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

Final Summary Report, Radiological Object Recovery

Parcel B Radiological Confirmation Sampling and Survey

Hunters Point Naval Shipyard, San Francisco, California

September 2024

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Table of Contents

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1.0 Introduction

This summary report contains information pertaining to the recovery of a small, discrete radiological object containing radium-226 (^{226}Ra) at Hunters Point Naval Shipyard (HPNS) Parcel B in San Francisco, California on 06 November 2023. This report and its appendices provide a summary of the fieldwork procedures, data collection and analysis, health and safety measures, and third-party quality assurance (QA) oversight performed during the recovery of the radiological object. This report establishes that: (1) a workplan was created in conjunction with regulatory agencies, (2) the workplan procedures were followed resulting in the recovery of the discrete radiological object, and (3) adherence to the workplan requires 100 percent re-excavation of Phase 2 Trench Units (TUs) at Parcel B based on the discovery of the radiological object found to contain ^{226}Ra at a concentration that fails to meet the Parcel B Record of Decision (ROD) Remedial Action Objective (RAO) for soil. The procedures outlined in this report are in accordance with the multi-agency approved *Final Parcel B Removal Site Evaluation Work Plan, Hunters Point Naval Shipyard, San Francisco, California* (Gilbane, 2022), referred to hereafter as the Parcel B Workplan.

The subsections of this report are organized in sequential order. Section 2.0, Project Overview, provides a summary of the overall investigative approach to the radiological “re-work” at Parcel B. Section 3.0, Radiological Object Recovery Process, details the fieldwork and sampling procedures performed pre- and post-object recovery. Section 4.0, Project Data Quality Objectives, defines the data evaluation and decision-making processes in accordance with the Parcel B Workplan. Section 5.0, Basis for Decision to Re-excavate Phase 2 Trench Units (TU’s), identifies the decision-making criteria involved in that determination based on the radiological object recovery, in consultation with regulatory agencies. The Navy will conduct the re-excavation and characterization of 100 percent of the remaining soil in trench units at Parcel B.

This report was prepared by Naval Facilities Engineering System Command Southwest under Contract Number N62473-17-D-0005 (RADMAC II), CTO# 18F5364, with GES-AIS, LLC, an ASRC Industrial Company (GES).

2.0 Project Overview

This section is intended to provide the Parcel B Radiological “re-work” Project Overview. The project is performed in compliance with the multi-agency approved *Final Parcel B Removal Site Evaluation Work Plan, Hunters Point Naval Shipyard, San Francisco, California* (Gilbane, 2022) hereto by referred to as the Parcel B Workplan.

The Parcel B Workplan was developed in order to ensure that the goals in the Parcel B ROD (Record of Decision) RAO (Remedial Action Objective) for soil can be met. The project is being conducted in compliance with the multi-agency approved Parcel B Workplan, which was developed in order to ensure that the goals in the Parcel B ROD RAO for soil can be met. In order to achieve a high level of confidence that the Parcel B ROD RAO can be met for soil, a two-phase investigation approach was designed for TUs associated with the former sanitary sewers and storm drains in Parcel B, as agreed upon by the Navy and regulatory agencies. Phase 1 includes the re-excavation and characterization of 100 percent of the soil in a targeted

group of one-third (24 of the 70) of the Parcel B TUs. The Phase 1 TUs were selected through a cooperative process between the Navy and regulators based on the highest potential for radioactive contamination. Phase 2 consists of subsurface soil samples collected via borings to be drilled within and along the sidewalls of the remaining two-thirds (46 of 70) of the Parcel B TUs. Per the cooperative workplan design, 100 percent of Phase 2 TUs will be re-excavated if contamination (i.e., exceedance of the remediation goal [RG] that is not attributable to naturally occurring radioactive material [NORM] or anthropogenic background) is identified in any of the Phase 1 TUs. The Parcel B RG for ^{226}Ra, in picocuries per gram (pCi/g), is shown below:

Soil Remediation Goal from Parcel B ROD

Radionuclide	Residential Soil Remediation Goal[a] (pCi/g)
^{226}Ra	1.0[b]

Notes:
[a] All RGs will be applied as stated in the Parcel B ROD. Analytical results also will be compared to background values.
[b] ^{226}Ra RG is 1 pCi/g above background

On November 6, 2023, radioactive contamination, in the form of a discrete radiological object and described as a small piece of glass or glass fragment, was identified and recovered from soil excavated from a Phase 1 TU. Section 3.0 and the appendices contain detailed information on this recovery.

The Parcel B Workplan describes a two-phase approach for Parcel B TUs. For Phase 1 TUs, the soil is excavated to the original TU boundaries, as practicable. An additional approximately six inches of soil is removed from the trench sidewalls and floors and kept separate from the main trench soil throughout the screening process. The excavated soil is moved to a radiological screening yard (RSY) and laid out on RSY pads. A gamma scan survey is conducted over 100 percent of the soil. Soil samples are collected from locations systematically spaced across each pad. In addition, soil samples are collected from biased locations of interest identified by the gamma scan data. For Phase 2 TUs, a gamma scan survey of 100 percent of accessible surface areas is conducted, and subsurface soil samples are collected via borings placed within and along the sidewalls of the TU. The borings are advanced 6-inches beyond the floor boundary of the TU or to the point of refusal. Soil samples are analyzed for the radionuclides of concern by an accredited off-site laboratory.

The re-excavation and characterization of soil in Phase 1 TUs in Parcel B began on 02 August 2022. At the time of the discovery of the radiological object, work was underway on 9 of the 24 Phase 1 TUs scheduled for re-excavation, with 9,934 cubic yards of 20,488 cubic yards (48.5%) of soil having been re-excavated. Work on the remaining 46 Phase 2 TUs is not scheduled to start until work on the Phase 1 TUs is complete.

3.0 Radiological Object Recovery Process at Parcel B

This section is intended to detail the fieldwork and sampling procedures performed pre and post radiological object recovery. All of the following activities were performed in compliance with the Parcel B Workplan.

On 06 November 2023, at approximately 1305 hours Pacific Time, a radiological anomaly was detected by the Navy's contractor, GES. The radiological anomaly was detected as the result of a field investigation prompted by a review of a drive-over data set from a towed Radiation Solutions, Inc. RS-700 mobile gamma-ray detection system, which was collected from an RSY pad unit of soil from trench unit TU-45 in Parcel B. The area around the radiological anomaly was delineated and secured. The Navy BRAC PMO office was alerted to the discovery via phone call, followed by calls to the Navy Resident Officer In Charge of Construction (ROICC), Caretaker Site Office (CSO), and the Navy 3rd Party radiological oversight contractor (Battelle).

According to GES trench excavation data, the soil from trench unit TU-45 was excavated and placed on the RSY pad between 24 January 2023 and 01 February 2023. Each individual truck load is tracked and logged from the point of excavation to each individual RSY pad. According to GES excavation trucking and tracking logs, the radiological object originated in TU-45.

At approximately 1340 hours, in the presence of ROICC and Navy 3rd party radiological oversight contractor representatives, GES staged polyvinyl sheeting next to the location to prepare for item retrieval. Shallow lifts of soil were removed until the item was located. A small piece of glass approximately 3/16" in size was discovered approximately six inches from the surface and determined to be the source of the activity. Static gamma counts and dose rate readings were collected from the object on contact and at a distance of thirty centimeters. The results are summarized in the table below and in Appendix A. GES Radiological Technician bagged, labeled, and placed the radiological object into a lead-lined safe within a secured GES site trailer under the supervision of the Navy ROICC.

Radiological Object Field Measurements

Gamma Static Counts	Exposure Rates
169,728 CPM on contact	240 µR/hr on contact
7,763 CPM @ 30 cm	7 µR/hr @ 30 cm

Notes:
cm = centimeters
CPM = counts per minute
µR/hr = microroentgen per hour

A fact sheet was disseminated by the Navy to the public on 26 December 2023. The fact sheet displays the location where the object was recovered, in addition to other pertinent information for the community. The fact sheet is provided in Appendix B.

