (Histogram)

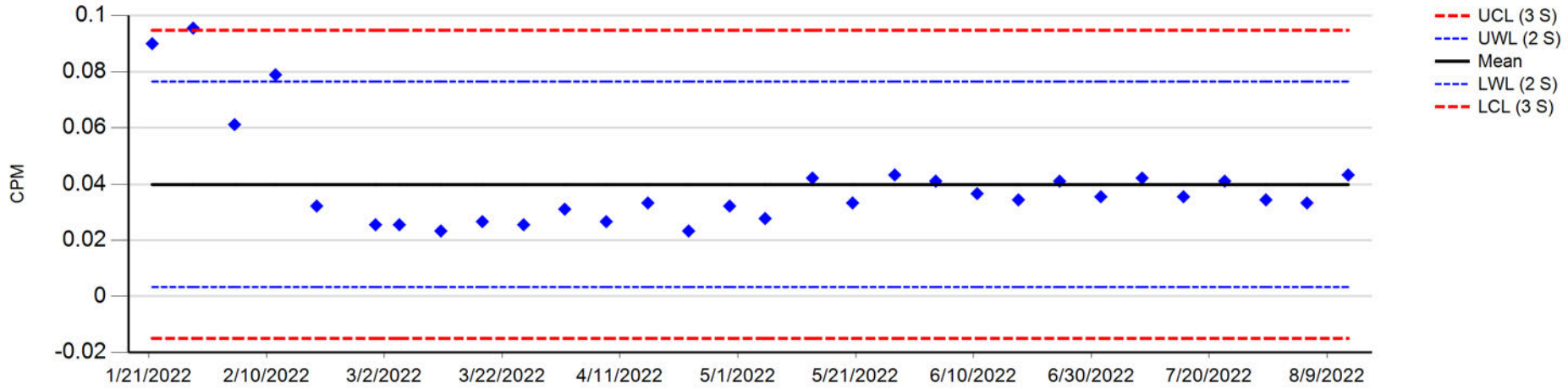


Alpha Long BKG - ARS1-B22-01124-05

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0399	CPM	0.0433	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0183	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0948	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0150	CPM	0.0333	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

LB4200-D - ALPHA LONG BACKGROUND - DETECTOR C1

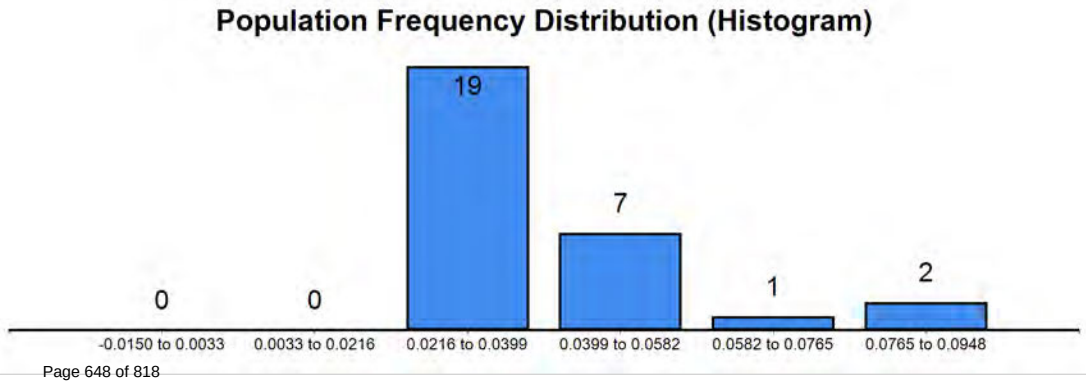
Process Date Range: 01/21/22 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0150 to 0.0033	0
0.0033 to 0.0216	0
0.0216 to 0.0399	19
0.0399 to 0.0582	7
0.0582 to 0.0765	1
0.0765 to 0.0948	2

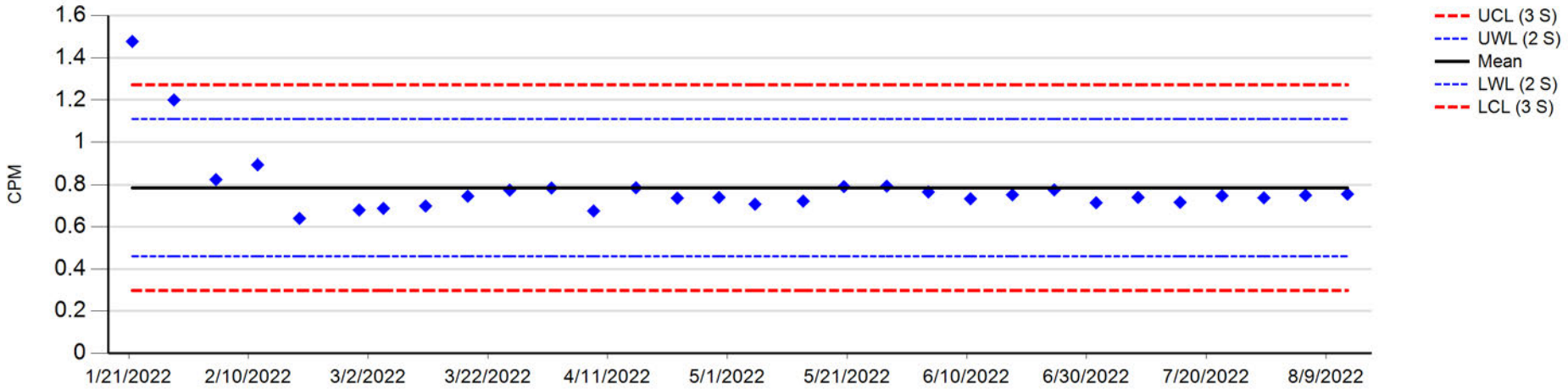


Beta Long BKG - ARS1-B22-01124-05

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7850	CPM	0.7556	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.1623	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.2720	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.2980	CPM	0.7500	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA LONG BACKGROUND - DETECTOR C1

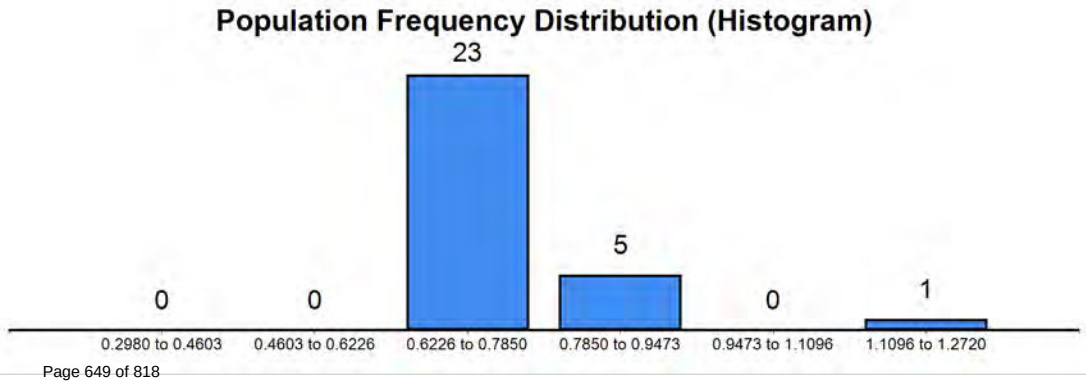
Process Date Range: 01/21/22 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

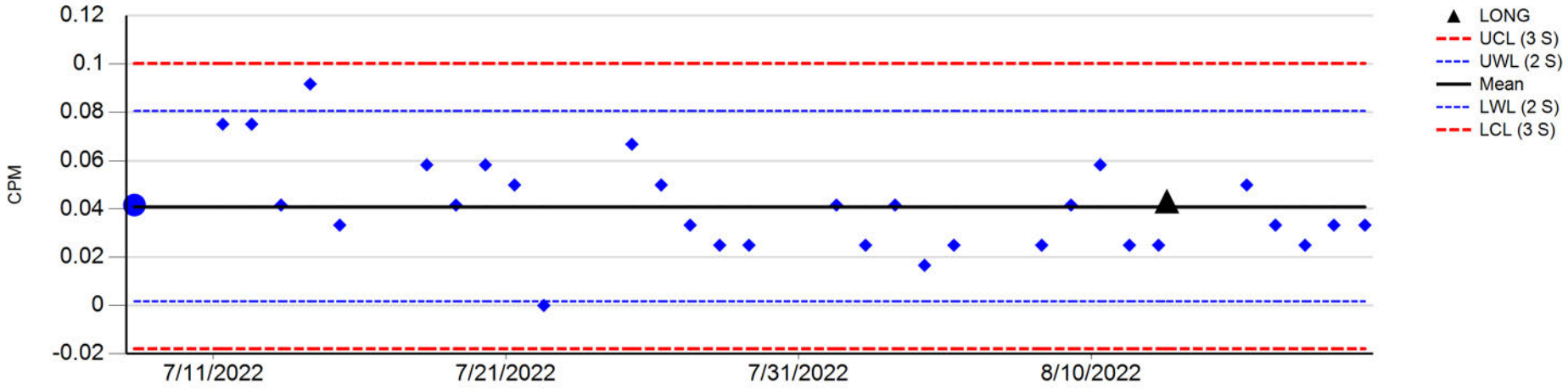
Bin	Frequency
0.2980 to 0.4603	0
0.4603 to 0.6226	0
0.6226 to 0.7850	23
0.7850 to 0.9473	5
0.9473 to 1.1096	0
1.1096 to 1.2720	1



Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0411	Long B CPM	0.0433	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0197	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1002	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0180	CPM	0.0333	7 trending most recent points in a row.	**OK**
DER	0.5539	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

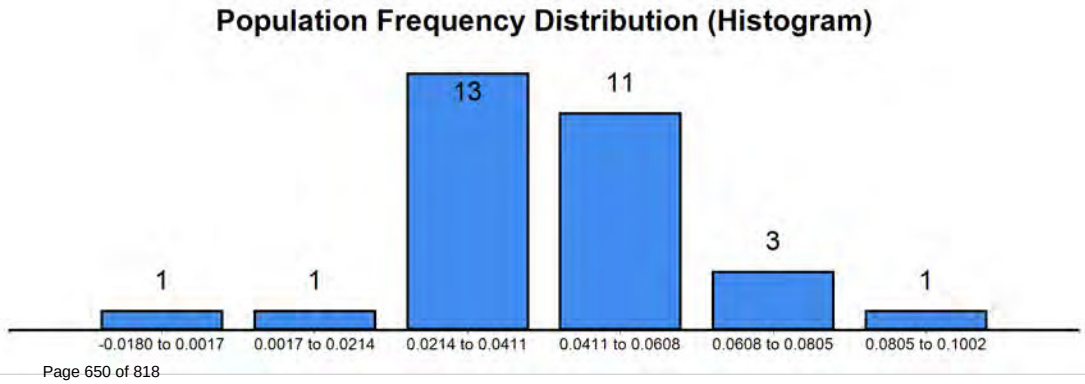
LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR C1

Process Date Range: 07/08/22 - 08/19/22



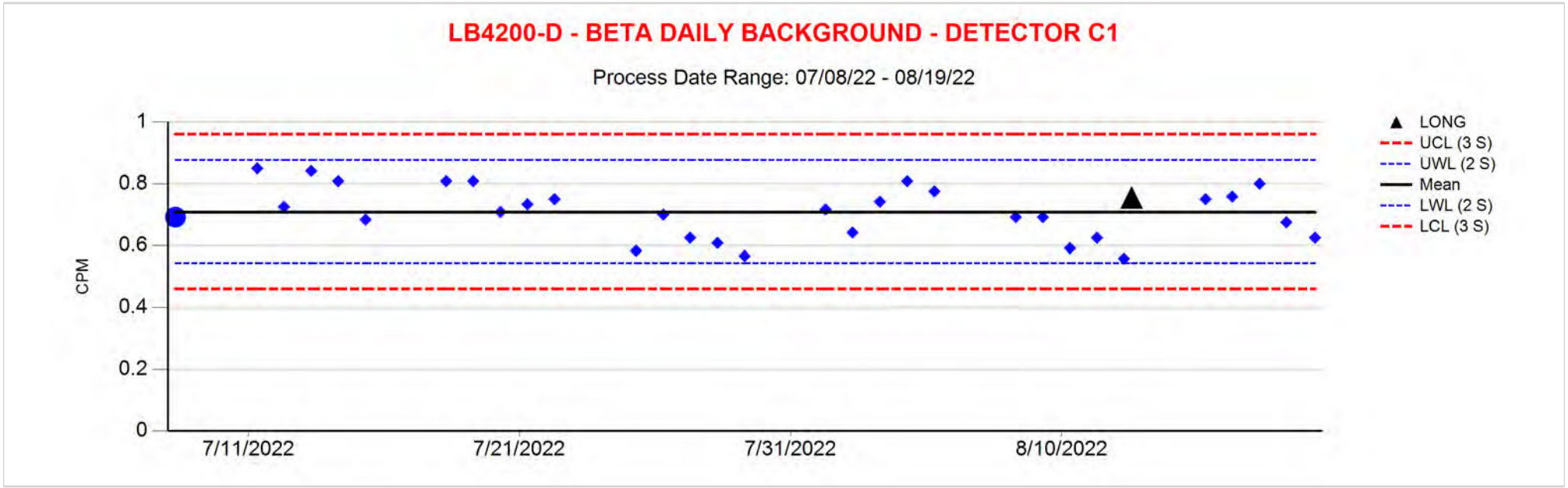
Statistical Process Control

Bin	Frequency
-0.0180 to 0.0017	1
0.0017 to 0.0214	1
0.0214 to 0.0411	13
0.0411 to 0.0608	11
0.0608 to 0.0805	3
0.0805 to 0.1002	1



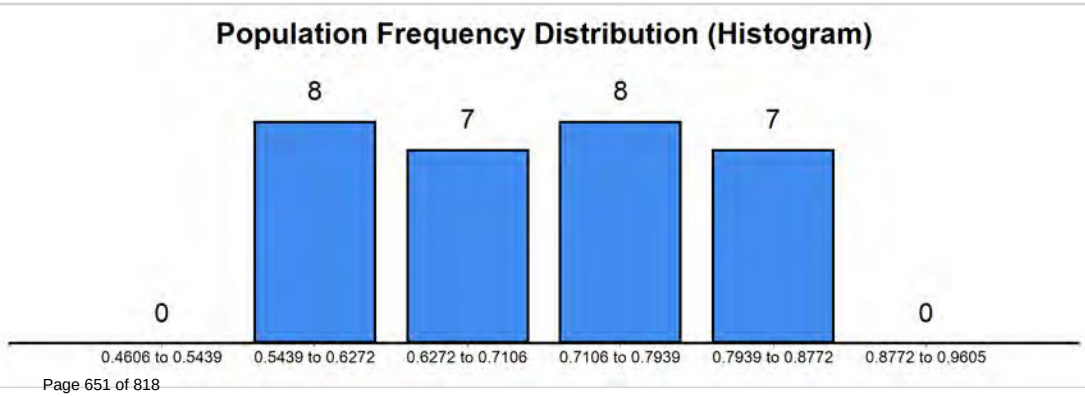
Beta Daily BKG - ARS1-B22-01124-05

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7106	Long B CPM	0.7556	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0833	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9605	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4606	CPM	0.6750	7 trending most recent points in a row.	**OK**
DER	1.0019	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

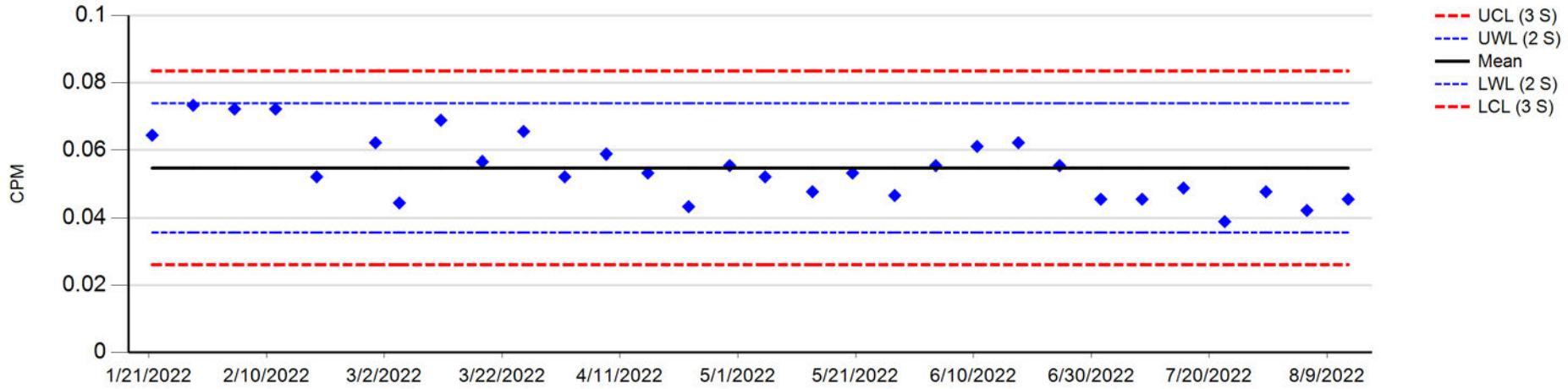
Bin	Frequency
0.4606 to 0.5439	0
0.5439 to 0.6272	8
0.6272 to 0.7106	7
0.7106 to 0.7939	8
0.7939 to 0.8772	7
0.8772 to 0.9605	0



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0548	CPM	0.0456	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0096	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0835	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0261	CPM	0.0422	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

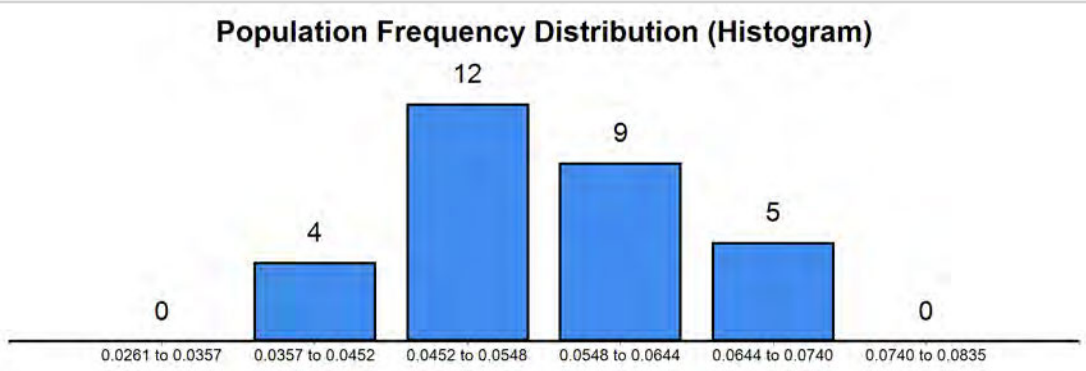
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR C2

Process Date Range: 01/21/22 - 08/12/22



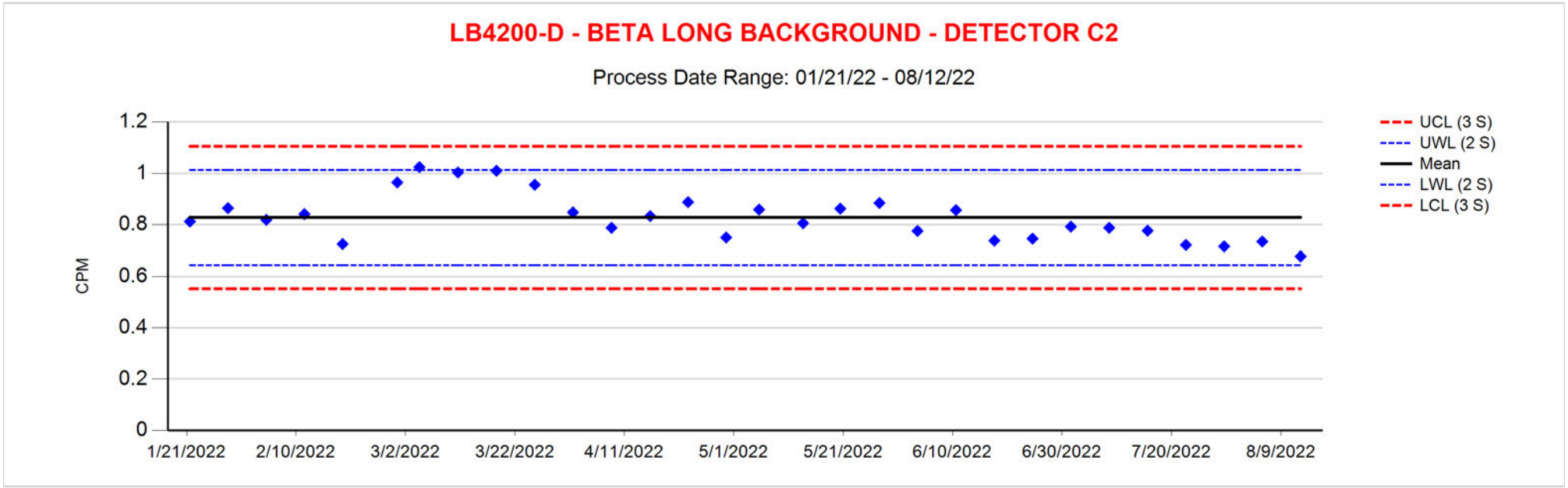
Statistical Process Control

Bin	Frequency
0.0261 to 0.0357	0
0.0357 to 0.0452	4
0.0452 to 0.0548	12
0.0548 to 0.0644	9
0.0644 to 0.0740	5
0.0740 to 0.0835	0



Beta Long BKG - ARS1-B22-01124-06

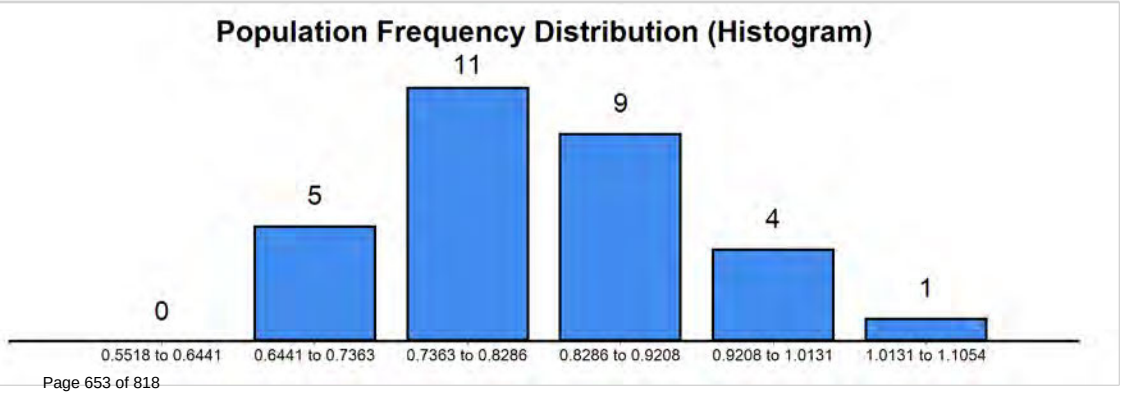
Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8286	CPM	0.6778	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0923	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.1054	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**INVESTIGATE**
- 3-sigma value	0.5518	CPM	0.7344	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.5518 to 0.6441	0
0.6441 to 0.7363	5
0.7363 to 0.8286	11
0.8286 to 0.9208	9
0.9208 to 1.0131	4
1.0131 to 1.1054	1

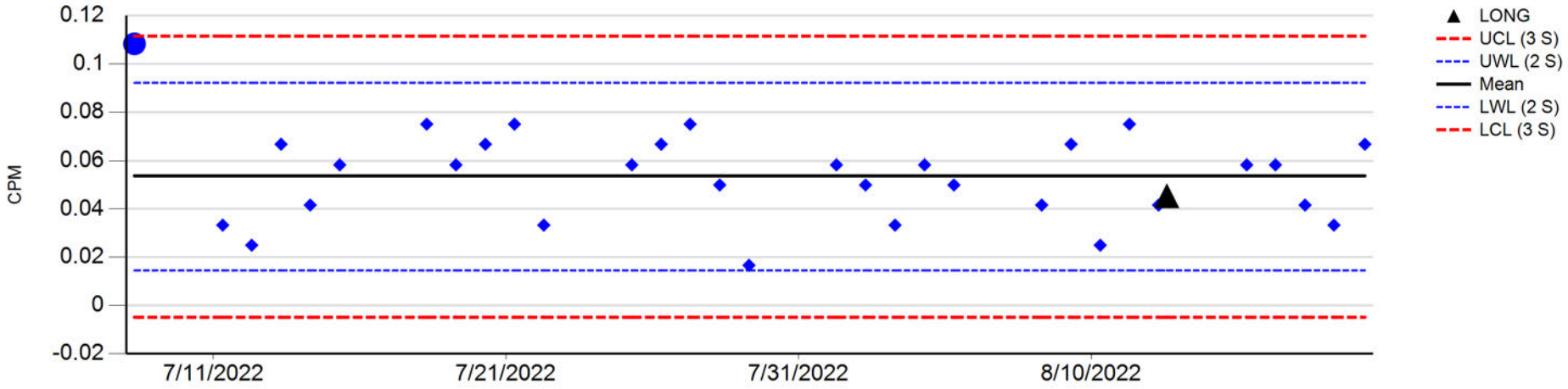


Alpha Daily BKG - ARS1-B22-01124-06

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0533	Long B CPM	0.0456	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0194	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1115	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0049	CPM	0.0333	7 trending most recent points in a row.	**OK**
DER	0.6745	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

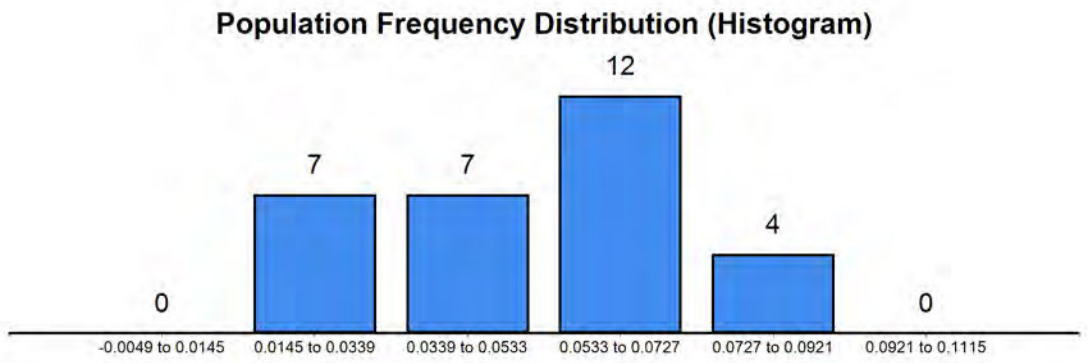
LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR C2

Process Date Range: 07/08/22 - 08/19/22



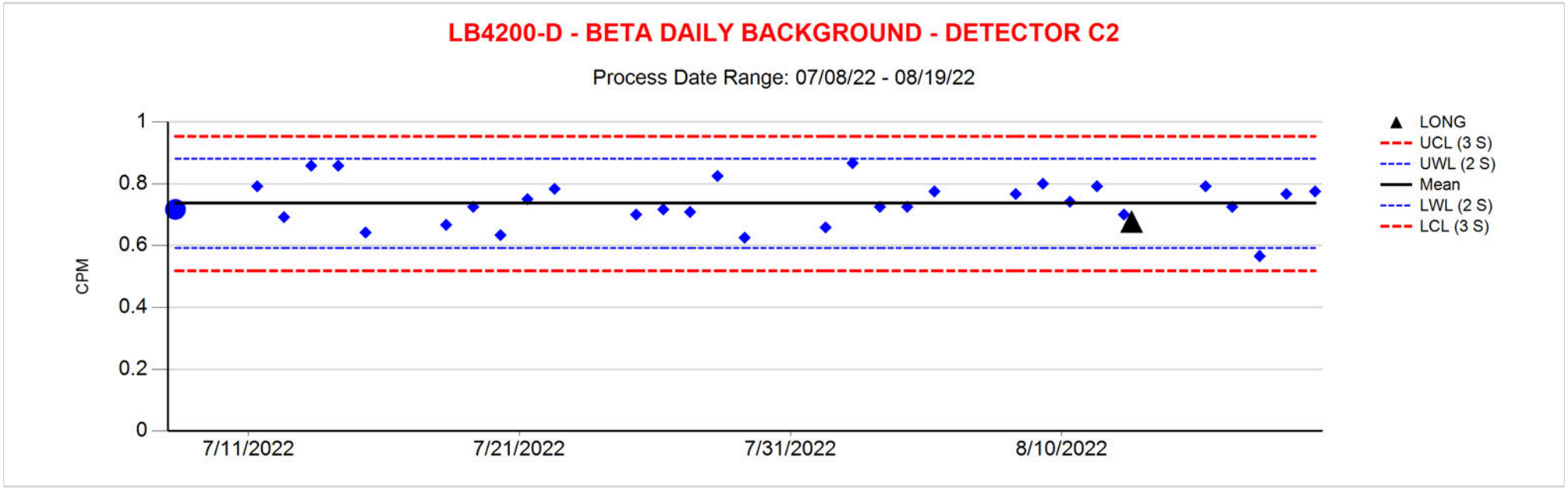
Statistical Process Control

Bin	Frequency
-0.0049 to 0.0145	0
0.0145 to 0.0339	7
0.0339 to 0.0533	7
0.0533 to 0.0727	12
0.0727 to 0.0921	4
0.0921 to 0.1115	0



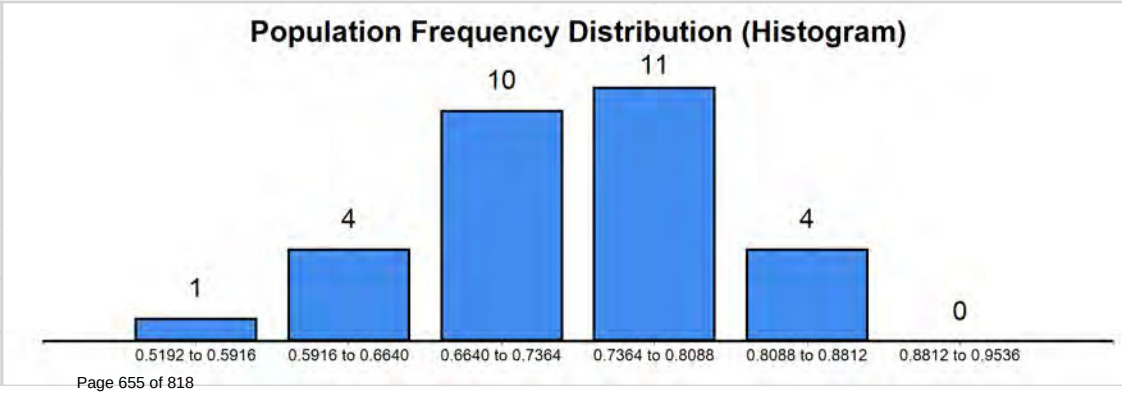
Beta Daily BKG - ARS1-B22-01124-06

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7364	Long B CPM	0.6778	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0724	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9536	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5192	CPM	0.7667	7 trending most recent points in a row.	**OK**
DER	1.0518	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

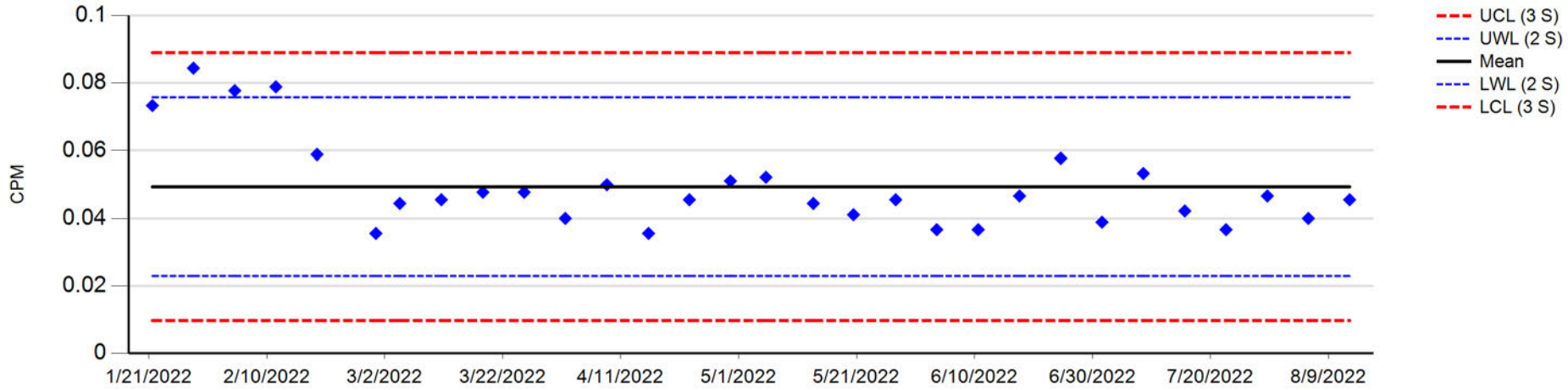
Bin	Frequency
0.5192 to 0.5916	1
0.5916 to 0.6640	4
0.6640 to 0.7364	10
0.7364 to 0.8088	11
0.8088 to 0.8812	4
0.8812 to 0.9536	0



Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0494	CPM	0.0456	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0132	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0890	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0097	CPM	0.0400	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

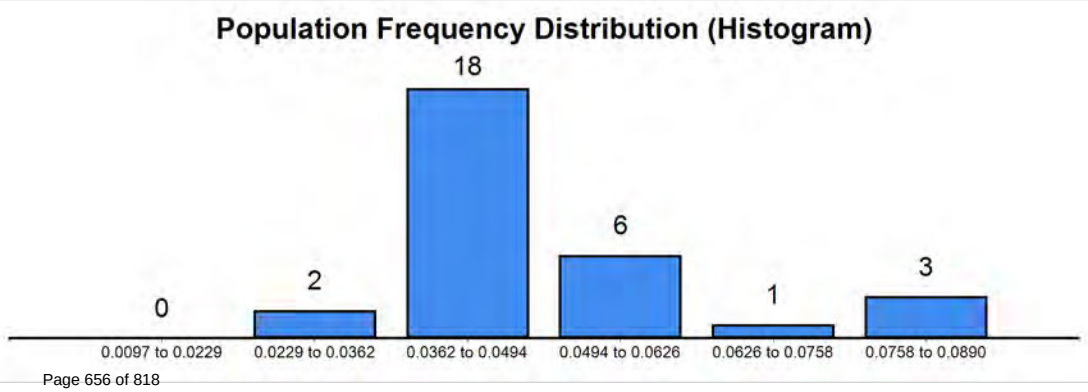
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR C3

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.0097 to 0.0229	0
0.0229 to 0.0362	2
0.0362 to 0.0494	18
0.0494 to 0.0626	6
0.0626 to 0.0758	1
0.0758 to 0.0890	3

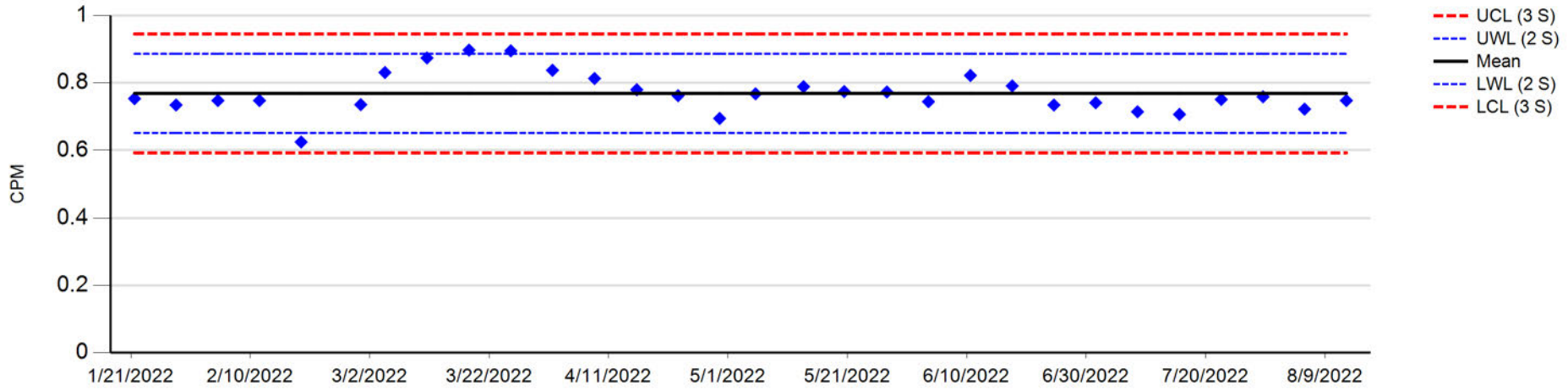


Beta Long BKG - ARS1-B22-01124-07

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7690	CPM	0.7478	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0589	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9457	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5923	CPM	0.7222	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

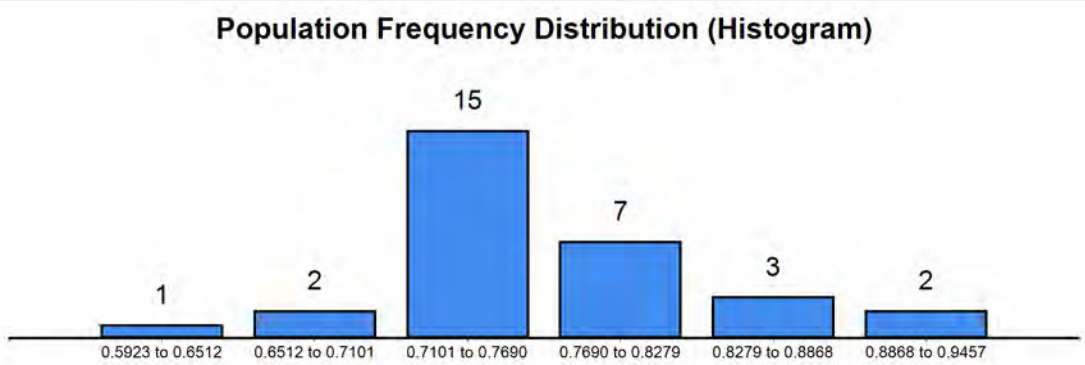
LB4200-D - BETA LONG BACKGROUND - DETECTOR C3

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.5923 to 0.6512	1
0.6512 to 0.7101	2
0.7101 to 0.7690	15
0.7690 to 0.8279	7
0.8279 to 0.8868	3
0.8868 to 0.9457	2

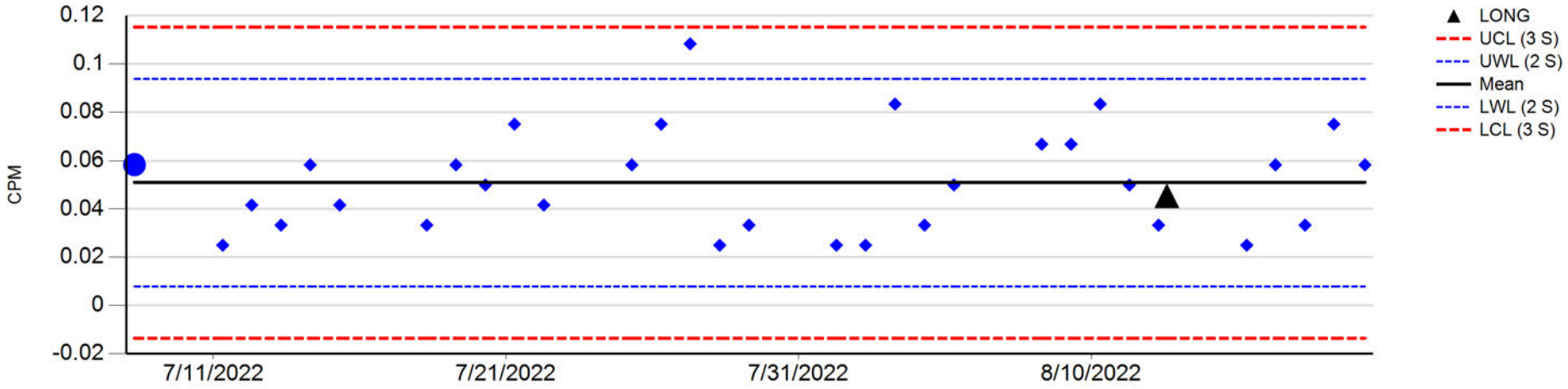


Alpha Daily BKG - ARS1-B22-01124-07

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0508	Long B CPM	0.0456	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0215	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1153	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0136	CPM	0.0750	7 trending most recent points in a row.	**OK**
DER	1.1328	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR C3

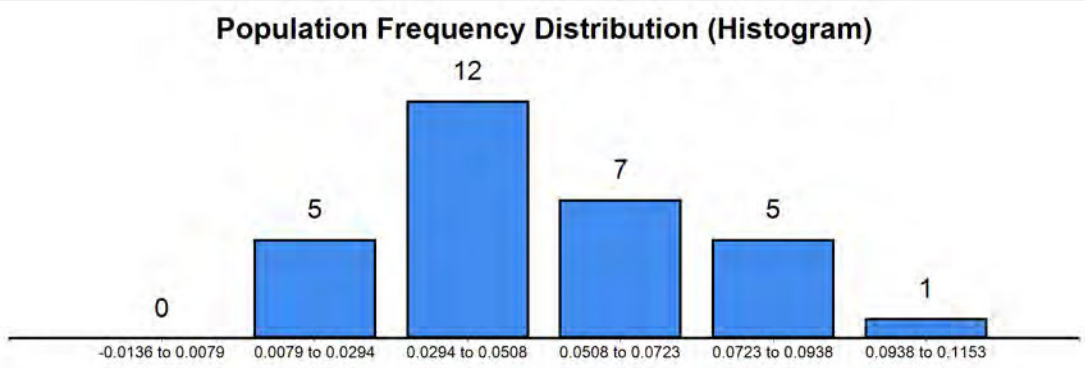
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

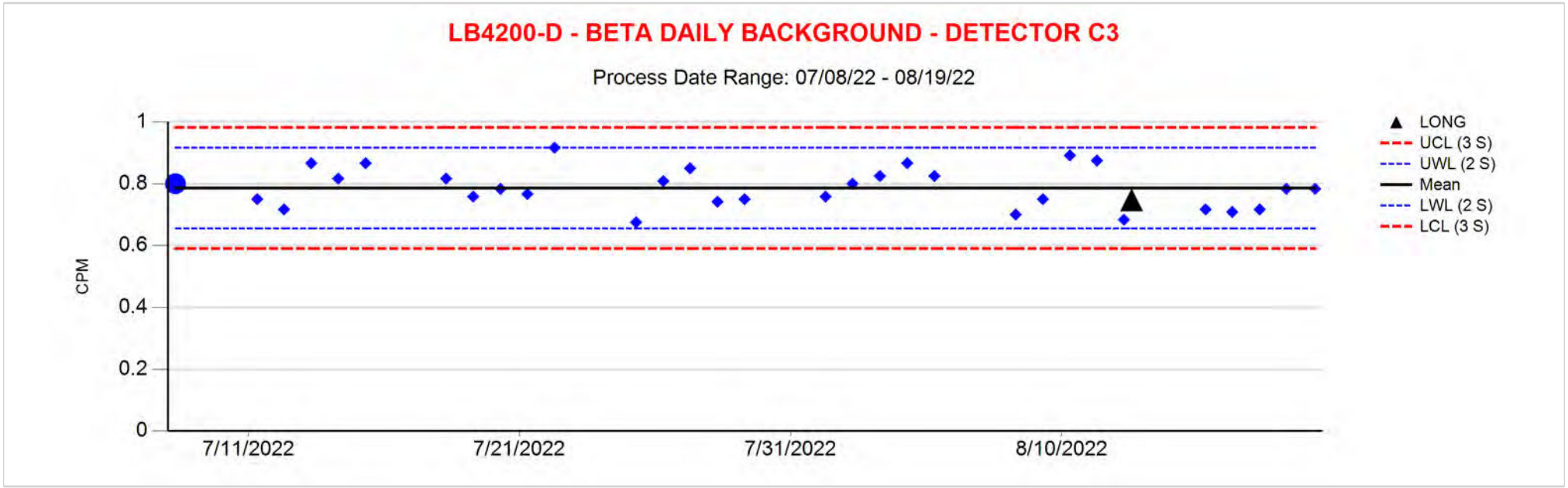
Statistical Process Control

Bin	Frequency
-0.0136 to 0.0079	0
0.0079 to 0.0294	5
0.0294 to 0.0508	12
0.0508 to 0.0723	7
0.0723 to 0.0938	5
0.0938 to 0.1153	1



Beta Daily BKG - ARS1-B22-01124-07

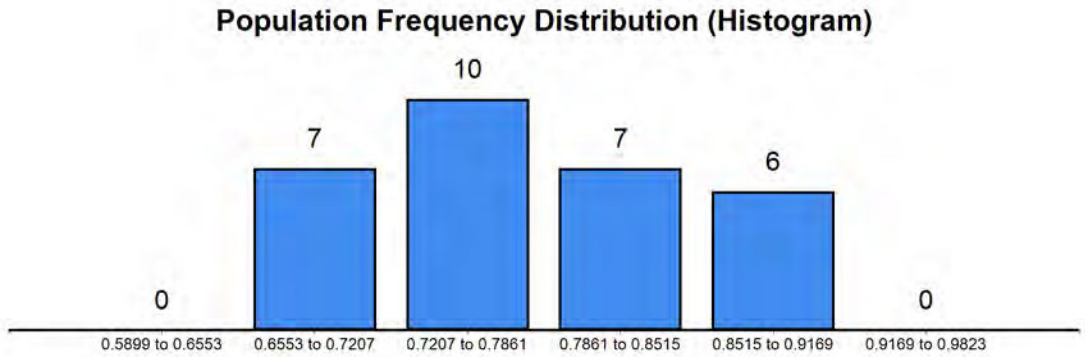
Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7861	Long B CPM	0.7478	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0654	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9823	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.5899	CPM	0.7833	7 trending most recent points in a row.	**OK**
DER	0.4145	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.5899 to 0.6553	0
0.6553 to 0.7207	7
0.7207 to 0.7861	10
0.7861 to 0.8515	7
0.8515 to 0.9169	6
0.9169 to 0.9823	0

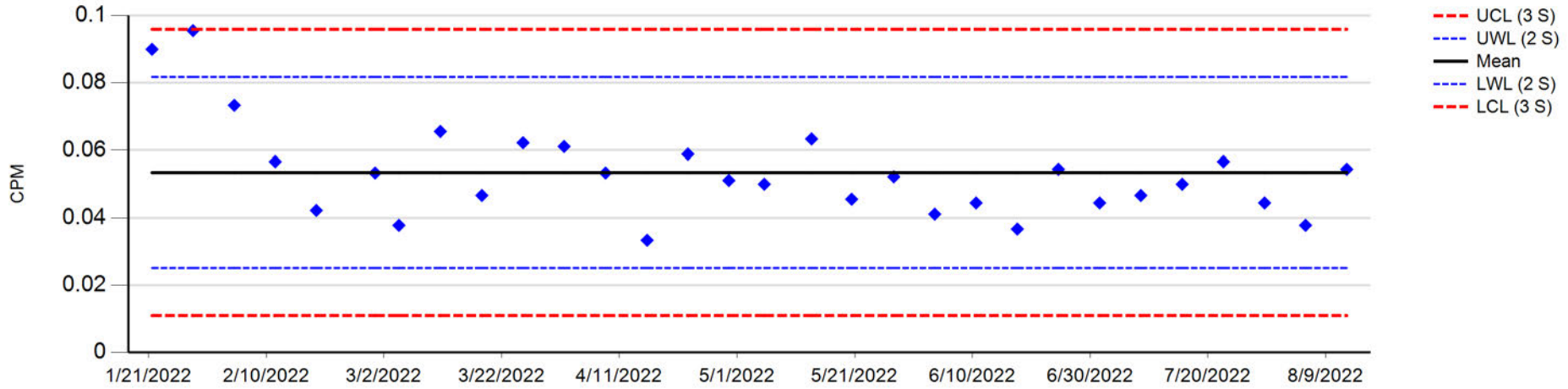


Alpha Long BKG - ARS1-B22-01124-08

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0534	CPM	0.0544	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0142	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0959	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0109	CPM	0.0378	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

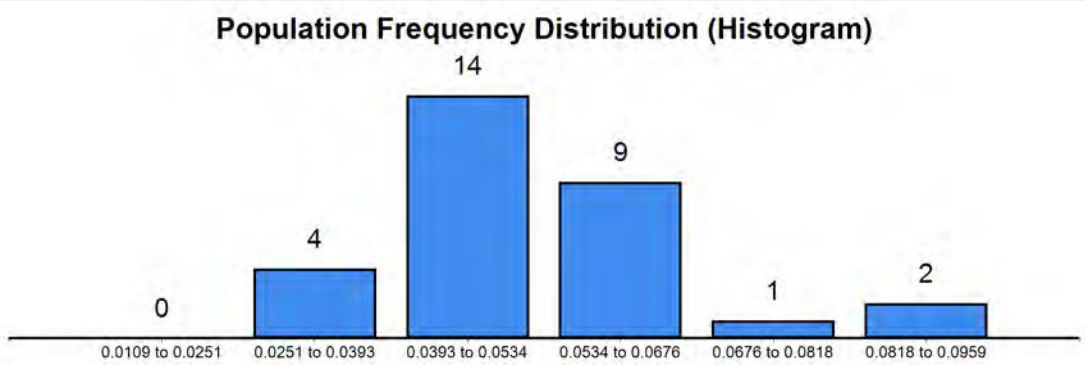
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR C4

Process Date Range: 01/21/22 - 08/12/22



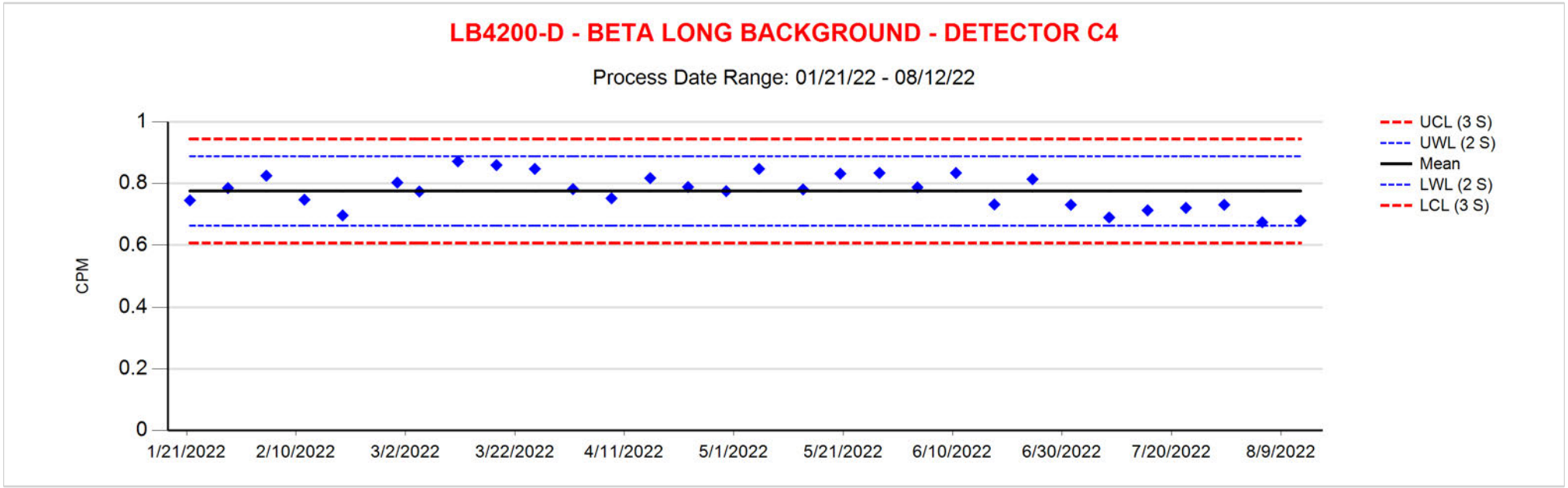
Statistical Process Control

Bin	Frequency
0.0109 to 0.0251	0
0.0251 to 0.0393	4
0.0393 to 0.0534	14
0.0534 to 0.0676	9
0.0676 to 0.0818	1
0.0818 to 0.0959	2



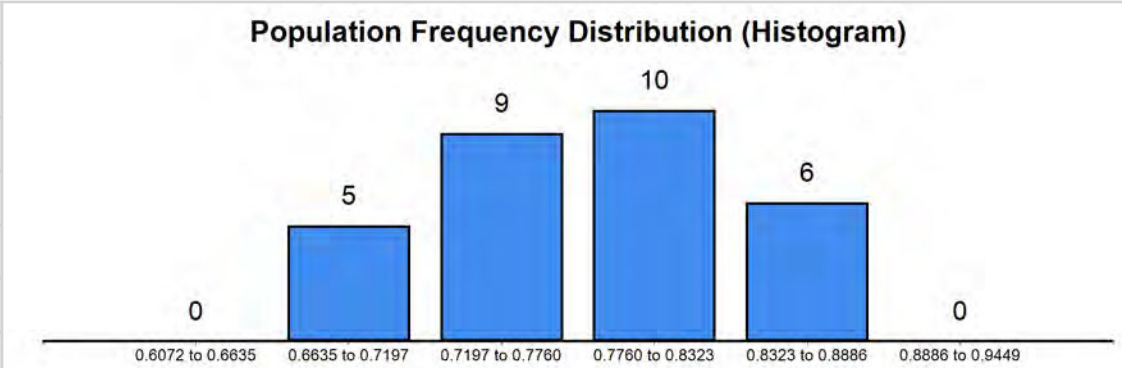
Beta Long BKG - ARS1-B22-01124-08

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7760	CPM	0.6800	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0563	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9449	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6072	CPM	0.6744	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.6072 to 0.6635	0
0.6635 to 0.7197	5
0.7197 to 0.7760	9
0.7760 to 0.8323	10
0.8323 to 0.8886	6
0.8886 to 0.9449	0

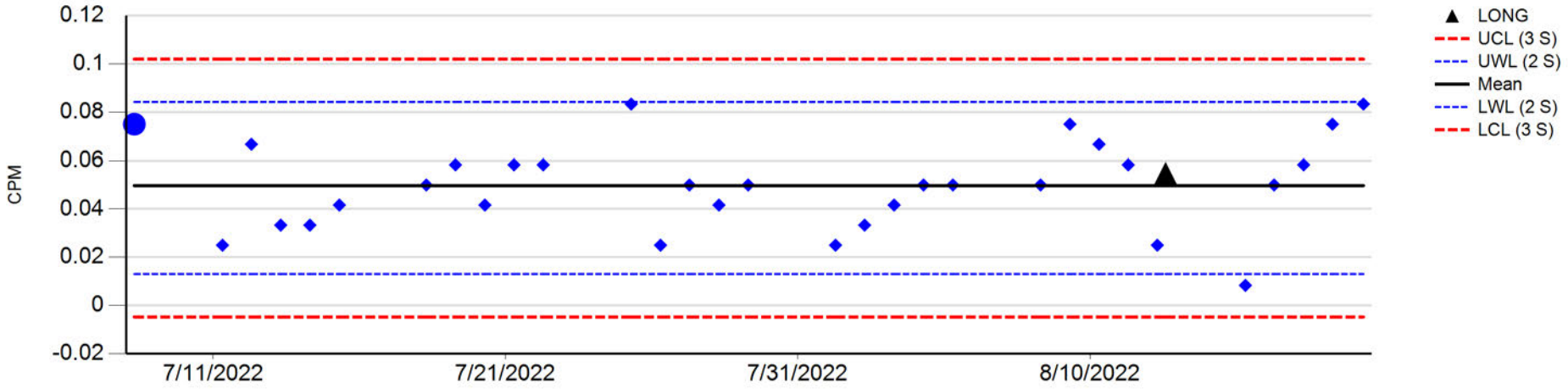


Alpha Daily BKG - ARS1-B22-01124-08

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0486	Long B CPM	0.0544	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0178	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1020	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0048	CPM	0.0750	7 trending most recent points in a row.	**OK**
DER	0.7851	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

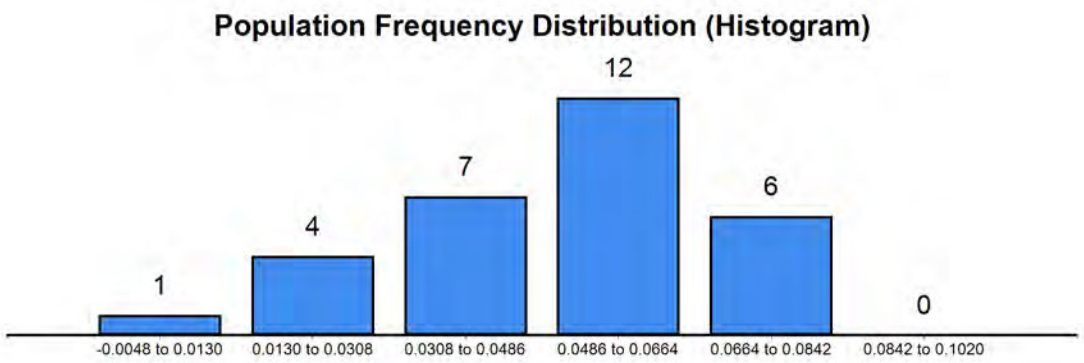
LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR C4

Process Date Range: 07/08/22 - 08/19/22



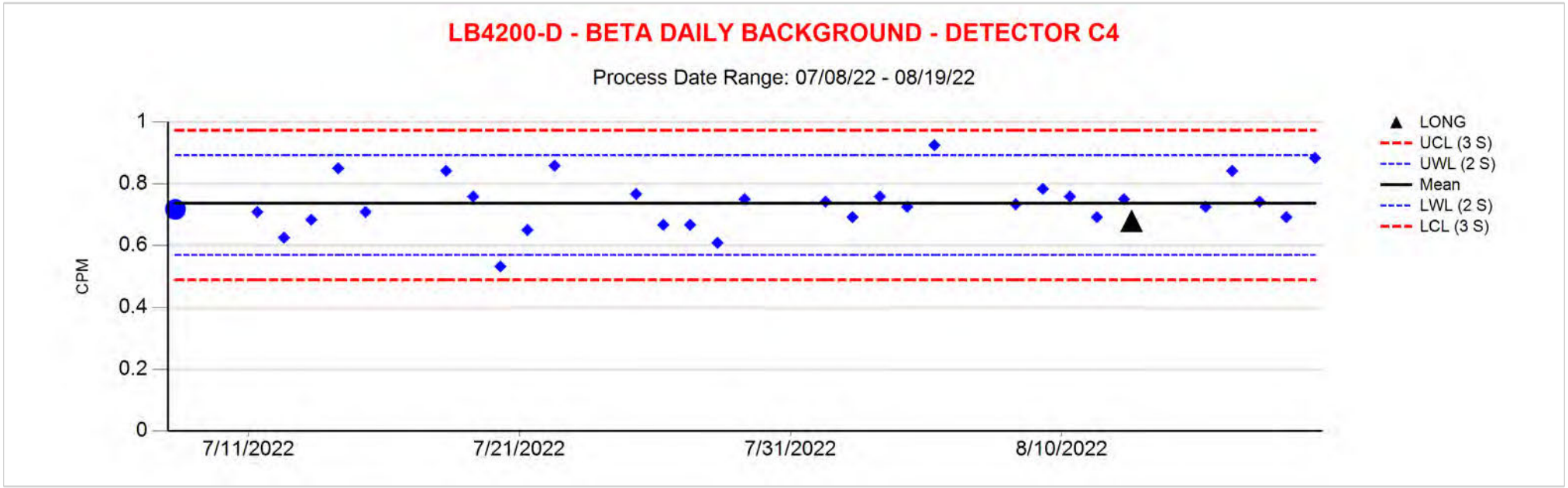
Statistical Process Control

Bin	Frequency
-0.0048 to 0.0130	1
0.0130 to 0.0308	4
0.0308 to 0.0486	7
0.0486 to 0.0664	12
0.0664 to 0.0842	6
0.0842 to 0.1020	0



Beta Daily BKG - ARS1-B22-01124-08

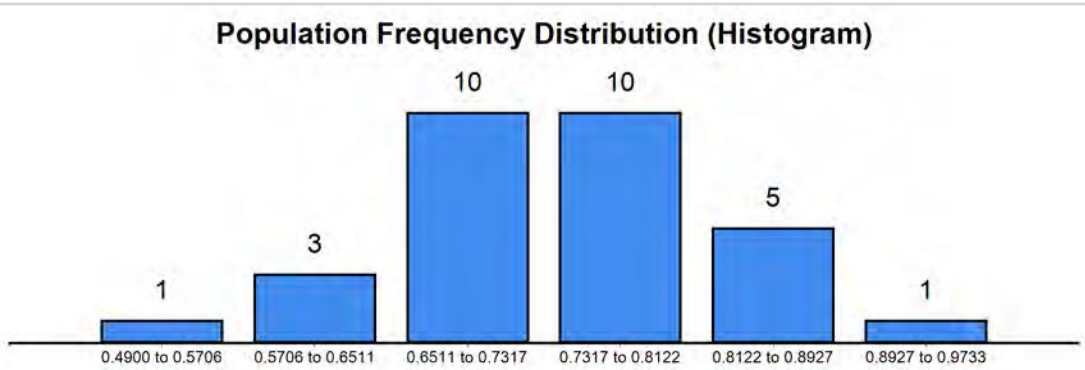
Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7317	Long B CPM	0.6800	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0805	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9733	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4900	CPM	0.6917	7 trending most recent points in a row.	**OK**
DER	0.1445	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.4900 to 0.5706	1
0.5706 to 0.6511	3
0.6511 to 0.7317	10
0.7317 to 0.8122	10
0.8122 to 0.8927	5
0.8927 to 0.9733	1

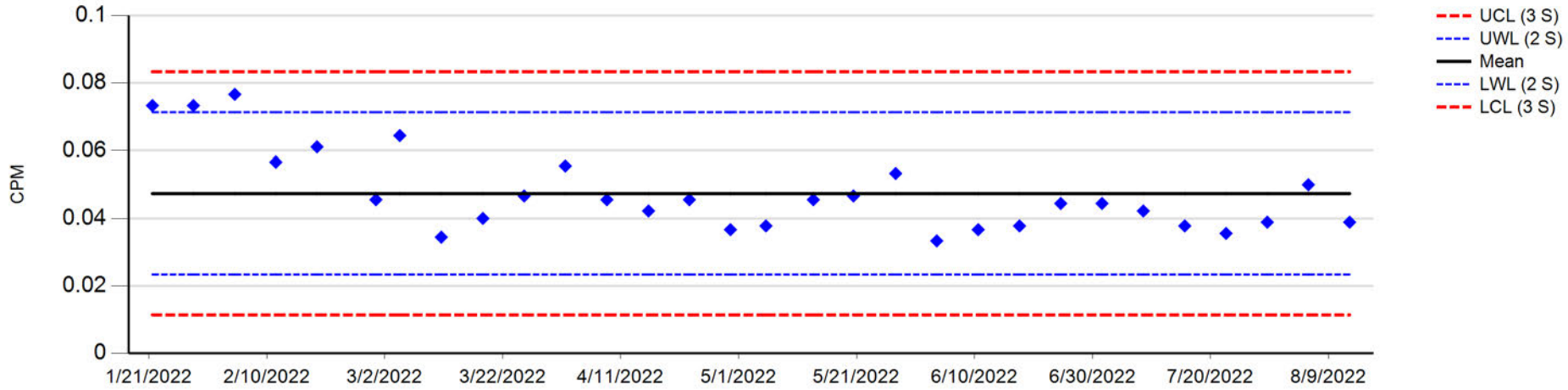


Alpha Long BKG - ARS1-B22-01124-09

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0474	CPM	0.0389	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0120	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0834	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0114	CPM	0.0500	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

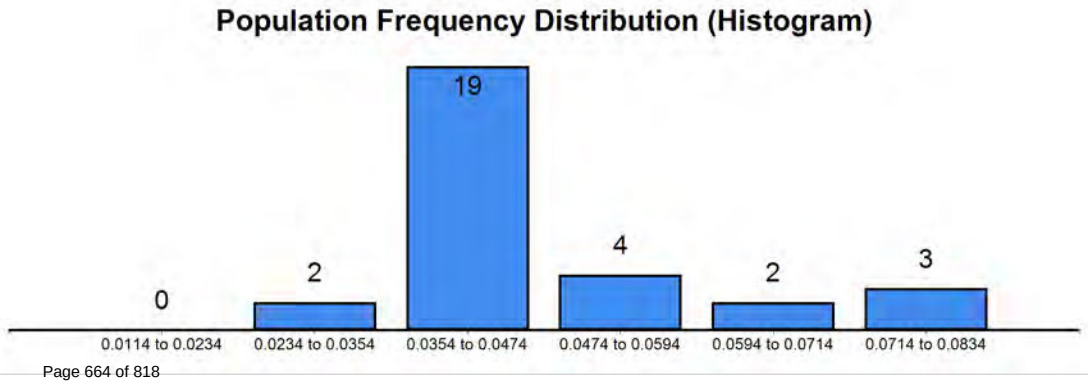
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR D1

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.0114 to 0.0234	0
0.0234 to 0.0354	2
0.0354 to 0.0474	19
0.0474 to 0.0594	4
0.0594 to 0.0714	2
0.0714 to 0.0834	3

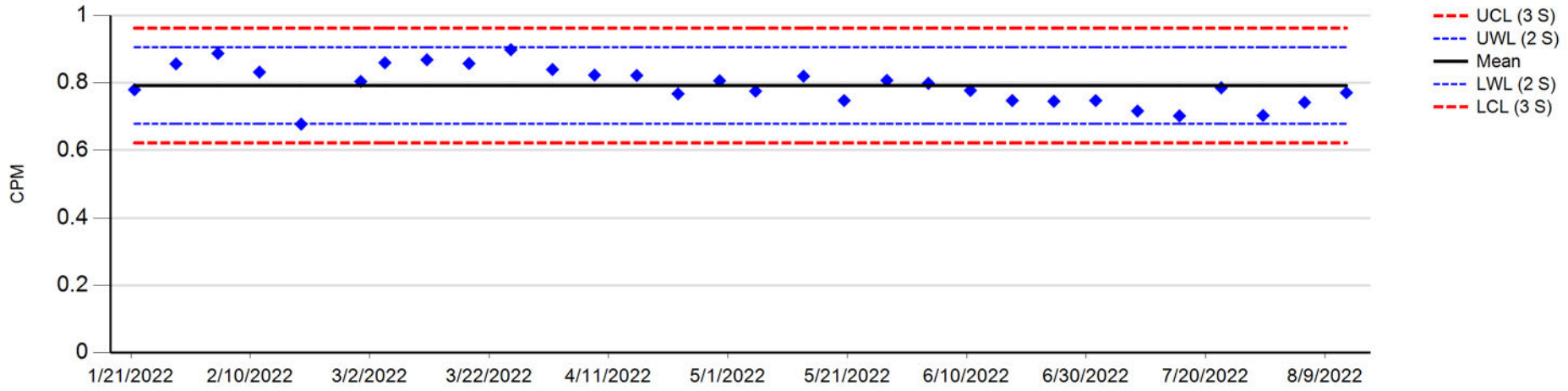


Beta Long BKG - ARS1-B22-01124-09

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7925	CPM	0.7711	8 consecutive most recent points on one side of the mean.	**INVESTIGATE**
Standard Deviation	0.0569	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.9630	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6219	CPM	0.7422	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA LONG BACKGROUND - DETECTOR D1

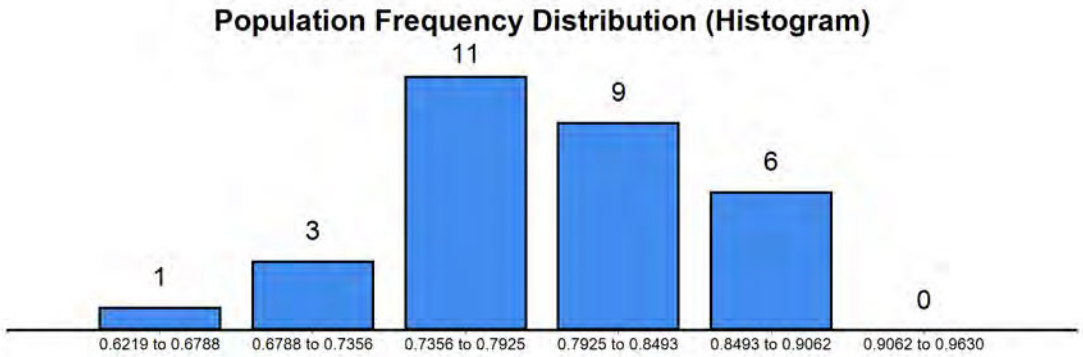
Process Date Range: 01/21/22 - 08/12/22



ARS Aleut Analytical

Statistical Process Control

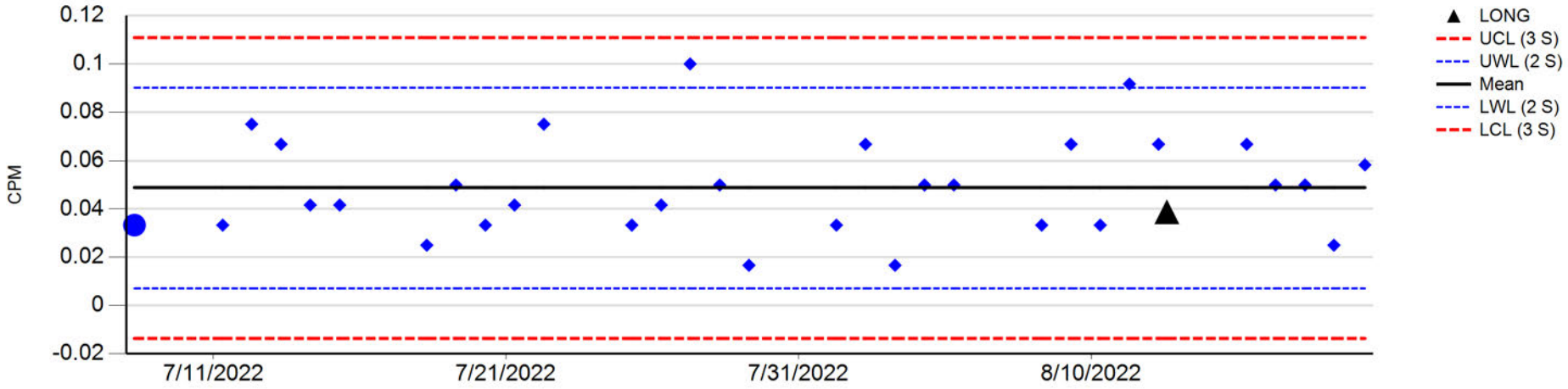
Bin	Frequency
0.6219 to 0.6788	1
0.6788 to 0.7356	3
0.7356 to 0.7925	11
0.7925 to 0.8493	9
0.8493 to 0.9062	6
0.9062 to 0.9630	0



Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0486	Long B CPM	0.0389	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0208	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1109	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0137	CPM	0.0250	7 trending most recent points in a row.	**OK**
DER	0.8757	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR D1

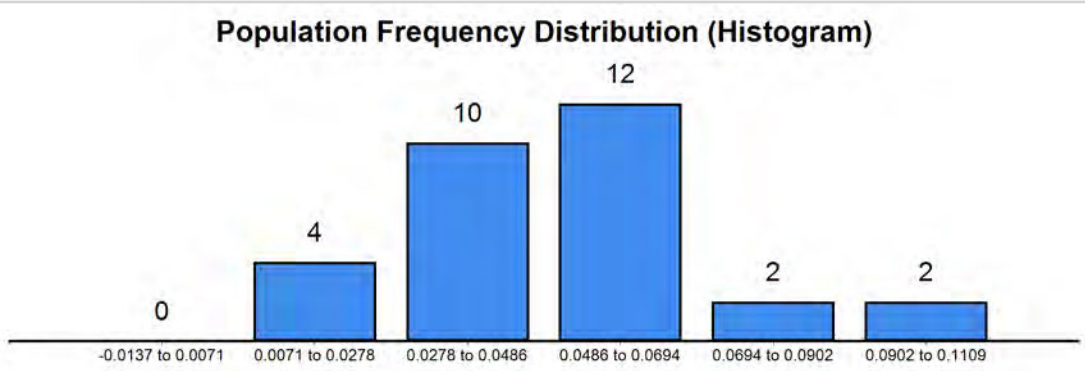
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

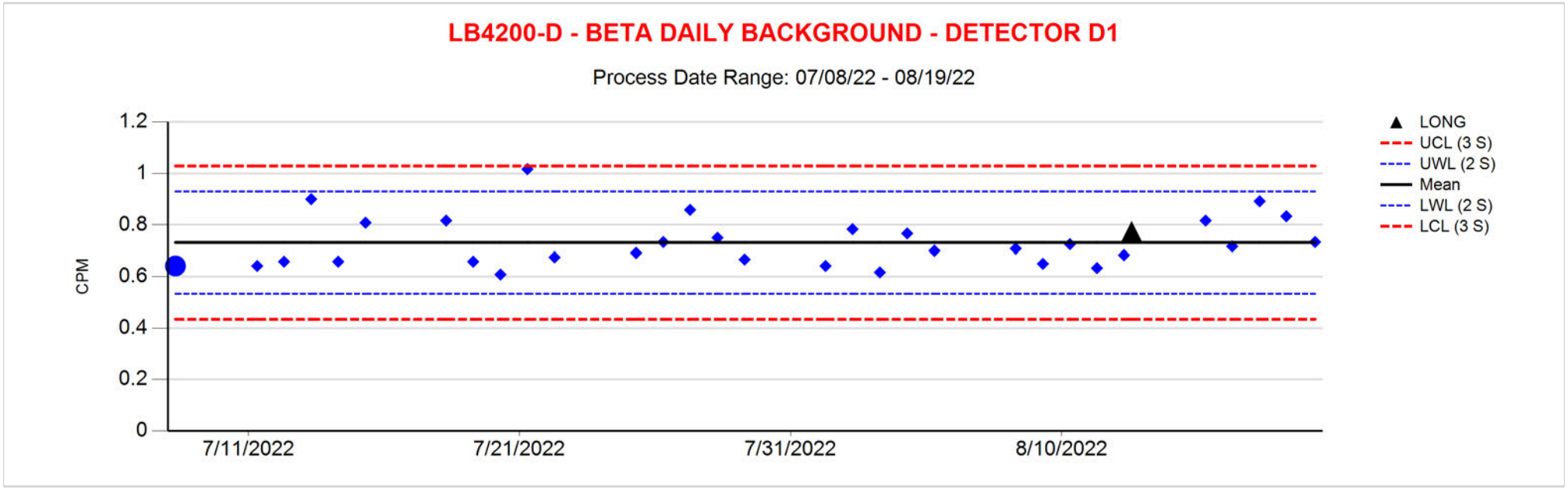
Statistical Process Control

Bin	Frequency
-0.0137 to 0.0071	0
0.0071 to 0.0278	4
0.0278 to 0.0486	10
0.0486 to 0.0694	12
0.0694 to 0.0902	2
0.0902 to 0.1109	2



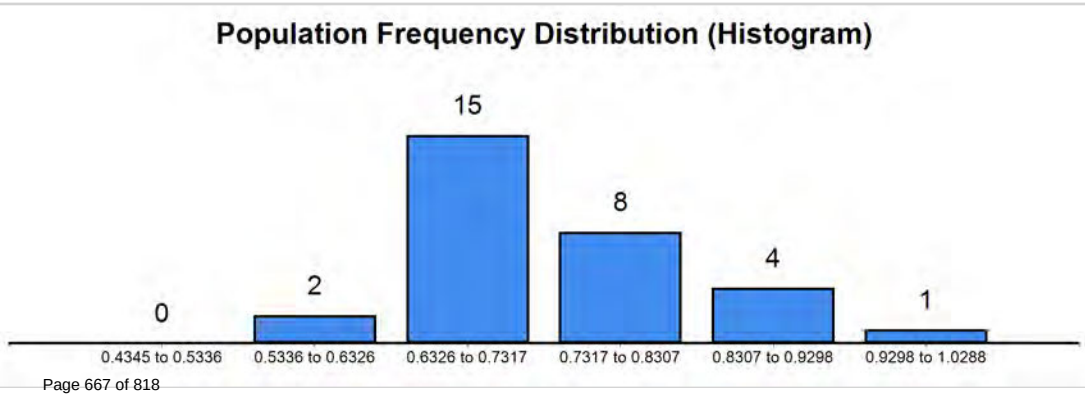
Beta Daily BKG - ARS1-B22-01124-09

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7317	Long B CPM	0.7711	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0990	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0288	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4345	CPM	0.8333	7 trending most recent points in a row.	**OK**
DER	0.7045	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**



Statistical Process Control

Bin	Frequency
0.4345 to 0.5336	0
0.5336 to 0.6326	2
0.6326 to 0.7317	15
0.7317 to 0.8307	8
0.8307 to 0.9298	4
0.9298 to 1.0288	1

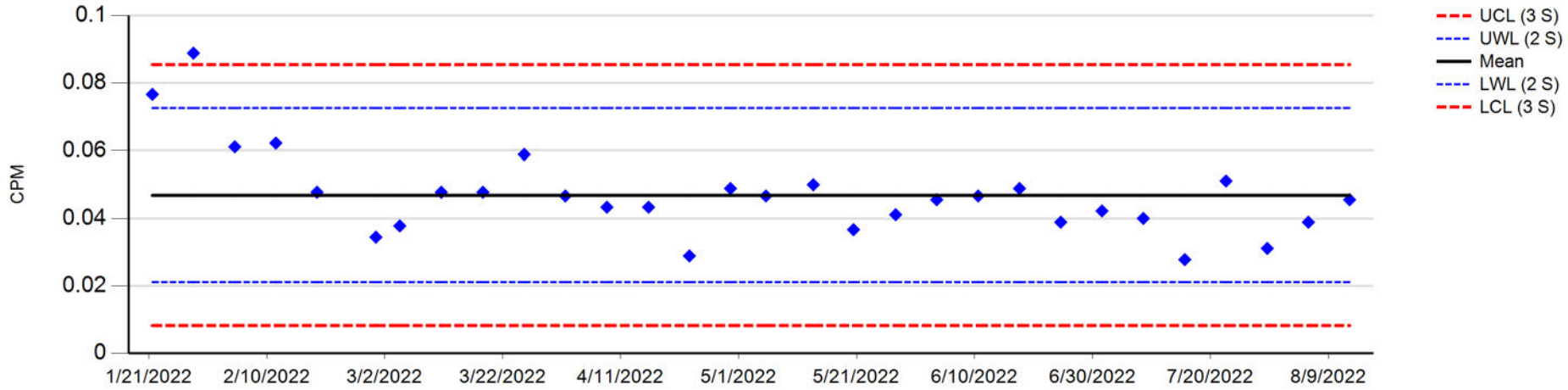


Alpha Long BKG - ARS1-B22-01124-10

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0469	CPM	0.0456	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0129	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.0855	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.0082	CPM	0.0389	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

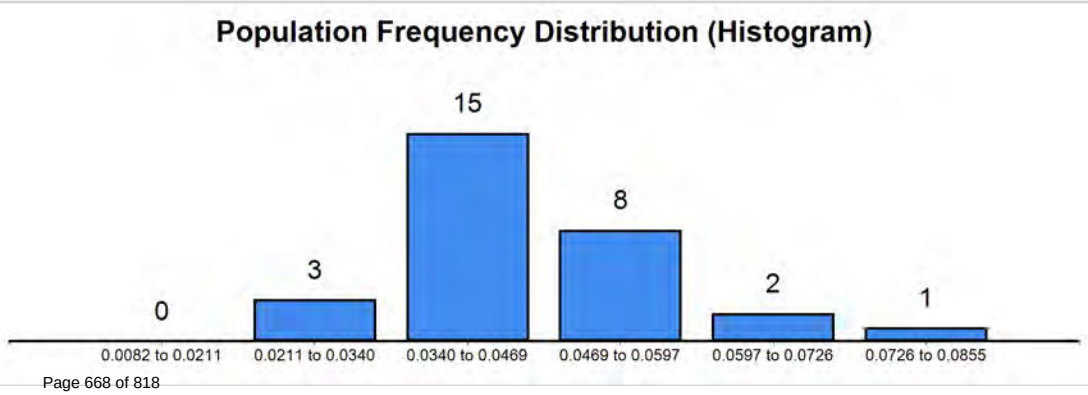
LB4200-D - ALPHA LONG BACKGROUND - DETECTOR D2

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.0082 to 0.0211	0
0.0211 to 0.0340	3
0.0340 to 0.0469	15
0.0469 to 0.0597	8
0.0597 to 0.0726	2
0.0726 to 0.0855	1

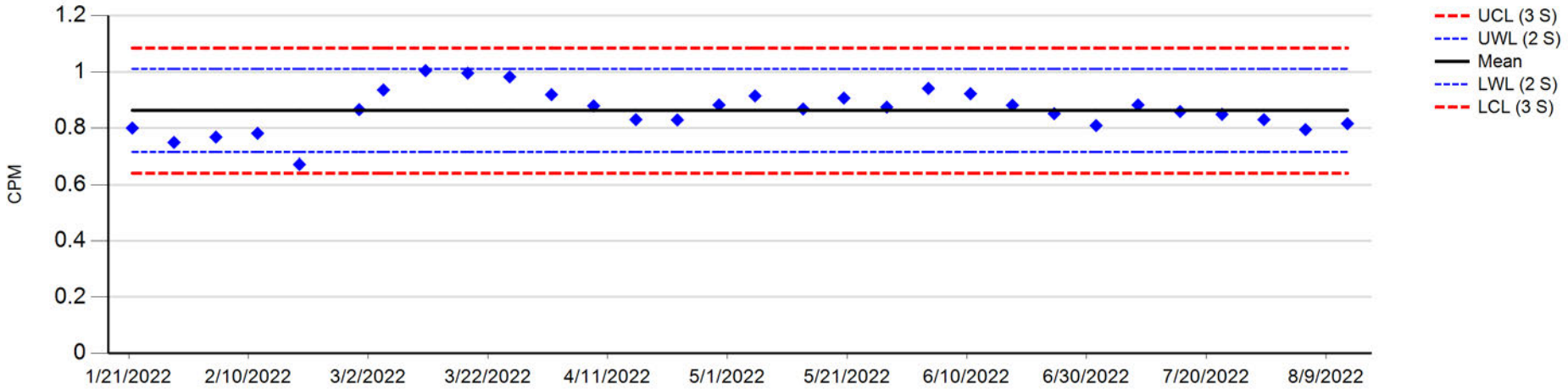


Beta Long BKG - ARS1-B22-01124-10

Population Statistics				Trending Analysis	
Population Size	**30**	Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.8630	CPM	0.8156	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0739	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.0848	Date	8/5/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.6412	CPM	0.7944	7 trending most recent points in a row.	**OK**
		Count Mins	900.00	15 most recent points inside 1 sigma.	**OK**
				8 most recent points outside 1 sigma.	**OK**

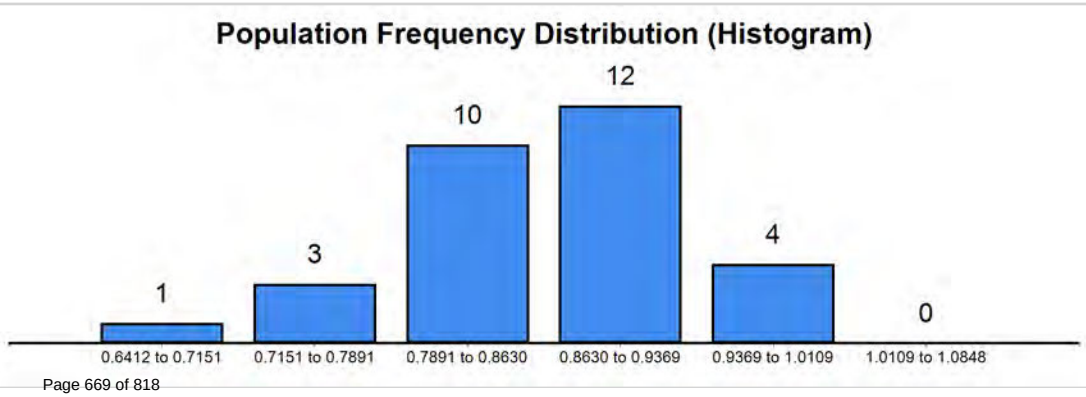
LB4200-D - BETA LONG BACKGROUND - DETECTOR D2

Process Date Range: 01/21/22 - 08/12/22



Statistical Process Control

Bin	Frequency
0.6412 to 0.7151	1
0.7151 to 0.7891	3
0.7891 to 0.8630	10
0.8630 to 0.9369	12
0.9369 to 1.0109	4
1.0109 to 1.0848	0

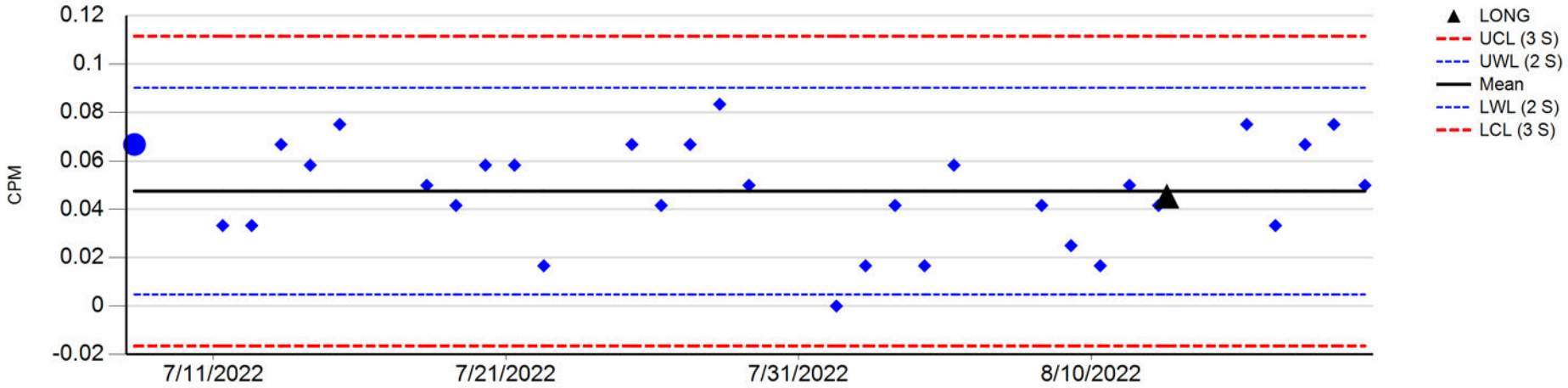


Alpha Daily BKG - ARS1-B22-01124-10

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.0475	Long B CPM	0.0456	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.0213	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	0.1115	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	-0.0165	CPM	0.0750	7 trending most recent points in a row.	**OK**
DER	1.1328	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - ALPHA DAILY BACKGROUND - DETECTOR D2

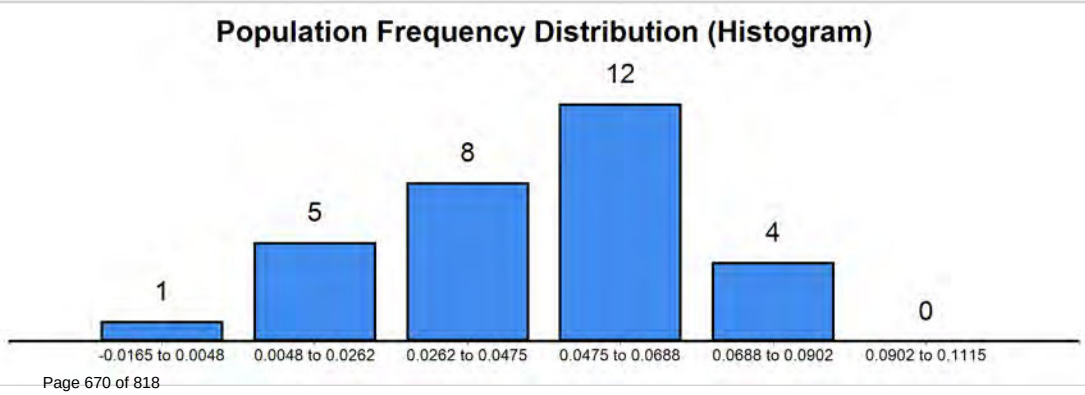
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
-0.0165 to 0.0048	1
0.0048 to 0.0262	5
0.0262 to 0.0475	8
0.0475 to 0.0688	12
0.0688 to 0.0902	4
0.0902 to 0.1115	0

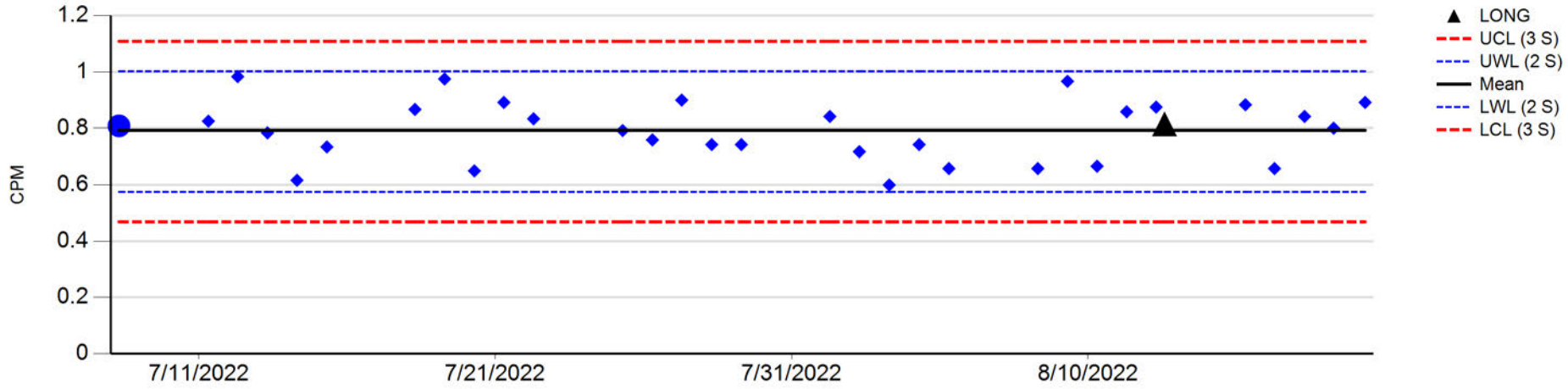


Beta Daily BKG - ARS1-B22-01124-10

Population Statistics				Trending Analysis	
Population Size	**30**	Long B Date	8/12/2022	Most recent point outside of the 3-sigma values.	**OK**
Average	0.7889	Long B CPM	0.8156	8 consecutive most recent points on one side of the mean.	**OK**
Standard Deviation	0.1067	Count Mins	900.00	2 of 3 most recent points above 2 sigma.	**OK**
+ 3-sigma value	1.1090	Date	8/18/2022	4 of 5 most recents points beyond the 1-sigma.	**OK**
- 3-sigma value	0.4688	CPM	0.8000	7 trending most recent points in a row.	**OK**
DER	0.1788	Count Mins	120.00	15 most recent points inside 1 sigma.	**OK**
DER Analysis	**OK**			8 most recent points outside 1 sigma.	**OK**

LB4200-D - BETA DAILY BACKGROUND - DETECTOR D2

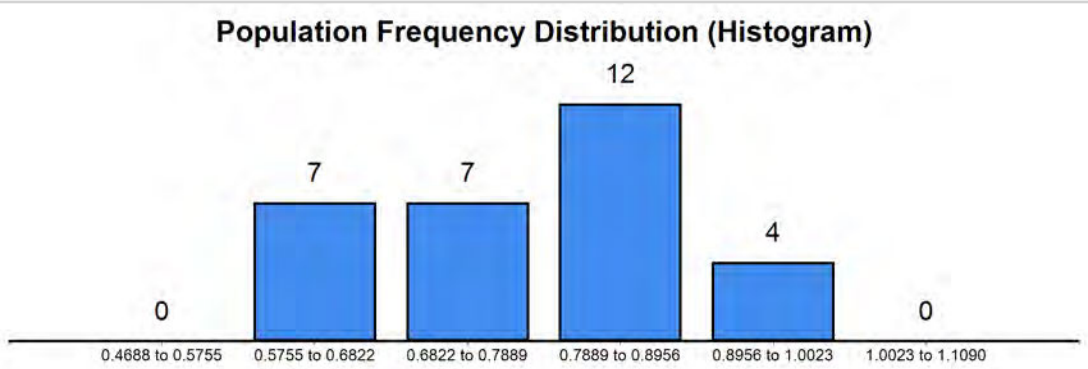
Process Date Range: 07/08/22 - 08/19/22



ARS Aleut Analytical

Statistical Process Control

Bin	Frequency
0.4688 to 0.5755	0
0.5755 to 0.6822	7
0.6822 to 0.7889	7
0.7889 to 0.8956	12
0.8956 to 1.0023	4
1.0023 to 1.1090	0



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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Ra-226 - Standards & Calibrations

Verification of and by Direct Gamma Spectrometric Comparison

ARS Aleut Analytical

Isotope being verified: Ra-226 **Halflife of Ra-226 (days)** 584400

Count ID (gamma spec file name)	First Standard solution ID	Standard solution activity (dpm/g or mL)	Standard solution added (g or mL)	Standard solution reference date	Det. ID*	Count date	decay (fract.)	Standard Solution activity at count (dpm)	Ra-226 peak net counts (bkg subtr.)	Count time (min)	Net response / dpm added (cnts/dpm)
ARS02800	S-0307	59.7709	50	8/26/2015	ARS02	10/8/2021	0.9974	2980.63	377	60	3.513E-05
ARS02801	S-0307	59.7709	50	8/26/2015	ARS02	10/8/2021	0.9974	2980.63	386	60	3.597E-05
ARS02802	S-0307	59.7709	50	8/26/2015	ARS02	10/8/2021	0.9974	2980.63	412	60	3.840E-05
										Average	3.650E-05
										Standard deviation	1.694E-06

Count ID (gamma spec file name)	Second Standard solution ID	Standard solution activity (dpm/g or mL)	Standard solution added (g or mL)	Standard solution reference date	Det. ID*	Count date	decay (fract.)	Standard Solution activity at count (dpm)	Ra-226 peak net counts (bkg subtr.)	Count time (min)	Net response / dpm added (cnts/dpm)
ARS02803	S-0155	59.9024	50	3/20/2007	ARS02	10/8/2021	0.9937	2976.29	418	60	3.901E-05
ARS02804	S-0155	59.9024	50	3/20/2007	ARS02	10/8/2021	0.9937	2976.29	392	60	3.659E-05
ARS02806	S-0155	59.9024	50	3/20/2007	ARS02	10/9/2021	0.9937	2976.29	404	60	3.771E-05
										Average	3.777E-05
										Standard deviation	1.214E-06

Comparison of Standards

	Net response in cpm/dpm for S-0307	Net response in cpm/dpm for S-0155	Relative difference (%)	Relative Uncertainty (%)
Average	3.650E-05	3.777E-05	3.4%	5.6%
Standard deviation	1.694E-06	1.214E-06	Acceptance	Acceptance
Relative Standard deviation	4.64%	3.22%	≤5%	≤10%

Per ARS-038

Reviewed by: [redacted] **Date:** 10-11-21

QA Approval: [redacted] **Date:** 10-11-2021

```
     ORTEC g v - i (32G3) Env32  G800W064  10/8/2021 9:11:40 AM
AAA                              Spectrum name: ARS02800.An1

Sample description
     Batch ID:  S-0307-V1
     SDG ID:  Ra-226  Tech:  EEC

Spectrum Filename: C:\User\ARS02800.An1

Acquisition information
       Start time:                10/8/2021 7:41:55 AM
       Live time:               3600
       Real time:               3607
       Dead time:                 0.18 %
       Detector ID:                 19

Detector system
     (ARS02) MCB 131


Calibration
       Filename:                  250mL jar 2079-79-2 calib 10-10-19.Clb
     250mL jar 2079-79-2
     10-10-19  EEC

       Energy Calibration
            Created:              10/10/2019 11:15:54 AM
            Zero offset:          0.421 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.079E-08 keV/channel^2

       Efficiency Calibration
            Created:              10/10/2019 1:02:43 PM
            Knee Energy:        120.15 keV
            Above the Knee:       Quadratic        Uncertainty =   1.52 %
            Log(Eff):            -1.912186E+00 + (-2.045736E-01*Log(E) ) +
                                 ( -3.683304E-02*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   0.51 %
            Log(Eff):            -1.187486E+01 + ( 3.636438E+00*Log(E) ) +
                                 ( -4.037865E-01*Log(E)^2 )

Library Files
       Main analysis library:     NORM.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G800W064
       Start channel:            10 (     2.92keV )
       Stop channel:           8000 (  1998.67keV )
       Peak rejection level:     40.000%
       Peak search sensitivity:   1
       Sample Size:               5.0000E-02 +/- 0.000E+00%
       Activity scaling factor:   1.0000E+06/(  1.0000E+00*  5.0000E-02) =
                                  2.0000E+07
       Detection limit method:    Reg. Guide 4.16 Method
```

ORTEC g v - i (32&3) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: ARS02800.An1

Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 0.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	norm.Pbc 10/1/2021 7:06:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1070

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/L	Nuc
13.32	265.	7.91	0.85	5.808E-03				
16.03	139.	15.43	0.85	7.593E-03				
46.66	536.	6.46	0.75	2.100E-02	46.52	4.000	8.592E+04	PB210
53.37	74.	25.16	0.60	2.240E-02				
74.85	394.	7.06	0.92	2.468E-02				
77.20	699.	4.93	0.92	2.479E-02				
84.09	49.	36.84	0.93	2.498E-02				
87.19	234.	10.03	0.93	2.502E-02				
186.14	409.	7.39	0.95	1.855E-02	186.10	3.500	8.715E+04	RA226
241.90	303.	7.92	1.00	1.585E-02	241.00	3.900	7.353E+04	RA224
					241.98	7.500	3.833E+04	PB214
295.00	686.	4.43	1.15	1.403E-02	295.21	18.500	3.928E+04	PB214
					296.00	80.000	9.194E+03	TL210
351.75	1138.	3.28	1.19	1.255E-02	351.92	35.800	3.764E+04	PB214
510.20	169.	12.81	2.78	9.858E-03	510.72	22.500	1.145E+04	TL208
609.45	921.	3.48	1.43	8.751E-03	609.31	44.791	3.482E+04	BI214
768.56	94.	15.06	1.33	7.464E-03	768.36	4.799	3.940E+04	BI214
785.50	22.	34.33	1.70	7.351E-03	785.42	2.000	2.287E+04	BI212
934.24	62.	21.76	2.13	6.513E-03	934.06	3.029	4.721E+04	BI214
1100.48	17.	35.67	0.93	5.790E-03				
1120.53	198.	7.99	1.90	5.716E-03	1120.29	14.797	3.515E+04	BI214
1238.18	88.	15.21	1.92	5.316E-03	1238.11	5.859	4.242E+04	BI214

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: ARS02800.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1281.22	46.	18.64	1.49	5.186E-03				
1377.39	56.	25.00	2.18	4.916E-03	1377.67	3.919	4.364E+04	BI214
1408.12	28.	27.43	2.19	4.838E-03	1410.00	5.000	1.728E+04	TL210
1661.42	16.	30.74	0.27	4.276E-03				
1764.46	200.	7.49	2.84	4.087E-03	1764.49	15.357	4.666E+04	BI214
1810.69	9.	33.33	0.37	4.008E-03				
1839.41	10.	36.74	2.56	3.961E-03				
1847.24	23.	23.98	2.57	3.948E-03				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.59	13.47	87.	265.	4.562E+04	15.82	0.850	BR-82	sD
62.43	16.18	159.	139.	1.826E+04	30.86	0.852	KR-85	sD
211.78	53.43	122.	74.	3.286E+03	50.32	0.600	CE-144	sM
297.71	74.84	190.	394.	1.596E+04	14.13	0.915	TH-234	D
307.09	77.18	243.	699.	2.819E+04	9.85	0.918	PB-212	D
334.64	84.12	140.	49.	1.970E+03	73.68	0.925	HG-203	sD
347.04	87.23	159.	234.	9.356E+03	20.06	0.929	PB-212	D
2039.42	510.18	60.	169.	1.714E+04	25.63	2.775	AG-108	sM
3141.20	785.60	14.	22.	3.047E+03	68.65	1.697	BI-212	sM
4402.15	1100.67	7.	17.	3.005E+03	71.34	0.933	J-135	s
5125.85	1280.91	7.	46.	8.947E+03	37.27	1.494	SR-91	s
5634.09	1407.99	9.	28.	5.747E+03	54.87	2.188	BI-214	s
6648.72	1661.61	2.	16.	3.671E+03	61.48	0.270	BI-214	s
7246.75	1810.69	0.	9.	2.245E+03	66.67	0.374	-	s
7361.83	1839.01	2.	10.	2.558E+03	73.48	2.562	Y-88	sD
7393.19	1846.83	3.	23.	5.725E+03	47.97	2.568	BI-214	sD

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: NORM.Lib

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: ARS02800.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	184.93	46.66	284.	480.	0.133	14.84	0.745s
RA-226	742.85	186.14	212.	377.	0.105	16.44	0.953
PB-214	965.92	241.90	106.	303.	0.084	15.85	1.003
PB-214	1178.35	295.00	96.	678.	0.188	9.02	1.147
PB-214	1405.41	351.75	91.	1126.	0.313	6.66	1.193
BI-214	2436.58	609.45	45.	909.	0.253	7.10	1.431
BI-214	3073.39	768.56	28.	94.	0.026	30.12	1.334
BI-214	3736.60	934.24	30.	62.	0.017	43.52	2.134s
BI-214	4482.40	1120.53	15.	198.	0.055	15.99	1.899
BI-214	4953.50	1238.18	19.	88.	0.024	30.42	1.919
BI-214	5512.13	1377.67	24.	56.	0.016	50.00	2.177s
BI-214	7061.53	1764.46	9.	195.	0.054	15.53	2.841

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/L	Peak Energy keV	Peak Activity pCi/L	Code	Peak MDA Value pCi/L		COMMENTS
RA-226		8.7152E+04				5.84E+05		
			186.10	8.715E+04	(P	1.633E+04	8.22E+00	3.50E+00 G
Ra-228		-1.1377E+03				2.10E+03		
			911.07	-1.138E+03	%(P	2.877E+03	2.23E+02	2.90E+01 G
			968.90	1.908E+03	&	4.176E+03	1.01E+02	1.75E+01 G
			338.40	9.717E+02	%	4.881E+03	2.02E+02	1.20E+01 G
			964.60	-4.184E+03	%	1.435E+04	1.57E+02	5.45E+00 G
PB-210		8.5917E+04				7.45E+03		
			46.52	8.592E+04	@(P	1.455E+04	7.42E+00	4.00E+00 G
U-238		-9.9438E+03				1.63E+12		
			63.29	-9.944E+03	%(P	1.634E+04	6.02E+01	3.90E+00 G
			92.80	-1.303E+04	% P	1.794E+04	6.01E+01	3.00E+00 G
			92.38	-1.371E+04	% P	2.126E+04	6.47E+01	2.57E+00 G
U-235		9.5737E+02				1.39E+09		
			143.76	9.574E+02	%(P	4.846E+03	1.97E+02	1.05E+01 G
			205.31	2.130E+03	%	1.093E+04	1.99E+02	4.70E+00 G
			163.35	5.320E+01	%	1.128E+04	8.19E+03	4.70E+00 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: ARS02800.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	3.4756E+03					4.68E+11	
		1460.75	3.476E+03	&(P	6.756E+03	8.48E+01	1.07E+01 G
PB-214	3.8215E+04					5.84E+05	
		351.92	3.764E+04	(P	1.573E+03	3.33E+00	3.58E+01 G
		295.21	3.928E+04	(P	2.794E+03	4.51E+00	1.85E+01 G
		241.98	3.833E+04	(	6.392E+03	7.92E+00	7.50E+00 G
BI-214	3.5235E+04					5.84E+05	
		609.31	3.482E+04	(P	1.301E+03	3.55E+00	4.48E+01 G
		1764.49	4.666E+04	+ P	3.980E+03	7.76E+00	1.54E+01 G
		1120.29	3.515E+04	(	3.685E+03	7.99E+00	1.48E+01 G
		1238.11	4.242E+04	+	1.110E+04	1.52E+01	5.86E+00 G
		768.36	3.940E+04	(	1.147E+04	1.51E+01	4.80E+00 G
		1377.67	4.364E+04	+	1.990E+04	2.50E+01	3.92E+00 G
		934.06	4.721E+04	+	2.150E+04	2.18E+01	3.03E+00 G
BI-212	2.2078E+03					2.10E+03	
		727.17	2.208E+03	&(	4.490E+03	8.78E+01	1.18E+01 G
		1620.56	-8.354E+02	%	2.418E+04	1.33E+03	2.75E+00 G
		785.42	-1.062E+04	%	4.035E+04	1.12E+02	2.00E+00 G
PB-212	5.9891E+01					2.10E+03	
		238.63	5.989E+01	%(P	2.308E+03	1.15E+03	4.31E+01 G
		300.09	-4.853E+03	%	4.794E+04	2.95E+02	3.27E+00 G
RA-223	-1.9440E+03					1.20E+07	
		269.39	-1.944E+03	%(	4.655E+03	9.40E+01	1.36E+01 G
		154.18	-3.774E+03	&	1.078E+04	1.13E+02	5.59E+00 G
		323.88	5.325E+03	&	1.292E+04	9.85E+01	3.90E+00 G
RA-224	-6.0042E+03					2.10E+03	
		241.00	-6.004E+03	%(	2.638E+04	1.32E+02	3.90E+00 G
TL-208	-5.4732E+02					2.10E+03	
		583.14	-5.473E+02	%(P	9.828E+02	1.34E+02	8.60E+01 G
		510.72	-1.377E+03	%	5.277E+03	1.14E+02	2.25E+01 G
		860.47	-1.451E+03	%	7.411E+03	2.28E+02	1.20E+01 G
		277.36	-2.483E+03	%	9.375E+03	1.47E+02	6.50E+00 G
		763.30	1.570E+03	%	7.489E+04	1.39E+03	1.70E+00 G
TL-210	-4.4084E+02					5.84E+05	
		795.00	-4.408E+02	%(	8.588E+02	8.86E+01	1.00E+02 G
		296.00	6.794E+01	%	1.827E+03	8.01E+02	8.00E+01 G
		1310.00	-2.383E+03	%	4.613E+03	9.52E+01	2.10E+01 G
		1210.00	1.797E+03	%	3.582E+03	9.29E+01	1.70E+01 G
		1110.00	2.485E+02	%	9.033E+03	1.58E+03	7.00E+00 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: AR$02800.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		860.00	-2.176E+03 %		1.108E+04	2.25E+02	7.00E+00 G
		1410.00	-9.197E+03 %		2.463E+04	8.01E+01	5.00E+00 G
BE-7	-1.8873E+03					5.34E+01	
		477.56	-1.887E+03 %(		6.824E+03	1.52E+02	1.03E+01 G
NA-22	2.9642E+02					9.50E+02	
		1274.54	2.964E+02 %(		1.199E+03	1.19E+02	9.99E+01 G
PA-234	4.8945E+02					1.65E+12	
		98.44	4.895E+02 %(		1.477E+03	1.12E+02	2.51E+01 G
		946.00	1.280E+03 %		3.383E+03	1.21E+02	2.00E+01 G
		131.28	-7.171E+02 %		2.452E+03	1.34E+02	2.00E+01 G
		94.67	-1.156E+03 %		3.214E+03	1.04E+02	1.55E+01 G
		883.24	3.142E+03 %		7.058E+03	1.01E+02	1.20E+01 G
		926.70	7.645E+02 %		1.212E+04	4.61E+02	1.10E+01 G
		569.26	-3.361E+03 %		7.090E+03	8.95E+01	1.04E+01 G
		111.00	-8.565E+02 %		5.082E+03	2.20E+02	8.55E+00 G
		733.00	-3.571E+03 %		8.227E+03	1.00E+02	8.50E+00 G
		949.00	5.981E+02 &		9.948E+03	7.49E+02	7.80E+00 G
		880.51	-6.126E+03 %		1.466E+04	1.08E+02	6.50E+00 G
		226.87	-1.262E+03 %		8.771E+03	2.69E+02	6.50E+00 G
		831.10	4.955E+03 %		9.867E+03	8.86E+01	5.60E+00 G
		808.10	5.952E+03 &		1.444E+04	1.09E+02	4.90E+00 G
		99.70	-2.996E+03 &		8.586E+03	1.07E+02	4.70E+00 G
		699.10	3.413E+03 %		1.387E+04	1.74E+02	4.60E+00 G
		898.60	2.244E+03 %		1.806E+04	3.51E+02	4.00E+00 G
		1394.10	8.521E+03 %		1.489E+04	8.33E+01	3.90E+00 G
IR-192	-2.6117E+02					7.40E+01	
		316.49	-2.612E+02 %(		7.080E+02	1.11E+02	8.70E+01 G K
		468.06	8.619E+02 %		1.010E+03	5.08E+01	5.18E+01 G K
		308.44	-6.934E+01 %		1.773E+03	1.02E+03	3.18E+01 G K
		604.40	-3.768E+03 &		2.931E+04	2.33E+02	8.90E+00 G K
		612.45	-1.537E+03 %		4.433E+04	8.61E+02	5.80E+00 G K
		588.60	-2.550E+03 %		1.421E+04	2.30E+02	4.60E+00 G K
		205.78	4.760E+03 &		1.442E+04	1.18E+02	3.49E+00 G
		484.54	-4.101E+03 %		1.977E+04	2.01E+02	3.35E+00 G
SC-46	-4.8473E+02					8.38E+01	
		889.26	-4.847E+02 &(		1.001E+03	9.40E+01	1.00E+02 G
TL-201	-4.6188E+02					3.06E+00	
		70.82	-4.619E+02 %(		2.686E+03	1.75E+02	4.90E+01 G
		68.89	-2.363E+02 %		2.035E+03	3.21E+02	2.89E+01 G
		80.20	-1.160E+03 &		8.388E+03	2.18E+02	1.69E+01 G
		167.43	1.633E+03 %		4.312E+03	1.04E+02	1.19E+01 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: ARS02800.An1

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 9:11:40 AM
AAA Spectrum name: ARS02800.An1

RA-223	#A	-1.9440E+03	3.6560E+03	3.6577E+03	0.466E+04
RA-224	#A	-6.0042E+03	1.5798E+04	1.5802E+04	0.264E+05
TL-208	#A	-5.4732E+02	1.4659E+03	1.4663E+03	0.983E+03
TL-210	#A	-4.4084E+02	7.8124E+02	7.8169E+02	0.859E+03
BE-7	#A	-1.8873E+03	5.7362E+03	5.7373E+03	0.682E+04
NA-22	#A	2.9642E+02	7.0484E+02	7.0507E+02	0.120E+04
PA-234	#A	4.8945E+02	1.1001E+03	1.1006E+03	0.148E+04
IR-192	#B	-2.6117E+02	5.7742E+02	5.7765E+02	0.708E+03
SC-46	#A	-4.8473E+02	9.1122E+02	9.1169E+02	0.100E+04
TL-201	#A	-4.6188E+02	1.6171E+03	1.6175E+03	0.269E+04

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (2.9 to 1998.7 keV) 2.465E+05 pCi/L

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAA

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

Sample description
Batch ID: S-0307-V2
SDG ID: Ra-226 Tech: EEC

Spectrum Filename: C:\User\ARS02801.An1

Acquisition information
Start time: 10/8/2021 9:11:07 AM
Live time: 3600
Real time: 3606
Dead time: 0.18 %
Detector ID: 19

Detector system
(ARS02) MCB 131

Calibration
Filename: 250mL jar 2079-79-2 calib 10-10-19.Clb
250mL jar 2079-79-2
10-10-19 EEC

Energy Calibration
Created: 10/10/2019 11:15:54 AM
Zero offset: 0.421 keV
Gain: 0.250 keV/channel
Quadratic: -3.079E-08 keV/channel^2

Efficiency Calibration
Created: 10/10/2019 1:02:43 PM
Knee Energy: 120.15 keV
Above the Knee: Quadratic Uncertainty = 1.52 %
Log(Eff): -1.912186E+00 + (-2.045736E-01*Log(E)) +
(-3.683304E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.51 %
Log(Eff): -1.187486E+01 + (3.636438E+00*Log(E)) +
(-4.037865E-01*Log(E)^2)

Library Files
Main analysis library: NORM.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.92keV)
Stop channel: 8000 (1998.67keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 5.0000E-02 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/(1.0000E+00* 5.0000E-02) =
2.0000E+07
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	norm.Pbc 10/1/2021 7:06:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %

Energy Calibration
Normalized diff: 0.1590

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/L	Nuc
13.42	157.	12.97	1.07	5.773E-03				
46.64	482.	6.70	0.80	2.100E-02	46.52	4.000	7.617E+04	PB210
53.45	83.	22.22	0.95	2.240E-02				
72.14	49.	36.23	0.91	2.453E-02				
74.88	401.	6.85	0.92	2.468E-02				
77.16	592.	5.17	0.92	2.478E-02				
79.52	51.	38.42	0.92	2.487E-02	80.20	16.900	1.822E+03	TL201
83.89	46.	38.34	0.93	2.498E-02				
87.17	161.	13.55	0.93	2.502E-02				
89.95	51.	34.58	0.93	2.503E-02				
186.08	418.	7.78	1.19	1.854E-02	186.10	3.500	8.919E+04	RA226
241.83	262.	8.26	1.05	1.585E-02	241.00	3.900	6.340E+04	RA224
					241.98	7.500	3.305E+04	PB214
295.01	585.	5.03	1.21	1.403E-02	295.21	18.500	3.345E+04	PB214
					296.00	80.000	7.845E+03	TL210
351.68	1003.	3.49	1.25	1.256E-02	351.92	35.800	3.312E+04	PB214
510.81	200.	11.79	3.33	9.850E-03	510.72	22.500	1.353E+04	TL208
609.37	792.	3.92	1.45	8.751E-03	609.31	44.791	2.986E+04	BI214
768.50	80.	14.67	1.62	7.464E-03	768.36	4.799	3.332E+04	BI214
934.67	52.	16.61	1.12	6.507E-03	934.06	3.029	3.967E+04	BI214
1094.96	17.	34.82	1.92	5.812E-03				
1102.95	10.	35.92	1.93	5.781E-03				

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1120.50	173.	8.77	1.37	5.715E-03	1120.29	14.797	3.067E+04	BI214
1238.43	83.	12.96	1.64	5.315E-03	1238.11	5.859	3.982E+04	BI214
1310.00	18.	23.57	2.12	5.101E-03	1310.00	21.000	2.523E+03	TL210
1377.96	49.	15.72	0.74	4.915E-03	1377.67	3.919	3.834E+04	BI214
1408.20	26.	30.28	0.60	4.837E-03	1410.00	5.000	1.616E+04	TL210
1620.56	10.	31.62	2.38	4.357E-03	1620.56	2.750	1.253E+04	BI212
1658.95	18.	23.57	0.69	4.278E-03				
1730.03	43.	18.62	0.33	4.148E-03				
1764.60	160.	7.91	2.09	4.087E-03	1764.49	15.357	3.719E+04	BI214
1847.88	26.	19.61	1.66	3.947E-03				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.97	13.42	116.	157.	2.713E+04	25.94	1.067	SE-75	s
212.08	53.41	108.	83.	3.715E+03	44.45	0.951	CE-144	
286.86	72.12	134.	49.	2.003E+03	72.46	0.913	AU-196	D
297.82	74.86	177.	401.	1.625E+04	13.70	0.915	TH-234	D
306.93	77.13	172.	592.	2.390E+04	10.33	0.918	PB-212	D
316.37	79.50	165.	51.	2.043E+03	76.84	0.920	BA-133	sD
333.86	83.87	134.	46.	1.853E+03	76.68	0.925	HG-203	D
346.98	87.15	157.	161.	6.431E+03	27.09	0.929	TH-234	sD
358.09	89.92	129.	51.	2.031E+03	69.16	0.932	AC-228	sD
2041.86	510.83	57.	200.	2.028E+04	23.57	3.330	TL-208	s
4380.05	1094.90	9.	17.	2.879E+03	69.64	1.925	TL-208	sD
4412.01	1102.88	1.	10.	1.676E+03	71.85	1.932	CE-143	sD
5634.40	1408.13	9.	26.	5.375E+03	60.57	0.603	EU-152	s
6638.80	1660.84	0.	18.	4.208E+03	47.14	0.686	BI-214	s
6923.58	1730.04	4.	43.	1.034E+04	37.24	0.332	BI-214	s
7395.75	1847.88	0.	26.	6.588E+03	39.22	1.664	BI-214	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: NORM.Lib

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	184.86	46.64	264.	425.	0.118	15.68	0.802
RA-226	742.63	186.08	225.	386.	0.107	17.22	1.187
PB-214	965.66	241.83	85.	262.	0.073	16.51	1.055
PB-214	1178.41	295.01	95.	578.	0.161	10.25	1.215
PB-214	1405.13	351.68	83.	991.	0.275	7.11	1.246
BI-214	2436.25	609.37	55.	780.	0.217	8.02	1.449
BI-214	3073.16	768.50	14.	80.	0.022	29.34	1.616
BI-214	3738.31	934.67	7.	52.	0.014	33.22	1.121s
BI-214	4482.29	1120.50	13.	173.	0.048	17.54	1.368s
BI-214	4954.52	1238.43	8.	83.	0.023	25.91	1.640
TL-210	5241.12	1310.00	0.	18.	0.005	47.14	2.118s
BI-214	5512.13	1377.67	6.	47.	0.013	38.53	2.177s
BI-212	6485.02	1620.56	0.	10.	0.003	63.25	2.383s
BI-214	7062.09	1764.60	5.	155.	0.043	16.57	2.090

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/L	Peak Energy keV	Peak Activity pCi/L	Peak Code	Peak MDA Value pCi/L	Peak COMMENTS
RA-226		8.9187E+04				5.84E+05	
			186.10	8.919E+04	(P	1.681E+04 8.61E+00 3.50E+00	G
Ra-228		-9.8146E+02				2.10E+03	
			911.07	-9.815E+02	%(P	2.901E+03 2.51E+02 2.90E+01	G
			968.90	1.908E+03	%	3.710E+03 8.95E+01 1.75E+01	G
			338.40	1.166E+03	&	4.700E+03 1.62E+02 1.20E+01	G
			964.60	-5.771E+02	%	1.350E+04 1.05E+03 5.45E+00	G
PB-210		7.6175E+04				7.45E+03	
			46.52	7.617E+04	(P	1.404E+04 7.84E+00 4.00E+00	G
U-238		-7.3652E+03				1.63E+12	
			63.29	-7.365E+03	%(P	1.484E+04 7.65E+01 3.90E+00	G
			92.80	-4.831E+03	% P	4.841E+04 3.00E+02 3.00E+00	G
			92.38	-5.102E+03	% P	5.641E+04 3.31E+02 2.57E+00	G
U-235		-1.4986E+03				1.39E+09	
			143.76	-1.499E+03	%(P	4.784E+03 3.22E+02 1.05E+01	G
			205.31	-2.434E+02	%	1.140E+04 1.80E+03 4.70E+00	G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		163.35	1.809E+03	&	1.009E+04	2.16E+02	4.70E+00 G
K-40	-1.0135E+02					4.68E+11	
		1460.75	-1.013E+02	%(P	9.181E+03	4.06E+03	1.07E+01 G
PB-214	3.3213E+04					5.84E+05	
		351.92	3.312E+04	(P	1.507E+03	3.55E+00	3.58E+01 G
		295.21	3.345E+04	(P	2.788E+03	5.13E+00	1.85E+01 G
		241.98	3.305E+04	(	5.783E+03	8.26E+00	7.50E+00 G
BI-214	3.0304E+04					5.84E+05	
		609.31	2.986E+04	(P	1.433E+03	4.01E+00	4.48E+01 G
		1764.49	3.719E+04	+ P	3.021E+03	8.29E+00	1.54E+01 G
		1120.29	3.067E+04	(	3.486E+03	8.77E+00	1.48E+01 G
		1238.11	3.982E+04	+	7.817E+03	1.30E+01	5.86E+00 G
		768.36	3.332E+04	(	8.573E+03	1.47E+01	4.80E+00 G
		1377.67	3.663E+04	+	1.101E+04	1.93E+01	3.92E+00 G
		934.06	3.967E+04	+	1.138E+04	1.66E+01	3.03E+00 G
BI-212	3.8303E+03					2.10E+03	
		727.17	1.803E+03	%(	3.748E+03	8.87E+01	1.18E+01 G
		1620.56	1.253E+04	?(	9.235E+03	3.16E+01	2.75E+00 G
		785.42	1.634E+04	&	3.286E+04	9.04E+01	2.00E+00 G
PB-212	8.9532E+01					2.10E+03	
		238.63	8.953E+01	%(P	2.239E+03	7.44E+02	4.31E+01 G
		300.09	5.777E+03	%	4,276E+04	2.21E+02	3.27E+00 G
RA-223	-1.7388E+03					1.20E+07	
		269.39	-1.739E+03	%(	4.185E+03	9.43E+01	1.36E+01 G
		154.18	-3.028E+03	&	9.510E+03	1.23E+02	5.59E+00 G
		323.88	-2.910E+02	%	1.589E+04	2.18E+03	3.90E+00 G
RA-224	-6.6898E+03					2.10E+03	
		241.00	-6.690E+03	%(	2.579E+04	1.16E+02	3.90E+00 G
TL-208	-4.1240E+02					2.10E+03	
		583.14	-4.124E+02	%(P	8.037E+02	1.67E+02	8.60E+01 G
		510.72	-8.219E+02	%	5.439E+03	1.96E+02	2.25E+01 G
		860.47	2.191E+03	%	7.668E+03	1.57E+02	1.20E+01 G
		277.36	-1.796E+03	%	8.430E+03	1.81E+02	6.50E+00 G
		763.30	-1.870E+04	%	6.954E+04	1.11E+02	1.70E+00 G
TL-210	3.6976E+02					5.84E+05	
		795.00	-8.238E+01	%(	6.996E+02	3.72E+02	1.00E+02 G
		296.00	0.000E+00	%	1.700E+03	1.00E+03	8.00E+01 G
		1310.00	2.523E+03	?(	1.033E+03	2.36E+01	2.10E+01 G
		1210.00	6.535E+02	%	4.882E+03	3.46E+02	1.70E+01 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1110.00	8.340E+03 %		2.735E+04	9.81E+01	7.00E+00 G
		860.00	7.381E+03 %		1.393E+04	8.61E+01	7.00E+00 G
		1410.00	1.243E+03 %		2.216E+04	5.05E+02	5.00E+00 G
BE-7	5.6619E+02					5.34E+01	
		477.56	5.662E+02 %(		5.702E+03	4.14E+02	1.03E+01 G
NA-22	2.4054E+02					9.50E+02	
		1274.54	2.405E+02 %(		5.934E+02	1.13E+02	9.99E+01 G
PA-234	5.1988E+02					1.65E+12	
		98.44	5.199E+02 %(		1.550E+03	1.11E+02	2.51E+01 G
		946.00	2.095E+03 %		4.072E+03	9.06E+01	2.00E+01 G
		131.28	2.538E+02 %		2.049E+03	3.12E+02	2.00E+01 G
		94.67	1.170E+03 %		3.250E+03	1.04E+02	1.55E+01 G
		883.24	1.109E+03 &		7.388E+03	2.96E+02	1.20E+01 G
		926.70	2.223E+03 %		9.475E+03	1.25E+02	1.10E+01 G
		569.26	1.681E+03 &		5.261E+03	1.30E+02	1.04E+01 G
		111.00	7.375E+02 &		4.697E+03	2.35E+02	8.55E+00 G
		733.00	4.552E+03 %		9.655E+03	9.31E+01	8.50E+00 G
		949.00	4.165E+03 %		1.012E+04	1.12E+02	7.80E+00 G
		880.51	3.063E+03 %		1.214E+04	1.76E+02	6.50E+00 G
		226.87	3.781E+03 %		9.400E+03	9.77E+01	6.50E+00 G
		831.10	1.138E+03 %		8.934E+03	3.33E+02	5.60E+00 G
		808.10	8.502E+02 %		1.584E+04	8.18E+02	4.90E+00 G
		99.70	3.083E+03 %		8.827E+03	1.07E+02	4.70E+00 G
		699.10	3.550E+03 %		1.277E+04	1.53E+02	4.60E+00 G
		898.60	6.171E+03 %		1.459E+04	1.04E+02	4.00E+00 G
		1394.10	6.026E+03 %		1.116E+04	8.56E+01	3.90E+00 G
IR-192	7.7115E+01					7.40E+01	
		316.49	7.712E+01 %(		6.093E+02	3.16E+02	8.70E+01 G K
		468.06	2.410E+02 %		1.154E+03	1.99E+02	5.18E+01 G K
		308.44	1.387E+02 %		1.609E+03	4.62E+02	3.18E+01 G K
		604.40	3.641E+03 %		2.741E+04	2.25E+02	8.90E+00 G K
		612.45	5.410E+02 %		4.165E+04	2.29E+03	5.80E+00 G K
		588.60	3.643E+02 %		1.418E+04	1.59E+03	4.60E+00 G K
		205.78	2.216E+03 %		1.580E+04	2.76E+02	3.49E+00 G
		484.54	1.465E+02 %		1.714E+04	4.77E+03	3.35E+00 G
SC-46	2.3285E+02					8.38E+01	
		889.26	2.329E+02 &(		5.362E+02	1.01E+02	1.00E+02 G
TL-201	-3.8478E+02					3.06E+00	
		70.82	3.848E+02 %(		3.130E+03	2.45E+02	4.90E+01 G
		68.89	5.654E+02 %		5.237E+03	2.79E+02	2.89E+01 G
		80.20	1.101E+03 &		8.665E+03	2.37E+02	1.69E+01 G
		167.43	5.996E+02 %		4.272E+03	2.76E+02	1.19E+01 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 10:11:26 AM
AAA Spectrum name: ARS02801.An1

PB-212	#A	8.9532E+01	1.3320E+03	1.3320E+03	0.224E+04
RA-223	#A	-1.7388E+03	3.2784E+03	3.2799E+03	0.419E+04
RA-224	#A	-6.6898E+03	1.5467E+04	1.5472E+04	0.258E+05
TL-208	#A	-4.1240E+02	1.3776E+03	1.3778E+03	0.804E+03
TL-210	#A	3.6976E+02	1.7431E+02	1.7573E+02	0.700E+03
BE-7	#A	5.6619E+02	4.6932E+03	4.6933E+03	0.570E+04
NA-22	#A	2.4054E+02	5.4462E+02	5.4482E+02	0.593E+03
PA-234	#A	5.1988E+02	1.1562E+03	1.1568E+03	0.155E+04
IR-192	#B	7.7115E+01	4.8682E+02	4.8684E+02	0.609E+03
SC-46	#A	2.3285E+02	4.7150E+02	4.7171E+02	0.536E+03
TL-201	#A	-3.8478E+02	1.8842E+03	1.8844E+03	0.313E+04

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.9 to 1998.7 keV) 2.289E+05 pCi/L

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAA

```
     ORTEC g v - i (3263) Env32  G800W064  10/8/2021 11:16:15 AM
AAA                              Spectrum name: ARS02802.An1

Sample description
     Batch ID:  S-0307-V3
     SDG ID:  Ra-226  Tech:  EEC

Spectrum Filename: C:\User\ARS02802.An1

Acquisition information
       Start time:                 10/8/2021 10:15:56 AM
       Live time:                3600
       Real time:                3606
       Dead time:                   0.17 %
       Detector ID:                   19

Detector system
     (ARS02) MCB 131


Calibration
       Filename:                   250mL jar 2079-79-2 calib 10-10-19.Clb
     250mL jar 2079-79-2
     10-10-19  EEC

       Energy Calibration
            Created:               10/10/2019 11:15:54 AM
            Zero offset:           0.421 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.079E-08 keV/channel^2

       Efficiency Calibration
            Created:               10/10/2019 1:02:43 PM
            Knee Energy:         120.15 keV
            Above the Knee:        Quadratic        Uncertainty =   1.52 %
            Log(Eff):             -1.912186E+00 + (-2.045736E-01*Log(E) ) +
                                   ( -3.683304E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.51 %
            Log(Eff):             -1.187486E+01 + ( 3.636438E+00*Log(E) ) +
                                   ( -4.037865E-01*Log(E)^2 )

Library Files
       Main analysis library:      NORM.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G800W064
       Start channel:             10 (     2.92keV )
       Stop channel:            8000 (  1998.67keV )
       Peak rejection level:      40.000%
       Peak search sensitivity:    1
       Sample Size:                5.0000E-02 +/- 0.000E+00%
       Activity scaling factor:    1.0000E+06/(  1.0000E+00*  5.0000E-02) =
                                   2.0000E+07
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

Random error:	1.0000000E+00
Systematic error:	1.0000000E+00
Fraction Limit:	0.000%
Background width:	best method (based on spectrum).
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	norm.Pbc 10/1/2021 7:06:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %

Energy Calibration
Normalized diff: 0.1058

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/L	Nuc
13.29	237.	7.66	0.85	5.735E-03				
15.94	136.	16.23	0.85	7.481E-03				
46.67	530.	5.96	0.83	2.100E-02	46.52	4.000	8.481E+04	PB210
53.53	60.	30.21	0.93	2.239E-02				
74.86	349.	7.59	0.92	2.468E-02				
77.17	599.	5.06	0.92	2.479E-02				
79.29	66.	32.69	0.92	2.486E-02	80.20	16.900	2.368E+03	TL201
83.84	66.	24.36	0.93	2.498E-02				
87.20	179.	11.64	0.93	2.502E-02				
90.18	75.	21.93	0.93	2.503E-02				
186.11	445.	6.42	0.92	1.855E-02	186.10	3.500	9.541E+04	RA226
241.86	263.	8.15	1.19	1.585E-02	241.00	3.900	6.369E+04	RA224
					241.98	7.500	3.320E+04	PB214
294.98	569.	5.08	1.00	1.403E-02	295.21	18.500	3.255E+04	PB214
					296.00	80.000	7.635E+03	TL210
351.75	910.	3.83	1.11	1.255E-02	351.92	35.800	3.003E+04	PB214
510.81	145.	14.71	2.18	9.848E-03	510.72	22.500	9.809E+03	TL208
609.36	771.	3.87	1.34	8.752E-03	609.31	44.791	2.908E+04	BI214
768.70	79.	16.80	0.58	7.465E-03	768.36	4.799	3.319E+04	BI214
934.18	45.	27.26	0.75	6.509E-03	934.06	3.029	3.411E+04	BI214
1001.76	19.	32.01	0.26	6.186E-03				
1120.25	166.	10.88	1.93	5.716E-03	1120.29	14.797	2.947E+04	BI214

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1133.30	10.	37.42	0.56	5.669E-03				
1238.36	76.	14.70	1.58	5.316E-03	1238.11	5.859	3.688E+04	BI214
1281.43	30.	25.39	0.82	5.185E-03				
1377.43	47.	19.02	1.62	4.917E-03	1377.67	3.919	3.632E+04	BI214
1408.14	32.	22.35	0.71	4.837E-03	1410.00	5.000	1.976E+04	TL210
1460.72	21.	21.82	1.81	4.708E-03	1460.75	10.700	PBC<MDA	K40
1764.20	124.	8.98	2.02	4.088E-03	1764.49	15.357	2.858E+04	BI214
1847.49	29.	18.57	2.00	3.947E-03				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.48	13.36	47.	237.	4.140E+04	15.32	0.849	SE-75	D
62.07	16.01	174.	136.	1.812E+04	32.47	0.852	KR-85	sD
212.41	53.39	121.	60.	2.670E+03	60.43	0.933	CE-144	
297.73	74.86	177.	349.	1.416E+04	15.17	0.915	TH-234	D
306.99	77.17	160.	599.	2.415E+04	10.12	0.918	PB-212	D
315.47	79.29	200.	66.	2.656E+03	65.39	0.920	BI-212	sD
333.66	83.83	96.	66.	2.640E+03	48.72	0.925	HG-203	D
347.11	87.19	128.	179.	7.159E+03	23.28	0.929	PB-212	sD
359.00	90.17	98.	75.	2.998E+03	43.86	0.932	AC-228	sD
2041.86	511.01	55.	145.	1.470E+04	29.43	2.184	NA-22	
4006.89	1003.56	6.	19.	3.071E+03	64.03	0.258	-	s
4533.57	1133.27	2.	10.	1.764E+03	74.83	0.560	-	s
5126.69	1281.42	6.	30.	5.709E+03	50.78	0.816	BI-214	s
5634.16	1408.15	5.	32.	6.574E+03	44.70	0.711	EU-152	s
7394.18	1847.49	0.	29.	7.347E+03	37.14	1.997	BI-214	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: NORM.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	184.98	46.67	235.	474.	0.132	13.79	0.825
RA-226	742.73	186.11	160.	412.	0.115	14.22	0.923
PB-214	965.76	241.86	75.	263.	0.073	16.29	1.186
PB-214	1178.28	294.98	91.	562.	0.156	10.36	0.999
PB-214	1405.39	351.75	103.	899.	0.250	7.81	1.115

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	2436.23	609.36	49.	759.	0.211	7.94	1.336
BI-214	3073.95	768.70	29.	79.	0.022	33.61	0.582s
BI-214	4481.29	1120.25	32.	166.	0.046	21.75	1.928s
BI-214	4954.24	1238.36	14.	76.	0.021	29.40	1.579s
BI-214	5512.13	1377.67	12.	50.	0.014	43.82	2.177s
BI-214	7060.48	1764.20	5.	119.	0.033	19.08	2.019

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/L	Peak Energy keV	Peak Activity pCi/L	Code	MDA Value pCi/L		COMMENTS
RA-226		9.5409E+04				5.84E+05		
			186.10	9.541E+04	(P	1.424E+04	7.11E+00 3.50E+00 G	
Ra-228		5.9779E+02				2.10E+03		
			911.07	5.978E+02	%(P	2.016E+03	1.40E+02 2.90E+01 G	
			968.90	1.908E+03	%	4.158E+03	1.01E+02 1.75E+01 G	
			338.40	-1.312E+03	%	5.275E+03	1.63E+02 1.20E+01 G	
			964.60	-4.040E+03	%	1.590E+04	1.81E+02 5.45E+00 G	
PB-210		8.4807E+04				7.45E+03		
			46.52	8.481E+04	(P	1.329E+04	6.89E+00 4.00E+00 G	
U-238		-1.1609E+04				1.63E+12		
			63.29	-1.161E+04	&(P	1.576E+04	4.76E+01 3.90E+00 G	
			92.80	-1.257E+04	% P	3.007E+04	5.81E+01 3.00E+00 G	
			92.38	-1.325E+04	% P	3.495E+04	6.21E+01 2.57E+00 G	
U-235		-6.0403E+01				1.39E+09		
			143.76	-6.040E+01	%(P	4.386E+03	2.78E+03 1.05E+01 G	
			205.31	3.408E+03	%	1.013E+04	1.16E+02 4.70E+00 G	
			163.35	2.022E+03	&	9.879E+03	1.90E+02 4.70E+00 G	
K-40		3.1775E+03				4.68E+11		
			1460.75	3.177E+03	%(P	5.687E+03	7.38E+01 1.07E+01 G	
PB-214		3.1169E+04				5.84E+05		
			351.92	3.003E+04	(P	1.674E+03	3.90E+00 3.58E+01 G	
			295.21	3.255E+04	(P	2.727E+03	5.18E+00 1.85E+01 G	
			241.98	3.320E+04	(	5.447E+03	8.15E+00 7.50E+00 G	

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	2.9303E+04					5.84E+05	
		609.31	2.908E+04	(P	1.350E+03	3.97E+00	4.48E+01 G
		1764.49	2.858E+04	(P	3.021E+03	9.54E+00	1.54E+01 G
		1120.29	2.947E+04	(	5.160E+03	1.09E+01	1.48E+01 G
		1238.11	3.688E+04	+	9.560E+03	1.47E+01	5.86E+00 G
		768.36	3.319E+04	(	1.162E+04	1.68E+01	4.80E+00 G
		1377.67	3.897E+04	+	1.469E+04	2.19E+01	3.92E+00 G
		934.06	4.826E+03	%	2.854E+04	2.62E+02	3.03E+00 G
BI-212	-1.5860E+03					2.10E+03	
		727.17	-1.586E+03	%(	5.668E+03	1.53E+02	1.18E+01 G
		1620.56	-5.012E+03	%	2.885E+04	2.75E+02	2.75E+00 G
		785.42	8.169E+03	%	3.641E+04	1.98E+02	2.00E+00 G
PB-212	-1.6918E+02					2.10E+03	
		238.63	-1.692E+02	%(P	2.282E+03	3.99E+02	4.31E+01 G
		300.09	6.074E+03	%	4.217E+04	2.08E+02	3.27E+00 G
RA-223	1.3898E+03					1.20E+07	
		269.39	1.390E+03	%(	3.386E+03	9.48E+01	1.36E+01 G
		154.18	-3.494E+03	&	1.009E+04	1.14E+02	5.59E+00 G
		323.88	4.075E+03	&	1.322E+04	1.31E+02	3.90E+00 G
RA-224	-6.3665E+03					2.10E+03	
		241.00	-6.366E+03	%(	2.542E+04	1.20E+02	3.90E+00 G
TL-208	-5.0266E+02					2.10E+03	
		583.14	-5.027E+02	%(P	8.544E+02	1.36E+02	8.60E+01 G
		510.72	-9.348E+02	%	4.895E+03	1.55E+02	2.25E+01 G
		860.47	-3.628E+02	%	5.904E+03	7.07E+02	1.20E+01 G
		277.36	-3.291E+03	%	8.721E+03	1.03E+02	6.50E+00 G
		763.30	-6.909E+03	%	7.038E+04	2.98E+02	1.70E+00 G
TL-210	6.1785E+01					5.84E+05	
		795.00	6.178E+01	%(	5.815E+02	4.06E+02	1.00E+02 G
		296.00	-2.333E+02	%	1.695E+03	2.17E+02	8.00E+01 G
		1310.00	4.205E+02	%	3.957E+03	4.45E+02	2.10E+01 G
		1210.00	1.998E+03	%	3.703E+03	8.69E+01	1.70E+01 G
		1110.00	2.485E+02	%	9.033E+03	1.58E+03	7.00E+00 G
		860.00	1.865E+03	%	8.776E+03	2.05E+02	7.00E+00 G
		1410.00	-9.539E+03	%	2.433E+04	7.64E+01	5.00E+00 G
BE-7	-3.3028E+02					5.34E+01	
		477.56	-3.303E+02	%(	5.876E+03	7.31E+02	1.03E+01 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	-4.8636E+02					1.65E+12	
		98.44	-4.864E+02	%(	1.488E+03	1.14E+02	2.51E+01 G
		946.00	8.145E+02	%	2.484E+03	1.35E+02	2.00E+01 G
		131.28	-8.398E+02	%	2.384E+03	1.11E+02	2.00E+01 G
		94.67	3.470E+02	%	5.665E+03	4.88E+02	1.55E+01 G
		883.24	7.390E+02	%	5.808E+03	3.42E+02	1.20E+01 G
		926.70	2.223E+03	%	9.190E+03	1.22E+02	1.10E+01 G
		569.26	4.727E+02	&	5.722E+03	4.94E+02	1.04E+01 G
		111.00	-1.739E+03	%	5.256E+03	1.13E+02	8.55E+00 G
		733.00	1.374E+03	%	7.565E+03	2.34E+02	8.50E+00 G
		949.00	-3.190E+03	%	8.896E+03	1.27E+02	7.80E+00 G
		880.51	-2.723E+03	%	1.095E+04	1.77E+02	6.50E+00 G
		226.87	1.869E+02	%	7.673E+03	1.57E+03	6.50E+00 G
		831.10	3.414E+03	%	1.149E+04	1.48E+02	5.60E+00 G
		808.10	5.952E+03	%	1.444E+04	1.09E+02	4.90E+00 G
		99.70	2.482E+03	&	7.335E+03	1.10E+02	4.70E+00 G
		699.10	-3.823E+03	%	1.654E+04	1.87E+02	4.60E+00 G
		898.60	6.920E+03	&	1.899E+04	1.22E+02	4.00E+00 G
		1394.10	6.320E+03	%	1.489E+04	1.10E+02	3.90E+00 G
IR-192	1.2853E+01					7.40E+01	
		316.49	1.285E+01	%(	6.687E+02	2.07E+03	8.70E+01 G K
		468.06	-1.946E+02	%	1.120E+03	2.38E+02	5.18E+01 G K
		308.44	-7.974E+02	%	1.978E+03	1.01E+02	3.18E+01 G K
		604.40	2.383E+03	%	2.607E+04	3.27E+02	8.90E+00 G K
		612.45	-6.059E+03	%	4.220E+04	2.09E+02	5.80E+00 G K
		588.60	4.091E+03	%	9.072E+03	9.16E+01	4.60E+00 G K
		205.78	-1.313E+03	%	1.492E+04	4.38E+02	3.49E+00 G
		484.54	-9.157E+03	%	2.025E+04	9.38E+01	3.35E+00 G
SC-46	-2.4509E+02					8.38E+01	
		889.26	-2.451E+02	%(	7.491E+02	1.36E+02	1.00E+02 G
TL-201	1.1315E+02					3.06E+00	
		70.82	1.131E+02	%(	2.426E+03	6.42E+02	4.90E+01 G
		68.89	-6.443E+01	&	1.820E+03	1.05E+03	2.89E+01 G
		80.20	-1.021E+03	%	8.323E+03	2.45E+02	1.69E+01 G
		167.43	-1.679E+03	%	4.557E+03	1.07E+02	1.19E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 11:16:15 AM
AAA Spectrum name: ARS02802.An1

IR-192	#B	1.2853E+01	5.3324E+02	5.3324E+02	0.669E+03
SC-46	#A	-2.4509E+02	6.6646E+02	6.6662E+02	0.749E+03
TL-201	#A	1.1315E+02	1.4539E+03	1.4539E+03	0.243E+04

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.9 to 1998.7 keV) 2.407E+05 pCi/L

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAA

ORTEC g v - i (32&3) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

Sample description
Batch ID: S-0155-V1
SDG ID: Ra-226 Tech: EEC

Spectrum Filename: C:\User\ARS02803.An1

Acquisition information
Start time: 10/8/2021 12:11:54 PM
Live time: 3600
Real time: 3606
Dead time: 0.17 %
Detector ID: 19

Detector system
(ARS02) MCB 131

Calibration
Filename: 250mL jar 2079-79-2 calib 10-10-19.Clb
250mL jar 2079-79-2
10-10-19 EEC

Energy Calibration
Created: 10/10/2019 11:15:54 AM
Zero offset: 0.421 keV
Gain: 0.250 keV/channel
Quadratic: -3.079E-08 keV/channel^2

Efficiency Calibration
Created: 10/10/2019 1:02:43 PM
Knee Energy: 120.15 keV
Above the Knee: Quadratic Uncertainty = 1.52 %
Log(Eff): -1.912186E+00 + (-2.045736E-01*Log(E)) +
(-3.683304E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.51 %
Log(Eff): -1.187486E+01 + (3.636438E+00*Log(E)) +
(-4.037865E-01*Log(E)^2)

Library Files
Main analysis library: NORM.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.92keV)
Stop channel: 8000 (1998.67keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 5.0000E-02 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/(1.0000E+00* 5.0000E-02) =
2.0000E+07
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 0.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	norm.Pbc 10/1/2021 7:06:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1164

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/L	Nuc
13.36	249.	7.65	0.85	5.763E-03				
15.99	105.	21.12	0.85	7.500E-03				
46.70	484.	6.55	0.89	2.100E-02	46.52	4.000	7.660E+04	PB210
53.20	83.	24.57	0.90	2.237E-02				
74.92	354.	7.68	0.92	2.468E-02				
77.15	583.	5.32	0.92	2.478E-02				
79.40	54.	34.29	0.92	2.487E-02	80.20	16.900	1.946E+03	TL201
84.19	56.	32.07	0.93	2.498E-02				
87.38	191.	11.19	0.93	2.502E-02				
89.96	67.	24.56	0.93	2.503E-02				
92.67	77.	21.43	0.93	2.503E-02	92.38	2.570	PBC<MDA	U238
					92.80	3.000	PBC<MDA	U238
186.06	451.	6.15	1.13	1.855E-02	186.10	3.500	9.680E+04	RA226
238.61	50.	26.38	1.09	1.598E-02	238.63	43.100	PBC<MDA	PB212
241.85	276.	7.54	1.09	1.585E-02	241.00	3.900	6.680E+04	RA224
					241.98	7.500	3.482E+04	PB214
294.96	605.	4.92	1.31	1.403E-02	295.21	18.500	3.461E+04	PB214
					296.00	80.000	8.113E+03	TL210
351.67	928.	3.58	1.24	1.256E-02	351.92	35.800	3.063E+04	PB214
510.75	166.	13.47	2.42	9.848E-03	510.72	22.500	1.126E+04	TL208
609.33	798.	3.85	1.64	8.751E-03	609.31	44.791	3.010E+04	BI214
768.39	86.	12.96	1.76	7.464E-03	768.36	4.799	3.587E+04	BI214

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
933.72	57.	21.03	1.54	6.514E-03	934.06	3.029	4.310E+04	BI214
1120.38	186.	7.93	1.58	5.716E-03	1120.29	14.797	3.302E+04	BI214
1238.40	87.	11.39	1.21	5.316E-03	1238.11	5.859	4.199E+04	BI214
1377.61	79.	12.66	1.20	4.916E-03	1377.67	3.919	6.149E+04	BI214
1402.95	16.	32.68	2.20	4.850E-03				
1408.13	24.	26.27	2.20	4.837E-03	1410.00	5.000	1.517E+04	TL210
1538.40	16.	28.45	1.23	4.530E-03				
1729.11	43.	15.25	0.86	4.150E-03				
1764.28	146.	8.28	1.81	4.088E-03	1764.49	15.357	3.384E+04	BI214
1847.32	32.	17.68	1.91	3.948E-03				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.74	13.41	58.	249.	4.329E+04	15.31	0.850	BR-82	D
62.28	16.04	194.	105.	1.402E+04	42.23	0.852	KR-85	sD
211.11	53.27	128.	83.	3.710E+03	49.14	0.896	RU-103	s
297.97	74.92	192.	354.	1.434E+04	15.35	0.916	TH-234	D
306.91	77.16	189.	583.	2.351E+04	10.63	0.918	PB-212	D
315.89	79.40	146.	54.	2.182E+03	68.58	0.920	BI-212	sD
335.06	84.16	136.	56.	2.260E+03	64.15	0.925	HG-203	sD
347.83	87.36	132.	191.	7.619E+03	22.39	0.929	PB-212	sD
358.11	89.93	103.	67.	2.687E+03	49.11	0.932	AC-228	sD
368.99	92.65	98.	77.	3.080E+03	42.87	0.934	TH-234	sD
2041.61	511.00	60.	166.	1.688E+04	26.94	2.424	NA-22	
5613.37	1403.08	6.	16.	3.329E+03	65.36	2.199	BI-214	sD
5634.13	1408.26	8.	24.	5.047E+03	52.55	2.203	EU-152	sD
6155.90	1538.41	2.	16.	3.576E+03	56.90	1.232	CS-136	s
6919.91	1729.11	0.	43.	1.036E+04	30.50	0.863	BI-214	s
7393.50	1847.32	0.	32.	8.106E+03	35.36	1.913	BI-214	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: NORM.Lib

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	185.12	46.70	256.	428.	0.119	15.32	0.886
RA-226	742.55	186.06	150.	418.	0.116	13.63	1.130
PB-212	952.84	238.63	587.	-44.	-0.012	65.70	1.088
PB-214	966.25	241.98	78.	276.	0.077	15.09	1.092D
PB-214	1178.19	294.96	95.	598.	0.166	10.02	1.308
PB-214	1405.09	351.67	61.	917.	0.255	7.30	1.240
BI-214	2436.08	609.33	55.	786.	0.218	7.89	1.637
BI-214	3072.71	768.39	10.	86.	0.024	25.92	1.764s
BI-214	4481.82	1120.38	7.	186.	0.052	15.86	1.576
BI-214	4954.40	1238.40	3.	87.	0.024	22.78	1.214s
BI-214	5512.13	1377.67	18.	61.	0.017	42.24	2.177s
BI-214	7060.79	1764.28	5.	141.	0.039	17.43	1.810s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/L	Peak Energy keV	Peak Activity pCi/L	Code	Peak MDA Value pCi/L		COMMENTS
RA-226		9.6797E+04				5.84E+05		
			186.10	9.680E+04	(P	1.381E+04	6.82E+00 3.50E+00	G
Ra-228		1.2846E+03				2.10E+03		
			911.07	1.285E+03	%(P	2.016E+03	6.78E+01 2.90E+01	G
			968.90	-2.034E+03	&	5.095E+03	1.16E+02 1.75E+01	G
			338.40	1.972E+03	%	4.700E+03	9.71E+01 1.20E+01	G
			964.60	3.462E+03	%	1.258E+04	1.65E+02 5.45E+00	G
PB-210		7.6605E+04				7.45E+03		
			46.52	7.660E+04	(P	1.384E+04	7.66E+00 4.00E+00	G
U-238		-1.9853E+03				1.63E+12		
			63.29	-1.985E+03	%(P	1.365E+04	2.48E+02 3.90E+00	G
			92.80	-4.463E+03	% P	2.880E+04	1.92E+02 3.00E+00	G
			92.38	-1.298E+04	% P	3.505E+04	5.69E+01 2.57E+00	G
U-235		-2.2205E+03				1.39E+09		
			143.76	-2.221E+03	%(P	5.265E+03	1.29E+02 1.05E+01	G
			205.31	-2.434E+02	%	1.093E+04	1.72E+03 4.70E+00	G
			163.35	2.181E+03	&	1.020E+04	1.82E+02 4.70E+00	G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	2.5813E+03					4.68E+11	
		1460.75	2.581E+03	%(P	5.687E+03	8.93E+01	1.07E+01 G
PB-214	3.2331E+04					5.84E+05	
		351.92	3.063E+04	(P	1.311E+03	3.65E+00	3.58E+01 G
		295.21	3.461E+04	(P	2.788E+03	5.01E+00	1.85E+01 G
		241.98	3.482E+04	(	5.553E+03	7.54E+00	7.50E+00 G
BI-214	3.1709E+04					5.84E+05	
		609.31	3.010E+04	(P	1.429E+03	3.94E+00	4.48E+01 G
		1764.49	3.384E+04	(P	3.021E+03	8.71E+00	1.54E+01 G
		1120.29	3.302E+04	(	2.670E+03	7.93E+00	1.48E+01 G
		1238.11	4.199E+04	+	5.132E+03	1.14E+01	5.86E+00 G
		768.36	3.587E+04	@(	7.434E+03	1.30E+01	4.80E+00 G
		1377.67	4.754E+04	+	1.752E+04	2.11E+01	3.92E+00 G
		934.06	7.872E+03	%	3.082E+04	1.75E+02	3.03E+00 G
BI-212	-6.5628E+02					2.10E+03	
		727.17	-6.563E+02	%(	5.400E+03	3.47E+02	1.18E+01 G
		1620.56	-2.214E+04	%	3.626E+04	8.26E+01	2.75E+00 G
		785.42	1.021E+03	%	4.113E+04	1.78E+03	2.00E+00 G
PB-212	-9.6157E+02					2.10E+03	
		238.63	-9.616E+02	?(P	2.521E+03	3.28E+01	4.31E+01 G
		300.09	5.928E+03	%	4.371E+04	2.20E+02	3.27E+00 G
RA-223	-1.1656E+03					1.20E+07	
		269.39	-1.166E+03	&(	4.073E+03	1.36E+02	1.36E+01 G
		154.18	-2.725E+03	%	9.322E+03	1.34E+02	5.59E+00 G
		323.88	3.201E+03	%	1.261E+04	1.58E+02	3.90E+00 G
RA-224	-4.1584E+03					2.10E+03	
		241.00	-4.158E+03	%(	2.698E+04	1.94E+02	3.90E+00 G
TL-208	1.0690E+02					2.10E+03	
		583.14	1.069E+02	%(P	6.463E+02	2.37E+02	8.60E+01 G
		510.72	-1.933E+03	%	5.327E+03	8.29E+01	2.25E+01 G
		860.47	-4.126E+02	&	6.052E+03	6.39E+02	1.20E+01 G
		277.36	-3.732E+03	&	9.365E+03	9.83E+01	6.50E+00 G
		763.30	-1.013E+04	%	6.686E+04	1.94E+02	1.70E+00 G
TL-210	-4.2481E+02					5.84E+05	
		795.00	-4.248E+02	%(	8.296E+02	8.87E+01	1.00E+02 G
		296.00	3.576E+01	%	1.734E+03	1.44E+03	8.00E+01 G
		1310.00	-4.205E+02	&	3.579E+03	3.99E+02	2.10E+01 G
		1210.00	-8.169E+02	%	4.882E+03	2.77E+02	1.70E+01 G
		1110.00	-1.367E+03	%	9.980E+03	3.24E+02	7.00E+00 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		860.00	4.126E+03 %		8.085E+03	8.72E+01	7.00E+00 G
		1410.00	-1.349E+04 %		3.313E+04	7.39E+01	5.00E+00 G
BE-7	3.3028E+02					5.34E+01	
		477.56	3.303E+02 &(		5.521E+03	6.85E+02	1.03E+01 G
NA-22	-6.0616E+02					9.50E+02	
		1274.54	-6.062E+02 %(		1.039E+03	8.27E+01	9.99E+01 G
PA-234	4.9569E+02					1.65E+12	
		98.44	4.957E+02 %(		1.477E+03	1.11E+02	2.51E+01 G
		946.00	1.164E+03 %		2.972E+03	1.16E+02	2.00E+01 G
		131.28	-6.620E+02 &		2.244E+03	1.33E+02	2.00E+01 G
		94.67	-1.025E+03 %		5.898E+03	1.73E+02	1.55E+01 G
		883.24	2.721E+03 %		6.784E+03	1.12E+02	1.20E+01 G
		926.70	2.223E+03 %		9.502E+03	1.26E+02	1.10E+01 G
		569.26	-1.156E+03 %		5.938E+03	2.12E+02	1.04E+01 G
		111.00	-1.707E+03 %		5.013E+03	1.10E+02	8.55E+00 G
		733.00	-9.161E+02 %		7.859E+03	3.63E+02	8.50E+00 G
		949.00	-4.563E+03 %		1.066E+04	1.08E+02	7.80E+00 G
		880.51	-7.914E+03 %		1.466E+04	8.45E+01	6.50E+00 G
		226.87	2.775E+03 %		6.999E+03	9.84E+01	6.50E+00 G
		831.10	3.920E+03 %		1.244E+04	1.41E+02	5.60E+00 G
		808.10	2.976E+03 %		1.287E+04	1.90E+02	4.90E+00 G
		99.70	-2.436E+03 &		8.224E+03	1.26E+02	4.70E+00 G
		699.10	-1.092E+03 &		1.598E+04	6.23E+02	4.60E+00 G
		898.60	-6.171E+03 %		1.906E+04	1.37E+02	4.00E+00 G
		1394.10	4.740E+03 %		2.018E+04	2.01E+02	3.90E+00 G
IR-192	-1.4138E+02					7.40E+01	
		316.49	-1.414E+02 %(		6.093E+02	1.73E+02	8.70E+01 G K
		468.06	1.854E+02 %		1.048E+03	2.33E+02	5.18E+01 G K
		308.44	-4.507E+02 %		1.773E+03	1.59E+02	3.18E+01 G K
		604.40	-3.768E+03 %		2.751E+04	2.19E+02	8.90E+00 G K
		612.45	3.519E+03 %		4.151E+04	3.52E+02	5.80E+00 G K
		588.60	-9.040E+02 %		1.231E+04	5.52E+02	4.60E+00 G K
		205.78	2.790E+03 %		1.392E+04	1.93E+02	3.49E+00 G
		484.54	-2.929E+03 &		1.714E+04	2.42E+02	3.35E+00 G
SC-46	-8.3090E+01					8.38E+01	
		889.26	-8.309E+01 %(		7.148E+02	3.75E+02	1.00E+02 G
TL-201	3.7642E+02					3.06E+00	
		70.82	3.764E+02 %(		2.453E+03	1.96E+02	4.90E+01 G
		68.89	-7.467E+02 %		2.068E+03	1.04E+02	2.89E+01 G
		80.20	-1.021E+03 %		8.636E+03	2.55E+02	1.69E+01 G
		167.43	-1.569E+03 %		4.297E+03	1.07E+02	1.19E+01 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 1:12:12 PM
AAA Spectrum name: ARS02803.An1

PB-212	#A	-9.6157E+02	6.3172E+02	6.3451E+02	0.252E+04
RA-223	#A	-1.1656E+03	3.1637E+03	3.1644E+03	0.407E+04
RA-224	#A	-4.1584E+03	1.6101E+04	1.6103E+04	0.270E+05
TL-208	#A	1.0690E+02	5.0601E+02	5.0605E+02	0.646E+03
TL-210	#A	-4.2481E+02	7.5366E+02	7.5410E+02	0.830E+03
BE-7	#A	3.3028E+02	4.5217E+03	4.5217E+03	0.552E+04
NA-22	#A	-6.0616E+02	1.0024E+03	1.0031E+03	0.104E+04
PA-234	#A	4.9569E+02	1.1001E+03	1.1007E+03	0.148E+04
IR-192	#B	-1.4138E+02	4.9020E+02	4.9028E+02	0.609E+03
SC-46	#A	-8.3090E+01	6.2349E+02	6.2351E+02	0.715E+03
TL-201	#A	3.7642E+02	1.4743E+03	1.4746E+03	0.245E+04

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (2.9 to 1998.7 keV) 2.374E+05 pCi/L

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAA

```
     ORTEC g v - i (3263) Env32  G800W064  10/8/2021 2:18:19 PM
AAA                            Spectrum name: ARS02804.An1

Sample description
     Batch ID:  S-0155-V2
     SDG ID:  Ra-226  Tech:  EEC

Spectrum Filename: C:\User\ARS02804.An1

Acquisition information
       Start time:                10/8/2021 1:18:01 PM
       Live time:               3600
       Real time:               3606
       Dead time:                  0.17 %
       Detector ID:                  19

Detector system
     (ARS02) MCB 131


Calibration
       Filename:                  250mL jar 2079-79-2 calib 10-10-19.Clb
     250mL jar 2079-79-2
     10-10-19  EEC

       Energy Calibration
            Created:              10/10/2019 11:15:54 AM
            Zero offset:          0.421 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.079E-08 keV/channel^2

       Efficiency Calibration
            Created:              10/10/2019 1:02:43 PM
            Knee Energy:        120.15 keV
            Above the Knee:       Quadratic        Uncertainty =   1.52 %
            Log(Eff):            -1.912186E+00 + (-2.045736E-01*Log(E) ) +
                                  ( -3.683304E-02*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   0.51 %
            Log(Eff):            -1.187486E+01 + ( 3.636438E+00*Log(E) ) +
                                  ( -4.037865E-01*Log(E)^2 )