Following removal of the object, soil was investigated and removed to a distance roughly two feet in each direction, and bounding samples were collected on 08 November 2023 to confirm that all potential radiological contamination was removed from the area. The bounding sample results can be found in Appendix A. No activity above the Parcel B Workplan established release criteria was detected in the bounding samples.

The radiological object was shipped to the lab on 04 December 2023 for analysis. The lab analytical data were received on 12 December 2023 and are provided in Appendix F. The analysis confirmed the radiological object contains levels of ^{226}Ra above the project remedial goal.

Additional data reviews by GES, the Navy, and Navy's 3rd party third radiological oversight contractor were performed following the object recovery and associated sampling. The table below displays the chronology of events in relation to the radiological object recovery at Parcel B.

Chronology of Events

Date(s)	Events
24 January – 01 February 2023	TU-45 excavated
17 April 2023	Electrostatic Unit (ESU)-45B gamma drive-over performed
23 May 2023	ESU-45B systematic and biased samples collected
28 July 2023	ESU-45B validated sample results received
06 November 2023	QA review performed on ESU-45B data package
06 November 2023	RSY pad QA investigation and object recovery performed
08 November 2023	RO-01 bounding samples collected
04 December 2023	Parcel B rad object shipped to lab for analysis
06 December 2023	Validated RO-01 bounding sample results received
12 December 2023	Parcel B rad object lab results received
26 December 2023	Public notified of Parcel B rad object via Parcel B Rad Object Fact Sheet (Appendix B)
13 November 2023 - Present	Navy data review and Parcel B radiological object reporting performed

4.0 Project Data Quality Objectives

The project data quality objectives (DQOs) for the Phase 1 soil investigation are found in the Parcel B Workplan, Section 3.1, and are summarized below.

Step 1-State the Problem: Data manipulation and falsification committed by a contractor during past sanitary sewer and storm drain removal actions call into question the reliability of soil data. There is uncertainty whether radiological contamination was present or remains in place.

Step 2-Identify the Objective: The primary objective of the soil investigation is to determine whether site conditions are compliant with the Parcel B ROD RAO.

Step 3-Identify Inputs to the Objective: The inputs include surface soil and subsurface soil analytical data for the applicable radionuclides of concern (ROCs) and gamma scan measurements to identify biased soil sample locations.

Step 4-Define the Study Boundaries: The Phase 1 and Phase 2 TUs are listed in the Parcel B Workplan Tables 3-1 and 3-2, and are shown on Figure 3-1.

Step 5-Develop Decision Rules: If the investigation results demonstrate exceedances of the RGs determined from a point-by-point comparison with the RGs and are not shown to be NORM or anthropogenic background, remediation will be conducted. Remediation will be based on the following:

- If one Phase 1 TU does not meet the Parcel B ROD RAO, all Phase 2 TUs will be excavated.
- If all Phase 1 TUs meet the Parcel B ROD RAO, Phase 2 will be initiated for TUs.

Step 6-Specify the Performance Criteria: The data will be evaluated by comparing each ROC concentration for every sample to the corresponding RG.

- If all concentrations for all ROCs for all samples are less than or equal to the RGs, then compliance with the Parcel B ROD RAO is achieved.
- If any result is greater than the RG and cannot be attributed to NORM or anthropogenic background, remediation will be performed prior to backfilling.

Step 7-Develop the Plan for Obtaining Data: The radiological investigation will be conducted on a targeted group of 24 of the 70 TUs associated with former sanitary sewers and storm drains in Parcel B.

- Soil will be excavated to the original TU boundaries, as practicable.
- Additional excavation of approximately 6 inches of the trench sidewalls and floors will be performed to provide ex-situ gamma scanning and sampling of the trench sidewalls and floors.
- Excavated soil will be 100 percent gamma scanned by laying it out on RSY pads.
- Systematic and biased samples will be collected from the excavated soil for off-site analysis.
- The soil samples collected will be analyzed for the applicable ROCs by accredited off-site laboratories and the results will be evaluated as described in Step 6.
- If contamination is found during Phase 1, then all of the Phase 2 TUs will be excavated and investigated in a manner exact to the Phase 1 TUs.

5.0 Basis for Decision to Re-Excavate Phase 2 TUs

Based on the recovery and per the Parcel B Workplan, the Navy will now conduct the re-excavation and characterization of 100 percent of the soil in the remaining 46 of 70 Parcel B TUs identified as Phase 2.

The purpose of the Parcel B radiological investigation is to determine whether site conditions are compliant with the Parcel B ROD RAO, which, for radiologically impacted soil, is to prevent receptor exposure to radionuclides of concern at concentrations that exceed the RG for all potentially complete exposure pathways. These pathways include exposure to external radiation. The Parcel B DQOs, specifically Step 3, identify as inputs to the DQOs not only surface soil and subsurface soil analytical data, but also gamma scan measurements. While the DQOs are focused primarily on soil, they clearly encompass site conditions, such as the presence of discrete radioactive objects, where receptor exposure to ROCs may occur at concentrations that exceed the RG. For example, the Parcel B Work Plan, Section 3.3.1, explains that areas of elevated activity identified during gamma scan surveys "*…may result in*

the collection of biased samples or additional field measurements to determine the areal extent of the elevated activity. Potential causes of elevated gamma scan measurements may include discrete radioactive objects (e.g., deck markers), localized soil contamination, measurement geometry effects, and NORM."

The Parcel B DQOs, specifically Step 5, states that 100 percent of Phase 2 TUs will be re-excavated if contamination (i.e., exceedance of the RG that is not attributable to NORM or anthropogenic background) is identified in Phase 1 TUs. Lab analysis of the radiological object reported radioactivity in exceedance of the RG that cannot be attributed to NORM or anthropogenic background (See Table 3 and Appendix F).

Table 3
Soil Remediation Goals from Parcel B ROD

Radionuclide	Residential Soil Remediation Goal[a] (pCi/g)	Parcel B Object Analytical Results (pCi/g)
^{226}Ra	1.0[b]	9,700

Notes:
[a] All RGs will be applied as stated in the Parcel B ROD. Analytical results also will be compared to background values.
[b] ^{226}Ra RG is 1 pCi/g above background

Therefore, based on the discovery of radioactive contamination (i.e., the small glass fragment containing ^{226}Ra) in a Phase 1 TU (TU 45), the re-excavation and characterization of 100 percent of the soil in the remaining 46 of 70 TUs identified as Phase 2 is required.

6.0 Appendices

A. HPNS Parcel B Radiological Object – GES

B. HPNS Parcel B Fact Sheet

C. HPNS Parcel B Phase I CQC Report and Daily Production Report for 11.06.23 - GES Report

D. HPNS Parcel B Radiological Investigation and Survey – ROICC Daily Report 11.06.23

E. HPNS Parcel B Radiological Rework – 3rd Party QA Report 11.06.23

F. HPNS Parcel B Radiological Object Laboratory Analysis Summary

7.0 References

Gilbane Federal (Gilbane), 2022. *Final Parcel B Removal Site Evaluation Work Plan, Hunters Point Naval Shipyard, San Francisco, California*. April.

APPENDIX A
HPNS PARCEL B RADIOLOGICAL OBJECT - GES

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13 November 2023

Submitted via Email

Mr. Sean-Ryan McCray
Remedial Project Manager
Navy BRAC PMO West
33000 Nixie Way, Building 50
San Diego CA 92147

Subject: Discovery of Radiological Object - Radiological Investigation, Survey, and Reporting at Parcel B, Hunters Point Naval Shipyard, San Francisco, California
Contract Number N62473-17-D-0005 (RADMAC II), CTO# N62473-18-F-5364

Dear Mr. McCray:

On 6 November, at approximately 1250 hours Pacific Time, during review of a drive-over data set from a towed Radiation Solutions, Inc. RS-700 mobile gamma-ray detection system for trench unit TU-45, it was determined that further investigation of the soil was warranted. A brief timeline of TU-45 relevant dates is included below – all activities are in compliance with the *Final Parcel B Removal Site Evaluation Work Plan, Hunters Point Naval Shipyard, San Francisco, CA* dated April 21, 2022.