Library Files
       Main analysis library:     NORM.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G800W064
       Start channel:            10 (     2.92keV )
       Stop channel:           8000 (  1998.67keV )
       Peak rejection level:     40.000%
       Peak search sensitivity:  1
       Sample Size:              5.0000E-02 +/- 0.000E+00%
       Activity scaling factor:  1.0000E+06/(  1.0000E+00*  5.0000E-02) =
                                 2.0000E+07
       Detection limit method:   Reg. Guide 4.16 Method
```

ORTEC g v - i (32ϕ3) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 0.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	norm.Pbc 10/1/2021 7:06:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.0881

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/L	Nuc
13.34	244.	7.77	0.85	5.729E-03				
16.11	141.	16.56	0.85	7.558E-03				
46.65	526.	6.02	0.84	2.099E-02	46.52	4.000	8.416E+04	PB210
53.23	56.	30.79	1.22	2.235E-02				
74.86	299.	7.98	0.92	2.468E-02				
77.21	482.	5.90	0.92	2.479E-02				
83.87	54.	30.45	0.93	2.498E-02				
87.25	129.	16.29	0.93	2.502E-02				
186.06	424.	6.89	1.08	1.855E-02	186.10	3.500	9.058E+04	RA226
241.88	220.	9.04	0.74	1.585E-02	241.00	3.900	5.327E+04	RA224
					241.98	7.500	2.777E+04	PB214
295.04	466.	5.77	1.16	1.402E-02	295.21	18.500	2.656E+04	PB214
					296.00	80.000	6.249E+03	TL210
351.69	791.	4.09	1.22	1.256E-02	351.92	35.800	2.604E+04	PB214
510.86	141.	15.23	2.63	9.845E-03	510.72	22.500	9.538E+03	TL208
609.36	714.	4.14	1.53	8.751E-03	609.31	44.791	2.691E+04	BI214
768.53	78.	15.72	1.40	7.464E-03	768.36	4.799	3.248E+04	BI214
933.93	39.	22.09	1.62	6.511E-03	934.06	3.029	2.970E+04	BI214
1120.34	152.	9.17	1.36	5.716E-03	1120.29	14.797	2.700E+04	BI214
1155.06	26.	19.61	1.25	5.592E-03				
1238.19	60.	16.30	1.18	5.316E-03	1238.11	5.859	2.873E+04	BI214
1310.00	10.	31.62	2.12	5.101E-03	1310.00	21.000	1.402E+03	TL210

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1377.98	54.	15.24	1.79	4.915E-03	1377.67	3.919	4.193E+04	BI214
1460.03	18.	23.57	0.50	4.709E-03	1460.75	10.700	3.476E+03	K40
1764.44	139.	8.79	1.86	4.087E-03	1764.49	15.357	3.222E+04	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.66	13.35	57.	244.	4.254E+04	15.53	0.850	SE-75	D
62.76	16.13	201.	141.	1.862E+04	33.13	0.853	KR-85	sD
211.21	53.17	107.	56.	2.523E+03	61.58	1.215	BA-133	s
297.72	74.83	135.	299.	1.212E+04	15.95	0.915	TH-234	D
307.13	77.19	163.	482.	1.943E+04	11.81	0.918	PB-212	D
333.78	83.90	107.	54.	2.148E+03	60.90	0.925	HG-203	sD
347.28	87.27	157.	129.	5.165E+03	32.58	0.929	PB-212	D
2042.06	511.24	60.	141.	1.430E+04	30.46	2.626	NA-22	s
4620.69	1155.06	0.	26.	4.650E+03	39.22	1.249	BI-214	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: NORM.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	184.91	46.65	233.	470.	0.131	13.94	0.839
RA-226	742.56	186.06	180.	392.	0.109	15.32	1.078
PB-214	965.83	241.88	67.	220.	0.061	18.07	0.742s
PB-214	1178.50	295.04	93.	459.	0.127	11.82	1.159
PB-214	1405.15	351.69	86.	779.	0.216	8.36	1.219
BI-214	2436.21	609.36	53.	702.	0.195	8.49	1.529
BI-214	3073.27	768.53	16.	78.	0.022	31.44	1.400s
BI-214	4481.68	1120.34	10.	152.	0.042	18.35	1.359s
BI-214	4953.54	1238.19	7.	60.	0.017	32.60	1.181s
TL-210	5241.12	1310.00	0.	10.	0.003	63.25	2.118s
BI-214	5513.39	1377.98	3.	54.	0.015	30.48	1.792s
K-40	5842.00	1460.03	0.	18.	0.005	47.14	0.499
BI-214	7061.42	1764.44	7.	135.	0.037	18.54	1.855s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/L	Peak Energy keV	Peak Activity pCi/L	Code	MDA Value pCi/L			COMMENTS
RA-226		9.0575E+04				5.84E+05			
			186.10	9.058E+04	(P	1.510E+04	7.66E+00	3.50E+00	G
Ra-228		5.9779E+02				2.10E+03			
			911.07	5.978E+02	%(P	2.016E+03	1.40E+02	2.90E+01	G
			968.90	1.175E+03	%	5.024E+03	1.96E+02	1.75E+01	G
			338.40	-9.717E+01	%	4.700E+03	1.92E+03	1.20E+01	G
			964.60	-7.358E+03	%	1.515E+04	9.58E+01	5.45E+00	G
PB-210		8.4162E+04				7.45E+03			
			46.52	8.416E+04	(P	1.322E+04	6.97E+00	4.00E+00	G
U-238		-2.4020E+03				1.63E+12			
			63.29	-2.402E+03	%(P	1.304E+04	1.94E+02	3.90E+00	G
			92.80	-1.313E+03	% P	1.694E+04	4.68E+02	3.00E+00	G
			92.38	-1.411E+04	% P	2.094E+04	4.99E+01	2.57E+00	G
U-235		-1.4764E+03				1.39E+09			
			143.76	-1.476E+03	%(P	4.707E+03	1.40E+02	1.05E+01	G
			205.31	-4.334E+03	%	1.105E+04	9.99E+01	4.70E+00	G
			163.35	-7.448E+02	%	1.009E+04	5.23E+02	4.70E+00	G
K-40		5.3654E+03				4.68E+11			
			1460.75	5.365E+03	(P	2.197E+03	2.36E+01	1.07E+01	G
PB-214		2.6406E+04				5.84E+05			
			351.92	2.604E+04	(P	1.533E+03	4.18E+00	3.58E+01	G
			295.21	2.656E+04	(P	2.761E+03	5.91E+00	1.85E+01	G
			241.98	2.777E+04	(	5.168E+03	9.04E+00	7.50E+00	G
BI-214		2.7090E+04				5.84E+05			
			609.31	2.691E+04	(P	1.398E+03	4.24E+00	4.48E+01	G
			1764.49	3.222E+04	+ P	3.666E+03	9.27E+00	1.54E+01	G
			1120.29	2.700E+04	(	3.084E+03	9.17E+00	1.48E+01	G
			1238.11	2.873E+04	(	7.417E+03	1.63E+01	5.86E+00	G
			768.36	3.248E+04	+	9.069E+03	1.57E+01	4.80E+00	G
			1377.67	4.193E+04	+,	8.609E+03	1.52E+01	3.92E+00	G
			934.06	7.496E+03	%	2.617E+04	1.55E+02	3.03E+00	G
BI-212		1.5612E+03				2.10E+03			
			727.17	1.561E+03	%(	3.305E+03	8.95E+01	1.18E+01	G
			1620.56	5.848E+03	%	1.809E+04	1.42E+02	2.75E+00	G

ORTEC g v - i (32ϕ3) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		785.42	9.190E+03 %		3.286E+04	1.58E+02	2.00E+00 G
PB-212	-5.1067E+02					2.10E+03	
		238.63	-5.107E+02 %(P		2.152E+03	1.32E+02	4.31E+01 G
		300.09	-1.875E+03 &		3.999E+04	6.34E+02	3.27E+00 G
RA-223	-1.6898E+03					1.20E+07	
		269.39	-1.690E+03 %(		4.073E+03	9.43E+01	1.36E+01 G
		154.18	-3.405E+03 %		9.322E+03	1.08E+02	5.59E+00 G
		323.88	4.124E+03 &		1.019E+04	9.93E+01	3.90E+00 G
RA-224	-5.7386E+03					2.10E+03	
		241.00	-5.739E+03 %(		2.257E+04	1.18E+02	3.90E+00 G
TL-208	-4.4468E+02					2.10E+03	
		583.14	-4.447E+02 %(P		8.493E+02	1.43E+02	8.60E+01 G
		510.72	-2.075E+03 %		5.231E+03	7.60E+01	2.25E+01 G
		860.47	1.814E+02 &		5.633E+03	1.34E+03	1.20E+01 G
		277.36	-5.283E+02 %		7.641E+03	5.51E+02	6.50E+00 G
		763.30	-1.870E+04 %		7.059E+04	1.12E+02	1.70E+00 G
TL-210	2.7729E+02					5.84E+05	
		795.00	4.119E+01 %(		5.815E+02	6.06E+02	1.00E+02 G
		296.00	1.073E+02 %		1.533E+03	4.25E+02	8.00E+01 G
		1310.00	1.402E+03 ?(		1.033E+03	3.16E+01	2.10E+01 G
		1210.00	1.035E+03 %		4.067E+03	1.81E+02	1.70E+01 G
		1110.00	4.355E+03 %		7.958E+03	8.31E+01	7.00E+00 G
		860.00	3.730E+03 &		8.085E+03	9.60E+01	7.00E+00 G
		1410.00	8.078E+03 %		1.701E+04	1.02E+02	5.00E+00 G
BE-7	1.8873E+02					5.34E+01	
		477.56	1.887E+02 %(		5.521E+03	1.20E+03	1.03E+01 G
NA-22	4.8108E+01					9.50E+02	
		1274.54	4.811E+01 %(		7.942E+02	7.53E+02	9.99E+01 G
PA-234	3.3412E+02					1.65E+12	
		98.44	3.341E+02 %(		1.348E+03	1.49E+02	2.51E+01 G
		946.00	1.358E+03 %		2.820E+03	9.46E+01	2.00E+01 G
		131.28	2.869E+02 &		2.079E+03	2.80E+02	2.00E+01 G
		94.67	-1.121E+03 %		3.056E+03	1.02E+02	1.55E+01 G
		883.24	-3.695E+02 %		6.340E+03	7.49E+02	1.20E+01 G
		926.70	1.283E+03 &		7.297E+03	1.64E+02	1.10E+01 G
		569.26	-2.941E+03 %		6.729E+03	9.67E+01	1.04E+01 G
		111.00	4.044E+02 &		4.175E+03	3.78E+02	8.55E+00 G
		733.00	1.873E+02 %		6.286E+03	1.38E+03	8.50E+00 G
		949.00	-4.187E+03 %		1.057E+04	1.17E+02	7.80E+00 G
		880.51	-2.042E+03 %		1.156E+04	2.49E+02	6.50E+00 G

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		226.87	1.121E+03 %		6.508E+03	2.22E+02	6.50E+00 G
		831.10	4.173E+03 %		8.934E+03	9.43E+01	5.60E+00 G
		808.10	4.251E+02 %		1.444E+04	1.48E+03	4.90E+00 G
		99.70	-3.111E+03 %		9.289E+03	1.12E+02	4.70E+00 G
		699.10	2.731E+02 &		1.277E+04	1.95E+03	4.60E+00 G
		898.60	7.294E+03 %		1.459E+04	8.90E+01	4.00E+00 G
		1394.10	-7.900E+03 %		2.018E+04	1.22E+02	3.90E+00 G
IR-192	-1.8422E+02					7.40E+01	
		316.49	-1.842E+02 %(		6.407E+02	1.41E+02	8.70E+01 G K
		468.06	-3.429E+02 &		1.154E+03	1.41E+02	5.18E+01 G K
		308.44	5.936E+02 &		1.465E+03	1.00E+02	3.18E+01 G K
		604.40	-1.802E+03 %		2.583E+04	4.27E+02	8.90E+00 G K
		612.45	-4.997E+03 %		4.009E+04	2.40E+02	5.80E+00 G K
		588.60	2.308E+03 %		1.339E+04	2.39E+02	4.60E+00 G K
		205.78	-4.168E+03 &		1.658E+04	1.55E+02	3.49E+00 G
		484.54	5.712E+03 %		1.398E+04	1.02E+02	3.35E+00 G
SC-46	2.3285E+02					8.38E+01	
		889.26	2.329E+02 %(		4.885E+02	9.21E+01	1.00E+02 G
TL-201	3.1417E+02					3.06E+00	
		70.82	3.142E+02 %(		2.104E+03	2.01E+02	4.90E+01 G
		68.89	-4.868E+02 %		1.662E+03	1.28E+02	2.89E+01 G
		80.20	-1.053E+03 %		7.538E+03	2.15E+02	1.69E+01 G
		167.43	-1.199E+03 &		4.397E+03	1.43E+02	1.19E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	Activity
TL-210	1310.00	0.	10.	0.003	63.25	1.402E+03

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/L	Uncertainty 2 Sigma Counting pCi/L	Total pCi/L	MDA pCi/L
RA-226	9.0575E+04	1.3878E+04	1.4572E+04	0.151E+05
Ra-228 #A	5.9779E+02	1.6787E+03	1.6791E+03	0.202E+04
PB-210	8.4162E+04	1.1735E+04	1.4053E+04	0.132E+05
U-238 #A	-2.4020E+03	9.3377E+03	9.3394E+03	0.130E+05
U-235 #A	-1.4764E+03	4.1449E+03	4.1461E+03	0.471E+04
K-40 #	5.3654E+03	2.5293E+03	2.5526E+03	0.220E+04
PB-214	2.6406E+04	2.0382E+03	2.9638E+03	0.153E+04
BI-214	2.7090E+04	2.2992E+03	2.7869E+03	0.140E+04
BI-212 #A	1.5612E+03	2.7943E+03	2.7959E+03	0.331E+04
PB-212 #A	-5.1067E+02	1.3445E+03	1.3449E+03	0.215E+04
RA-223 #A	-1.6898E+03	3.1882E+03	3.1897E+03	0.407E+04
RA-224 #A	-5.7386E+03	1.3508E+04	1.3512E+04	0.226E+05
TL-208 #A	-4.4468E+02	1.2756E+03	1.2759E+03	0.849E+03
TL-210 #A	2.7729E+02	1.7537E+02	1.7617E+02	0.581E+03
BE-7 #A	1.8873E+02	4.5128E+03	4.5128E+03	0.552E+04
NA-22 #A	4.8108E+01	7.2449E+02	7.2450E+02	0.794E+03
PA-234 #A	3.3412E+02	9.9609E+02	9.9637E+02	0.135E+04
IR-192 #B	-1.8422E+02	5.1833E+02	5.1846E+02	0.641E+03
SC-46 #A	2.3285E+02	4.2886E+02	4.2909E+02	0.488E+03
TL-201 #A	3.1417E+02	1.2626E+03	1.2628E+03	0.210E+04

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

ORTEC g v - i (3263) Env32 G800W064 10/8/2021 2:18:19 PM
AAA Spectrum name: ARS02804.An1

---------- S U M M A R Y ----------

Total Activity (2.9 to 1998.7 keV) 2.336E+05 pCi/L

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAA

```
     ORTEC g v - i (3263) Env32  G800W064  10/9/2021 3:06:38 PM
AAA                              Spectrum name: ARS02806.An1

Sample description
     Batch ID:  S-0155-V3
     SDG ID:  Ra-226  Tech:  EEC

Spectrum Filename: C:\User\ARS02806.An1

Acquisition information
       Start time:                10/9/2021 2:06:17 PM
       Live time:               3600
       Real time:               3606
       Dead time:                  0.17 %
       Detector ID:                  19

Detector system
     (ARS02) MCB 131


Calibration
       Filename:                  250mL jar 2079-79-2 calib 10-10-19.Clb
     250mL jar 2079-79-2
     10-10-19  EEC

       Energy Calibration
            Created:              10/10/2019 11:15:54 AM
            Zero offset:          0.421 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -3.079E-08 keV/channel^2

       Efficiency Calibration
            Created:              10/10/2019 1:02:43 PM
            Knee Energy:        120.15 keV
            Above the Knee:       Quadratic        Uncertainty =   1.52 %
            Log(Eff):            -1.912186E+00 + (-2.045736E-01*Log(E) ) +
                                  ( -3.683304E-02*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   0.51 %
            Log(Eff):            -1.187486E+01 + ( 3.636438E+00*Log(E) ) +
                                  ( -4.037865E-01*Log(E)^2 )

Library Files
       Main analysis library:     NORM.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G800W064
       Start channel:            10 (     2.92keV )
       Stop channel:           8000 (  1998.67keV )
       Peak rejection level:     40.000%
       Peak search sensitivity:  1
       Sample Size:              5.0000E-02 +/- 0.000E+00%
       Activity scaling factor:  1.0000E+06/(  1.0000E+00*  5.0000E-02) =
                                 2.0000E+07
       Detection limit method:   Reg. Guide 4.16 Method
```

ORTEC g v - i (3263) Env32 G800W064 10/9/2021 3:06:38 PM
AAA Spectrum name: ARS02806.An1

Random error: 1.0000000E+00
Systematic error: 1.0000000E+00
Fraction Limit: 0.000%
Background width: best method (based on spectrum).
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	norm.Pbc 10/1/2021 7:06:00 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.1209

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. pCi/L	Nuc
13.30	312.	6.84	0.85	5.756E-03				
16.05	150.	16.02	0.85	7.564E-03				
46.64	553.	5.81	0.78	2.099E-02	46.52	4.000	8.896E+04	PB210
53.43	58.	32.51	0.87	2.240E-02				
74.88	420.	6.77	0.92	2.468E-02				
77.20	710.	4.76	0.92	2.479E-02				
87.36	200.	10.85	0.93	2.502E-02				
90.00	91.	19.93	0.93	2.503E-02				
186.10	437.	6.70	1.10	1.855E-02	186.10	3.500	9.354E+04	RA226
241.84	329.	7.73	1.16	1.585E-02	241.00	3.900	7.983E+04	RA224
					241.98	7.500	4.161E+04	PB214
295.01	614.	4.82	1.20	1.403E-02	295.21	18.500	3.515E+04	PB214
					296.00	80.000	8.239E+03	TL210
351.75	1105.	3.40	1.16	1.255E-02	351.92	35.800	3.655E+04	PB214
446.07	33.	35.21	1.97	1.077E-02				
510.80	184.	11.78	2.59	9.849E-03	510.72	22.500	1.246E+04	TL208
609.39	961.	3.51	1.44	8.751E-03	609.31	44.791	3.635E+04	BI214
752.74	26.	38.05	0.71	7.573E-03				
768.31	96.	16.14	1.12	7.465E-03	768.36	4.799	4.023E+04	BI214
933.92	66.	16.45	1.73	6.511E-03	934.06	3.029	4.995E+04	BI214
1120.40	223.	8.06	1.87	5.716E-03	1120.29	14.797	3.958E+04	BI214
1154.76	22.	24.05	1.00	5.593E-03				

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pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1237.98	78.	14.08	1.09	5.317E-03	1238.11	5.859	3.784E+04	BI214
1377.70	68.	16.96	1.01	4.915E-03	1377.67	3.919	5.261E+04	BI214
1408.20	34.	26.78	0.73	4.837E-03	1410.00	5.000	2.125E+04	TL210
1509.16	35.	19.06	0.29	4.595E-03				
1729.77	44.	15.08	0.35	4.149E-03				
1764.43	149.	8.56	1.58	4.087E-03	1764.49	15.357	3.451E+04	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 2 Sigma %	FWHM keV	Suspected Nuclide	
51.52	13.40	71.	312.	5.414E+04	13.68	0.849	SE-75	D
62.50	16.14	214.	150.	1.984E+04	32.04	0.852	KR-85	sD
212.01	53.43	127.	58.	2.571E+03	65.02	0.868	CE-144	sM
297.83	74.87	194.	420.	1.700E+04	13.54	0.915	TH-234	D
307.10	77.19	215.	710.	2.863E+04	9.51	0.918	PB-212	D
347.73	87.33	135.	200.	7.984E+03	21.71	0.929	PB-212	sD
358.27	89.96	119.	91.	3.636E+03	39.85	0.932	AC-228	D
1782.79	446.41	34.	33.	3.065E+03	70.42	1.974	AG-110M	s
2041.80	510.90	44.	184.	1.868E+04	23.56	2.588	NA-22	
3010.07	752.75	20.	26.	3.486E+03	76.09	0.705	LA-140	s
4619.46	1154.72	2.	22.	3.934E+03	48.10	0.996	BI-214	s
5634.42	1408.23	11.	34.	7.070E+03	53.56	0.729	EU-152	s
6038.80	1509.21	3.	35.	7.682E+03	38.13	0.294	BI-214	s
6922.55	1729.77	0.	44.	1.061E+04	30.15	0.349	BI-214	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: NORM.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 2 Sigma %	FWHM keV
PB-210	184.87	46.64	240.	497.	0.138	13.36	0.779
RA-226	742.72	186.10	177.	404.	0.112	14.85	1.101s
PB-214	965.67	241.84	97.	329.	0.091	15.46	1.163
PB-214	1178.42	295.01	101.	607.	0.169	9.81	1.197
PB-214	1405.38	351.75	97.	1094.	0.304	6.92	1.163
BI-214	2436.33	609.39	65.	949.	0.264	7.15	1.442
BI-214	3072.39	768.31	36.	96.	0.027	32.27	1.116s

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Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	3735.29	933.92	12.	66.	0.018	32.90	1.725
BI-214	4481.88	1120.40	20.	223.	0.062	16.12	1.874
BI-214	4953.23	1238.11	28.	74.	0.020	41.13	2.054s
BI-214	5512.26	1377.70	16.	68.	0.019	33.92	1.011s
BI-214	7061.39	1764.43	8.	144.	0.040	17.98	1.585s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity pCi/L	Peak Energy keV	Peak Activity pCi/L	Code	Peak MDA Value pCi/L		COMMENTS
RA-226		9.3536E+04				5.84E+05		
			186.10	9.354E+04	*(P	1.495E+04	7.43E+00	3.50E+00 G
Ra-228		-5.126E+02				2.10E+03		
			911.07	-5.126E+02	%(P	2.901E+03	5.20E+02	2.90E+01 G
			968.90	-1.265E+03	%	5.151E+03	1.87E+02	1.75E+01 G
			338.40	1.360E+03	%	4.606E+03	1.37E+02	1.20E+01 G
			964.60	6.348E+03	&	1.350E+04	9.82E+01	5.45E+00 G
PB-210		8.8961E+04				7.45E+03		
			46.52	8.896E+04	(P	1.342E+04	6.68E+00	4.00E+00 G
U-238		-4.3767E+03				1.63E+12		
			63.29	-4.377E+03	%(P	1.584E+04	1.31E+02	3.90E+00 G
			92.80	-1.798E+03	% P	2.716E+04	4.50E+02	3.00E+00 G
			92.38	-5.664E+02	% P	3.139E+04	1.65E+03	2.57E+00 G
U-235		-2.1528E+02				1.39E+09		
			143.76	-2.153E+02	&(P	5.034E+03	9.00E+02	1.05E+01 G
			205.31	-6.086E+02	&	1.201E+04	7.62E+02	4.70E+00 G
			163.35	7.182E+03	%	9.986E+03	5.54E+01	4.70E+00 G
K-40		2.1514E+03				4.68E+11		
			1460.75	2.151E+03	%(P	7.661E+03	1.57E+02	1.07E+01 G
PB-214		3.6749E+04				5.84E+05		
			351.92	3.655E+04	(P	1.626E+03	3.46E+00	3.58E+01 G
			295.21	3.515E+04	(P	2.865E+03	4.91E+00	1.85E+01 G
			241.98	4.161E+04	(	6.128E+03	7.73E+00	7.50E+00 G
BI-214		3.6742E+04				5.84E+05		
			609.31	3.635E+04	(P	1.541E+03	3.58E+00	4.48E+01 G
			1764.49	3.451E+04	(P	3.748E+03	8.99E+00	1.54E+01 G

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AAA Spectrum name: ARS02806.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1120.29	3.958E+04	(	4.180E+03	8.06E+00	1.48E+01 G
		1238.11	3.551E+04	?(	1.326E+04	2.06E+01	5.86E+00 G
		768.36	4.023E+04	(	1.285E+04	1.61E+01	4.80E+00 G
		1377.67	5.261E+04	+	1.641E+04	1.70E+01	3.92E+00 G
		934.06	4.995E+04	+	1.456E+04	1.64E+01	3.03E+00 G
BI-212	2.0155E+03					2.10E+03	
		727.17	2.015E+03	%(	4.138E+03	8.82E+01	1.18E+01 G
		1620.56	-6.265E+03	%	2.885E+04	2.21E+02	2.75E+00 G
		785.42	6.127E+03	%	3.806E+04	2.75E+02	2.00E+00 G
PB-212	-1.9679E+02					2.10E+03	
		238.63	-1.968E+02	&(P	2.395E+03	3.60E+02	4.31E+01 G
		300.09	6.627E+03	%	4.461E+04	2.01E+02	3.27E+00 G
RA-223	1.3593E+03					1.20E+07	
		269.39	1.359E+03	%(	3.316E+03	9.49E+01	1.36E+01 G
		154.18	1.384E+03	%	9.308E+03	2.62E+02	5.59E+00 G
		323.88	-2.619E+03	&	1.565E+04	2.41E+02	3.90E+00 G
RA-224	-2.8273E+03					2.10E+03	
		241.00	-2.827E+03	%(	2.497E+04	2.63E+02	3.90E+00 G
TL-208	-2.8975E+02					2.10E+03	
		583.14	-2.897E+02	%(P	9.132E+02	2.55E+02	8.60E+01 G
		510.72	-2.044E+03	%	5.613E+03	8.26E+01	2.25E+01 G
		860.47	-3.628E+02	%	7.201E+03	8.75E+02	1.20E+01 G
		277.36	-2.906E+03	%	9.148E+03	1.23E+02	6.50E+00 G
		763.30	2.159E+03	%	7.111E+04	9.58E+02	1.70E+00 G
TL-210	1.0297E+02					5.84E+05	
		795.00	1.030E+02	%(	6.628E+02	2.82E+02	1.00E+02 G
		296.00	2.592E+01	%	1.758E+03	2.02E+03	8.00E+01 G
		1310.00	-2.922E+03	%	4.905E+03	8.32E+01	2.10E+01 G
		1210.00	-1.579E+03	%	5.238E+03	1.56E+02	1.70E+01 G
		1110.00	-3.727E+03	%	1.304E+04	1.61E+02	7.00E+00 G
		860.00	-2.487E+03	&	1.158E+04	2.07E+02	7.00E+00 G
		1410.00	-5.386E+02	%	2.172E+04	1.13E+03	5.00E+00 G
BE-7	-2.5479E+03					5.34E+01	
		477.56	-2.548E+03	%(	6.676E+03	1.11E+02	1.03E+01 G
NA-22	2.5978E+02					9.50E+02	
		1274.54	2.598E+02	%(	6.328E+02	1.12E+02	9.99E+01 G
PA-234	5.5971E+02					1.65E+12	
		98.44	5.597E+02	%(	1.649E+03	1.10E+02	2.51E+01 G
		946.00	3.879E+02	%	3.462E+03	3.99E+02	2.00E+01 G

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Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		131.28	7.444E+02	&	2.049E+03	1.08E+02	2.00E+01 G
		94.67	-1.203E+03	%	3.505E+03	1.09E+02	1.55E+01 G
		883.24	-4.157E+03	%	7.957E+03	8.72E+01	1.20E+01 G
		926.70	2.223E+03	&	1.011E+04	1.34E+02	1.10E+01 G
		569.26	-1.050E+02	%	5.654E+03	2.18E+03	1.04E+01 G
		111.00	1.690E+03	%	4.530E+03	1.00E+02	8.55E+00 G
		733.00	-2.661E+03	%	6.990E+03	1.13E+02	8.50E+00 G
		949.00	-5.183E+03	%	1.145E+04	1.03E+02	7.80E+00 G
		880.51	1.702E+03	&	1.156E+04	2.98E+02	6.50E+00 G
		226.87	1.682E+03	%	7.885E+03	1.81E+02	6.50E+00 G
		831.10	-3.035E+03	%	1.472E+04	2.16E+02	5.60E+00 G
		808.10	6.003E+03	%	1.200E+04	8.93E+01	4.90E+00 G
		99.70	-2.967E+03	%	8.578E+03	1.08E+02	4.70E+00 G
		699.10	-1.013E+04	%	2.001E+04	8.72E+01	4.60E+00 G
		898.60	5.049E+03	%	1.584E+04	1.38E+02	4.00E+00 G
		1394.10	3.950E+03	%	2.018E+04	2.41E+02	3.90E+00 G
IR-192	-2.5705E+01					7.40E+01	
		316.49	-2.571E+01	%(	6.687E+02	1.04E+03	8.70E+01 G K
		468.06	3.429E+02	%	1.084E+03	1.32E+02	5.18E+01 G K
		308.44	-3.467E+02	%	1.950E+03	2.27E+02	3.18E+01 G K
		604.40	2.473E+03	&	2.968E+04	3.59E+02	8.90E+00 G K
		612.45	-6.427E+03	&	4.662E+04	2.17E+02	5.80E+00 G K
		588.60	5.222E+03	%	1.395E+04	1.12E+02	4.60E+00 G K
		205.78	4.678E+03	&	1.539E+04	1.28E+02	3.49E+00 G
		484.54	4.394E+03	&	1.770E+04	1.68E+02	3.35E+00 G
SC-46	4.2513E+02					8.38E+01	
		889.26	4.251E+02	&(	9.445E+02	1.01E+02	1.00E+02 G
TL-201	-4.4965E+02					3.06E+00	
		70.82	-4.497E+02	%(	2.707E+03	1.81E+02	4.90E+01 G
		68.89	2.792E+02	%	1.820E+03	2.43E+02	2.89E+01 G
		80.20	1.107E+03	%	7.170E+03	1.95E+02	1.69E+01 G
		167.43	-1.601E+03	%	4.698E+03	1.15E+02	1.19E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.

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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G800W064 10/9/2021 3:06:38 PM
AAA Spectrum name: ARS02806.An1

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (	2.9 to 1998.7 keV)	2.560E+05	pCi/L

Analyzed by: _____
ARS_Local_Admin

Reviewed by: _____
Supervisor

Laboratory: AAA

National Institute of Standards & Technology
Certificate

Standard Reference Material 4967A
Radium-226 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive radium-226 chloride (and its radioactive decay products), non-radioactive barium chloride and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of instruments and for the monitoring of radiochemical procedures.

Radiological Hazard: The SRM ampoule contains radium-226 with an activity of approximately 13 kBq. Radium-226 decays by alpha-particle emission. The progeny of radium-226 have a total activity of approximately 95 kBq and decay by alpha- and beta-particle emission. None of the alpha or beta particles escape from the SRM ampoule. During the decay process, X-rays and gamma rays with energies from 11 kev to 2.5 MeV are also emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Gaseous radon-222 will escape from the ampoule when it is opened. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard: The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1.0 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution

Storage and Handling: The SRM should be stored and used at a temperature between 5 °C and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2013. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of both the radioactivity and the strong acid.

Preparation: This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, M.P. Unterweger, Acting Group Leader. The overall technical direction and physical measurements leading to certification were provided by R. Collé and P. Volkovitsky of the Radioactivity Group. Statistical consultation was provided by S.D. Leigh of the NIST Statistical Engineering Division. The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program.

[redacted]

[redacted]

Gaithersburg, Maryland 20899
December 2004

*Notes and references are on pages 5 to 7.

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*.

PROPERTIES OF SRM 4967A

Certified values

Radionuclide	**Radium-226**
Reference time	**1200 EST, 01 September 2003**
Massic activity of the solution [b]*	**2482 Bq·g^{-1}**
Relative expanded uncertainty (k=2)	**1.20%** [c] [d]
Solution mass	**(5.086 ± 0.003) g** [e]
Solution density	**(1.017 ± 0.002) g·mL^{-1} at 21 °C** [e]

Uncertified values

Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter Wall thickness Barium content Lead-oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L^{-1})	Mass Fraction (g·g^{-1})
	H_2O HCl $BaCl_2$ $^{226}RaCl_2$	54 1.0 4×10^{-4} 3×10^{-7}	0.96 0.04 8×10^{-5} 9×10^{-8}
Radiological Properties:			
Photon-emitting impurities	None detected [f]		
Half lives used	Radium-226: (1600 ± 7) a [g] [5] Radon-222: (3.8235 ± 0.0003) d [g] [5]		
Calibration method and measuring instrument(s)	Gravimetric dilution of SRM 4963, confirmed by comparison with solution standards, and derivatives thereof, from the NBS/NIST "1947 (1967 recalibrated) series" of radium-226 solution standards. The mass of radium-226 in these solution standards had previously been determined by comparison with the U.S. National Standards for radium-226. Conversion from mass of radium-226 to activity of radium-226 was done using the half life of radium-226 shown above. [h]		

*Notes and references are on pages 5 to 7.

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [c] [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [i]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [j]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [k]
Calibration of the "1947 (1967 recalibrated) series" of radium-226 solution standards in terms of mass of radium-226 [h]	Estimated (B)	0.34	1.0	0.34
Ratio of the mass of radium-226 in SRM 4967A to the mass of radium-226 in the "1947 (1967 recalibrated) series" of radium-226 solution standards	Weighted mean of the ratios obtained using seven different comparisons (B)	0.15	1.0	0.15
Corrections for the decay of radium-226	Standard uncertainty of the radium-226 half-life (A) [m]	0.44	0.016 [n]	0.007
Gravimetric measurements	Estimated (B)	0.10	1.0	0.10
Conversion of radium-226 mass to activity [p]	Standard uncertainty of the radium-226 half-life (A) [q]	0.44	1.0	0.44
Photon-emitting impurities	Limit of detection (B) [r]	100.	0.0001	0.01
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.6
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				1.2

*Notes and references are on pages 5 to 7.

NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	10	100
Approximate Dose Rate (μSv/h):	5	0.4	-

[b] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[c] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process. The value, x_i, used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) \equiv |\partial y/\partial x_i| \cdot u(x_i)$, called a **component of combined standard uncertainty** of y. The **combined standard uncertainty** of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty. The combined standard uncertainty is multiplied by a **coverage factor** of $k = 2$ to obtain U, the **expanded uncertainty** of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[d] The value of each component of combined standard uncertainty, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the massic response is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[e] The stated uncertainty is two times the standard uncertainty.

[f] Estimated limits of detection for photon-emitting impurities, as of the reference time, expressed as massic photon emission rates, are:
6×10^{0} $s^{-1} \cdot g^{-1}$ for energies between 22 and 182 keV,
3×10^{0} $s^{-1} \cdot g^{-1}$ for energies between 190 and 347 keV,
8×10^{-1} $s^{-1} \cdot g^{-1}$ for energies between 356 and 1455 keV, and
3×10^{-1} $s^{-1} \cdot g^{-1}$ for energies between 1465 and 2750 keV,
provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of radium-226 and progeny.

[g] The stated uncertainty is the standard uncertainty.

[h] For further details on NBS/NIST radium series calibrations refer to reference [6]. The 1967 recalibrations of the "1947 series" and of the "1957 series" were made using pressurized "4π"γ ionization chamber (PIC) "A".

The master solution for SRM 4967A was directly compared with the "1947 (1967 recalibrated) series" of radium-226 solution standards using PIC "A", and was compared with solutions of the "1992 series" of radium solution standards (SRM 4967) using PIC "A", pulse-ionization-chamber radon analyses (see references [7] and [8]), and germanium photon spectrometry.

The radium-226 in SRM 4967A was chemically purified approximately 55 years ago. The lead-210 and its daughter radionuclides are not in equilibrium.

[i] Relative standard uncertainty of the input quantity x_i.

[j] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

k] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y \equiv |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[m] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[n] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$

[p] The U.S. National Standards for radium-226 are certified in terms of mass of radium-226, as were all radium-226 SRMs prior to the "1992 series". Beginning with the "1992 series", radium-226 solution SRMs are now certified in terms of the massic activity of radium-226.

[q] The relative standard uncertainty of the activity of radium-226 per unit mass of radium-226 is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainties of the atomic weight of radium-226 and of Avogadro's number are negligible.

[r] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{$(response per Bq of impurity)/(response per Bq of Ra-226)$\} \cdot \{$(Bq of impurity)/(Bq of Ra-226)$\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993 (corrected and reprinted, 1995). Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), September 2003.

[6] W.B. Mann, L.L. Stockman, W.J. Youden, A. Schwebel, P.A. Mullen and S.B. Garfinkel, Preparation of New Solution Standards of Radium, *Journal of Research of the National Bureau of Standards* **62** (1959) 21-26.

[7] R. Collé, J.M.R. Hutchinson and M.P. Unterweger, The NIST Primary Radon-222 Measurement System, *Journal of Research of the National Institute of Standards and Technology* **95** (1990) 155-165.

[8] J.M.R. Hutchinson, J. Cessna, R. Collé and P. Hodge, An International Radon-In-Air Measurement Intercomparison Using a New Transfer Standard, *Applied Radiation and Isotopes* **43** (1992) 175-189.

Calibration

ID	STD ID	STD Conc (pCi/g)	STD MASS (g)	dpm added	Carrier ID	Carrier Conc. (mg Ba/mL)	Carrier volume (mL)	Carrier added (mg)	grav. Factor (mg Ba / mg BaSO4)	Carrier expected mass (mg)	Start of Rn-222 ingrowth	Planchet tare (g)	Planchet + ppt (g)	net ppt (mg)	chemical yield	Chemical Yield for calculations	dpm for efficiency calculations	Alpha Gross (counts)	Count duration (min)	Alpha Gross CPM	Alpha Bkg counts	Alpha bkg count duration (min)	Alpha Bkg CPM	Alpha net CPM	Count Finish	Elapsed time to count midpoint (days)	T 1/2 Rn222 (days)	Ingrowth Factor	Det ID	Total Radium Alpha Efficiency (cpm/dpm)
Blank	—	—	—	—	xxxx	xxxx	xxxx	#VALUE!	0.5884	#VALUE!	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	—	xxxx	xxxx	#VALUE!	xxxx	xxxxx	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	—
S-0142.1	S-0142	293.74	2.026	1322.464	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.7904	7.8466	56.2	103.34%	1.0000	1322.464	13795	15	919.667	65	900	0.0733	919.593	12/4/21 4:56	5613.40694	3.8235	4.0000	A1	0.174
S-0142.2	S-0142	293.74	2.0287	1321.617	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.7914	7.849	57.6	105.91%	1.0000	1321.617	13856	15	926.533	82	900	0.0911	926.442	12/4/21 4:56	5613.40694	3.8235	4.0000	A2	0.175
S-0142.3	S-0142	293.74	2.0225	1318.678	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.7794	7.8372	57.8	106.28%	1.0000	1318.678	12730	15	848.667	99	900	0.1100	848.557	12/4/21 4:56	5613.40694	3.8235	4.0000	A3	0.161
S-0142.4	S-0142	293.74	2.025	1321.16	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.8327	7.8905	57.8	106.28%	1.0000	1321.160	12727	15	848.467	97	900	0.1078	848.359	12/4/21 4:56	5613.40694	3.8235	4.0000	A4	0.161
S-0142.5	S-0142	293.74	2.0203	1317.443	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.7878	7.8455	57.7	106.10%	1.0000	1317.443	14417	15	961.133	103	900	0.1144	960.989	12/4/21 4:56	5613.40694	3.8235	4.0000	B1	0.182
S-0142.6	S-0142	293.74	2.0238	1319.726	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.7727	7.8302	57.5	105.73%	1.0000	1319.726	15205	15	1013.667	74	900	0.0822	1013.584	12/4/21 4:56	5613.40694	3.8235	4.0000	B2	0.192
S-0142.7	S-0142	293.74	2.0256	1320.899	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.8305	7.8883	57.7	106.10%	1.0000	1320.899	14141	15	942.733	74	900	0.0822	942.651	12/4/21 4:56	5613.40694	3.8235	4.0000	B3	0.178
S-0142.8	S-0142	293.74	2.0283	1322.66	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	7.8115	7.8685	57	104.81%	1.0000	1322.660	15231	15	1015.400	133	900	0.1478	1015.252	12/4/21 4:56	5613.40694	3.8235	4.0000	B4	0.192
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!
xxxx	S-0142	293.74	xxxx	#VALUE!	C-0020	16	2	32	0.5884	54.3848	7/22/2006 11:40	xxxx	xxxx	#######	#VALUE!	#VALUE!	xxxx	xxxx	15	#VALUE!	xxxx	900	#VALUE!	#VALUE!	xxxx	#VALUE!	3.8235	#VALUE!	xxxx	#VALUE!

Detector	Eff
A1	0.174
A2	0.175
A3	0.161
A4	0.161
B1	0.172
B2	0.174
B3	0.174
B4	0.168
C1	0.180
C2	0.190
C3	0.169
C4	0.162
D1	0.182
D2	0.192
D3	0.178
D4	0.192

pCi	2.22
dpm	1
Ba	80

293.3726

Entered By: [redacted] Date/Time: 12/7/2021 12:57

Signature: [redacted]

Verified By: [redacted] Date/Time: 12-8-21 1013

Signature: [redacted]

[redacted]

12-8-21

Apex-Alpha/Beta™

CANBERRA

Background Report

Batch Name: Batch_1963
Procedure: Background
Calibration: Background

Count Date: 12/3/2021 1:56:30 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A1	7.3333E-002 +/- 9.0267E-003	6.8667E-001 +/- 2.7622E-002
	66	618

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A2	9.1111E-002 +/- 1.0062E-002	7.1111E-001 +/- 2.8109E-002
	82	640

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A3	1.1000E-001 +/- 1.1055E-002	7.8333E-001 +/- 2.9502E-002
	99	705

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A4	1.0778E-001 +/- 1.0943E-002	8.2222E-001 +/- 3.0225E-002
	97	740

Batch Name: Batch_1964
Procedure: Background
Calibration: Background

Count Date: 12/3/2021 1:56:30 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B1	1.8667E-001 +/- 1.4402E-002	9.8444E-001 +/- 3.3073E-002
	168	886

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B2	1.9111E-001 +/- 1.4572E-002	8.0000E-001 +/- 2.9814E-002
	172	720

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B3	1.4222E-001 +/- 1.2571E-002	7.8000E-001 +/- 2.9439E-002
	128	702

Calculated Background (cpm)

Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
B4	1.0667E-001 +/- 1.0887E-002	7.6556E-001 +/- 2.9165E-002
	96	689

Batch Name: Batch_1965
Procedure: Background
Calibration: Background

Count Date: 12/3/2021 1:56:30 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C1	2.0556E-001 +/- 1.5113E-002	7.2000E-001 +/- 2.8284E-002
	185	648

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C2	1.4000E-001 +/- 1.2472E-002	8.0000E-001 +/- 2.9814E-002
	126	720

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C3	1.3333E-001 +/- 1.2172E-002	7.1000E-001 +/- 2.8087E-002
	120	639

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
C4	6.4444E-002 +/- 8.4620E-003	7.9778E-001 +/- 2.9773E-002
	58	718

Batch Name: Batch_1966
Procedure: Background
Calibration: Background

Count Date: 12/3/2021 1:56:30 PM
Preset Count Time: 54000
Count Mode: Simultaneous

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D1	1.1444E-001 +/- 1.1277E-002	6.9667E-001 +/- 2.7822E-002
	103	627

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D2	8.2222E-002 +/- 9.5581E-003	7.2667E-001 +/- 2.8415E-002
	74	654

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D3	8.2222E-002 +/- 9.5581E-003	4.3678E+000 +/- 6.9664E-002
	74	3931

Calculated Background (cpm)		
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D4	1.4778E-001 +/- 1.2814E-002	8.5667E-001 +/- 3.0852E-002
	133	771

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Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Count Time	Run Date & Time
LB 4200 A	2020	A1	S-0142	S-0142-1 A1	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 A	2020	A2	S-0142	S-0142-2 A2	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 A	2020	A3	S-0142	S-0142-3 A3	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 A	2020	A4	S-0142	S-0142-4 A4	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 B	2020	B1	S-0142	S-0142-5 B1	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 B	2020	B2	S-0142	S-0142-6 B2	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 B	2020	B3	S-0142	S-0142-7 B3	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 B	2020	B4	S-0142	S-0142-8 B4	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 C	2020	C1	S-0142	S-0142-9 C1	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 C	2020	C2	S-0142	S-0142-10 C2	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM
LB 4200 C	2020	C3	S-0142	S-0142-11 C3	903/Ra-226 Calibration	900	12/7/2021 11:59:31 AM

Apex-Alpha/Beta™

CANBERRA

Assignment Summary

Drawer	Batch ID	Detector	Batch	Sample	Procedure	Count Time	Run Date & Time
LB 4200 C	2020	C1	S-0142	S-0142-1 C1	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 C	2020	C2	S-0142	S-0142-2 C2	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 C	2020	C3	S-0142	S-0142-3 C3	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 C	2020	C4	S-0142	S-0142-4 C4	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 D	2020	D1	S-0142	S-0142-5 D1	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 D	2020	D2	S-0142	S-0142-6 D2	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 D	2020	D3	S-0142	S-0142-7 D3	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM
LB 4200 D	2020	D4	S-0142	S-0142-8 D4	903/Ra-226 Calibration	900	12/7/2021 12:20:51 PM

GPC D 1155921 Batch Report

Batch Name: S-0142
Procedure: 903/Ra-226 Calibration
Batch ID: 2020
Calibration: Fitted Efficiency
Preset Count Time (min): 15
Count Mode: Simultaneous

Sample ID	Detector ID	Gross Alpha Counts (cpm)	Gross Beta Counts (cpm)	Alpha activity (uCi)	Beta activity (uCi)	Count Time (s)	Voltage (V)	Run Date & Time
S-0142-1 A1	A1	13795	18987	919.666666666667	1265.8	900	1230	12/7/2021 11:59:38 AM
S-0142-1 C1	C1	14302	19789	953.466666666667	1319.26666666667	900	1230	12/7/2021 11:59:38 AM
~~S-0142-10 C2~~	C2	~~16141~~	20793	1076.06666666667	1386.2	900	1230	12/7/2021 11:59:38 AM
~~S-0142-11 C3~~	C3	~~14919~~	20143	994.6	1342.86666666667	900	1230	12/7/2021 11:59:38 AM
S-0142-2 A2	A2	13898	19087	926.533333333333	1272.46666666667	900	1230	12/7/2021 11:59:38 AM
S-0142-2 C2	C2	15099	20034	1006.6	1335.6	900	1230	12/7/2021 11:59:38 AM
S-0142-3 A3	A3	12730	18329	848.666666666667	1221.93333333333	900	1230	12/7/2021 11:59:38 AM
S-0142-3 C3	C3	13410	19002	894	1266.8	900	1230	12/7/2021 11:59:38 AM
S-0142-4 A4	A4	12727	18865	848.466666666667	1257.66666666667	900	1230	12/7/2021 11:59:38 AM
S-0142-4 C4	C4	12880	19354	858.666666666667	1290.26666666667	900	1230	12/7/2021 11:59:38 AM
S-0142-5 B1	B1	13680	18658	912	1243.86666666667	900	1230	12/7/2021 11:59:38 AM
S-0142-5 D1	D1	14417	19450	961.133333333333	1296.66666666667	900	1230	12/7/2021 11:59:38 AM
S-0142-6 B2	B2	13835	18738	922.333333333333	1249.2	900	1230	12/7/2021 11:59:38 AM
S-0142-6 D2	D2	15205	20480	1013.66666666667	1365.33333333333	900	1230	12/7/2021 11:59:38 AM
S-0142-7 B3	B3	13778	18447	918.533333333333	1229.8	900	1230	12/7/2021 11:59:38 AM
S-0142-7 D3	D3	14141	19185	942.733333333333	1279	900	1230	12/7/2021 11:59:38 AM
S-0142-8 B4	B4	14874	18827	991.6	1255.13333333333	900	1230	12/7/2021 11:59:38 AM
S-0142-8 D4	D4	15231	19821	1015.4	1321.4	900	1230	12/7/2021 11:59:38 AM
~~S-0142-9 C1~~	C1	~~15317~~	20488	1021.13333333333	1365.86666666667	900	1230	12/7/2021 11:59:38 AM

Unknown Batch Report

✓ Samples reviewed FFF 12-7-21

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1010

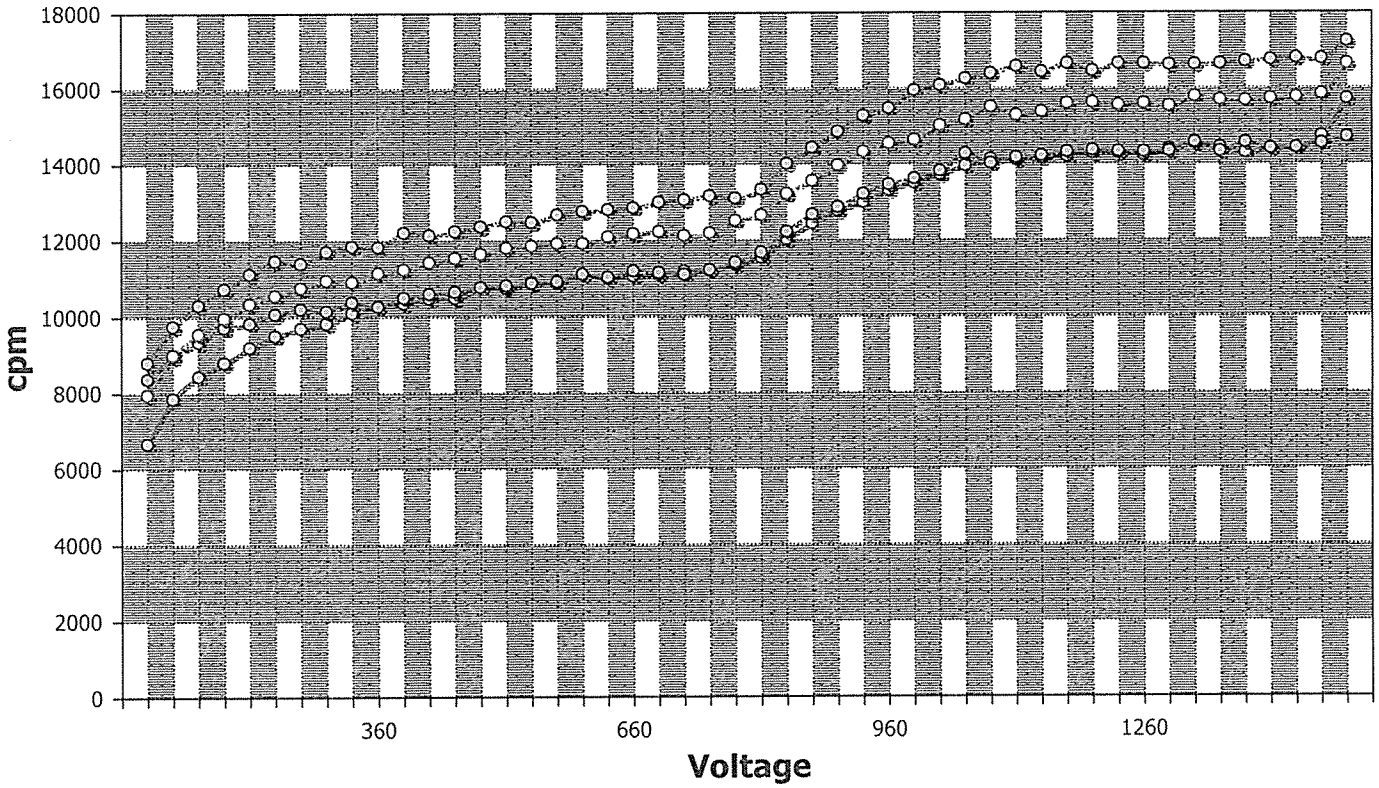
Plateau Date: 8/6/2021 3:16:56 PM

Decay Mode: Alpha

Drawer: LB 4200_D1

Device: LB 4200 A

Operating Voltage: 540



	A1		A2		A3		A4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	6675		8379		7962		8811		90
2	7862		8976		9012		9763		120
3	8454	23.71	9352	13.14	9563	20.02	1.032E+04	18.22	150
4	8808	15.35	9733	9.308	9974	13.08	1.075E+04	13.16	180
5	9209	11.64	9845	7.08	1.035E+04	9.718	1.114E+04	8.684	210
6	9513	8.956	1.009E+04	4.083	1.057E+04	7.563	1.148E+04	6.403	240
7	9710	7.308	1.022E+04	3.825	1.077E+04	4.758	1.141E+04	4.92	270
8	9835	6.673	1.016E+04	1.802	1.096E+04	4.006	1.172E+04	3.363	300
9	1.011E+04	5.828	1.039E+04	2.225	1.093E+04	3.523	1.186E+04	4.884	330
10	1.03E+04	5.061	1.028E+04	3.297	1.116E+04	3.812	1.184E+04	3.42	360
11	1.036E+04	3.178	1.051E+04	2.796	1.125E+04	4.489	1.221E+04	2.963	390
12	1.049E+04	3.617	1.061E+04	3.689	1.144E+04	3.75	1.215E+04	3.052	420
13	1.051E+04	3.458	1.067E+04	2.568	1.154E+04	3.865	1.225E+04	2.249	450
14	1.079E+04	3.408	1.079E+04	2.231	1.165E+04	3.195	1.238E+04	2.546	480
15	1.076E+04	2.713	1.083E+04	1.958	1.181E+04	2.791	1.251E+04	2.638	510
16	1.092E+04	2.393	1.089E+04	2.402	1.186E+04	1.88	1.249E+04	2.585	540
17	1.088E+04	2.264	1.093E+04	2.023	1.193E+04	1.802	1.269E+04	2.358	570
18	1.112E+04	1.346	1.113E+04	2.236	1.193E+04	2.264	1.277E+04	2.306	600
19	1.103E+04	1.24	1.105E+04	1.652	1.21E+04	2.387	1.282E+04	1.93	630
20	1.107E+04	0.7557	1.121E+04	0.2657	1.218E+04	1.5	1.287E+04	2.052	660

	A1		A2		A3		A4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	1.111E+04	1.625	1.117E+04	0.8567	1.224E+04	0.3767	1.301E+04	2.366	690
22	1.12E+04	2.14	1.111E+04	1.511	1.213E+04	1.781	1.307E+04	1.658	720
23	1.123E+04	3.101	1.124E+04	4.014	1.22E+04	3.428	1.318E+04	1.755	750
24	1.137E+04	5.81	1.142E+04	7.849	1.253E+04	7.084	1.311E+04	5.236	780
25	1.155E+04	8.939	1.169E+04	10.58	1.267E+04	9.051	1.334E+04	8.598	810
26	1.203E+04	10.27	1.223E+04	10.66	1.323E+04	9.55	1.402E+04	10.97	840
27	1.245E+04	9.78	1.269E+04	9.77	1.357E+04	10.05	1.444E+04	10.95	870
28	1.278E+04	8.184	1.288E+04	7.761	1.398E+04	8.197	1.487E+04	8.453	900
29	1.301E+04	6.842	1.322E+04	6.206	1.434E+04	6.385	1.529E+04	7.944	930
30	1.332E+04	6.019	1.346E+04	5.669	1.456E+04	5.497	1.548E+04	6.709	960
31	1.351E+04	5.696	1.363E+04	6.065	1.465E+04	4.857	1.596E+04	2.415	990
32	1.373E+04	5.028	1.382E+04	4.306	1.502E+04	0.3439	1.609E+04	-4.467	1020
33	1.396E+04	3.416	1.428E+04	2.175	1.518E+04	-4.193	1.627E+04	-11.4	1050
34	1.414E+04	0.1768	1.403E+04	-1.492	1.551E+04	-9.1	1.64E+04	-14.11	1080
35	1.412E+04	-3.384	1.418E+04	-4.997	1.529E+04	-9.86	1.659E+04	-11.8	1110
36	1.416E+04	-5.533	1.423E+04	-5.56	1.538E+04	-7.159	1.645E+04	-7.973	1140
37	1.42E+04	-5.649	1.433E+04	-5.398	1.56E+04	-6.069	1.666E+04	-5.656	1170
38	1.428E+04	-4.268	1.437E+04	-4.534	1.563E+04	-4.615	1.647E+04	-4.412	1200
39	1.43E+04	-3.242	1.434E+04	-3.51	1.556E+04	-3.784	1.666E+04	-3.407	1230
40	1.424E+04	-2.669	1.433E+04	-2.501	1.56E+04	-2.459	1.666E+04	-3.059	1260
41	1.441E+04	-2.043	1.435E+04	-2.16	1.554E+04	-2.273	1.663E+04	-3.09	1290
42	1.455E+04	-3.934	1.458E+04	-3.426	1.579E+04	-3.417	1.664E+04	-4.373	1320
43	1.445E+04	-7.004	1.434E+04	-7.616	1.57E+04	-7.147	1.665E+04	-7.063	1350
44	1.431E+04	-10.21	1.457E+04	-11.21	1.568E+04	-10.36	1.672E+04	-10.01	1380
45	1.443E+04	-10.78	1.442E+04	-12.55	1.573E+04	-11.28	1.676E+04	-11.63	1410
46	1.444E+04	-5.28	1.443E+04	-10.1	1.577E+04	-7.683	1.68E+04	-9.42	1440
47	1.474E+04		1.455E+04		1.585E+04		1.678E+04		1470
48	1.572E+04		1.471E+04		1.665E+04		1.724E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1015

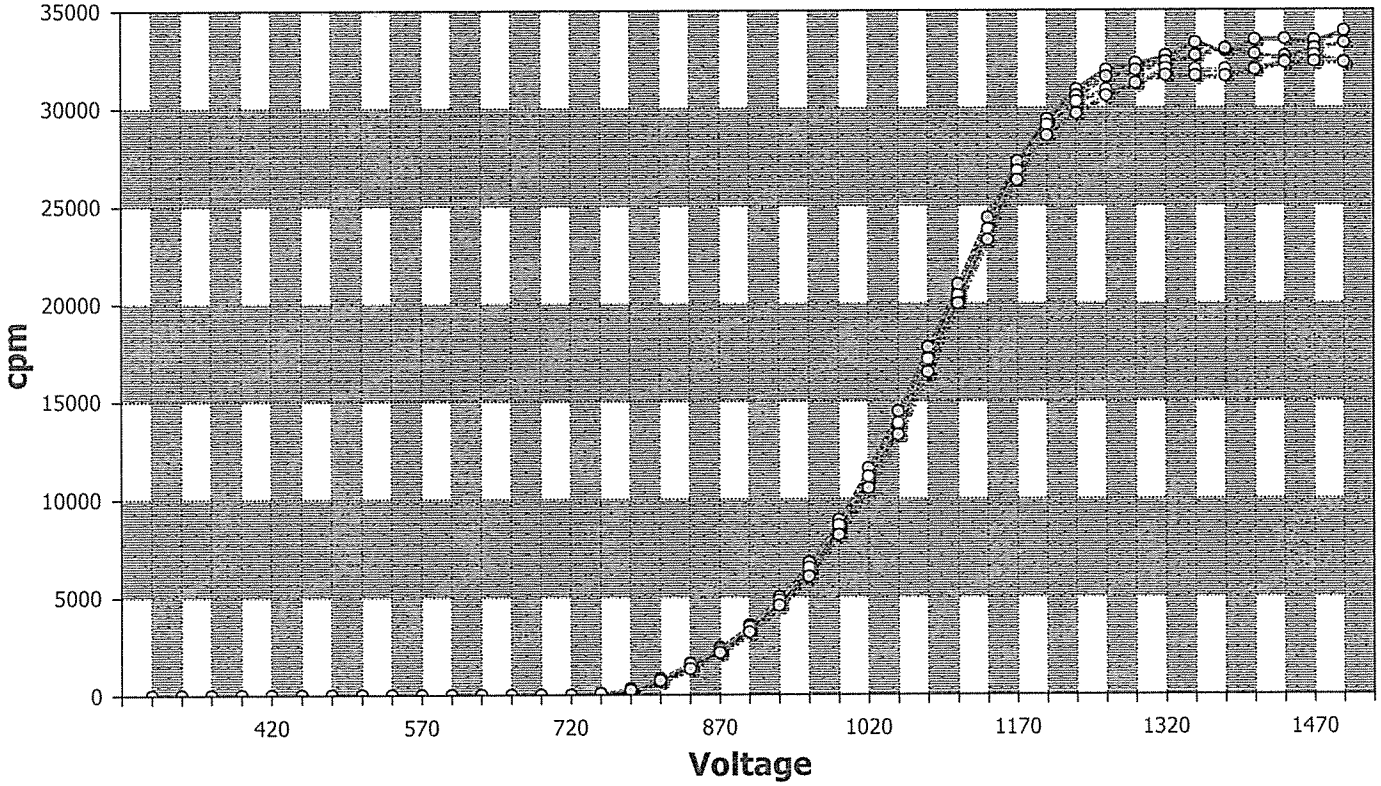
Plateau Date: 8/9/2021 1:43:22 PM

Decay Mode: Beta

Drawer: LB 4200_D1

Device: LB 4200 A

Operating Voltage: 1230



	A1		A2		A3		A4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	0		0		0		0		300
2	0		0.5		0		0		330
3	0	0	0.5	0	0	0	0	0	360
4	0	0	0.5	-100	0	0	0	0	390
5	0	0	0	0	0	0	0	0	420
6	0	0	0	0	0	0	0	0	450
7	0	0	0	0	0	0	0	0	480
8	0	0	0	0	0	0	0	0	510
9	0	0	0	0	0	0	0	0	540
10	0	0	0	0	0	0	0	0	570
11	0	0	0	0	0	0	0	0	600
12	0	0	0	0	0	0	0.5	100	630
13	0	0	0	0	0	0	0.5	1333	660
14	1.5	2822	1.5	4589	1.5	3789	0.5	1.017E+04	690
15	8	2271	14.5	1776	14.5	1670	10	1892	720
16	59.5	945.9	96	702.6	78	843.4	72	791.4	750
17	243.5	479.5	339	389.4	325	398.4	248.5	442.8	780
18	728	257.2	851	233.5	833	228.3	736	237.7	810
19	1425	180	1617	166.2	1579	163.6	1329	184.4	840
20	2278	142.7	2437	140.7	2304	142.9	2157	147.9	870

	A1		A2		A3		A4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	3316	124.3	3578	120.1	3464	119.2	3212	123.3	900
22	4658	111	5012	107.9	4830	108.8	4580	108.4	930
23	6415	101.1	6776	98.08	6508	98.34	6059	100.7	960
24	8481	90.01	8949	88.34	8668	87.38	8182	89.29	990
25	1.113E+04	67.23	1.158E+04	63.24	1.114E+04	66.37	1.056E+04	72.54	1020
26	1.375E+04	40.99	1.447E+04	35.77	1.387E+04	39.7	1.329E+04	45.35	1050
27	1.724E+04	19.99	1.775E+04	16.39	1.714E+04	19.65	1.648E+04	23.53	1080
28	2.055E+04	5.551	2.098E+04	2.364	2.041E+04	5.021	2E+04	7.62	1110
29	2.381E+04	0.005556	2.439E+04	0.001111	2.381E+04	0.001111	2.326E+04	0.005556	1140
30	2.703E+04	0.001111	2.727E+04	-0.001111	2.679E+04	-0.003333	2.632E+04	0.008889	1170
31	2.941E+04	0.01	2.941E+04	-0.001111	2.913E+04	-0.002222	2.857E+04	0.002222	1200
32	3.093E+04	0.005556	3.061E+04	0.01111	3.03E+04	0.005555	2.971E+04	0.01555	1230
33	3.192E+04	0.11	3.158E+04	0.1911	3.093E+04	0.1533	3.061E+04	0.1578	1260
34	3.226E+04	0.7633	3.192E+04	0.9287	3.126E+04	0.8532	3.126E+04	0.8664	1290
35	3.266E+04	2.357	3.235E+04	2.721	3.199E+04	2.609	3.165E+04	2.575	1320
36	3.332E+04	4.91	3.266E+04	5.62	3.195E+04	5.525	3.162E+04	5.25	1350
37	3.288E+04	8.349	3.302E+04	9.404	3.196E+04	8.857	3.162E+04	8.587	1380
38	3.348E+04	12.43	3.274E+04	13.69	3.205E+04	12.68	3.194E+04	12.62	1410
39	3.351E+04	18.27	3.263E+04	19.29	3.237E+04	18.18	3.23E+04	18.26	1440
40	3.344E+04		3.304E+04		3.267E+04		3.235E+04		1470
41	3.394E+04		3.331E+04		3.234E+04		3.23E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1012

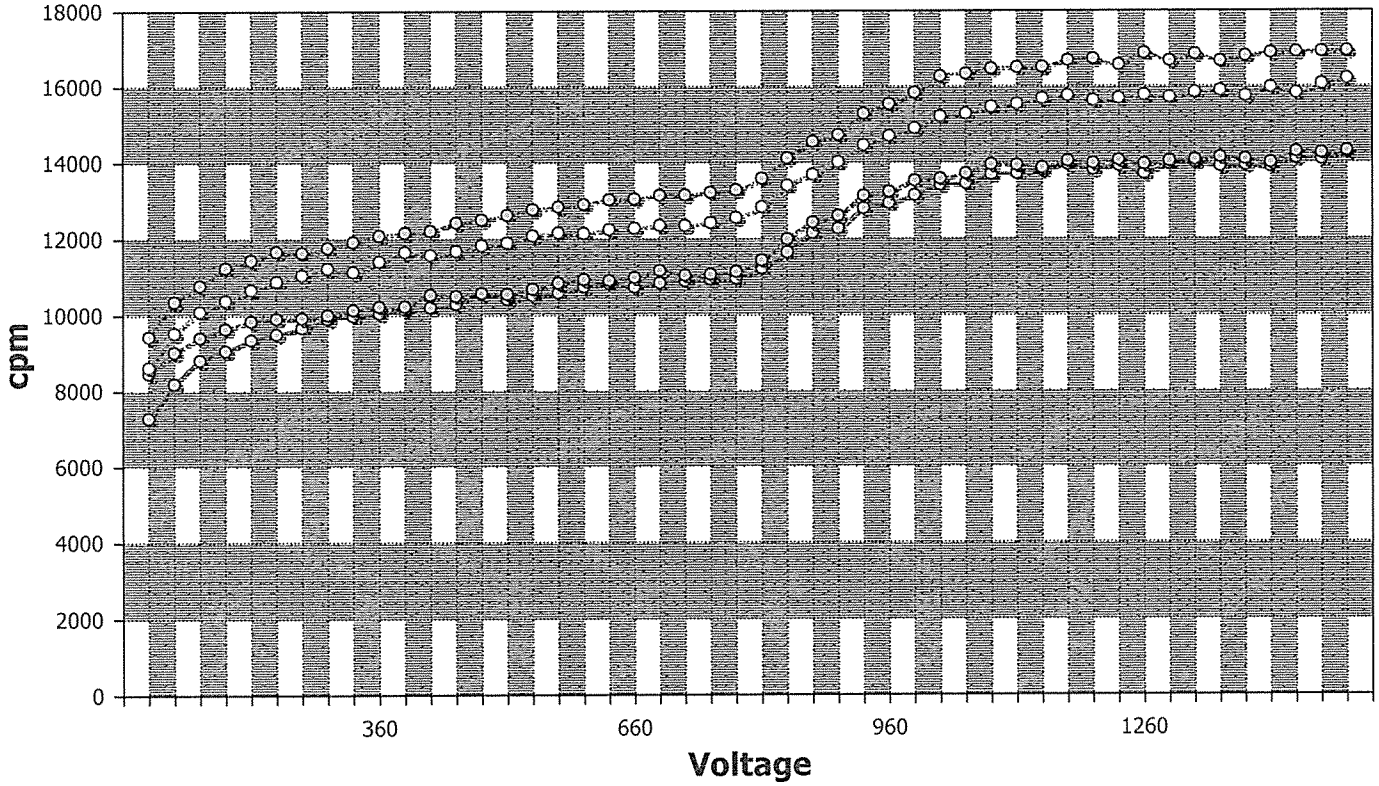
Plateau Date: 8/9/2021 9:06:57 AM

Decay Mode: Alpha

Drawer: LB 4200 B_D1

Device: LB 4200 B

Operating Voltage: 570



	B1		B2		B3		B4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	7283		8467		8629		9441		90
2	8196		9026		9532		1.037E+04		120
3	8820	18.93	9417	12	1.01E+04	16.33	1.078E+04	15.19	150
4	9066	11.57	9652	7.647	1.038E+04	10.59	1.125E+04	9.754	180
5	9352	7.655	9849	4.373	1.068E+04	7.6	1.145E+04	6.271	210
6	9503	7.05	9917	2.706	1.089E+04	6.386	1.167E+04	3.541	240
7	9675	5.772	9930	2.317	1.106E+04	3.826	1.165E+04	3.046	270
8	9909	4.721	1.001E+04	2.792	1.123E+04	3.348	1.178E+04	3.182	300
9	9987	3.679	1.015E+04	2.731	1.114E+04	4.158	1.193E+04	3.77	330
10	1.005E+04	2.576	1.023E+04	3.741	1.142E+04	3.613	1.209E+04	3.068	360
11	1.016E+04	2.571	1.024E+04	3.348	1.167E+04	3.63	1.216E+04	3.062	390
12	1.021E+04	3.818	1.054E+04	3.072	1.159E+04	2.495	1.222E+04	3.012	420
13	1.03E+04	2.827	1.05E+04	2.135	1.169E+04	2.101	1.243E+04	3.289	450
14	1.056E+04	2.309	1.058E+04	1.103	1.184E+04	3.425	1.251E+04	3.512	480
15	1.042E+04	1.719	1.055E+04	2.515	1.191E+04	3.351	1.263E+04	2.885	510
16	1.052E+04	1.687	1.069E+04	3.154	1.209E+04	2.411	1.278E+04	2.63	540
17	1.059E+04	3.326	1.085E+04	2.965	1.216E+04	2.055	1.284E+04	2.468	570
18	1.074E+04	2.151	1.094E+04	2.032	1.215E+04	1.329	1.291E+04	1.932	600
19	1.083E+04	1.594	1.091E+04	2.148	1.225E+04	1.429	1.304E+04	1.95	630
20	1.074E+04	1.03	1.099E+04	1.473	1.229E+04	1.369	1.305E+04	1.538	660

	B1		B2		B3		B4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	1.085E+04	1.134	1.117E+04	1.176	1.236E+04	1.093	1.315E+04	1.186	690
22	1.09E+04	1.636	1.105E+04	0.6403	1.235E+04	1.645	1.315E+04	1.361	720
23	1.094E+04	2.544	1.108E+04	1.892	1.242E+04	3.148	1.322E+04	2.543	750
24	1.097E+04	5.45	1.115E+04	6.744	1.256E+04	6.728	1.329E+04	5.786	780
25	1.123E+04	9.292	1.144E+04	10.38	1.284E+04	8.788	1.359E+04	8.581	810
26	1.165E+04	10.13	1.2E+04	10.89	1.341E+04	9.398	1.412E+04	9.119	840
27	1.216E+04	10.29	1.243E+04	10.76	1.369E+04	9.408	1.455E+04	9.225	870
28	1.227E+04	8.728	1.261E+04	8.415	1.402E+04	8.014	1.474E+04	8.117	900
29	1.28E+04	6.865	1.314E+04	7.184	1.447E+04	7.174	1.53E+04	7.364	930
30	1.294E+04	6.806	1.324E+04	5.9	1.471E+04	6.404	1.555E+04	7.75	960
31	1.315E+04	4.541	1.354E+04	3.695	1.491E+04	4.825	1.584E+04	5.94	990
32	1.342E+04	4.497	1.358E+04	3.964	1.522E+04	0.5645	1.627E+04	-2.561	1020
33	1.345E+04	3.484	1.372E+04	2.827	1.529E+04	-4.317	1.635E+04	-10.18	1050
34	1.369E+04	2.502	1.395E+04	1.441	1.547E+04	-8.908	1.648E+04	-16.15	1080
35	1.371E+04	0.6489	1.393E+04	-1.541	1.555E+04	-10.35	1.651E+04	-15.3	1110
36	1.38E+04	-1.813	1.387E+04	-4.301	1.569E+04	-8.198	1.652E+04	-7.926	1140
37	1.395E+04	-3.623	1.405E+04	-5.658	1.577E+04	-6.001	1.67E+04	-6.093	1170
38	1.382E+04	-4.497	1.399E+04	-5.128	1.564E+04	-4.215	1.674E+04	-5.021	1200
39	1.392E+04	-4.06	1.407E+04	-3.408	1.57E+04	-3.575	1.658E+04	-3.71	1230
40	1.372E+04	-3.651	1.396E+04	-2.354	1.578E+04	-2.922	1.689E+04	-3.164	1260
41	1.396E+04	-2.606	1.405E+04	-1.644	1.573E+04	-2.679	1.668E+04	-1.778	1290
42	1.4E+04	-2.298	1.408E+04	-2.299	1.585E+04	-2.999	1.686E+04	-1.897	1320
43	1.391E+04	-4.101	1.414E+04	-4.942	1.59E+04	-5.333	1.668E+04	-4.481	1350
44	1.394E+04	-7.714	1.409E+04	-8.226	1.575E+04	-9.188	1.681E+04	-7.93	1380
45	1.389E+04	-10.6	1.4E+04	-11.11	1.598E+04	-11.18	1.69E+04	-11.56	1410
46	1.412E+04	-10.37	1.429E+04	-11.79	1.583E+04	-9.977	1.692E+04	-11.62	1440
47	1.409E+04		1.425E+04		1.607E+04		1.693E+04		1470
48	1.427E+04		1.431E+04		1.622E+04		1.694E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1009

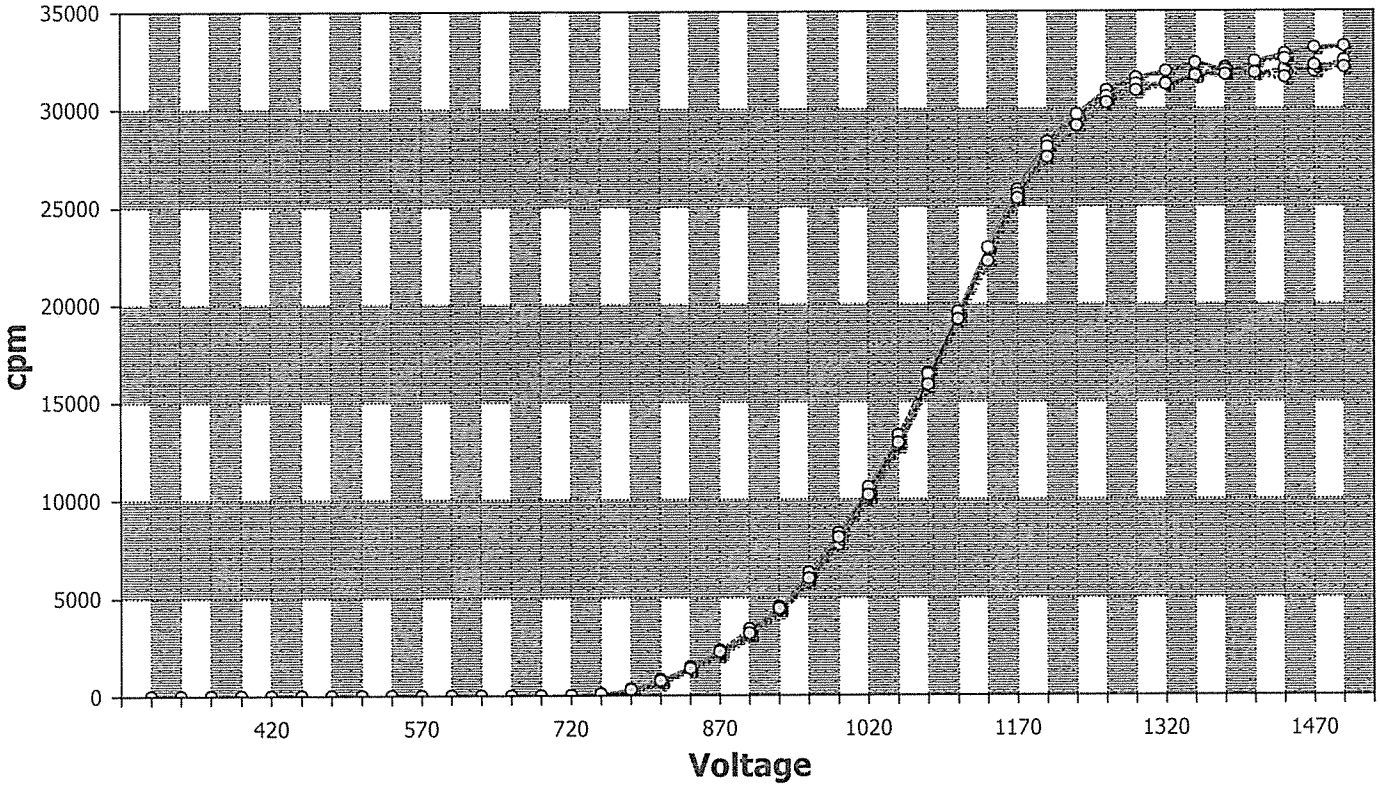
Plateau Date: 8/6/2021 2:01:50 PM

Decay Mode: Beta

Drawer: LB 4200 B_D1

Device: LB 4200 B

Operating Voltage: 1230



	B1		B2		B3		B4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	0		0		0		0		300
2	0		0		0		0		330
3	0	0	0	0	0	0	0	0	360
4	0	0	0	0	0	0	0	0	390
5	0	0	0	0	0	0	0	0	420
6	0.5	0	0	0	0	0	0	0	450
7	0	0	0	0	0	0	0	0	480
8	0	0	0	0	0	0	0	0	510
9	0	0	0	0	0	0	0	0	540
10	0	0	0	0	0	0	0	0	570
11	0	0	0	0	0	0	0	0	600
12	0	0	0	0	0.5	400	0	0	630
13	0.5	2667	0.5	2867	0	0	0.5	3367	660
14	0	0	2	3917	3	1767	1.5	5222	690
15	20	1172	20.5	1321	11	1877	24.5	1008	720
16	87	691	107.5	618.8	74.5	728.9	105.5	578.7	750
17	308.5	383.5	354	343.7	274	407	319	357.1	780
18	757.5	238.3	833	222.6	686	253.4	770	232.6	810
19	1460	165.4	1483	171.1	1378	168.4	1401	171.5	840
20	2219	139.5	2325	134.6	2130	140.9	2251	135.8	870

	B1		B2		B3		B4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	3198	119.5	3414	115.8	3034	122.6	3183	119.3	900
22	4532	106.4	4562	108.6	4361	106.8	4463	108	930
23	6037	99.74	6292	96.54	5840	99.87	5993	98.46	960
24	8033	88.61	8316	87.42	7716	91.01	8075	87.07	990
25	1.048E+04	72.79	1.065E+04	70.09	1.011E+04	77.08	1.023E+04	74.41	1020
26	1.299E+04	47.37	1.329E+04	44.45	1.276E+04	50.84	1.289E+04	48.15	1050
27	1.604E+04	24.57	1.648E+04	23.15	1.639E+04	26.73	1.587E+04	25.9	1080
28	1.948E+04	8.945	1.961E+04	7.612	1.961E+04	9.951	1.923E+04	9.374	1110
29	2.29E+04	-0.001111	2.29E+04	0.001111	2.29E+04	0	2.222E+04	0.004444	1140
30	2.586E+04	0.001111	2.564E+04	-0.001111	2.564E+04	0	2.543E+04	0.006666	1170
31	2.83E+04	0	2.804E+04	-0.003333	2.804E+04	0.006667	2.752E+04	0.002222	1200
32	2.97E+04	0.004444	2.97E+04	0.002222	2.97E+04	0.003333	2.913E+04	-0.005555	1230
33	3.093E+04	0.02666	3.061E+04	0.04222	3.062E+04	0.08221	3.03E+04	0.01556	1260
34	3.158E+04	0.2	3.125E+04	0.2555	3.125E+04	0.4489	3.093E+04	0.2589	1290
35	3.193E+04	1.046	3.127E+04	1.215	3.129E+04	1.695	3.126E+04	1.177	1320
36	3.235E+04	2.937	3.169E+04	3.185	3.177E+04	3.895	3.17E+04	3.135	1350
37	3.203E+04	5.811	3.21E+04	6.276	3.195E+04	6.827	3.174E+04	6.029	1380
38	3.242E+04	9.054	3.184E+04	9.658	3.242E+04	10.38	3.182E+04	9.134	1410
39	3.281E+04	12.99	3.202E+04	14.02	3.255E+04	14.39	3.16E+04	13.13	1440
40	3.312E+04		3.21E+04		3.191E+04		3.222E+04		1470
41	3.32E+04		3.247E+04		3.246E+04		3.213E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1019

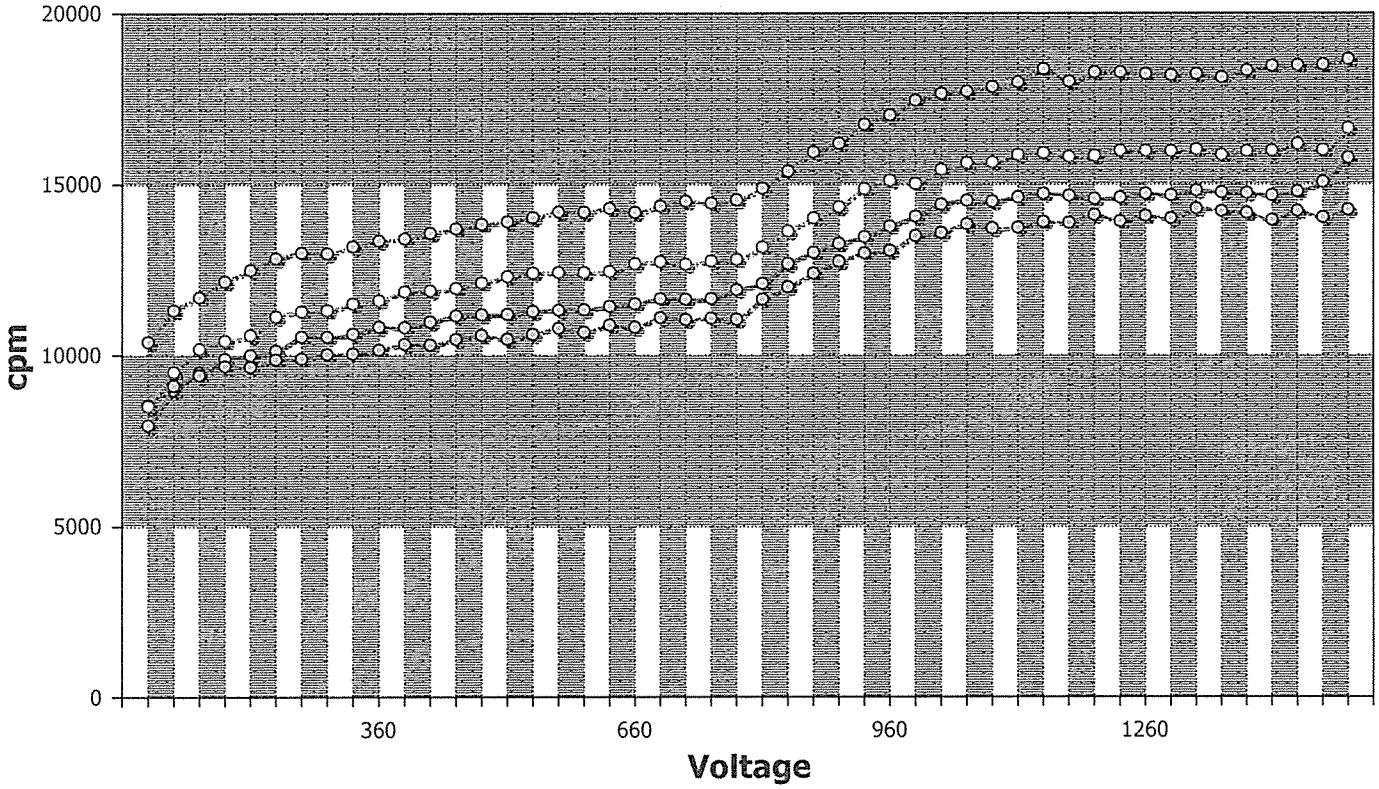
Plateau Date: 10/21/2021 9:56:29 AM

Decay Mode: Alpha

Drawer: LB 4200 C

Device: LB 4200 C

Operating Voltage: 540



	C1		C2		C3		C4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	7949		8543		8516		1.04E+04		90
2	8976		9107		9508		1.132E+04		120
3	9497	17.62	9419	9.927	1.019E+04	16.56	1.17E+04	14.44	150
4	9890	9.519	9682	6.12	1.042E+04	11.67	1.217E+04	10.54	180
5	1E+04	7.781	9658	4.002	1.059E+04	9.091	1.25E+04	8.75	210
6	1.014E+04	6.05	9877	3.183	1.113E+04	7.423	1.284E+04	5.554	240
7	1.054E+04	5.222	9902	3.175	1.128E+04	5.971	1.301E+04	3.895	270
8	1.054E+04	4.658	1.003E+04	2.426	1.132E+04	3.473	1.299E+04	3.131	300
9	1.063E+04	2.654	1.005E+04	3.306	1.151E+04	4.239	1.319E+04	3.019	330
10	1.083E+04	3.325	1.017E+04	2.741	1.161E+04	4.38	1.336E+04	3.565	360
11	1.082E+04	3.747	1.033E+04	3.189	1.187E+04	3.414	1.342E+04	3.156	390
12	1.098E+04	3.205	1.031E+04	3.182	1.19E+04	3.214	1.359E+04	3.082	420
13	1.116E+04	2.917	1.047E+04	1.835	1.197E+04	3.139	1.371E+04	3.036	450
14	1.119E+04	1.949	1.059E+04	1.977	1.213E+04	3.794	1.384E+04	2.695	480
15	1.12E+04	1.278	1.048E+04	2.15	1.232E+04	3.299	1.392E+04	2.851	510
16	1.129E+04	1.199	1.062E+04	1.579	1.242E+04	1.945	1.404E+04	2.361	540
17	1.132E+04	1.539	1.08E+04	2.695	1.244E+04	0.8241	1.421E+04	2.209	570
18	1.133E+04	1.671	1.068E+04	1.543	1.243E+04	1.491	1.419E+04	0.9265	600
19	1.144E+04	2.473	1.089E+04	2.321	1.246E+04	2.301	1.431E+04	0.7767	630
20	1.151E+04	2.439	1.082E+04	2.94	1.268E+04	1.966	1.419E+04	1.671	660

	C1		C2		C3		C4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	1.166E+04	1.634	1.111E+04	1.888	1.274E+04	1.516	1.438E+04	1.463	690
22	1.165E+04	2.394	1.105E+04	1.348	1.267E+04	0.6908	1.452E+04	1.862	720
23	1.166E+04	3.408	1.109E+04	3.248	1.276E+04	2.587	1.446E+04	2.444	750
24	1.193E+04	7.072	1.105E+04	7.43	1.281E+04	6.121	1.455E+04	4.95	780
25	1.211E+04	9.539	1.164E+04	10.27	1.317E+04	8.464	1.489E+04	8.492	810
26	1.268E+04	9.466	1.2E+04	11.57	1.364E+04	9.622	1.538E+04	9.404	840
27	1.302E+04	8.461	1.241E+04	9.278	1.402E+04	4.472	1.594E+04	-3.513	870
28	1.328E+04	6.637	1.276E+04	7.094	1.435E+04	-1.142	1.619E+04	-13.08	900
29	1.347E+04	6.437	1.299E+04	5.343	1.487E+04	-6.623	1.674E+04	-20.49	930
30	1.378E+04	6.975	1.307E+04	2.599	1.511E+04	-8.165	1.701E+04	-16.84	960
31	1.407E+04	6.552	1.349E+04	0.9065	1.501E+04	-5.253	1.744E+04	-3.935	990
32	1.442E+04	3.098	1.359E+04	-1.219	1.543E+04	-3.834	1.765E+04	-2.965	1020
33	1.453E+04	-1.46	1.384E+04	-3.134	1.562E+04	-2.097	1.771E+04	-2.153	1050
34	1.451E+04	-5.684	1.372E+04	-2.621	1.564E+04	-2.535	1.785E+04	-1.96	1080
35	1.463E+04	-7.508	1.375E+04	-2.617	1.585E+04	-2.551	1.798E+04	-1.454	1110
36	1.473E+04	-6.484	1.39E+04	-1.24	1.592E+04	-2.212	1.836E+04	-0.9964	1140
37	1.467E+04	-5.387	1.388E+04	-0.824	1.58E+04	-1.551	1.8E+04	-1.452	1170
38	1.458E+04	-4.072	1.411E+04	-3.275	1.583E+04	-2.338	1.827E+04	-2.388	1200
39	1.462E+04	-2.868	1.393E+04	-7.005	1.598E+04	-5.129	1.827E+04	-5.852	1230
40	1.473E+04	-2.18	1.408E+04	-10.53	1.598E+04	-8.362	1.822E+04	-9.152	1260
41	1.469E+04	-1.679	1.401E+04	-12	1.597E+04	-11.08	1.819E+04	-11.59	1290
42	1.482E+04	-4.235	1.43E+04	-10.13	1.602E+04	-10.6	1.822E+04	-11.51	1320
43	1.477E+04	-7.757	1.422E+04	-8.184	1.586E+04	-9.022	1.812E+04	-9.031	1350
44	1.475E+04	-10.42	1.417E+04	-7.141	1.596E+04	-7.304	1.832E+04	-7.203	1380
45	1.468E+04	-10.55	1.396E+04	-5.645	1.598E+04	-5.031	1.846E+04	-5.538	1410
46	1.479E+04	-5.588	1.423E+04	-3.467	1.617E+04	-1.844	1.848E+04	-3.156	1440
47	1.507E+04		1.404E+04		1.6E+04		1.85E+04		1470
48	1.577E+04		1.426E+04		1.663E+04		1.865E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1022

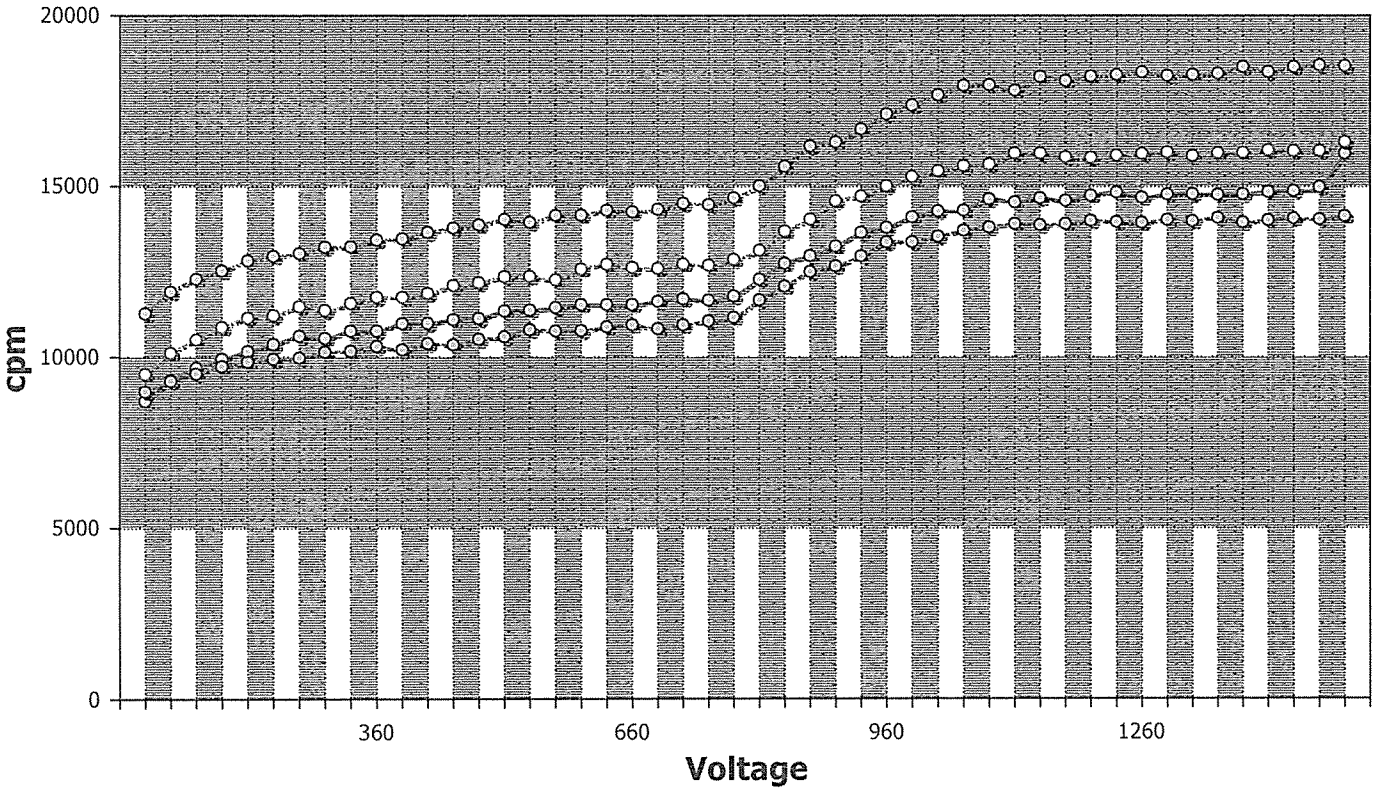
Plateau Date: 10/22/2021 11:32:28 AM

Decay Mode: Alpha

Drawer: LB 4200 C

Device: LB 4200 C

Operating Voltage: 570



	C1		C2		C3		C4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	8730		9007		9506		1.127E+04		90
2	9336		9312		1.013E+04		1.19E+04		120
3	9686	12.04	9519	7.473	1.051E+04	12.75	1.228E+04	10.09	150
4	9951	8.585	9733	5.552	1.087E+04	8.628	1.252E+04	7.02	180
5	1.017E+04	7.498	9864	3.854	1.114E+04	6.791	1.282E+04	5.022	210
6	1.037E+04	5.295	9950	3.189	1.122E+04	3.916	1.295E+04	4.136	240
7	1.062E+04	4.315	9981	2.818	1.147E+04	2.883	1.303E+04	2.779	270
8	1.055E+04	2.993	1.015E+04	3.119	1.136E+04	3.363	1.322E+04	2.878	300
9	1.077E+04	2.943	1.019E+04	2.117	1.157E+04	2.69	1.323E+04	2.671	330
10	1.077E+04	3.396	1.032E+04	1.721	1.174E+04	3.312	1.343E+04	2.726	360
11	1.098E+04	2.657	1.022E+04	1.41	1.175E+04	3.29	1.346E+04	3.31	390
12	1.099E+04	2.542	1.04E+04	1.766	1.186E+04	3.373	1.365E+04	2.97	420
13	1.11E+04	2.591	1.036E+04	2.834	1.209E+04	4.2	1.378E+04	3.31	450
14	1.113E+04	3.038	1.053E+04	3.302	1.217E+04	3.474	1.387E+04	2.033	480
15	1.134E+04	2.783	1.06E+04	3.424	1.235E+04	1.413	1.403E+04	1.928	510
16	1.138E+04	2.641	1.081E+04	2.11	1.236E+04	1.921	1.395E+04	1.657	540
17	1.145E+04	1.531	1.077E+04	1.763	1.226E+04	2.572	1.415E+04	1.771	570
18	1.153E+04	1.123	1.078E+04	1.23	1.258E+04	2.638	1.416E+04	1.78	600
19	1.153E+04	1.043	1.089E+04	0.9161	1.272E+04	1.884	1.43E+04	1.046	630
20	1.153E+04	1.277	1.094E+04	0.8104	1.263E+04	0.4409	1.425E+04	1.691	660

	C1		C2		C3		C4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	1.163E+04	1.236	1.084E+04	1.024	1.259E+04	0.08911	1.433E+04	1.389	690
22	1.17E+04	1.525	1.094E+04	1.992	1.272E+04	1.469	1.451E+04	2.242	720
23	1.166E+04	3.939	1.106E+04	5.66	1.269E+04	3.154	1.447E+04	3.56	750
24	1.178E+04	7.651	1.116E+04	8.569	1.286E+04	6.141	1.467E+04	6.163	780
25	1.228E+04	9.726	1.167E+04	10.84	1.312E+04	8.969	1.502E+04	9.659	810
26	1.275E+04	9.437	1.207E+04	10.65	1.369E+04	10.61	1.559E+04	9.471	840
27	1.297E+04	8.315	1.25E+04	8.484	1.404E+04	9.676	1.619E+04	8.321	870
28	1.324E+04	6.996	1.267E+04	8.023	1.458E+04	7.632	1.63E+04	7.313	900
29	1.365E+04	6.883	1.296E+04	6.287	1.472E+04	6.644	1.669E+04	6.449	930
30	1.38E+04	6.111	1.337E+04	5.334	1.502E+04	5.166	1.713E+04	6.734	960
31	1.41E+04	4.226	1.337E+04	4.163	1.529E+04	3.029	1.739E+04	-4.377	990
32	1.428E+04	2.342	1.353E+04	2.995	1.546E+04	-4.243	1.768E+04	-15.03	1020
33	1.43E+04	-1.085	1.371E+04	2.569	1.561E+04	-10.05	1.796E+04	-23.61	1050
34	1.464E+04	-4.624	1.381E+04	0.2229	1.565E+04	-13.2	1.798E+04	-23.31	1080
35	1.454E+04	-6.62	1.39E+04	-2.778	1.597E+04	-11.45	1.782E+04	-11.72	1110
36	1.466E+04	-6.923	1.388E+04	-4.658	1.598E+04	-6.702	1.823E+04	-6.868	1140
37	1.459E+04	-5.5	1.391E+04	-4.561	1.587E+04	-4.839	1.81E+04	-4.824	1170
38	1.474E+04	-3.576	1.4E+04	-3.214	1.584E+04	-3.92	1.823E+04	-3.558	1200
39	1.483E+04	-2.897	1.396E+04	-2.29	1.592E+04	-3.281	1.827E+04	-2.969	1230
40	1.469E+04	-2.323	1.394E+04	-2.258	1.596E+04	-2.759	1.836E+04	-2.377	1260
41	1.478E+04	-2.483	1.403E+04	-2.912	1.6E+04	-2.908	1.825E+04	-2.232	1290
42	1.479E+04	-4.688	1.399E+04	-5.376	1.59E+04	-3.702	1.828E+04	-3.837	1320
43	1.477E+04	-7.895	1.409E+04	-8.766	1.599E+04	-6.679	1.831E+04	-6.761	1350
44	1.479E+04	-10.4	1.396E+04	-11.65	1.6E+04	-9.889	1.851E+04	-10.44	1380
45	1.485E+04	-10	1.402E+04	-12.26	1.607E+04	-10.95	1.836E+04	-11.87	1410
46	1.488E+04	-5.101	1.407E+04	-9.477	1.605E+04	-9.07	1.852E+04	-9.908	1440
47	1.499E+04		1.404E+04		1.605E+04		1.856E+04		1470
48	1.598E+04		1.414E+04		1.631E+04		1.854E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1021

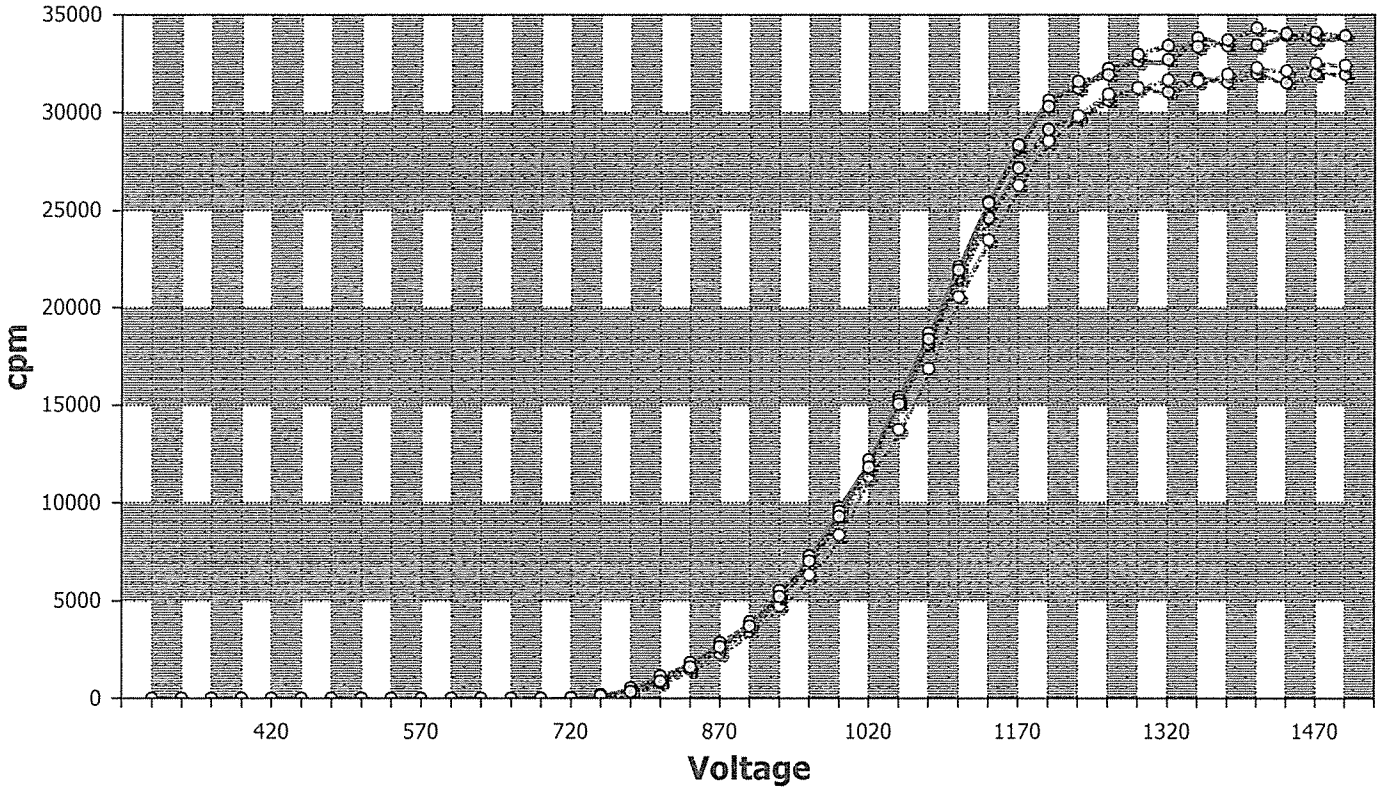
Plateau Date: 10/21/2021 1:05:29 PM

Decay Mode: Beta

Drawer: LB 4200 C

Device: LB 4200 C

Operating Voltage: 1290



	C1		C2		C3		C4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	0		0		0		0		300
2	0		0		0		0		330
3	0	0	0	0	0	0	0	0	360
4	0	0	0	0	0	0	0	0	390
5	0	0	0	0	0	0	0	0	420
6	0	0	0	0	0	0	0	0	450
7	0	0	0	0	0	0	0	0	480
8	0	0	0	0	0	0	0	0	510
9	0	0	0	0	1	0	0	0	540
10	0	0	0	0	0	0	0	0	570
11	0	0	0	0	0	0	0	0	600
12	0	0	0	0	0	0	0	0	630
13	2	1233	1	2633	0	0	1	1567	660
14	4	3142	5	2920	0	0	3	3300	690
15	35	1059	37	1162	12	2289	22	1283	720
16	172	482.8	201	469.5	90	756.7	138	509.4	750
17	474	312.9	548	278.8	367	335.9	357	369.9	780
18	1030	207.9	1165	189.8	844	220.6	890	235.4	810
19	1831	149.9	1847	152.9	1484	171.7	1627	173.3	840
20	2706	128.7	2869	125.9	2324	140.1	2646	135.5	870

	C1		C2		C3		C4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	3754	118.8	3933	115.1	3449	117.3	3708	120.4	900
22	5292	110.8	5539	101	4747	105.2	5227	106.2	930
23	7229	98.21	7304	93.98	6340	102.2	7034	96.4	960
24	9763	85.98	9577	84.57	8370	91.66	9312	87.64	990
25	1.217E+04	78.31	1.221E+04	74.53	1.136E+04	77.62	1.184E+04	80.19	1020
26	1.541E+04	67.57	1.524E+04	65.33	1.375E+04	72.5	1.507E+04	70.39	1050
27	1.87E+04	59.33	1.813E+04	57.24	1.688E+04	61.32	1.84E+04	61.56	1080
28	2.212E+04	48.58	2.155E+04	46.92	2.056E+04	51.35	2.194E+04	50.94	1110
29	2.545E+04	37.51	2.461E+04	37.4	2.347E+04	41.23	2.539E+04	38.87	1140
30	2.816E+04	24.04	2.716E+04	25.69	2.629E+04	29.94	2.834E+04	24.39	1170
31	3.062E+04	12.15	2.913E+04	15.3	2.853E+04	19.41	3.03E+04	12.11	1200
32	3.125E+04	4.119	2.976E+04	7.382	2.983E+04	9.972	3.158E+04	3.709	1230
33	3.226E+04	0.2133	3.061E+04	2.473	3.093E+04	3.639	3.192E+04	0.1667	1260
34	3.262E+04	1.08	3.127E+04	1.748	3.126E+04	1.231	3.297E+04	0.871	1290
35	3.271E+04	2.848	3.104E+04	3.264	3.166E+04	2.572	3.342E+04	2.631	1320
36	3.382E+04	5.698	3.176E+04	5.53	3.161E+04	5.306	3.336E+04	5.227	1350
37	3.341E+04	9.297	3.156E+04	4.588	3.195E+04	6.153	3.371E+04	8.731	1380
38	3.346E+04	9.387	3.198E+04	3.4	3.229E+04	5.71	3.432E+04	10.28	1410
39	3.392E+04	7.237	3.151E+04	1.485	3.213E+04	3.524	3.404E+04	8.001	1440
40	3.371E+04		3.198E+04		3.252E+04		3.411E+04		1470
41	3.393E+04		3.194E+04		3.242E+04		3.392E+04		1500

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1016

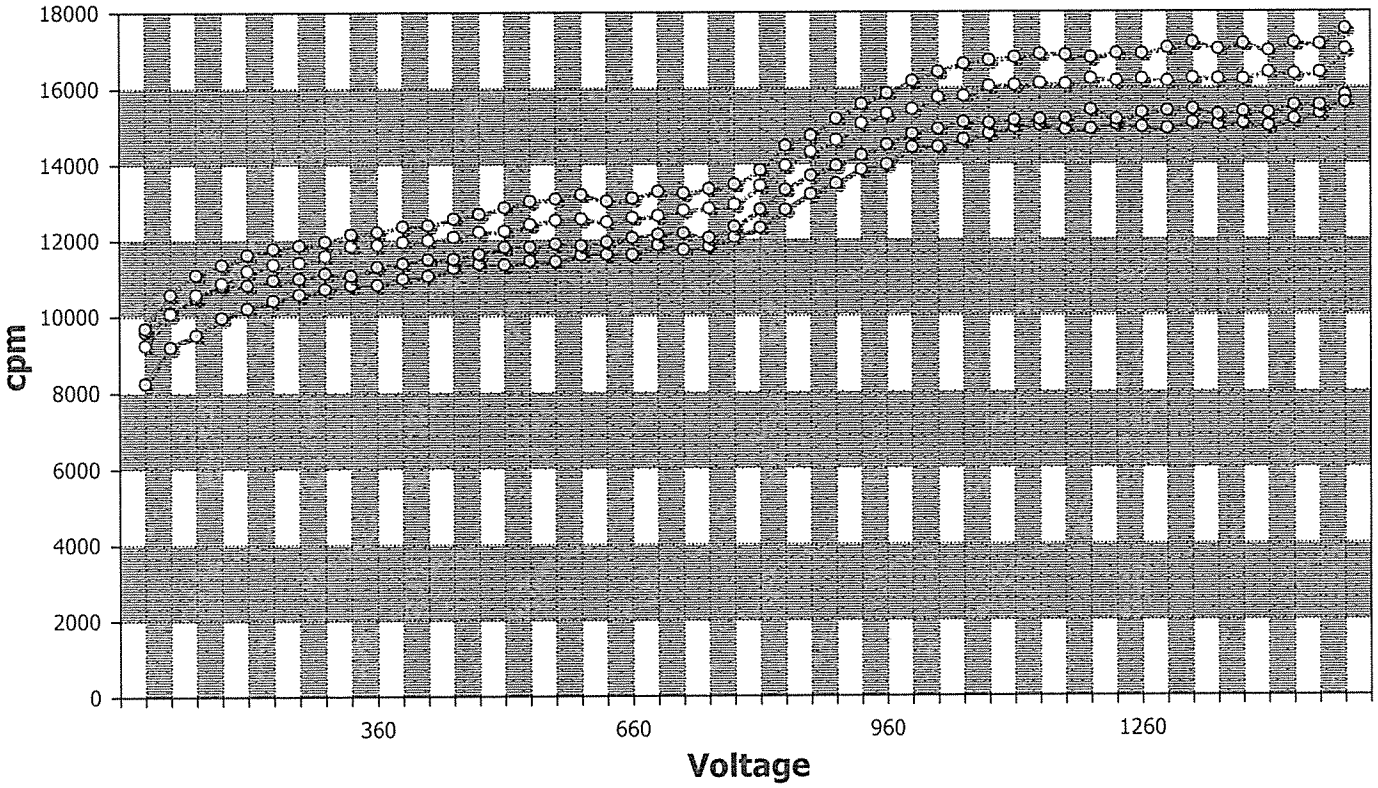
Plateau Date: 8/10/2021 9:11:37 AM

Decay Mode: Alpha

Drawer: LB 4200 D_D1

Device: LB 4200 D

Operating Voltage: 570



	D1		D2		D3		D4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	8250		9587		9237		9695		90
2	9196		1.011E+04		1.008E+04		1.058E+04		120
3	9516	16.42	1.049E+04	10.11	1.058E+04	14.89	1.11E+04	13.98	150
4	9966	10.5	1.081E+04	6.326	1.088E+04	9.861	1.137E+04	8.619	180
5	1.021E+04	8.446	1.083E+04	3.594	1.12E+04	6.47	1.163E+04	5.612	210
6	1.042E+04	6.018	1.097E+04	2.513	1.138E+04	4.847	1.178E+04	4.115	240
7	1.058E+04	4.832	1.1E+04	2.019	1.142E+04	4.479	1.187E+04	3.524	270
8	1.072E+04	3.341	1.114E+04	2.285	1.16E+04	4.157	1.197E+04	3.25	300
9	1.083E+04	2.866	1.108E+04	2.92	1.185E+04	3.813	1.216E+04	3.396	330
10	1.083E+04	2.66	1.131E+04	3.108	1.188E+04	2.581	1.222E+04	2.906	360
11	1.099E+04	3.442	1.14E+04	3.111	1.195E+04	1.666	1.237E+04	2.72	390
12	1.107E+04	4.163	1.151E+04	2.245	1.201E+04	2.308	1.24E+04	3.13	420
13	1.128E+04	3.129	1.151E+04	2.851	1.209E+04	2.231	1.258E+04	3.471	450
14	1.138E+04	2.566	1.164E+04	2.721	1.223E+04	2.729	1.27E+04	4.113	480
15	1.136E+04	1.212	1.182E+04	2.741	1.225E+04	2.986	1.287E+04	3.56	510
16	1.146E+04	1.566	1.183E+04	1.464	1.243E+04	2.603	1.304E+04	3.134	540
17	1.144E+04	1.967	1.19E+04	0.8606	1.254E+04	1.617	1.31E+04	1.262	570
18	1.161E+04	1.417	1.186E+04	1.498	1.257E+04	0.7523	1.32E+04	0.2205	600
19	1.163E+04	2.499	1.196E+04	1.96	1.248E+04	0.689	1.304E+04	0.7703	630
20	1.162E+04	1.486	1.207E+04	2.389	1.26E+04	1.641	1.311E+04	0.8797	660

Apex-Alpha/Beta™

CANBERRA

Plateau Report

Plateau: Plateau 1013

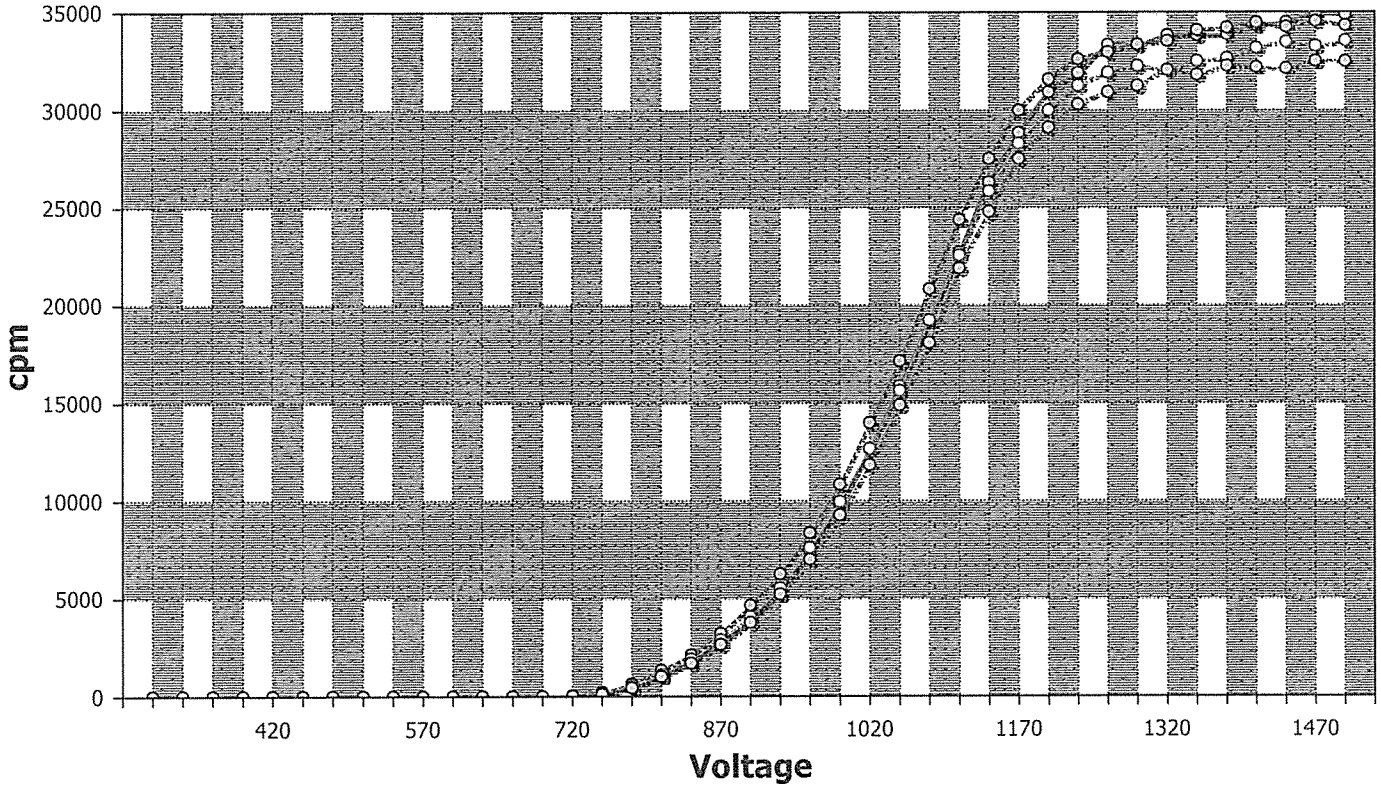
Plateau Date: 8/9/2021 12:00:44 PM

Decay Mode: Beta

Drawer: LB 4200 D_D1

Device: LB 4200 D

Operating Voltage: 1230



	D1		D2		D3		D4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
1	0		0		0		0		300
2	0.5		0		0		0		330
3	0	0	0	0	0	0	0	0	360
4	0	0	0	0	0.5	0	0	0	390
5	0.5	0	0	0	0	0	0	0	420
6	0	0	0	0	0	0	0	0	450
7	0	0	0	0	0	0	0.5	0	480
8	0	0	0	0	0	0	0	0	510
9	0	0	0	0	0	0	0	0	540
10	0	0	0	0	0	0	0	0	570
11	0	0	0	0	0	0	0	0	600
12	0	0	0	0	0	0	0	0	630
13	0	0	0	0	0	0	0	0	660
14	2	4725	11.5	1491	4	3525	2	4475	690
15	29.5	1165	60.5	833.9	36	1197	31.5	1069	720
16	127	654.5	227	478.5	193.5	473.8	118.5	689	750
17	453	329.3	649	270.2	551.5	283.9	447	316.3	780
18	1037	214.9	1347	185.6	1122	201.9	1019	207.7	810
19	1812	157.8	2131	155.5	1921	153.8	1702	163	840
20	2791	131.9	3236	127.7	2905	126.6	2665	131.8	870

	D1		D2		D3		D4		Voltage
Iteration	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	cpm	Slope (%)	
21	3866	120.8	4675	110.7	4089	114.2	3785	116.3	900
22	5533	106.2	6275	100.6	5556	106	5247	104.5	930
23	7446	97.84	8371	92.53	7602	94.79	7012	95.9	960
24	9811	82.03	1.086E+04	70.87	9979	80.08	9280	86.74	990
25	1.265E+04	53.47	1.4E+04	41.43	1.269E+04	52.07	1.185E+04	60.74	1020
26	1.587E+04	28.28	1.714E+04	20.64	1.563E+04	27.46	1.49E+04	32.64	1050
27	1.923E+04	10.43	2.083E+04	4.441	1.923E+04	10.29	1.807E+04	14.2	1080
28	2.273E+04	0.001111	2.439E+04	0.002222	2.256E+04	0.005555	2.19E+04	0.45	1110
29	2.632E+04	0.01444	2.752E+04	0	2.586E+04	0.001111	2.479E+04	-0.001111	1140
30	2.885E+04	0.005555	3E+04	0	2.83E+04	-0.003333	2.753E+04	0.001111	1170
31	3.093E+04	0.005554	3.158E+04	0	3E+04	-0.002222	2.913E+04	0.007778	1200
32	3.191E+04	0.008889	3.261E+04	0.06	3.125E+04	0.02556	3.03E+04	0.02222	1230
33	3.334E+04	0.2266	3.297E+04	0.4322	3.192E+04	0.3433	3.093E+04	0.3033	1260
34	3.334E+04	1.108	3.336E+04	1.704	3.227E+04	1.418	3.126E+04	1.336	1290
35	3.383E+04	3.074	3.354E+04	3.996	3.207E+04	3.595	3.206E+04	3.446	1320
36	3.383E+04	6.098	3.409E+04	7.342	3.252E+04	6.767	3.181E+04	6.742	1350
37	3.388E+04	9.817	3.422E+04	11.54	3.266E+04	10.59	3.227E+04	10.48	1380
38	3.432E+04	14.88	3.448E+04	16.65	3.318E+04	15.25	3.219E+04	14.87	1410
39	3.448E+04	21	3.425E+04	23.77	3.349E+04	22.06	3.213E+04	21.42	1440
40	3.494E+04		3.454E+04		3.327E+04		3.251E+04		1470
41	3.489E+04		3.433E+04		3.356E+04		3.25E+04		1500

Apex-Alpha/Beta™

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Background Report

Batch Name: Batch_1624
Procedure: Constant Background
Calibration: Constant Efficiency

Count Date: 11/11/2021 6:32:27 AM
Preset Count Time: 54000
Count Mode: Simultaneous

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A1	9.0000E-002 +/- 1.0000E-002	7.0444E-001 +/- 2.7977E-002

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A2	7.2222E-002 +/- 8.9581E-003	7.8000E-001 +/- 2.9439E-002

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A3	1.0444E-001 +/- 1.0773E-002	8.6889E-001 +/- 3.1071E-002

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
A4	2.0778E-001 +/- 1.5194E-002	9.9778E-001 +/- 3.3296E-002

Apex-Alpha/Beta™

CANBERRA

Background Report

Batch Name: Batch_1623
Procedure: Constant Background
Calibration: Constant Efficiency

Count Date: 11/11/2021 6:32:27 AM
Preset Count Time: 54000
Count Mode: Simultaneous

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
B1	2.2222E-001 +/- 1.5713E-002	8.4889E-001 +/- 3.0712E-002

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
B2	1.2778E-001 +/- 1.1915E-002	6.9333E-001 +/- 2.7756E-002

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
B3	1.1222E-001 +/- 1.1167E-002	8.9000E-001 +/- 3.1447E-002

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
B4	1.5222E-001 +/- 1.3005E-002	1.1578E+000 +/- 3.5867E-002

Apex-Alpha/Beta™

CANBERRA

Background Report

Batch Name: Batch_1622
Procedure: Constant Background
Calibration: Constant Efficiency

Count Date: 11/11/2021 6:32:27 AM
Preset Count Time: 54000
Count Mode: Simultaneous

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
C1	1.5889E-001 +/- 1.3287E-002	6.9444E-001 +/- 2.7778E-002

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
C2	1.2556E-001 +/- 1.1811E-002	9.8000E-001 +/- 3.2998E-002

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
C3	7.2222E-002 +/- 8.9581E-003	7.3000E-001 +/- 2.8480E-002

	Calculated Background (cpm)	
Detector Name	**Alpha Bkg Rate (cpm)**	**Beta Bkg Rate (cpm)**
C4	1.5112E-001 +/- 1.2958E-002	8.0892E-001 +/- 2.9981E-002

Apex-Alpha/Beta™

CANBERRA

Background Report

Batch Name: Batch_1621
Procedure: Constant Background
Calibration: Constant Efficiency

Count Date: 11/11/2021 6:32:27 AM
Preset Count Time: 54000
Count Mode: Simultaneous

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D1	9.5556E-002 +/- 1.0304E-002	7.6000E-001 +/- 2.9059E-002

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D2	7.0000E-002 +/- 8.8192E-003	7.6889E-001 +/- 2.9229E-002

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D3	1.2778E-001 +/- 1.1915E-002	7.8778E-001 +/- 2.9586E-002

	Calculated Background (cpm)	
Detector Name	Alpha Bkg Rate (cpm)	Beta Bkg Rate (cpm)
D4	8.2222E-002 +/- 9.5581E-003	7.0556E-001 +/- 2.7999E-002

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Assignment Summary

Device	Drawer	Detector	Batch	Sample	Procedure	Standard	Count Time
LB 4200 A	LB 4200 A	A1	Batch_1624	System Background_2782	Constant Background		54000
LB 4200 A	LB 4200 A	A2	Batch_1624	System Background_2781	Constant Background		54000
LB 4200 A	LB 4200 A	A3	Batch_1624	System Background_2780	Constant Background		54000
LB 4200 A	LB 4200 A	A4	Batch_1624	System Background_2779	Constant Background		54000
LB 4200 B	LB 4200 B	B1	Batch_1623	System Background_2778	Constant Background		54000
LB 4200 B	LB 4200 B	B2	Batch_1623	System Background_2777	Constant Background		54000
LB 4200 B	LB 4200 B	B3	Batch_1623	System Background_2776	Constant Background		54000
LB 4200 B	LB 4200 B	B4	Batch_1623	System Background_2775	Constant Background		54000
LB 4200 C	LB 4200 C	C1	Batch_1622	System Background_2774	Constant Background		54000
LB 4200 C	LB 4200 C	C2	Batch_1622	System Background_2773	Constant Background		54000
LB 4200 C	LB 4200 C	C3	Batch_1622	System Background_2772	Constant Background		54000
LB 4200 C	LB 4200 C	C4	Batch_1622	System Background_2771	Constant Background		54000
LB 4200 D	LB 4200 D	D1	Batch_1621	System Background_2770	Constant Background		54000
LB 4200 D	LB 4200 D	D2	Batch_1621	System Background_2769	Constant Background		54000
LB 4200 D	LB 4200 D	D3	Batch_1621	System Background_2768	Constant Background		54000
LB 4200 D	LB 4200 D	D4	Batch_1621	System Background_2767	Constant Background		54000

11-11-21 0432

Apex-Alpha/Beta™

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Efficiency Report

Batch Name: Batch_1956
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Alpha

Count Date: 12/3/2021 9:12:46 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A1	3.1060E+001 +/- 4.4695E-001	1.1418E+004 +/- 1.6430E+002	2.6453E+001 +/- 8.0183E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:12:45 AM	1	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.631E+001 +/- 5.764E-001	3.059E+003 +/- 5.964E+001
12/3/2021 9:13:42 AM	2	30.91 +/- 9.78E-001	1.136E+004 +/- 1.136E+002	2.536E+001 +/- 5.638E-001	2.882E+003 +/- 5.723E+001
12/3/2021 9:14:41 AM	3	30.91 +/- 9.78E-001	1.136E+004 +/- 1.136E+002	2.703E+001 +/- 5.860E-001	3.072E+003 +/- 5.908E+001
12/3/2021 9:15:36 AM	4	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.593E+001 +/- 5.714E-001	3.015E+003 +/- 5.921E+001
12/3/2021 9:16:32 AM	5	30.56 +/- 9.67E-001	1.124E+004 +/- 1.124E+002	2.788E+001 +/- 5.971E-001	3.133E+003 +/- 5.933E+001
12/3/2021 9:17:27 AM	6	30.91 +/- 9.78E-001	1.136E+004 +/- 1.136E+002	2.659E+001 +/- 5.802E-001	3.022E+003 +/- 5.860E+001
12/3/2021 9:18:24 AM	7	30.22 +/- 9.56E-001	1.111E+004 +/- 1.111E+002	2.753E+001 +/- 5.925E-001	3.059E+003 +/- 5.830E+001
12/3/2021 9:19:20 AM	8	31.27 +/- 9.89E-001	1.149E+004 +/- 1.149E+002	2.583E+001 +/- 5.701E-001	2.969E+003 +/- 5.842E+001
12/3/2021 9:20:16 AM	9	31.27 +/- 9.89E-001	1.150E+004 +/- 1.149E+002	2.598E+001 +/- 5.720E-001	2.986E+003 +/- 5.859E+001
12/3/2021 9:21:12 AM	10	31.27 +/- 9.89E-001	1.150E+004 +/- 1.149E+002	2.610E+001 +/- 5.736E-001	3.000E+003 +/- 5.872E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A2	2.9787E+001 +/- 1.7646E-001	1.1300E+004 +/- 6.6944E+001	2.6712E+001 +/- 5.6949E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:12:45 AM	1	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.774E+001 +/- 5.952E-001	3.117E+003 +/- 5.918E+001
12/3/2021 9:13:43 AM	2	29.96 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.690E+001 +/- 5.842E-001	3.057E+003 +/- 5.894E+001
12/3/2021 9:14:41 AM	3	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.555E+001 +/- 5.663E-001	2.871E+003 +/- 5.679E+001
12/3/2021 9:15:37 AM	4	29.95 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.638E+001 +/- 5.774E-001	2.998E+003 +/- 5.837E+001
12/3/2021 9:16:33 AM	5	29.95 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.631E+001 +/- 5.765E-001	2.990E+003 +/- 5.829E+001
12/3/2021 9:17:28 AM	6	29.95 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.693E+001 +/- 5.847E-001	3.060E+003 +/- 5.897E+001
12/3/2021 9:18:25 AM	7	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.659E+001 +/- 5.802E-001	2.988E+003 +/- 5.794E+001
12/3/2021 9:19:21 AM	8	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.679E+001 +/- 5.828E-001	3.010E+003 +/- 5.816E+001
12/3/2021 9:20:17 AM	9	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.702E+001 +/- 5.858E-001	3.037E+003 +/- 5.842E+001
12/3/2021 9:21:12 AM	10	29.95 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.691E+001 +/- 5.844E-001	3.058E+003 +/- 5.895E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A3	2.8461E+001 +/- 2.8889E-001	1.2302E+004 +/- 1.2487E+002	2.6401E+001 +/- 5.3273E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:12:45 AM	1	28.56 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.602E+001 +/- 5.726E-001	3.212E+003 +/- 6.298E+001
12/3/2021 9:13:43 AM	2	28.92 +/- 9.15E-001	1.250E+004 +/- 1.250E+002	2.633E+001 +/- 5.767E-001	3.291E+003 +/- 6.414E+001
12/3/2021 9:14:35 AM	3	28.57 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.668E+001 +/- 5.813E-001	3.294E+003 +/- 6.377E+001
12/3/2021 9:15:25 AM	4	28.21 +/- 8.92E-001	1.220E+004 +/- 1.220E+002	2.681E+001 +/- 5.831E-001	3.270E+003 +/- 6.314E+001
12/3/2021 9:16:16 AM	5	28.92 +/- 9.15E-001	1.250E+004 +/- 1.250E+002	2.579E+001 +/- 5.696E-001	3.224E+003 +/- 6.348E+001
12/3/2021 9:17:06 AM	6	28.22 +/- 8.92E-001	1.220E+004 +/- 1.220E+002	2.670E+001 +/- 5.816E-001	3.257E+003 +/- 6.303E+001
12/3/2021 9:18:01 AM	7	28.56 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.682E+001 +/- 5.832E-001	3.311E+003 +/- 6.394E+001
12/3/2021 9:18:52 AM	8	28.21 +/- 8.92E-001	1.220E+004 +/- 1.220E+002	2.726E+001 +/- 5.890E-001	3.324E+003 +/- 6.367E+001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:19:48 AM	9	28.21 +/- 8.92E-001	1.220E+004 +/- 1.220E+002	2.596E+001 +/- 5.718E-001	3.166E+003 +/- 6.214E+001
12/3/2021 9:20:39 AM	10	28.22 +/- 8.92E-001	1.220E+004 +/- 1.220E+002	2.563E+001 +/- 5.674E-001	3.127E+003 +/- 6.175E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A4	2.8917E+001 +/- 3.1387E-001	1.3108E+004 +/- 1.4228E+002	2.6749E+001 +/- 7.9035E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:12:45 AM	1	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.635E+001 +/- 5.770E-001	3.467E+003 +/- 6.754E+001
12/3/2021 9:13:36 AM	2	29.41 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.569E+001 +/- 5.682E-001	3.425E+003 +/- 6.758E+001
12/3/2021 9:14:26 AM	3	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.755E+001 +/- 5.928E-001	3.625E+003 +/- 6.906E+001
12/3/2021 9:15:14 AM	4	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.779E+001 +/- 5.959E-001	3.609E+003 +/- 6.846E+001
12/3/2021 9:16:05 AM	5	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.677E+001 +/- 5.825E-001	3.477E+003 +/- 6.719E+001
12/3/2021 9:16:55 AM	6	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.675E+001 +/- 5.822E-001	3.474E+003 +/- 6.717E+001
12/3/2021 9:17:45 AM	7	29.42 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.623E+001 +/- 5.754E-001	3.497E+003 +/- 6.829E+001
12/3/2021 9:18:36 AM	8	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.664E+001 +/- 5.808E-001	3.460E+003 +/- 6.703E+001
12/3/2021 9:19:26 AM	9	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.579E+001 +/- 5.696E-001	3.393E+003 +/- 6.682E+001
12/3/2021 9:20:17 AM	10	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.794E+001 +/- 5.978E-001	3.629E+003 +/- 6.865E+001

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1953
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Beta

Count Date: 12/3/2021 8:58:51 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A1	7.5299E+001 +/- 1.2010E-002	3.0309E+004 +/- 4.8337E+000	1.0148E+000 +/- 1.7845E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 8:58:48 AM	1	75.29 +/- 2.45E+000	2.182E+002 +/- 2.571E+001	7.199E-001 +/- 8.515E-002	3.031E+004 +/- 3.030E+002
12/3/2021 9:00:46 AM	2	75.28 +/- 2.45E+000	2.667E+002 +/- 2.843E+001	8.800E-001 +/- 9.422E-002	3.030E+004 +/- 3.030E+002
12/3/2021 9:01:10 AM	3	75.30 +/- 2.45E+000	2.667E+002 +/- 2.843E+001	8.798E-001 +/- 9.420E-002	3.031E+004 +/- 3.031E+002
12/3/2021 9:01:33 AM	4	75.31 +/- 2.45E+000	3.455E+002 +/- 3.235E+001	1.140E+000 +/- 1.073E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:01:57 AM	5	75.31 +/- 2.45E+000	3.152E+002 +/- 3.090E+001	1.040E+000 +/- 1.025E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:02:20 AM	6	75.32 +/- 2.45E+000	2.667E+002 +/- 2.843E+001	8.796E-001 +/- 9.417E-002	3.032E+004 +/- 3.031E+002
12/3/2021 9:02:44 AM	7	75.28 +/- 2.45E+000	3.152E+002 +/- 3.090E+001	1.040E+000 +/- 1.025E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:03:08 AM	8	75.31 +/- 2.45E+000	3.152E+002 +/- 3.090E+001	1.040E+000 +/- 1.025E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:03:32 AM	9	75.29 +/- 2.45E+000	3.939E+002 +/- 3.455E+001	1.300E+000 +/- 1.147E-001	3.031E+004 +/- 3.030E+002
12/3/2021 9:03:56 AM	10	75.29 +/- 2.45E+000	3.727E+002 +/- 3.361E+001	1.230E+000 +/- 1.116E-001	3.031E+004 +/- 3.030E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A2	7.4857E+001 +/- 1.1470E+000	2.9950E+004 +/- 4.5890E+002	9.6488E-001 +/- 7.1997E-002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 8:58:48 AM	1	73.53 +/- 2.40E+000	2.882E+002 +/- 2.912E+001	9.798E-001 +/- 9.946E-002	2.942E+004 +/- 2.941E+002
12/3/2021 9:00:47 AM	2	75.75 +/- 2.47E+000	2.606E+002 +/- 2.810E+001	8.599E-001 +/- 9.312E-002	3.031E+004 +/- 3.030E+002
12/3/2021 9:01:10 AM	3	75.74 +/- 2.47E+000	2.758E+002 +/- 2.891E+001	9.100E-001 +/- 9.583E-002	3.030E+004 +/- 3.030E+002
12/3/2021 9:01:34 AM	4	73.53 +/- 2.40E+000	2.824E+002 +/- 2.882E+001	9.598E-001 +/- 9.843E-002	2.942E+004 +/- 2.941E+002
12/3/2021 9:01:57 AM	5	75.74 +/- 2.47E+000	3.000E+002 +/- 3.015E+001	9.900E-001 +/- 9.999E-002	3.030E+004 +/- 3.030E+002
12/3/2021 9:02:21 AM	6	73.51 +/- 2.39E+000	3.235E+002 +/- 3.085E+001	1.100E+000 +/- 1.055E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:02:45 AM	7	73.53 +/- 2.40E+000	2.676E+002 +/- 2.806E+001	9.097E-001 +/- 9.580E-002	2.942E+004 +/- 2.942E+002
12/3/2021 9:03:09 AM	8	75.75 +/- 2.47E+000	3.182E+002 +/- 3.105E+001	1.050E+000 +/- 1.030E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:03:32 AM	9	75.74 +/- 2.47E+000	2.758E+002 +/- 2.891E+001	9.100E-001 +/- 9.583E-002	3.030E+004 +/- 3.030E+002
12/3/2021 9:03:56 AM	10	75.75 +/- 2.47E+000	2.970E+002 +/- 3.000E+001	9.798E-001 +/- 9.946E-002	3.031E+004 +/- 3.031E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A3	7.3182E+001 +/- 6.5709E-001	2.9329E+004 +/- 2.6334E+002	9.0494E-001 +/- 1.2559E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 8:58:49 AM	1	73.39 +/- 2.39E+000	2.088E+002 +/- 2.478E+001	7.100E-001 +/- 8.456E-002	2.941E+004 +/- 2.941E+002
12/3/2021 9:00:47 AM	2	73.39 +/- 2.39E+000	2.824E+002 +/- 2.882E+001	9.600E-001 +/- 9.845E-002	2.941E+004 +/- 2.941E+002
12/3/2021 9:01:11 AM	3	73.40 +/- 2.39E+000	2.294E+002 +/- 2.598E+001	7.799E-001 +/- 8.865E-002	2.941E+004 +/- 2.941E+002
12/3/2021 9:01:34 AM	4	73.39 +/- 2.39E+000	2.059E+002 +/- 2.461E+001	7.000E-001 +/- 8.396E-002	2.941E+004 +/- 2.941E+002
12/3/2021 9:01:58 AM	5	71.31 +/- 2.32E+000	2.971E+002 +/- 2.914E+001	1.040E+000 +/- 1.025E-001	2.858E+004 +/- 2.858E+002
12/3/2021 9:02:22 AM	6	73.39 +/- 2.39E+000	2.882E+002 +/- 2.912E+001	9.800E-001 +/- 9.948E-002	2.941E+004 +/- 2.941E+002
12/3/2021 9:02:46 AM	7	73.40 +/- 2.39E+000	2.912E+002 +/- 2.926E+001	9.898E-001 +/- 9.997E-002	2.942E+004 +/- 2.941E+002
12/3/2021 9:03:09 AM	8	73.39 +/- 2.39E+000	2.794E+002 +/- 2.867E+001	9.500E-001 +/- 9.793E-002	2.941E+004 +/- 2.941E+002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:03:33 AM	9	73.39 +/- 2.39E+000	2.941E+002 +/- 2.941E+001	1.000E+000 +/- 1.005E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:03:57 AM	10	73.39 +/- 2.39E+000	2.765E+002 +/- 2.852E+001	9.400E-001 +/- 9.741E-002	2.941E+004 +/- 2.941E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
A4	7.3199E+001 +/- 1.0973E+000	2.8912E+004 +/- 4.3340E+002	1.1198E+000 +/- 1.0349E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 8:58:49 AM	1	74.48 +/- 2.43E+000	2.971E+002 +/- 2.956E+001	1.010E+000 +/- 1.010E-001	2.942E+004 +/- 2.941E+002
12/3/2021 9:00:48 AM	2	74.46 +/- 2.43E+000	3.029E+002 +/- 2.985E+001	1.030E+000 +/- 1.020E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:01:11 AM	3	72.36 +/- 2.36E+000	2.800E+002 +/- 2.828E+001	9.797E-001 +/- 9.945E-002	2.858E+004 +/- 2.858E+002
12/3/2021 9:01:40 AM	4	74.49 +/- 2.43E+000	3.324E+002 +/- 3.127E+001	1.130E+000 +/- 1.069E-001	2.942E+004 +/- 2.942E+002
12/3/2021 9:02:04 AM	5	72.35 +/- 2.36E+000	3.429E+002 +/- 3.130E+001	1.200E+000 +/- 1.102E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:02:28 AM	6	72.35 +/- 2.36E+000	3.629E+002 +/- 3.220E+001	1.270E+000 +/- 1.134E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:02:51 AM	7	72.34 +/- 2.36E+000	3.629E+002 +/- 3.220E+001	1.270E+000 +/- 1.134E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:03:15 AM	8	72.35 +/- 2.36E+000	3.229E+002 +/- 3.037E+001	1.130E+000 +/- 1.069E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:03:39 AM	9	72.34 +/- 2.36E+000	3.229E+002 +/- 3.037E+001	1.130E+000 +/- 1.069E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:04:03 AM	10	74.46 +/- 2.43E+000	3.088E+002 +/- 3.014E+001	1.050E+000 +/- 1.030E-001	2.941E+004 +/- 2.941E+002

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1954
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Alpha

Count Date: 12/3/2021 8:58:51 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B1	2.9799E+001 +/- 3.1139E-001	1.0955E+004 +/- 1.1447E+002	2.6273E+001 +/- 5.2452E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 8:58:49 AM	1	29.57 +/- 9.35E-001	1.087E+004 +/- 1.087E+002	2.626E+001 +/- 5.758E-001	2.855E+003 +/- 5.571E+001
12/3/2021 9:01:20 AM	2	30.22 +/- 9.56E-001	1.111E+004 +/- 1.111E+002	2.611E+001 +/- 5.738E-001	2.901E+003 +/- 5.678E+001
12/3/2021 9:02:16 AM	3	29.57 +/- 9.35E-001	1.087E+004 +/- 1.087E+002	2.533E+001 +/- 5.634E-001	2.753E+003 +/- 5.471E+001
12/3/2021 9:03:18 AM	4	29.57 +/- 9.35E-001	1.087E+004 +/- 1.087E+002	2.619E+001 +/- 5.749E-001	2.847E+003 +/- 5.563E+001
12/3/2021 9:04:19 AM	5	29.90 +/- 9.45E-001	1.099E+004 +/- 1.099E+002	2.555E+001 +/- 5.663E-001	2.808E+003 +/- 5.555E+001
12/3/2021 9:05:20 AM	6	29.57 +/- 9.35E-001	1.087E+004 +/- 1.087E+002	2.675E+001 +/- 5.823E-001	2.908E+003 +/- 5.622E+001
12/3/2021 9:06:22 AM	7	29.57 +/- 9.35E-001	1.087E+004 +/- 1.087E+002	2.653E+001 +/- 5.794E-001	2.884E+003 +/- 5.599E+001
12/3/2021 9:07:23 AM	8	29.57 +/- 9.35E-001	1.087E+004 +/- 1.087E+002	2.700E+001 +/- 5.856E-001	2.935E+003 +/- 5.648E+001
12/3/2021 9:08:24 AM	9	30.23 +/- 9.56E-001	1.111E+004 +/- 1.111E+002	2.629E+001 +/- 5.761E-001	2.921E+003 +/- 5.697E+001
12/3/2021 9:09:23 AM	10	30.22 +/- 9.56E-001	1.111E+004 +/- 1.111E+002	2.672E+001 +/- 5.819E-001	2.969E+003 +/- 5.743E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B2	2.9392E+001 +/- 4.1106E-001	1.1151E+004 +/- 1.5594E+002	2.6349E+001 +/- 5.7575E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 8:58:49 AM	1	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.595E+001 +/- 5.717E-001	2.852E+003 +/- 5.598E+001
12/3/2021 9:01:20 AM	2	29.96 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.618E+001 +/- 5.747E-001	2.975E+003 +/- 5.814E+001
12/3/2021 9:02:16 AM	3	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.668E+001 +/- 5.814E-001	2.998E+003 +/- 5.804E+001
12/3/2021 9:03:12 AM	4	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.677E+001 +/- 5.825E-001	3.008E+003 +/- 5.813E+001
12/3/2021 9:04:08 AM	5	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.643E+001 +/- 5.781E-001	2.904E+003 +/- 5.649E+001
12/3/2021 9:05:09 AM	6	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.679E+001 +/- 5.827E-001	2.944E+003 +/- 5.688E+001
12/3/2021 9:06:10 AM	7	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.634E+001 +/- 5.769E-001	2.895E+003 +/- 5.640E+001
12/3/2021 9:07:06 AM	8	29.62 +/- 9.37E-001	1.124E+004 +/- 1.124E+002	2.705E+001 +/- 5.862E-001	3.039E+003 +/- 5.844E+001
12/3/2021 9:08:01 AM	9	29.95 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.500E+001 +/- 5.590E-001	2.841E+003 +/- 5.682E+001
12/3/2021 9:08:56 AM	10	29.29 +/- 9.26E-001	1.111E+004 +/- 1.111E+002	2.631E+001 +/- 5.764E-001	2.923E+003 +/- 5.699E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B3	2.8635E+001 +/- 2.2378E-001	1.2377E+004 +/- 9.6725E+001	2.6698E+001 +/- 4.9894E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 8:58:49 AM	1	28.56 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.748E+001 +/- 5.919E-001	3.393E+003 +/- 6.472E+001
12/3/2021 9:01:14 AM	2	28.56 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.691E+001 +/- 5.844E-001	3.322E+003 +/- 6.404E+001
12/3/2021 9:02:04 AM	3	28.92 +/- 9.15E-001	1.250E+004 +/- 1.250E+002	2.648E+001 +/- 5.787E-001	3.310E+003 +/- 6.432E+001
12/3/2021 9:02:55 AM	4	28.57 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.650E+001 +/- 5.789E-001	3.272E+003 +/- 6.355E+001
12/3/2021 9:03:46 AM	5	28.92 +/- 9.15E-001	1.250E+004 +/- 1.250E+002	2.629E+001 +/- 5.762E-001	3.286E+003 +/- 6.409E+001
12/3/2021 9:04:36 AM	6	28.92 +/- 9.15E-001	1.250E+004 +/- 1.250E+002	2.745E+001 +/- 5.915E-001	3.431E+003 +/- 6.549E+001
12/3/2021 9:05:26 AM	7	28.57 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.638E+001 +/- 5.773E-001	3.257E+003 +/- 6.341E+001
12/3/2021 9:06:22 AM	8	28.21 +/- 8.92E-001	1.220E+004 +/- 1.220E+002	2.607E+001 +/- 5.733E-001	3.179E+003 +/- 6.227E+001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:07:17 AM	9	28.56 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.708E+001 +/- 5.866E-001	3.343E+003 +/- 6.424E+001
12/3/2021 9:08:07 AM	10	28.56 +/- 9.03E-001	1.235E+004 +/- 1.235E+002	2.635E+001 +/- 5.770E-001	3.253E+003 +/- 6.337E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B4	2.9070E+001 +/- 3.3424E-001	1.3177E+004 +/- 1.5151E+002	2.6203E+001 +/- 5.9847E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 8:58:49 AM	1	29.41 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.662E+001 +/- 5.806E-001	3.549E+003 +/- 6.879E+001
12/3/2021 9:01:08 AM	2	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.675E+001 +/- 5.822E-001	3.520E+003 +/- 6.805E+001
12/3/2021 9:01:58 AM	3	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.737E+001 +/- 5.904E-001	3.555E+003 +/- 6.794E+001
12/3/2021 9:02:49 AM	4	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.617E+001 +/- 5.746E-001	3.443E+003 +/- 6.731E+001
12/3/2021 9:03:40 AM	5	29.41 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.592E+001 +/- 5.713E-001	3.456E+003 +/- 6.788E+001
12/3/2021 9:04:30 AM	6	29.41 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.550E+001 +/- 5.657E-001	3.400E+003 +/- 6.733E+001
12/3/2021 9:05:21 AM	7	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.557E+001 +/- 5.666E-001	3.364E+003 +/- 6.654E+001
12/3/2021 9:06:10 AM	8	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.651E+001 +/- 5.791E-001	3.443E+003 +/- 6.687E+001
12/3/2021 9:07:00 AM	9	29.41 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.570E+001 +/- 5.684E-001	3.427E+003 +/- 6.759E+001
12/3/2021 9:07:50 AM	10	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.593E+001 +/- 5.714E-001	3.368E+003 +/- 6.613E+001

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1958
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Beta

Count Date: 12/3/2021 9:24:56 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B1	7.3075E+001 +/- 7.8543E-003	2.9414E+004 +/- 3.1617E+000	1.1459E+000 +/- 1.4427E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:24:53 AM	1	73.07 +/- 2.38E+000	3.559E+002 +/- 3.235E+001	1.210E+000 +/- 1.107E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:25:20 AM	2	73.07 +/- 2.38E+000	3.235E+002 +/- 3.085E+001	1.100E+000 +/- 1.055E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:25:44 AM	3	73.09 +/- 2.38E+000	4.118E+002 +/- 3.480E+001	1.400E+000 +/- 1.191E-001	2.942E+004 +/- 2.942E+002
12/3/2021 9:26:08 AM	4	73.07 +/- 2.38E+000	3.353E+002 +/- 3.140E+001	1.140E+000 +/- 1.074E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:26:31 AM	5	73.09 +/- 2.38E+000	2.912E+002 +/- 2.926E+001	9.898E-001 +/- 9.997E-002	2.942E+004 +/- 2.941E+002
12/3/2021 9:26:55 AM	6	73.07 +/- 2.38E+000	3.265E+002 +/- 3.099E+001	1.110E+000 +/- 1.059E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:27:20 AM	7	73.07 +/- 2.38E+000	3.735E+002 +/- 3.315E+001	1.270E+000 +/- 1.134E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:27:44 AM	8	73.07 +/- 2.38E+000	3.735E+002 +/- 3.315E+001	1.270E+000 +/- 1.134E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:28:08 AM	9	73.07 +/- 2.38E+000	3.088E+002 +/- 3.014E+001	1.050E+000 +/- 1.030E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:28:32 AM	10	73.08 +/- 2.38E+000	2.706E+002 +/- 2.821E+001	9.199E-001 +/- 9.635E-002	2.941E+004 +/- 2.941E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B2	7.2893E+001 +/- 1.0123E+000	2.9164E+004 +/- 4.0501E+002	1.2758E+000 +/- 1.2884E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:24:53 AM	1	71.43 +/- 2.33E+000	4.086E+002 +/- 3.417E+001	1.430E+000 +/- 1.204E-001	2.858E+004 +/- 2.858E+002
12/3/2021 9:25:21 AM	2	73.51 +/- 2.39E+000	3.618E+002 +/- 3.262E+001	1.230E+000 +/- 1.116E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:25:45 AM	3	73.52 +/- 2.40E+000	3.500E+002 +/- 3.208E+001	1.190E+000 +/- 1.097E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:26:08 AM	4	71.43 +/- 2.33E+000	3.886E+002 +/- 3.332E+001	1.360E+000 +/- 1.174E-001	2.858E+004 +/- 2.858E+002
12/3/2021 9:26:32 AM	5	71.41 +/- 2.33E+000	3.257E+002 +/- 3.051E+001	1.140E+000 +/- 1.074E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:26:56 AM	6	73.53 +/- 2.40E+000	3.118E+002 +/- 3.028E+001	1.060E+000 +/- 1.035E-001	2.942E+004 +/- 2.942E+002
12/3/2021 9:27:20 AM	7	73.53 +/- 2.40E+000	3.559E+002 +/- 3.235E+001	1.210E+000 +/- 1.106E-001	2.942E+004 +/- 2.942E+002
12/3/2021 9:27:45 AM	8	73.51 +/- 2.39E+000	4.235E+002 +/- 3.529E+001	1.440E+000 +/- 1.209E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:28:08 AM	9	73.52 +/- 2.40E+000	4.059E+002 +/- 3.455E+001	1.380E+000 +/- 1.183E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:28:32 AM	10	73.52 +/- 2.40E+000	3.882E+002 +/- 3.379E+001	1.320E+000 +/- 1.156E-001	2.941E+004 +/- 2.941E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B3	7.3183E+001 +/- 6.5987E-001	2.9330E+004 +/- 2.6445E+002	1.1329E+000 +/- 9.0813E-002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:24:54 AM	1	71.31 +/- 2.32E+000	3.143E+002 +/- 2.997E+001	1.100E+000 +/- 1.054E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:25:21 AM	2	73.39 +/- 2.39E+000	3.235E+002 +/- 3.085E+001	1.100E+000 +/- 1.055E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:25:45 AM	3	73.39 +/- 2.39E+000	3.176E+002 +/- 3.057E+001	1.080E+000 +/- 1.045E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:26:09 AM	4	73.40 +/- 2.39E+000	3.206E+002 +/- 3.071E+001	1.090E+000 +/- 1.050E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:26:33 AM	5	73.40 +/- 2.39E+000	3.294E+002 +/- 3.113E+001	1.120E+000 +/- 1.064E-001	2.942E+004 +/- 2.941E+002
12/3/2021 9:26:56 AM	6	73.39 +/- 2.39E+000	3.824E+002 +/- 3.353E+001	1.300E+000 +/- 1.148E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:27:21 AM	7	73.39 +/- 2.39E+000	3.353E+002 +/- 3.140E+001	1.140E+000 +/- 1.074E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:27:45 AM	8	73.40 +/- 2.39E+000	3.000E+002 +/- 2.970E+001	1.020E+000 +/- 1.015E-001	2.941E+004 +/- 2.941E+002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:28:09 AM	9	73.39 +/- 2.39E+000	3.206E+002 +/- 3.071E+001	1.090E+000 +/- 1.050E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:28:33 AM	10	73.40 +/- 2.39E+000	3.794E+002 +/- 3.341E+001	1.290E+000 +/- 1.143E-001	2.941E+004 +/- 2.941E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
B4	7.2561E+001 +/- 6.7425E-001	2.8660E+004 +/- 2.6631E+002	1.1968E+000 +/- 1.0472E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:24:54 AM	1	72.35 +/- 2.36E+000	3.371E+002 +/- 3.104E+001	1.180E+000 +/- 1.092E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:25:27 AM	2	72.34 +/- 2.36E+000	3.486E+002 +/- 3.156E+001	1.220E+000 +/- 1.111E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:25:51 AM	3	72.34 +/- 2.36E+000	3.486E+002 +/- 3.156E+001	1.220E+000 +/- 1.111E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:26:15 AM	4	72.35 +/- 2.36E+000	3.257E+002 +/- 3.051E+001	1.140E+000 +/- 1.074E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:26:39 AM	5	72.34 +/- 2.36E+000	2.857E+002 +/- 2.857E+001	9.999E-001 +/- 1.005E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:27:02 AM	6	74.48 +/- 2.43E+000	3.706E+002 +/- 3.301E+001	1.260E+000 +/- 1.129E-001	2.942E+004 +/- 2.941E+002
12/3/2021 9:27:27 AM	7	72.37 +/- 2.36E+000	3.657E+002 +/- 3.232E+001	1.279E+000 +/- 1.138E-001	2.858E+004 +/- 2.858E+002
12/3/2021 9:27:51 AM	8	72.34 +/- 2.36E+000	3.543E+002 +/- 3.182E+001	1.240E+000 +/- 1.120E-001	2.857E+004 +/- 2.857E+002
12/3/2021 9:28:15 AM	9	72.35 +/- 2.36E+000	3.886E+002 +/- 3.332E+001	1.360E+000 +/- 1.174E-001	2.858E+004 +/- 2.857E+002
12/3/2021 9:28:39 AM	10	72.34 +/- 2.36E+000	3.057E+002 +/- 2.955E+001	1.070E+000 +/- 1.040E-001	2.857E+004 +/- 2.857E+002

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1962
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Alpha

Count Date: 12/3/2021 9:36:59 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C1	3.1637E+001 +/- 3.4429E-001	1.1630E+004 +/- 1.2657E+002	2.6993E+001 +/- 4.7329E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:36:56 AM	1	31.27 +/- 9.89E-001	1.150E+004 +/- 1.150E+002	2.647E+001 +/- 5.786E-001	3.044E+003 +/- 5.915E+001
12/3/2021 9:37:57 AM	2	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.784E+001 +/- 5.965E-001	3.237E+003 +/- 6.135E+001
12/3/2021 9:38:53 AM	3	31.64 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.707E+001 +/- 5.864E-001	3.149E+003 +/- 6.051E+001
12/3/2021 9:39:49 AM	4	32.01 +/- 1.01E+000	1.177E+004 +/- 1.177E+002	2.643E+001 +/- 5.780E-001	3.109E+003 +/- 6.048E+001
12/3/2021 9:40:45 AM	5	32.00 +/- 1.01E+000	1.176E+004 +/- 1.176E+002	2.678E+001 +/- 5.827E-001	3.151E+003 +/- 6.088E+001
12/3/2021 9:41:37 AM	6	32.01 +/- 1.01E+000	1.177E+004 +/- 1.177E+002	2.669E+001 +/- 5.815E-001	3.141E+003 +/- 6.079E+001
12/3/2021 9:42:33 AM	7	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.686E+001 +/- 5.837E-001	3.123E+003 +/- 6.026E+001
12/3/2021 9:43:29 AM	8	30.91 +/- 9.78E-001	1.136E+004 +/- 1.136E+002	2.757E+001 +/- 5.931E-001	3.133E+003 +/- 5.967E+001
12/3/2021 9:44:24 AM	9	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.742E+001 +/- 5.911E-001	3.188E+003 +/- 6.089E+001
12/3/2021 9:45:19 AM	10	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.679E+001 +/- 5.828E-001	3.115E+003 +/- 6.018E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C2	2.8972E+001 +/- 4.0482E-001	1.0991E+004 +/- 1.5358E+002	2.7288E+001 +/- 5.1568E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:36:56 AM	1	28.65 +/- 9.06E-001	1.087E+004 +/- 1.087E+002	2.789E+001 +/- 5.972E-001	3.032E+003 +/- 5.740E+001
12/3/2021 9:37:58 AM	2	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.737E+001 +/- 5.904E-001	3.008E+003 +/- 5.749E+001
12/3/2021 9:38:59 AM	3	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.818E+001 +/- 6.010E-001	3.098E+003 +/- 5.835E+001
12/3/2021 9:40:00 AM	4	28.65 +/- 9.06E-001	1.087E+004 +/- 1.087E+002	2.654E+001 +/- 5.795E-001	2.885E+003 +/- 5.600E+001
12/3/2021 9:40:57 AM	5	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.691E+001 +/- 5.844E-001	2.957E+003 +/- 5.701E+001
12/3/2021 9:41:54 AM	6	28.65 +/- 9.06E-001	1.087E+004 +/- 1.087E+002	2.728E+001 +/- 5.893E-001	2.965E+003 +/- 5.677E+001
12/3/2021 9:42:55 AM	7	28.65 +/- 9.06E-001	1.087E+004 +/- 1.087E+002	2.764E+001 +/- 5.940E-001	3.004E+003 +/- 5.715E+001
12/3/2021 9:43:52 AM	8	29.29 +/- 9.26E-001	1.111E+004 +/- 1.111E+002	2.697E+001 +/- 5.852E-001	2.997E+003 +/- 5.770E+001
12/3/2021 9:44:52 AM	9	28.97 +/- 9.16E-001	1.099E+004 +/- 1.099E+002	2.735E+001 +/- 5.902E-001	3.005E+003 +/- 5.747E+001
12/3/2021 9:45:50 AM	10	29.95 +/- 9.47E-001	1.136E+004 +/- 1.136E+002	2.675E+001 +/- 5.823E-001	3.040E+003 +/- 5.877E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C3	2.9550E+001 +/- 2.5581E-001	1.2773E+004 +/- 1.1057E+002	2.5735E+001 +/- 4.9683E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:36:57 AM	1	29.67 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.610E+001 +/- 5.737E-001	3.347E+003 +/- 6.551E+001
12/3/2021 9:37:51 AM	2	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.561E+001 +/- 5.672E-001	3.283E+003 +/- 6.488E+001
12/3/2021 9:38:42 AM	3	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.588E+001 +/- 5.708E-001	3.276E+003 +/- 6.440E+001
12/3/2021 9:39:32 AM	4	30.05 +/- 9.50E-001	1.299E+004 +/- 1.299E+002	2.538E+001 +/- 5.641E-001	3.296E+003 +/- 6.543E+001
12/3/2021 9:40:23 AM	5	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.470E+001 +/- 5.550E-001	3.167E+003 +/- 6.372E+001
12/3/2021 9:41:15 AM	6	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.622E+001 +/- 5.753E-001	3.319E+003 +/- 6.482E+001
12/3/2021 9:42:05 AM	7	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.631E+001 +/- 5.765E-001	3.373E+003 +/- 6.576E+001
12/3/2021 9:42:56 AM	8	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.607E+001 +/- 5.733E-001	3.300E+003 +/- 6.463E+001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:43:45 AM	9	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.532E+001 +/- 5.633E-001	3.246E+003 +/- 6.451E+001
12/3/2021 9:44:35 AM	10	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.576E+001 +/- 5.692E-001	3.261E+003 +/- 6.425E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C4	3.1795E+001 +/- 3.9061E-001	1.4413E+004 +/- 1.7706E+002	2.6517E+001 +/- 7.0225E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:36:57 AM	1	31.98 +/- 1.01E+000	1.449E+004 +/- 1.449E+002	2.698E+001 +/- 5.852E-001	3.910E+003 +/- 7.528E+001
12/3/2021 9:37:45 AM	2	32.45 +/- 1.03E+000	1.471E+004 +/- 1.471E+002	2.576E+001 +/- 5.692E-001	3.790E+003 +/- 7.465E+001
12/3/2021 9:38:30 AM	3	31.52 +/- 9.97E-001	1.429E+004 +/- 1.429E+002	2.733E+001 +/- 5.899E-001	3.906E+003 +/- 7.470E+001
12/3/2021 9:39:15 AM	4	32.45 +/- 1.03E+000	1.471E+004 +/- 1.471E+002	2.587E+001 +/- 5.706E-001	3.804E+003 +/- 7.480E+001