At approximately 1305 hours an area of statistically anomalous data on pad ESU-45B, from which a biased sample had been previously collected with no exceedance of the release criteria, was scanned for radiation with a Ludlum Model 2221 meter and Ludlum Model 44-10 Gamma Detector. One location produced a 1-minute count of 53,531 counts per minute at the surface.

At approximately 1308 hours the area was delineated/secured and the Navy BRAC PMO office was alerted to the discovery via phone call, followed by calls to the Navy Resident Officer In Charge of Construction (ROICC), Caretaker Site Office (CSO), and the Navy 3rd Party radiological oversight contractor (Batelle).

At approximately 1340 hours, in the presence of ROICC and Navy Third Party Radiological Oversight Contractor representatives, GES staged polyvinyl sheeting next to the location to prepare for item retrieval. Shallow lifts of soil were removed until the item was located. A small piece of glass approximately 3/16” in size was discovered approximately six inches from the surface, and determined to be the source of the activity. Static gamma counts and dose rate readings were collected from the object at contact and from a distance of thirty centimeters. The results are below. The object was bagged, labeled, and placed into a lead-lined safe within a secured GES site trailer.

The timeline for ESU-45B soil and the object discovery is as follows:

- TU-45 excavated: 24 Jan 2023 - 01 Feb 2023
- ESU-45B gamma drive-over performed: 17 April 2023
- ESU-45B systematic and biased samples collected: 23 May 2023
- Validated sample results received: 28 July 2023
- QC performed on ESU-45B data package/item discovery 6 November 2023

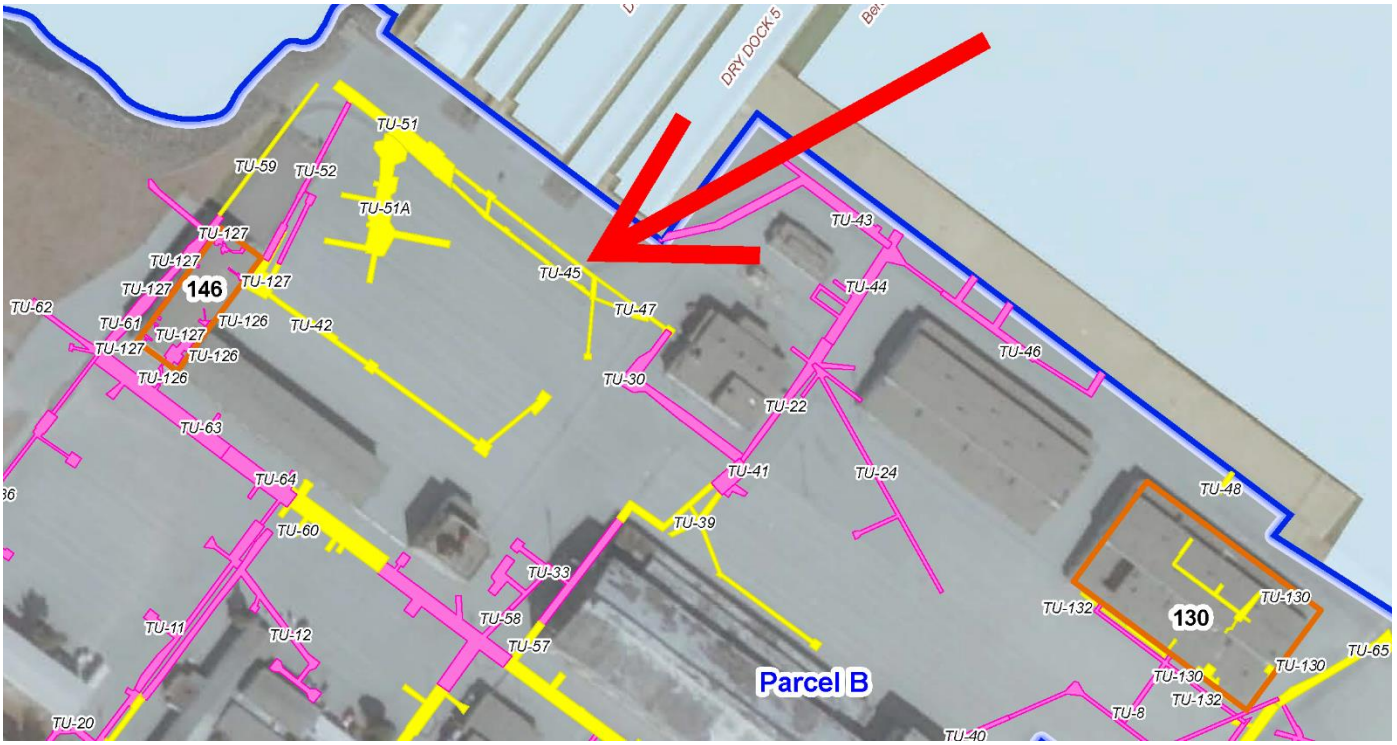
Data collected on 6 November 2023:

Gamma Static Counts	**Dose Rates**
169,728 CPM on Contact	240uR/hr on contact
7,763 CPM @ 30 cm	7uR/hr @ 30 cm

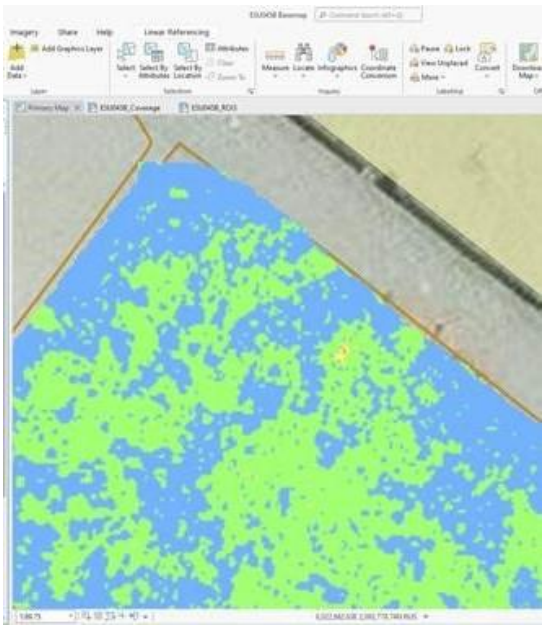
A swipe sample was collected from the object, as it was degraded and removeable contamination was considered likely. The swipe sample allowed to decay for 72 hours, and then was analyzed via Protean WPC-9550 Automatic Sample Counter. The results are below.

Alpha Counts Per Minute	**Beta Counts Per Minute**
113,383 CPM	176,859 CPM

Based upon the distribution of gamma spectra observed during evaluation of the object using region of interest (ROI)-peak identification tools, the discovered radionuclide is presumed to be Ra-226. No event was triggered in the Th-232 ROI.

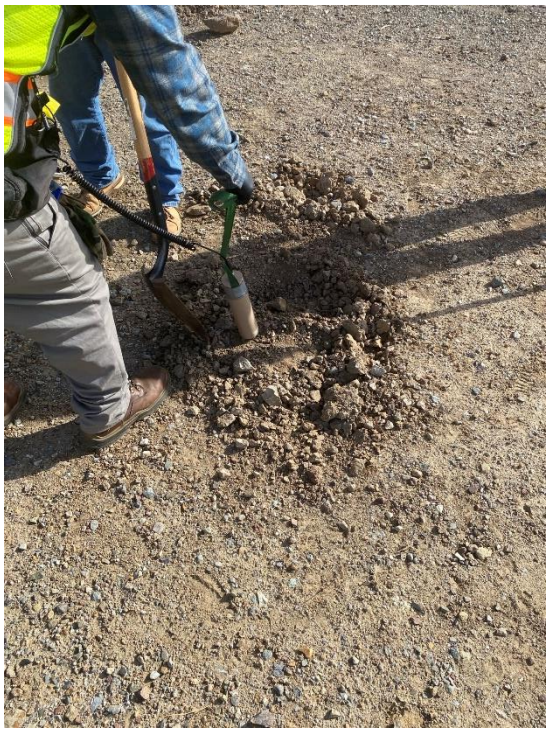


Trench TU-45 Location


RS-700 Drive Over Map with Anomalies

Static Gamma Count at Surface – 6 November 2023

Static Gamma Count and Biased Sample Locations

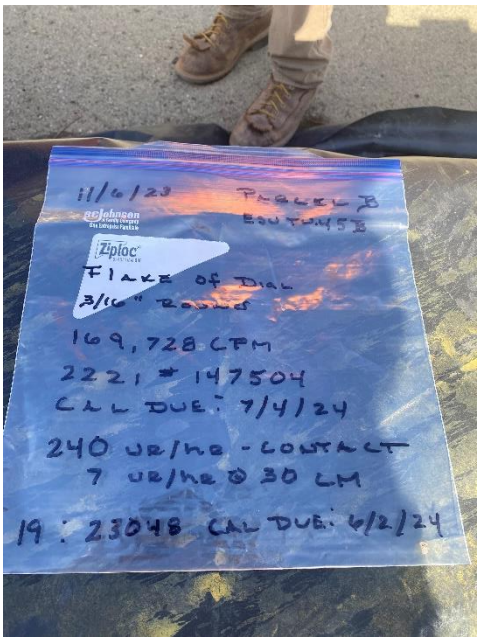


Excavation/Investigation – 6 November 2023

Investigation of Removed Soil – 6 November 2023

Location of Item – 6 November 2023


Glass Object – 6 November 2023



Bagged Object (Lower Right Corner)

We will provide additional information as it arises. If you have any questions or require additional information, please contact the undersigned at your earliest convenience.

Sincerely,

Brett Womack
Project Manager
925-250-8027
bwomack@ges-ais.com

APPENDIX B
HPNS PARCEL B FACT SHEET

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FACT SHEET
Hunters Point Naval Shipyard
Parcel B Radiological Object Recovery
December 2023

This fact sheet discusses information about the recent recovery of a small glass object in a secured area on Parcel B at Hunters Point Naval Shipyard (HPNS).

Radiological Retesting at HPNS

In late 2017, Navy completed an evaluation of past radiological data in identified areas at HPNS and determined this data to be unreliable. Since 2020, the Navy has been collecting new radiological data in those identified areas to ensure cleanup is protective of public health and the environment. The data includes soil samples from trench excavations, soil borings, and former building areas. Retesting fieldwork at Parcel B began in August 2022 and is ongoing. To date, approximately 30% of the trenches in Parcel B have been excavated and sampled.

Recovery at Parcel B

On April 17, 2023, a routine surface scan of excavated material from Trench Unit 45B was conducted on radiological screening yard (RSY) pad ESU TU-45B. No irregular readings were found and the data entered a detailed review process per the approved Parcel B Work Plan. On November 6, 2023, results of the data analysis resulted in the determination that further investigation of ESU TU-45B was necessary. A field investigation was promptly conducted. A mobile radiation detection system identified an elevated reading in one location on the RSY pad. In compliance with established work plans, the location was marked off for further investigation.

What was discovered?

Upon investigation, a small piece of glass, approximately 3/16 inch in diameter (about the size of a green pea), was found approximately 6-inches below the surface in loose soil on the RSY pad. Static gamma counts and dose-rate readings were collected before the item was bagged, labeled, and taken for further analysis. Laboratory analysis of the pea-sized object identified low level radium-226 activity.

Is the community at risk?

No. The glass object was found in a radiologically-controlled area at HPNS that is not accessible to the public. The relative dose of radiation from the glass object is low and it does not pose a risk to members of the community. The Navy's health and safety protocols ensured worker safety during recovery and removal of the radiological object.

How can you get answers to your radiological health and safety questions?

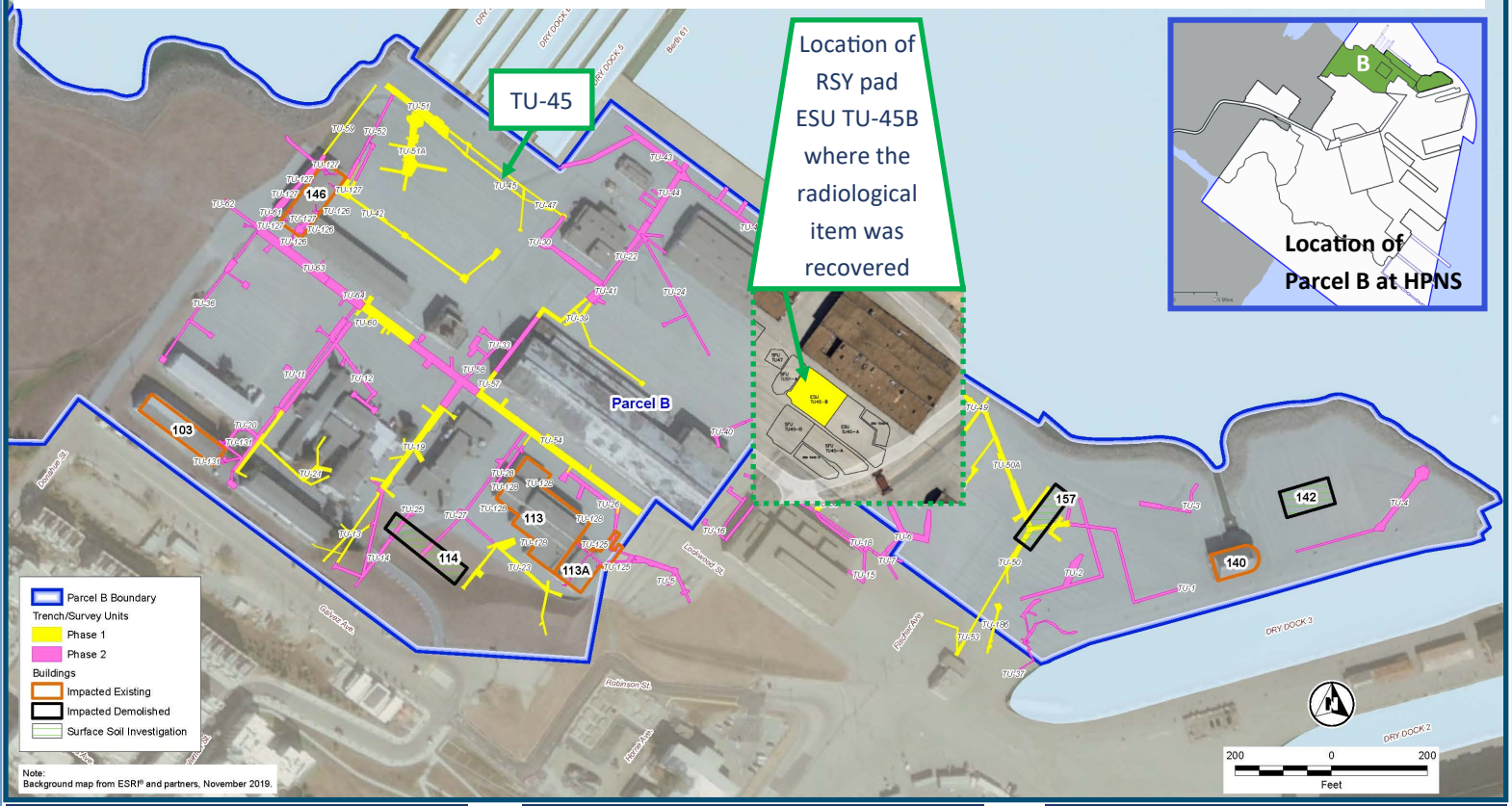
Dr. Kathryn Higley is an internationally recognized expert in radiological health and safety. She is a resource to the community for radiological health and safety information, especially as it relates to HPNS. Dr. Higley is available to members of the community by phone (541-737-0675), email (kathryn.higley@oregonstate.edu), or during office hours (scan QR code to register).

This image shows the location of the glass object in loose soil using static gamma count equipment. It is located on an RSY pad within a restricted area on Parcel B.