12/3/2021 9:40:01 AM	5	31.52 +/- 9.97E-001	1.429E+004 +/- 1.429E+002	2.744E+001 +/- 5.913E-001	3.920E+003 +/- 7.483E+001
12/3/2021 9:40:45 AM	6	31.52 +/- 9.97E-001	1.429E+004 +/- 1.429E+002	2.712E+001 +/- 5.872E-001	3.874E+003 +/- 7.440E+001
12/3/2021 9:41:31 AM	7	31.52 +/- 9.97E-001	1.429E+004 +/- 1.429E+002	2.642E+001 +/- 5.779E-001	3.774E+003 +/- 7.343E+001
12/3/2021 9:42:16 AM	8	31.52 +/- 9.97E-001	1.429E+004 +/- 1.429E+002	2.672E+001 +/- 5.819E-001	3.819E+003 +/- 7.386E+001
12/3/2021 9:43:01 AM	9	31.52 +/- 9.97E-001	1.429E+004 +/- 1.429E+002	2.606E+001 +/- 5.731E-001	3.723E+003 +/- 7.293E+001
12/3/2021 9:43:46 AM	10	31.97 +/- 1.01E+000	1.449E+004 +/- 1.449E+002	2.547E+001 +/- 5.653E-001	3.691E+003 +/- 7.314E+001

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1955
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Beta

Count Date: 12/3/2021 9:09:03 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C1	8.0171E+001 +/- 1.2208E+000	3.2270E+004 +/- 4.9139E+002	8.6887E-001 +/- 1.3086E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:09:00 AM	1	77.65 +/- 2.53E+000	2.156E+002 +/- 2.596E+001	6.899E-001 +/- 8.334E-002	3.126E+004 +/- 3.125E+002
12/3/2021 9:10:56 AM	2	80.14 +/- 2.61E+000	3.355E+002 +/- 3.290E+001	1.040E+000 +/- 1.025E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:11:20 AM	3	80.15 +/- 2.61E+000	2.129E+002 +/- 2.621E+001	6.599E-001 +/- 8.150E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:11:43 AM	4	80.17 +/- 2.61E+000	2.903E+002 +/- 3.060E+001	8.996E-001 +/- 9.526E-002	3.227E+004 +/- 3.226E+002
12/3/2021 9:12:07 AM	5	80.14 +/- 2.61E+000	3.097E+002 +/- 3.161E+001	9.600E-001 +/- 9.845E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:12:31 AM	6	80.17 +/- 2.61E+000	2.548E+002 +/- 2.867E+001	7.898E-001 +/- 8.921E-002	3.227E+004 +/- 3.226E+002
12/3/2021 9:12:55 AM	7	80.15 +/- 2.61E+000	3.258E+002 +/- 3.242E+001	1.010E+000 +/- 1.010E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:13:18 AM	8	80.14 +/- 2.61E+000	2.613E+002 +/- 2.903E+001	8.100E-001 +/- 9.036E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:13:43 AM	9	82.83 +/- 2.70E+000	3.233E+002 +/- 3.283E+001	9.698E-001 +/- 9.895E-002	3.334E+004 +/- 3.334E+002
12/3/2021 9:14:07 AM	10	80.16 +/- 2.61E+000	2.774E+002 +/- 2.991E+001	8.598E-001 +/- 9.312E-002	3.226E+004 +/- 3.226E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C2	7.6226E+001 +/- 9.9123E-001	3.0498E+004 +/- 3.9659E+002	1.1828E+000 +/- 1.1973E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:09:00 AM	1	75.75 +/- 2.47E+000	3.000E+002 +/- 3.015E+001	9.899E-001 +/- 9.998E-002	3.031E+004 +/- 3.030E+002
12/3/2021 9:10:56 AM	2	75.75 +/- 2.47E+000	3.273E+002 +/- 3.149E+001	1.080E+000 +/- 1.045E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:11:20 AM	3	75.75 +/- 2.47E+000	3.788E+002 +/- 3.388E+001	1.250E+000 +/- 1.125E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:11:44 AM	4	75.75 +/- 2.47E+000	3.606E+002 +/- 3.306E+001	1.190E+000 +/- 1.097E-001	3.031E+004 +/- 3.031E+002
12/3/2021 9:12:08 AM	5	75.78 +/- 2.47E+000	3.576E+002 +/- 3.292E+001	1.179E+000 +/- 1.092E-001	3.032E+004 +/- 3.031E+002
12/3/2021 9:12:31 AM	6	78.11 +/- 2.54E+000	3.500E+002 +/- 3.307E+001	1.120E+000 +/- 1.064E-001	3.125E+004 +/- 3.125E+002
12/3/2021 9:12:55 AM	7	75.75 +/- 2.47E+000	3.848E+002 +/- 3.415E+001	1.270E+000 +/- 1.134E-001	3.031E+004 +/- 3.030E+002
12/3/2021 9:13:19 AM	8	75.74 +/- 2.47E+000	3.242E+002 +/- 3.135E+001	1.070E+000 +/- 1.040E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:13:43 AM	9	75.77 +/- 2.47E+000	4.182E+002 +/- 3.560E+001	1.379E+000 +/- 1.182E-001	3.032E+004 +/- 3.031E+002
12/3/2021 9:14:07 AM	10	78.11 +/- 2.54E+000	4.063E+002 +/- 3.563E+001	1.300E+000 +/- 1.148E-001	3.125E+004 +/- 3.125E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C3	7.7754E+001 +/- 7.4492E-001	3.1162E+004 +/- 2.9854E+002	8.2384E-001 +/- 7.5966E-002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:09:00 AM	1	78.04 +/- 2.54E+000	2.156E+002 +/- 2.596E+001	6.894E-001 +/- 8.329E-002	3.128E+004 +/- 3.126E+002
12/3/2021 9:10:57 AM	2	77.97 +/- 2.54E+000	2.406E+002 +/- 2.742E+001	7.700E-001 +/- 8.809E-002	3.125E+004 +/- 3.125E+002
12/3/2021 9:11:21 AM	3	77.99 +/- 2.54E+000	2.625E+002 +/- 2.864E+001	8.398E-001 +/- 9.202E-002	3.126E+004 +/- 3.125E+002
12/3/2021 9:11:44 AM	4	75.63 +/- 2.46E+000	2.394E+002 +/- 2.693E+001	7.898E-001 +/- 8.921E-002	3.031E+004 +/- 3.031E+002
12/3/2021 9:12:08 AM	5	77.98 +/- 2.54E+000	2.750E+002 +/- 2.932E+001	8.799E-001 +/- 9.421E-002	3.125E+004 +/- 3.125E+002
12/3/2021 9:12:32 AM	6	78.00 +/- 2.54E+000	2.875E+002 +/- 2.997E+001	9.197E-001 +/- 9.633E-002	3.126E+004 +/- 3.125E+002
12/3/2021 9:12:56 AM	7	77.99 +/- 2.54E+000	2.688E+002 +/- 2.898E+001	8.598E-001 +/- 9.312E-002	3.126E+004 +/- 3.125E+002
12/3/2021 9:13:20 AM	8	77.97 +/- 2.54E+000	2.688E+002 +/- 2.898E+001	8.600E-001 +/- 9.313E-002	3.125E+004 +/- 3.125E+002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:13:44 AM	9	77.97 +/- 2.54E+000	2.813E+002 +/- 2.965E+001	9.000E-001 +/- 9.529E-002	3.125E+004 +/- 3.125E+002
12/3/2021 9:14:08 AM	10	77.98 +/- 2.54E+000	2.281E+002 +/- 2.670E+001	7.299E-001 +/- 8.574E-002	3.125E+004 +/- 3.125E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
C4	8.2497E+001 +/- 1.3141E+000	3.2585E+004 +/- 5.1903E+002	9.9288E-001 +/- 1.3278E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:09:01 AM	1	84.39 +/- 2.75E+000	3.033E+002 +/- 3.180E+001	9.100E-001 +/- 9.583E-002	3.333E+004 +/- 3.333E+002
12/3/2021 9:10:57 AM	2	81.70 +/- 2.66E+000	2.903E+002 +/- 3.060E+001	8.996E-001 +/- 9.526E-002	3.227E+004 +/- 3.226E+002
12/3/2021 9:11:21 AM	3	81.70 +/- 2.66E+000	3.548E+002 +/- 3.383E+001	1.100E+000 +/- 1.054E-001	3.227E+004 +/- 3.226E+002
12/3/2021 9:11:45 AM	4	84.41 +/- 2.75E+000	3.033E+002 +/- 3.180E+001	9.098E-001 +/- 9.581E-002	3.334E+004 +/- 3.334E+002
12/3/2021 9:12:09 AM	5	81.67 +/- 2.66E+000	3.742E+002 +/- 3.474E+001	1.160E+000 +/- 1.083E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:12:32 AM	6	84.40 +/- 2.75E+000	3.000E+002 +/- 3.162E+001	8.999E-001 +/- 9.528E-002	3.334E+004 +/- 3.333E+002
12/3/2021 9:12:56 AM	7	81.68 +/- 2.66E+000	3.161E+002 +/- 3.193E+001	9.799E-001 +/- 9.947E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:13:20 AM	8	81.67 +/- 2.66E+000	2.839E+002 +/- 3.026E+001	8.800E-001 +/- 9.422E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:13:45 AM	9	81.67 +/- 2.66E+000	4.065E+002 +/- 3.621E+001	1.260E+000 +/- 1.130E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:14:08 AM	10	81.68 +/- 2.66E+000	3.000E+002 +/- 3.111E+001	9.299E-001 +/- 9.687E-002	3.226E+004 +/- 3.226E+002

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1959
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Alpha

Count Date: 12/3/2021 9:24:57 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D1	3.2350E+001 +/- 3.3339E-001	1.1892E+004 +/- 1.2256E+002	2.5972E+001 +/- 5.1797E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:24:54 AM	1	32.77 +/- 1.04E+000	1.205E+004 +/- 1.205E+002	2.701E+001 +/- 5.857E-001	3.254E+003 +/- 6.262E+001
12/3/2021 9:27:20 AM	2	32.38 +/- 1.02E+000	1.190E+004 +/- 1.190E+002	2.553E+001 +/- 5.661E-001	3.039E+003 +/- 6.015E+001
12/3/2021 9:28:17 AM	3	31.63 +/- 1.00E+000	1.163E+004 +/- 1.163E+002	2.650E+001 +/- 5.790E-001	3.081E+003 +/- 5.986E+001
12/3/2021 9:29:12 AM	4	32.38 +/- 1.02E+000	1.190E+004 +/- 1.190E+002	2.606E+001 +/- 5.732E-001	3.102E+003 +/- 6.077E+001
12/3/2021 9:30:08 AM	5	32.39 +/- 1.02E+000	1.191E+004 +/- 1.191E+002	2.551E+001 +/- 5.658E-001	3.038E+003 +/- 6.014E+001
12/3/2021 9:31:03 AM	6	32.38 +/- 1.02E+000	1.190E+004 +/- 1.190E+002	2.634E+001 +/- 5.769E-001	3.136E+003 +/- 6.110E+001
12/3/2021 9:31:59 AM	7	32.38 +/- 1.02E+000	1.190E+004 +/- 1.190E+002	2.554E+001 +/- 5.662E-001	3.040E+003 +/- 6.016E+001
12/3/2021 9:32:55 AM	8	32.77 +/- 1.04E+000	1.205E+004 +/- 1.205E+002	2.541E+001 +/- 5.645E-001	3.061E+003 +/- 6.073E+001
12/3/2021 9:33:50 AM	9	32.01 +/- 1.01E+000	1.177E+004 +/- 1.177E+002	2.591E+001 +/- 5.712E-001	3.049E+003 +/- 5.990E+001
12/3/2021 9:34:46 AM	10	32.38 +/- 1.02E+000	1.190E+004 +/- 1.190E+002	2.590E+001 +/- 5.710E-001	3.083E+003 +/- 6.059E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D2	3.1995E+001 +/- 4.1647E-001	1.2138E+004 +/- 1.5800E+002	2.6257E+001 +/- 7.5600E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:24:54 AM	1	32.15 +/- 1.02E+000	1.220E+004 +/- 1.220E+002	2.550E+001 +/- 5.657E-001	3.111E+003 +/- 6.159E+001
12/3/2021 9:27:20 AM	2	32.15 +/- 1.02E+000	1.220E+004 +/- 1.220E+002	2.529E+001 +/- 5.629E-001	3.084E+003 +/- 6.133E+001
12/3/2021 9:28:17 AM	3	32.15 +/- 1.02E+000	1.220E+004 +/- 1.220E+002	2.510E+001 +/- 5.604E-001	3.061E+003 +/- 6.110E+001
12/3/2021 9:29:12 AM	4	31.38 +/- 9.92E-001	1.190E+004 +/- 1.190E+002	2.693E+001 +/- 5.847E-001	3.206E+003 +/- 6.178E+001
12/3/2021 9:30:08 AM	5	31.76 +/- 1.00E+000	1.205E+004 +/- 1.205E+002	2.710E+001 +/- 5.869E-001	3.265E+003 +/- 6.272E+001
12/3/2021 9:31:04 AM	6	32.54 +/- 1.03E+000	1.235E+004 +/- 1.235E+002	2.664E+001 +/- 5.808E-001	3.289E+003 +/- 6.372E+001
12/3/2021 9:32:00 AM	7	31.76 +/- 1.00E+000	1.205E+004 +/- 1.205E+002	2.704E+001 +/- 5.861E-001	3.258E+003 +/- 6.265E+001
12/3/2021 9:32:55 AM	8	31.38 +/- 9.92E-001	1.190E+004 +/- 1.190E+002	2.670E+001 +/- 5.816E-001	3.179E+003 +/- 6.151E+001
12/3/2021 9:33:51 AM	9	32.54 +/- 1.03E+000	1.235E+004 +/- 1.235E+002	2.586E+001 +/- 5.705E-001	3.193E+003 +/- 6.278E+001
12/3/2021 9:34:47 AM	10	32.15 +/- 1.02E+000	1.220E+004 +/- 1.220E+002	2.641E+001 +/- 5.778E-001	3.221E+003 +/- 6.267E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D3	2.9589E+001 +/- 2.4030E-001	1.2789E+004 +/- 1.0387E+002	2.6763E+001 +/- 5.7371E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:24:54 AM	1	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.684E+001 +/- 5.834E-001	3.397E+003 +/- 6.558E+001
12/3/2021 9:27:21 AM	2	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.695E+001 +/- 5.849E-001	3.455E+003 +/- 6.656E+001
12/3/2021 9:28:11 AM	3	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.720E+001 +/- 5.881E-001	3.443E+003 +/- 6.602E+001
12/3/2021 9:29:06 AM	4	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.697E+001 +/- 5.851E-001	3.458E+003 +/- 6.658E+001
12/3/2021 9:29:56 AM	5	29.29 +/- 9.26E-001	1.266E+004 +/- 1.266E+002	2.739E+001 +/- 5.907E-001	3.467E+003 +/- 6.625E+001
12/3/2021 9:30:47 AM	6	30.05 +/- 9.50E-001	1.299E+004 +/- 1.299E+002	2.562E+001 +/- 5.673E-001	3.329E+003 +/- 6.575E+001
12/3/2021 9:31:37 AM	7	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.665E+001 +/- 5.809E-001	3.417E+003 +/- 6.618E+001
12/3/2021 9:32:28 AM	8	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.620E+001 +/- 5.750E-001	3.359E+003 +/- 6.562E+001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:33:18 AM	9	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.747E+001 +/- 5.917E-001	3.522E+003 +/- 6.719E+001
12/3/2021 9:34:08 AM	10	29.66 +/- 9.38E-001	1.282E+004 +/- 1.282E+002	2.635E+001 +/- 5.769E-001	3.378E+003 +/- 6.581E+001

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D4	2.9072E+001 +/- 4.2461E-001	1.3178E+004 +/- 1.9247E+002	2.7115E+001 +/- 6.8526E-001

Assay Date	Iteration	Efficiency (%)	Alpha Count Rate (cpm)	Spillover	Beta Count Rate (cpm)
12/3/2021 9:24:54 AM	1	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.638E+001 +/- 5.774E-001	3.471E+003 +/- 6.758E+001
12/3/2021 9:27:13 AM	2	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.757E+001 +/- 5.931E-001	3.581E+003 +/- 6.819E+001
12/3/2021 9:28:05 AM	3	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.791E+001 +/- 5.975E-001	3.625E+003 +/- 6.861E+001
12/3/2021 9:28:55 AM	4	29.81 +/- 9.43E-001	1.351E+004 +/- 1.351E+002	2.667E+001 +/- 5.812E-001	3.604E+003 +/- 6.979E+001
12/3/2021 9:29:45 AM	5	29.41 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.646E+001 +/- 5.785E-001	3.528E+003 +/- 6.859E+001
12/3/2021 9:30:36 AM	6	29.42 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.605E+001 +/- 5.730E-001	3.473E+003 +/- 6.805E+001
12/3/2021 9:31:26 AM	7	29.42 +/- 9.30E-001	1.333E+004 +/- 1.333E+002	2.743E+001 +/- 5.912E-001	3.657E+003 +/- 6.983E+001
12/3/2021 9:32:16 AM	8	29.03 +/- 9.18E-001	1.316E+004 +/- 1.316E+002	2.719E+001 +/- 5.881E-001	3.578E+003 +/- 6.861E+001
12/3/2021 9:33:07 AM	9	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.746E+001 +/- 5.916E-001	3.566E+003 +/- 6.805E+001
12/3/2021 9:33:57 AM	10	28.65 +/- 9.06E-001	1.299E+004 +/- 1.299E+002	2.804E+001 +/- 5.992E-001	3.642E+003 +/- 6.877E+001

Apex-Alpha/Beta™

CANBERRA

Efficiency Report

Batch Name: Batch_1961
Procedure: Constant Efficiency
Calibration: Constant Efficiency
Decay Mode: Beta

Count Date: 12/3/2021 9:36:59 AM
Preset Count Time: 300
Count Mode: Simultaneous

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D1	7.9158E+001 +/- 1.3017E+000	3.1862E+004 +/- 5.2397E+002	9.3580E-001 +/- 8.5738E-002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:36:57 AM	1	77.64 +/- 2.53E+000	3.188E+002 +/- 3.156E+001	1.020E+000 +/- 1.015E-001	3.125E+004 +/- 3.125E+002
12/3/2021 9:37:23 AM	2	80.16 +/- 2.61E+000	3.161E+002 +/- 3.193E+001	9.798E-001 +/- 9.946E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:37:47 AM	3	77.65 +/- 2.53E+000	3.031E+002 +/- 3.078E+001	9.698E-001 +/- 9.895E-002	3.126E+004 +/- 3.125E+002
12/3/2021 9:38:11 AM	4	77.65 +/- 2.53E+000	2.625E+002 +/- 2.864E+001	8.398E-001 +/- 9.202E-002	3.126E+004 +/- 3.125E+002
12/3/2021 9:38:35 AM	5	80.16 +/- 2.61E+000	2.742E+002 +/- 2.974E+001	8.498E-001 +/- 9.257E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:38:59 AM	6	80.18 +/- 2.61E+000	2.548E+002 +/- 2.867E+001	7.896E-001 +/- 8.919E-002	3.227E+004 +/- 3.227E+002
12/3/2021 9:39:23 AM	7	77.64 +/- 2.53E+000	3.125E+002 +/- 3.125E+001	1.000E+000 +/- 1.005E-001	3.125E+004 +/- 3.125E+002
12/3/2021 9:39:47 AM	8	80.17 +/- 2.61E+000	3.323E+002 +/- 3.274E+001	1.030E+000 +/- 1.020E-001	3.227E+004 +/- 3.226E+002
12/3/2021 9:40:12 AM	9	80.15 +/- 2.61E+000	3.194E+002 +/- 3.210E+001	9.899E-001 +/- 9.998E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:40:35 AM	10	80.18 +/- 2.61E+000	2.871E+002 +/- 3.043E+001	8.896E-001 +/- 9.471E-002	3.227E+004 +/- 3.227E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D2	7.9886E+001 +/- 1.2228E+000	3.1962E+004 +/- 4.8923E+002	1.1428E+000 +/- 1.7242E-001

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:36:57 AM	1	80.64 +/- 2.63E+000	2.968E+002 +/- 3.094E+001	9.198E-001 +/- 9.634E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:37:24 AM	2	78.11 +/- 2.54E+000	3.531E+002 +/- 3.322E+001	1.130E+000 +/- 1.069E-001	3.125E+004 +/- 3.125E+002
12/3/2021 9:37:48 AM	3	80.64 +/- 2.63E+000	3.000E+002 +/- 3.111E+001	9.298E-001 +/- 9.686E-002	3.226E+004 +/- 3.226E+002
12/3/2021 9:38:12 AM	4	80.64 +/- 2.63E+000	3.323E+002 +/- 3.274E+001	1.030E+000 +/- 1.020E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:38:36 AM	5	80.64 +/- 2.63E+000	4.226E+002 +/- 3.692E+001	1.310E+000 +/- 1.152E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:39:00 AM	6	78.12 +/- 2.54E+000	4.031E+002 +/- 3.549E+001	1.290E+000 +/- 1.143E-001	3.126E+004 +/- 3.125E+002
12/3/2021 9:39:24 AM	7	78.11 +/- 2.54E+000	4.531E+002 +/- 3.763E+001	1.450E+000 +/- 1.213E-001	3.125E+004 +/- 3.125E+002
12/3/2021 9:39:47 AM	8	80.63 +/- 2.63E+000	3.903E+002 +/- 3.548E+001	1.210E+000 +/- 1.107E-001	3.226E+004 +/- 3.226E+002
12/3/2021 9:40:12 AM	9	80.65 +/- 2.63E+000	3.613E+002 +/- 3.414E+001	1.120E+000 +/- 1.064E-001	3.227E+004 +/- 3.226E+002
12/3/2021 9:40:36 AM	10	80.67 +/- 2.63E+000	3.355E+002 +/- 3.290E+001	1.039E+000 +/- 1.025E-001	3.227E+004 +/- 3.227E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D3	7.5853E+001 +/- 7.4540E-001	3.0400E+004 +/- 2.9874E+002	1.1829E+000 +/- 8.9071E-002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:36:57 AM	1	77.97 +/- 2.54E+000	3.344E+002 +/- 3.233E+001	1.070E+000 +/- 1.040E-001	3.125E+004 +/- 3.125E+002
12/3/2021 9:37:25 AM	2	75.62 +/- 2.46E+000	3.727E+002 +/- 3.361E+001	1.230E+000 +/- 1.116E-001	3.031E+004 +/- 3.030E+002
12/3/2021 9:37:48 AM	3	75.61 +/- 2.46E+000	4.152E+002 +/- 3.547E+001	1.370E+000 +/- 1.178E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:38:12 AM	4	75.61 +/- 2.46E+000	3.303E+002 +/- 3.164E+001	1.090E+000 +/- 1.050E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:38:36 AM	5	75.61 +/- 2.46E+000	3.394E+002 +/- 3.207E+001	1.120E+000 +/- 1.064E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:39:01 AM	6	75.61 +/- 2.46E+000	3.606E+002 +/- 3.306E+001	1.190E+000 +/- 1.097E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:39:24 AM	7	75.62 +/- 2.46E+000	3.394E+002 +/- 3.207E+001	1.120E+000 +/- 1.064E-001	3.031E+004 +/- 3.030E+002
12/3/2021 9:39:48 AM	8	75.61 +/- 2.46E+000	3.788E+002 +/- 3.388E+001	1.250E+000 +/- 1.125E-001	3.030E+004 +/- 3.030E+002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:40:13 AM	9	75.62 +/- 2.46E+000	3.636E+002 +/- 3.320E+001	1.200E+000 +/- 1.102E-001	3.031E+004 +/- 3.030E+002
12/3/2021 9:40:37 AM	10	75.64 +/- 2.46E+000	3.606E+002 +/- 3.306E+001	1.190E+000 +/- 1.097E-001	3.032E+004 +/- 3.031E+002

Calculated Efficiency (%)

DetectorName	Avg. Efficiency (%)	Count Rate (cpm)	Avg. Spillover (%)
D4	7.4698E+001 +/- 7.1099E-001	2.9504E+004 +/- 2.8082E+002	1.0769E+000 +/- 7.7738E-002

Assay Date	Iteration	Efficiency (%)	Beta Count Rate (cpm)	Spillover	Alpha Count Rate (cpm)
12/3/2021 9:36:57 AM	1	74.47 +/- 2.43E+000	2.735E+002 +/- 2.836E+001	9.299E-001 +/- 9.687E-002	2.941E+004 +/- 2.941E+002
12/3/2021 9:37:25 AM	2	74.48 +/- 2.43E+000	3.088E+002 +/- 3.014E+001	1.050E+000 +/- 1.030E-001	2.942E+004 +/- 2.941E+002
12/3/2021 9:37:49 AM	3	74.46 +/- 2.43E+000	3.353E+002 +/- 3.140E+001	1.140E+000 +/- 1.074E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:38:13 AM	4	74.46 +/- 2.43E+000	3.088E+002 +/- 3.014E+001	1.050E+000 +/- 1.030E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:38:37 AM	5	74.46 +/- 2.43E+000	3.176E+002 +/- 3.057E+001	1.080E+000 +/- 1.045E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:39:01 AM	6	74.47 +/- 2.43E+000	3.500E+002 +/- 3.208E+001	1.190E+000 +/- 1.097E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:39:25 AM	7	74.48 +/- 2.43E+000	3.059E+002 +/- 2.999E+001	1.040E+000 +/- 1.025E-001	2.942E+004 +/- 2.941E+002
12/3/2021 9:39:49 AM	8	76.72 +/- 2.50E+000	3.061E+002 +/- 3.045E+001	1.010E+000 +/- 1.010E-001	3.030E+004 +/- 3.030E+002
12/3/2021 9:40:13 AM	9	74.47 +/- 2.43E+000	3.412E+002 +/- 3.168E+001	1.160E+000 +/- 1.083E-001	2.941E+004 +/- 2.941E+002
12/3/2021 9:40:37 AM	10	74.49 +/- 2.43E+000	3.294E+002 +/- 3.113E+001	1.120E+000 +/- 1.064E-001	2.942E+004 +/- 2.942E+002

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A1 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:58 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A1 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 1.3686E+001 +/- 2.0787E-001
C1 = -4.7951E+001 +/- 9.6277E-001
Chi^2 = 2.0555E+001

Spillover Coefficients

Spill C0 = 2.7750E+001 +/- 5.9981E-001
Spill C1 = 1.4381E+002 +/- 9.2547E+000
Chi^2 = 5.9746E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.7879E+003 +/- 5.3569E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.64	29.84
1	3.4965E+003 +/- 4.9448E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.57	28.94
1	2.7939E+003 +/- 3.9507E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.68	33.79
1	2.1459E+003 +/- 3.0348E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.86	39.84
1	1.9380E+003 +/- 2.7407E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.12	36.70
1	1.6203E+003 +/- 2.3240E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.47	41.16
1	4.3667E+002 +/- 1.2065E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.03	69.16

Exponential

Efficiency Coefficients

C0 = 1.7902E+001 +/- 3.5189E-001
C1 = -8.8223E+002 +/- 2.0161E+001
Chi^2 = 2.0192E+000

Spillover Coefficients

Spill C0 = 2.8996E+001 +/- 4.9008E-001
Spill C1 = 3.5641E+002 +/- 1.9299E+001
Chi^2 = 4.5934E+000

JEL 11.26.21

Batch 1831

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.7879E+003 +/- 5.3569E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.64	29.84
1	3.4965E+003 +/- 4.9448E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.57	28.94
1	2.7939E+003 +/- 3.9507E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.68	33.79
1	2.1459E+003 +/- 3.0348E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.86	39.84
1	1.9380E+003 +/- 2.7407E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.12	36.70
1	1.6203E+003 +/- 2.3240E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.47	41.16
1	4.3667E+002 +/- 1.2065E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.03	69.16

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A1 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:49 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A1 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 4.0786E+001 +/- 3.5415E-001
C1 = -3.2672E+001 +/- 2.6615E+000
Chi^2 = 7.7222E+000

Spillover Coefficients

Spill C0 = 1.5444E+000 +/- 9.0002E-002
Spill C1 = -1.8999E+000 +/- 6.8956E-001
Chi^2 = 7.1999E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.68
1	8.3333E+003 +/- 1.1785E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.89	1.02
1	1.0204E+004 +/- 1.4431E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.90	1.30
1	1.0419E+004 +/- 1.4733E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.47	1.60
1	9.4340E+003 +/- 1.3342E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.73	1.46
1	1.0870E+004 +/- 1.5372E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	41.98	1.44
1	1.1628E+004 +/- 1.6444E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.37	1.30

Exponential
EEL 11-30-21

Efficiency Coefficients

C0 = 4.1087E+001 +/- 3.7476E-001
C1 = -9.2217E+001 +/- 7.8340E+000
Chi^2 = 7.9455E+000

Spillover Coefficients

Spill C0 = 1.5807E+000 +/- 9.9832E-002
Spill C1 = -1.5365E+002 +/- 6.0712E+001
Chi^2 = 7.5502E-001

Batch 18622

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.68
1	8.3333E+003 +/- 1.1785E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.89	1.02
1	1.0204E+004 +/- 1.4431E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.90	1.30
1	1.0419E+004 +/- 1.4733E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.47	1.60
1	9.4340E+003 +/- 1.3342E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.73	1.46
1	1.0870E+004 +/- 1.5372E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	41.98	1.44
1	1.1628E+004 +/- 1.6444E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.37	1.30

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A2 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:58 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A2 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 1.3775E+001 +/- 2.0881E-001
C1 = -4.8255E+001 +/- 9.6600E-001
Chi^2 = 1.8626E+001

Spillover Coefficients

Spill C0 = 2.6962E+001 +/- 5.8424E-001
Spill C1 = 1.4686E+002 +/- 8.9996E+000
Chi^2 = 8.3007E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.8462E+003 +/- 5.4393E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.90	27.60
1	3.4965E+003 +/- 4.9448E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.57	28.60
1	2.7473E+003 +/- 3.8852E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.47	33.58
1	2.1186E+003 +/- 2.9962E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.73	40.78
1	1.9231E+003 +/- 2.7196E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.05	38.88
1	1.7007E+003 +/- 2.4051E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.84	37.64
1	4.3800E+002 +/- 1.2083E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.03	68.42

Exponential Fit linear

Efficiency Coefficients

C0 = 1.7927E+001 +/- 3.5233E-001
C1 = -8.7821E+002 +/- 2.0150E+001
Chi^2 = 2.1921E+000

Spillover Coefficients

Spill C0 = 2.8415E+001 +/- 4.8506E-001
Spill C1 = 3.6477E+002 +/- 1.9454E+001
Chi^2 = 8.2284E+000

Batch 1832

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.8462E+003 +/- 5.4393E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.90	27.60
1	3.4965E+003 +/- 4.9448E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.57	28.60
1	2.7473E+003 +/- 3.8852E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.47	33.58
1	2.1186E+003 +/- 2.9962E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.73	40.78
1	1.9231E+003 +/- 2.7196E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.05	38.88
1	1.7007E+003 +/- 2.4051E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.84	37.64
1	4.3800E+002 +/- 1.2083E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.03	68.42

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A2 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:50 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A2 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 4.0711E+001 +/- 3.5701E-001
C1 = -2.6319E+001 +/- 2.7569E+000
Chi^2 = 1.0369E+001

Spillover Coefficients

Spill C0 = 1.3026E+000 +/- 8.4309E-002
Spill C1 = -1.2826E+000 +/- 6.7470E-001
Chi^2 = 9.1790E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.1630E+004 +/- 1.6446E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.38	1.22
1	9.2593E+003 +/- 1.3095E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.70	1.48
1	8.7737E+003 +/- 1.2407E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	33.58	1.00
1	1.0000E+004 +/- 1.4142E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.14	1.20
1	1.0638E+004 +/- 1.5045E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	38.26	1.10
1	9.8039E+003 +/- 1.3865E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.21	1.04
1	1.1111E+004 +/- 1.5713E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.92	1.44

Exponential Fit 11 no 21

Efficiency Coefficients

C0 = 4.1020E+001 +/- 3.7414E-001
C1 = -7.3719E+001 +/- 7.8336E+000
Chi^2 = 1.0571E+001

Spillover Coefficients

Spill C0 = 1.3439E+000 +/- 8.9851E-002
Spill C1 = -1.2754E+002 +/- 6.1958E+001
Chi^2 = 9.0592E-001

Batch 19623

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.1630E+004 +/- 1.6446E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.38	1.22
1	9.2593E+003 +/- 1.3095E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.70	1.48
1	8.7737E+003 +/- 1.2407E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	33.58	1.00
1	1.0000E+004 +/- 1.4142E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.14	1.20
1	1.0638E+004 +/- 1.5045E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	38.26	1.10
1	9.8039E+003 +/- 1.3865E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.21	1.04
1	1.1111E+004 +/- 1.5713E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.92	1.44

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A3 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:59 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A3 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 1.2784E+001 +/- 1.9380E-001
C1 = -4.4941E+001 +/- 8.9683E-001
Chi^2 = 1.8524E+001

Spillover Coefficients

Spill C0 = 2.7166E+001 +/- 5.9678E-001
Spill C1 = 1.4361E+002 +/- 9.3675E+000
Chi^2 = 8.9739E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.4490E+003 +/- 4.8771E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.15	29.15
1	3.2680E+003 +/- 4.6216E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.56	28.00
1	2.6178E+003 +/- 3.7021E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	11.88	33.46
1	1.9841E+003 +/- 2.8060E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.11	40.64
1	1.7921E+003 +/- 2.5344E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.43	36.36
1	1.5450E+003 +/- 2.2694E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.13	39.27
1	3.9867E+002 +/- 1.1528E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.85	70.07

Exponential

Eff 11.2%-7.1

Batch 1833

Efficiency Coefficients

C0 = 1.6641E+001 +/- 3.2812E-001
C1 = -8.8311E+002 +/- 2.0445E+001
Chi^2 = 3.1961E+000

Spillover Coefficients

Spill C0 = 2.8436E+001 +/- 4.8740E-001
Spill C1 = 3.6557E+002 +/- 1.9921E+001
Chi^2 = 7.4704E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.4490E+003 +/- 4.8771E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.15	29.15
1	3.2680E+003 +/- 4.6216E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.56	28.00
1	2.6178E+003 +/- 3.7021E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	11.88	33.46
1	1.9841E+003 +/- 2.8060E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.11	40.64
1	1.7921E+003 +/- 2.5344E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.43	36.36
1	1.5450E+003 +/- 2.2694E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.13	39.27
1	3.9867E+002 +/- 1.1528E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.85	70.07

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A3 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:50 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A3 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 3.9251E+001 +/- 3.4176E-001
C1 = -2.8649E+001 +/- 2.5956E+000
Chi^2 = 8.1514E+000

Spillover Coefficients

Spill C0 = 1.2233E+000 +/- 8.2627E-002
Spill C1 = -8.7305E-001 +/- 6.8018E-001
Chi^2 = 1.5229E+000

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0419E+004 +/- 1.4733E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.24	1.08
1	1.1111E+004 +/- 1.5713E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	40.49	1.34
1	8.9286E+003 +/- 1.2627E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	36.35	1.24
1	8.1967E+003 +/- 1.1592E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.37	1.06
1	9.6154E+003 +/- 1.3598E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.71	0.86
1	1.0204E+004 +/- 1.4431E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	36.70	1.32
1	9.6154E+003 +/- 1.3598E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	38.45	1.32

Exponential
Rel Unit

Efficiency Coefficients

C0 = 3.9519E+001 +/- 3.6046E-001
C1 = -8.3150E+001 +/- 7.8340E+000
Chi^2 = 8.4564E+000

Spillover Coefficients

Spill C0 = 1.2600E+000 +/- 8.6174E-002
Spill C1 = -7.8807E+001 +/- 6.1614E+001
Chi^2 = 1.5664E+000

Batch 18604

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0419E+004 +/- 1.4733E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.24	1.08
1	1.1111E+004 +/- 1.5713E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	40.49	1.34
1	8.9286E+003 +/- 1.2627E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	36.35	1.24
1	8.1967E+003 +/- 1.1592E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.37	1.06
1	9.6154E+003 +/- 1.3598E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.71	0.86
1	1.0204E+004 +/- 1.4431E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	36.70	1.32
1	9.6154E+003 +/- 1.3598E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	38.45	1.32

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A4 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:59 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A4 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 1.2982E+001 +/- 1.9754E-001
C1 = -4.5400E+001 +/- 9.1897E-001
Chi^2 = 2.0751E+001

Spillover Coefficients

Spill C0 = 2.7048E+001 +/- 5.9475E-001
Spill C1 = 1.4794E+002 +/- 9.3240E+000
Chi^2 = 5.1568E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.5971E+003 +/- 5.0871E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.80	28.90
1	3.2686E+003 +/- 4.6221E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.56	29.43
1	2.6882E+003 +/- 3.8016E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.20	31.26
1	2.0325E+003 +/- 2.8744E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.34	39.36
1	1.8587E+003 +/- 2.6286E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.75	37.88
1	1.5230E+003 +/- 2.2531E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.02	40.40
1	4.1967E+002 +/- 1.1827E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.95	69.10

Exponential
Fit 11/24/21

Efficiency Coefficients

C0 = 1.6940E+001 +/- 3.3345E-001
C1 = -8.7663E+002 +/- 2.0285E+001
Chi^2 = 2.0340E+000

Spillover Coefficients

Spill C0 = 2.8350E+001 +/- 4.8430E-001
Spill C1 = 3.6960E+002 +/- 1.9637E+001
Chi^2 = 3.9603E+000

Batch 1834

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.5971E+003 +/- 5.0871E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.80	28.90
1	3.2686E+003 +/- 4.6221E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.56	29.43
1	2.6882E+003 +/- 3.8016E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.20	31.26
1	2.0325E+003 +/- 2.8744E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.34	39.36
1	1.8587E+003 +/- 2.6286E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.75	37.88
1	1.5230E+003 +/- 2.2531E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.02	40.40
1	4.1967E+002 +/- 1.1827E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.95	69.10

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: A4 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:51 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: A4 **Drawer:** LB 4200 A **Device:** LB 4200 A

Efficiency Coefficients

C0 = 3.9176E+001 +/- 3.4424E-001
C1 = -2.1913E+001 +/- 2.6924E+000
Chi^2 = 4.2387E+000

Spillover Coefficients

Spill C0 = 1.5615E+000 +/- 8.9757E-002
Spill C1 = -2.3648E+000 +/- 6.6698E-001
Chi^2 = 3.8958E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	9.4340E+003 +/- 1.3342E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.73	1.42
1	1.0417E+004 +/- 1.4731E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.23	1.28
1	1.0870E+004 +/- 1.5372E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	39.61	1.58
1	9.0909E+003 +/- 1.2856E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.01	1.64
1	8.6207E+003 +/- 1.2191E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	32.99	0.92
1	1.0002E+004 +/- 1.4144E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.15	1.40
1	1.0419E+004 +/- 1.4733E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.47	1.38

Exponential
Eff 11 nov 21

Efficiency Coefficients

C0 = 3.9310E+001 +/- 3.5855E-001
C1 = -6.1346E+001 +/- 7.8340E+000
Chi^2 = 4.3998E-001

Spillover Coefficients

Spill C0 = 1.5973E+000 +/- 1.0125E-001
Spill C1 = -1.9719E+002 +/- 6.2711E+001
Chi^2 = 4.0119E-001

Batch 18625

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	9.4340E+003 +/- 1.3342E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.73	1.42
1	1.0417E+004 +/- 1.4731E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.23	1.28
1	1.0870E+004 +/- 1.5372E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	39.61	1.58
1	9.0909E+003 +/- 1.2856E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.01	1.64
1	8.6207E+003 +/- 1.2191E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	32.99	0.92
1	1.0002E+004 +/- 1.4144E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.15	1.40
1	1.0419E+004 +/- 1.4733E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.47	1.38

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B1 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:58 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B1 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 1.3211E+001 +/- 2.0091E-001
C1 = -4.6164E+001 +/- 9.3422E-001
Chi^2 = 2.0561E+001

Spillover Coefficients

Spill C0 = 2.7010E+001 +/- 5.9022E-001
Spill C1 = 1.2882E+002 +/- 9.0815E+000
Chi^2 = 7.7447E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.5971E+003 +/- 5.0871E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.80	28.66
1	3.4014E+003 +/- 4.8103E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.15	29.16
1	2.7473E+003 +/- 3.8852E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.47	31.38
1	2.0492E+003 +/- 2.8980E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.41	38.86
1	1.8587E+003 +/- 2.6286E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.75	35.18
1	1.5820E+003 +/- 2.2964E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.30	37.48
1	4.2833E+002 +/- 1.1949E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.99	67.94

Exponential
Fit Linear

Efficiency Coefficients

C0 = 1.7215E+001 +/- 3.3860E-001
C1 = -8.7366E+002 +/- 2.0220E+001
Chi^2 = 3.0134E+000

Spillover Coefficients

Spill C0 = 2.7881E+001 +/- 4.7733E-001
Spill C1 = 3.4985E+002 +/- 1.9604E+001
Chi^2 = 5.2805E+000

Batch 1835

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.5971E+003 +/- 5.0871E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.80	28.66
1	3.4014E+003 +/- 4.8103E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.15	29.16
1	2.7473E+003 +/- 3.8852E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.47	31.38
1	2.0492E+003 +/- 2.8980E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.41	38.86
1	1.8587E+003 +/- 2.6286E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.75	35.18
1	1.5820E+003 +/- 2.2964E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.30	37.48
1	4.2833E+002 +/- 1.1949E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.99	67.94

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B1 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:50 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B1 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 3.9244E+001 +/- 3.4340E-001
C1 = -2.7511E+001 +/- 2.6332E+000
Chi^2 = 6.8466E+000

Spillover Coefficients

Spill C0 = 1.5901E+000 +/- 9.1494E-002
Spill C1 = -1.9597E+000 +/- 7.0264E-001
Chi^2 = 6.5873E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0000E+004 +/- 1.4142E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	35.96	1.34
1	9.6173E+003 +/- 1.3600E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	38.46	1.40
1	1.0419E+004 +/- 1.4733E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.24	1.58
1	1.1111E+004 +/- 1.5713E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	40.49	1.80
1	9.0909E+003 +/- 1.2856E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.01	1.44
1	8.3350E+003 +/- 1.1786E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.90	1.06
1	9.6154E+003 +/- 1.3598E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.71	1.46

Exponential fit

Efficiency Coefficients

C0 = 3.9487E+001 +/- 3.6016E-001
C1 = -7.9565E+001 +/- 7.8336E+000
Chi^2 = 6.9369E+000

Spillover Coefficients

Spill C0 = 1.6291E+000 +/- 1.0121E-001
Spill C1 = -1.5700E+002 +/- 5.9665E+001
Chi^2 = 6.8339E-001

Batch 1B1e

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0000E+004 +/- 1.4142E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	35.96	1.34
1	9.6173E+003 +/- 1.3600E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	38.46	1.40
1	1.0419E+004 +/- 1.4733E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.24	1.58
1	1.1111E+004 +/- 1.5713E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	40.49	1.80
1	9.0909E+003 +/- 1.2856E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.01	1.44
1	8.3350E+003 +/- 1.1786E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.90	1.06
1	9.6154E+003 +/- 1.3598E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.71	1.46

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B2 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:58 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B2 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 1.3375E+001 +/- 2.0298E-001
C1 = -4.6723E+001 +/- 9.4324E-001
Chi^2 = 1.7908E+001

Spillover Coefficients

Spill C0 = 2.7335E+001 +/- 5.8853E-001
Spill C1 = 1.2643E+002 +/- 8.9731E+000
Chi^2 = 6.4683E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.6765E+003 +/- 5.1993E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.15	28.46
1	3.3113E+003 +/- 4.6828E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.75	29.74
1	2.7484E+003 +/- 3.8860E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.48	31.45
1	2.0921E+003 +/- 2.9586E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.61	38.98
1	1.8868E+003 +/- 2.6683E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.88	36.44
1	1.6140E+003 +/- 2.3195E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.44	37.09
1	4.3333E+002 +/- 1.2019E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.01	65.77

Exponential
Eff 117%

Efficiency Coefficients

C0 = 1.7298E+001 +/- 3.4010E-001
C1 = -8.6804E+002 +/- 2.0184E+001
Chi^2 = 1.8960E+000

Spillover Coefficients

Spill C0 = 2.8251E+001 +/- 4.8327E-001
Spill C1 = 3.3655E+002 +/- 1.9640E+001
Chi^2 = 4.8324E+000

Batch 1836

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.6765E+003 +/- 5.1993E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.15	28.46
1	3.3113E+003 +/- 4.6828E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.75	29.74
1	2.7484E+003 +/- 3.8860E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.48	31.45
1	2.0921E+003 +/- 2.9586E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.61	38.98
1	1.8868E+003 +/- 2.6683E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.88	36.44
1	1.6140E+003 +/- 2.3195E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.44	37.09
1	4.3333E+002 +/- 1.2019E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.01	65.77

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B2 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:51 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B2 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 3.9995E+001 +/- 3.4760E-001
C1 = -3.2063E+001 +/- 2.6159E+000
Chi^2 = 6.7693E+000

Spillover Coefficients

Spill C0 = 1.3835E+000 +/- 8.8706E-002
Spill C1 = -4.1700E-001 +/- 7.5155E-001
Chi^2 = 1.4830E+000

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	9.8039E+003 +/- 1.3865E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	36.41	1.14
1	1.0204E+004 +/- 1.4431E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	36.70	1.58
1	9.4396E+003 +/- 1.3346E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.75	1.48
1	1.0643E+004 +/- 1.5048E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	41.11	1.14
1	1.1364E+004 +/- 1.6071E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	41.41	1.36
1	9.2593E+003 +/- 1.3095E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.70	1.58
1	8.1967E+003 +/- 1.1592E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.37	1.32

Exponential
Eff 11767

Efficiency Coefficients

C0 = 4.0282E+001 +/- 3.6740E-001
C1 = -9.2379E+001 +/- 7.8339E+000
Chi^2 = 6.9174E+000

Spillover Coefficients

Spill C0 = 1.4253E+000 +/- 9.0801E-002
Spill C1 = -3.8968E+001 +/- 5.5754E+001
Chi^2 = 1.5351E+000

Batch 1867

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	9.8039E+003 +/- 1.3865E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	36.41	1.14
1	1.0204E+004 +/- 1.4431E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	36.70	1.58
1	9.4396E+003 +/- 1.3346E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.75	1.48
1	1.0643E+004 +/- 1.5048E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	41.11	1.14
1	1.1364E+004 +/- 1.6071E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	41.41	1.36
1	9.2593E+003 +/- 1.3095E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.70	1.58
1	8.1967E+003 +/- 1.1592E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.37	1.32

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B3 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:13:59 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B3 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 1.3064E+001 +/- 1.9886E-001
C1 = -4.5989E+001 +/- 9.1909E-001
Chi^2 = 2.5253E+001

Spillover Coefficients

Spill C0 = 2.6690E+001 +/- 5.9040E-001
Spill C1 = 1.4839E+002 +/- 9.2849E+000
Chi^2 = 9.0531E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.6496E+003 +/- 5.1614E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.04	28.68
1	3.4253E+003 +/- 4.8437E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.26	29.11
1	2.7933E+003 +/- 3.9503E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.68	29.60
1	2.0000E+003 +/- 2.8284E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.19	40.66
1	1.8116E+003 +/- 2.5620E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.53	38.20
1	1.5433E+003 +/- 2.2681E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.12	40.02
1	4.0600E+002 +/- 1.1633E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.88	67.32

Exponential
Eff 11-Nov-21

Efficiency Coefficients

C0 = 1.7392E+001 +/- 3.4272E-001
C1 = -9.0350E+002 +/- 2.0387E+001
Chi^2 = 3.5988E+000

Spillover Coefficients

Spill C0 = 2.8216E+001 +/- 4.8601E-001
Spill C1 = 3.6861E+002 +/- 1.9964E+001
Chi^2 = 8.6182E+000

Batch 1857

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.6496E+003 +/- 5.1614E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.04	28.68
1	3.4253E+003 +/- 4.8437E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.26	29.11
1	2.7933E+003 +/- 3.9503E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.68	29.60
1	2.0000E+003 +/- 2.8284E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.19	40.66
1	1.8116E+003 +/- 2.5620E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.53	38.20
1	1.5433E+003 +/- 2.2681E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.12	40.02
1	4.0600E+002 +/- 1.1633E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.88	67.32

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B3 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:14:51 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B3 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 3.8832E+001 +/- 3.4080E-001
C1 = -2.6347E+001 +/- 2.6271E+000
Chi^2 = 9.1254E+000

Spillover Coefficients

Spill C0 = 1.7793E+000 +/- 9.9541E-002
Spill C1 = -1.8952E+000 +/- 8.0137E-001
Chi^2 = 1.6043E+000

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.3333E+003 +/- 1.1785E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.89	1.40
1	9.4358E+003 +/- 1.3343E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.04	1.36
1	1.0000E+004 +/- 1.4142E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	35.96	1.58
1	9.4358E+003 +/- 1.3343E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.74	1.60
1	1.0204E+004 +/- 1.4431E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	39.41	1.54
1	1.1364E+004 +/- 1.6071E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	41.41	1.84
1	8.9304E+003 +/- 1.2628E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	36.36	2.22

Exponential
Eff 11 20 21

Efficiency Coefficients

C0 = 3.9123E+001 +/- 3.5684E-001
C1 = -7.7730E+001 +/- 7.8339E+000
Chi^2 = 9.1889E+000

Spillover Coefficients

Spill C0 = 1.8553E+000 +/- 1.0509E-001
Spill C1 = -1.4531E+002 +/- 5.2365E+001
Chi^2 = 1.5312E+000

Batch 1868

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.3333E+003 +/- 1.1785E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.89	1.40
1	9.4358E+003 +/- 1.3343E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.04	1.36
1	1.0000E+004 +/- 1.4142E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	35.96	1.58
1	9.4358E+003 +/- 1.3343E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	37.74	1.60
1	1.0204E+004 +/- 1.4431E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	39.41	1.54
1	1.1364E+004 +/- 1.6071E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	41.41	1.84
1	8.9304E+003 +/- 1.2628E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	36.36	2.22

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B4 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:18:13 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B4 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 1.3120E+001 +/- 1.9963E-001
C1 = -4.5647E+001 +/- 9.3251E-001
Chi^2 = 1.8891E+001

Spillover Coefficients

Spill C0 = 2.7164E+001 +/- 5.8833E-001
Spill C1 = 1.3468E+002 +/- 9.0356E+000
Chi^2 = 3.4103E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.5461E+003 +/- 5.0149E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.58	29.74
1	3.3333E+003 +/- 4.7140E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.85	27.90
1	2.7027E+003 +/- 3.8222E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.27	32.50
1	2.0833E+003 +/- 2.9463E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.57	35.90
1	1.8382E+003 +/- 2.5997E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.65	37.66
1	1.5723E+003 +/- 2.2893E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.25	40.45
1	4.3633E+002 +/- 1.2060E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.02	63.56

Exponential
FFL 11-20-21

Efficiency Coefficients

C0 = 1.6943E+001 +/- 3.3306E-001
C1 = -8.5946E+002 +/- 2.0165E+001
Chi^2 = 2.3300E+000

Spillover Coefficients

Spill C0 = 2.8371E+001 +/- 4.8593E-001
Spill C1 = 3.3872E+002 +/- 1.9675E+001
Chi^2 = 2.7549E+000

Batch LB38

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.5461E+003 +/- 5.0149E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.58	29.74
1	3.3333E+003 +/- 4.7140E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	14.85	27.90
1	2.7027E+003 +/- 3.8222E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.27	32.50
1	2.0833E+003 +/- 2.9463E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.57	35.90
1	1.8382E+003 +/- 2.5997E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.65	37.66
1	1.5723E+003 +/- 2.2893E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.25	40.45
1	4.3633E+002 +/- 1.2060E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.02	63.56

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: B4 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 10:23:23 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: B4 **Drawer:** LB 4200 B **Device:** LB 4200 B

Efficiency Coefficients

C0 = 3.8974E+001 +/- 3.4078E-001
C1 = -2.5655E+001 +/- 2.6216E+000
Chi^2 = 6.9631E+000

Spillover Coefficients

Spill C0 = 1.4066E+000 +/- 8.8983E-002
Spill C1 = -9.0973E-001 +/- 7.3776E-001
Chi^2 = 7.1605E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.3333E+003 +/- 1.1785E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.89	1.24
1	9.6154E+003 +/- 1.3598E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.71	1.16
1	1.0204E+004 +/- 1.4431E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	36.70	1.26
1	9.6154E+003 +/- 1.3598E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	38.45	1.40
1	1.0417E+004 +/- 1.4731E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.23	1.26
1	1.0870E+004 +/- 1.5372E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	39.61	1.60
1	8.9286E+003 +/- 1.2627E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	36.35	1.48

Exponential Eff 11769

Efficiency Coefficients

C0 = 3.9191E+001 +/- 3.5747E-001
C1 = -7.3909E+001 +/- 7.8340E+000
Chi^2 = 7.1948E+000

Spillover Coefficients

Spill C0 = 1.4327E+000 +/- 9.1217E-002
Spill C1 = -7.7319E+001 +/- 5.6863E+001
Chi^2 = 7.0866E-001

Batch 18169

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.3333E+003 +/- 1.1785E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	31.89	1.24
1	9.6154E+003 +/- 1.3598E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	35.71	1.16
1	1.0204E+004 +/- 1.4431E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	36.70	1.26
1	9.6154E+003 +/- 1.3598E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	38.45	1.40
1	1.0417E+004 +/- 1.4731E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.23	1.26
1	1.0870E+004 +/- 1.5372E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	39.61	1.60
1	8.9286E+003 +/- 1.2627E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	36.35	1.48

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C1 Alpha fitted efficiency 2
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 10:42:04 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C1 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 1.4487E+001 +/- 2.1934E-001
C1 = -5.0677E+001 +/- 1.0138E+000
Chi^2 = 1.6280E+001

Spillover Coefficients

Spill C0 = 2.8853E+001 +/- 6.0500E-001
Spill C1 = 1.2971E+002 +/- 9.1023E+000
Chi^2 = 5.0375E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.8760E+003 +/- 5.4814E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	17.03	30.58
1	3.6232E+003 +/- 5.1240E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	16.14	30.20
1	2.9412E+003 +/- 4.1595E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	13.35	34.64
1	2.2936E+003 +/- 3.2436E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.54	39.46
1	2.0408E+003 +/- 2.8862E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.60	37.62
1	1.7544E+003 +/- 2.4811E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.09	39.56
1	4.6433E+002 +/- 1.2441E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.15	67.84

EXPONENTIAL FEL 11 26 21

Efficiency Coefficients

C0 = 1.8658E+001 +/- 3.6602E-001
C1 = -8.6690E+002 +/- 1.9979E+001
Chi^2 = 2.5659E+000

Spillover Coefficients

Spill C0 = 2.9774E+001 +/- 4.9688E-001
Spill C1 = 3.2719E+002 +/- 1.8929E+001
Chi^2 = 3.2805E+000

Batch ~~1877~~ 1878 FEL 123 21

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.8760E+003 +/- 5.4814E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	17.03	30.58
1	3.6232E+003 +/- 5.1240E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	16.14	30.20
1	2.9412E+003 +/- 4.1595E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	13.35	34.64
1	2.2936E+003 +/- 3.2436E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.54	39.46
1	2.0408E+003 +/- 2.8862E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.60	37.62
1	1.7544E+003 +/- 2.4811E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.09	39.56
1	4.6433E+002 +/- 1.2441E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.15	67.84

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C1 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:46 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C1 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 4.3127E+001 +/- 3.7769E-001
C1 = -3.2212E+001 +/- 2.8864E+000
Chi^2 = 6.7225E+000

Spillover Coefficients

Spill C0 = 1.3518E+000 +/- 8.4629E-002
Spill C1 = -1.3174E+000 +/- 6.6380E-001
Chi^2 = 6.7221E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0204E+004 +/- 1.4431E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	41.54	1.18
1	9.0909E+003 +/- 1.2856E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.79	0.98
1	1.0417E+004 +/- 1.4731E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	38.69	1.12
1	1.1111E+004 +/- 1.5713E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.96	1.30
1	1.0004E+004 +/- 1.4145E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	40.01	1.48
1	1.1628E+004 +/- 1.6444E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	44.91	1.34
1	1.2198E+004 +/- 1.7248E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	44.45	1.38

Exponential
FEL 112021

Efficiency Coefficients

C0 = 4.3425E+001 +/- 3.9607E-001
C1 = -8.5722E+001 +/- 7.8339E+000
Chi^2 = 6.6018E+000

Spillover Coefficients

Spill C0 = 1.3779E+000 +/- 9.2568E-002
Spill C1 = -1.1595E+002 +/- 6.3183E+001
Chi^2 = 7.0902E-001

Batch 1870

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0204E+004 +/- 1.4431E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	41.54	1.18
1	9.0909E+003 +/- 1.2856E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.79	0.98
1	1.0417E+004 +/- 1.4731E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	38.69	1.12
1	1.1111E+004 +/- 1.5713E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.96	1.30
1	1.0004E+004 +/- 1.4145E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	40.01	1.48
1	1.1628E+004 +/- 1.6444E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	44.91	1.34
1	1.2198E+004 +/- 1.7248E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	44.45	1.38

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C2 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:49:34 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C2 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 1.3353E+001 +/- 2.0290E-001
C1 = -4.6710E+001 +/- 9.4184E-001
Chi^2 = 2.0440E+001

Spillover Coefficients

Spill C0 = 2.8908E+001 +/- 6.1213E-001
Spill C1 = 1.2748E+002 +/- 9.3422E+000
Chi^2 = 6.6917E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.4965E+003 +/- 4.9448E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.57	30.78
1	3.6239E+003 +/- 5.1245E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.92	30.81
1	4.2967E+002 +/- 1.1968E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.99	69.82
1	1.6010E+003 +/- 2.3101E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.38	38.95
1	1.9015E+003 +/- 2.6889E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.95	37.55
1	2.0576E+003 +/- 2.9099E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.45	39.92
1	2.7174E+003 +/- 3.8430E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.34	33.44

Exponential
FFE 112021

Efficiency Coefficients

C0 = 1.7413E+001 +/- 3.4245E-001
C1 = -8.7607E+002 +/- 2.0210E+001
Chi^2 = 3.4195E+000

Spillover Coefficients

Spill C0 = 2.9668E+001 +/- 4.9753E-001
Spill C1 = 3.3224E+002 +/- 1.9310E+001
Chi^2 = 4.2465E+000

Batch 1840

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	3.4965E+003 +/- 4.9448E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.57	30.78
1	3.6239E+003 +/- 5.1245E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	15.92	30.81
1	4.2967E+002 +/- 1.1968E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.99	69.82
1	1.6010E+003 +/- 2.3101E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.38	38.95
1	1.9015E+003 +/- 2.6889E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.95	37.55
1	2.0576E+003 +/- 2.9099E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.45	39.92
1	2.7174E+003 +/- 3.8430E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.34	33.44

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C2 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:46 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C2 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 4.1522E+001 +/- 3.6569E-001
C1 = -2.5375E+001 +/- 2.8507E+000
Chi^2 = 8.9486E+000

Spillover Coefficients

Spill C0 = 1.4782E+000 +/- 9.1042E-002
Spill C1 = -3.8267E-001 +/- 7.6644E-001
Chi^2 = 4.7704E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.1905E+004 +/- 1.6836E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	43.38	1.34
1	9.6154E+003 +/- 1.3598E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	39.15	1.48
1	9.0909E+003 +/- 1.2856E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.79	1.38
1	1.0419E+004 +/- 1.4733E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	38.69	1.36
1	1.0421E+004 +/- 1.4734E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.48	1.40
1	1.0206E+004 +/- 1.4432E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	40.82	1.64
1	1.1116E+004 +/- 1.5717E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.93	1.58

Exponential
Eff 43.29

Efficiency Coefficients

C0 = 4.1792E+001 +/- 3.8117E-001
C1 = -6.8989E+001 +/- 7.8339E+000
Chi^2 = 9.0149E+000

Spillover Coefficients

Spill C0 = 1.4930E+000 +/- 9.3218E-002
Spill C1 = -2.9887E+001 +/- 5.4786E+001
Chi^2 = 4.8298E-001

Batch 1871

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.1905E+004 +/- 1.6836E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	43.38	1.34
1	9.6154E+003 +/- 1.3598E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	39.15	1.48
1	9.0909E+003 +/- 1.2856E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.79	1.38
1	1.0419E+004 +/- 1.4733E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	38.69	1.36
1	1.0421E+004 +/- 1.4734E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.48	1.40
1	1.0206E+004 +/- 1.4432E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	40.82	1.64
1	1.1116E+004 +/- 1.5717E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.93	1.58

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C3 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:49:34 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C3 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 1.3518E+001 +/- 2.0556E-001
C1 = -4.7156E+001 +/- 9.5652E-001
Chi^2 = 1.9918E+001

Spillover Coefficients

Spill C0 = 2.6520E+001 +/- 5.8285E-001
Spill C1 = 1.2951E+002 +/- 8.9305E+000
Chi^2 = 6.9463E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	2.7778E+003 +/- 3.9284E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.61	31.88
1	3.4247E+003 +/- 4.8432E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.25	27.68
1	3.7313E+003 +/- 5.2769E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.39	28.60
1	4.4267E+002 +/- 1.2147E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.05	66.79
1	1.6137E+003 +/- 2.3192E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.44	37.08
1	1.9084E+003 +/- 2.6989E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.98	35.20
1	2.1186E+003 +/- 2.9962E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.73	37.56

Exponential
Eff 11/26/21

Efficiency Coefficients

C0 = 1.7574E+001 +/- 3.4529E-001
C1 = -8.6977E+002 +/- 2.0120E+001
Chi^2 = 1.9422E+000

Spillover Coefficients

Spill C0 = 2.7465E+001 +/- 4.7145E-001
Spill C1 = 3.5116E+002 +/- 1.9488E+001
Chi^2 = 4.6153E+000

Batch 1841

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	2.7778E+003 +/- 3.9284E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.61	31.88
1	3.4247E+003 +/- 4.8432E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.25	27.68
1	3.7313E+003 +/- 5.2769E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.39	28.60
1	4.4267E+002 +/- 1.2147E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.05	66.79
1	1.6137E+003 +/- 2.3192E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.44	37.08
1	1.9084E+003 +/- 2.6989E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.98	35.20
1	2.1186E+003 +/- 2.9962E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.73	37.56

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C3 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:47 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C3 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 4.1092E+001 +/- 3.6086E-001
C1 = -2.5517E+001 +/- 2.8005E+000
Chi^2 = 7.9791E+000

Spillover Coefficients

Spill C0 = 1.3483E+000 +/- 8.1990E-002
Spill C1 = -2.3406E+000 +/- 5.8307E-001
Chi^2 = 9.6693E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.1113E+004 +/- 1.5715E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.93	1.06
1	1.1628E+004 +/- 1.6444E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.37	1.26
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.40
1	8.9286E+003 +/- 1.2627E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.17	0.68
1	1.0204E+004 +/- 1.4431E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.90	1.38
1	1.0638E+004 +/- 1.5045E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	38.26	1.18
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.24

Exponential
FEZ 11/26/21

Efficiency Coefficients

C0 = 4.1342E+001 +/- 3.7709E-001
C1 = -6.9982E+001 +/- 7.8340E+000
Chi^2 = 8.1258E+000

Spillover Coefficients

Spill C0 = 1.3850E+000 +/- 9.6508E-002
Spill C1 = -2.1464E+002 +/- 7.1327E+001
Chi^2 = 1.1349E+000

Batch 1872

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.1113E+004 +/- 1.5715E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.93	1.06
1	1.1628E+004 +/- 1.6444E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.37	1.26
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.40
1	8.9286E+003 +/- 1.2627E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.17	0.68
1	1.0204E+004 +/- 1.4431E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.90	1.38
1	1.0638E+004 +/- 1.5045E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	38.26	1.18
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.24

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C4 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:49:35 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C4 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 1.4897E+001 +/- 2.2616E-001
C1 = -5.1744E+001 +/- 1.0510E+000
Chi^2 = 1.6922E+001

Spillover Coefficients

Spill C0 = 2.7594E+001 +/- 5.8349E-001
Spill C1 = 1.2357E+002 +/- 8.6738E+000
Chi^2 = 4.7970E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	2.3585E+003 +/- 3.3354E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.83	38.06
1	3.0303E+003 +/- 4.2855E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	13.76	32.26
1	3.7037E+003 +/- 5.2378E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	16.50	29.80
1	4.0650E+003 +/- 5.7488E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	17.86	28.68
1	4.9767E+002 +/- 1.2880E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.31	64.30
1	1.8315E+003 +/- 2.5901E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.45	37.06
1	2.0661E+003 +/- 2.9219E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.72	36.78

Exponential
Not used

Efficiency Coefficients

C0 = 1.9126E+001 +/- 3.7443E-001
C1 = -8.5341E+002 +/- 1.9785E+001
Chi^2 = 1.7692E+000

Spillover Coefficients

Spill C0 = 2.8484E+001 +/- 4.8059E-001
Spill C1 = 3.2480E+002 +/- 1.8834E+001
Chi^2 = 3.2517E+000

Batch 1842

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	2.3585E+003 +/- 3.3354E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.83	38.06
1	3.0303E+003 +/- 4.2855E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	13.76	32.26
1	3.7037E+003 +/- 5.2378E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	16.50	29.80
1	4.0650E+003 +/- 5.7488E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	17.86	28.68
1	4.9767E+002 +/- 1.2880E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.31	64.30
1	1.8315E+003 +/- 2.5901E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.45	37.06
1	2.0661E+003 +/- 2.9219E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.72	36.78

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: C4 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:47 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: C4 **Drawer:** LB 4200 C **Device:** LB 4200 C

Efficiency Coefficients

C0 = 4.3262E+001 +/- 3.8211E-001
C1 = -2.4359E+001 +/- 3.0029E+000
Chi^2 = 8.2869E+000

Spillover Coefficients

Spill C0 = 1.3297E+000 +/- 8.6582E-002
Spill C1 = -2.0917E-001 +/- 7.3490E-001
Chi^2 = 8.8775E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0417E+004 +/- 1.4731E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	41.66	1.24
1	1.1628E+004 +/- 1.6444E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	44.91	1.36
1	1.2500E+004 +/- 1.7678E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	45.55	1.16
1	1.0000E+004 +/- 1.4142E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	40.71	1.52
1	9.6154E+003 +/- 1.3598E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	36.80	1.26
1	1.0874E+004 +/- 1.5375E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	40.38	1.52
1	1.1111E+004 +/- 1.5713E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.96	1.22

Experimental
BEE 112021

Efficiency Coefficients

C0 = 4.3526E+001 +/- 3.9701E-001
C1 = -6.3406E+001 +/- 7.8340E+000
Chi^2 = 8.3502E+000

Spillover Coefficients

Spill C0 = 1.3567E+000 +/- 8.8666E-002
Spill C1 = -2.2715E+001 +/- 5.6950E+001
Chi^2 = 9.1033E-001

Batch L873

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0417E+004 +/- 1.4731E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	41.66	1.24
1	1.1628E+004 +/- 1.6444E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	44.91	1.36
1	1.2500E+004 +/- 1.7678E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	45.55	1.16
1	1.0000E+004 +/- 1.4142E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	40.71	1.52
1	9.6154E+003 +/- 1.3598E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	36.80	1.26
1	1.0874E+004 +/- 1.5375E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	40.38	1.52
1	1.1111E+004 +/- 1.5713E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.96	1.22

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D1 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:49:36 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D1 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 1.4666E+001 +/- 2.2227E-001
C1 = -5.1075E+001 +/- 1.0308E+000
Chi^2 = 1.5840E+001

Spillover Coefficients

Spill C0 = 2.9154E+001 +/- 5.9615E-001
Spill C1 = 1.0758E+002 +/- 8.7242E+000
Chi^2 = 4.4143E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	2.0751E+003 +/- 2.9343E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.77	37.31
1	2.2836E+003 +/- 3.2291E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.49	38.49
1	3.0303E+003 +/- 4.2855E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	13.76	31.96
1	3.5714E+003 +/- 5.0508E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.91	30.92
1	3.9683E+003 +/- 5.6120E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	17.44	30.84
1	4.8200E+002 +/- 1.2675E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.24	60.51
1	1.7986E+003 +/- 2.5435E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.30	37.90

Exponential Eff with

Efficiency Coefficients

C0 = 1.8786E+001 +/- 3.6811E-001
C1 = -8.5520E+002 +/- 1.9873E+001
Chi^2 = 2.4021E+000

Spillover Coefficients

Spill C0 = 2.9871E+001 +/- 5.0107E-001
Spill C1 = 2.8031E+002 +/- 1.9131E+001
Chi^2 = 3.2590E+000

Batch 1843

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	2.0751E+003 +/- 2.9343E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.77	37.31
1	2.2836E+003 +/- 3.2291E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.49	38.49
1	3.0303E+003 +/- 4.2855E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	13.76	31.96
1	3.5714E+003 +/- 5.0508E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.91	30.92
1	3.9683E+003 +/- 5.6120E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	17.44	30.84
1	4.8200E+002 +/- 1.2675E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.24	60.51
1	1.7986E+003 +/- 2.5435E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.30	37.90

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D1 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:45 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D1 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 4.1444E+001 +/- 3.6243E-001
C1 = -2.5398E+001 +/- 2.8010E+000
Chi^2 = 7.6029E+000

Spillover Coefficients

Spill C0 = 1.3207E+000 +/- 8.3516E-002
Spill C1 = -1.0345E+000 +/- 6.6061E-001
Chi^2 = 8.2615E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0876E+004 +/- 1.5376E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.12	1.16
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.44
1	1.1113E+004 +/- 1.5715E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.93	1.34
1	1.1628E+004 +/- 1.6444E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.37	1.26
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.16
1	8.9286E+003 +/- 1.2627E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.17	0.98
1	1.0640E+004 +/- 1.5046E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	39.52	1.40

Exponential
FFE 11.26.21

Efficiency Coefficients

C0 = 4.1662E+001 +/- 3.8000E-001
C1 = -6.8229E+001 +/- 7.8340E+000
Chi^2 = 7.9025E+000

Spillover Coefficients

Spill C0 = 1.3404E+000 +/- 9.1353E-002
Spill C1 = -8.3955E+001 +/- 6.3346E+001
Chi^2 = 8.7288E-001

Batch 1874

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0876E+004 +/- 1.5376E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.12	1.16
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.44
1	1.1113E+004 +/- 1.5715E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	42.93	1.34
1	1.1628E+004 +/- 1.6444E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.37	1.26
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.16
1	8.9286E+003 +/- 1.2627E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.17	0.98
1	1.0640E+004 +/- 1.5046E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	39.52	1.40

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D2 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:49:36 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D2 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 1.5369E+001 +/- 2.3314E-001
C1 = -5.3649E+001 +/- 1.0772E+000
Chi^2 = 1.8476E+001

Spillover Coefficients

Spill C0 = 2.5472E+001 +/- 5.6308E-001
Spill C1 = 1.4345E+002 +/- 8.5583E+000
Chi^2 = 4.0412E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.8315E+003 +/- 2.5901E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.45	40.12
1	2.2321E+003 +/- 3.1567E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	10.50	35.68
1	2.3697E+003 +/- 3.3512E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.89	36.94
1	3.2051E+003 +/- 4.5327E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	14.55	29.76
1	3.8176E+003 +/- 5.3983E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	17.00	27.27
1	4.1667E+003 +/- 5.8926E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	18.31	27.36
1	4.9933E+002 +/- 1.2901E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.32	62.48

Exponential fit

Efficiency Coefficients

C0 = 1.9874E+001 +/- 3.8903E-001
C1 = -8.6628E+002 +/- 1.9775E+001
Chi^2 = 3.0307E+000

Spillover Coefficients

Spill C0 = 2.6976E+001 +/- 4.6432E-001
Spill C1 = 3.6273E+002 +/- 1.9029E+001
Chi^2 = 4.3899E+000

Batch 1944

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.8315E+003 +/- 2.5901E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	8.45	40.12
1	2.2321E+003 +/- 3.1567E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	10.50	35.68
1	2.3697E+003 +/- 3.3512E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	10.89	36.94
1	3.2051E+003 +/- 4.5327E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	14.55	29.76
1	3.8176E+003 +/- 5.3983E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	17.00	27.27
1	4.1667E+003 +/- 5.8926E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	18.31	27.36
1	4.9933E+002 +/- 1.2901E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.32	62.48

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D2 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:46 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D2 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 4.2920E+001 +/- 3.7517E-001
C1 = -2.9710E+001 +/- 2.8761E+000
Chi^2 = 5.9035E+000

Spillover Coefficients

Spill C0 = 1.4570E+000 +/- 8.8877E-002
Spill C1 = -1.2666E+000 +/- 7.1167E-001
Chi^2 = 6.1165E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0872E+004 +/- 1.5373E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	40.38	1.14
1	1.1116E+004 +/- 1.5717E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.98	1.40
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.54
1	1.1364E+004 +/- 1.6071E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	43.89	1.50
1	1.2198E+004 +/- 1.7248E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	44.45	1.46
1	1.0000E+004 +/- 1.4142E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	40.71	1.36
1	9.0964E+003 +/- 1.2860E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.81	1.14

Exponential Eff 11x73

Efficiency Coefficients

C0 = 4.3156E+001 +/- 3.9362E-001
C1 = -7.8090E+001 +/- 7.8328E+000
Chi^2 = 6.0438E+000

Spillover Coefficients

Spill C0 = 1.4785E+000 +/- 9.4592E-002
Spill C1 = -1.0041E+002 +/- 5.9003E+001
Chi^2 = 6.1686E-001

Batch 1975

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	1.0872E+004 +/- 1.5373E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	40.38	1.14
1	1.1116E+004 +/- 1.5717E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	39.98	1.40
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.54
1	1.1364E+004 +/- 1.6071E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	43.89	1.50
1	1.2198E+004 +/- 1.7248E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	44.45	1.46
1	1.0000E+004 +/- 1.4142E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	40.71	1.36
1	9.0964E+003 +/- 1.2860E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	34.81	1.14

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D3 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:49:37 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D3 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 1.3665E+001 +/- 2.0666E-001
C1 = -4.8196E+001 +/- 9.5046E-001
Chi^2 = 1.8051E+001

Spillover Coefficients

Spill C0 = 2.6808E+001 +/- 5.9127E-001
Spill C1 = 1.4266E+002 +/- 9.1930E+000
Chi^2 = 4.7371E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	4.1700E+002 +/- 1.1790E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.94	68.11
1	1.6373E+003 +/- 2.3362E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.55	40.27
1	1.9157E+003 +/- 2.7092E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.02	36.26
1	2.1372E+003 +/- 3.0221E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.82	38.35
1	2.8409E+003 +/- 4.0177E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.90	31.70
1	3.4247E+003 +/- 4.8432E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.25	28.74
1	3.6765E+003 +/- 5.1993E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.15	28.78

Exponential fit

Efficiency Coefficients

C0 = 1.7819E+001 +/- 3.5078E-001
C1 = -8.9044E+002 +/- 2.0301E+001
Chi^2 = 3.2382E+000

Spillover Coefficients

Spill C0 = 2.7990E+001 +/- 4.8030E-001
Spill C1 = 3.6559E+002 +/- 1.9710E+001
Chi^2 = 3.2156E+000

Bottom 1845

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	4.1700E+002 +/- 1.1790E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	1.94	68.11
1	1.6373E+003 +/- 2.3362E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.55	40.27
1	1.9157E+003 +/- 2.7092E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	9.02	36.26
1	2.1372E+003 +/- 3.0221E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.82	38.35
1	2.8409E+003 +/- 4.0177E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.90	31.70
1	3.4247E+003 +/- 4.8432E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.25	28.74
1	3.6765E+003 +/- 5.1993E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.15	28.78

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D3 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 11:54:46 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D3 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 3.9897E+001 +/- 3.5090E-001
C1 = -2.3063E+001 +/- 2.7420E+000
Chi^2 = 4.9828E+000

Spillover Coefficients

Spill C0 = 1.6880E+000 +/- 9.4437E-002
Spill C1 = -1.9123E+000 +/- 7.3092E-001
Chi^2 = 1.4709E-001

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.7719E+003 +/- 1.2405E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	33.57	1.16
1	1.0004E+004 +/- 1.4145E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.15	1.46
1	1.0421E+004 +/- 1.4734E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.48	1.60
1	9.8039E+003 +/- 1.3865E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.21	1.62
1	1.0638E+004 +/- 1.5045E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	41.09	1.60
1	1.1111E+004 +/- 1.5713E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	40.49	1.72
1	9.2593E+003 +/- 1.3095E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.70	1.58

Exponential Fit Linear

Efficiency Coefficients

C0 = 4.0062E+001 +/- 3.6541E-001
C1 = -6.3961E+001 +/- 7.8340E+000
Chi^2 = 5.1029E+000

Spillover Coefficients

Spill C0 = 1.7036E+000 +/- 1.0307E-001
Spill C1 = -1.3479E+002 +/- 5.7491E+001
Chi^2 = 1.7017E-001

Batch 1B76

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.7719E+003 +/- 1.2405E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	33.57	1.16
1	1.0004E+004 +/- 1.4145E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.15	1.46
1	1.0421E+004 +/- 1.4734E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.48	1.60
1	9.8039E+003 +/- 1.3865E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.21	1.62
1	1.0638E+004 +/- 1.5045E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	41.09	1.60
1	1.1111E+004 +/- 1.5713E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	40.49	1.72
1	9.2593E+003 +/- 1.3095E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	37.70	1.58

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D4 Alpha fitted efficiency
Procedure: Alpha Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Alpha

Count Date: 11/26/2021 9:57:20 AM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D4 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 1.3394E+001 +/- 2.0352E-001
C1 = -4.6862E+001 +/- 9.4451E-001
Chi^2 = 2.0416E+001

Spillover Coefficients

Spill C0 = 2.7858E+001 +/- 5.9710E-001
Spill C1 = 1.3913E+002 +/- 9.1816E+000
Chi^2 = 4.4882E+000

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	4.3067E+002 +/- 1.1981E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.00	66.25
1	1.5987E+003 +/- 2.3084E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.37	40.78
1	1.8939E+003 +/- 2.6784E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.91	37.38
1	2.0661E+003 +/- 2.9219E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.49	39.64
1	2.8415E+003 +/- 4.0181E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.90	32.89
1	3.3784E+003 +/- 4.7777E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.05	29.26
1	3.6496E+003 +/- 5.1614E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.04	29.70

Exponential
Eff 11/26/21

Efficiency Coefficients

C0 = 1.7453E+001 +/- 3.4323E-001
C1 = -8.7563E+002 +/- 2.0203E+001
Chi^2 = 3.2287E+000

Spillover Coefficients

Spill C0 = 2.9088E+001 +/- 4.9402E-001
Spill C1 = 3.4325E+002 +/- 1.9556E+001
Chi^2 = 3.8363E+000

Batch 18416

Iteration	Alpha Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	4.3067E+002 +/- 1.1981E+001	J602	244.8 mg	2.1550E+004	7/1/2020 3:00:34 PM	2.00	66.25
1	1.5987E+003 +/- 2.3084E+001	J601	100.3 mg	2.1680E+004	7/1/2020 3:00:34 PM	7.37	40.78
1	1.8939E+003 +/- 2.6784E+001	J600	79.1 mg	2.1250E+004	7/1/2020 3:00:34 PM	8.91	37.38
1	2.0661E+003 +/- 2.9219E+001	J599	62.9 mg	2.1770E+004	7/1/2020 3:00:34 PM	9.49	39.64
1	2.8415E+003 +/- 4.0181E+001	J598	43.5 mg	2.2030E+004	7/1/2020 3:00:34 PM	12.90	32.89
1	3.3784E+003 +/- 4.7777E+001	J597	21.7 mg	2.2450E+004	7/1/2020 3:00:34 PM	15.05	29.26
1	3.6496E+003 +/- 5.1614E+001	J596	0.2 mg	2.2760E+004	7/1/2020 3:00:34 PM	16.04	29.70

Apex-Alpha/Beta™

CANBERRA

Fitted Efficiency Report

Batch Name: D4 Beta fitted efficiency
Procedure: Beta Fitted Efficiency
Calibration: Fitted Efficiency
Decay Mode: Beta

Count Date: 11/26/2021 12:01:55 PM
Preset Count Time: 180
Count Mode: Simultaneous
Fit Model: Linear

Detector: D4 **Drawer:** LB 4200 D **Device:** LB 4200 D

Efficiency Coefficients

C0 = 4.0576E+001 +/- 3.5600E-001
C1 = -2.5714E+001 +/- 2.7583E+000
Chi^2 = 5.3641E+000

Spillover Coefficients

Spill C0 = 1.4987E+000 +/- 9.1356E-002
Spill C1 = -1.3164E+000 +/- 7.4374E-001
Chi^2 = 1.5513E+000

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.7754E+003 +/- 1.2408E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	33.59	1.24
1	1.0204E+004 +/- 1.4431E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.90	1.08
1	1.0417E+004 +/- 1.4731E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.46	1.62
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.34
1	1.0419E+004 +/- 1.4733E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.24	1.34
1	1.1633E+004 +/- 1.6448E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.39	1.68
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.60

Exponential
EE2 11/26/21

Efficiency Coefficients

C0 = 4.0772E+001 +/- 3.7187E-001
C1 = -7.0907E+001 +/- 7.8331E+000
Chi^2 = 5.4737E+000

Spillover Coefficients

Spill C0 = 1.5452E+000 +/- 9.5687E-002
Spill C1 = -1.0434E+002 +/- 5.6435E+001
Chi^2 = 1.5580E+000

Batch 1877

Iteration	Beta Count Rate (cpm)	Standard	Mass	Decay Corrected Activity (dpm)	Reference Date	Efficiency	Spillover
1	8.7754E+003 +/- 1.2408E+002	J595	269 mg	2.6129E+004	9/1/1999 3:00:31 PM	33.59	1.24
1	1.0204E+004 +/- 1.4431E+002	J594	103.6 mg	2.6926E+004	9/1/1999 3:00:31 PM	37.90	1.08
1	1.0417E+004 +/- 1.4731E+002	J593	78.2 mg	2.7805E+004	9/1/1999 3:00:31 PM	37.46	1.62
1	1.0000E+004 +/- 1.4142E+002	J592	61.4 mg	2.5005E+004	9/1/1999 3:00:31 PM	39.99	1.34
1	1.0419E+004 +/- 1.4733E+002	J591	39 mg	2.5890E+004	9/1/1999 3:00:31 PM	40.24	1.34
1	1.1633E+004 +/- 1.6448E+002	J590	19.9 mg	2.7444E+004	9/1/1999 3:00:31 PM	42.39	1.68
1	9.4340E+003 +/- 1.3342E+002	J589	0.1 mg	2.4563E+004	9/1/1999 3:00:31 PM	38.41	1.60

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Technical Review

Project Manager Report Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492 REVISED **Sample Matrix:** AF

Client: GES (Gilbane Federal)

COMPONENTS: Stage 1	Project Manager or Designee Review		
1) Title Page and Cover Sheet	Yes	No	N/A
2) Table Of Contents	Yes	No	N/A
3) Case Narrative (including Correspondence/Notes Page)	Yes	No	N/A
4) Form 1s (including all Samples and Tests)	Yes	No	N/A
5) Sample Receipt Records (COC/SDG/DQO/Survey/Shipping)	Yes	No	N/A

COMPONENTS: Stage 2	Project Manager or Designee Review		
6) All Stage 1 Components	Yes	No	N/A
A 7) QC Results (including All Tests)	Yes	No	N/A
B 8) Instrument QC Forms	Yes	No	N/A
B 9) Instrument Runlog/Preparation Logs	Yes	No	N/A

COMPONENTS: Stage 3	Project Manager or Designee Review		
10) All Stage 2A/B Components	Yes	No	N/A
11) Instrument Quantitation Reports and Raw Data	Yes	No	N/A
12) LIMS Generated Reports	Yes	No	N/A
13) Standards Traceability	Yes	No	N/A

COMPONENTS: Stage 4	Project Manager or Designee Review		
14) All Stage 3 Components	Yes	No	N/A
15) RAD Instrument Data (Eff/Cal/Back/Spec/Control Charts)	Yes	No	N/A
16) Chemistry Data (Cal/CCV/Spectrums)	Yes	No	N/A
17) Technical Review Checklists	Yes	No	N/A
18) Other:	Yes	No	N/A

[redacted] 9-2-22

Project Manager or Designee Signature **Date**

[redacted] 9-2-22

Report Signatory or Designee Signature Date

Gamma Spec Technical Review Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492

Sample Matrix: AF **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

Batch A: B22-01012 **Batch B:** _____

Test Method(s): GAM-A-AF _____

Batch C: _____ **Batch D:** _____

Test Method(s): _____ _____

A. Sample Prep and Analysis Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) Sample Prep Anomaly? (No) **Yes** (See Tech Notes) **CAR#** (If initiated): _____		
2) Prepped Sample Homogeneity Acceptable?	Yes No N/A	
3) Physical Integrity of equipment verified?	Yes No N/A	
4) Cleanliness of equipment verified?	Yes No N/A	
5) Test/Sample Specific Parameters (See ARS-059 for details)		
a) Calibration Applied Matches Sample Geometry ?	Yes No N/A	(Yes) No N/A
b) Nuclide Identification Report Correlates within Expected Ranges?	Yes No N/A	(Yes) No N/A
c) FWHM / Peak Activity Correlation is Satisfactory?	Yes No N/A	(Yes) No N/A
d) Library Identified Peaks are Correctly Identified?	Yes No N/A	(Yes) No N/A
e) Spectral Anomalies Addressed & Appropriate Action Taken?	Yes No N/A	Yes No (N/A)
f) Peak Background Correction is activated?	Yes No N/A	(Yes) No N/A
6) Calibrations/Backgrounds Valid and Current?	Yes No N/A	(Yes) No N/A
7) Source Checks Completed and Acceptable?	Yes No N/A	(Yes) No N/A
8) Background Checks Complete and Acceptable?	Yes No N/A	(Yes) No N/A
9) Sample IDs Correspond to LIMS/SDG Information?	Yes No N/A	(Yes) No N/A
10) 100% of Manual Transcriptions Verified?	Yes No N/A	(Yes) No N/A