Scan the QR code for HPNS resources.

- Join the mailing list
- Link to the Navy website
- Register for guided bus tours
- Sign up for Technical Advisor office hours

Map of Radiological Retesting Trench Units at HPNS Parcel B



Static Gamma Count at Surface

Excavation and Investigation

Glass Object Recovered

What is radium?

Radium is a chemical element with the symbol “Ra” and atomic number 88. It is included in the Periodic Table of Elements in the alkaline earth metals group. It is naturally present in the environment in small amounts in rocks and soil and is also present in man-made sources. During the early 1900s through mid-century, it was common practice to add radium to paint to make items glow in the dark.

Before the effects of radiation exposure were well understood, radium was used in everyday items, including toys, nightlights, wristwatch dials, and clock faces.

How did glass object get onto HPNS property?

Radioluminescent (glow-in-the-dark) items that were typically used by the Navy included switches, volt meters, deck markers, and safety ropes. While ships were in dry dock at HPNS, these types of items were removed and/or replaced during normal ship maintenance activities.

有关海军在猎人角海军造船厂的清理活动方案的更多信息，
请拨打 (833) 350-6222 并留言。

Para más información sobre el programa de limpieza de la Marina en Hunters Point Naval Shipyard, favor de dejar un mensaje en (833) 202-5888.

www.bracpmo.navy.mil/hpns **info@sfhpns.com** **(415) 295-4742**

APPENDIX C
HPNS PARCEL B PHASE I CQC REPORT AND DAILY PRODUCTION REPORT FOR 11.06.23 - GES REPORT

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DAILY QUALITY CONTROL REPORT

PHASE	CONTRACT NO / TO NO: **N62473-17-D-0005, Task Order N6247318F5364**	GES PROJECT NO.: **J31000.900**	REPORT NO: **290**
	PROJECT TITLE / LOCATION: **Parcel B Phase I Removal, Hunters Point Naval Shipyard, San Francisco, CA**		DATE: **11/6/23**

PREPARATORY

PREPARATORY PHASE INSPECTIONS PERFORMED TODAY — YES ☐ NO ☑

(Attach 2-page Preparatory Phase Checklist for each DFOW.)

Schedule Activity No.	Definable Feature of Work
	NA

INITIAL

INITIAL PHASE INSPECTIONS PERFORMED TODAY — YES ☐ NO ☑

(Attach Initial Phase Checklist for each DFOW.)

Schedule Activity No.	Definable Feature of Work

FOLLOW-UP

FOLLOW UP INSPECTIONS PERFORMED TODAY

WORK OBSERVED COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE?	YES ☑	NO ☐
WORK OBSERVED COMPLIES WITH SAFETY REQUIREMENTS?	YES ☑	NO ☐

Schedule Activity No.	Definable Feature of Work and Work Description
	- Maintain BMP's and secure the site. - radiological survey of building 146. - Radiological drive over of RSY test areas.
	- Instrument Set up, Source Check and QC Check. - No Air Monitoring (Lo Vol) Set up performed today. - Building 113A, continue survey of ceiling. - Building 103- Prep, Clean, Lay-out and Grid-out of Locations for Upcoming Radiological Survey - Site maintenance.

TESTS & INSPECTIONS PERFORMED TODAY (List: tests/inspections performed, methods used, who performed, equipment calibration

Radiation equipment: side Pak (see attached documents for calibration and results) NA

REWORK ITEMS IDENTIFIED TODAY	REWORK ITEMS CORRECTED TODAY
DFOW / Description	DFOW / Description
NA	**NA**

SUBMITTALS REVIEWED TODAY: None

MATERIAL RECEIPT INSPECTIONS PERFORMED

NA	
NA	

INSTRUCTIONS GIVEN TO SUBCONTRACTORS OR RECEIVED FROM CLIENT / DIFFERING SITE CONDITIONS, ERRORS OR DISCREPANCIES NOTED / REMARKS;

At approximately 1250 hours Pacific Time, during review of a drive-over data set from a towed Radiation Solutions, Inc.RS-700 mobile gamma-ray detection system for trench unit TU-45, it was determined that further investigation of the soil was warranted. Soil from TU-45 was excavated between 24 January and 01 February 2023.At approximately 1305 hours an area of statistically anomalous data on pad ESU-45B, from which a biased sample had been previously collected with no exceedance of the release criteria, was scanned for radiation with a Ludlum Model 2221 meter and Ludlum Model 44-10 Gamma Detector. One location produced a 1-minute count of 53,531 counts per minute at the surface. At approximately 1308 hours the area was delineated/secured and the Navy BRAC PMO office was alerted to the discovery via phone call, followed by calls to the Navy Resident Officer In Charge of Construction (ROICC), Caretaker Site Office (CSO), and the Navy 3rd Party radiological oversight contractor (Batelle).At approximately 1340 hours, in the presence of ROICC and Batelle representatives, GES staged polyvinyl sheeting next to the location to prepare for item retrieval. Shallow lifts of soil were removed until the item was located. A small piece of glass approximately 3/16" in size was discovered approximately six inches from the surface, and determined to be the source of the activity. Static gamma counts and dose rate readings were collected from the object at contact and from a distance of thirty centimeters. The object was bagged, labeled, and placed into a lead-lined safe within a secured GES site trailer. Personel present were as follows Navy ROICC Hamid Naimi , Navy ROICC Basi Basi , Battelle Radiation Safety Specialist Chi Minh , GES Radiation Manager Andrew Alexander , Envirachem RSO Swayze Burrus and Envirachem Senior Lead Tech Danny Bulilan.

DAILY QUALITY CONTROL REPORT

PHASE	CONTRACT NO / TO NO: **N62473-17-D-0005, Task Order N6247318F5364**	GES PROJECT NO.: **J31000.900**	REPORT NO: **290**
	PROJECT TITLE / LOCATION: **Parcel B Phase I Removal, Hunters Point Naval Shipyard, San Francisco, CA**		DATE: **11/6/23**

On behalf of Gilbane Federal, I certify that this report is complete and correct, and that the equipment and material used, and the work performed during this reporting period follow the contract plans, drawings, and specifications to the best of my knowledge, except as noted in this report.	Lovesy, Scott Digitally signed by Lovesy, Scott DN: E=slovesy@ges-ais.com, CN="Lovesy, Scott", OU=GES-AIS, OU=All Users, DC=corp, DC=ad, DC=asrc, DC=com Date: 2023.11.07 10:54:38-08'00' PROJECT QC MANAGER PRINT AND SIGN	**11/6/23** DATE

NOTE: Include as an attachment to the Daily QC Report: The Daily Production Report, Subcontractor daily logs, material receipts and bills of lading, inspection and test results, Nonconformance Reports, Site Safety Sign-in Logs, and other records developed or received on today's report date.

DAILY PRODUCTION REPORT

(Attach Continuation Page as Needed)

Project

CONTRACT NO. / TO NO.	PROJECT TITLE / LOCATION	REPORT DATE	REPORT NO.
N62473-17-D-0005/TO. No. F5217	Parcel B Removal Site Evaluation	06-Nov-23	290
GES Project No. J31000.900	Hunters Point Naval Shipyard, San Francisco, CA		

Weather

Weather Conditions				Temp (F)		Ground Conditions
AM	Cloudy	PM	Cloudy	Low	61	Dry
				High	70	

Additional Comments

10 MPH wind max.

Gilbane Personnel On Site

Scheduled Activity No.	Gilbane Staff Name	Trade/Duty Position	Number	Description of Work Performed	Hrs.
	Scott Lovesy	QC Manager		Project quality control	5.00
	Tony Olmstead	General Superintendent		HPNS site manager	5.00
	Logan Schwing	Air sampling		Sampling	5.00
	Henry Ng	Surveyor Alt QC		Project oversight and trench layout	5.00
	Giovanny Alfaro	Operator/superintendent		Superintendent / Oversight	5.00
	Andy Alexander	Radiation Manager		Project RAD oversight	0.00
	Charles Cronister	Rad tech		Project RAD oversight	0.00
	Francisco Hernandez	Labor		Labor	0.00
	Oscar Hernandez	Site Super		Superintendent / Oversight	0.00
	Kimberly Tom	Sampling		Sampling	0.00
	Mike Chindavong	Air sampling		Sampling/Air	0.00
	Teresa Ruha	Geologist		Sampling	0.00
	Harry Obregon	Labor		Labor	0.00
	Deshon Grayson	Labor		Labor	0.00
	Erick Gutierrez	Labor		Labor	0.00
	Andre Galloway	Labor		Labor	0.00
					0.00
	Dusty Herteman	Operator		Operator	0.00