11) Sample Prepped in Valid Geometry? (Sample Prep Information)	Yes No N/A	(Yes) No N/A
12) Prepped Sample Density Acceptable?	Yes No N/A	Yes No (N/A)
13) Appropriate QC samples initiated at required frequency?	Yes No N/A	(Yes) No N/A
14) 100% of Manually entered Parameters Verified Accurate?	Yes No N/A	(Yes) No N/A
15) Analysis Anomaly ? (No) **Yes** (See Comments) **CAR#** (If initiated): _____		

[redacted] 8-1-22
Primary Analyst or Designee Signature Date

[redacted] 8-4-22
Secondary Reviewer Signature Date

Gamma Spec Technical Review Checklist

ARS Aleut Analytical

B. Project Management and Report Signatory Review

	Project Manager or Designee Review			Report Signatory or Designee Reviewer		
1) RDL Criteria are Met?	Yes	No	N/A	Yes	No	N/A
2) Activity + 3xCSU a Negative Number?	Yes	No	N/A	Yes	No	N/A
3) Method Blank Criterion Met?	Yes	No	N/A	Yes	No	N/A
4) LCS/LCD Criteria Met?	Yes	No	N/A	Yes	No	N/A
5) Duplicate (Sample Duplicate, LCSD) Criteria Met?	Yes	No	N/A	Yes	No	N/A
6) Batch QC Anomaly?	No	**Yes** (See Tech Notes)		**CAR#** (If initiated):		

[redacted] 8-16-22

Project Manager or Designee Signature Date

[redacted] 8-24-22

Report Signatory or Designee Signature Date

C. Comments

Alpha Spec Technical Review Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492

Sample Matrix: AF **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

Batch A: B22-01099 **Batch B:** _____

Test Method(s): ASP-PU239-AF _____

Batch C: _____ **Batch D:** _____

Test Method(s): _____ _____

A. Sample Prep Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) 100% of Manual Transcriptions Verified?	(Yes) No N/A	(Yes) No N/A
2) 100% of Manual Calculations Verified?	Yes No (N/A)	Yes No (N/A)
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	(Yes) No N/A	(Yes) No N/A
4) QC and Samples are Aliquoted / Traced?	(Yes) No N/A	(Yes) No N/A
5) Deviations from procedure are documented and verified?	Yes No (N/A)	Yes No (N/A)

6) Sample Prep Anomaly? (No) **Yes** (See Tech Notes) **CAR#** (If initiated): _____

[redacted] 8-10-22 — [redacted] 8-10-22

Primary Analyst or Designee Signature — Date — Secondary Reviewer Signature — Date

B. Sample Analysis Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) Calibrations/Backgrounds Valid and Current?	(Yes) No N/A	(Yes) No N/A
2) Source Checks Completed and Acceptable?	(Yes) No N/A	(Yes) No N/A
3) Background Checks Complete and Acceptable?	(Yes) No N/A	(Yes) No N/A
4) 100% of Manually entered Parameters Verified Accurate?	(Yes) No N/A	(Yes) No N/A
5) Appropriate QC samples initiated at required frequency?	(Yes) No N/A	(Yes) No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) All Centroids +/- 50 keV for each sample and QC sample?	(Yes) No N/A	(Yes) No N/A
b) FWHM <100 kEV for each sample and QC sample?	(Yes) No N/A	(Yes) No N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	(Yes) No N/A	(Yes) No N/A
d) Spectrum shows no visual indication of interferences?	(Yes) No N/A	(Yes) No N/A

7) Analysis Anomaly? (No) **Yes** (See Comments) **CAR#** (If initiated): _____

[redacted] 8-12-22 — [redacted] 8-15-22

Primary Analyst or Designee Signature — Date — Secondary Reviewer Signature — Date

Alpha Spec Technical Review Checklist

ARS Aleut Analytical

C. Project Management and Report Signatory Review

	Project Manager or Designee Review	Report Signatory or Designee Reviewer
1) RDL Criteria are Met? [redacted] 9-2-22	Yes No N/A	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No N/A	Yes No N/A
3) Method Blank Criteria Met?	Yes No N/A	Yes No N/A
4) LCS/LCD Criteria Met?	Yes No N/A	Yes No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No N/A	Yes No N/A
6) Tracer yield results meet acceptance criteria?	Yes No N/A	Yes No N/A
7) Batch QC Anomaly? No Yes (See Comments) CAR# (If initiated): _____		

[redacted] 8-16-22
Project Manager or Designee Signature Date

[redacted] 8-24-22
Report Signatory or Designee Signature Date

[redacted] 9-2-22

D. Comments

Alpha Spec Technical Review Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492

Sample Matrix: AF **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

Batch A: B22-01100 **Batch B:** _____

Test Method(s): ASP-TH-AF _____

Batch C: _____ **Batch D:** _____

Test Method(s): _____ _____

A. Sample Prep Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) 100% of Manual Transcriptions Verified?	(Yes) No N/A	(Yes) No N/A
2) 100% of Manual Calculations Verified?	Yes No (N/A)	Yes No (N/A)
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	(Yes) No N/A	(Yes) No N/A
4) QC and Samples are Aliquoted / Traced?	(Yes) No N/A	(Yes) No N/A
5) Deviations from procedure are documented and verified?	Yes No (N/A)	Yes No (N/A)

6) Sample Prep Anomaly? (No) **Yes** (See Tech Notes) **CAR#** (If initiated): _____

[redacted] 8-9-22 [redacted] 8-9-22

Primary Analyst or Designee Signature Date Secondary Reviewer Signature Date

B. Sample Analysis Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) Calibrations/Backgrounds Valid and Current?	(Yes) No N/A	(Yes) No N/A
2) Source Checks Completed and Acceptable?	(Yes) No N/A	(Yes) No N/A
3) Background Checks Complete and Acceptable?	(Yes) No N/A	(Yes) No N/A
4) 100% of Manually entered Parameters Verified Accurate?	(Yes) No N/A	(Yes) No N/A
5) Appropriate QC samples initiated at required frequency?	(Yes) No N/A	(Yes) No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) All Centroids +/- 50 keV for each sample and QC sample?	(Yes) No N/A	(Yes) No N/A
b) FWHM <100 kEV for each sample and QC sample?	Yes (No) N/A	Yes (No) N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	(Yes) No N/A	(Yes) No N/A
d) Spectrum shows no visual indication of interferences?	(Yes) No N/A	(Yes) No N/A

7) Analysis Anomaly? **No** (Yes) (See Comments) **CAR#** (If initiated): _____

[redacted] 8-10-22 [redacted] 8-11-22

Primary Analyst or Designee Signature Date Secondary Reviewer Signature Date

Alpha Spec Technical Review Checklist

ARS Aleut Analytical

C. Project Management and Report Signatory Review

	Project Manager or Designee Review	Report Signatory or Designee Reviewer
1) RDL Criteria are Met? SDK 9-2-22	Yes No N/A	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No N/A	Yes No N/A
3) Method Blank Criteria Met?	Yes No N/A	Yes No N/A
4) LCS/LCD Criteria Met?	Yes No N/A	Yes No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No N/A	Yes No N/A
6) Tracer yield results meet acceptance criteria?	Yes No N/A	Yes No N/A

7) Batch QC Anomaly? No Yes (See Comments) CAR# (If initiated): _____

[redacted] 8-16-22
Project Manager or Designee Signature Date

[redacted] 8-24-22
Report Signatory or Designee Signature Date

[redacted] 9-2-22

D. Comments

See tech note. 8-10-22 [redacted]

Alpha Spec Technical Review Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492

Sample Matrix: AF **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

Batch A: B22-01102 **Batch B:** _____

Test Method(s): ASP-U-AF _____

Batch C: _____ **Batch D:** _____

Test Method(s): _____ _____

A. Sample Prep Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) 100% of Manual Transcriptions Verified?	(Yes) No N/A	(Yes) No N/A
2) 100% of Manual Calculations Verified?	Yes No (N/A)	Yes No (N/A)
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	(Yes) No N/A	(Yes) No N/A
4) QC and Samples are Aliquoted / Traced?	(Yes) No N/A	(Yes) No N/A
5) Deviations from procedure are documented and verified?	Yes No (N/A)	Yes No (N/A)

6) Sample Prep Anomaly? (No) **Yes** (See Tech Notes) **CAR#** (If initiated): _____

[redacted] 8-11-22 — Primary Analyst or Designee Signature / Date

[redacted] 8-11-22 — Secondary Reviewer Signature / Date

B. Sample Analysis Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) Calibrations/Backgrounds Valid and Current?	(Yes) No N/A	(Yes) No N/A
2) Source Checks Completed and Acceptable?	(Yes) No N/A	(Yes) No N/A
3) Background Checks Complete and Acceptable?	(Yes) No N/A	(Yes) No N/A
4) 100% of Manually entered Parameters Verified Accurate?	(Yes) No N/A	(Yes) No N/A
5) Appropriate QC samples initiated at required frequency?	(Yes) No N/A	(Yes) No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) All Centroids +/- 50 keV for each sample and QC sample?	(Yes) No N/A	(Yes) No N/A
b) FWHM <100 kEV for each sample and QC sample?	(Yes) No N/A	(Yes) No N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	(Yes) No N/A	(Yes) No N/A
d) Spectrum shows no visual indication of interferences?	(Yes) No N/A	(Yes) No N/A

7) Analysis Anomaly? (No) **Yes** (See Comments) **CAR#** (If initiated): _____

[redacted] 8-17-22 — Primary Analyst or Designee Signature / Date

[redacted] 8-17-22 — Secondary Reviewer Signature / Date

Alpha Spec Technical Review Checklist

C. Project Management and Report Signatory Review

	Project Manager or Designee Review	Report Signatory or Designee Reviewer
1) RDL Criteria are Met? [redacted] 9-2-22	~~Yes~~ No N/A	~~Yes~~ No N/A
2) Activity + 3xCSU a Negative Number?	Yes ~~No~~ N/A	Yes ~~No~~ N/A
3) Method Blank Criteria Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
4) LCS/LCD Criteria Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
6) Tracer yield results meet acceptance criteria?	Yes ~~No~~ N/A	Yes ~~No~~ N/A

7) Batch QC Anomaly? No ~~Yes~~ (See Comments) CAR# (If initiated): _____

[redacted] 8-22-22
Project Manager or Designee Signature Date

[redacted] 8-24-22
Report Signatory or Designee Signature Date

[redacted] 9-2-22

D. Comments

GPC Technical Review Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492

Sample Matrix: AF **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

Batch A: B22-01103 **Batch B:** _____

Test Method(s): GPC-SR90-AF _____

Batch C: _____ **Batch D:** _____

Test Method(s): _____ _____

A. Sample Prep Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) 100% of Manual Transcriptions Verified?	(Yes) No N/A	(Yes) No N/A
2) QC and Samples are Aliquoted / Traced?	(Yes) No N/A	(Yes) No N/A
3) QC (LCS and LCSD) samples are present and match ID to batch ID	(Yes) No N/A	(Yes) No N/A
4) Tracer Recorded/ Carrier Recorded Correct Standard	(Yes) No N/A	(Yes) No N/A
5) Gravimetric Yield is within Acceptance Limits?	(Yes) No N/A	(Yes) No N/A
6) Deviations from procedure have been documented and verified?	Yes No (N/A)	Yes No (N/A)

7) Sample Prep Anomaly? (No) **Yes** (See Tech Notes) **CAR# (If initiated):** _____

[redacted] 8-9-22 [redacted] 8-9-22

Primary Analyst or Designee Signature Date Secondary Reviewer Signature Date

B. Sample Analysis Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) Calibrations/Backgrounds Valid and Current?	(Yes) No N/A	(Yes) No N/A
2) Source Checks Completed and Acceptable?	(Yes) No N/A	(Yes) No N/A
3) Background Checks Complete and Acceptable?	(Yes) No N/A	(Yes) No N/A
4) 100% of Manually entered Parameters Verified Accurate?	(Yes) No N/A	(Yes) No N/A
5) Appropriate QC samples initiated at required frequency?	(Yes) No N/A	(Yes) No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)	(Yes) No N/A	(Yes) No N/A
a) Physical Configuration of Sample equivalent to Calibration?	(Yes) No N/A	(Yes) No N/A

7) Analysis Anomaly? (No) **Yes** (See Comments) **CAR# (If initiated):** _____

[redacted] 8-9-22 [redacted] 8-15-22

Primary Analyst or Designee Signature Date Secondary Reviewer Signature Date

GPC Technical Review Checklist

ARS Aleut Analytical

C. Project Management and Report Signatory Review

	Project Manager or Designee Review	Report Signatory or Designee Reviewer
1) RDL Criteria are Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
2) Activity + 3xCSU a Negative Number?	Yes ~~No~~ N/A	Yes ~~No~~ N/A
4) Method Blank Criterion Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
5) LCS/LCSD Criteria Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
6) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	~~Yes~~ No N/A	~~Yes~~ No N/A
7) MS/MSD Criteria Met?	Yes No ~~N/A~~	Yes No ~~N/A~~
8) Chemical Yield results meet acceptance criteria?	~~Yes~~ No N/A	~~Yes~~ No N/A
9) Batch QC Anomaly? ~~No~~ **Yes** (See Tech Notes)	**CAR #** (If initiated):	

[redacted] 8-16-22

Project Manager or Designee Signature **Date**

[redacted] 8-24-22

Report Signatory or Designee Signature **Date**

D. Comments

ARS-059-004 R4.0
Revision Date: 09/09/2020

SDG# ARS1-22-01492

GPC Technical Review Checklist

ARS Aleut Analytical

SDG# ARS1-22-01492

Sample Matrix: AF **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

Batch A: B22-01124 **Batch B:** _____

Test Method(s): GPC-RA226-AF _____

Batch C: _____ **Batch D:** _____

Test Method(s): _____ _____

A. Sample Prep Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) 100% of Manual Transcriptions Verified?	(Yes) No N/A	(Yes) No N/A
2) QC and Samples are Aliquoted / Traced?	(Yes) No N/A	(Yes) No N/A
3) QC (LCS and LCSD) samples are present and match ID to batch ID	(Yes) No N/A	(Yes) No N/A
4) Tracer Recorded/ Carrier Recorded Correct Standard	(Yes) No N/A	(Yes) No N/A
5) Gravimetric Yield is within Acceptance Limits?	Yes (No) N/A	Yes (No) N/A
6) Deviations from procedure have been documented and verified?	Yes No (N/A)	Yes No (N/A)

7) Sample Prep Anomaly? No (Yes) (See Tech Notes) CAR# (If initiated): _____

[redacted] 8-17-22 — [redacted] 8-12-22

Primary Analyst or Designee Signature Date — Secondary Reviewer Signature Date

B. Sample Analysis Review

	Primary Analyst or Designee Review	Secondary Reviewer
1) Calibrations/Backgrounds Valid and Current?	(Yes) No N/A	(Yes) No N/A
2) Source Checks Completed and Acceptable?	(Yes) No N/A	(Yes) No N/A
3) Background Checks Complete and Acceptable?	(Yes) No N/A	(Yes) No N/A
4) 100% of Manually entered Parameters Verified Accurate?	(Yes) No N/A	(Yes) No N/A
5) Appropriate QC samples initiated at required frequency?	(Yes) No N/A	(Yes) No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)	(Yes) No N/A	(Yes) No N/A
a) Physical Configuration of Sample equivalent to Calibration?	(Yes) No N/A	(Yes) No N/A

7) Analysis Anomaly? (No) Yes (See Comments) CAR# (If initiated): _____

[redacted] 8-22-22 — [redacted] 8-23-22

Primary Analyst or Designee Signature Date — Secondary Reviewer Signature Date

GPC Technical Review Checklist

ARS Aleut Analytical

C. Project Management and Report Signatory Review

	Project Manager or Designee Review	Report Signatory or Designee Reviewer
1) RDL Criteria are Met? [redacted] 9-2-22	Yes No N/A	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No N/A	Yes No N/A
4) Method Blank Criterion Met?	Yes No N/A	Yes No N/A
5) LCS/LCSD Criteria Met?	Yes No N/A	Yes No N/A
6) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No N/A	Yes No N/A
7) MS/MSD Criteria Met?	Yes No N/A	Yes No N/A
8) Chemical Yield results meet acceptance criteria? [redacted] 9-2-22	Yes No N/A	Yes No N/A
9) Batch QC Anomaly? No Yes (See Tech Notes) CAR # (If initiated):		

[redacted] 8-24-22

Project Manager or Designee Signature Date

[redacted] 8-24-22

Report Signatory or Designee Signature Date

[redacted] 9-2-22

D. Comments

2609 North River Road
Port Allen, Louisiana 70767
(225) 228-1394 | Fax (225) 381-2996

ARS Aleut Analytical, LLC

Laboratory Analytical Report

ARS1-22-01572 Revision 1

Gilbane Federal
[redacted]
1655 Grant Street
Suite 1200
Concord, CA 94520
[redacted]

COC Number: **KT072722RADB**
Job Number: **J310000900**
Job Location: **Parcel B Air Monitoring RAD**
Sample ID Prefix: **MSB**
Project Name: **HPS, Parcel B Removal Site Evaluation**

Questions regarding this analytical report should be addressed to ARS project manager, [redacted], who can be reached by email at projectmanagers@aaa.aleutfederal.com.

I certify that the test results presented in this report (in either hardcopy or electronic file (EDD)) meet the requirements of the laboratory's certifications and other applicable contract terms and conditions. A full list of the Port Allen, LA laboratory's certifications is provided with this report. Any exceptions to the certification or contract will be noted within the case narratives presented in the report. Any subcontracted sample results will be identified within the case narratives presented in the report. In the event this report is an amendment to a previously released report, the case narrative will clearly identify the original report as well as the reason(s) for reissuance. A statement of uncertainty for each analysis is available upon request. I authorize release and issuance of this report on the date signed below.

		Laboratory Management, ARS Aleut Analytical
Signature	**Date**	**Title**

This report provides analytical results of the requested analysis and does not include any opinions or interpretations. ARS Aleut Analytical, LLC assumes no liability for the use or interpretation of analytical results. Results relate only to items tested. A partial reproduction of this test report is prohibited. Reproduction of this report in full requires the written approval of the laboratory.

LELAP Cert # 01949

ARS Aleut Analytical
2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

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Certifications and Accreditations List

State or Accrediting Body (AB)	Certificate Number
AIHA LAP, LLC	209312
Alaska	LA01131
California	3085
ANAB DoD	ADE-1489
ANAB DOE	ADE-1489.01
Louisiana DEQ - NELAC	01949
Louisiana DHH	LA022
Nevada	LA011312023-1
New Jersey	LA009
New York	65039
Pennsylvania	68-04294-011
Texas	T104704447-21-17
Utah	LA011312022-13
Washington	C1010

For additional information related to the specific matrices, methods, and analytes recognized by each accrediting body, contact us at QA@aaa.aleutfederal.com for additional information.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Case Narrative

ARS Aleut Analytical
2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • Fax (225) 381-2996

PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs

Client Sample ID	ARS Aleut Analytical Sample ID
FB-071822	ARS1-22-01572-001
MSB01-071822	ARS1-22-01572-002
MSB02-071822	ARS1-22-01572-003
MSB113A-071822	ARS1-22-01572-004

Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
001	07/18/22 08:00	07/28/22	ASP-PU239-AF	As Received	08/12/22 07:10	08/17/22 21:23
001	07/18/22 08:00	07/28/22	ASP-TH-AF	As Received	08/12/22 07:10	08/16/22 22:26
001	07/18/22 08:00	07/28/22	ASP-U-AF	As Received	08/12/22 07:10	08/17/22 21:21
001	07/18/22 08:00	07/28/22	GAM-A-AF	As Received	N/A	08/05/22 14:07
001	07/18/22 08:00	07/28/22	GPC-RA226-AF	As Received	08/12/22 07:10	08/24/22 10:01
001	07/18/22 08:00	07/28/22	GPC-SR90-AF	As Received	08/12/22 07:10	08/18/22 10:56
002	07/22/22 08:04	07/28/22	ASP-PU239-AF	As Received	08/12/22 07:10	08/17/22 21:23
002	07/22/22 08:04	07/28/22	ASP-TH-AF	As Received	08/12/22 07:10	08/16/22 22:26
002	07/22/22 08:04	07/28/22	ASP-U-AF	As Received	08/12/22 07:10	08/17/22 21:21
002	07/22/22 08:04	07/28/22	GAM-A-AF	As Received	N/A	08/04/22 14:04
002	07/22/22 08:04	07/28/22	GPC-RA226-AF	As Received	08/12/22 07:10	08/24/22 10:01
002	07/22/22 08:04	07/28/22	GPC-SR90-AF	As Received	08/12/22 07:10	08/18/22 10:56
003	07/22/22 07:34	07/28/22	ASP-PU239-AF	As Received	08/12/22 07:10	08/17/22 21:23
003	07/22/22 07:34	07/28/22	ASP-TH-AF	As Received	08/12/22 07:10	08/16/22 22:26

003	07/22/22 07:34	07/28/22	ASP-U-AF	As Received	08/12/22 07:10	08/17/22 21:21
003	07/22/22 07:34	07/28/22	GAM-A-AF	As Received	N/A	08/09/22 14:29
003	07/22/22 07:34	07/28/22	GPC-RA226-AF	As Received	08/12/22 07:10	08/24/22 10:01
003	07/22/22 07:34	07/28/22	GPC-SR90-AF	As Received	08/12/22 07:10	08/18/22 10:56
004	07/22/22 07:49	07/28/22	ASP-PU239-AF	As Received	08/12/22 07:10	08/17/22 21:23
004	07/22/22 07:49	07/28/22	ASP-TH-AF	As Received	08/12/22 07:10	08/16/22 22:26
004	07/22/22 07:49	07/28/22	ASP-U-AF	As Received	08/12/22 07:10	08/17/22 21:21
004	07/22/22 07:49	07/28/22	GAM-A-AF	As Received	N/A	08/04/22 14:07
004	07/22/22 07:49	07/28/22	GPC-RA226-AF	As Received	08/12/22 07:10	08/24/22 10:01
004	07/22/22 07:49	07/28/22	GPC-SR90-AF	As Received	08/12/22 07:10	08/18/22 10:56

SAMPLE RECEIPT/PREP

The samples arrived in good condition. The samples were screened for radioactive contamination as per procedure **PALA-SR-001-SOP Sample Receiving**. Sample date(s) and time(s) are listed as provided by the client. In regard to the Air Filters, no flow rate information was provided by the client. Turnaround time was set at 28 calendar days.

ANALYTICAL METHODS

Pu-239/240 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Th-232 analysis was performed using **PALA-RAD-031, "Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom ACW-08 & Eichrom ACW-10)"**.

U-235 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Co-60, Cs-137, Ra-226 analyses were performed using **PALA-RAD-007, "Modified Gamma Emitting Radionuclides in Soil, Air, and Biota Matrices (EPA 901.1 Mod, SM 7120B, & HASL-300 Ga-01-R)"**.

Ra-226 analysis was performed using **PALA-RAD-008, "Alpha Emitting Radium Isotopes in Water (EPA 903.0, EPA 9315, SM 7500-Ra C, SM 7500-Ra C)"**.

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Sr-90 analysis was performed using **PALA-RAD-032, "Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom SRW01, EPA 905.0, HASL 300 Sr-01-RC)"**.

ANALYTICAL RESULTS

Batch ARS1-B22-01095: DUP and/or parent sample value(s) for Co-60 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01095: DUP and/or parent sample value(s) for Cs-137 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01095: DUP and/or parent sample value(s) for Ra-226 are below the MDC, RPD is not applicable.

Fraction 002 has elevated MDC for Pu-239/240 with ACT of -9.122E-8 uCi/filter, MDC of 2.354E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for U-235 with ACT of -2.399E-8 uCi/filter, MDC of 2.318E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Th-232 with ACT of 6.145E-8 uCi/filter, MDC of 1.640E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Ra-226 with ACT of -8.919E-5 uCi/filter, MDC of 3.154E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 003 has elevated MDC for Pu-239/240 with ACT of -9.145E-8 uCi/filter, MDC of 2.617E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for U-235 with ACT of -1.723E-8 uCi/filter, MDC of 1.661E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Th-232 with ACT of 2.840E-8 uCi/filter, MDC of 1.201E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Ra-226 with ACT of -3.833E-6 uCi/filter, MDC of 9.426E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 004 has elevated MDC for Pu-239/240 with ACT of -1.023E-7 uCi/filter, MDC of 2.991E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for U-235 with ACT of -4.615E-8 uCi/filter, MDC of 2.080E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Th-232 with ACT of 2.536E-8 uCi/filter, MDC of 1.580E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Ra-226 with ACT of -7.049E-6 uCi/filter, MDC of 1.486E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.

ARS1-B22-01135: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01136: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01137: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01137: FWHM is greater than 100 keV for Th-229 on batch sample -04.

ARS1-B22-01137: Isotopic Thorium batch LCS ,LCSD, Method Blank, and ARS1-22-01572-001 tracer recovery values are less than 30%. The tracer recoveries, though biased low, are used in the final calculation of the calculated result, which passed QC criteria.

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Batch ARS1-B22-01137: Fraction 001 has tracer recovery of 12.7%, which is outside limits of 30%-110%. The sample results have been qualified with a "Q".

For batch ARS1-B22-01095, sample “MSB113A-071822” (ARS1-22-01572-004) was used as the Sample Duplicate.

Notes (Case Narrative)

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23)
DO	Duplicate Original
DUP	Sample Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MBL	Method Blank
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NC	Not Calculated
NP	Not Provided
NR	Not Referenced
PQL	Practical Quantitation Limit

Data Qualifiers:

B	The result of both the method blank and the target sample are above the MDL.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the LOD but below the LOQ, or above the MDL but below the PQL.
Q	One or more quality control criteria failed.
U	Result is below the MDA, MDL, PQL, LOD, or LOQ
*	LCS/LCSD or Sample DUP fails all Duplicate criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected
‡	Method/Matrix/Analyte not accredited for this certification

Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

8.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.

9.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Non-Potable Water**:
Gross Alpha and Gross Beta (EPA 900.0, EPA 9310); Radium 226 (EPA 903.0, EPA 903.1, EPA 9315); Radium 228 (EPA 904.0, EPA 9320); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7470A); Strontium-89 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-02-RC); Tritium (EPA 906.0); Enriched Tritium (ARS-040), Carbon-14 (ARS-019), Tritium/Carbon (ARS-151); Gamma Emitters (EPA 901.1, SM 7120B, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-10); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02)

10.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Solid and Chemical Materials**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7471B); Strontium-89 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-02); Tritium (EPA 906.0 Mod); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-01-RC); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-02-RC, HASL 300 Pu-03-RC); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03, HASL 300 U-02, HASL 300 U-04); Technetium-99 (Eichrom TCS01)

11.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Air and Emissions**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); Strontium-89 (Eichrom SRW01, HASL 300 Sr-01-RC); Strontium-90 (Eichrom SRW01, HASL 300 Sr-02-RC); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02, Eichrom TCS01)

General Comments:

1.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of “M” or “Mod” to the procedure number (i.e. 901.1M, 901.1 Mod).

2.0) All NIOSH method results are reported without blank corrections applied.

3.0) Basis: “As Received” = analyzed as received from client; “Dry” = dried prior to being analyzed; “Dry Weight Corrected” = analyzed as received; result corrected for percent moisture.

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ARS Aleut Analytical, LLC
Analytical Reports

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Analytical Results

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01572
Client Sample ID: FB-071822
Sample Collection Date: 07/18/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01572-001
Date Received: 07/28/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.041E-7	1.477E-7	3.218E-7	1.400E-7	4.8E-08	U	uCi/filter	08/17/22 21:23	[redacted]	61.6%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	1.147E-7	2.532E-7	5.027E-7	1.383E-7	4.8E-08	UQ	uCi/filter	08/16/22 22:26	[redacted]	12.7%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	1.749E-8	3.435E-8	4.740E-8	0.000	4.8E-08	U	uCi/filter	08/17/22 21:21	[redacted]	63.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-6.477E-7	1.091E-6	1.178E-6	5.890E-7	0.00024	U	uCi/filter	08/05/22 14:07	[redacted]	N/A
Cs-137	-2.666E-7	8.287E-7	9.654E-7	4.827E-7	0.00048	U	uCi/filter	08/05/22 14:07	[redacted]	N/A
Ra-226	-1.093E-5	1.380E-5	1.533E-5	7.665E-6	4.4E-06	U	uCi/filter	08/05/22 14:07	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	5.309E-7	3.652E-7	4.526E-7	1.695E-7	4.4E-06		uCi/filter	08/24/22 10:01	[redacted]	75.6%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	1.861E-6	1.255E-6	1.914E-6	8.815E-7	2.4E-05	U	uCi/filter	08/18/22 10:56	[redacted]	92.0%

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ARS Sample Delivery Group: ARS1-22-01572
Client Sample ID: MSB01-071822
Sample Collection Date: 07/22/22 8:04
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01572-002
Date Received: 07/28/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-9.122E-8	8.478E-8	2.354E-7	9.524E-8	4.8E-08	U	uCi/filter	08/17/22 21:23	[redacted]	60.5%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	6.145E-8	9.493E-8	1.640E-7	5.821E-8	4.8E-08	U	uCi/filter	08/16/22 22:26	[redacted]	53.4%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-2.399E-8	7.925E-8	2.318E-7	7.873E-8	4.8E-08	U	uCi/filter	08/17/22 21:21	[redacted]	41.2%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-2.439E-8	1.634E-6	1.689E-6	8.445E-7	0.00024	U	uCi/filter	08/04/22 14:04	[redacted]	N/A
Cs-137	-8.026E-7	1.548E-6	1.726E-6	8.630E-7	0.00048	U	uCi/filter	08/04/22 14:04	[redacted]	N/A
Ra-226	-8.919E-5	2.992E-5	3.154E-5	1.577E-5	4.4E-06	U	uCi/filter	08/04/22 14:04	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.088E-6	5.125E-7	4.744E-7	1.759E-7	4.4E-06		uCi/filter	08/24/22 10:01	[redacted]	70.9%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	5.212E-7	1.156E-6	2.004E-6	9.275E-7	2.4E-05	U	uCi/filter	08/18/22 10:56	[redacted]	88.7%

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ARS Sample Delivery Group: ARS1-22-01572
Client Sample ID: MSB02-071822
Sample Collection Date: 07/22/22 7:34
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01572-003
Date Received: 07/28/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-9.145E-8	1.000E-7	2.617E-7	1.067E-7	4.8E-08	U	uCi/filter	08/17/22 21:23	[redacted]	57.6%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	2.840E-8	6.194E-8	1.201E-7	3.805E-8	4.8E-08	U	uCi/filter	08/16/22 22:26	[redacted]	60.7%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-1.723E-8	3.384E-8	1.661E-7	4.571E-8	4.8E-08	U	uCi/filter	08/17/22 21:21	[redacted]	41.3%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	2.343E-7	8.022E-7	8.241E-7	4.121E-7	0.00024	U	uCi/filter	08/09/22 14:29	[redacted]	N/A
Cs-137	1.038E-7	6.702E-7	7.293E-7	3.647E-7	0.00048	U	uCi/filter	08/09/22 14:29	[redacted]	N/A
Ra-226	-3.833E-6	7.494E-6	9.426E-6	4.713E-6	4.4E-06	U	uCi/filter	08/09/22 14:29	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	3.532E-7	3.164E-7	4.512E-7	1.695E-7	4.4E-06	U	uCi/filter	08/24/22 10:01	[redacted]	71.8%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	4.876E-7	1.284E-6	2.240E-6	1.039E-6	2.4E-05	U	uCi/filter	08/18/22 10:56	[redacted]	83.7%

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ARS Sample Delivery Group: ARS1-22-01572
Client Sample ID: MSB113A-071822
Sample Collection Date: 07/22/22 7:49
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01572-004
Date Received: 07/28/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.023E-7	1.283E-7	2.991E-7	1.269E-7	4.8E-08	U	uCi/filter	08/17/22 21:23	[redacted]	56.7%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	2.536E-8	7.822E-8	1.580E-7	5.606E-8	4.8E-08	U	uCi/filter	08/16/22 22:26	[redacted]	60.8%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-4.615E-8	5.252E-8	2.080E-7	7.067E-8	4.8E-08	U	uCi/filter	08/17/22 21:21	[redacted]	47.2%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-3.189E-7	9.418E-7	1.028E-6	5.140E-7	0.00024	U	uCi/filter	08/04/22 14:07	[redacted]	N/A
Cs-137	-7.662E-9	7.827E-7	9.202E-7	4.601E-7	0.00048	U	uCi/filter	08/04/22 14:07	[redacted]	N/A
Ra-226	-7.049E-6	1.346E-5	1.486E-5	7.430E-6	4.4E-06	U	uCi/filter	08/04/22 14:07	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	2.798E-7	2.805E-7	4.133E-7	1.503E-7	4.4E-06	U	uCi/filter	08/24/22 10:01	[redacted]	75.4%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	6.936E-7	1.256E-6	2.153E-6	9.956E-7	2.4E-05	U	uCi/filter	08/18/22 10:56	[redacted]	92.0%

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QC Summary

ARS Aleut Analytical
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QC Sample Results

Analytical Batch: ARS1-B22-01095
Lab Sample ID: ARS1-B22-01095-01
Method: EPA 901.1M

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/04/22 13:37

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Am-241	33.065	31.665		uCi/filter	95.8	75 - 125
Co-60	20.928	21.724		uCi/filter	103.8	75 - 125
Cs-137	12.996	12.908		uCi/filter	99.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01095
Lab Sample ID: ARS1-B22-01095-02
Method: EPA 901.1M

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/04/22 13:48

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Am-241	33.065	31.483		uCi/filter	95.2	75 - 125	0.6	25	0.102	3
Co-60	20.928	22.067		uCi/filter	105.4	75 - 125	1.6	25	0.369	3
Cs-137	12.996	13.642		uCi/filter	105.0	75 - 125	5.5	25	1.363	3

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QC Sample Results

Analytical Batch: ARS1-B22-01095
Lab Sample ID: ARS1-B22-01095-03
Method: EPA 901.1M

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/08/22 14:02

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Co-60	4.273E-4	8.510E-4	9.270E-4	4.635E-4	U	uCi/filter
Cs-137	3.859E-4	6.982E-4	8.110E-4	4.055E-4	U	uCi/filter
Ra-226	-0.004	0.014	0.015	0.008	U	uCi/filter

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QC Sample Results

Analytical Batch: ARS1-B22-01095
Lab Sample ID: ARS1-B22-01095-08
Method: EPA 901.1M

Sample Type: DUP
Matrix: Air Filter
Analysis Date: 08/08/22 14:04

Analyte	DO Result	DO Qual	DUP Result	DUP Qual	Analysis Units	RPD	RPD Limit	DER	DER Limit
Co-60	-3.189E-7	U	-5.919E-7	U	uCi/filter	NC	25	0.388	3
Cs-137	-7.662E-9	U	-4.070E-7	U	uCi/filter	NC	25	0.728	3
Ra-226	-7.049E-6	U	3.859E-6	U	uCi/filter	NC	25	1.396	3

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01572 **Analytical Batch:** ARS1-B22-01095

Analysis: Gamma Spec (Short) in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01572-001	FB-071822	Air Filter	EPA 901.1M	N/A
ARS1-22-01572-002	MSB01-071822	Air Filter	EPA 901.1M	N/A
ARS1-22-01572-003	MSB02-071822	Air Filter	EPA 901.1M	N/A
ARS1-22-01572-004	MSB113A-071822	Air Filter	EPA 901.1M	N/A
ARS1-B22-01095-01	Lab Control Sample	Air Filter	EPA 901.1M	N/A
ARS1-B22-01095-02	Lab Control Sample Duplicate	Air Filter	EPA 901.1M	N/A
ARS1-B22-01095-03	Method Blank	Air Filter	EPA 901.1M	N/A
ARS1-B22-01095-08	Sample Duplicate (MSB113A-071822)	Air Filter	EPA 901.1M	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01135
Lab Sample ID: ARS1-B22-01135-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/17/22 21:23

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Pu-239/240	7.684E-6	7.505E-6		uCi/filter	97.7	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01135
Lab Sample ID: ARS1-B22-01135-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/17/22 21:23

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Pu-239/240	7.551E-6	7.913E-6		uCi/filter	104.8	75 - 125	5.3	25	0.572	3

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QC Sample Results

Analytical Batch: ARS1-B22-01135
Lab Sample ID: ARS1-B22-01135-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/17/22 21:23

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Pu-239/240	-1.811E-8	2.738E-8	6.415E-8	2.677E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01572

Analytical Batch: ARS1-B22-01135

Analysis: Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01572-001	FB-071822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01572-002	MSB01-071822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01572-003	MSB02-071822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01572-004	MSB113A-071822	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01135-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01135-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01135-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01136
Lab Sample ID: ARS1-B22-01136-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/17/22 21:21

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
U-238	8.239E-6	8.038E-6		uCi/filter	97.6	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01136
Lab Sample ID: ARS1-B22-01136-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/17/22 21:21

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
U-238	8.255E-6	8.123E-6		uCi/filter	98.4	75 - 125	1.0	25	0.116	3

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QC Sample Results

Analytical Batch: ARS1-B22-01136
Lab Sample ID: ARS1-B22-01136-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/17/22 21:21

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
U-234	2.318E-9	6.108E-8	1.145E-7	5.098E-8	U	uCi/filter
U-235	2.485E-8	3.620E-8	6.170E-8	2.357E-8	U	uCi/filter
U-238	-3.065E-8	5.379E-8	1.108E-7	4.911E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01572

Analytical Batch: ARS1-B22-01136

Analysis: Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01572-001	FB-071822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01572-002	MSB01-071822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01572-003	MSB02-071822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01572-004	MSB113A-071822	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01136-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01136-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01136-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01137
Lab Sample ID: ARS1-B22-01137-01
Method: Eichrom ACW10

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/16/22 22:26

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Th-230	5.237E-6	5.915E-6		uCi/filter	112.9	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01137
Lab Sample ID: ARS1-B22-01137-02
Method: Eichrom ACW10

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/16/22 22:26

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Th-230	5.212E-6	6.248E-6		uCi/filter	119.9	75 - 125	5.5	25	0.553	3

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QC Sample Results

Analytical Batch: ARS1-B22-01137
Lab Sample ID: ARS1-B22-01137-03
Method: Eichrom ACW10

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/16/22 22:26

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Th-228	-9.891E-9	5.607E-8	1.156E-7	4.889E-8	U	uCi/filter
Th-230	4.086E-8	4.529E-8	7.081E-8	2.655E-8	U	uCi/filter
Th-232	-5.709E-9	1.886E-8	5.515E-8	1.873E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01572

Analytical Batch: ARS1-B22-01137

Analysis: Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01572-001	FB-071822	Air Filter	Eichrom ACW10	N/A
ARS1-22-01572-002	MSB01-071822	Air Filter	Eichrom ACW10	N/A
ARS1-22-01572-003	MSB02-071822	Air Filter	Eichrom ACW10	N/A
ARS1-22-01572-004	MSB113A-071822	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01137-01	Lab Control Sample	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01137-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01137-03	Method Blank	Air Filter	Eichrom ACW10	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01138
Lab Sample ID: ARS1-B22-01138-01
Method: EPA 9315

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/24/22 10:01

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Ra-226	2.751E-5	2.782E-5		uCi/filter	101.1	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01138
Lab Sample ID: ARS1-B22-01138-02
Method: EPA 9315

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/24/22 10:01

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Ra-226	2.762E-5	2.485E-5		uCi/filter	90.0	75 - 125	11.3	25	0.966	3

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QC Sample Results

Analytical Batch: ARS1-B22-01138
Lab Sample ID: ARS1-B22-01138-03
Method: EPA 9315

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/24/22 10:01

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Ra-226	5.932E-8	5.695E-8	8.536E-8	3.326E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01572

Analytical Batch: ARS1-B22-01138

Analysis: Radium-226 in Air Filter

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01572-001	FB-071822	Air Filter	EPA 9315	N/A
ARS1-22-01572-002	MSB01-071822	Air Filter	EPA 9315	N/A
ARS1-22-01572-003	MSB02-071822	Air Filter	EPA 9315	N/A
ARS1-22-01572-004	MSB113A-071822	Air Filter	EPA 9315	N/A
ARS1-B22-01138-01	Lab Control Sample	Air Filter	EPA 9315	N/A
ARS1-B22-01138-02	Lab Control Sample Duplicate	Air Filter	EPA 9315	N/A
ARS1-B22-01138-03	Method Blank	Air Filter	EPA 9315	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01139
Lab Sample ID: ARS1-B22-01139-01
Method: Eichrom SRW01

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/18/22 10:56

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
SR-90	1.980E-5	2.312E-5		uCi/filter	116.8	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01139
Lab Sample ID: ARS1-B22-01139-02
Method: Eichrom SRW01

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/18/22 10:56

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
SR-90	1.976E-5	2.112E-5		uCi/filter	106.9	75 - 125	9.0	25	0.817	3

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QC Sample Results

Analytical Batch: ARS1-B22-01139
Lab Sample ID: ARS1-B22-01139-03
Method: Eichrom SRW01

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/18/22 10:56

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
SR-90	1.450E-7	2.689E-7	4.619E-7	2.135E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01572 **Analytical Batch:** ARS1-B22-01139

Analysis: Strontium-90 in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01572-001	FB-071822	Air Filter	Eichrom SRW01	N/A
ARS1-22-01572-002	MSB01-071822	Air Filter	Eichrom SRW01	N/A
ARS1-22-01572-003	MSB02-071822	Air Filter	Eichrom SRW01	N/A
ARS1-22-01572-004	MSB113A-071822	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01139-01	Lab Control Sample	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01139-02	Lab Control Sample Duplicate	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01139-03	Method Blank	Air Filter	Eichrom SRW01	N/A

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01095**
SDG	**ARS1-22-01572**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Method	**EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

			Analysis Date	08/04/22 13:37	Analysis Technician	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**Expected Value**	**LCS Rec (%)**	**MDC**
ARS1-B22-01095-01	**LCS**	AM-241	31.665	2.471	33.065	95.8	0.157
ARS1-B22-01095-01	**LCS**	CO-60	21.724	1.283	20.928	103.8	0.538
ARS1-B22-01095-01	**LCS**	CS-137	12.908	0.729	12.996	99.3	0.099

Duplicate RER/DER/RPD

			Analysis Date	08/04/22 13:48	Analysis Technician	[redacted]	
Analyte	**Results LCS**	**CSU LCS (2s)**	**Results LCSD**	**CSU LCSD (2s)**	**DER**	**RPD**	
AM-241	31.665	2.471	31.483	2.457	0.102	0.6	
CO-60	21.724	1.283	22.067	1.291	0.369	1.6	
CS-137	12.908	0.729	13.642	0.764	1.363	5.5	

Duplicate RER/DER/RPD (Dup Sample)

			Analysis Date	08/08/22 14:04	Analysis Technician	[redacted]	
Analysis Batch Sample ID	**Analyte**	**Results DO**	**CSU DO (2s)**	**Results DUP**	**CSU DUP (2s)**	**DER**	**RPD**
ARS1-B22-01095-08	CO-60	-3.189E-7	9.418E-7	-5.919E-7	1.007E-6	0.388	NC
ARS1-B22-01095-08	CS-137	-7.662E-9	7.827E-7	-4.070E-7	7.368E-7	0.728	NC
ARS1-B22-01095-08	RA-226	-7.049E-6	1.346E-5	3.859E-6	7.308E-6	1.396	NC

Method Blank

			Analysis Date	08/08/22 14:02	Analysis Technician	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**MDC**	**Qual**	
ARS1-B22-01095-03	**MBL**	CO-60	4.273E-4	8.510E-4	9.270E-4	U	
ARS1-B22-01095-03	**MBL**	CS-137	3.859E-4	6.982E-4	8.110E-4	U	
ARS1-B22-01095-03	**MBL**	RA-226	-0.004	0.014	0.015	U	

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01135**
SDG	**ARS1-22-01572**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

			Analysis Date	08/17/22 21:23	**Analysis Technician**	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**Expected Value**	**LCS Rec (%)**	**MDC**
ARS1-B22-01135-01	**LCS**	PU-239/240	7.505E-6	9.653E-7	7.684E-6	97.7	1.134E-7

Duplicate RER/DER/RPD

			Analysis Date	08/17/22 21:23	**Analysis Technician**	[redacted]	
Analyte	**Results LCS**	**CSU LCS (2s)**	**Results LCSD**	**CSU LCSD (2s)**	**DER**	**RPD**	
PU-239/240	7.505E-6	9.653E-7	7.913E-6	1.012E-6	0.572	5.3	

Method Blank

			Analysis Date	08/17/22 21:23	**Analysis Technician**	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**MDC**	**Qual**	
ARS1-B22-01135-03	**MBL**	PU-239/240	-1.811E-8	2.738E-8	6.415E-8	U	

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01136**
SDG	**ARS1-22-01572**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/17/22 21:21	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01136-01	**LCS**	U-238	8.038E-6	1.006E-6	8.239E-6	97.6	4.082E-8

Duplicate RER/DER/RPD

Analysis Date	08/17/22 21:21	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
U-238	8.038E-6	1.006E-6	8.123E-6	1.017E-6	0.116	1.0

Method Blank

Analysis Date	08/17/22 21:21	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01136-03	**MBL**	U-234	2.318E-9	6.108E-8	1.145E-7	U
ARS1-B22-01136-03	**MBL**	U-235	2.485E-8	3.620E-8	6.170E-8	U
ARS1-B22-01136-03	**MBL**	U-238	-3.065E-8	5.379E-8	1.108E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01137**
SDG	**ARS1-22-01572**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Method	**Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/16/22 22:26	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01137-01	**LCS**	TH-230	5.915E-6	8.154E-7	5.237E-6	112.9	1.161E-7

Duplicate RER/DER/RPD

Analysis Date	08/16/22 22:26	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
TH-230	5.915E-6	8.154E-7	6.248E-6	8.536E-7	0.553	5.5

Method Blank

Analysis Date	08/16/22 22:26	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01137-03	**MBL**	TH-228	-9.891E-9	5.607E-8	1.156E-7	U
ARS1-B22-01137-03	**MBL**	TH-230	4.086E-8	4.529E-8	7.081E-8	U
ARS1-B22-01137-03	**MBL**	TH-232	-5.709E-9	1.886E-8	5.515E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01138**
SDG	**ARS1-22-01572**
Analysis	**Radium-226 in Air Filter**
Method	**Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/24/22 10:01	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01138-01	**LCS**	RA-226	2.782E-5	4.505E-6	2.751E-5	101.1	9.466E-8

Duplicate RER/DER/RPD

Analysis Date	08/24/22 10:01	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
RA-226	2.782E-5	4.505E-6	2.485E-5	4.028E-6	0.966	11.3

Method Blank

Analysis Date	08/24/22 10:01	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01138-03	**MBL**	RA-226	5.932E-8	5.695E-8	8.536E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01139**
SDG	**ARS1-22-01572**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Method	**Eichrom SRW01,HASL 300 Sr-01-RC/Sr-02-**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/18/22 10:56	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01139-01	**LCS**	SR-90	2.312E-5	3.527E-6	1.980E-5	116.8	4.169E-7

Duplicate RER/DER/RPD

Analysis Date	08/18/22 10:56	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
SR-90	2.312E-5	3.527E-6	2.112E-5	3.238E-6	0.817	9.0

Method Blank

Analysis Date	08/18/22 10:56	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01139-03	**MBL**	SR-90	1.450E-7	2.689E-7	4.619E-7	U

Analytical Batch	ARS1-B22-01095
SDG	ARS1-22-01572
Analysis	Gamma Spec (Short) in (Air Filters, Smears
Analysis Test Method	/EPA 901.1M
Analysis Code	GAM-A-AF
Report Units	uCi/filter

Z Values per Analytical Batch

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	ZLCS	<= 3
Matrix Spike	ZMS	<= 3
Method Blank	ZBLANK	<= 3
Duplicate	ZDUP	<= 3

Laboratory Control Sample

Analysis Date: 08/04/22 13:37 | Analysis Technician: [redacted]

QC Type	Analyte	Results	CSU (1s)	Expected Value	CSU (1s)	Z
LCS	AM-241	31.665	1.261	33.065	0.001	1.110
LCSD	AM-241	31.483	1.254	33.065	0.001	1.262
LCS	CO-60	21.724	0.655	20.928	5.860E-4	1.216
LCSD	CO-60	22.067	0.659	20.928	5.860E-4	1.730
LCS	CS-137	12.908	0.372	12.996	3.119E-4	0.236
LCSD	CS-137	13.642	0.390	12.996	3.119E-4	1.658

Method Blank

Analysis Date: 08/08/22 14:02 | Analysis Technician: [redacted]

QC Type	Analyte	Results	CSU (1s)	Z
MBL	CS-137	3.859E-4	3.562E-4	1.083
MBL	CO-60	4.273E-4	4.342E-4	0.984
MBL	RA-226	-0.004	0.007	0.572

Duplicate Sample

Analysis Date: 08/08/22 14:04 | Analysis Technician: [redacted]

QC Type	Analyte	Results Dup	CSU (1s)	Results DO	CSU (1s)	Z
DUP	RA-226	3.859E-6	3.729E-6	-7.049E-6	6.869E-6	1.396
DUP	CO-60	-5.919E-7	5.140E-7	-3.189E-7	4.805E-7	0.388
DUP	CS-137	-4.070E-7	3.759E-7	-7.662E-9	3.993E-7	0.728
LCSD	AM-241	31.483	1.254	31.665	1.261	0.102
LCSD	CO-60	22.067	0.659	21.724	0.655	0.369
LCSD	CS-137	13.642	0.390	12.908	0.372	1.363

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01135**
SDG	**ARS1-22-01572**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/17/22 21:23	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	PU-239/240	7.505E-6	4.925E-7	7.684E-6	1.263E-7	0.352
LCSD	PU-239/240	7.913E-6	5.162E-7	7.551E-6	1.263E-7	0.682

Method Blank	**Analysis Date**	08/17/22 21:23	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	PU-239/240	-1.811E-8	1.397E-8	1.297

Duplicate Sample	**Analysis Date**	08/17/22 21:23	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	PU-239/240	7.913E-6	5.162E-7	7.505E-6	4.925E-7	0.572

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01136**
SDG	**ARS1-22-01572**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Analysis Test Method	**/Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/17/22 21:21	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	U-238	8.038E-6	5.133E-7	8.239E-6	3.939E-8	0.391
LCSD	U-238	8.123E-6	5.186E-7	8.255E-6	3.939E-8	0.254

Method Blank	**Analysis Date**	08/17/22 21:21	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	U-234	2.318E-9	3.116E-8	0.074
MBL	U-235	2.485E-8	1.847E-8	1.345
MBL	U-238	-3.065E-8	2.744E-8	1.117

Duplicate Sample	**Analysis Date**	08/17/22 21:21	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	U-238	8.123E-6	5.186E-7	8.038E-6	5.133E-7	0.116

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01137**
SDG	**ARS1-22-01572**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Analysis Test Method	**/Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/16/22 22:26	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	TH-230	5.915E-6	4.160E-7	5.237E-6	1.018E-7	1.581
LCSD	TH-230	6.248E-6	4.355E-7	5.212E-6	1.018E-7	2.316

Method Blank	**Analysis Date**	08/16/22 22:26	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	TH-228	-9.891E-9	2.861E-8	0.346
MBL	TH-230	4.086E-8	2.311E-8	1.768
MBL	TH-232	-5.709E-9	9.621E-9	0.593

Duplicate Sample	**Analysis Date**	08/16/22 22:26	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	TH-230	6.248E-6	4.355E-7	5.915E-6	4.160E-7	0.553

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01138**
SDG	**ARS1-22-01572**
Analysis	**Radium-226 in Air Filter**
Analysis Test Method	**/Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/24/22 10:01	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	RA-226	2.782E-5	2.298E-6	2.751E-5	3.221E-7	0.133
LCSD	RA-226	2.485E-5	2.055E-6	2.762E-5	3.221E-7	1.334

Method Blank	**Analysis Date**	08/24/22 10:01	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	RA-226	5.932E-8	2.905E-8	2.042

Duplicate Sample	**Analysis Date**	08/24/22 10:01	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	RA-226	2.485E-5	2.055E-6	2.782E-5	2.298E-6	0.966

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01139**
SDG	**ARS1-22-01572**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Analysis Test Method	**/Eichrom SRW01,HASL 300 Sr-01-RC/Sr-02-**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/18/22 10:56	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	SR-90	2.312E-5	1.799E-6	1.980E-5	3.425E-7	1.812
LCSD	SR-90	2.112E-5	1.652E-6	1.976E-5	3.425E-7	0.808

Method Blank	**Analysis Date**	08/18/22 10:56	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	SR-90	1.450E-7	1.372E-7	1.057

Duplicate Sample	**Analysis Date**	08/18/22 10:56	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	SR-90	2.112E-5	1.652E-6	2.312E-5	1.799E-6	0.817

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Sample Management Records

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
[redacted]
1655 Grant Street, Suite 1200, Concord, CA 94520
[redacted]

COC # KT072722RADB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: ARS Aleut Analytical (AAA), Port Allen, LA	Event: **Parcel B Air Monitoring RAD**
Project Number: J310000900	POC: [redacted]@aaa.aleutfederal.com	
WBS Code: J310000900	Ship to: 2609 North River Road, Port Allen, LA 70767-3469	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
5	1x 250-mL Plastic, 4 Degrees C
15	1x 250-mL Plastic, 4 Degrees C

						Analytical Test Method	A01RM - Th-232 U-235	E901.1 - Gamma Spec Air Monitoring CS	E903.1 - Radium 226	E905.0 - Sr-90	U02RC - Pu-239									
	Event: Parcel B Air Monitoring RAD						15	15	15	5	15									
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	FB-071822	AQ	07/18/2022	0800	KT	X	X	X	X	X						FIELDQC	FB1	0.00	0.00	1	
2	MSB01-071822	A	07/22/2022	0804	KT	X	X	X	X	X						MSB01	N1	0.00	0.00	1	TOTAL FLOW = 357,960 (L)
3	MSB02-071822	A	07/22/2022	0734	KT	X	X	X	X	X						MSB02	N1	0.00	0.00	1	TOTAL FLOW = 356,640 (L)
4	MSB113A-071822	A	07/22/2022	0749	KT	X	X	X	X	X						MSB113A	N1	0.00	0.00	1	TOTAL FLOW = 357,240 (L)
5																N/A					
6				N/A																	

Turnaround Time: NA

Relinquished by: *(Signature)*	**Date**	**Time**	**Received by:** *(Signature)*	**Date**	**Time**
[redacted]	7-27-22	1600	FEDEX	7-27-22	1600
			[redacted]	7/28/22	1000

Shipping Date / Carrier / Airbill Number

Shipping Date: 7/27/2022/FedEx/ 7774 9311 7636

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
July 26, 2022

Red font = field entry

Procedures: GES-003 / EPA 900.0M

File ID Number: _____

	Sample ID	Date In:	Time In:	Date Out:	Time Out:	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)	Total Run Time (Hours)	Total Run Time (Minutes)	Average Flow Rate (LPM)	Initial Flow Rate (CFM)	Final Flow Rate (CFM)	Average Flow Rate (CFM)	Average Flow Rate (Cu.M/h)	Flow Rate (Cu.M/min)	Total Flow (L)
1	MSB01-071822	07/18/22	4:38	07/22/22	8:04	60	60	358.0	203	4.14	99.43	5966.0	60	2.11888	2.11888	2.11888	3.6	0.06	357960
2	MSB02-071822	07/18/22	4:30	07/22/22	7:34	60	60	356.6	203	4.13	99.07	5944.0	60	2.11888	2.11888	2.11888	3.6	0.06	356640
3	MSB0113A-071822	07/18/22	4:35	07/22/22	7:48	60	60	357.2	203	4.13	99.23	5954.0	60	2.11888	2.11888	2.11888	3.6	0.06	357240
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			

FORMULAS

Number of Days = (Date Out +Time Out) minus (Date In+Time In)

Number of Minutes = # of Days X 24hr X 60min

Flow Rate (m3/h) = Flow Rate (CFM) x 60min x (12in x 2.54cm/in / 100cm/m)^3

Mid-Sample Date/Time = [(Date+Time Out) + (Date+Time In)] / 2

Flow Rate (Cu.M/min) = CFM X 0.0283168466 Cu.M/CF

Flow Rate (LPM) = Cu.M X 1000

Total Flow (L) = LPM X Total Minutes

SDG Report - Samples and Containers

SDG Specific Data							
SDG	ARS1-22-01572		TAT Days	28 Calendar Days	Project Type	Environmental
Sample Count	4	Rpt Level 4	Date Received	07/28/2022	COC Number	KT072722RADB
Client	Gilbane Federal		Discrepancy Resol	N/A	PO Number	
Client Code	1138		Client Deadline	08/25/2022	Job Number	J310000900
Profile Number	PN-01411				Job Location	Parcel B Air Monitoring RAD
Comment						

Samples and Containers Checked In Thus Far

FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Comments
001	FB-071822	Air Filter	07/18/2022 07:59	07/18/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421559	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/18/2022 07:59	AF Volume (CuM):		0.001		
002	MSB01-071822	Air Filter	07/22/2022 08:03	07/22/2022 08:04	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421560	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/22/2022 08:03	AF Volume (CuM):		0.001		
003	MSB02-071822	Air Filter	07/22/2022 07:33	07/22/2022 07:34	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421561	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/22/2022 07:33	AF Volume (CuM):		0.001		
004	MSB113A-071822	Air Filter	07/22/2022 07:48	07/22/2022 07:49	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421562	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/22/2022 07:48	AF Volume (CuM):		0.001		

SDG Report - Analysis Assignments

SDG	ARS1-22-01572	Sample Count	4
Client	Gilbane Federal	Analysis Count	6-24

Sample Count Totals Per Analysis

Analysis Code	Analysis Description	In/Out	Samples Count
ASP-PU239-AF	Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-TH-AF	Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-U-AF	Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
GAM-A-AF	Gamma Spec (Short) in (Air Filters, Smears [AF])	I	4
GPC-RA226-AF	Radium-226 in Air Filter	I	4
GPC-SR90-AF	Strontium-90 in (Air Filters, Smears [AF])	I	4

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-PU239-AF	X
001	ASP-TH-AF	X
001	ASP-U-AF	X
001	GAM-A-AF	X
001	GPC-RA226-AF	X
001	GPC-SR90-AF	X
002	ASP-PU239-AF	X
002	ASP-TH-AF	X
002	ASP-U-AF	X
002	GAM-A-AF	X
002	GPC-RA226-AF	X
002	GPC-SR90-AF	X
003	ASP-PU239-AF	X
003	ASP-TH-AF	X
003	ASP-U-AF	X
003	GAM-A-AF	X
003	GPC-RA226-AF	X
003	GPC-SR90-AF	X
004	ASP-PU239-AF	X
004	ASP-TH-AF	X
004	ASP-U-AF	X
004	GAM-A-AF	X
004	GPC-RA226-AF	X
004	GPC-SR90-AF	X

DQO Report for SDG

ARS1-22-01572

Client Name: Gilbane Federal Profile Name: Parcel B Rad Sampling Report Level: 4

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time					
ASP-PU239-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Pu-239/240 (15117-48-3)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-TH-AF	WRAD	uCi	filter	N/A	PALA-RAD-031						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Th-232 (7440-29-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-U-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	U-235 (15117-96-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GAM-A-AF	WGAM	uCi	filter	N/A	PALA-RAD-007						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Co-60 (10198-40-0)			0.00024 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Cs-137 (10045-97-3)			0.00048 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-RA226-AF	WRAD	uCi	filter		PALA-RAD-008						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-SR90-AF	WRAD	uCi	filter	N/A	PALA-RAD-032						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Sr-90 (10098-97-2)			2.4E-05 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A

Analysis Code	Fraction	Units	Aliquot	Conductivity	Analyte Count
ASP-PU239-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-TH-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-U-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	

ASP-U-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
GAM-A-AF	001	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	002	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	003	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	004	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	

GPC-SR90-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

Sample Custodian: [redacted] Survey Start Date: 7/28/22 Survey Start Time: 1014

Thermometer ID: E0067010585 Calibration Due Date: 2-28-23 pH Paper Lot# NA

Exposure Rate Meter + Probe Unit ID: PR3844C9/273629 Calibration Due Date: 5-27-22 Background: 4 µR/hr

Count Rate Meter + Probe Unit ID: PR368083/331788 Calibration Due Date: 9-22-22 Background: 20 cpm

Delivery Type (circle one): Direct Lock Box (Commercial Carrier) FEDEX Total # of ESCs: 1

*True temperature is recorded which includes any applicable correction factors.

External Shipping Container Tracking:	Exposure Rate (µR/hr) (limit <500 µR/hr)	Max External Swipe Counts (cpm)	Max Internal Swipe Counts (cpm)	ESC True Temps* (°C)	TRAX Matrix ID (circle all that apply): (See Section 4.3 of SOP)
A: 777493117636	4	20	40		AQ WD WG WO
B:					WS WW SI UR
C:					SO OL BI VG
D:					WP (SM) (AF) COW 7/29/22
E:					
F:					

Visual Inspection: *(Circle response)*
External Shipping Container

Good Condition with no Leaks or Tears	(Yes)	No	
Marked Radioactive	Yes	(No)	
UN2910	Yes	(No)	
Security Seals	(Yes)	No	
If yes, intact?	(Yes)	No	N/A
Internal Shipping Container			
COC's Present	(Yes)	No	
Well packaged container with no signs of leakage	(Yes)	No	

COC/Sample Inspection *(Circle response)*

Sample Containers in good condition	(Yes)	No	
No spills or leaks	(Yes)	No	
Marked Radioactive	Yes	(No)	
Durable labels w/indelible ink	(Yes)	No	
COC reliquished/received correctly	(Yes)	No	
Adequate volume/filled correctly	(Yes)	No	
Hold Time sufficient for analysis	(Yes)	No	
For VOC/Radon, Head space?	Yes	(No)	N/A
If yes, <6mm?	Yes	No	(N/A)
# of containers received matches # on COC	(Yes)	No	
Samples received on ice?	Yes	(No)	
Type (circle one):	Bagged Ice	Loose Ice	Blue Ice (N/A)

Comments:

ARS Aleut Analytical

PALA Sample Survey Form

Client Name: Gilbane

SDG: ARS1-22-01572

Sample Survey Form
PALA-SR-001-FM-02 r 0.1
Effective 08/30/2019

Pipette ID: NA Tip Lot#: NA

Disposible pipette lot#: NA

Sample ID from Client on COC or Sample	ESC Letter	Sample Container Type	Approx. Fill Level (%)	pH <2 is Acceptable: pH As Rec'd	pH Adjusted	Acid Lot # or Ind container temp (°C)	Vol. of Acid Used (mL)	Acceptance Limits <100 cpm/cm: cpm
FB-071822	A	2 plo	25	NA	NA	NA	NA	40
MSB01-071822	↓	↓	↓	↓	↓	↓	↓	↓
MSB02-071822								
MSB113A-071822								

Sample Custodian: [redacted] Survey End Date: 7/28/22 Survey/pH End Time: 1018

pH re-check required? YES or NO *NOTE: Any metals sample acidified at sample receiving must be re-checked after a 24 hour hold.*

If YES: pH re-check date/time: _____/_____ Analyst: _____ pH strip lot #: _____

Were all re-checked samples' pH < 2? YES or NO*

**If no, complete and send to Project Management:*
1. Section A of PALA-SR-001-FM-05 (24 Hour Hold pH Readjustment)
2. SR section of PALA-SR-001-FM-03 (Discrepant Sample Receipt Report).

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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Port Allen, Louisiana 70767
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ARS Aleut Analytical, LLC

Laboratory Analytical Report

ARS1-22-01634

Gilbane Federal
[redacted]
1655 Grant Street
Suite 1200
Concord, CA 94520
[redacted]

COC Number: **KT080322RADB**
Job Number: **J31000900**
Job Location: **Parcel B Air Monitoring RAD**
Sample ID Prefix: **MS**
Project Name: **HSP, Parcel B Removal Site Evaluation**

Questions regarding this analytical report should be addressed to ARS project manager, Gabe Culberson, who can be reached by email at projectmanagers@aaa.aleutfederal.com.

I certify that the test results presented in this report (in either hardcopy or electronic file (EDD)) meet the requirements of the laboratory's certifications and other applicable contract terms and conditions. A full list of the Port Allen, LA laboratory's certifications is provided with this report. Any exceptions to the certification or contract will be noted within the case narratives presented in the report. Any subcontracted sample results will be identified within the case narratives presented in the report. In the event this report is an amendment to a previously released report, the case narrative will clearly identify the original report as well as the reason(s) for reissuance. A statement of uncertainty for each analysis is available upon request. I authorize release and issuance of this report on the date signed below.

Signature	Date	Title
		Laboratory Management, ARS Aleut Analytical

This report provides analytical results of the requested analysis and does not include any opinions or interpretations. ARS Aleut Analytical, LLC assumes no liability for the use or interpretation of analytical results. Results relate only to items tested. A partial reproduction of this test report is prohibited. Reproduction of this report in full requires the written approval of the laboratory.

LELAP Cert # 01949

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Certifications and Accreditations List

State or Accrediting Body (AB)	Certificate Number
AIHA LAP, LLC	209312
Alaska	LA01131
California	3085
ANAB DoD	ADE-1489
ANAB DOE	ADE-1489.01
Louisiana DEQ - NELAC	01949
Louisiana DHH	LA022
Nevada	LA011312023-1
New Jersey	LA009
New York	65039
Pennsylvania	68-04294-011
Texas	T104704447-21-17
Utah	LA011312022-13
Washington	C1010

For additional information related to the specific matrices, methods, and analytes recognized by each accrediting body, contact us at QA@aaa.aleutfederal.com for additional information.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Case Narrative

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PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs

Client Sample ID	ARS Aleut Analytical Sample ID
MSB01-072522	ARS1-22-01634-001
MSB01-072522D	ARS1-22-01634-002
MSB02-072522	ARS1-22-01634-003
MSB113A-072522	ARS1-22-01634-004
FB-072522	ARS1-22-01634-005

Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
001	07/29/22 08:23	08/04/22	ASP-PU239-AF	As Received	08/17/22 08:39	08/24/22 22:17
001	07/29/22 08:23	08/04/22	ASP-TH-AF	As Received	08/17/22 10:22	08/23/22 22:37
001	07/29/22 08:23	08/04/22	ASP-U-AF	As Received	08/17/22 10:19	08/24/22 22:20
001	07/29/22 08:23	08/04/22	GAM-A-AF	As Received	N/A	08/11/22 14:10
001	07/29/22 08:23	08/04/22	GPC-RA226-AF	As Received	08/17/22 10:29	08/31/22 09:11
001	07/29/22 08:23	08/04/22	GPC-SR90-AF	As Received	08/17/22 10:26	08/24/22 10:21
002	07/29/22 08:25	08/04/22	ASP-PU239-AF	As Received	08/17/22 08:39	08/24/22 22:17
002	07/29/22 08:25	08/04/22	ASP-TH-AF	As Received	08/17/22 10:22	08/23/22 22:37
002	07/29/22 08:25	08/04/22	ASP-U-AF	As Received	08/17/22 10:19	08/24/22 22:20
002	07/29/22 08:25	08/04/22	GAM-A-AF	As Received	N/A	08/11/22 14:13
002	07/29/22 08:25	08/04/22	GPC-RA226-AF	As Received	08/17/22 10:29	08/31/22 09:11
002	07/29/22 08:25	08/04/22	GPC-SR90-AF	As Received	08/17/22 10:26	08/24/22 10:21
003	07/29/22 08:00	08/04/22	ASP-PU239-AF	As Received	08/17/22 08:39	08/24/22 22:17
003	07/29/22 08:00	08/04/22	ASP-TH-AF	As Received	08/17/22 10:22	08/23/22 22:37

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003	07/29/22 08:00	08/04/22	ASP-U-AF	As Received	08/17/22 10:19	08/24/22 22:20
003	07/29/22 08:00	08/04/22	GAM-A-AF	As Received	N/A	08/12/22 14:23
003	07/29/22 08:00	08/04/22	GPC-RA226-AF	As Received	08/17/22 10:29	08/31/22 09:11
003	07/29/22 08:00	08/04/22	GPC-SR90-AF	As Received	08/17/22 10:26	08/24/22 10:21
004	07/29/22 08:10	08/04/22	ASP-PU239-AF	As Received	08/17/22 08:39	08/24/22 22:17
004	07/29/22 08:10	08/04/22	ASP-TH-AF	As Received	08/17/22 10:22	08/23/22 22:37
004	07/29/22 08:10	08/04/22	ASP-U-AF	As Received	08/17/22 10:19	08/24/22 22:20
004	07/29/22 08:10	08/04/22	GAM-A-AF	As Received	N/A	08/13/22 11:22
004	07/29/22 08:10	08/04/22	GPC-RA226-AF	As Received	08/17/22 10:29	08/31/22 09:11
004	07/29/22 08:10	08/04/22	GPC-SR90-AF	As Received	08/17/22 10:26	08/24/22 10:21
005	07/25/22 08:00	08/04/22	ASP-PU239-AF	As Received	08/17/22 08:39	08/24/22 22:17
005	07/25/22 08:00	08/04/22	ASP-TH-AF	As Received	08/17/22 10:22	08/23/22 22:37
005	07/25/22 08:00	08/04/22	ASP-U-AF	As Received	08/17/22 10:19	08/24/22 22:20
005	07/25/22 08:00	08/04/22	GAM-A-AF	As Received	N/A	08/13/22 11:25
005	07/25/22 08:00	08/04/22	GPC-RA226-AF	As Received	08/17/22 10:29	08/31/22 09:11
005	07/25/22 08:00	08/04/22	GPC-SR90-AF	As Received	08/17/22 10:26	08/24/22 10:21

SAMPLE RECEIPT/PREP

The samples arrived in good condition. There was a discrepancy upon receipt which was resolved on 08/04/2022. The samples were screened for radioactive contamination as per procedure **PALA-SR-001-SOP Sample Receiving**. Sample date(s) and time(s) are listed as provided by the client. In regard to the Air Filters, no flow rate information was provided by the client. Turnaround time was set at 28 calendar days, starting from the resolution of the discrepancy.

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ANALYTICAL METHODS

Pu-239/240 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Th-232 analysis was performed using **PALA-RAD-031, "Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom ACW-08 & Eichrom ACW-10)"**.

U-235 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Co-60, Cs-137, Ra-226 analyses were performed using **PALA-RAD-007, "Modified Gamma Emitting Radionuclides in Soil, Air, and Biota Matrices (EPA 901.1 Mod, SM 7120B, & HASL-300 Ga-01-R)"**.

Ra-226 analysis was performed using **PALA-RAD-008, "Alpha Emitting Radium Isotopes in Water (EPA 903.0, EPA 9315, SM 7500-Ra C, SM 7500-Ra C)"**.

Sr-90 analysis was performed using **PALA-RAD-032, "Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom SRW01, EPA 905.0, HASL 300 Sr-01-RC)"**.

ANALYTICAL RESULTS

Batch ARS1-B22-01125: DUP and/or parent sample value(s) for Co-60 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01125: DUP and/or parent sample value(s) for Cs-137 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01125: DUP and/or parent sample value(s) for Ra-226 are below the MDC, RPD is not applicable.

Fraction 002 has elevated MDC for Pu-239/240 with ACT of -4.263E-8 uCi/filter, MDC of 2.032E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for U-235 with ACT of 3.408E-9 uCi/filter, MDC of 2.305E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Th-232 with ACT of 9.290E-9 uCi/filter, MDC of 1.736E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Ra-226 with ACT of 1.129E-6 uCi/filter, MDC of 9.347E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 003 has elevated MDC for Pu-239/240 with ACT of -1.114E-7 uCi/filter, MDC of 2.667E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for U-235 with ACT of 3.796E-8 uCi/filter, MDC of 1.663E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Th-232 with ACT of 4.594E-8 uCi/filter, MDC of 1.618E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Ra-226 with ACT of 6.323E-7 uCi/filter, MDC of 9.510E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 004 has elevated MDC for Pu-239/240 with ACT of -7.679E-8 uCi/filter, MDC of 2.682E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for U-235 with ACT of -6.157E-8 uCi/filter, MDC of 2.301E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Th-232 with ACT of -1.871E-8 uCi/filter, MDC of 1.683E-7 uCi/filter and

CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Ra-226 with ACT of 1.220E-6 uCi/filter, MDC of 1.533E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 005 has elevated MDC for Pu-239/240 with ACT of 2.079E-8 uCi/filter, MDC of 2.430E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 005 has elevated MDC for U-235 with ACT of 3.918E-9 uCi/filter, MDC of 2.649E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 005 has elevated MDC for Th-232 with ACT of 7.483E-8 uCi/filter, MDC of 1.031E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 005 has elevated MDC for Ra-226 with ACT of -4.012E-6 uCi/filter, MDC of 9.770E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.

ARS1-B22-01164: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01165: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01166: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01166: FWHM greater than 100 keV for Th-229 on batch samples -01, -02, -03, -06, and -08.

ARS1-B22-01166: FWHM greater than 100 keV for Th-232 and Th-228 on batch sample -01 possibly due to software artifacts.

For batch ARS1-B22-01125, sample “MSB01-072522” (ARS1-22-01634-001) was used as the Sample Duplicate.

Notes (Case Narrative)

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23)
DO	Duplicate Original
DUP	Sample Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MBL	Method Blank
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NC	Not Calculated
NP	Not Provided
NR	Not Referenced
PQL	Practical Quantitation Limit

Data Qualifiers:

B	The result of both the method blank and the target sample are above the MDL.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the LOD but below the LOQ, or above the MDL but below the PQL.
Q	One or more quality control criteria failed.
U	Result is below the MDA, MDL, PQL, LOD, or LOQ
*	LCS/LCSD or Sample DUP fails all Duplicate criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected
‡	Method/Matrix/Analyte not accredited for this certification

Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

8.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.

9.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Non-Potable Water**:
Gross Alpha and Gross Beta (EPA 900.0, EPA 9310); Radium 226 (EPA 903.0, EPA 903.1, EPA 9315); Radium 228 (EPA 904.0, EPA 9320); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7470A); Strontium-89 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-02-RC); Tritium (EPA 906.0); Enriched Tritium (ARS-040), Carbon-14 (ARS-019), Tritium/Carbon (ARS-151); Gamma Emitters (EPA 901.1, SM 7120B, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-10); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02)

10.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Solid and Chemical Materials**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7471B); Strontium-89 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-02); Tritium (EPA 906.0 Mod); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-01-RC); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-02-RC, HASL 300 Pu-03-RC); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03, HASL 300 U-02, HASL 300 U-04); Technetium-99 (Eichrom TCS01)

11.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Air and Emissions**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); Strontium-89 (Eichrom SRW01, HASL 300 Sr-01-RC); Strontium-90 (Eichrom SRW01, HASL 300 Sr-02-RC); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02, Eichrom TCS01)

General Comments:

1.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of “M” or “Mod” to the procedure number (i.e. 901.1M, 901.1 Mod).

2.0) All NIOSH method results are reported without blank corrections applied.

3.0) Basis: “As Received” = analyzed as received from client; “Dry” = dried prior to being analyzed; “Dry Weight Corrected” = analyzed as received; result corrected for percent moisture.

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ARS Aleut Analytical, LLC
Analytical Reports

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Analytical Results

ARS Aleut Analytical

2609 North River Road • Port Allen, Louisiana 70767

(225) 228-1394 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-22-01634
Client Sample ID: MSB01-072522
Sample Collection Date: 07/29/22 8:23
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J31000900
ARS Sample ID: ARS1-22-01634-001
Date Received: 08/04/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-4.940E-8	1.855E-7	3.749E-7	1.631E-7	4.8E-08	U	uCi/filter	08/24/22 22:17	[redacted]	52.9%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	5.005E-8	5.696E-8	4.521E-8	0.000	4.8E-08		uCi/filter	08/23/22 22:37	[redacted]	61.6%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	1.137E-8	7.011E-8	1.827E-7	5.028E-8	4.8E-08	U	uCi/filter	08/24/22 22:20	[redacted]	40.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-4.600E-7	9.730E-7	1.057E-6	5.285E-7	0.00024	U	uCi/filter	08/11/22 14:10	[redacted]	N/A
Cs-137	-3.731E-7	8.526E-7	9.898E-7	4.949E-7	0.00048	U	uCi/filter	08/11/22 14:10	[redacted]	N/A
Ra-226	6.259E-6	1.380E-5	1.513E-5	7.565E-6	4.4E-06	U	uCi/filter	08/11/22 14:10	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	2.301E-7	4.792E-7	8.901E-7	3.251E-7	4.4E-06	U	uCi/filter	08/31/22 9:11	[redacted]	37.1%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	4.388E-7	1.220E-6	2.140E-6	9.864E-7	2.4E-05	U	uCi/filter	08/24/22 10:21	[redacted]	85.3%

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ARS Sample Delivery Group: ARS1-22-01634
Client Sample ID: MSB01-072522D
Sample Collection Date: 07/29/22 8:25
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J31000900
ARS Sample ID: ARS1-22-01634-002
Date Received: 08/04/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-4.263E-8	8.387E-8	2.032E-7	8.153E-8	4.8E-08	U	uCi/filter	08/24/22 22:17	[redacted]	67.7%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	9.290E-9	7.780E-8	1.736E-7	6.161E-8	4.8E-08	U	uCi/filter	08/23/22 22:37	[redacted]	51.0%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.408E-9	9.518E-8	2.305E-7	7.829E-8	4.8E-08	U	uCi/filter	08/24/22 22:20	[redacted]	39.9%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-5.539E-7	9.955E-7	1.009E-6	5.045E-7	0.00024	U	uCi/filter	08/11/22 14:13	[redacted]	N/A
Cs-137	2.553E-7	6.438E-7	6.970E-7	3.485E-7	0.00048	U	uCi/filter	08/11/22 14:13	[redacted]	N/A
Ra-226	1.129E-6	7.378E-6	9.347E-6	4.674E-6	4.4E-06	U	uCi/filter	08/11/22 14:13	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	5.825E-7	6.794E-7	1.074E-6	4.010E-7	4.4E-06	U	uCi/filter	08/31/22 9:11	[redacted]	36.7%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-1.231E-6	1.474E-6	2.742E-6	1.299E-6	2.4E-05	U	uCi/filter	08/24/22 10:21	[redacted]	100%

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ARS Sample Delivery Group: ARS1-22-01634
Client Sample ID: MSB02-072522
Sample Collection Date: 07/29/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J31000900
ARS Sample ID: ARS1-22-01634-003
Date Received: 08/04/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.114E-7	9.578E-8	2.667E-7	1.087E-7	4.8E-08	U	uCi/filter	08/24/22 22:17	[redacted]	56.5%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	4.594E-8	8.850E-8	1.618E-7	5.923E-8	4.8E-08	U	uCi/filter	08/23/22 22:37	[redacted]	60.6%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.796E-8	8.378E-8	1.663E-7	4.576E-8	4.8E-08	U	uCi/filter	08/24/22 22:20	[redacted]	41.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	2.595E-7	8.041E-7	8.251E-7	4.126E-7	0.00024	U	uCi/filter	08/12/22 14:23	[redacted]	N/A
Cs-137	-4.462E-7	7.861E-7	8.447E-7	4.224E-7	0.00048	U	uCi/filter	08/12/22 14:23	[redacted]	N/A
Ra-226	6.323E-7	7.500E-6	9.510E-6	4.755E-6	4.4E-06	U	uCi/filter	08/12/22 14:23	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.235E-6	8.655E-7	1.074E-6	3.982E-7	4.4E-06		uCi/filter	08/31/22 9:11	[redacted]	34.5%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-1.307E-6	1.007E-6	2.037E-6	9.420E-7	2.4E-05	U	uCi/filter	08/24/22 10:21	[redacted]	96.1%

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01634
Client Sample ID: MSB113A-072522
Sample Collection Date: 07/29/22 8:10
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J31000900
ARS Sample ID: ARS1-22-01634-004
Date Received: 08/04/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-7.679E-8	1.186E-7	2.682E-7	1.138E-7	4.8E-08	U	uCi/filter	08/24/22 22:17	[redacted]	63.2%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	-1.871E-8	6.483E-8	1.683E-7	6.164E-8	4.8E-08	U	uCi/filter	08/23/22 22:37	[redacted]	56.4%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-6.157E-8	6.080E-8	2.301E-7	8.166E-8	4.8E-08	U	uCi/filter	08/24/22 22:20	[redacted]	48.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	3.836E-7	8.130E-7	8.875E-7	4.438E-7	0.00024	U	uCi/filter	08/13/22 11:22	[redacted]	N/A
Cs-137	2.332E-7	7.660E-7	8.943E-7	4.472E-7	0.00048	U	uCi/filter	08/13/22 11:22	[redacted]	N/A
Ra-226	1.220E-6	1.385E-5	1.533E-5	7.665E-6	4.4E-06	U	uCi/filter	08/13/22 11:22	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.668E-7	6.201E-7	1.220E-6	4.745E-7	4.4E-06	U	uCi/filter	08/31/22 9:11	[redacted]	31.4%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-9.945E-7	1.056E-6	2.084E-6	9.631E-7	2.4E-05	U	uCi/filter	08/24/22 10:21	[redacted]	95.3%

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ARS Sample Delivery Group: ARS1-22-01634
Client Sample ID: FB-072522
Sample Collection Date: 07/25/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J31000900
ARS Sample ID: ARS1-22-01634-005
Date Received: 08/04/22
Report Date: 09/09/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	2.079E-8	1.269E-7	2.430E-7	1.027E-7	4.8E-08	U	uCi/filter	08/24/22 22:17	[redacted]	69.9%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	7.483E-8	7.835E-8	1.031E-7	2.835E-8	4.8E-08	U	uCi/filter	08/23/22 22:37	[redacted]	57.6%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.918E-9	1.094E-7	2.649E-7	8.999E-8	4.8E-08	U	uCi/filter	08/24/22 22:20	[redacted]	36.2%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-3.751E-7	9.247E-7	9.428E-7	4.714E-7	0.00024	U	uCi/filter	08/13/22 11:25	[redacted]	N/A
Cs-137	-4.325E-7	7.773E-7	8.357E-7	4.179E-7	0.00048	U	uCi/filter	08/13/22 11:25	[redacted]	N/A
Ra-226	-4.012E-6	7.771E-6	9.770E-6	4.885E-6	4.4E-06	U	uCi/filter	08/13/22 11:25	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	5.260E-7	5.952E-7	9.041E-7	3.114E-7	4.4E-06	U	uCi/filter	08/31/22 9:11	[redacted]	32.0%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	7.064E-7	1.214E-6	2.077E-6	9.563E-7	2.4E-05	U	uCi/filter	08/24/22 10:21	[redacted]	88.7%

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QC Summary

ARS Aleut Analytical
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QC Sample Results

Analytical Batch: ARS1-B22-01125
Lab Sample ID: ARS1-B22-01125-01
Method: EPA 901.1M

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/11/22 13:34

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Am-241	33.065	31.637		uCi/filter	95.7	75 - 125
Co-60	20.928	20.405		uCi/filter	97.5	75 - 125
Cs-137	12.996	13.250		uCi/filter	102.0	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01125
Lab Sample ID: ARS1-B22-01125-02
Method: EPA 901.1M

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/11/22 13:57

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Am-241	33.065	31.554		uCi/filter	95.4	75 - 125	0.3	25	0.047	3
Co-60	20.928	20.888		uCi/filter	99.8	75 - 125	2.3	25	0.528	3
Cs-137	12.996	13.175		uCi/filter	101.4	75 - 125	0.6	25	0.148	3

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QC Sample Results

Analytical Batch: ARS1-B22-01125
Lab Sample ID: ARS1-B22-01125-03
Method: EPA 901.1M

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/15/22 14:10

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Co-60	5.055E-4	8.627E-4	9.360E-4	4.680E-4	U	uCi/filter
Cs-137	-3.695E-4	8.377E-4	9.730E-4	4.865E-4	U	uCi/filter
Ra-226	0.001	0.014	0.015	0.008	U	uCi/filter

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QC Sample Results

Analytical Batch: ARS1-B22-01125
Lab Sample ID: ARS1-B22-01125-09
Method: EPA 901.1M

Sample Type: DUP
Matrix: Air Filter
Analysis Date: 08/15/22 14:08

Analyte	DO Result	DO Qual	DUP Result	DUP Qual	Analysis Units	RPD	RPD Limit	DER	DER Limit
Co-60	-4.600E-7	U	-2.555E-8	U	uCi/filter	NC	25	0.657	3
Cs-137	-3.731E-7	U	-2.275E-7	U	uCi/filter	NC	25	0.257	3
Ra-226	6.259E-6	U	1.468E-6	U	uCi/filter	NC	25	0.598	3

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01634 **Analytical Batch:** ARS1-B22-01125

Analysis: Gamma Spec (Short) in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01634-001	MSB01-072522	Air Filter	EPA 901.1M	N/A
ARS1-22-01634-002	MSB01-072522D	Air Filter	EPA 901.1M	N/A
ARS1-22-01634-003	MSB02-072522	Air Filter	EPA 901.1M	N/A
ARS1-22-01634-004	MSB113A-072522	Air Filter	EPA 901.1M	N/A
ARS1-22-01634-005	FB-072522	Air Filter	EPA 901.1M	N/A
ARS1-B22-01125-01	Lab Control Sample	Air Filter	EPA 901.1M	N/A
ARS1-B22-01125-02	Lab Control Sample Duplicate	Air Filter	EPA 901.1M	N/A
ARS1-B22-01125-03	Method Blank	Air Filter	EPA 901.1M	N/A
ARS1-B22-01125-09	Sample Duplicate (MSB01-072522)	Air Filter	EPA 901.1M	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01164
Lab Sample ID: ARS1-B22-01164-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/24/22 22:17

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Pu-239/240	7.635E-6	7.280E-6		uCi/filter	95.4	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01164
Lab Sample ID: ARS1-B22-01164-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/24/22 22:17

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Pu-239/240	7.614E-6	7.293E-6		uCi/filter	95.8	75 - 125	0.2	25	0.019	3

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QC Sample Results

Analytical Batch: ARS1-B22-01164
Lab Sample ID: ARS1-B22-01164-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/24/22 22:17

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Pu-238	9.898E-9	2.309E-8	4.330E-8	1.654E-8	U	uCi/filter
Pu-239/240	-9.425E-9	2.303E-8	5.352E-8	2.165E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01634

Analytical Batch: ARS1-B22-01164

Analysis: Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01634-001	MSB01-072522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-002	MSB01-072522D	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-003	MSB02-072522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-004	MSB113A-072522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-005	FB-072522	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01164-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01164-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01164-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01165
Lab Sample ID: ARS1-B22-01165-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/24/22 22:20

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
U-238	8.208E-6	8.368E-6		uCi/filter	102.0	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01165
Lab Sample ID: ARS1-B22-01165-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/24/22 22:20

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
U-238	8.208E-6	8.340E-6		uCi/filter	101.6	75 - 125	0.3	25	0.037	3

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QC Sample Results

Analytical Batch: ARS1-B22-01165
Lab Sample ID: ARS1-B22-01165-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/24/22 22:20

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
U-234	-1.281E-8	3.793E-8	8.385E-8	3.462E-8	U	uCi/filter
U-235	-1.562E-8	1.543E-8	5.838E-8	2.072E-8	U	uCi/filter
U-238	-4.103E-8	3.312E-8	8.815E-8	3.678E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01634

Analytical Batch: ARS1-B22-01165

Analysis: Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01634-001	MSB01-072522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-002	MSB01-072522D	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-003	MSB02-072522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-004	MSB113A-072522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01634-005	FB-072522	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01165-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01165-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01165-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01166
Lab Sample ID: ARS1-B22-01166-01
Method: Eichrom ACW10

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/23/22 22:37

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Th-230	5.059E-6	5.640E-6		uCi/filter	111.5	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01166
Lab Sample ID: ARS1-B22-01166-02
Method: Eichrom ACW10

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/23/22 22:37

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Th-230	5.090E-6	5.791E-6		uCi/filter	113.8	75 - 125	2.6	25	0.269	3

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QC Sample Results

Analytical Batch: ARS1-B22-01166
Lab Sample ID: ARS1-B22-01166-03
Method: Eichrom ACW10

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/23/22 22:37

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Th-228	1.275E-8	3.790E-8	7.003E-8	2.949E-8	U	uCi/filter
Th-230	2.978E-8	3.237E-8	5.111E-8	2.008E-8	U	uCi/filter
Th-232	1.159E-8	2.232E-8	4.080E-8	1.494E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01634

Analytical Batch: ARS1-B22-01166

Analysis: Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01634-001	MSB01-072522	Air Filter	Eichrom ACW10	N/A
ARS1-22-01634-002	MSB01-072522D	Air Filter	Eichrom ACW10	N/A
ARS1-22-01634-003	MSB02-072522	Air Filter	Eichrom ACW10	N/A
ARS1-22-01634-004	MSB113A-072522	Air Filter	Eichrom ACW10	N/A
ARS1-22-01634-005	FB-072522	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01166-01	Lab Control Sample	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01166-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01166-03	Method Blank	Air Filter	Eichrom ACW10	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01167
Lab Sample ID: ARS1-B22-01167-01
Method: Eichrom SRW01

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/24/22 10:21

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
SR-90	2.017E-5	2.126E-5		uCi/filter	105.4	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01167
Lab Sample ID: ARS1-B22-01167-02
Method: Eichrom SRW01

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/24/22 10:21

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
SR-90	2.019E-5	2.452E-5		uCi/filter	121.4	75 - 125	14.2	25	1.292	3

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QC Sample Results

Analytical Batch: ARS1-B22-01167
Lab Sample ID: ARS1-B22-01167-03
Method: Eichrom SRW01

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/24/22 10:21

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
SR-90	7.432E-8	2.175E-7	3.824E-7	1.761E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01634 **Analytical Batch:** ARS1-B22-01167

Analysis: Strontium-90 in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01634-001	MSB01-072522	Air Filter	Eichrom SRW01	N/A
ARS1-22-01634-002	MSB01-072522D	Air Filter	Eichrom SRW01	N/A
ARS1-22-01634-003	MSB02-072522	Air Filter	Eichrom SRW01	N/A
ARS1-22-01634-004	MSB113A-072522	Air Filter	Eichrom SRW01	N/A
ARS1-22-01634-005	FB-072522	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01167-01	Lab Control Sample	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01167-02	Lab Control Sample Duplicate	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01167-03	Method Blank	Air Filter	Eichrom SRW01	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01169
Lab Sample ID: ARS1-B22-01169-01
Method: EPA 9315

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/31/22 9:11

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Ra-226	2.727E-5	2.982E-5		uCi/filter	109.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01169
Lab Sample ID: ARS1-B22-01169-02
Method: EPA 9315

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/31/22 9:11

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Ra-226	2.730E-5	3.138E-5		uCi/filter	114.9	75 - 125	5.1	25	0.432	3

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QC Sample Results

Analytical Batch: ARS1-B22-01169
Lab Sample ID: ARS1-B22-01169-03
Method: EPA 9315

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/31/22 9:11

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Ra-226	8.342E-8	7.590E-8	1.092E-7	4.116E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01634

Analytical Batch: ARS1-B22-01169

Analysis: Radium-226 in Air Filter

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01634-001	MSB01-072522	Air Filter	EPA 9315	N/A
ARS1-22-01634-002	MSB01-072522D	Air Filter	EPA 9315	N/A
ARS1-22-01634-003	MSB02-072522	Air Filter	EPA 9315	N/A
ARS1-22-01634-004	MSB113A-072522	Air Filter	EPA 9315	N/A
ARS1-22-01634-005	FB-072522	Air Filter	EPA 9315	N/A
ARS1-B22-01169-01	Lab Control Sample	Air Filter	EPA 9315	N/A
ARS1-B22-01169-02	Lab Control Sample Duplicate	Air Filter	EPA 9315	N/A
ARS1-B22-01169-03	Method Blank	Air Filter	EPA 9315	N/A

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Analytical Reports

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Batch QC

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01125**
SDG	**ARS1-22-01634**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Method	**EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date 08/11/22 13:34 **Analysis Technician** [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01125-01	**LCS**	AM-241	31.637	2.458	33.065	95.7	0.120
ARS1-B22-01125-01	**LCS**	CO-60	20.405	1.258	20.928	97.5	0.420
ARS1-B22-01125-01	**LCS**	CS-137	13.250	0.706	12.996	102.0	0.074

Duplicate RER/DER/RPD

Analysis Date 08/11/22 13:57 **Analysis Technician** [redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
AM-241	31.637	2.458	31.554	2.451	0.047	0.3
CO-60	20.405	1.258	20.888	1.280	0.528	2.3
CS-137	13.250	0.706	13.175	0.702	0.148	0.6

Duplicate RER/DER/RPD (Dup Sample)

Analysis Date 08/15/22 14:08 **Analysis Technician** [redacted]

Analysis Batch Sample ID	Analyte	Results DO	CSU DO (2s)	Results DUP	CSU DUP (2s)	DER	RPD
ARS1-B22-01125-09	CO-60	-4.600E-7	9.730E-7	-2.555E-8	8.567E-7	0.657	NC
ARS1-B22-01125-09	CS-137	-3.731E-7	8.526E-7	-2.275E-7	7.092E-7	0.257	NC
ARS1-B22-01125-09	RA-226	6.259E-6	1.380E-5	1.468E-6	7.501E-6	0.598	NC

Method Blank

Analysis Date 08/15/22 14:10 **Analysis Technician** [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01125-03	**MBL**	CO-60	5.055E-4	8.627E-4	9.360E-4	U
ARS1-B22-01125-03	**MBL**	CS-137	-3.695E-4	8.377E-4	9.730E-4	U
ARS1-B22-01125-03	**MBL**	RA-226	0.001	0.014	0.015	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01164**
SDG	**ARS1-22-01634**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

			Analysis Date	08/24/22 22:17	**Analysis Technician**	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**Expected Value**	**LCS Rec (%)**	**MDC**
ARS1-B22-01164-01	**LCS**	PU-239/240	7.280E-6	9.349E-7	7.635E-6	95.4	1.051E-7

Duplicate RER/DER/RPD

			Analysis Date	08/24/22 22:17	**Analysis Technician**	[redacted]	
Analyte	**Results LCS**	**CSU LCS (2s)**	**Results LCSD**	**CSU LCSD (2s)**	**DER**	**RPD**	
PU-239/240	7.280E-6	9.349E-7	7.293E-6	9.460E-7	0.019	0.2	

Method Blank

			Analysis Date	08/24/22 22:17	**Analysis Technician**	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**MDC**	**Qual**	
ARS1-B22-01164-03	**MBL**	PU-238	9.898E-9	2.309E-8	4.330E-8	U	
ARS1-B22-01164-03	**MBL**	PU-239/240	-9.425E-9	2.303E-8	5.352E-8	U	

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01165**
SDG	**ARS1-22-01634**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/24/22 22:20	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01165-01	**LCS**	U-238	8.368E-6	1.047E-6	8.208E-6	102.0	3.492E-8

Duplicate RER/DER/RPD

Analysis Date	08/24/22 22:20	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
U-238	8.368E-6	1.047E-6	8.340E-6	1.044E-6	0.037	0.3

Method Blank

Analysis Date	08/24/22 22:20	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01165-03	**MBL**	U-234	-1.281E-8	3.793E-8	8.385E-8	U
ARS1-B22-01165-03	**MBL**	U-235	-1.562E-8	1.543E-8	5.838E-8	U
ARS1-B22-01165-03	**MBL**	U-238	-4.103E-8	3.312E-8	8.815E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01166**
SDG	**ARS1-22-01634**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Method	**Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/23/22 22:37	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01166-01	**LCS**	TH-230	5.640E-6	7.624E-7	5.059E-6	111.5	1.189E-7

Duplicate RER/DER/RPD

Analysis Date	08/23/22 22:37	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
TH-230	5.640E-6	7.624E-7	5.791E-6	7.902E-7	0.269	2.6

Method Blank

Analysis Date	08/23/22 22:37	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01166-03	**MBL**	TH-228	1.275E-8	3.790E-8	7.003E-8	U
ARS1-B22-01166-03	**MBL**	TH-230	2.978E-8	3.237E-8	5.111E-8	U
ARS1-B22-01166-03	**MBL**	TH-232	1.159E-8	2.232E-8	4.080E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01167**
SDG	**ARS1-22-01634**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Method	**Eichrom SRW01,HASL 300 Sr-01-RC/Sr-02-**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/24/22 10:21	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01167-01	**LCS**	SR-90	2.126E-5	3.244E-6	2.017E-5	105.4	3.563E-7

Duplicate RER/DER/RPD

Analysis Date	08/24/22 10:21	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
SR-90	2.126E-5	3.244E-6	2.452E-5	3.732E-6	1.292	14.2

Method Blank

Analysis Date	08/24/22 10:21	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01167-03	**MBL**	SR-90	7.432E-8	2.175E-7	3.824E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01169**
SDG	**ARS1-22-01634**
Analysis	**Radium-226 in Air Filter**
Method	**Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/31/22 09:11	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01169-01	**LCS**	RA-226	2.982E-5	4.869E-6	2.727E-5	109.3	1.499E-7

Duplicate RER/DER/RPD

Analysis Date	08/31/22 09:11	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
RA-226	2.982E-5	4.869E-6	3.138E-5	5.125E-6	0.432	5.1

Method Blank

Analysis Date	08/31/22 09:11	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01169-03	**MBL**	RA-226	8.342E-8	7.590E-8	1.092E-7	U

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01125**
SDG	**ARS1-22-01634**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Analysis Test Method	**PALA-RAD-007/EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample

Analysis Date 08/11/22 13:34 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Expected Value	CSU (1s)	Z
LCS	AM-241	31.637	1.254	33.065	0.001	1.139
LCSD	AM-241	31.554	1.251	33.065	0.001	1.208
LCS	CO-60	20.405	0.642	20.928	5.860E-4	0.815
LCSD	CO-60	20.888	0.653	20.928	5.860E-4	0.061
LCS	CS-137	13.250	0.360	12.996	3.119E-4	0.706
LCSD	CS-137	13.175	0.358	12.996	3.119E-4	0.500

Method Blank

Analysis Date 08/15/22 14:10 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Z
MBL	CS-137	-3.695E-4	4.274E-4	0.865
MBL	CO-60	5.055E-4	4.401E-4	1.148
MBL	RA-226	0.001	0.007	0.189

Duplicate Sample

Analysis Date 08/15/22 14:08 **Analysis Technician** [redacted]

QC Type	Analyte	Results Dup	CSU (1s)	Results DO	CSU (1s)	Z
DUP	CS-137	-2.275E-7	3.619E-7	-3.731E-7	4.350E-7	0.257
DUP	RA-226	1.468E-6	3.827E-6	6.259E-6	7.038E-6	0.598
DUP	CO-60	-2.555E-8	4.371E-7	-4.600E-7	4.964E-7	0.657
LCSD	AM-241	31.554	1.251	31.637	1.254	0.047
LCSD	CO-60	20.888	0.653	20.405	0.642	0.528
LCSD	CS-137	13.175	0.358	13.250	0.360	0.148

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01164**
SDG	**ARS1-22-01634**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/24/22 22:17	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	PU-239/240	7.280E-6	4.770E-7	7.635E-6	1.263E-7	0.718
LCSD	PU-239/240	7.293E-6	4.826E-7	7.614E-6	1.263E-7	0.643

Method Blank	**Analysis Date**	08/24/22 22:17	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	PU-238	9.898E-9	1.178E-8	0.840
MBL	PU-239/240	-9.425E-9	1.175E-8	0.802

Duplicate Sample	**Analysis Date**	08/24/22 22:17	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	PU-239/240	7.293E-6	4.826E-7	7.280E-6	4.770E-7	0.019

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01165**
SDG	**ARS1-22-01634**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/24/22 22:20	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	U-238	8.368E-6	5.340E-7	8.208E-6	3.939E-8	0.300
LCSD	U-238	8.340E-6	5.325E-7	8.208E-6	3.939E-8	0.248

Method Blank	**Analysis Date**	08/24/22 22:20	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	U-234	-1.281E-8	1.935E-8	0.662
MBL	U-235	-1.562E-8	7.872E-9	1.985
MBL	U-238	-4.103E-8	1.690E-8	2.428

Duplicate Sample	**Analysis Date**	08/24/22 22:20	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	U-238	8.340E-6	5.325E-7	8.368E-6	5.340E-7	0.037

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01166**
SDG	**ARS1-22-01634**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Analysis Test Method	**PALA-RAD-031/Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/23/22 22:37	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	TH-230	5.640E-6	3.890E-7	5.059E-6	1.018E-7	1.445
LCSD	TH-230	5.791E-6	4.032E-7	5.090E-6	1.018E-7	1.686

Method Blank	**Analysis Date**	08/23/22 22:37	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	TH-228	1.275E-8	1.934E-8	0.659
MBL	TH-230	2.978E-8	1.651E-8	1.803
MBL	TH-232	1.159E-8	1.139E-8	1.017

Duplicate Sample	**Analysis Date**	08/23/22 22:37	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	TH-230	5.791E-6	4.032E-7	5.640E-6	3.890E-7	0.269

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01167**
SDG	**ARS1-22-01634**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Analysis Test Method	**PALA-RAD-032/Eichrom SRW01,HASL 300**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/24/22 10:21	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	SR-90	2.126E-5	1.655E-6	2.017E-5	3.424E-7	0.645
LCSD	SR-90	2.452E-5	1.904E-6	2.019E-5	3.424E-7	2.237

Method Blank	**Analysis Date**	08/24/22 10:21	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	SR-90	7.432E-8	1.110E-7	0.670

Duplicate Sample	**Analysis Date**	08/24/22 10:21	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	SR-90	2.452E-5	1.904E-6	2.126E-5	1.655E-6	1.292

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01169**
SDG	**ARS1-22-01634**
Analysis	**Radium-226 in Air Filter**
Analysis Test Method	**PALA-RAD-008/Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/31/22 09:11	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	RA-226	2.982E-5	2.484E-6	2.727E-5	3.221E-7	1.017
LCSD	RA-226	3.138E-5	2.615E-6	2.730E-5	3.221E-7	1.549

Method Blank	**Analysis Date**	08/31/22 09:11	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	RA-226	8.342E-8	3.873E-8	2.154

Duplicate Sample	**Analysis Date**	08/31/22 09:11	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	RA-226	3.138E-5	2.615E-6	2.982E-5	2.484E-6	0.432

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Sample Management Records

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
[redacted]
1655 Grant Street, Suite 1200, Concord, CA 94520
[redacted]

COC # KT080322RADB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: ARS Aleut Analytical (AAA), Port Allen, LA	Event: **Parcel B Air Monitoring RAD**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 2609 North River Road, Port Allen, LA 70767-3469	

Comments:

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
5	1x 250-mL Plastic, 4 Degrees C
15	1x 250-mL Plastic, 4 Degrees C

Event: Parcel B Air Monitoring RAD

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: A01RM - Th-232 U-235 (15)	E901.1 - Gamma Spec Air Monitoring CS (15)	E903.1 - Radium 226 (15)	E905.0 - Sr-90 (5)	RC0240 - Pu-239 (15)	Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	MSB01-072522	A	07/29/2022	0823	[redacted]	X	X	X	X	X	MSB01	N1	0.00	0.00	1	TOTAL FLOW: 359,280 (L)
2	MSB01-072522D	A	07/29/2022	0825		X	X	X	X	X	MSB01	N1	0.00	0.00	1	TOTAL FLOW: 359,220 (L)
3	MSB02-072522	A	07/29/2022	0800		X	X	X	X	X	MSB02	N1	0.00	0.00	1	TOTAL FLOW: ~~355,140~~ (L) 356700
4	MSB113A-072522	A	07/29/2022	0810		X	X	X	X	X	MSB113A	N1	0.00	0.00	1	TOTAL FLOW: ~~357,240~~ (L) 357900
5	FB-072522	AQ	07/25/2022	0800		X	X	X	X	X	FIELDQC	FB1	0.00	0.00	1	[redacted] 8-4-22
6											[redacted] 8-03-22					
7																
8																

Turnaround Time: 28 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	08/03/22	1600	FEDEX	08/03/22	1600
			[redacted]	8/4/22	1010

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/3/2022/FedEx 7775 4401 6150

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 03, 2022

GES

Red font = field entry

Procedures: GES-003 / EPA 900.0M

File ID Number: _____

	Sample ID	Date In:	Time In:	Date Out:	Time Out:	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)	Total Run Time (Hours)	Total Run Time (Minutes)	Flow Rate (LPM)	Initial Flow Rate (CFM)	Final Flow Rate (CFM)	Average Flow Rate (CFM)	Average Flow Rate (Cu.M/h)	Flow Rate (Cu.M/min)	Total Flow (L)
1	MSB01-072522	07/25/22	4:35	07/29/22	8:23	60	60	359.3	210	4.16	99.80	5988.0	60	2.11888	2.11888	2.11888	3.6	0.06	359280
2	MSB01-072522D	07/25/22	4:38	07/29/22	8:25	60	60	359.2	210	4.16	99.78	5987.0	60	2.11888	2.11888	2.11888	3.6	0.06	359220
3	MSB02-072522	07/25/22	4:55	07/29/22	8:00	60	60	356.7	210	4.13	99.08	5945.0	60	2.11888	2.11888	2.11888	3.6	0.06	356700
4	MSB0113A-072522	07/25/22	4:45	07/29/22	8:10	60	60	357.9	210	4.14	99.42	5965.0	60	2.11888	2.11888	2.11888	3.6	0.06	357900
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			

FORMULAS:

Number of Days = (Date Out +Time Out) minus (Date In+Time In)

Number of Minutes = # of Days X 24hr X 60min

Flow Rate (m3/h) = Flow Rate (CFM) x 60min x (12in x 2.54cm/in / 100cm/m)^3

Mid-Sample Date/Time = [(Date+Time Out) + (Date+Time In)] / 2

Flow Rate (Cu.M/min) = CFM X 0.0283168466 Cu.M/CF

Flow Rate (LPM) = Cu.M X 1000

Total Flow (L) = LPM X Total Minutes

GES

Red font = field entry

Procedures: GES-003 / EPA 900.0M

File ID Number:

	Sample ID	Date In	Time In	Date Out	Time Out	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)	Total Run Time (Hours)	Total Run Time (Minutes)	Flow Rate (LPM)	Initial Flow Rate (CFM)	Final Flow Rate (CFM)	Average Flow Rate (CFM)	Average Flow Rate (Cu.M/h)	Flow Rate (Cu.M/min)	Total Flow (L)
1	MSB01-072522	07/25/22	4:35	07/29/22	5:23	60	60	359.3	210	4.16	99.80	5988.0	60	2.11888	2.11888	2.11888	3.6	0.06	359280
2	MSB01-072522D	07/25/22	4:36	07/29/22	5:25	60	60	359.2	210	4.16	99.78	5987.0	60	2.11888	2.11888	2.11888	3.6	0.06	359220
3	MSB02-072522	07/25/22	4:55	07/29/22	5:00	60	60	356.7	210	4.13	99.06	5945.0	60	2.11888	2.11888	2.11888	3.6	0.06	356700
4	MSB0113A-072522	07/25/22	4:45	07/29/22	5:10	60	60	357.9	210	4.14	99.42	5965.0	60	2.11888	2.11888	2.11888	3.6	0.06	357900
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			

FORMULAS

Number of Days = (Date Out + Time Out) minus (Date In+Time In)

Number of Minutes = # of Days X 24Hr X 60min

Flow Rate (m3/h) = Flow Rate (CFM) x 60min x (12in x 2.54cm/in / 100cm/m)^3

Mid-Sample Date/Time = [(Date+Time Out) + (Date+Time In)] / 2

Flow Rate (Cu.M/min) = CFM X 0.0283168466 Cu.M/CF

Flow Rate (LPM) = Cu.M X 1000

Total Flow (L) = LPM X Total Minutes

SDG Report - Samples and Containers

SDG Specific Data							
SDG	ARS1-22-01634		TAT Days	28 Calendar Days	Project Type	Environmental
Sample Count	5	Rpt Level 4	Date Received	08/04/2022	COC Number	KT080322RADB
Client	Gilbane Federal		Discrepancy Resol	08/04/2022	PO Number	
Client Code	1138		Client Deadline	09/01/2022	Job Number	J31000900
Profile Number	PN-01411				Job Location	Parcel B Air Monitoring RAD
Comment						

Samples and Containers Checked In Thus Far

FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Comments
001	MSB01-072522	Air Filter	07/29/2022 08:22	07/29/2022 08:23	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421857	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/29/2022 08:22	AF Volume (CuM):		0.001		
002	MSB01-072522D	Air Filter	07/29/2022 08:24	07/29/2022 08:25	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421858	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/29/2022 08:24	AF Volume (CuM):		0.001		
003	MSB02-072522	Air Filter	07/29/2022 07:59	07/29/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421859	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/29/2022 07:59	AF Volume (CuM):		0.001		
004	MSB113A-072522	Air Filter	07/29/2022 08:09	07/29/2022 08:10	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421860	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/29/2022 08:09	AF Volume (CuM):		0.001		
005	FB-072522	Air Filter	07/25/2022 07:59	07/25/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	421861	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	07/25/2022 07:59	AF Volume (CuM):		0.001		

SDG Report - Analysis Assignments

SDG	ARS1-22-01634	Sample Count	5
Client	Gilbane Federal	Analysis Count	6-30

Sample Count Totals Per Analysis

Analysis Code	Analysis Description	In/Out	Samples Count
ASP-PU239-AF	Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	5
ASP-TH-AF	Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	5
ASP-U-AF	Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	5
GAM-A-AF	Gamma Spec (Short) in (Air Filters, Smears [AF])	I	5
GPC-RA226-AF	Radium-226 in Air Filter	I	5
GPC-SR90-AF	Strontium-90 in (Air Filters, Smears [AF])	I	5

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-PU239-AF	X
001	ASP-TH-AF	X
001	ASP-U-AF	X
001	GAM-A-AF	X
001	GPC-RA226-AF	X
001	GPC-SR90-AF	X
002	ASP-PU239-AF	X
002	ASP-TH-AF	X
002	ASP-U-AF	X
002	GAM-A-AF	X
002	GPC-RA226-AF	X
002	GPC-SR90-AF	X
003	ASP-PU239-AF	X
003	ASP-TH-AF	X
003	ASP-U-AF	X
003	GAM-A-AF	X
003	GPC-RA226-AF	X
003	GPC-SR90-AF	X
004	ASP-PU239-AF	X
004	ASP-TH-AF	X
004	ASP-U-AF	X
004	GAM-A-AF	X
004	GPC-RA226-AF	X
004	GPC-SR90-AF	X
005	ASP-PU239-AF	X
005	ASP-TH-AF	X
005	ASP-U-AF	X

005	GAM-A-AF	**X**
005	GPC-RA226-AF	**X**
005	GPC-SR90-AF	**X**

Client Name: Gilbane Federal Profile Name: Parcel B Rad Sampling Report Level: 4

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time					
ASP-PU239-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Pu-239/240 (15117-48-3)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-TH-AF	WRAD	uCi	filter	N/A	PALA-RAD-031						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Th-232 (7440-29-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-U-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	U-235 (15117-96-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GAM-A-AF	WGAM	uCi	filter	N/A	PALA-RAD-007						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Co-60 (10198-40-0)			0.00024 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Cs-137 (10045-97-3)			0.00048 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-RA226-AF	WRAD	uCi	filter		PALA-RAD-008						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-SR90-AF	WRAD	uCi	filter	N/A	PALA-RAD-032						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Sr-90 (10098-97-2)			2.4E-05 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A

Analysis Code	Fraction	Units	Aliquot	Conductivity	Analyte Count
ASP-PU239-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-TH-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-U-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	

ASP-U-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
GAM-A-AF	001	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	002	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	003	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	004	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	005	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	

GAM-A-AF	005	Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-SR90-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	005	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

ARS Aleut Analytical

PALA Sample Receipt Inspection Form

Client Name: Gilbane

SDG: ARS1-22-01634

Sample Custodian: [redacted] Survey Start Date: 8/4/22 Survey Start Time: 1020

Thermometer ID: E0067010085 Calibration Due Date: 2-28-23 pH Paper Lot# NA

Exposure Rate Meter + Probe Unit ID: PR3544057/273629 Calibration Due Date: 5-27-22 Background: 4 µR/hr

Count Rate Meter + Probe Unit ID: PR368083/331788 Calibration Due Date: 9-22-22 Background: 20 cpm

Delivery Type (circle one): Direct Lock Box (Commercial Carrier) FEDEX Total # of ESCs: 1

*True temperature is recorded which includes any applicable correction factors.

External Shipping Container Tracking:	Exposure Rate (µR/hr) (limit <500 µR/hr)	Max External Swipe Counts (cpm)	Max Internal Swipe Counts (cpm)	ESC True Temps* (°C)	TRAX Matrix ID (circle all that apply): (See Section 4.3 of SOP)
A: 777544016150	6	40	40	NA	AQ WD WG WO
B:					WS WW SI UR
C:					SO OL BI VG
D:					WP SM (AF)
E:					
F:					

Visual Inspection: External Shipping Container	(Circle response)		
Good Condition with no Leaks or Tears	(Yes)	No	
Marked Radioactive	Yes	(No)	
UN2910	Yes	(No)	
Security Seals	(Yes)	No	
If yes, intact?	(Yes)	No	N/A
Internal Shipping Container			
COC's Present	(Yes)	No	
Well packaged container with no signs of leakage	(Yes)	No	

COC/Sample Inspection	(Circle response)		
Sample Containers in good condition	(Yes)	No	
No spills or leaks	(Yes)	No	
Marked Radioactive	Yes	(No)	
Durable labels w/indelible ink	(Yes)	No	
COC reliquished/received correctly	(Yes)	No	
Adequate volume/filled correctly	(Yes)	No	
Hold Time sufficient for analysis	(Yes)	No	
For VOC/Radon, Head space?	Yes	(No)	N/A
If yes, <6mm?	Yes	No	(N/A)
# of containers received matches # on COC	(Yes)	No	
Samples received on ice?	Yes	(No)	
Type (circle one):	Bagged Ice	Loose Ice	Blue Ice (N/A)

Comments:

ENVIRONMENTAL SOLUTIONS | QUALITY CONSCIOUS

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PALA Sample Survey Form

Client Name: Gilbane

SDG: ARS1-22-01634

Sample Survey Form
PALA-SR-001-FM-02 r 0.1
Effective 08/30/2019

Pipette ID: NA Tip Lot#: NA

Disposible pipette lot#: NA

Sample ID from Client on COC or Sample	ESC Letter	Sample Container Type	Approx. Fill Level (%)	pH <2 is Acceptable: pH As Rec'd	pH Adjusted	Acid Lot # or Ind container temp (°C)	Vol. of Acid Used (mL)	Acceptance Limits <100 cpm/cm: cpm
MSB01-072522	A	ziploc	25	NA	NA	NA	NA	40
MSB01-072522D	↓	↓	↓	↓	↓	↓	↓	↓
MSB02-072522								
MSB13A-072522								
FB-072522								

Sample Custodian: [redacted] Survey End Date: 8/4/22 Survey/pH End Time: 1030

pH re-check required? YES or NO *NOTE: Any metals sample acidified at sample receiving must be re-checked after a 24 hour hold.*

If YES: pH re-check date/time: _____ / _____ Analyst: _____ pH strip lot #: _____

Were all re-checked samples' pH < 2? YES or NO*

**If no, complete and send to Project Management:*
1. Section A of PALA-SR-001-FM-05 (24 Hour Hold pH Readjustment)
2. SR section of PALA-SR-001-FM-03 (Discrepant Sample Receipt Report).

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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PALA Discrepant Sample Receipt Report

DSRR Form
PALA-SR-001-FM-03 r 00.0
Effective 05/28/2019
Page 1 of 1

For Sample Receiving Use

SDG: ARS1-22-01634 Receipt Date/Time: 8/4/22 1010 Matrix: AF

Client Name: Gilbane

Problem Description:

Samples "MSB02-072522" and "MSB113A-072522" had start/stop times that did not match the total sample volume stated on the CoC

For Project Manager Use

Client Notified (Y) N): _____ Date/Time Client Notified: 8-4-22 / 1150

Client/PM Resolution:

emailed [redacted]

[redacted] sent updated spreadsheet

Client Notified that TAT Starts from Resolution of DSRR (Y) N): _____

Date/Time DSRR Resolved: 8-4-22 1401 PM Initials: [redacted]

For Sample Receiving Use

Action Taken:

use revised chain

Signature [redacted] Date/Time: 8/4/22 / 1400

[redacted]dian

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ARS Aleut Analytical, LLC

Laboratory Analytical Report

ARS1-22-01680

Gilbane Federal
[redacted]
1655 Grant Street
Suite 1200
Concord, CA 94520
[redacted]

COC Number: **KT081022RADB**
Job Number: **J310000900**
Job Location: **Hunters Point Shipyard**
Project Name: **Parcel B Air Monitoring RAD**

Questions regarding this analytical report should be addressed to ARS project manager, [redacted] who can be reached by email at projectmanagers@aaa.aleutfederal.com.

I certify that the test results presented in this report (in either hardcopy or electronic file (EDD)) meet the requirements of the laboratory's certifications and other applicable contract terms and conditions. A full list of the Port Allen, LA laboratory's certifications is provided with this report. Any exceptions to the certification or contract will be noted within the case narratives presented in the report. Any subcontracted sample results will be identified within the case narratives presented in the report. In the event this report is an amendment to a previously released report, the case narrative will clearly identify the original report as well as the reason(s) for reissuance. A statement of uncertainty for each analysis is available upon request. I authorize release and issuance of this report on the date signed below.

		Laboratory Management, ARS Aleut Analytical
Signature	**Date**	**Title**

This report provides analytical results of the requested analysis and does not include any opinions or interpretations. ARS Aleut Analytical, LLC assumes no liability for the use or interpretation of analytical results. Results relate only to items tested. A partial reproduction of this test report is prohibited. Reproduction of this report in full requires the written approval of the laboratory.

LELAP Cert # 01949

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Certifications and Accreditations List

State or Accrediting Body (AB)	Certificate Number
AIHA LAP, LLC	209312
Alaska	LA01131
California	3085
ANAB DoD	ADE-1489
ANAB DOE	ADE-1489.01
Louisiana DEQ - NELAC	01949
Louisiana DHH	LA022
Nevada	LA011312023-1
New Jersey	LA009
New York	65039
Pennsylvania	68-04294-011
Texas	T104704447-21-17
Utah	LA011312022-13
Washington	C1010

For additional information related to the specific matrices, methods, and analytes recognized by each accrediting body, contact us at QA@aaa.aleutfederal.com for additional information.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Case Narrative

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PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs

Client Sample ID	ARS Aleut Analytical Sample ID
FB-080122	ARS1-22-01680-001
MSB01-080122	ARS1-22-01680-002
MSB02-080122	ARS1-22-01680-003
MSB113A-080122	ARS1-22-01680-004

Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
001	08/01/22 08:00	08/11/22	ASP-PU239-AF	As Received	08/26/22 08:30	08/31/22 21:48
001	08/01/22 08:00	08/11/22	ASP-TH-AF	As Received	08/26/22 08:30	09/01/22 22:53
001	08/01/22 08:00	08/11/22	ASP-U-AF	As Received	08/26/22 08:30	08/31/22 21:50
001	08/01/22 08:00	08/11/22	GAM-A-AF	As Received	N/A	08/19/22 15:28
001	08/01/22 08:00	08/11/22	GPC-RA226-AF	As Received	08/26/22 08:30	09/08/22 10:29
001	08/01/22 08:00	08/11/22	GPC-SR90-AF	As Received	08/26/22 08:30	08/31/22 10:30
002	08/05/22 08:15	08/11/22	ASP-PU239-AF	As Received	08/26/22 08:30	08/31/22 21:48
002	08/05/22 08:15	08/11/22	ASP-TH-AF	As Received	08/26/22 08:30	09/01/22 22:53
002	08/05/22 08:15	08/11/22	ASP-U-AF	As Received	08/26/22 08:30	08/31/22 21:51
002	08/05/22 08:15	08/11/22	GAM-A-AF	As Received	N/A	08/19/22 15:47
002	08/05/22 08:15	08/11/22	GPC-RA226-AF	As Received	08/26/22 08:30	09/08/22 10:29
002	08/05/22 08:15	08/11/22	GPC-SR90-AF	As Received	08/26/22 08:30	08/31/22 10:30
003	08/05/22 07:28	08/11/22	ASP-PU239-AF	As Received	08/26/22 08:30	08/31/22 21:48
003	08/05/22 07:28	08/11/22	ASP-TH-AF	As Received	08/26/22 08:30	09/01/22 22:53

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Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
003	08/05/22 07:28	08/11/22	ASP-U-AF	As Received	08/26/22 08:30	08/31/22 21:51
003	08/05/22 07:28	08/11/22	GAM-A-AF	As Received	N/A	08/22/22 14:02
003	08/05/22 07:28	08/11/22	GPC-RA226-AF	As Received	08/26/22 08:30	09/08/22 10:29
003	08/05/22 07:28	08/11/22	GPC-SR90-AF	As Received	08/26/22 08:30	08/31/22 10:30
004	08/05/22 07:50	08/11/22	ASP-PU239-AF	As Received	08/26/22 08:30	08/31/22 21:48
004	08/05/22 07:50	08/11/22	ASP-TH-AF	As Received	08/26/22 08:30	09/01/22 22:53
004	08/05/22 07:50	08/11/22	ASP-U-AF	As Received	08/26/22 08:30	08/31/22 21:51
004	08/05/22 07:50	08/11/22	GAM-A-AF	As Received	N/A	08/25/22 13:55
004	08/05/22 07:50	08/11/22	GPC-RA226-AF	As Received	08/26/22 08:30	09/08/22 10:29
004	08/05/22 07:50	08/11/22	GPC-SR90-AF	As Received	08/26/22 08:30	08/31/22 10:30

SAMPLE RECEIPT/PREP

The samples arrived in good condition. The samples were screened for radioactive contamination as per procedure **PALA-SR-001-SOP Sample Receiving**. Sample date(s) and time(s) are listed as provided by the client. In regard to the Air Filters, no flow rate information was provided by the client. Turnaround time was set at 28 calendar days.

ANALYTICAL METHODS

Pu-239/240 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Th-232 analysis was performed using **PALA-RAD-031, "Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom ACW-08 & Eichrom ACW-10)"**.

U-235 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Co-60, Cs-137, Ra-226 analyses were performed using **PALA-RAD-007, "Modified Gamma Emitting Radionuclides in Soil, Air, and Biota Matrices (EPA 901.1 Mod, SM 7120B, & HASL-300 Ga-01-R)"**.

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Ra-226 analysis was performed using **PALA-RAD-008, "Alpha Emitting Radium Isotopes in Water (EPA 903.0, EPA 9315, SM 7500-Ra C, SM 7500-Ra C)"**.

Sr-90 analysis was performed using **PALA-RAD-032, "Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom SRW01, EPA 905.0, HASL 300 Sr-01-RC)"**.

ANALYTICAL RESULTS

Batch ARS1-B22-01183: DUP and/or parent sample value(s) for Co-60 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01183: DUP and/or parent sample value(s) for Cs-137 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01183: DUP and/or parent sample value(s) for Ra-226 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01233: The Method Blank is greater than the MDC for Ra-226. All fractions either had activities over 5x the blank activity or were non-detects for Ra-226, therefore the activity in the Method Blank did not contribute to the concentration in client samples. All positive detects for Ra-226 in this analytical batch are qualified with a “B”.

Fraction 001 has elevated MDC for Pu-239/240 with ACT of -9.803E-8 uCi/filter, MDC of 2.864E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for U-235 with ACT of 3.716E-8 uCi/filter, MDC of 1.936E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Th-232 with ACT of 9.454E-8 uCi/filter, MDC of 1.060E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Ra-226 with ACT of 1.061E-6 uCi/filter, MDC of 9.530E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 002 has elevated MDC for Pu-239/240 with ACT of 6.636E-8 uCi/filter, MDC of 1.647E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for U-235 with ACT of 2.953E-8 uCi/filter, MDC of 5.374E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Th-232 with ACT of -1.399E-8 uCi/filter, MDC of 2.021E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Ra-226 with ACT of -7.285E-5 uCi/filter, MDC of 3.104E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 003 has elevated MDC for Pu-239/240 with ACT of -1.104E-7 uCi/filter, MDC of 2.328E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Th-232 with ACT of 3.044E-8 uCi/filter, MDC of 1.287E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Ra-226 with ACT of 3.789E-6 uCi/filter, MDC of 9.028E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 004 has elevated MDC for Pu-239/240 with ACT of -4.852E-8 uCi/filter, MDC of 2.780E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for U-235 with ACT of 3.155E-8 uCi/filter, MDC of 2.060E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Th-232 with ACT of 6.018E-8 uCi/filter, MDC of 1.606E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Ra-226 with ACT of 1.614E-6 uCi/filter, MDC of 1.498E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.

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ANALYTICAL RESULTS (continued)

ARS1-B22-01229: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01230: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01231: ROI's adjusted to better fit the peaks of interest.

For batch ARS1-B22-01183, sample “MSB113A-080122” (ARS1-22-01680-004) was used as the Sample Duplicate.

Notes (Case Narrative)

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23)
DO	Duplicate Original
DUP	Sample Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MBL	Method Blank
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NC	Not Calculated
NP	Not Provided
NR	Not Referenced
PQL	Practical Quantitation Limit

Data Qualifiers:

B	The result of both the method blank and the target sample are above the MDL.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the LOD but below the LOQ, or above the MDL but below the PQL.
Q	One or more quality control criteria failed.
U	Result is below the MDA, MDL, PQL, LOD, or LOQ
*	LCS/LCSD or Sample DUP fails all Duplicate criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected
‡	Method/Matrix/Analyte not accredited for this certification

Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

8.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.

9.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Non-Potable Water**:
Gross Alpha and Gross Beta (EPA 900.0, EPA 9310); Radium 226 (EPA 903.0, EPA 903.1, EPA 9315); Radium 228 (EPA 904.0, EPA 9320); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7470A); Strontium-89 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-02-RC); Tritium (EPA 906.0); Enriched Tritium (ARS-040), Carbon-14 (ARS-019), Tritium/Carbon (ARS-151); Gamma Emitters (EPA 901.1, SM 7120B, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-10); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02)

10.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Solid and Chemical Materials**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7471B); Strontium-89 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-02); Tritium (EPA 906.0 Mod); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-01-RC); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-02-RC, HASL 300 Pu-03-RC); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03, HASL 300 U-02, HASL 300 U-04); Technetium-99 (Eichrom TCS01)

11.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Air and Emissions**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); Strontium-89 (Eichrom SRW01, HASL 300 Sr-01-RC); Strontium-90 (Eichrom SRW01, HASL 300 Sr-02-RC); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02, Eichrom TCS01)

General Comments:

1.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of “M” or “Mod” to the procedure number (i.e. 901.1M, 901.1 Mod).

2.0) All NIOSH method results are reported without blank corrections applied.

3.0) Basis: “As Received” = analyzed as received from client; “Dry” = dried prior to being analyzed; “Dry Weight Corrected” = analyzed as received; result corrected for percent moisture.

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ARS Aleut Analytical, LLC
Analytical Reports

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Analytical Results

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01680
Client Sample ID: FB-080122
Sample Collection Date: 08/01/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01680-001
Date Received: 08/11/22
Report Date: 09/12/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-9.803E-8	1.204E-7	2.864E-7	1.206E-7	4.8E-08	U	uCi/filter	08/31/22 21:48	[redacted]	57.3%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	9.454E-8	8.789E-8	1.060E-7	2.916E-8	4.8E-08	U	uCi/filter	09/01/22 22:53	[redacted]	60.1%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.716E-8	9.494E-8	1.936E-7	6.008E-8	4.8E-08	U	uCi/filter	08/31/22 21:50	[redacted]	40.7%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	1.278E-8	8.916E-7	9.201E-7	4.601E-7	0.00024	U	uCi/filter	08/19/22 15:28	[redacted]	N/A
Cs-137	-5.587E-8	6.485E-7	7.074E-7	3.537E-7	0.00048	U	uCi/filter	08/19/22 15:28	[redacted]	N/A
Ra-226	1.061E-6	7.524E-6	9.530E-6	4.765E-6	4.4E-06	U	uCi/filter	08/19/22 15:28	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.898E-7	2.482E-7	4.076E-7	1.517E-7	4.4E-06	U	uCi/filter	09/08/22 10:29	[redacted]	86.2%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	6.559E-7	1.115E-6	1.909E-6	8.742E-7	2.4E-05	U	uCi/filter	08/31/22 10:30	[redacted]	88.7%

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ARS Sample Delivery Group: ARS1-22-01680
Client Sample ID: MSB01-080122
Sample Collection Date: 08/05/22 8:15
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01680-002
Date Received: 08/11/22
Report Date: 09/12/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	6.636E-8	9.666E-8	1.647E-7	6.293E-8	4.8E-08	U	uCi/filter	08/31/22 21:48	[redacted]	67.8%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	-1.399E-8	8.456E-8	2.021E-7	7.577E-8	4.8E-08	U	uCi/filter	09/01/22 22:53	[redacted]	50.2%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	2.953E-8	4.757E-8	5.374E-8	0.000	4.8E-08	U	uCi/filter	08/31/22 21:51	[redacted]	58.8%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-6.831E-7	1.810E-6	1.846E-6	9.230E-7	0.00024	U	uCi/filter	08/19/22 15:47	[redacted]	N/A
Cs-137	-8.218E-7	1.542E-6	1.718E-6	8.590E-7	0.00048	U	uCi/filter	08/19/22 15:47	[redacted]	N/A
Ra-226	-7.285E-5	2.288E-5	3.104E-5	1.552E-5	4.4E-06	U	uCi/filter	08/19/22 15:47	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	4.657E-7	3.106E-7	3.738E-7	1.386E-7	4.4E-06	B	uCi/filter	09/08/22 10:29	[redacted]	92.0%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	2.305E-6	2.848E-6	4.747E-6	2.249E-6	2.4E-05	U	uCi/filter	08/31/22 10:30	[redacted]	58.0%

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ARS Sample Delivery Group: ARS1-22-01680
Client Sample ID: MSB02-080122
Sample Collection Date: 08/05/22 7:28
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01680-003
Date Received: 08/11/22
Report Date: 09/12/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.104E-7	8.333E-8	2.328E-7	9.612E-8	4.8E-08	U	uCi/filter	08/31/22 21:48	[redacted]	65.5%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	3.044E-8	6.640E-8	1.287E-7	4.078E-8	4.8E-08	U	uCi/filter	09/01/22 22:53	[redacted]	56.6%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	7.049E-8	7.445E-8	5.475E-8	0.000	4.8E-08		uCi/filter	08/31/22 21:51	[redacted]	59.0%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	2.683E-7	7.088E-7	7.290E-7	3.645E-7	0.00024	U	uCi/filter	08/22/22 14:02	[redacted]	N/A
Cs-137	-4.463E-7	8.414E-7	9.041E-7	4.521E-7	0.00048	U	uCi/filter	08/22/22 14:02	[redacted]	N/A
Ra-226	3.789E-6	7.176E-6	9.028E-6	4.514E-6	4.4E-06	U	uCi/filter	08/22/22 14:02	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	6.202E-7	3.489E-7	3.917E-7	1.503E-7	4.4E-06	B	uCi/filter	09/08/22 10:29	[redacted]	92.6%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	7.016E-7	1.189E-6	2.030E-6	9.381E-7	2.4E-05	U	uCi/filter	08/31/22 10:30	[redacted]	95.3%

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ARS Sample Delivery Group: ARS1-22-01680
Client Sample ID: MSB113A-080122
Sample Collection Date: 08/05/22 7:50
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01680-004
Date Received: 08/11/22
Report Date: 09/12/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-4.852E-8	1.300E-7	2.780E-7	1.180E-7	4.8E-08	U	uCi/filter	08/31/22 21:48	[redacted]	64.4%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	6.018E-8	9.296E-8	1.606E-7	5.701E-8	4.8E-08	U	uCi/filter	09/01/22 22:53	[redacted]	59.8%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.155E-8	9.850E-8	2.060E-7	6.794E-8	4.8E-08	U	uCi/filter	08/31/22 21:51	[redacted]	42.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-3.330E-7	1.001E-6	1.091E-6	5.455E-7	0.00024	U	uCi/filter	08/25/22 13:55	[redacted]	N/A
Cs-137	-9.665E-8	7.841E-7	9.193E-7	4.597E-7	0.00048	U	uCi/filter	08/25/22 13:55	[redacted]	N/A
Ra-226	1.614E-6	1.361E-5	1.498E-5	7.490E-6	4.4E-06	U	uCi/filter	08/25/22 13:55	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	6.566E-7	3.779E-7	4.220E-7	1.595E-7	4.4E-06	B	uCi/filter	09/08/22 10:29	[redacted]	88.2%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-8.201E-8	1.205E-6	2.203E-6	1.018E-6	2.4E-05	U	uCi/filter	08/31/22 10:30	[redacted]	90.3%

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QC Summary

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QC Sample Results

Analytical Batch: ARS1-B22-01183
Lab Sample ID: ARS1-B22-01183-01
Method: EPA 901.1M

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/19/22 14:57

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Am-241	33.065	31.779		uCi/filter	96.1	75 - 125
Co-60	20.928	21.059		uCi/filter	100.6	75 - 125
Cs-137	12.996	13.341		uCi/filter	102.7	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01183
Lab Sample ID: ARS1-B22-01183-02
Method: EPA 901.1M

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/19/22 15:08

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Am-241	33.065	32.297		uCi/filter	97.7	75 - 125	1.6	25	0.289	3
Co-60	20.928	22.121		uCi/filter	105.7	75 - 125	4.9	25	1.298	3
Cs-137	12.996	13.234		uCi/filter	101.8	75 - 125	0.8	25	0.210	3

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QC Sample Results

Analytical Batch: ARS1-B22-01183
Lab Sample ID: ARS1-B22-01183-03
Method: EPA 901.1M

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/23/22 14:29

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Co-60	3.443E-4	9.440E-4	9.650E-4	4.825E-4	U	uCi/filter
Cs-137	-1.392E-4	8.175E-4	9.190E-4	4.595E-4	U	uCi/filter
Ra-226	-0.006	0.012	0.013	0.006	U	uCi/filter

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QC Sample Results

Analytical Batch: ARS1-B22-01183
Lab Sample ID: ARS1-B22-01183-08
Method: EPA 901.1M

Sample Type: DUP
Matrix: Air Filter
Analysis Date: 08/23/22 14:21

Analyte	DO Result	DO Qual	DUP Result	DUP Qual	Analysis Units	RPD	RPD Limit	DER	DER Limit
Co-60	-3.330E-7	U	-5.795E-7	U	uCi/filter	NC	25	0.349	3
Cs-137	-9.665E-8	U	3.745E-7	U	uCi/filter	NC	25	0.900	3
Ra-226	1.614E-6	U	-4.517E-7	U	uCi/filter	NC	25	0.262	3

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01680 **Analytical Batch:** ARS1-B22-01183

Analysis: Gamma Spec (Short) in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01680-001	FB-080122	Air Filter	EPA 901.1M	N/A
ARS1-22-01680-002	MSB01-080122	Air Filter	EPA 901.1M	N/A
ARS1-22-01680-003	MSB02-080122	Air Filter	EPA 901.1M	N/A
ARS1-22-01680-004	MSB113A-080122	Air Filter	EPA 901.1M	N/A
ARS1-B22-01183-01	Lab Control Sample	Air Filter	EPA 901.1M	N/A
ARS1-B22-01183-02	Lab Control Sample Duplicate	Air Filter	EPA 901.1M	N/A
ARS1-B22-01183-03	Method Blank	Air Filter	EPA 901.1M	N/A
ARS1-B22-01183-08	Sample Duplicate (MSB113A-080122)	Air Filter	EPA 901.1M	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01229
Lab Sample ID: ARS1-B22-01229-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/31/22 21:48

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Pu-239/240	7.796E-6	7.755E-6		uCi/filter	99.5	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01229
Lab Sample ID: ARS1-B22-01229-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/31/22 21:48

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Pu-239/240	7.726E-6	7.024E-6		uCi/filter	90.9	75 - 125	9.9	25	1.074	3

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QC Sample Results

Analytical Batch: ARS1-B22-01229
Lab Sample ID: ARS1-B22-01229-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/31/22 21:48

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Pu-238	9.284E-9	2.026E-8	3.741E-8	1.451E-8	U	uCi/filter
Pu-239/240	-4.371E-8	4.567E-8	9.361E-8	4.261E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01680

Analytical Batch: ARS1-B22-01229

Analysis: Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01680-001	FB-080122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01680-002	MSB01-080122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01680-003	MSB02-080122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01680-004	MSB113A-080122	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01229-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01229-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01229-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01230
Lab Sample ID: ARS1-B22-01230-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/31/22 21:50

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
U-238	8.113E-6	7.692E-6		uCi/filter	94.8	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01230
Lab Sample ID: ARS1-B22-01230-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/31/22 21:50

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
U-238	8.145E-6	8.386E-6		uCi/filter	103.0	75 - 125	8.6	25	0.956	3

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QC Sample Results

Analytical Batch: ARS1-B22-01230
Lab Sample ID: ARS1-B22-01230-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/31/22 21:50

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
U-234	-4.599E-9	3.306E-8	7.204E-8	2.890E-8	U	uCi/filter
U-235	-5.330E-9	1.761E-8	5.149E-8	1.749E-8	U	uCi/filter
U-238	-4.524E-8	3.071E-8	8.592E-8	3.585E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01680

Analytical Batch: ARS1-B22-01230

Analysis: Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01680-001	FB-080122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01680-002	MSB01-080122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01680-003	MSB02-080122	Air Filter	Eichrom ACW03	N/A
ARS1-22-01680-004	MSB113A-080122	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01230-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01230-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01230-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01231
Lab Sample ID: ARS1-B22-01231-01
Method: Eichrom ACW10

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/01/22 22:53

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Th-230	5.156E-6	6.115E-6		uCi/filter	118.6	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01231
Lab Sample ID: ARS1-B22-01231-02
Method: Eichrom ACW10

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/01/22 22:53

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Th-230	5.176E-6	5.780E-6		uCi/filter	111.7	75 - 125	5.6	25	0.600	3

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QC Sample Results

Analytical Batch: ARS1-B22-01231
Lab Sample ID: ARS1-B22-01231-03
Method: Eichrom ACW10

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/01/22 22:53

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Th-228	-1.798E-9	3.137E-8	6.307E-8	2.666E-8	U	uCi/filter
Th-230	6.094E-8	3.782E-8	4.877E-8	1.957E-8		uCi/filter
Th-232	-6.659E-9	7.578E-9	3.002E-8	1.020E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01680

Analytical Batch: ARS1-B22-01231

Analysis: Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01680-001	FB-080122	Air Filter	Eichrom ACW10	N/A
ARS1-22-01680-002	MSB01-080122	Air Filter	Eichrom ACW10	N/A
ARS1-22-01680-003	MSB02-080122	Air Filter	Eichrom ACW10	N/A
ARS1-22-01680-004	MSB113A-080122	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01231-01	Lab Control Sample	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01231-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01231-03	Method Blank	Air Filter	Eichrom ACW10	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01232
Lab Sample ID: ARS1-B22-01232-01
Method: Eichrom SRW01

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/31/22 10:30

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
SR-90	2.010E-5	2.200E-5		uCi/filter	109.4	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01232
Lab Sample ID: ARS1-B22-01232-02
Method: Eichrom SRW01

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/31/22 10:30

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
SR-90	2.006E-5	2.250E-5		uCi/filter	112.2	75 - 125	2.3	25	0.205	3

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QC Sample Results

Analytical Batch: ARS1-B22-01232
Lab Sample ID: ARS1-B22-01232-03
Method: Eichrom SRW01

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/31/22 10:30

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
SR-90	1.625E-8	2.437E-7	4.410E-7	2.031E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01680 **Analytical Batch:** ARS1-B22-01232

Analysis: Strontium-90 in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01680-001	FB-080122	Air Filter	Eichrom SRW01	N/A
ARS1-22-01680-002	MSB01-080122	Air Filter	Eichrom SRW01	N/A
ARS1-22-01680-003	MSB02-080122	Air Filter	Eichrom SRW01	N/A
ARS1-22-01680-004	MSB113A-080122	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01232-01	Lab Control Sample	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01232-02	Lab Control Sample Duplicate	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01232-03	Method Blank	Air Filter	Eichrom SRW01	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01233
Lab Sample ID: ARS1-B22-01233-01
Method: EPA 9315

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/08/22 10:29

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Ra-226	2.722E-5	2.335E-5		uCi/filter	85.8	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01233
Lab Sample ID: ARS1-B22-01233-02
Method: EPA 9315

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/08/22 10:29

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Ra-226	2.719E-5	2.407E-5		uCi/filter	88.5	75 - 125	3.0	25	0.259	3

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QC Sample Results

Analytical Batch: ARS1-B22-01233
Lab Sample ID: ARS1-B22-01233-03
Method: EPA 9315

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/08/22 10:29

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Ra-226	8.314E-8	5.973E-8	7.778E-8	2.985E-8		uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01680

Analytical Batch: ARS1-B22-01233

Analysis: Radium-226 in Air Filter

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01680-001	FB-080122	Air Filter	EPA 9315	N/A
ARS1-22-01680-002	MSB01-080122	Air Filter	EPA 9315	N/A
ARS1-22-01680-003	MSB02-080122	Air Filter	EPA 9315	N/A
ARS1-22-01680-004	MSB113A-080122	Air Filter	EPA 9315	N/A
ARS1-B22-01233-01	Lab Control Sample	Air Filter	EPA 9315	N/A
ARS1-B22-01233-02	Lab Control Sample Duplicate	Air Filter	EPA 9315	N/A
ARS1-B22-01233-03	Method Blank	Air Filter	EPA 9315	N/A

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01183**
SDG	**ARS1-22-01680**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Method	**EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/19/22 14:57	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01183-01	**LCS**	AM-241	31.779	2.468	33.065	96.1	0.118
ARS1-B22-01183-01	**LCS**	CO-60	21.059	1.115	20.928	100.6	0.372
ARS1-B22-01183-01	**LCS**	CS-137	13.341	0.710	12.996	102.7	0.073

Duplicate RER/DER/RPD

Analysis Date	08/19/22 15:08	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
AM-241	31.779	2.468	32.297	2.507	0.289	1.6
CO-60	21.059	1.115	22.121	1.153	1.298	4.9
CS-137	13.341	0.710	13.234	0.704	0.210	0.8

Duplicate RER/DER/RPD (Dup Sample)

Analysis Date	08/23/22 14:21	Analysis Technician	[redacted]

Analysis Batch Sample ID	Analyte	Results DO	CSU DO (2s)	Results DUP	CSU DUP (2s)	DER	RPD
ARS1-B22-01183-08	CO-60	-3.330E-7	1.001E-6	-5.795E-7	9.588E-7	0.349	NC
ARS1-B22-01183-08	CS-137	-9.665E-8	7.841E-7	3.745E-7	6.612E-7	0.900	NC
ARS1-B22-01183-08	RA-226	1.614E-6	1.361E-5	-4.517E-7	7.306E-6	0.262	NC

Method Blank

Analysis Date	08/23/22 14:29	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01183-03	**MBL**	CO-60	3.443E-4	9.440E-4	9.650E-4	U
ARS1-B22-01183-03	**MBL**	CS-137	-1.392E-4	8.175E-4	9.190E-4	U
ARS1-B22-01183-03	**MBL**	RA-226	-0.006	0.012	0.013	U

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01229**
SDG	**ARS1-22-01680**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/31/22 21:48	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01229-01	**LCS**	PU-239/240	7.755E-6	9.864E-7	7.796E-6	99.5	5.283E-8

Duplicate RER/DER/RPD

Analysis Date	08/31/22 21:48	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
PU-239/240	7.755E-6	9.864E-7	7.024E-6	8.960E-7	1.074	9.9

Method Blank

Analysis Date	08/31/22 21:48	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01229-03	**MBL**	PU-238	9.284E-9	2.026E-8	3.741E-8	U
ARS1-B22-01229-03	**MBL**	PU-239/240	-4.371E-8	4.567E-8	9.361E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01230**
SDG	**ARS1-22-01680**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Method	**Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/31/22 21:50	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01230-01	**LCS**	U-238	7.692E-6	9.630E-7	8.113E-6	94.8	5.119E-8

Duplicate RER/DER/RPD

Analysis Date	08/31/22 21:50	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
U-238	7.692E-6	9.630E-7	8.386E-6	1.049E-6	0.956	8.6

Method Blank

Analysis Date	08/31/22 21:50	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01230-03	**MBL**	U-234	-4.599E-9	3.306E-8	7.204E-8	U
ARS1-B22-01230-03	**MBL**	U-235	-5.330E-9	1.761E-8	5.149E-8	U
ARS1-B22-01230-03	**MBL**	U-238	-4.524E-8	3.071E-8	8.592E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01231**
SDG	**ARS1-22-01680**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Method	**Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/01/22 22:53	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01231-01	**LCS**	TH-230	6.115E-6	7.996E-7	5.156E-6	118.6	6.718E-8

Duplicate RER/DER/RPD

Analysis Date	09/01/22 22:53	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
TH-230	6.115E-6	7.996E-7	5.780E-6	7.505E-7	0.600	5.6

Method Blank

Analysis Date	09/01/22 22:53	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01231-03	**MBL**	TH-228	-1.798E-9	3.137E-8	6.307E-8	U
ARS1-B22-01231-03	**MBL**	TH-230	6.094E-8	3.782E-8	4.877E-8	
ARS1-B22-01231-03	**MBL**	TH-232	-6.659E-9	7.578E-9	3.002E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01232**
SDG	**ARS1-22-01680**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Method	**Eichrom SRW01,HASL 300 Sr-01-RC/Sr-02-**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/31/22 10:30	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01232-01	**LCS**	SR-90	2.200E-5	3.367E-6	2.010E-5	109.4	3.992E-7

Duplicate RER/DER/RPD

Analysis Date	08/31/22 10:30	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
SR-90	2.200E-5	3.367E-6	2.250E-5	3.437E-6	0.205	2.3

Method Blank

Analysis Date	08/31/22 10:30	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01232-03	**MBL**	SR-90	1.625E-8	2.437E-7	4.410E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01233**
SDG	**ARS1-22-01680**
Analysis	**Radium-226 in Air Filter**
Method	**Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/08/22 10:29	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01233-01	**LCS**	RA-226	2.335E-5	3.788E-6	2.722E-5	85.8	9.689E-8

Duplicate RER/DER/RPD

Analysis Date	09/08/22 10:29	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
RA-226	2.335E-5	3.788E-6	2.407E-5	3.895E-6	0.259	3.0

Method Blank

Analysis Date	09/08/22 10:29	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01233-03	**MBL**	RA-226	8.314E-8	5.973E-8	7.778E-8	

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01183**
SDG	**ARS1-22-01680**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Analysis Test Method	**PALA-RAD-007/EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample

Analysis Date 08/19/22 14:57 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Expected Value	CSU (1s)	Z
LCS	AM-241	31.779	1.259	33.065	0.001	1.021
LCSD	AM-241	32.297	1.279	33.065	0.001	0.600
LCS	CO-60	21.059	0.569	20.928	5.860E-4	0.230
LCSD	CO-60	22.121	0.588	20.928	5.860E-4	2.028
LCS	CS-137	13.341	0.362	12.996	3.119E-4	0.953
LCSD	CS-137	13.234	0.359	12.996	3.119E-4	0.663

Method Blank

Analysis Date 08/23/22 14:29 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Z
MBL	CS-137	-1.392E-4	4.171E-4	0.334
MBL	CO-60	3.443E-4	4.816E-4	0.715
MBL	RA-226	-0.006	0.006	1.000

Duplicate Sample

Analysis Date 08/23/22 14:21 **Analysis Technician** [redacted]

QC Type	Analyte	Results Dup	CSU (1s)	Results DO	CSU (1s)	Z
DUP	RA-226	-4.517E-7	3.728E-6	1.614E-6	6.944E-6	0.262
DUP	CO-60	-5.795E-7	4.892E-7	-3.330E-7	5.105E-7	0.349
DUP	CS-137	3.745E-7	3.374E-7	-9.665E-8	4.001E-7	0.900
LCSD	AM-241	32.297	1.279	31.779	1.259	0.289
LCSD	CO-60	22.121	0.588	21.059	0.569	1.298
LCSD	CS-137	13.234	0.359	13.341	0.362	0.210

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01229**
SDG	**ARS1-22-01680**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/31/22 21:48	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	PU-239/240	7.755E-6	5.032E-7	7.796E-6	1.263E-7	0.080
LCSD	PU-239/240	7.024E-6	4.571E-7	7.726E-6	1.263E-7	1.479

Method Blank	**Analysis Date**	08/31/22 21:48	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	PU-238	9.284E-9	1.034E-8	0.898
MBL	PU-239/240	-4.371E-8	2.330E-8	1.876

Duplicate Sample	**Analysis Date**	08/31/22 21:48	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	PU-239/240	7.024E-6	4.571E-7	7.755E-6	5.032E-7	1.074

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01230**
SDG	**ARS1-22-01680**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/31/22 21:50	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	U-238	7.692E-6	4.913E-7	8.113E-6	3.939E-8	0.856
LCSD	U-238	8.386E-6	5.350E-7	8.145E-6	3.939E-8	0.450

Method Blank	**Analysis Date**	08/31/22 21:50	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	U-234	-4.599E-9	1.687E-8	0.273
MBL	U-235	-5.330E-9	8.984E-9	0.593
MBL	U-238	-4.524E-8	1.567E-8	2.887

Duplicate Sample	**Analysis Date**	08/31/22 21:50	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	U-238	8.386E-6	5.350E-7	7.692E-6	4.913E-7	0.956

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01231**
SDG	**ARS1-22-01680**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Analysis Test Method	**PALA-RAD-031/Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/01/22 22:53	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	TH-230	6.115E-6	4.079E-7	5.156E-6	1.018E-7	2.281
LCSD	TH-230	5.780E-6	3.829E-7	5.176E-6	1.018E-7	1.522

Method Blank	**Analysis Date**	09/01/22 22:53	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	TH-228	-1.798E-9	1.601E-8	0.112
MBL	TH-230	6.094E-8	1.930E-8	3.158
MBL	TH-232	-6.659E-9	3.866E-9	1.722

Duplicate Sample	**Analysis Date**	09/01/22 22:53	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	TH-230	5.780E-6	3.829E-7	6.115E-6	4.079E-7	0.600

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01232**
SDG	**ARS1-22-01680**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Analysis Test Method	**PALA-RAD-032/Eichrom SRW01,HASL 300**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/31/22 10:30	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	SR-90	2.200E-5	1.718E-6	2.010E-5	3.422E-7	1.084
LCSD	SR-90	2.250E-5	1.754E-6	2.006E-5	3.422E-7	1.367

Method Blank	**Analysis Date**	08/31/22 10:30	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	SR-90	1.625E-8	1.243E-7	0.131

Duplicate Sample	**Analysis Date**	08/31/22 10:30	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	SR-90	2.250E-5	1.754E-6	2.200E-5	1.718E-6	0.205

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01233**
SDG	**ARS1-22-01680**
Analysis	**Radium-226 in Air Filter**
Analysis Test Method	**PALA-RAD-008/Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/08/22 10:29	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	RA-226	2.335E-5	1.933E-6	2.722E-5	3.221E-7	1.975
LCSD	RA-226	2.407E-5	1.987E-6	2.719E-5	3.221E-7	1.552

Method Blank	**Analysis Date**	09/08/22 10:29	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	RA-226	8.314E-8	3.048E-8	2.728

Duplicate Sample	**Analysis Date**	09/08/22 10:29	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	RA-226	2.407E-5	1.987E-6	2.335E-5	1.933E-6	0.259

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Sample Management Records

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
[redacted]
1655 Grant Street, Suite 1200, Concord, CA 94520
[redacted]

COC # KT081022RADB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: ARS Aleut Analytical (AAA), Port Allen, LA	Event: **Parcel B Air Monitoring RAD**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 2609 North River Road, Port Allen, LA 70767-3469	

Comments:
E901.1 (B) = Gamma Spec Air Monitoring CO60 CS137 RA226

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
5	1x 250-mL Plastic, 4 Degrees C
15	1x 250-mL Plastic, 4 Degrees C

						Analytical Test Method	A01RM - Th-232 U-235	E901.1 (B)	E903.1 - Radium 226	E905.0 - Sr-90	RC0240 - Pu-239										
	Event: Parcel B Air Monitoring RAD						15	15	15	5	15										
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	FB-080122	AQ	08/01/2022	0800	KT		X	X	X	X	X							FIELDQC	FB1	0.00	0.00	1	
2	MSB01-080122	A	08/05/2022	0815	KT		X	X	X	X	X							MSB01	N1	0.00	0.00	1	TOTAL FLOW: 357,720 (L)
3	MSB02-080122	A	08/05/2022	0728	KT		X	X	X	X	X							MSB02	N1	0.00	0.00	1	TOTAL FLOW: 355,500 (L)
4	MSB113A-080122	A	08/05/2022	0750	KT		X	X	X	X	X							MSB113A	N1	0.00	0.00	1	TOTAL FLOW: 356,520 (L)
5																							
6																							

Turnaround Time: 28 days

N/A [redacted] 8-10-22

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	08/10/2022	1600	FEDEX	08/10/2022	1600
			[redacted]	8/11/22	935

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/10/2022/FedEx 7776 1812 8195

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 09, 2022

GES
AN ASRC INDUSTRIAL COMPANY

Procedures: GES-003 / EPA 900.0M

File ID Number: KT081022RADB

Red font = field entry

	Sample ID	Date In:	Time In:	Date Out:	Time Out:	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)
1	MSB01-080122	08/01/22	4:53	08/05/22	8:15	60	60	357.7	217	4.14
2	MSB02-080122	08/01/22	4:43	08/05/22	7:28	60	60	355.5	217	4.11
3	MSB113A-080122	08/01/22	4:48	08/05/22	7:50	60	60	356.5	217	4.13

FORMULAS:

Number of Days = (Date Out +Time Out) minus (Date In+Time In)

SDG Report - Samples and Containers

SDG Specific Data							
SDG	ARS1-22-01680		TAT Days	28 Calendar Days	Project Type	Environmental
Sample Count	4	Rpt Level 4	Date Received	08/11/2022	COC Number	KT081022RADB
Client	Gilbane Federal		Discrepancy Resol	N/A	PO Number	
Client Code	1138		Client Deadline	09/08/2022	Job Number	J310000900
Profile Number	PN-01411				Job Location	Hunters Point Shipyard
Comment						

Samples and Containers Checked In Thus Far

FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Comments
001	FB-080122	Air Filter	08/01/2022 07:59	08/01/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422206	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/01/2022 07:59	AF Volume (CuM):		0.001		
002	MSB01-080122	Air Filter	08/05/2022 08:14	08/05/2022 08:15	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422207	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/05/2022 08:14	AF Volume (CuM):		0.001		
003	MSB02-080122	Air Filter	08/05/2022 07:27	08/05/2022 07:28	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422208	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/05/2022 07:27	AF Volume (CuM):		0.001		
004	MSB113A-080122	Air Filter	08/05/2022 07:49	08/05/2022 07:50	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422209	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/05/2022 07:49	AF Volume (CuM):		0.001		

SDG Report - Analysis Assignments

SDG	ARS1-22-01680	Sample Count	4
Client	Gilbane Federal	Analysis Count	6-24

Sample Count Totals Per Analysis

Analysis Code	Analysis Description	In/Out	Samples Count
ASP-PU239-AF	Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-TH-AF	Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-U-AF	Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
GAM-A-AF	Gamma Spec (Short) in (Air Filters, Smears [AF])	I	4
GPC-RA226-AF	Radium-226 in Air Filter	I	4
GPC-SR90-AF	Strontium-90 in (Air Filters, Smears [AF])	I	4

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-PU239-AF	X
001	ASP-TH-AF	X
001	ASP-U-AF	X
001	GAM-A-AF	X
001	GPC-RA226-AF	X
001	GPC-SR90-AF	X
002	ASP-PU239-AF	X
002	ASP-TH-AF	X
002	ASP-U-AF	X
002	GAM-A-AF	X
002	GPC-RA226-AF	X
002	GPC-SR90-AF	X
003	ASP-PU239-AF	X
003	ASP-TH-AF	X
003	ASP-U-AF	X
003	GAM-A-AF	X
003	GPC-RA226-AF	X
003	GPC-SR90-AF	X
004	ASP-PU239-AF	X
004	ASP-TH-AF	X
004	ASP-U-AF	X
004	GAM-A-AF	X
004	GPC-RA226-AF	X
004	GPC-SR90-AF	X

DQO Report for SDG

ARS1-22-01680

Client Name: Gilbane Federal Profile Name: Parcel B Rad Sampling Report Level: 4

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time					
ASP-PU239-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Pu-239/240 (15117-48-3)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-TH-AF	WRAD	uCi	filter	N/A	PALA-RAD-031						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Th-232 (7440-29-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-U-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	U-235 (15117-96-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GAM-A-AF	WGAM	uCi	filter	N/A	PALA-RAD-007						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Co-60 (10198-40-0)			0.00024 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Cs-137 (10045-97-3)			0.00048 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-RA226-AF	WRAD	uCi	filter		PALA-RAD-008						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-SR90-AF	WRAD	uCi	filter	N/A	PALA-RAD-032						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Sr-90 (10098-97-2)			2.4E-05 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A

Analysis Code	Fraction	Units	Aliquot	Conductivity	Analyte Count
ASP-PU239-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-TH-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-U-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	

ASP-U-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
GAM-A-AF	001	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	002	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	003	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	004	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	

GPC-SR90-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

Sample Custodian: [redacted] Survey Start Date: 8/11/22 Survey Start Time: 1005

Thermometer ID: E0064010085 Calibration Due Date: 2-28-23 pH Paper Lot#: NA

Exposure Rate Meter + Probe Unit ID: PR384409/273629 Calibration Due Date: 5-27-22 Background: 4 µR/hr

Count Rate Meter + Probe Unit ID: PR368083/331788 Calibration Due Date: 9-22-22 Background: 20 cpm

Delivery Type (circle one): Direct Lock Box (Commercial Carrier) FEDEX Total # of ESCs: 1

*True temperature is recorded which includes any applicable correction factors.

External Shipping Container Tracking:	Exposure Rate (µR/hr) (limit <500 µR/hr)	Max External Swipe Counts (cpm)	Max Internal Swipe Counts (cpm)	ESC True Temps* (°C)	TRAX Matrix ID (circle all that apply): (See Section 4.3 of SOP)
A: 777618128195	5	20	30	NA	AQ WD WG WO
B:					WS WW SI UR
C:					SO OL BI VG
D:					WP SM (AF)
E:					
F:					

Visual Inspection: (Circle response)

External Shipping Container

Good Condition with no Leaks or Tears	(Yes)	No	
Marked Radioactive	Yes	(No)	
UN2910	Yes	(No)	
Security Seals	(Yes)	No	
If yes, intact?	(Yes)	No	N/A

Internal Shipping Container

COC's Present	(Yes)	No	
Well packaged container with no signs of leakage	(Yes)	No	

COC/Sample Inspection (Circle response)

Sample Containers in good condition	(Yes)	No	
No spills or leaks	(Yes)	No	
Marked Radioactive	Yes	(No)	
Durable labels w/indelible ink	(Yes)	No	
COC reliquished/received correctly	(Yes)	No	
Adequate volume/filled correctly	(Yes)	No	
Hold Time sufficient for analysis	(Yes)	No	
For VOC/Radon, Head space?	Yes	(No)	N/A
If yes, <6mm?	Yes	No	(N/A)
# of containers received matches # on COC	(Yes)	No	
Samples received on ice?	Yes	(No)	
Type (circle one):	Bagged Ice	Loose Ice	Blue Ice (N/A)

Comments:

ARS Aleut Analytical

PALA Sample Survey Form

Client Name: Gilbane

SDG: ARS1-22-01680

Sample Survey Form
PALA-SR-001-FM-02 r 0.1
Effective 08/30/2019

Pipette ID: NA Tip Lot#: NA

Disposible pipette lot#: NA

Sample ID from Client on COC or Sample	ESC Letter	Sample Container Type	Approx. Fill Level (%)	pH <2 is Acceptable: pH As Rec'd	pH Adjusted	Acid Lot # or Ind container temp (°C)	Vol. of Acid Used (mL)	Acceptance Limits <100 cpm/cm: cpm
FB-080122	A	2 pla	25	NA	NA	NA	NA	30
MSB01-080122	↓	↓	↓	↓	↓	↓	↓	↓
MSB02-080122								
MSB113A-080122								

Sample Custodian: [redacted] Survey End Date: 8/11/22 Survey/pH End Time: 1010

pH re-check required? YES or NO *NOTE: Any metals sample acidified at sample receiving must be re-checked after a 24 hour hold.*

If YES: pH re-check date/time: _____/_____ Analyst: _____ pH strip lot #: _____

Were all re-checked samples' pH < 2? YES or NO*

**If no, complete and send to Project Management:*
1. Section A of PALA-SR-001-FM-05 (24 Hour Hold pH Readjustment)
2. SR section of PALA-SR-001-FM-03 (Discrepant Sample Receipt Report).

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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Laboratory Analytical Report

ARS1-22-01742

Gilbane Federal
[redacted]
1655 Grant Street
Suite 1200
Concord, CA 94520
[redacted]

COC Number: **KT081722RADB**
Job Number: **J310000900**
Job Location: **Not Provided**
Project Name: **Parcel B Air Monitoring RAD**

Questions regarding this analytical report should be addressed to ARS project manager, Susan Leese, who can be reached by email at projectmanagers@aaa.aleutfederal.com.

I certify that the test results presented in this report (in either hardcopy or electronic file (EDD)) meet the requirements of the laboratory's certifications and other applicable contract terms and conditions. A full list of the Port Allen, LA laboratory's certifications is provided with this report. Any exceptions to the certification or contract will be noted within the case narratives presented in the report. Any subcontracted sample results will be identified within the case narratives presented in the report. In the event this report is an amendment to a previously released report, the case narrative will clearly identify the original report as well as the reason(s) for reissuance. A statement of uncertainty for each analysis is available upon request. I authorize release and issuance of this report on the date signed below.

		Laboratory Management, ARS Aleut Analytical
Signature	**Date**	**Title**

This report provides analytical results of the requested analysis and does not include any opinions or interpretations. ARS Aleut Analytical, LLC assumes no liability for the use or interpretation of analytical results. Results relate only to items tested. A partial reproduction of this test report is prohibited. Reproduction of this report in full requires the written approval of the laboratory.

NELAP ACCREDITED TNI LABORATORY
LELAP Cert # 01949

ANAB ACCREDITED ISO/IEC 17025 DOD ELAP

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Certifications and Accreditations List

State or Accrediting Body (AB)	Certificate Number
AIHA LAP, LLC	209312
Alaska	LA01131
California	3085
ANAB DoD	ADE-1489
ANAB DOE	ADE-1489.01
Louisiana DEQ - NELAC	01949
Louisiana DHH	LA022
Nevada	LA011312023-1
New Jersey	LA009
New York	65039
Pennsylvania	68-04294-011
Texas	T104704447-21-17
Utah	LA011312022-13
Washington	C1010

For additional information related to the specific matrices, methods, and analytes recognized by each accrediting body, contact us at QA@aaa.aleutfederal.com for additional information.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Case Narrative

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PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs

Client Sample ID	ARS Aleut Analytical Sample ID
FB-080822	ARS1-22-01742-001
MSB01-080822	ARS1-22-01742-002
MSB02-080822	ARS1-22-01742-003
MSB113A-080822	ARS1-22-01742-004

Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
001	08/08/22 08:00	08/18/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
001	08/08/22 08:00	08/18/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33
001	08/08/22 08:00	08/18/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
001	08/08/22 08:00	08/18/22	GAM-A-AF	As Received	N/A	08/27/22 11:28
001	08/08/22 08:00	08/18/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
001	08/08/22 08:00	08/18/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54
002	08/12/22 07:51	08/18/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
002	08/12/22 07:51	08/18/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33
002	08/12/22 07:51	08/18/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
002	08/12/22 07:51	08/18/22	GAM-A-AF	As Received	N/A	08/24/22 14:29
002	08/12/22 07:51	08/18/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
002	08/12/22 07:51	08/18/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54
003	08/12/22 07:15	08/18/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
003	08/12/22 07:15	08/18/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33

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Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
003	08/12/22 07:15	08/18/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
003	08/12/22 07:15	08/18/22	GAM-A-AF	As Received	N/A	08/26/22 15:47
003	08/12/22 07:15	08/18/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
003	08/12/22 07:15	08/18/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54
004	08/12/22 07:31	08/18/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
004	08/12/22 07:31	08/18/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33
004	08/12/22 07:31	08/18/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
004	08/12/22 07:31	08/18/22	GAM-A-AF	As Received	N/A	08/24/22 14:31
004	08/12/22 07:31	08/18/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
004	08/12/22 07:31	08/18/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54

SAMPLE RECEIPT/PREP

The samples arrived in good condition. The samples were screened for radioactive contamination as per procedure **PALA-SR-001-SOP Sample Receiving**. Sample date(s) and time(s) are listed as provided by the client. In regard to the Air Filters, no flow rate information was provided by the client. Turnaround time was set at 28 calendar days.

ANALYTICAL METHODS

Pu-239/240 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Th-232 analysis was performed using **PALA-RAD-031, "Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom ACW-08 & Eichrom ACW-10)"**.

U-235 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Co-60, Cs-137, Ra-226 analyses were performed using **PALA-RAD-007, "Modified Gamma Emitting Radionuclides in Soil, Air, and Biota Matrices (EPA 901.1 Mod, SM 7120B, & HASL-300 Ga-01-R)"**.

Ra-226 analysis was performed using **PALA-RAD-008, "Alpha Emitting Radium Isotopes in Water (EPA 903.0, EPA 9315, SM 7500-Ra C, SM 7500-Ra C)"**.

Sr-90 analysis was performed using **PALA-RAD-032, "Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom SRW01, EPA 905.0, HASL 300 Sr-01-RC)"**.

ANALYTICAL RESULTS

Batch ARS1-B22-01219: DUP and/or parent sample value(s) for Co-60 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01219: DUP and/or parent sample value(s) for Cs-137 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01219: DUP and/or parent sample value(s) for Ra-226 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01322: Fraction 003 has tracer recovery of 29.9%, which is outside limits of 30%-110%. The sample results have been qualified with a "Q".

Fraction 001 has elevated MDC for Pu-239/240 with ACT of -1.639E-7 uCi/filter, MDC of 3.140E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for U-235 with ACT of 4.525E-8 uCi/filter, MDC of 6.131E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Th-232 with ACT of 3.775E-8 uCi/filter, MDC of 1.016E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Ra-226 with ACT of 1.694E-6 uCi/filter, MDC of 9.130E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 002 has elevated MDC for Pu-239/240 with ACT of -8.004E-8 uCi/filter, MDC of 2.133E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Th-232 with ACT of 2.303E-8 uCi/filter, MDC of 1.070E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Ra-226 with ACT of 9.034E-8 uCi/filter, MDC of 8.965E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 003 has elevated MDC for Pu-239/240 with ACT of 5.724E-8 uCi/filter, MDC of 3.026E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for U-235 with ACT of 2.383E-8 uCi/filter, MDC of 1.754E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Th-232 with ACT of 1.856E-8 uCi/filter, MDC of 9.996E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Ra-226 with ACT of -2.010E-6 uCi/filter, MDC of 9.595E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 004 has elevated MDC for Pu-239/240 with ACT of -3.595E-8 uCi/filter, MDC of 1.440E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for U-235 with ACT of 3.835E-8 uCi/filter, MDC of 1.412E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Th-232 with ACT of 6.432E-8 uCi/filter, MDC of 1.104E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Ra-226 with ACT of -6.862E-6 uCi/filter, MDC of 1.539E-5 uCi/filter and

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CRDL of 4.4E-06 uCi/filter.

ARS1-B22-01320: Planchette for batch sample 2 underwent an electroplating error and showed no signs of sample. Therefore, there is no LCSD for this batch. Results were reported, per client (correspondence included).

ARS1-B22-01320: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01320: FWHM greater than 100 keV for Th-229 on batch samples -01, -03 and -06.

ARS1-B22-01321: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01322: ROI's adjusted to better fit the peaks of interest.

For batch ARS1-B22-01219, sample “MSB113A-080822” (ARS1-22-01742-004) was used as the Sample Duplicate.

Notes (Case Narrative)

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23)
DO	Duplicate Original
DUP	Sample Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MBL	Method Blank
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NC	Not Calculated
NP	Not Provided
NR	Not Referenced
PQL	Practical Quantitation Limit

Data Qualifiers:

B	The result of both the method blank and the target sample are above the MDL.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the LOD but below the LOQ, or above the MDL but below the PQL.
Q	One or more quality control criteria failed.
U	Result is below the MDA, MDL, PQL, LOD, or LOQ
*	LCS/LCSD or Sample DUP fails all Duplicate criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected
‡	Method/Matrix/Analyte not accredited for this certification

Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

8.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.

9.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Non-Potable Water**:
Gross Alpha and Gross Beta (EPA 900.0, EPA 9310); Radium 226 (EPA 903.0, EPA 903.1, EPA 9315); Radium 228 (EPA 904.0, EPA 9320); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7470A); Strontium-89 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-02-RC); Tritium (EPA 906.0); Enriched Tritium (ARS-040), Carbon-14 (ARS-019), Tritium/Carbon (ARS-151); Gamma Emitters (EPA 901.1, SM 7120B, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-10); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02)

10.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Solid and Chemical Materials**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7471B); Strontium-89 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-02); Tritium (EPA 906.0 Mod); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-01-RC); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-02-RC, HASL 300 Pu-03-RC); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03, HASL 300 U-02, HASL 300 U-04); Technetium-99 (Eichrom TCS01)

11.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Air and Emissions**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); Strontium-89 (Eichrom SRW01, HASL 300 Sr-01-RC); Strontium-90 (Eichrom SRW01, HASL 300 Sr-02-RC); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02, Eichrom TCS01)

General Comments:

1.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of “M” or “Mod” to the procedure number (i.e. 901.1M, 901.1 Mod).

2.0) All NIOSH method results are reported without blank corrections applied.

3.0) Basis: “As Received” = analyzed as received from client; “Dry” = dried prior to being analyzed; “Dry Weight Corrected” = analyzed as received; result corrected for percent moisture.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Analytical Results

ARS Aleut Analytical

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ARS Sample Delivery Group: ARS1-22-01742
Client Sample ID: FB-080822
Sample Collection Date: 08/08/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01742-001
Date Received: 08/18/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.639E-7	1.379E-7	3.140E-7	1.385E-7	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	44.9%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	3.775E-8	5.867E-8	1.016E-7	3.802E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	64.3%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	4.525E-8	6.294E-8	6.131E-8	0.000	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	30.7%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-6.274E-7	1.041E-6	1.053E-6	5.265E-7	0.00024	U	uCi/filter	08/27/22 11:28	[redacted]	N/A
Cs-137	-3.607E-7	6.932E-7	1.150E-6	5.750E-7	0.00048	U	uCi/filter	08/27/22 11:28	[redacted]	N/A
Ra-226	1.694E-6	7.216E-6	9.130E-6	4.565E-6	4.4E-06	U	uCi/filter	08/27/22 11:28	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	1.228E-6	4.647E-7	3.079E-7	1.075E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	96.4%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	8.590E-7	1.209E-6	2.038E-6	9.416E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	92.0%

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ARS Sample Delivery Group: ARS1-22-01742
Client Sample ID: MSB01-080822
Sample Collection Date: 08/12/22 7:51
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01742-002
Date Received: 08/18/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-8.004E-8	9.656E-8	2.133E-7	9.311E-8	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	62.5%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	2.303E-8	5.534E-8	1.070E-7	3.788E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	51.3%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	0.000	0.000	4.567E-8	0.000	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	41.9%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-1.871E-7	9.060E-7	9.294E-7	4.647E-7	0.00024	U	uCi/filter	08/24/22 14:29	[redacted]	N/A