Subcontractor Personnel On Site

Scheduled Activity No.	Employer	Trade/Duty/Position	Number	Description of Work Performed	Hrs.
	Envirachem	Rad tech/Danny Bulilan		Radiological Survey oversight	5.00
	Envirachem	Rad tech/B Swayze		Radiological Survey oversight	5.00
	Envirachem	Jake Roediger		Radiological survey	10.00
	Envirachem	Paul Danenburg		Radiological oversite	0.00
	Lawson trucking	Henry Lawson		Truck driver	0.00
	Envirachem	Rhys Davidson		Radiological oversite	10.00
	Envirachem	James Vorasane		Radiological oversite	10.00
	Envirachem	Charles Cronister		Radiological oversite	10.00
	Envirachem	Tomas Moore		Radiological oversite	10.00
	Envirachem	Devin Lewis		Radiological oversite	0.00
	Envirachem	Jaime Pena		Radiological oversite	0.00
	Envirachem	Jason Huynh		Radiological oversite	0.00
	Envirachem	Journey Coughman		Radiological oversite	0.00
	Envirachem	Ray Blaine		Radiological oversite	0.00

Total Gilbane Work-Hours on Site This Day	**25.00**
Total Subcontractor Work-Hours on Site This Day	**60.00**
Subtotal Gilbane + Subcontractor Work-Hours on Site This Day	**85.00**
Cumulative Total Work-Hours From Previous Report	30753.0
Cumulative Work-Hours from Start of Construction	**30838.00**

Safety

Was a job safety meeting held this date? (If "yes," attach copy of meeting minutes.)	No		Yes	X
Were there any lost time accidents this date? (If "yes" attach copy of completed OSHA report)	No	X	Yes	
Was Crane/Man lift/Trenching/Scaffolding/HV Elec/High Work/Hazmat work done? (If "yes" attach statement or checklist showing inspection performed.)	No	X	Yes	
Was hazardous material/waste released into the environment? (If "yes" attach description of incident and proposed action)	No	X	Yes	

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

See todays tailgate for details. (attached)

DAILY PRODUCTION REPORT

(Attach Continuation Page as Needed)

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	GES Project No. J31000.900	Hunters Point Naval Shipyard, San Francisco, CA		

Equipment

Equipment/material received today to be used on job site:

Construction and field equipment on job site today (include field instruments): radiological instrumentation, Manlift

Work Performed Today

Site meeting with all hands at building 400, tailgate for staff out on parcel B work area.
Building 113A, Continued the ceiling surveys. Building 103- Prep, continued of wall and ceiling surveys.

Work Planned Next Day

Maintain BMP's and secure the site.
Continue radiological survey of building 113A

Issues or Concerns

At approximately 1250 hours Pacific Time, during review of a drive-over data set from a towed Radiation Solutions, Inc.RS-700 mobile gamma-ray detection system for trench unit TU-45, it was determined that further investigation of the soil was warranted. Soil from TU-45 was excavated between 24 January and 01 February 2023.At approximately 1305 hours an area of statistically anomalous data on pad ESU-45B, from which a biased sample had been previously collected with no exceedance of the release criteria, was scanned for radiation with a Ludlum Model 2221 meter and Ludlum Model 44-10 Gamma Detector. One location produced a 1-minute count of 53,531 counts per minute at the surface.At approximately 1308 hours the area was delineated/secured and the Navy BRAC PMO office was alerted to the discovery via phone call, followed by calls to the Navy Resident Officer In Charge of Construction (ROICC), Caretaker Site Office (CSO), and the Navy 3rd Party radiological oversight contractor (Batelle).At approximately 1340 hours, in the presence of ROICC and Batelle representatives, GES staged polyvinyl sheeting next to the location to prepare for item retrieval. Shallow lifts of soil were removed until the item was located. A small piece of glass approximately 3/16" in size was discovered approximately six inches from the surface, and determined to be the source of the activity. Static gamma counts and dose rate readings were collected from the object at contact and from a distance of thirty centimeters. The object was bagged, labeled, and placed into a lead-lined safe within a secured GES site trailer. Personel present were as follows Navy ROICC Hamid Naimi , Navy ROICC Basi Basi , Battelle Radiation Safety Specialist Chi Minh , GES Radiation Manager Andrew Alexander , Envirachem RSO Swayze Burrus and Envirachem Senior Lead Tech Danny Bulilan.

Visitors

Name	Organization	Purpose of Visit
Hamid Naime	ROICC	Visit Parcel B ESU-45B see above for details
Basi Basi	ROICC	Visit Parcel B ESU-45B see above for details
Chi Minh	Battelle	Visit Parcel B ESU-45B see above for details

Signed

GES Superintendent Signature:		**Date:** 6-Nov-23
Printed Name and Title:	Giovany Alfaro	

NOTE: ATTACH PERTINENT INFORMATION TO THIS REPORT.

DAILY PRODUCTION REPORT
PHOTO LOG

PROJECT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
N62473-17-D-0005/TO. No. F5217	Parcel B Removal Site Evaluation	06-Nov-23	290
PROJECT NO. J31000.900	Hunters Point Naval Shipyard, San Francisco, CA		

DAILY PHOTOS

1

Envirachem doing Survey in building 113A

2

Envirachem doing survey in building in 103

3

4

APPENDIX D
HPNS PARCEL B RADIOLOGICAL INVESTIGATION AND SURVEY – ROICC DAILY REPORT 11.06.23

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ROICC QUALITY ASSURANCE (QA) REPORT				DATE	11/06/2023
CONTRACT NO: N62473-17-D-0005 CTO No: N6247318F5364	TITLE AND LOCATION **Hunters Point Parcel B Removal site Evaluation**			CONTRACTOR	Gilbane (GES)

Status	**WORKING?**	YES	NO	IF NO, WHY NOT:
		☒	☐	
	WEATHER CONDITIONS:	AM: Cloudy/Light Rain PM: Partly Cloudy High 66^{0}F, Low 57^{0}F		

Check Points		YES	NO	REMARKS (REQUIRED FIELD):
	SUPERINTENDENT ON SITE	☒	☐	Giovanny Alfaro
	QC MANAGER ON SITE	☒	☐	Tony Olmstead
	NAVY QASP CURRENT	☒	☐	
	CONTRACTOR QC REPORTS CURRENT	☒	☐	Contractor will submit QC report for today.
	DUST / AIR MONITORING COMPLIANT	☒	☐	Upwind and downwind air monitoring stations were in operation during site work.
	DEFICIENCY LIST REVIEWED	☐	☒	No deficiency observed during the site visit

WORK OBSERVED/DEFICIENCIES NOTED/SAFETY ISSUES DISCUSSED/QA TESTS AND RESULTS:

Schedule Activity No	DESCRIBE OBSERVATIONS
1	A site visit for Quality Assurance (QA) has been conducted of Gilbane (GES) job site at Parcel B Radiological Investigation and Survey, and no deficiency was observed during the site visit.
2	Radiological scanning of building 113A upper walls and ceiling, and preparation of building for radiological scanning were observed.
3	Observed floor/walls radiological scanning of building 103, and preparation marking of scanning locations in building 103.
4	Continued RSY pads and project site maintenance.
5	While GES conducted Gamma drive-over survey of RSY Pad ESU-TU-45B, the soil from this pad was excavated from TU-45. The GES detected a radiological anomaly, necessitating a further investigation of the soil. During today's investigation, GES identified a radiological object. At approximately 1322 hours Pacific Time, GES informed ROICC of their intent to remove the identified object. At around 1348 hours, GES successfully located and removed the object.