Cs-137	-1.543E-7	6.797E-7	7.381E-7	3.691E-7	0.00048	U	uCi/filter	08/24/22 14:29	[redacted]	N/A
Ra-226	9.034E-8	7.053E-6	8.965E-6	4.483E-6	4.4E-06	U	uCi/filter	08/24/22 14:29	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	7.150E-7	3.622E-7	3.847E-7	1.496E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	99.3%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	1.634E-6	1.676E-6	2.752E-6	1.299E-6	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	93.6%

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ARS Sample Delivery Group: ARS1-22-01742
Client Sample ID: MSB02-080822
Sample Collection Date: 08/12/22 7:15
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01742-003
Date Received: 08/18/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	5.724E-8	1.695E-7	3.026E-7	1.358E-7	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	54.1%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	1.856E-8	5.151E-8	9.996E-8	3.740E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	64.9%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	2.383E-8	8.094E-8	1.754E-7	5.543E-8	4.8E-08	UQ	uCi/filter	09/16/22 2:18	[redacted]	29.9%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-3.829E-8	8.562E-7	8.841E-7	4.421E-7	0.00024	U	uCi/filter	08/26/22 15:47	[redacted]	N/A
Cs-137	-2.620E-7	7.163E-7	7.744E-7	3.872E-7	0.00048	U	uCi/filter	08/26/22 15:47	[redacted]	N/A
Ra-226	-2.010E-6	7.594E-6	9.595E-6	4.798E-6	4.4E-06	U	uCi/filter	08/26/22 15:47	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	4.603E-7	3.070E-7	3.695E-7	1.370E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	104%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-2.137E-7	1.159E-6	2.130E-6	9.886E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	96.1%

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ARS Sample Delivery Group: ARS1-22-01742
Client Sample ID: MSB113A-080822
Sample Collection Date: 08/12/22 7:31
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01742-004
Date Received: 08/18/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-3.595E-8	5.269E-8	1.440E-7	5.575E-8	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	54.1%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	6.432E-8	7.018E-8	1.104E-7	4.275E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	71.9%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.835E-8	7.531E-8	1.412E-7	4.461E-8	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	37.9%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	4.521E-7	6.890E-7	1.143E-6	5.715E-7	0.00024	U	uCi/filter	08/24/22 14:31	[redacted]	N/A
Cs-137	-4.503E-7	8.448E-7	9.786E-7	4.893E-7	0.00048	U	uCi/filter	08/24/22 14:31	[redacted]	N/A
Ra-226	-6.862E-6	1.384E-5	1.539E-5	7.695E-6	4.4E-06	U	uCi/filter	08/24/22 14:31	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	6.085E-7	3.628E-7	4.151E-7	1.569E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	98.2%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	1.827E-6	1.275E-6	1.963E-6	9.065E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	100%

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QC Summary

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-01
Method: EPA 901.1M

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/26/22 8:02

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Am-241	33.065	32.514		uCi/filter	98.3	75 - 125
Co-60	20.928	21.610		uCi/filter	103.3	75 - 125
Cs-137	12.996	13.294		uCi/filter	102.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-02
Method: EPA 901.1M

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/26/22 8:15

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Am-241	33.065	31.599		uCi/filter	95.6	75 - 125	2.9	25	0.509	3
Co-60	20.928	20.143		uCi/filter	96.2	75 - 125	7.0	25	1.598	3
Cs-137	12.996	13.554		uCi/filter	104.3	75 - 125	1.9	25	0.504	3

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-03
Method: EPA 901.1M

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/27/22 11:31

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Co-60	2.832E-4	0.002	0.002	8.300E-4	U	uCi/filter
Cs-137	2.787E-4	0.001	0.002	7.900E-4	U	uCi/filter
Ra-226	-0.084	0.030	0.032	0.016	U	uCi/filter

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-08
Method: EPA 901.1M

Sample Type: DUP
Matrix: Air Filter
Analysis Date: 08/25/22 14:05

Analyte	DO Result	DO Qual	DUP Result	DUP Qual	Analysis Units	RPD	RPD Limit	DER	DER Limit
Co-60	4.521E-7	U	3.658E-7	U	uCi/filter	NC	25	0.163	3
Cs-137	-4.503E-7	U	-3.955E-7	U	uCi/filter	NC	25	0.102	3
Ra-226	-6.862E-6	U	-1.965E-6	U	uCi/filter	NC	25	0.615	3

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01742 **Analytical Batch:** ARS1-B22-01219

Analysis: Gamma Spec (Short) in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01742-001	FB-080822	Air Filter	EPA 901.1M	N/A
ARS1-22-01742-002	MSB01-080822	Air Filter	EPA 901.1M	N/A
ARS1-22-01742-003	MSB02-080822	Air Filter	EPA 901.1M	N/A
ARS1-22-01742-004	MSB113A-080822	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-01	Lab Control Sample	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-02	Lab Control Sample Duplicate	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-03	Method Blank	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-08	Sample Duplicate (MSB113A-080822)	Air Filter	EPA 901.1M	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01312
Lab Sample ID: ARS1-B22-01312-01
Method: EPA 9315

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/21/22 10:10

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Ra-226	2.754E-5	2.739E-5		uCi/filter	99.5	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01312
Lab Sample ID: ARS1-B22-01312-02
Method: EPA 9315

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/21/22 10:10

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Ra-226	2.743E-5	2.754E-5		uCi/filter	100.4	75 - 125	0.5	25	0.046	3

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QC Sample Results

Analytical Batch: ARS1-B22-01312
Lab Sample ID: ARS1-B22-01312-03
Method: EPA 9315

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/21/22 10:10

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Ra-226	7.666E-8	6.029E-8	8.266E-8	3.194E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01742

Analytical Batch: ARS1-B22-01312

Analysis: Radium-226 in Air Filter

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01742-001	FB-080822	Air Filter	EPA 9315	N/A
ARS1-22-01742-002	MSB01-080822	Air Filter	EPA 9315	N/A
ARS1-22-01742-003	MSB02-080822	Air Filter	EPA 9315	N/A
ARS1-22-01742-004	MSB113A-080822	Air Filter	EPA 9315	N/A
ARS1-B22-01312-01	Lab Control Sample	Air Filter	EPA 9315	N/A
ARS1-B22-01312-02	Lab Control Sample Duplicate	Air Filter	EPA 9315	N/A
ARS1-B22-01312-03	Method Blank	Air Filter	EPA 9315	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01320
Lab Sample ID: ARS1-B22-01320-01
Method: Eichrom ACW10

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/21/22 2:33

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Th-230	5.182E-6	5.663E-6		uCi/filter	109.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01320
Lab Sample ID: ARS1-B22-01320-03
Method: Eichrom ACW10

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/21/22 2:33

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Th-228	8.466E-8	1.141E-7	1.920E-7	8.165E-8	U	uCi/filter
Th-230	1.567E-7	1.637E-7	2.665E-7	1.191E-7	U	uCi/filter
Th-232	-1.043E-8	6.781E-8	1.471E-7	5.943E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01742

Analytical Batch: ARS1-B22-01320

Analysis: Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01742-001	FB-080822	Air Filter	Eichrom ACW10	N/A
ARS1-22-01742-002	MSB01-080822	Air Filter	Eichrom ACW10	N/A
ARS1-22-01742-003	MSB02-080822	Air Filter	Eichrom ACW10	N/A
ARS1-22-01742-004	MSB113A-080822	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01320-01	Lab Control Sample	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01320-03	Method Blank	Air Filter	Eichrom ACW10	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01321
Lab Sample ID: ARS1-B22-01321-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/20/22 2:09

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Pu-239/240	7.719E-6	7.919E-6		uCi/filter	102.6	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01321
Lab Sample ID: ARS1-B22-01321-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/20/22 2:09

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Pu-239/240	7.684E-6	7.630E-6		uCi/filter	99.3	75 - 125	3.7	25	0.412	3

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QC Sample Results

Analytical Batch: ARS1-B22-01321
Lab Sample ID: ARS1-B22-01321-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/20/22 2:09

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Pu-238	4.145E-8	5.000E-8	7.629E-8	2.411E-8	U	uCi/filter
Pu-239/240	1.036E-8	8.852E-8	1.727E-7	7.230E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01742

Analytical Batch: ARS1-B22-01321

Analysis: Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01742-001	FB-080822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01742-002	MSB01-080822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01742-003	MSB02-080822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01742-004	MSB113A-080822	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01321-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01321-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01321-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01322
Lab Sample ID: ARS1-B22-01322-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/16/22 2:18

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
U-238	1.618E-5	1.680E-5		uCi/filter	103.8	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01322
Lab Sample ID: ARS1-B22-01322-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/16/22 2:18

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
U-238	1.626E-5	1.584E-5		uCi/filter	97.4	75 - 125	5.9	25	0.664	3

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QC Sample Results

Analytical Batch: ARS1-B22-01322
Lab Sample ID: ARS1-B22-01322-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/16/22 2:18

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
U-234	-1.004E-7	3.080E-7	5.792E-7	2.669E-7	U	uCi/filter
U-235	-3.880E-8	1.423E-7	3.079E-7	1.276E-7	U	uCi/filter
U-238	-5.011E-7	3.164E-7	6.472E-7	3.010E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01742

Analytical Batch: ARS1-B22-01322

Analysis: Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01742-001	FB-080822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01742-002	MSB01-080822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01742-003	MSB02-080822	Air Filter	Eichrom ACW03	N/A
ARS1-22-01742-004	MSB113A-080822	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01322-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01322-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01322-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01323
Lab Sample ID: ARS1-B22-01323-01
Method: Eichrom SRW01

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/20/22 9:54

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
SR-90	2.062E-5	2.242E-5		uCi/filter	108.7	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01323
Lab Sample ID: ARS1-B22-01323-02
Method: Eichrom SRW01

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/20/22 9:54

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
SR-90	2.054E-5	2.107E-5		uCi/filter	102.6	75 - 125	6.2	25	0.560	3

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QC Sample Results

Analytical Batch: ARS1-B22-01323
Lab Sample ID: ARS1-B22-01323-03
Method: Eichrom SRW01

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/20/22 9:54

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
SR-90	6.665E-7	1.244E-6	2.139E-6	9.858E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01742 **Analytical Batch:** ARS1-B22-01323

Analysis: Strontium-90 in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01742-001	FB-080822	Air Filter	Eichrom SRW01	N/A
ARS1-22-01742-002	MSB01-080822	Air Filter	Eichrom SRW01	N/A
ARS1-22-01742-003	MSB02-080822	Air Filter	Eichrom SRW01	N/A
ARS1-22-01742-004	MSB113A-080822	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01323-01	Lab Control Sample	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01323-02	Lab Control Sample Duplicate	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01323-03	Method Blank	Air Filter	Eichrom SRW01	N/A

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01219**
SDG	**ARS1-22-01742**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears [AF])**
Method	**EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/26/22 08:02	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01219-01	**LCS**	AM-241	32.514	2.524	33.065	98.3	0.078
ARS1-B22-01219-01	**LCS**	CO-60	21.610	1.312	20.928	103.3	0.410
ARS1-B22-01219-01	**LCS**	CS-137	13.294	0.708	12.996	102.3	0.084

Duplicate RER/DER/RPD

Analysis Date	08/26/22 08:15	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
AM-241	32.514	2.524	31.599	2.455	0.509	2.9
CO-60	21.610	1.312	20.143	1.231	1.598	7.0
CS-137	13.294	0.708	13.554	0.722	0.504	1.9

Duplicate RER/DER/RPD (Dup Sample)

Analysis Date	08/25/22 14:05	Analysis Technician	[redacted]

Analysis Batch Sample ID	Analyte	Results DO	CSU DO (2s)	Results DUP	CSU DUP (2s)	DER	RPD
ARS1-B22-01219-08	CO-60	4.521E-7	6.890E-7	3.658E-7	7.794E-7	0.163	NC
ARS1-B22-01219-08	CS-137	-4.503E-7	8.448E-7	-3.955E-7	6.275E-7	0.102	NC
ARS1-B22-01219-08	RA-226	-6.862E-6	1.384E-5	-1.965E-6	7.221E-6	0.615	NC

Method Blank

Analysis Date	08/27/22 11:31	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01219-03	**MBL**	CO-60	2.832E-4	0.002	0.002	U
ARS1-B22-01219-03	**MBL**	CS-137	2.787E-4	0.001	0.002	U
ARS1-B22-01219-03	**MBL**	RA-226	-0.084	0.030	0.032	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01312**
SDG	**ARS1-22-01742**
Analysis	**Radium-226 in Air Filter**
Method	**EPA 9315**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/21/22 10:10	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01312-01	**LCS**	RA-226	2.739E-5	4.416E-6	2.754E-5	99.5	9.289E-8

Duplicate RER/DER/RPD

Analysis Date	09/21/22 10:10	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
RA-226	2.739E-5	4.416E-6	2.754E-5	4.439E-6	0.046	0.5

Method Blank

Analysis Date	09/21/22 10:10	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01312-03	**MBL**	RA-226	7.666E-8	6.029E-8	8.266E-8	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01320**
SDG	**ARS1-22-01742**
Analysis	**Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])**
Method	**Eichrom ACW10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date 09/21/22 02:33 **Analysis Technician** [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01320-01	**LCS**	TH-230	5.663E-6	7.184E-7	5.182E-6	109.3	4.088E-8

Method Blank

Analysis Date 09/21/22 02:33 **Analysis Technician** [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01320-03	**MBL**	TH-228	8.466E-8	1.141E-7	1.920E-7	U
ARS1-B22-01320-03	**MBL**	TH-230	1.567E-7	1.637E-7	2.665E-7	U
ARS1-B22-01320-03	**MBL**	TH-232	-1.043E-8	6.781E-8	1.471E-7	U

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01321**
SDG	**ARS1-22-01742**
Analysis	**Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])**
Method	**Eichrom ACW03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

			Analysis Date	09/20/22 02:09	Analysis Technician	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**Expected Value**	**LCS Rec (%)**	**MDC**
ARS1-B22-01321-01	**LCS**	PU-239/240	7.919E-6	9.918E-7	7.719E-6	102.6	5.045E-8

Duplicate RER/DER/RPD

		Analysis Date	09/20/22 02:09	Analysis Technician	[redacted]	
Analyte	**Results LCS**	**CSU LCS (2s)**	**Results LCSD**	**CSU LCSD (2s)**	**DER**	**RPD**
PU-239/240	7.919E-6	9.918E-7	7.630E-6	9.537E-7	0.412	3.7

Method Blank

		Analysis Date	09/20/22 02:09	Analysis Technician	[redacted]	
Analysis Batch Sample ID	**QC Type**	**Analyte**	**Results**	**CSU (2s)**	**MDC**	**Qual**
ARS1-B22-01321-03	**MBL**	PU-238	4.145E-8	5.000E-8	7.629E-8	U
ARS1-B22-01321-03	**MBL**	PU-239/240	1.036E-8	8.852E-8	1.727E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01322**
SDG	**ARS1-22-01742**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])**
Method	**Eichrom ACW03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/16/22 02:18	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01322-01	**LCS**	U-238	1.680E-5	2.053E-6	1.618E-5	103.8	3.700E-8

Duplicate RER/DER/RPD

Analysis Date	09/16/22 02:18	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
U-238	1.680E-5	2.053E-6	1.584E-5	1.937E-6	0.664	5.9

Method Blank

Analysis Date	09/16/22 02:18	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01322-03	**MBL**	U-234	-1.004E-7	3.080E-7	5.792E-7	U
ARS1-B22-01322-03	**MBL**	U-235	-3.880E-8	1.423E-7	3.079E-7	U
ARS1-B22-01322-03	**MBL**	U-238	-5.011E-7	3.164E-7	6.472E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01323**
SDG	**ARS1-22-01742**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Method	**Eichrom SRW01**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/20/22 09:54	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01323-01	**LCS**	SR-90	2.242E-5	3.421E-6	2.062E-5	108.7	3.822E-7

Duplicate RER/DER/RPD

Analysis Date	09/20/22 09:54	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
SR-90	2.242E-5	3.421E-6	2.107E-5	3.224E-6	0.560	6.2

Method Blank

Analysis Date	09/20/22 09:54	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01323-03	**MBL**	SR-90	6.665E-7	1.244E-6	2.139E-6	U

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01219**
SDG	**ARS1-22-01742**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Analysis Test Method	**PALA-RAD-007/EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample

Analysis Date 08/26/22 08:02 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Expected Value	CSU (1s)	Z
LCS	AM-241	32.514	1.288	33.065	0.001	0.428
LCSD	AM-241	31.599	1.252	33.065	0.001	1.170
LCS	CO-60	21.610	0.669	20.928	5.860E-4	1.019
LCSD	CO-60	20.143	0.628	20.928	5.860E-4	1.250
LCS	CS-137	13.294	0.361	12.996	3.119E-4	0.825
LCSD	CS-137	13.554	0.368	12.996	3.119E-4	1.516

Method Blank

Analysis Date 08/27/22 11:31 **Analysis Technician** [redacted]

QC Type	Analyte	Results	CSU (1s)	Z
MBL	CS-137	2.787E-4	7.159E-4	0.389
MBL	CO-60	2.832E-4	8.223E-4	0.344
MBL	RA-226	-0.084	0.015	5.537

Duplicate Sample

Analysis Date 08/25/22 14:05 **Analysis Technician** [redacted]

QC Type	Analyte	Results Dup	CSU (1s)	Results DO	CSU (1s)	Z
DUP	RA-226	-1.965E-6	3.684E-6	-6.862E-6	7.059E-6	0.615
DUP	CO-60	3.658E-7	3.977E-7	4.521E-7	3.516E-7	0.163
DUP	CS-137	-3.955E-7	3.201E-7	-4.503E-7	4.310E-7	0.102
LCSD	AM-241	31.599	1.252	32.514	1.288	0.509
LCSD	CO-60	20.143	0.628	21.610	0.669	1.598
LCSD	CS-137	13.554	0.368	13.294	0.361	0.504

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01312**
SDG	**ARS1-22-01742**
Analysis	**Radium-226 in Air Filter**
Analysis Test Method	**PALA-RAD-008/Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/21/22 10:10	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	RA-226	2.739E-5	2.253E-6	2.754E-5	3.221E-7	0.065
LCSD	RA-226	2.754E-5	2.265E-6	2.743E-5	3.221E-7	0.047

Method Blank	**Analysis Date**	09/21/22 10:10	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	RA-226	7.666E-8	3.076E-8	2.492

Duplicate Sample	**Analysis Date**	09/21/22 10:10	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	RA-226	2.754E-5	2.265E-6	2.739E-5	2.253E-6	0.046

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01320**
SDG	**ARS1-22-01742**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Analysis Test Method	**PALA-RAD-031/Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/21/22 02:33	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	TH-230	5.663E-6	3.665E-7	5.182E-6	1.018E-7	1.266

Method Blank	**Analysis Date**	09/21/22 02:33	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	TH-228	8.466E-8	5.820E-8	1.455
MBL	TH-230	1.567E-7	8.351E-8	1.877
MBL	TH-232	-1.043E-8	3.460E-8	0.301

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01321**
SDG	**ARS1-22-01742**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/20/22 02:09	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	PU-239/240	7.919E-6	5.060E-7	7.719E-6	1.263E-7	0.384
LCSD	PU-239/240	7.630E-6	4.866E-7	7.684E-6	1.263E-7	0.107

Method Blank	**Analysis Date**	09/20/22 02:09	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	PU-238	4.145E-8	2.551E-8	1.625
MBL	PU-239/240	1.036E-8	4.516E-8	0.229

Duplicate Sample	**Analysis Date**	09/20/22 02:09	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	PU-239/240	7.630E-6	4.866E-7	7.919E-6	5.060E-7	0.412

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Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01322**
SDG	**ARS1-22-01742**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/16/22 02:18	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	U-238	1.680E-5	1.047E-6	1.618E-5	3.939E-8	0.588
LCSD	U-238	1.584E-5	9.880E-7	1.626E-5	3.939E-8	0.423

Method Blank	**Analysis Date**	09/16/22 02:18	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	U-234	-1.004E-7	1.571E-7	0.639
MBL	U-235	-3.880E-8	7.262E-8	0.534
MBL	U-238	-5.011E-7	1.614E-7	3.104

Duplicate Sample	**Analysis Date**	09/16/22 02:18	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	U-238	1.584E-5	9.880E-7	1.680E-5	1.047E-6	0.664

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01323**
SDG	**ARS1-22-01742**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Analysis Test Method	**PALA-RAD-032/Eichrom SRW01,HASL 300**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/20/22 09:54	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	SR-90	2.242E-5	1.746E-6	2.062E-5	3.417E-7	1.012
LCSD	SR-90	2.107E-5	1.645E-6	2.054E-5	3.417E-7	0.319

Method Blank	**Analysis Date**	09/20/22 09:54	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	SR-90	6.665E-7	6.346E-7	1.050

Duplicate Sample	**Analysis Date**	09/20/22 09:54	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	SR-90	2.107E-5	1.645E-6	2.242E-5	1.746E-6	0.560

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Sample Management Records

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
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1655 Grant Street, Suite 1200, Concord, CA 94520
[redacted]

COC # KT081722RADB

GES

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: ARS Aleut Analytical (AAA), Port Allen, LA	Event: **Parcel B Air Monitoring RAD**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 2609 North River Road, Port Allen, LA 70767-3469	

Comments:
E901.1 (B) = Gamma Spec Air Monitoring CO60 CS137 RA226

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
5	1x 250-mL Plastic, 4 Degrees C
15	1x 250-mL Plastic, 4 Degrees C

						Analytical Test Method	A01RM - Th-232 U-235	E901.1 (B)	E903.1 - Radium 226	E905.0 - Sr-90	RC0240 - Pu-239									
	Event: Parcel B Air Monitoring RAD						15	15	15	5	15									
	Sample ID	Matrix	Date	Time	Samp Init.											Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
1	FB-080822	AQ	08/08/2022	0800	KT	X	X	X	X	X						FIELDQC	FB1	0.00	0.00	1	
2	MSB01-080822	A	08/12/2022	0751	KT	X	X	X	X	X						MSB01	N1	0.00	0.00	1	TOTAL FLOW = 359,280 (L)
3	MSB02-080822	A	08/12/2022	0715	KT	X	X	X	X	X						MSB02	N1	0.00	0.00	1	TOTAL FLOW = 356,700 (L)
4	MSB113A-080822	A	08/12/2022	0731	KT	X	X	X	X	X						MSB113A	N1	0.00	0.00	1	TOTAL FLOW = 358,560 (L)
5											N/A										
6											[redacted] 8-17-22										

Turnaround Time: 28 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/17/22	1600	FEDEX [redacted]	8/17/22	1600
				8/18/22	1015

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/17/2022/ FedEx 7776 4974 2805

Received by Laboratory: *(Signature, Date, Time)* **& condition**

GES.Navy_COC_Field
August 12, 2022

Procedures: GES-003 / EPA 900.0M

File ID Number: _____

Red font = field entry

	Sample ID	Date In:	Time In:	Date Out:	Time Out:	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)	Total Run Time (Hours)	Total Run Time (Minutes)	Average Flow Rate (LPM)	Initial Flow Rate (CFM)	Final Flow Rate (CFM)	Average Flow Rate (CFM)	Average Flow Rate (Cu.M/h)	Flow Rate (Cu.M/min)	Total Flow (L)
1	MSB01-080821	######	4:03	08/12/22	7:51	60	60	359.3	224	4.16	99.80	5988.0	60	2.11888	2.11888	2.11888	3.6	0.06	359280
2	MSB02-080821	######	4:10	08/12/22	7:15	60	60	356.7	224	4.13	99.08	5945.0	60	2.11888	2.11888	2.11888	3.6	0.06	356700
3	MSB113A-080821	######	3:55	08/12/22	7:31	60	60	358.6	224	4.15	99.60	5976.0	60	2.11888	2.11888	2.11888	3.6	0.06	358560

FORMULAS:

Number of Days = (Date Out +Time Out) minus (Date In+Time In)

Number of Minutes = # of Days X 24hr X 60min

Flow Rate (m3/h) = Flow Rate (CFM) x 60min x (12in x 2.54cm/in / 100cm/m)^3 :

Mid-Sample Date/Time = [(Date+Time Out) + (Date+Time In)] / 2

Flow Rate (Cu.M/min) = CFM X 0.0283168466 Cu.M/CF

Flow Rate (LPM) = Cu.M X 1000

Total Flow (L) = LPM X Total Minutes

SDG Report - Samples and Containers

SDG Specific Data							
SDG	ARS1-22-01742		TAT Days	28 Calendar Days	Project Type	Environmental
Sample Count	4	Rpt Level 4	Date Received	08/18/2022	COC Number	KT081722RADB
Client	Gilbane Federal		Discrepancy Resol	N/A	PO Number	
Client Code	1138		Client Deadline	09/15/2022	Job Number	J310000900
Profile Number	PN-01411				Job Location	
Comment						

Samples and Containers Checked In Thus Far

FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Comments
001	FB-080822	Air Filter	08/08/2022 07:59	08/08/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422543	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/08/2022 07:59	AF Volume (CuM):		0.001		
002	MSB01-080822	Air Filter	08/12/2022 07:50	08/12/2022 07:51	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422544	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/12/2022 07:50	AF Volume (CuM):		0.001		
003	MSB02-080822	Air Filter	08/12/2022 07:14	08/12/2022 07:15	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422545	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/12/2022 07:14	AF Volume (CuM):		0.001		
004	MSB113A-080822	Air Filter	08/12/2022 07:30	08/12/2022 07:31	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422546	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/12/2022 07:30	AF Volume (CuM):		0.001		

SDG Report - Analysis Assignments

SDG	ARS1-22-01742	Sample Count	4
Client	Gilbane Federal	Analysis Count	6-24

Sample Count Totals Per Analysis

Analysis Code	Analysis Description	In/Out	Samples Count
ASP-PU239-AF	Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-TH-AF	Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-U-AF	Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
GAM-A-AF	Gamma Spec (Short) in (Air Filters, Smears [AF])	I	4
GPC-RA226-AF	Radium-226 in Air Filter	I	4
GPC-SR90-AF	Strontium-90 in (Air Filters, Smears [AF])	I	4

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-PU239-AF	X
001	ASP-TH-AF	X
001	ASP-U-AF	X
001	GAM-A-AF	X
001	GPC-RA226-AF	X
001	GPC-SR90-AF	X
002	ASP-PU239-AF	X
002	ASP-TH-AF	X
002	ASP-U-AF	X
002	GAM-A-AF	X
002	GPC-RA226-AF	X
002	GPC-SR90-AF	X
003	ASP-PU239-AF	X
003	ASP-TH-AF	X
003	ASP-U-AF	X
003	GAM-A-AF	X
003	GPC-RA226-AF	X
003	GPC-SR90-AF	X
004	ASP-PU239-AF	X
004	ASP-TH-AF	X
004	ASP-U-AF	X
004	GAM-A-AF	X
004	GPC-RA226-AF	X
004	GPC-SR90-AF	X

DQO Report for SDG

ARS1-22-01742

Client Name: Gilbane Federal Profile Name: Parcel B Rad Sampling Report Level: 4

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time					
ASP-PU239-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Pu-239/240 (15117-48-3)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-TH-AF	WRAD	uCi	filter	N/A	PALA-RAD-031						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Th-232 (7440-29-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-U-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	U-235 (15117-96-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GAM-A-AF	WGAM	uCi	filter	N/A	PALA-RAD-007						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Co-60 (10198-40-0)			0.00024 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Cs-137 (10045-97-3)			0.00048 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-RA226-AF	WRAD	uCi	filter		PALA-RAD-008						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-SR90-AF	WRAD	uCi	filter	N/A	PALA-RAD-032						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Sr-90 (10098-97-2)			2.4E-05 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A

Analysis Code	Fraction	Units	Aliquot	Conductivity	Analyte Count
ASP-PU239-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-TH-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-U-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	

ASP-U-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
GAM-A-AF	001	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	002	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	003	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	004	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	

GPC-SR90-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

Sample Custodian: [redacted] Survey Start Date: 8/18/22 Survey Start Time: 1230

Thermometer ID: E0064010085 Calibration Due Date: 2-28-23 pH Paper Lot#: NA

Exposure Rate Meter + Probe Unit ID: PR384409/273629 Calibration Due Date: 5-27-22 Background: 4 µR/hr

Count Rate Meter + Probe Unit ID: PR368083/331788 Calibration Due Date: 9-22-22 Background: 20 cpm

Delivery Type (circle one): Direct Lock Box (Commercial Carrier): FEDEX Total # of ESCs: 1

*True temperature is recorded which includes any applicable correction factors.

External Shipping Container Tracking:	Exposure Rate (µR/hr) (limit <500 µR/hr)	Max External Swipe Counts (cpm)	Max Internal Swipe Counts (cpm)	ESC True Temps* (°C)	TRAX Matrix ID (circle all that apply): (See Section 4.3 of SOP)
A: 777049742805	6	30	50	NA	AQ WD WG WO
B:					WS WW SI UR
C:					SO OL BI VG
D:					WP SM (AF)
E:					
F:					

Visual Inspection: (Circle response)

External Shipping Container

Good Condition with no Leaks or Tears	(Yes)	No	
Marked Radioactive	Yes	(No)	
UN2910	Yes	(No)	
Security Seals	(Yes)	No	
If yes, intact?	(Yes)	No	N/A

Internal Shipping Container

COC's Present	(Yes)	No	
Well packaged container with no signs of leakage	(Yes)	No	

COC/Sample Inspection (Circle response)

Sample Containers in good condition	(Yes)	No	
No spills or leaks	(Yes)	No	
Marked Radioactive	Yes	(No)	
Durable labels w/indelible ink	(Yes)	No	
COC reliquished/received correctly	(Yes)	No	
Adequate volume/filled correctly	(Yes)	No	
Hold Time sufficient for analysis	(Yes)	No	
For VOC/Radon, Head space?	Yes	No	(N/A)
If yes, <6mm?	Yes	No	(N/A)
# of containers received matches # on COC	(Yes)	No	
Samples received on ice?	Yes	(No)	
Type (circle one):	Bagged Ice	Loose Ice	Blue Ice (N/A)

Comments:

ARS Aleut Analytical

PALA Sample Survey Form

Client Name: Gilbane

SDG: ARS1-22-01742

Sample Survey Form
PALA-SR-001-FM-02 r 0.1
Effective 08/30/2019

Pipette ID: NA Tip Lot#: NA

Disposible pipette lot#: NA

Sample ID from Client on COC or Sample	ESC Letter	Sample Container Type	Approx. Fill Level (%)	pH (pH <2 is Acceptable) As Rec'd	pH Adjusted	Acid Lot # or Ind container temp (°C)	Vol. of Acid Used (mL)	Acceptance Limits <100 cpm/cm cpm
FB-080822	A	ziploc	25	NA	NA	NA	NA	50
MSB01-080822	↓	↓	↓	↓	↓	↓	↓	↓
MSB02-080822								
MSB113A-080822								

Sample Custodian: [redacted] Survey End Date: 8/18/22 Survey/pH End Time: 1233

pH re-check required? YES or NO *NOTE: Any metals sample acidified at sample receiving must be re-checked after a 24 hour hold.*

If YES: pH re-check date/time: _____/_____ Analyst: _____ pH strip lot #: _____

Were all re-checked samples' pH < 2? YES or NO*

**If no, complete and send to Project Management:*
1. Section A of PALA-SR-001-FM-05 (24 Hour Hold pH Readjustment)
2. SR section of PALA-SR-001-FM-03 (Discrepant Sample Receipt Report).

ENVIRONMENTAL SOLUTIONS / QUALITY CONSCIOUS

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
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3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Susan Leese

From: [redacted]
Sent: Tuesday, September 20, 2022 11:23 AM
To: [redacted]
Cc: Project Managers AAA
Subject: RE: Thorium AF Question - Please Advise

If these are air samples, please report them with the MB and the LCS.

Best,

[redacted] **CHMM, PMP**
Sr. Chemist | Project Manager
GES | MBE
1501 W Fountainhead Parkway, Suite 550
Tempe, Arizona 85282
[redacted]
GES-AIS.COM

From: [redacted]
Sent: Tuesday, September 20, 2022 9:09 AM
To: [redacted]
Cc: Project Managers AAA <ProjectManagers@aaa.aleutfederal.com>
Subject: RE: Thorium AF Question - Please Advise

CAUTION: EXTERNAL SENDER *This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.*

We have an LCS and a Method Blank with this batch.

From: [redacted]
Sent: Tuesday, September 20, 2022 11:05 AM
To: [redacted]
Cc: Project Managers AAA <ProjectManagers@aaa.aleutfederal.com>
Subject: RE: Thorium AF Question - Please Advise

Hi [redacted]

What QC do we have with the Th batch?

[redacted]
Sr. Chemist | Project Manager
GES | MBE
1501 W Fountainhead Parkway, Suite 550
Tempe, Arizona 85282
[redacted]
GES-AIS.COM

From: [redacted]
Sent: Tuesday, September 20, 2022 8:35 AM
To: [redacted]
Cc: Project Managers AAA <ProjectManagers@aaa.aleutfederal.com>
Subject: Thorium AF Question - Please Advise

CAUTION: EXTERNAL SENDER *This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.*

Hi [redacted]

Regarding the Thorium analysis for SDGs ARS1-22-01742; 22-01795, the LCSD did not plate correctly. Therefore there will not be an LCSD to report for this batch. Would you like us to proceed with the reporting of this batch or rerun the Thorium analysis for these 2 SDGs?

Thanks very much,

[redacted]

ALEUT

[redacted]

Program Manager
ARS Aleut Analytical, LLC
2609 North River Road
Port Allen, Louisiana 70767
[redacted]
www.aleutfederal.com/aaa

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2609 North River Road
Port Allen, Louisiana 70767
(225) 228-1394 | Fax (225) 381-2996

ARS Aleut Analytical, LLC

Laboratory Analytical Report

ARS1-22-01795

Gilbane Federal
[redacted]
1655 Grant Street
Suite 1200
Concord, CA 94520
925-946-3180
[redacted]

COC Number: **KT082422RADB**
Job Number: **J310000900**
Job Location: **Hunter's Point Shipyard, Parcel B Removal Site Evaluation**
Project Name: **Parcel B Air Monitoring RAD**

Questions regarding this analytical report should be addressed to ARS project manager, [redacted] who can be reached by email at projectmanagers@aaa.aleutfederal.com.

I certify that the test results presented in this report (in either hardcopy or electronic file (EDD)) meet the requirements of the laboratory's certifications and other applicable contract terms and conditions. A full list of the Port Allen, LA laboratory's certifications is provided with this report. Any exceptions to the certification or contract will be noted within the case narratives presented in the report. Any subcontracted sample results will be identified within the case narratives presented in the report. In the event this report is an amendment to a previously released report, the case narrative will clearly identify the original report as well as the reason(s) for reissuance. A statement of uncertainty for each analysis is available upon request. I authorize release and issuance of this report on the date signed below.

		Laboratory Management, ARS Aleut Analytical
Signature	**Date**	**Title**

This report provides analytical results of the requested analysis and does not include any opinions or interpretations. ARS Aleut Analytical, LLC assumes no liability for the use or interpretation of analytical results. Results relate only to items tested. A partial reproduction of this test report is prohibited. Reproduction of this report in full requires the written approval of the laboratory.

NELAP ACCREDITED TNI LABORATORY LELAP Cert # 01949

ANAB ACCREDITED ISO/IEC 17025 DOD ELAP

ARS Aleut Analytical
2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

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Certifications and Accreditations List

State or Accrediting Body (AB)	Certificate Number
AIHA LAP, LLC	209312
Alaska	LA01131
California	3085
ANAB DoD	ADE-1489
ANAB DOE	ADE-1489.01
Louisiana DEQ - NELAC	01949
Louisiana DHH	LA022
Nevada	LA011312023-1
New Jersey	LA009
New York	65039
Pennsylvania	68-04294-011
Texas	T104704447-21-17
Utah	LA011312022-13
Washington	C1010

For additional information related to the specific matrices, methods, and analytes recognized by each accrediting body, contact us at QA@aaa.aleutfederal.com for additional information.

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(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Case Narrative

ARS Aleut Analytical
2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • Fax (225) 381-2996

PROJECT SAMPLE IDENTIFICATION CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs

Client Sample ID	ARS Aleut Analytical Sample ID
FB-081522	ARS1-22-01795-001
MSB01-081522	ARS1-22-01795-002
MSB02-081522	ARS1-22-01795-003
MSB113A-081522	ARS1-22-01795-004

Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
001	08/15/22 08:00	08/25/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
001	08/15/22 08:00	08/25/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33
001	08/15/22 08:00	08/25/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
001	08/15/22 08:00	08/25/22	GAM-A-AF	As Received	N/A	08/27/22 11:40
001	08/15/22 08:00	08/25/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
001	08/15/22 08:00	08/25/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54
002	08/19/22 07:52	08/25/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
002	08/19/22 07:52	08/25/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33
002	08/19/22 07:52	08/25/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
002	08/19/22 07:52	08/25/22	GAM-A-AF	As Received	N/A	09/01/22 14:30
002	08/19/22 07:52	08/25/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
002	08/19/22 07:52	08/25/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54
003	08/19/22 07:25	08/25/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
003	08/19/22 07:25	08/25/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33

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Sample	Date Collected	Date Received	Analysis	Basis	Prep Date/Time	Analysis Date/Time
003	08/19/22 07:25	08/25/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
003	08/19/22 07:25	08/25/22	GAM-A-AF	As Received	N/A	09/01/22 14:31
003	08/19/22 07:25	08/25/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
003	08/19/22 07:25	08/25/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54
004	08/19/22 07:41	08/25/22	ASP-PU239-AF	As Received	09/12/22 10:40	09/20/22 02:09
004	08/19/22 07:41	08/25/22	ASP-TH-AF	As Received	09/12/22 10:40	09/21/22 02:33
004	08/19/22 07:41	08/25/22	ASP-U-AF	As Received	09/12/22 10:40	09/16/22 02:18
004	08/19/22 07:41	08/25/22	GAM-A-AF	As Received	N/A	09/02/22 14:06
004	08/19/22 07:41	08/25/22	GPC-RA226-AF	As Received	09/13/22 07:41	09/21/22 10:10
004	08/19/22 07:41	08/25/22	GPC-SR90-AF	As Received	09/12/22 10:40	09/20/22 09:54

SAMPLE RECEIPT/PREP

The samples arrived in good condition. The samples were screened for radioactive contamination as per procedure **PALA-SR-001-SOP Sample Receiving**. Sample date(s) and time(s) are listed as provided by the client. In regard to the Air Filters, no flow rate information was provided by the client. Turnaround time was set at 28 calendar days.

ANALYTICAL METHODS

Pu-239/240 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

Th-232 analysis was performed using **PALA-RAD-031, "Thorium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom ACW-08 & Eichrom ACW-10)"**.

U-235 analysis was performed using **PALA-RAD-026, "Americium, Plutonium and Uranium in Water, Soil and Vegetation Matrices by Sequential Separation Using Eichrom Stabilized Chemistry Resin (with Vacuum Box System Option) (Eichrom ACW-02 & Eichrom ACW-03)"**.

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Co-60, Cs-137, Ra-226 analyses were performed using **PALA-RAD-007, "Modified Gamma Emitting Radionuclides in Soil, Air, and Biota Matrices (EPA 901.1 Mod, SM 7120B, & HASL-300 Ga-01-R)"**.

Ra-226 analysis was performed using **PALA-RAD-008, "Alpha Emitting Radium Isotopes in Water (EPA 903.0, EPA 9315, SM 7500-Ra C, SM 7500-Ra C)"**.

Sr-90 analysis was performed using **PALA-RAD-032, "Strontium 89, 90 and Total Strontium in Water, Soil and Vegetation Matrices by Eichrom Resin Separation (Eichrom SRW01, EPA 905.0, HASL 300 Sr-01-RC)"**.

ANALYTICAL RESULTS

Batch ARS1-B22-01219: DUP and/or parent sample value(s) for Co-60 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01219: DUP and/or parent sample value(s) for Cs-137 are below the MDC, RPD is not applicable.

Batch ARS1-B22-01219: DUP and/or parent sample value(s) for Ra-226 are below the MDC, RPD is not applicable.

Fraction 001 has elevated MDC for Pu-239/240 with ACT of -1.730E-7 uCi/filter, MDC of 2.540E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for U-235 with ACT of 0.000 uCi/filter, MDC of 1.786E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Th-232 with ACT of 2.107E-8 uCi/filter, MDC of 1.135E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 001 has elevated MDC for Ra-226 with ACT of -6.390E-6 uCi/filter, MDC of 1.515E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 002 has elevated MDC for Pu-239/240 with ACT of -3.896E-8 uCi/filter, MDC of 2.132E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for U-235 with ACT of 0.000 uCi/filter, MDC of 1.905E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 002 has elevated MDC for Ra-226 with ACT of -3.753E-6 uCi/filter, MDC of 9.767E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 003 has elevated MDC for Pu-239/240 with ACT of -6.111E-8 uCi/filter, MDC of 2.217E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for U-235 with ACT of 3.795E-8 uCi/filter, MDC of 5.142E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Th-232 with ACT of 3.578E-8 uCi/filter, MDC of 8.310E-8 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 003 has elevated MDC for Ra-226 with ACT of -1.589E-5 uCi/filter, MDC of 1.611E-5 uCi/filter and CRDL of 4.4E-06 uCi/filter.
Fraction 004 has elevated MDC for Pu-239/240 with ACT of 5.360E-8 uCi/filter, MDC of 1.757E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for U-235 with ACT of -1.576E-8 uCi/filter, MDC of 1.697E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Th-232 with ACT of 8.200E-8 uCi/filter, MDC of 1.344E-7 uCi/filter and CRDL of 4.8E-08 uCi/filter.
Fraction 004 has elevated MDC for Ra-226 with ACT of 3.681E-6 uCi/filter, MDC of 8.776E-6 uCi/filter and CRDL of 4.4E-06 uCi/filter.

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ARS1-B22-01320: Planchette for batch sample 2 underwent an electroplating error and showed no signs of sample. Therefore, there is no LCSD for this batch. Results were reported, per client (correspondence included).

ARS1-B22-01320: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01320: FWHM greater than 100 keV for Th-229 on batch samples -01, -03 and -06.

ARS1-B22-01321: ROI's adjusted to better fit the peaks of interest.

ARS1-B22-01322: ROI's adjusted to better fit the peaks of interest.

Notes (Case Narrative)

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23)
DO	Duplicate Original
DUP	Sample Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOD	Limit of Detection
LOQ	Limit of Quantitation
MBL	Method Blank
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NC	Not Calculated
NP	Not Provided
NR	Not Referenced
PQL	Practical Quantitation Limit

Data Qualifiers:

B	The result of both the method blank and the target sample are above the MDL.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the LOD but below the LOQ, or above the MDL but below the PQL.
Q	One or more quality control criteria failed.
U	Result is below the MDA, MDL, PQL, LOD, or LOQ
*	LCS/LCSD or Sample DUP fails all Duplicate criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded
E	Exceeds MCL
**	Reporting Limit is higher than MCL; Target cannot be detected
‡	Method/Matrix/Analyte not accredited for this certification

Radiochemistry Comments:

1.0) All MDA/MDC values are calculated on a sample specific basis.

2.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.

3.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.

4.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).

5.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).

6.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (**HPGe**).

7.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).

8.0) Gamma spectroscopy results are calculated values based on the **ORTEC®** GammaVision ENV32 Analysis Engine.

9.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Non-Potable Water**:
Gross Alpha and Gross Beta (EPA 900.0, EPA 9310); Radium 226 (EPA 903.0, EPA 903.1, EPA 9315); Radium 228 (EPA 904.0, EPA 9320); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7470A); Strontium-89 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0, Eichrom SRW01, HASL 300 Sr-02-RC); Tritium (EPA 906.0); Enriched Tritium (ARS-040), Carbon-14 (ARS-019), Tritium/Carbon (ARS-151); Gamma Emitters (EPA 901.1, SM 7120B, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-10); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02)

10.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Solid and Chemical Materials**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); ICP/MS (EPA 6020B); ICP-OES (EPA 6010D); Mercury CVAA (EPA 7471B); Strontium-89 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-01); Strontium-90 (EPA 905.0 Mod, Eichrom SRW01, HASL 300 Sr-02); Tritium (EPA 906.0 Mod); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Am-01-RC); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03, HASL 300 Pu-02-RC, HASL 300 Pu-03-RC); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03, HASL 300 U-02, HASL 300 U-04); Technetium-99 (Eichrom TCS01)

11.0) DoD/DOE and ISO 17025 certifications through ANAB apply only to the following methods in **Air and Emissions**:
Gross Alpha and Gross Beta (EPA 900.0 Mod, EPA 9310); Strontium-89 (Eichrom SRW01, HASL 300 Sr-01-RC); Strontium-90 (Eichrom SRW01, HASL 300 Sr-02-RC); Gamma Emitters (EPA 901.1, HASL 300 Ga-01-R); Americium-241 (Eichrom ACW03, HASL 300 Se-03); Plutonium 238, Plutonium 239/240, Plutonium-241 (Eichrom ACW03, HASL 300 Se-03); Thorium-228, Thorium 230, Thorium-232 (Eichrom ACW10); Uranium-234, Uranium-235, Uranium-238 (Eichrom ACW03, HASL 300 Se-03); Technetium-99 (Eichrom TCW02, Eichrom TCS01)

General Comments:

1.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of “M” or “Mod” to the procedure number (i.e. 901.1M, 901.1 Mod).

2.0) All NIOSH method results are reported without blank corrections applied.

3.0) Basis: “As Received” = analyzed as received from client; “Dry” = dried prior to being analyzed; “Dry Weight Corrected” = analyzed as received; result corrected for percent moisture.

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ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Analytical Results

ARS Aleut Analytical

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(225) 228-1394 • FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-22-01795
Client Sample ID: FB-081522
Sample Collection Date: 08/15/22 8:00
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01795-001
Date Received: 08/25/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-1.730E-7	1.118E-7	2.540E-7	1.140E-7	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	70.8%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	2.107E-8	5.847E-8	1.135E-7	4.246E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	55.6%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	0.000	8.238E-8	1.786E-7	6.914E-8	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	48.4%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	1.456E-7	8.876E-7	9.768E-7	4.884E-7	0.00024	U	uCi/filter	08/27/22 11:40	[redacted]	N/A
Cs-137	3.398E-8	7.735E-7	9.090E-7	4.545E-7	0.00048	U	uCi/filter	08/27/22 11:40	[redacted]	N/A
Ra-226	-6.390E-6	1.366E-5	1.515E-5	7.575E-6	4.4E-06	U	uCi/filter	08/27/22 11:40	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	7.245E-7	3.614E-7	3.555E-7	1.327E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	98.4%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	5.086E-7	1.184E-6	2.055E-6	9.525E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	96.9%

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ARS Sample Delivery Group: ARS1-22-01795
Client Sample ID: MSB01-081522
Sample Collection Date: 08/19/22 7:52
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01795-002
Date Received: 08/25/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-3.896E-8	1.047E-7	2.132E-7	9.342E-8	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	60.9%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	1.046E-7	6.050E-8	2.362E-8	0.000	4.8E-08		uCi/filter	09/21/22 2:33	[redacted]	70.7%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	0.000	8.492E-8	1.905E-7	7.127E-8	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	42.5%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-5.911E-7	1.021E-6	1.034E-6	5.170E-7	0.00024	U	uCi/filter	09/01/22 14:30	[redacted]	N/A
Cs-137	-8.245E-8	7.160E-7	7.784E-7	3.892E-7	0.00048	U	uCi/filter	09/01/22 14:30	[redacted]	N/A
Ra-226	-3.753E-6	7.764E-6	9.767E-6	4.884E-6	4.4E-06	U	uCi/filter	09/01/22 14:30	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	3.273E-7	2.642E-7	3.647E-7	1.400E-7	4.4E-06	U	uCi/filter	09/21/22 10:10	[redacted]	99.2%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	-1.363E-7	1.101E-6	2.023E-6	9.348E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	94.5%

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ARS Sample Delivery Group: ARS1-22-01795
Client Sample ID: MSB02-081522
Sample Collection Date: 08/19/22 7:25
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01795-003
Date Received: 08/25/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	-6.111E-8	9.904E-8	2.217E-7	9.430E-8	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	51.3%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	3.578E-8	4.978E-8	8.310E-8	2.943E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	71.8%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	3.795E-8	5.280E-8	5.142E-8	0.000	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	41.6%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	4.716E-7	7.730E-7	8.404E-7	4.202E-7	0.00024	U	uCi/filter	09/01/22 14:31	[redacted]	N/A
Cs-137	-1.622E-7	7.966E-7	9.317E-7	4.659E-7	0.00048	U	uCi/filter	09/01/22 14:31	[redacted]	N/A
Ra-226	-1.589E-5	1.423E-5	1.611E-5	8.055E-6	4.4E-06	U	uCi/filter	09/01/22 14:31	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	5.427E-7	3.184E-7	3.430E-7	1.248E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	97.0%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	4.547E-7	1.185E-6	2.065E-6	9.586E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	91.1%

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ARS Sample Delivery Group: ARS1-22-01795
Client Sample ID: MSB113A-081522
Sample Collection Date: 08/19/22 7:41
Sample Matrix: Air Filter
Percent Solids: N/A

Request or PO Number: J310000900
ARS Sample ID: ARS1-22-01795-004
Date Received: 08/25/22
Report Date: 09/22/22

Radiochemistry

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Pu-239/240	5.360E-8	9.849E-8	1.757E-7	6.971E-8	4.8E-08	U	uCi/filter	09/20/22 2:09	[redacted]	47.9%

Analysis Method: Eichrom ACW10

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Th-232	8.200E-8	8.581E-8	1.344E-7	5.332E-8	4.8E-08	U	uCi/filter	09/21/22 2:33	[redacted]	59.6%

Analysis Method: Eichrom ACW03

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
U-235	-1.576E-8	6.908E-8	1.697E-7	6.349E-8	4.8E-08	U	uCi/filter	09/16/22 2:18	[redacted]	43.7%

Analysis Method: EPA 901.1M

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Co-60	-6.195E-7	9.994E-7	1.011E-6	5.055E-7	0.00024	U	uCi/filter	09/02/22 14:06	[redacted]	N/A
Cs-137	-4.324E-7	8.176E-7	8.789E-7	4.395E-7	0.00048	U	uCi/filter	09/02/22 14:06	[redacted]	N/A
Ra-226	3.681E-6	6.974E-6	8.776E-6	4.388E-6	4.4E-06	U	uCi/filter	09/02/22 14:06	[redacted]	N/A

Analysis Method: EPA 9315

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Ra-226	5.618E-7	3.185E-7	3.492E-7	1.312E-7	4.4E-06		uCi/filter	09/21/22 10:10	[redacted]	96.8%

Analysis Method: Eichrom SRW01

Analysis Description	Analysis Results	CSU +/- 2 s	MDC	DLC	CRDL	Qual	Analysis Units	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
SR-90	2.413E-7	1.178E-6	2.094E-6	9.692E-7	2.4E-05	U	uCi/filter	09/20/22 9:54	[redacted]	92.8%

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QC Summary

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-01
Method: EPA 901.1M

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 08/26/22 8:02

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Am-241	33.065	32.514		uCi/filter	98.3	75 - 125
Co-60	20.928	21.610		uCi/filter	103.3	75 - 125
Cs-137	12.996	13.294		uCi/filter	102.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-02
Method: EPA 901.1M

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 08/26/22 8:15

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Am-241	33.065	31.599		uCi/filter	95.6	75 - 125	2.9	25	0.509	3
Co-60	20.928	20.143		uCi/filter	96.2	75 - 125	7.0	25	1.598	3
Cs-137	12.996	13.554		uCi/filter	104.3	75 - 125	1.9	25	0.504	3

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-03
Method: EPA 901.1M

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 08/27/22 11:31

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Co-60	2.832E-4	0.002	0.002	8.300E-4	U	uCi/filter
Cs-137	2.787E-4	0.001	0.002	7.900E-4	U	uCi/filter
Ra-226	-0.084	0.030	0.032	0.016	U	uCi/filter

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QC Sample Results

Analytical Batch: ARS1-B22-01219
Lab Sample ID: ARS1-B22-01219-08
Method: EPA 901.1M

Sample Type: DUP
Matrix: Air Filter
Analysis Date: 08/25/22 14:05

Analyte	DO Result	DO Qual	DUP Result	DUP Qual	Analysis Units	RPD	RPD Limit	DER	DER Limit
Co-60	4.521E-7		3.658E-7	U	uCi/filter	NC	25	0.163	3
Cs-137	-4.503E-7		-3.955E-7	U	uCi/filter	NC	25	0.102	3
Ra-226	-6.862E-6		-1.965E-6	U	uCi/filter	NC	25	0.615	3

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01795 **Analytical Batch:** ARS1-B22-01219

Analysis: Gamma Spec (Short) in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01795-001	FB-081522	Air Filter	EPA 901.1M	N/A
ARS1-22-01795-002	MSB01-081522	Air Filter	EPA 901.1M	N/A
ARS1-22-01795-003	MSB02-081522	Air Filter	EPA 901.1M	N/A
ARS1-22-01795-004	MSB113A-081522	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-01	Lab Control Sample	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-02	Lab Control Sample Duplicate	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-03	Method Blank	Air Filter	EPA 901.1M	N/A
ARS1-B22-01219-08	Sample Duplicate (MSB113A-080822)	Air Filter	EPA 901.1M	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01312
Lab Sample ID: ARS1-B22-01312-01
Method: EPA 9315

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/21/22 10:10

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Ra-226	2.754E-5	2.739E-5		uCi/filter	99.5	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01312
Lab Sample ID: ARS1-B22-01312-02
Method: EPA 9315

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/21/22 10:10

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Ra-226	2.743E-5	2.754E-5		uCi/filter	100.4	75 - 125	0.5	25	0.046	3

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QC Sample Results

Analytical Batch: ARS1-B22-01312
Lab Sample ID: ARS1-B22-01312-03
Method: EPA 9315

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/21/22 10:10

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Ra-226	7.666E-8	6.029E-8	8.266E-8	3.194E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01795 **Analytical Batch:** ARS1-B22-01312

Analysis: Radium-226 in Air Filter

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01795-001	FB-081522	Air Filter	EPA 9315	N/A
ARS1-22-01795-002	MSB01-081522	Air Filter	EPA 9315	N/A
ARS1-22-01795-003	MSB02-081522	Air Filter	EPA 9315	N/A
ARS1-22-01795-004	MSB113A-081522	Air Filter	EPA 9315	N/A
ARS1-B22-01312-01	Lab Control Sample	Air Filter	EPA 9315	N/A
ARS1-B22-01312-02	Lab Control Sample Duplicate	Air Filter	EPA 9315	N/A
ARS1-B22-01312-03	Method Blank	Air Filter	EPA 9315	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01320
Lab Sample ID: ARS1-B22-01320-01
Method: Eichrom ACW10

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/21/22 2:33

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Th-230	5.182E-6	5.663E-6		uCi/filter	109.3	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01320
Lab Sample ID: ARS1-B22-01320-03
Method: Eichrom ACW10

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/21/22 2:33

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Th-228	8.466E-8	1.141E-7	1.920E-7	8.165E-8	U	uCi/filter
Th-230	1.567E-7	1.637E-7	2.665E-7	1.191E-7	U	uCi/filter
Th-232	-1.043E-8	6.781E-8	1.471E-7	5.943E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01795

Analytical Batch: ARS1-B22-01320

Analysis: Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01795-001	FB-081522	Air Filter	Eichrom ACW10	N/A
ARS1-22-01795-002	MSB01-081522	Air Filter	Eichrom ACW10	N/A
ARS1-22-01795-003	MSB02-081522	Air Filter	Eichrom ACW10	N/A
ARS1-22-01795-004	MSB113A-081522	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01320-01	Lab Control Sample	Air Filter	Eichrom ACW10	N/A
ARS1-B22-01320-03	Method Blank	Air Filter	Eichrom ACW10	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01321
Lab Sample ID: ARS1-B22-01321-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/20/22 2:09

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
Pu-239/240	7.719E-6	7.919E-6		uCi/filter	102.6	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01321
Lab Sample ID: ARS1-B22-01321-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/20/22 2:09

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
Pu-239/240	7.684E-6	7.630E-6		uCi/filter	99.3	75 - 125	3.7	25	0.412	3

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QC Sample Results

Analytical Batch: ARS1-B22-01321
Lab Sample ID: ARS1-B22-01321-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/20/22 2:09

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
Pu-238	4.145E-8	5.000E-8	7.629E-8	2.411E-8	U	uCi/filter
Pu-239/240	1.036E-8	8.852E-8	1.727E-7	7.230E-8	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01795

Analytical Batch: ARS1-B22-01321

Analysis: Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01795-001	FB-081522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01795-002	MSB01-081522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01795-003	MSB02-081522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01795-004	MSB113A-081522	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01321-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01321-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01321-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01322
Lab Sample ID: ARS1-B22-01322-01
Method: Eichrom ACW03

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/16/22 2:18

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
U-238	1.618E-5	1.680E-5		uCi/filter	103.8	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01322
Lab Sample ID: ARS1-B22-01322-02
Method: Eichrom ACW03

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/16/22 2:18

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
U-238	1.626E-5	1.584E-5		uCi/filter	97.4	75 - 125	5.9	25	0.664	3

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QC Sample Results

Analytical Batch: ARS1-B22-01322
Lab Sample ID: ARS1-B22-01322-03
Method: Eichrom ACW03

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/16/22 2:18

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
U-234	-1.004E-7	3.080E-7	5.792E-7	2.669E-7	U	uCi/filter
U-235	-3.880E-8	1.423E-7	3.079E-7	1.276E-7	U	uCi/filter
U-238	-5.011E-7	3.164E-7	6.472E-7	3.010E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01795

Analytical Batch: ARS1-B22-01322

Analysis: Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01795-001	FB-081522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01795-002	MSB01-081522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01795-003	MSB02-081522	Air Filter	Eichrom ACW03	N/A
ARS1-22-01795-004	MSB113A-081522	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01322-01	Lab Control Sample	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01322-02	Lab Control Sample Duplicate	Air Filter	Eichrom ACW03	N/A
ARS1-B22-01322-03	Method Blank	Air Filter	Eichrom ACW03	N/A

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QC Sample Results

Analytical Batch: ARS1-B22-01323
Lab Sample ID: ARS1-B22-01323-01
Method: Eichrom SRW01

Sample Type: LCS
Matrix: Air Filter
Analysis Date: 09/20/22 9:54

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits
SR-90	2.062E-5	2.242E-5		uCi/filter	108.7	75 - 125

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QC Sample Results

Analytical Batch: ARS1-B22-01323
Lab Sample ID: ARS1-B22-01323-02
Method: Eichrom SRW01

Sample Type: LCSD
Matrix: Air Filter
Analysis Date: 09/20/22 9:54

Analyte	Spike Added	Analysis Result	Qual	Analysis Units	% Rec	% Rec Limits	RPD	RPD Limit	DER	DER Limit
SR-90	2.054E-5	2.107E-5		uCi/filter	102.6	75 - 125	6.2	25	0.560	3

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QC Sample Results

Analytical Batch: ARS1-B22-01323
Lab Sample ID: ARS1-B22-01323-03
Method: Eichrom SRW01

Sample Type: MBL
Matrix: Air Filter
Analysis Date: 09/20/22 9:54

Analyte	Analysis Result	CSU +/- 2 s	MDC	DLC	Qual	Analysis Units
SR-90	6.665E-7	1.244E-6	2.139E-6	9.858E-7	U	uCi/filter

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QC Association Summary

ARS Sample Delivery Group: ARS1-22-01795 **Analytical Batch:** ARS1-B22-01323

Analysis: Strontium-90 in (Air Filters, Smears [AF])

Lab Sample ID	Client Sample ID	Matrix	Method	Prep Method
ARS1-22-01795-001	FB-081522	Air Filter	Eichrom SRW01	N/A
ARS1-22-01795-002	MSB01-081522	Air Filter	Eichrom SRW01	N/A
ARS1-22-01795-003	MSB02-081522	Air Filter	Eichrom SRW01	N/A
ARS1-22-01795-004	MSB113A-081522	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01323-01	Lab Control Sample	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01323-02	Lab Control Sample Duplicate	Air Filter	Eichrom SRW01	N/A
ARS1-B22-01323-03	Method Blank	Air Filter	Eichrom SRW01	N/A

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01219**
SDG	**ARS1-22-01795**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears [AF])**
Method	**EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	08/26/22 08:02	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01219-01	**LCS**	AM-241	32.514	2.524	33.065	98.3	0.078
ARS1-B22-01219-01	**LCS**	CO-60	21.610	1.312	20.928	103.3	0.410
ARS1-B22-01219-01	**LCS**	CS-137	13.294	0.708	12.996	102.3	0.084

Duplicate RER/DER/RPD

Analysis Date	08/26/22 08:15	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
AM-241	32.514	2.524	31.599	2.455	0.509	2.9
CO-60	21.610	1.312	20.143	1.231	1.598	7.0
CS-137	13.294	0.708	13.554	0.722	0.504	1.9

Duplicate RER/DER/RPD (Dup Sample)

Analysis Date	08/25/22 14:05	Analysis Technician	[redacted]

Analysis Batch Sample ID	Analyte	Results DO	CSU DO (2s)	Results DUP	CSU DUP (2s)	DER	RPD
ARS1-B22-01219-08	CO-60	4.521E-7	6.890E-7	3.658E-7	7.794E-7	0.163	NC
ARS1-B22-01219-08	CS-137	-4.503E-7	8.448E-7	-3.955E-7	6.275E-7	0.102	NC
ARS1-B22-01219-08	RA-226	-6.862E-6	1.384E-5	-1.965E-6	7.221E-6	0.615	NC

Method Blank

Analysis Date	08/27/22 11:31	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01219-03	**MBL**	CO-60	2.832E-4	0.002	0.002	U
ARS1-B22-01219-03	**MBL**	CS-137	2.787E-4	0.001	0.002	U
ARS1-B22-01219-03	**MBL**	RA-226	-0.084	0.030	0.032	U

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QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01312**
SDG	**ARS1-22-01795**
Analysis	**Radium-226 in Air Filter**
Method	**EPA 9315**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/21/22 10:10	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01312-01	**LCS**	RA-226	2.739E-5	4.416E-6	2.754E-5	99.5	9.289E-8

Duplicate RER/DER/RPD

Analysis Date	09/21/22 10:10	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
RA-226	2.739E-5	4.416E-6	2.754E-5	4.439E-6	0.046	0.5

Method Blank

Analysis Date	09/21/22 10:10	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01312-03	**MBL**	RA-226	7.666E-8	6.029E-8	8.266E-8	U

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01320**
SDG	**ARS1-22-01795**
Analysis	**Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])**
Method	**Eichrom ACW10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date 09/21/22 02:33 **Analysis Technician** [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01320-01	**LCS**	TH-230	5.663E-6	7.184E-7	5.182E-6	109.3	4.088E-8

Method Blank

Analysis Date 09/21/22 02:33 **Analysis Technician** [redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01320-03	**MBL**	TH-228	8.466E-8	1.141E-7	1.920E-7	U
ARS1-B22-01320-03	**MBL**	TH-230	1.567E-7	1.637E-7	2.665E-7	U
ARS1-B22-01320-03	**MBL**	TH-232	-1.043E-8	6.781E-8	1.471E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01321**
SDG	**ARS1-22-01795**
Analysis	**Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])**
Method	**Eichrom ACW03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/20/22 02:09	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01321-01	**LCS**	PU-239/240	7.919E-6	9.918E-7	7.719E-6	102.6	5.045E-8

Duplicate RER/DER/RPD

Analysis Date	09/20/22 02:09	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
PU-239/240	7.919E-6	9.918E-7	7.630E-6	9.537E-7	0.412	3.7

Method Blank

Analysis Date	09/20/22 02:09	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01321-03	**MBL**	PU-238	4.145E-8	5.000E-8	7.629E-8	U
ARS1-B22-01321-03	**MBL**	PU-239/240	1.036E-8	8.852E-8	1.727E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01322**
SDG	**ARS1-22-01795**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])**
Method	**Eichrom ACW03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/16/22 02:18	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01322-01	**LCS**	U-238	1.680E-5	2.053E-6	1.618E-5	103.8	3.700E-8

Duplicate RER/DER/RPD

Analysis Date	09/16/22 02:18	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
U-238	1.680E-5	2.053E-6	1.584E-5	1.937E-6	0.664	5.9

Method Blank

Analysis Date	09/16/22 02:18	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01322-03	**MBL**	U-234	-1.004E-7	3.080E-7	5.792E-7	U
ARS1-B22-01322-03	**MBL**	U-235	-3.880E-8	1.423E-7	3.079E-7	U
ARS1-B22-01322-03	**MBL**	U-238	-5.011E-7	3.164E-7	6.472E-7	U

ARS Aleut Analytical

QC Results per Analytical Batch

Analytical Batch	**ARS1-B22-01323**
SDG	**ARS1-22-01795**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Method	**Eichrom SRW01**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	**Recovery (%):**	**> 75**	**< 125**
Matrix Spike	**Recovery (%):**	**> 60**	**< 140**
Duplicate	**Duplicate Error Ratio (DER):**		**< 3**
	Relative Percent Difference (RPD %):		**≤ 25**

Laboratory Control Sample

Analysis Date	09/20/22 09:54	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B22-01323-01	**LCS**	SR-90	2.242E-5	3.421E-6	2.062E-5	108.7	3.822E-7

Duplicate RER/DER/RPD

Analysis Date	09/20/22 09:54	Analysis Technician	[redacted]

Analyte	Results LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	DER	RPD
SR-90	2.242E-5	3.421E-6	2.107E-5	3.224E-6	0.560	6.2

Method Blank

Analysis Date	09/20/22 09:54	Analysis Technician	[redacted]

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B22-01323-03	**MBL**	SR-90	6.665E-7	1.244E-6	2.139E-6	U

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01219**
SDG	**ARS1-22-01795**
Analysis	**Gamma Spec (Short) in (Air Filters, Smears**
Analysis Test Method	**PALA-RAD-007/EPA 901.1M**
Analysis Code	**GAM-A-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	08/26/22 08:02	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	AM-241	32.514	1.288	33.065	0.001	0.428
LCSD	AM-241	31.599	1.252	33.065	0.001	1.170
LCS	CO-60	21.610	0.669	20.928	5.860E-4	1.019
LCSD	CO-60	20.143	0.628	20.928	5.860E-4	1.250
LCS	CS-137	13.294	0.361	12.996	3.119E-4	0.825
LCSD	CS-137	13.554	0.368	12.996	3.119E-4	1.516

Method Blank	**Analysis Date**	08/27/22 11:31	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	CS-137	2.787E-4	7.159E-4	0.389
MBL	RA-226	-0.084	0.015	5.537
MBL	CO-60	2.832E-4	8.223E-4	0.344

Duplicate Sample	**Analysis Date**	08/25/22 14:05	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
DUP	CO-60	3.658E-7	3.977E-7	4.521E-7	3.516E-7	0.163
DUP	RA-226	-1.965E-6	3.684E-6	-6.862E-6	7.059E-6	0.615
DUP	CS-137	-3.955E-7	3.201E-7	-4.503E-7	4.310E-7	0.102
LCSD	AM-241	31.599	1.252	32.514	1.288	0.509
LCSD	CO-60	20.143	0.628	21.610	0.669	1.598
LCSD	CS-137	13.554	0.368	13.294	0.361	0.504

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01312**
SDG	**ARS1-22-01795**
Analysis	**Radium-226 in Air Filter**
Analysis Test Method	**PALA-RAD-008/Gas Proportional Counter**
Analysis Code	**GPC-RA226-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/21/22 10:10	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	RA-226	2.739E-5	2.253E-6	2.754E-5	3.221E-7	0.065
LCSD	RA-226	2.754E-5	2.265E-6	2.743E-5	3.221E-7	0.047

Method Blank	**Analysis Date**	09/21/22 10:10	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	RA-226	7.666E-8	3.076E-8	2.492

Duplicate Sample	**Analysis Date**	09/21/22 10:10	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	RA-226	2.754E-5	2.265E-6	2.739E-5	2.253E-6	0.046

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01320**
SDG	**ARS1-22-01795**
Analysis	**Thorium in (Air Filters, Smears, Leak Test**
Analysis Test Method	**PALA-RAD-031/Eichrom ACW-10**
Analysis Code	**ASP-TH-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/21/22 02:33	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	TH-230	5.663E-6	3.665E-7	5.182E-6	1.018E-7	1.266

Method Blank	**Analysis Date**	09/21/22 02:33	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	TH-228	8.466E-8	5.820E-8	1.455
MBL	TH-230	1.567E-7	8.351E-8	1.877
MBL	TH-232	-1.043E-8	3.460E-8	0.301

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01321**
SDG	**ARS1-22-01795**
Analysis	**Plutonium (239, 240Pu) in (Air Filters,**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-PU239-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/20/22 02:09	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	PU-239/240	7.919E-6	5.060E-7	7.719E-6	1.263E-7	0.384
LCSD	PU-239/240	7.630E-6	4.866E-7	7.684E-6	1.263E-7	0.107

Method Blank	**Analysis Date**	09/20/22 02:09	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	PU-238	4.145E-8	2.551E-8	1.625
MBL	PU-239/240	1.036E-8	4.516E-8	0.229

Duplicate Sample	**Analysis Date**	09/20/22 02:09	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	PU-239/240	7.630E-6	4.866E-7	7.919E-6	5.060E-7	0.412

ARS Aleut Analytical

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01322**
SDG	**ARS1-22-01795**
Analysis	**Uranium (233, 234U, 235U, 238U) in (Air**
Analysis Test Method	**PALA-RAD-026/Eichrom ACW-03**
Analysis Code	**ASP-U-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/16/22 02:18	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	U-238	1.680E-5	1.047E-6	1.618E-5	3.939E-8	0.588
LCSD	U-238	1.584E-5	9.880E-7	1.626E-5	3.939E-8	0.423

Method Blank	**Analysis Date**	09/16/22 02:18	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	U-234	-1.004E-7	1.571E-7	0.639
MBL	U-235	-3.880E-8	7.262E-8	0.534
MBL	U-238	-5.011E-7	1.614E-7	3.104

Duplicate Sample	**Analysis Date**	09/16/22 02:18	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	U-238	1.584E-5	9.880E-7	1.680E-5	1.047E-6	0.664

Z Values per Analytical Batch

Analytical Batch	**ARS1-B22-01323**
SDG	**ARS1-22-01795**
Analysis	**Strontium-90 in (Air Filters, Smears [AF])**
Analysis Test Method	**PALA-RAD-032/Eichrom SRW01,HASL 300**
Analysis Code	**GPC-SR90-AF**
Report Units	**uCi/filter**

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges	
Laboratory Control Sample	**ZLCS**	**<= 3**
Matrix Spike	**ZMS**	**<= 3**
Method Blank	**ZBLANK**	**<= 3**
Duplicate	**ZDUP**	**<= 3**

Laboratory Control Sample	**Analysis Date**	09/20/22 09:54	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Expected Value**	**CSU (1s)**	**Z**
LCS	SR-90	2.242E-5	1.746E-6	2.062E-5	3.417E-7	1.012
LCSD	SR-90	2.107E-5	1.645E-6	2.054E-5	3.417E-7	0.319

Method Blank	**Analysis Date**	09/20/22 09:54	**Analysis Technician**	[redacted]
QC Type	**Analyte**	**Results**	**CSU (1s)**	**Z**
MBL	SR-90	6.665E-7	6.346E-7	1.050

Duplicate Sample	**Analysis Date**	09/20/22 09:54	**Analysis Technician**	[redacted]		
QC Type	**Analyte**	**Results Dup**	**CSU (1s)**	**Results DO**	**CSU (1s)**	**Z**
LCSD	SR-90	2.107E-5	1.645E-6	2.242E-5	1.746E-6	0.560

2609 North River Road • Port Allen, Louisiana 70767
(225) 228-1394 • FAX (225) 381-2996

ARS Aleut Analytical, LLC
Analytical Reports

for

Gilbane Federal

Sample Management Records

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
[redacted]
1655 Grant Street, Suite 1200, Concord, CA 94520
[redacted]

COC # KT082422RADB

Project Name: Hunters Point Shipyard, Parcel B Removal Site Evaluation	Laboratory: ARS Aleut Analytical (AAA), Port Allen, LA	Event: **Parcel B Air Monitoring RAD**
Project Number: J310000900	POC: [redacted]	
WBS Code: J310000900	Ship to: 2609 North River Road, Port Allen, LA 70767-3469	

Comments:
E901.1 (B) = Gamma Spec Air Monitoring CO60 CS137 RA226

Equipment:

Code	Matrix
A	Air
AQ	Air Quality Control Matrix

Code	Container/Preservative
5	1x 250-mL Plastic, 4 Degrees C
15	1x 250-mL Plastic, 4 Degrees C

Event: Parcel B Air Monitoring RAD

	Sample ID	Matrix	Date	Time	Samp Init.	Analytical Test Method: A01RM - Th-232 U-235	E901.1 (B)	E903.1 - Radium 226	E905.0 - Sr-90	RC0240 - Pu-239						Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom	Cooler	Comments
						15	15	15	5	15											
1	FB-081522	AQ	08/15/2022	0800	[redacted]	X	X	X	X	X						FIELDQC	FB1	0.00	0.00	1	
2	MSB01-081522	A	08/19/2022	0752		X	X	X	X	X						MSB01	N1	0.00	0.00	1	TOTAL FLOW = 360,120 (L)
3	MSB02-081522	A	08/19/2022	0725		X	X	X	X	X						MSB02	N1	0.00	0.00	1	TOTAL FLOW = 358,020 (L)
4	MSB113A-081522	A	08/19/2022	0741		X	X	X	X	X						MSB113A	N1	0.00	0.00	1	TOTAL FLOW = 358,260 (L)
5																[redacted] 8/24/22					
6																					

Turnaround Time: 28 days

Relinquished by: *(Signature)*	Date	Time	Received by: *(Signature)*	Date	Time
[redacted]	8/24/22	1500	FedEx	8/24/22	1500
[redacted]			[redacted]	8/25/22	1000

Shipping Date / Carrier / Airbill Number
Shipping Date: 8/24/2022/ FedEx 2769 7765 9596

Received by Laboratory: *(Signature, Date, Time)* **& condition**

Procedures: GES-003 / EPA 900.0M

File ID Number: _____

Red font = field entry

	Sample ID	Date In:	Time In:	Date Out:	Time Out:	Initial Flow Rate (LPM)	Final Flow Rate (LPM)	Flow volume Cu.M	Julian Date for Date Out	Total Run Time (Days)	Total Run Time (Hours)	Total Run Time (Minutes)	Average Flow Rate (LPM)	Initial Flow Rate (CFM)	Final Flow Rate (CFM)	Average Flow Rate (CFM)	Average Flow Rate (Cu.M/h)	Flow Rate (Cu.M/min)	Total Flow (L)
1	MSB01-081522	08/15/22	3:50	08/19/22	7:52	60	60	360.1	231	4.17	100.03	6002.0	60	2.11888	2.11888	2.11888	3.6	0.06	360120
2	MSB02-081522	08/15/22	3:58	08/19/22	7:25	60	60	358.0	231	4.14	99.45	5967.0	60	2.11888	2.11888	2.11888	3.6	0.06	358020
3	MSB113A-081522	08/15/22	4:10	08/19/22	7:41	60	60	358.3	231	4.15	99.52	5971.0	60	2.11888	2.11888	2.11888	3.6	0.06	358260

FORMULAS:

Number of Days = (Date Out +Time Out) minus (Date In+Time In)

Number of Minutes = # of Days X 24hr X 60min

Flow Rate (m3/h) = Flow Rate (CFM) x 60min x (12in x 2.54cm/in / 100cm/m)^3 :

Mid-Sample Date/Time = [(Date+Time Out) + (Date+Time In)] / 2

Flow Rate (Cu.M/min) = CFM X 0.0283168466 Cu.M/CF

Flow Rate (LPM) = Cu.M X 1000

Total Flow (L) = LPM X Total Minutes

SDG Report - Samples and Containers

SDG Specific Data							
SDG	ARS1-22-01795		TAT Days	28 Calendar Days	Project Type	Environmental
Sample Count	4	Rpt Level 4	Date Received	08/25/2022	COC Number	KT082422RADB
Client	Gilbane Federal		Discrepancy Resol	N/A	PO Number	
Client Code	1138		Client Deadline	09/22/2022	Job Number	J310000900
Profile Number	PN-01411				Job Location	Hunter's Point Shipyard, Parcel B Removal Site Evaluation
Comment						

Samples and Containers Checked In Thus Far

FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Comments
001	FB-081522	Air Filter	08/15/2022 07:59	08/15/2022 08:00	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422903	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/15/2022 07:59	AF Volume (CuM):		0.001		
002	MSB01-081522	Air Filter	08/19/2022 07:51	08/19/2022 07:52	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422904	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/19/2022 07:51	AF Volume (CuM):		0.001		
003	MSB02-081522	Air Filter	08/19/2022 07:24	08/19/2022 07:25	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422905	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/19/2022 07:24	AF Volume (CuM):		0.001		
004	MSB113A-081522	Air Filter	08/19/2022 07:40	08/19/2022 07:41	H	30	10	PrePrep	
	IC_ID	**Cnt**	**Container Type**	**AF Volume (L)**	**AF Units**		**Rate**	**Mins**	**Comments**
	422906	1	HDP Container	1	LPM			1	
			Mid-Sample Date:	08/19/2022 07:40	AF Volume (CuM):		0.001		

SDG Report - Analysis Assignments

SDG	ARS1-22-01795	Sample Count	4
Client	Gilbane Federal	Analysis Count	6-24

Sample Count Totals Per Analysis

Analysis Code	Analysis Description	In/Out	Samples Count
ASP-PU239-AF	Plutonium (239, 240Pu) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-TH-AF	Thorium in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
ASP-U-AF	Uranium (233, 234U, 235U, 238U) in (Air Filters, Smears, Leak Test [AF, SM, LT])	I	4
GAM-A-AF	Gamma Spec (Short) in (Air Filters, Smears [AF])	I	4
GPC-RA226-AF	Radium-226 in Air Filter	I	4
GPC-SR90-AF	Strontium-90 in (Air Filters, Smears [AF])	I	4

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-PU239-AF	X
001	ASP-TH-AF	X
001	ASP-U-AF	X
001	GAM-A-AF	X
001	GPC-RA226-AF	X
001	GPC-SR90-AF	X
002	ASP-PU239-AF	X
002	ASP-TH-AF	X
002	ASP-U-AF	X
002	GAM-A-AF	X
002	GPC-RA226-AF	X
002	GPC-SR90-AF	X
003	ASP-PU239-AF	X
003	ASP-TH-AF	X
003	ASP-U-AF	X
003	GAM-A-AF	X
003	GPC-RA226-AF	X
003	GPC-SR90-AF	X
004	ASP-PU239-AF	X
004	ASP-TH-AF	X
004	ASP-U-AF	X
004	GAM-A-AF	X
004	GPC-RA226-AF	X
004	GPC-SR90-AF	X

DQO Report for SDG

ARS1-22-01795

Client Name: Gilbane Federal Profile Name: Parcel B Rad Sampling Report Level: 4

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time					
ASP-PU239-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Pu-239/240 (15117-48-3)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-TH-AF	WRAD	uCi	filter	N/A	PALA-RAD-031						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Th-232 (7440-29-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
ASP-U-AF	WRAD	uCi	filter	N/A	PALA-RAD-026						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	U-235 (15117-96-1)			4.8E-08 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GAM-A-AF	WGAM	uCi	filter	N/A	PALA-RAD-007						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Co-60 (10198-40-0)			0.00024 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Cs-137 (10045-97-3)			0.00048 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-RA226-AF	WRAD	uCi	filter		PALA-RAD-008						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Ra-226 (13982-63-3)			4.4E-06 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A
GPC-SR90-AF	WRAD	uCi	filter	N/A	PALA-RAD-032						
	Analyte			**RDL**	**LCS LL/UL**	**MS LL/UL**	**RadY LL/UL**	**GravY LL/UL**	**RER**	**RPD**	**Surr LL/UL**
	Sr-90 (10098-97-2)			2.4E-05 uCi/filter	75/125	60/140	30/110	30/110	1	25	N/A

Analysis Code	Fraction	Units	Aliquot	Conductivity	Analyte Count
ASP-PU239-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-PU239-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Pu-239/240	
ASP-TH-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-TH-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Th-232	
ASP-U-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
ASP-U-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	

ASP-U-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		U-235	
GAM-A-AF	001	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	002	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	003	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GAM-A-AF	004	uCi	filter	N/A	3
		Group		**Analyte**	
		Parcel B Rad Sampling		Cs-137	
		Parcel B Rad Sampling		Co-60	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	
GPC-RA226-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Ra-226	

GPC-SR90-AF	001	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	002	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	003	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	
GPC-SR90-AF	004	uCi	filter	N/A	1
		Group		**Analyte**	
		Parcel B Rad Sampling		Sr-90	

Sample Custodian: [redacted] Survey Start Date: 8/25/22 Survey Start Time: 1032

Thermometer ID: E00640 10085 Calibration Due Date: 2-28-23 pH Paper Lot# NA

Exposure Rate Meter + Probe Unit ID: PR384409/273629 Calibration Due Date: 5-27-22 Background: 4 µR/hr

Count Rate Meter + Probe Unit ID: PR308083/331788 Calibration Due Date: 9-22-22 Background: 20 cpm

Delivery Type (circle one): Direct Lock Box (Commercial Carrier): FEDEX Total # of ESCs: 1

*True temperature is recorded which includes any applicable correction factors.

External Shipping Container Tracking:	Exposure Rate (µR/hr) (limit <500 µR/hr)	Max External Swipe Counts (cpm)	Max Internal Swipe Counts (cpm)	ESC True Temps* (°C)	TRAX Matrix ID (circle all that apply): (See Section 4.3 of SOP)
A: 276977659596	6	40	40	NA	AQ WD WG WO
B:					WS WW SI UR
C:					SO OL BI VG
D:					WP SM (AF)
E:					
F:					

Visual Inspection: (Circle response)
External Shipping Container

Good Condition with no Leaks or Tears	(Yes)	No	
Marked Radioactive	Yes	(No)	
UN2910	Yes	(No)	
Security Seals	(Yes)	No	
If yes, intact?	(Yes)	No	N/A

Internal Shipping Container

COC's Present	(Yes)	No	
Well packaged container with no signs of leakage	(Yes)	No	

COC/Sample Inspection (Circle response)

Sample Containers in good condition	(Yes)	No	
No spills or leaks	(Yes)	No	
Marked Radioactive	Yes	(No)	
Durable labels w/indelible ink	(Yes)	No	
COC reliquished/received correctly	(Yes)	No	
Adequate volume/filled correctly	(Yes)	No	
Hold Time sufficient for analysis	(Yes)	No	
For VOC/Radon, Head space?	Yes	No	(N/A)
If yes, <6mm?	Yes	No	(N/A)
# of containers received matches # on COC	(Yes)	No	
Samples received on ice?	Yes	(No)	
Type (circle one):	Bagged Ice	Loose Ice	Blue Ice (N/A)

Comments:

ARS Aleut Analytical

Client Name: Gilbane
SDG: ARS1-22-01795

Pipette ID: NA Tip Lot#: NA

Disposible pipette lot#: NA

Sample ID from Client on COC or Sample	ESC Letter	Sample Container Type	Approx. Fill Level (%)	pH (pH<2 is Acceptable) As Rec'd	pH Adjusted	Acid Lot # or Ind container temp (°C)	Vol. of Acid Used (mL)	cpm (Acceptance Limits <100 cpm/cm)
FB-081522	A	ziploc	25	NA	NA	NA	NA	40
MSB01-081522	↓	↓	↓	↓	↓	↓	↓	↓
MSB02-081522	↓	↓	↓	↓	↓	↓	↓	↓
MSB113A-081522	↓	↓	↓	↓	↓	↓	↓	↓

Sample Custodian: [redacted] Survey End Date: 8/25/22 Survey/pH End Time: 1035

pH re-check required? YES or NO *NOTE: Any metals sample acidified at sample receiving must be re-checked after a 24 hour hold.*

If YES: pH re-check date/time: ____/____ Analyst: ____ pH strip lot #: ____

Were all re-checked samples' pH < 2? YES or NO*

**If no, complete and send to Project Management:*
1. Section A of PALA-SR-001-FM-05 (24 Hour Hold pH Readjustment)
2. SR section of PALA-SR-001-FM-03 (Discrepant Sample Receipt Report).

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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Susan Leese

From: [redacted]
Sent: Tuesday, September 20, 2022 11:23 AM
To: [redacted]
Cc: Project Managers AAA
Subject: RE: Thorium AF Question - Please Advise

If these are air samples, please report them with the MB and the LCS.

Best,

[redacted]
Sr. Chemist | Project Manager
GES | MBE
1501 W Fountainhead Parkway, Suite 550
Tempe, Arizona 85282
[redacted]
GES-AIS.COM

From: [redacted]
Sent: Tuesday, September 20, 2022 9:09 AM
To: [redacted]
Cc: Project Managers AAA <ProjectManagers@aaa.aleutfederal.com>
Subject: RE: Thorium AF Question - Please Advise

CAUTION: EXTERNAL SENDER *This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.*

We have an LCS and a Method Blank with this batch.

From: [redacted]
Sent: Tuesday, September 20, 2022 11:05 AM
To: [redacted]
Cc: Project Managers AAA <ProjectManagers@aaa.aleutfederal.com>
Subject: RE: Thorium AF Question - Please Advise

Hi [redacted]

What QC do we have with the Th batch?

[redacted]
Sr. Chemist | Project Manager
GES | MBE
1501 W Fountainhead Parkway, Suite 550
Tempe, Arizona 85282
[redacted]
GES-AIS.COM

From: [redacted]
Sent: Tuesday, September 20, 2022 8:35 AM
To: [redacted]
Cc: Project Managers AAA <ProjectManagers@aaa.aleutfederal.com>
Subject: Thorium AF Question - Please Advise

⚠ **CAUTION: EXTERNAL SENDER** *This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.*

Hi [redacted]

Regarding the Thorium analysis for SDGs ARS1-22-01742; 22-01795, the LCSD did not plate correctly. Therefore there will not be an LCSD to report for this batch. Would you like us to proceed with the reporting of this batch or rerun the Thorium analysis for these 2 SDGs?

Thanks very much,

[redacted]

ALEUT

[redacted]

Program Manager
ARS Aleut Analytical, LLC
2609 North River Road
Port Allen, Louisiana 70767
[redacted]
www.aleutfederal.com/aaa

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