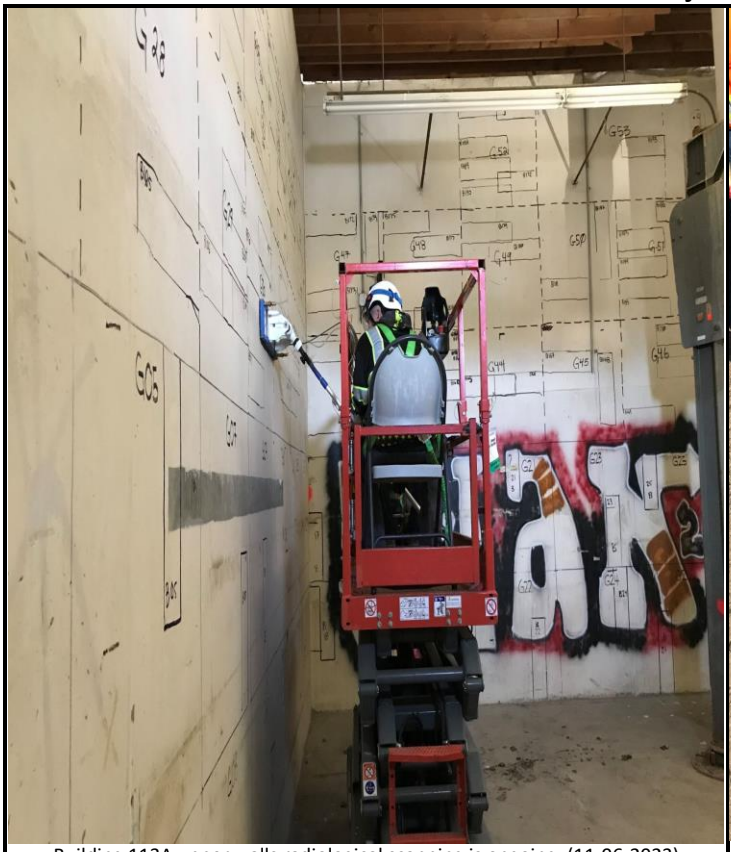
MEETING/CONFERENCE NOTES (INCLUDING PARTICIPANTS):

INSTRUCTIONS GIVEN OR RECEIVED/CONTROVERSIES PENDING:

Schedule Activity No.	INSTRUCTIONS/CONTROVERSIES
	No safety or QA issues wore observed.

Hamid Naimi	11-06-2023		
QA / ROICC REPRESENTATIVE	DATE	SUPV INITIALS	DATE

Project Site Pictures



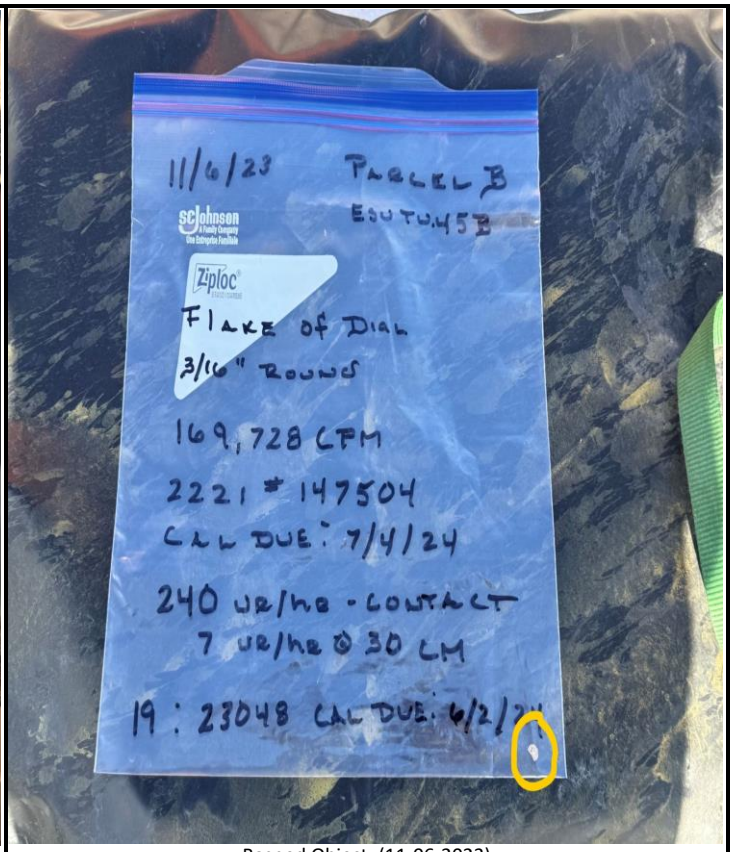
Building 113A upper walls radiological scanning is ongoing. (11-06-2023)

Location of the identified object. (11-06-2023)

Locating and removing the soil. (11-06-2023)

Scanning removed soil to locate the object location. (11-06-2023)

Identified object. (11-06-2023)



Bagged Object. (11-06-2023)

APPENDIX E
HPNS PARCEL B RADIOLOGICAL REWORK – 3rd PARTY QA REPORT 11.06.23

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Radiological QA Summary Report:
Week of November 6, 2023
Hunters Point Naval Shipyard San Francisco, California
Contract Number CNTR0000000000000869
Task Order (4042)

11/13/2023

QA Surveillance Summary

Contractor/Site/Bldg./Survey Unit	Surveillances Conducted		Non-Conformance Issues	
	Week	To Date	Week	To Date
Jacobs Parcel G Building Survey	0	24	0	1
Kemron/PermaFix Parcel E-2	0	17	0	1
EIP TPH	0	5	0	0
APTIM Basewide Parcel C	0	5	0	0
APTIM Basewide	0	335	0	12
APTIM O&M Basewide	1	98	0	0
APTIM Parcel E Revetment	0	177	0	4
APTIM Treasure Island Arsenic/TPH Excavation	0	21	0	1
APTIM Alameda Building 5	0	30	0	0
APTIM Parcel F	0	20	0	0
APTIM Parcel E Phases 1/3	1	163	0	2
APTIM Parcel G Rework	1	152	0	0
APTIM H&S Survey	0	51	0	0
Gilbane Treasure Island Site 12	0	133	0	2
Gilbane/Parcel E-2	0	163	0	6
Gilbane/GES Building 253/211	0	64	0	2
Gilbane/GES Parcel B/C Rework	3	98	0	3
Gilbane/GES Parcel E Phase 2	0	190	0	1
ECC-Insight	0	19	0	1
NOREAS Treasure Island/Site 12 Data Gap	0	15	0	0
Wood	0	19	0	3
Jacobs	0	28	0	0
Tetra Tech/Bldg. 130/SU 12	0	1	0	0
Tetra Tech/Bldg. 351A/SU 43	0	1	0	0
Tetra Tech/Bldg. 204 Sewer	0	3	0	0
Tetra Tech/Bldg. 271	0	9	0	0
Tetra Tech/Bldg. 406	0	9	0	0
Tetra Tech/Bldg. 253	0	1	0	0
Tetra Tech/Bldg. 258	0	1	0	0

Summary of Navy-Directed Confirmatory Scanning and/or Sampling

Contractor/Site/ Bldg./Survey Unit	Reason	Confirmatory Scanning and/or Sampling
Parcel C Outfall Survey	BRAC Request	HPNS-QAR-2019-0033 Gamma Walk-over
Parcel G Building 351 A SU-11	BRAC Request	HPNS-QAR-2022-0162 Location Survey
Parcel G Building 351 A SU-11	BRAC Request	HPNS-QAR-2023-0133 Remedial Action Support Survey

SUMMARY OF WORK CONDUCTED:

Monday, 11/6/2023

- Surveillance # HPNS-QAS-2023-0223 was completed to verify if GES Parcel B Rework radiological building survey at Building 113-A was completed in compliance with approved site documents. No deficient conditions were observed.
- Surveillance # HPNS-QAS-2023-0224 was performed to verify if an APTIM Parcel G gamma walkover survey at TU-119 was conducted in compliance with approved site documents. No deficient conditions were observed.
- Surveillance # HPNS-QAS-2023-0225 was generated to document an LLRO discovered/recovered by GES Parcel B Rework from RSY Pad # ESY TU-45B.

Tuesday, 11/7/2023

- Battelle attended the GES Parcel B/C CQC meeting at 08:15, the GES Parcel E Phase II CQC meeting at 10:00, the APTIM O&M Basewide CQC meeting at 10:30, the APTIM Parcel E Phases 1/3 CQC meeting at 11:00/11:15 and the APTIM Parcel G CQC meeting at 11:45.

Wednesday, 11/08/2023

- Battelle attended the GES Parcels D-2, UC-1, UC-2, UC-3 Removal Evaluation CQC meeting at 08:00.
- Surveillance # HPNS-QAS-2023-0226 was conducted to verify if GES Parcel B Rework radiological soil sampling conducted at RSY Pad # ESY TU-45B was completed in compliance with approved site documents. No deficient conditions were noted.
- Surveillance # HPNS-QAS-2023-0227 was conducted to verify if APTIM O&M Basewide radiological training was conducted in compliance with approved site documents. No deficient conditions were observed.

Thursday, 11/09/2023

- Surveillance # HPNS-QAS-2023-0228 was performed to verify if APTIM Parcel E Phases 1/3 radiological debris survey was conducted in compliance with the Project Radiation Protection Plan. No deficient conditions were observed.

Friday, 11/10/2023

- No work was performed today due to Battelle's 9/80 split schedule.

QA SUMMARY ISSUES/DEFICIENCIES

Issue #	Contractor	Independent Radiological QA Finding	Date of Initial Finding	Notification to Contractor	Responsible Party	Contractor Est. Date to Resolution	Resolved (Yes/No)	Date Resolved	Battelle Contract Number	Additional Comments
1	CBI	Postings are windblown, bleached, saggy, not in compliance with requirement to be able to withstand the elements.	2/18/16	2/18/16	CBI	NA	Yes	3/31/16	TO-0096	Additional surveillances on dates 3/22/2016 and 3/31/2016
2	ITSI/GILBANE	Faded postings (not readable)	2/18/16	2/18/16	ITSI/GILBANE	NA	Yes	3/28/16	TO-0096	Additional surveillances on dates 3/21/2016 and 3/28/2016
3	ITSI/GILBANE	180 second background time used, 300 seconds stated in procedure.	2/24/16	2/24/16	ITSI/GILBANE	NA	Yes	2/25/16	TO-0096	Bryson FCR issued
4	CBI	MOU Map does not accurately show contractor's license area	2/29/16	2/29/16	CBI	NA	Yes	3/17/16	TO-0096	MOU Map redrawn to include contractor's license area
5	ITSI/GILBANE	RAM stored in coolers, lack of spill kit/sorbant at work site	3/8/16	3/8/16	ITSI/GILBANE	NA	Yes	3/30/16	TO-0096	Spill Kit/Sorbant condition corrected on 3/8/2016; Sources placed into DOT paint cans on 3/30/2016
6	CBI	LMI 3500-1000 Detector Height	3/10/16	3/10/16	CBI	NA	Yes	3/14/16	TO-0096	Observation only / No Deficiency
7	ITSI/GILBANE	RS-700 Response check source geometry	4/14/16	4/14/16	ITSI/GILBANE	5/10/16	Yes	5/10/16	TO-0096	ITSI FCR #008 generated per CQC meeting
8	CBI	RSY-3 Pad Debris greater than 6" diameter	4/28/2016	4/28/2016	CBI	5/23/2016	Yes	5/23/2016	TO-0096	Work Instruction D2005-0008-005 Radiological Screening Yard Survey Of Comingled Soil and Plastic Sheeting submitted to Battelle on 5/20/2016.
9	CBI	Portal monitor load documentation	6/13/16	6/13/16	CBI	6/14/16	Yes	6/14/16	TO-0096	Leslie Howard provided map along with statement of load
10	CBI	Portal Monitor RSOR did not observe recycle materials being loaded	6/13/16	6/13/16	CBI	7/11/2016	Yes	7/11/2016	TO-0096	Revised Procedure D2005-0008-003 "Screening of Trucks Using Stationary Portal Monitor and Portable Survey Instrumentation. Revision 1 7/11/2016
11	CBI	Gamma handscan survey performed incorrectly	6/27/16	6/27/16	CBI	6/27/16	Yes	6/27/16	TO-0096	Training provided to RCT, Training verification document veiwed
12	CBI	Truck overspeed sensor not connected / not functioning	6/27/16	6/27/16	CBI	7/11/2016	Yes	7/11/16	TO-0096	Participated in "Drive Through" test on 7/11/2016 13:20
13	CBI	Hand scan log not being used. Being generated after operations	6/28/16	6/28/16	CBI	7/7/2016	Yes	7/7/16	TO-0096	Viewed correction during HPNS-QAS-2016-0087
14	CBI	Truck survey log not being completed (Dates and Times)	6/28/16	7/6/16	CBI	7/7/2016	Yes	7/7/16	TO-0096	Viewed correction during HPNS-QAS-2016-0087
15	ITSI/GILBANE	Active RWP not available at control point	1/4/17	1/4/17	ITSI/GILBANE	1/4/2017	Yes	1/4/17	TO-0096	RWP #HPNS-E2-2017-008 produced/placed the same day
16	CBI-TI	Rad Postings at arsenic/TPH excavation faded, missing, falling	3/28/17	3/28/17	CBI-TI	3/29/2017	Yes	3/29/17	TO-0096	D. Morrison - photo's of corrective actions sent to A. Berry
17	CBI-Revetment	Parcel E-2 RSY Pad C-6, Lift 2 greater than 9" thick	6/27/17	6/27/17	CBI-Revetment	6/29/2017	Yes	6/29/17	TO-0096	CB&I pad tracking sheet has been updated to include QC inspection date. Tracking sheet is now accessible by radiological department. Pad re-work measured/observed as
18	CBI/APTIM-Revetment	Parcel E-2 RSY Pad D-4, Use 3 greater than 9" thick	8/21/17	8/21/17	CBI/APTIM-Revetment	8/22/2017	Yes	8/22/17	TO-0096	Re-work performed (pad grading). C. Hanif mistake letter published during CTO-0013 CQC meeting on 8/22/2017
19	CBI/APTIM-Revetment	Parcel E-2 RSY Pad C-10, Use 3 greater than 9" thick	8/29/2017	8/29/2017	CBI/APTIM-Revetment	9/1/2017	Yes	9/1/2017	TO-0096	Re-work performed (pad grading) excess yardard removed from pad. New pad layout design used and employees trained on new methodology
20	ECC-Insight	No estimated collective dose stated on RWP # ECC-HP-003	12/11/2017	12/11/2017	ECC-Insight	12/11/2017	Yes	12/11/2017	TO-0096	Collective estimated dose added to RWP
21	Gilbane	Faded postings (not readable)	3/19/2018	3/19/2018	Gilbane	3/26/2018	Yes	3/26/2018	TO-0096	Postings replaced
22	CBI/APTIM-Revetment	Radiological postings missing over 200' section of fence line	7/3/18	7/3/18	APTIM-Revetment	7/5/2018	Yes	7/5/18	TO-0096	Postings replaced
23	Wood	No Wood Radiological Postings at the RSY4 during work	8/14/18	8/14/18	Wood	8/15/2018	Yes	8/16/18	TO-0096	Wood postings installed
24	APTIM-Basewide	RS-700 speed greater than 0.25 Meters per second	10/1/2018	10/1/2018	APTIM-Basewide	10/29/2018	Yes	10/29/2018	TO-0096	Use of groundspeed evaluation form (RIR # 2018-HPNS-0013)
25	APTIM-Revetment	Radiological postings missing over 200' section of fence line	10/8/18	10/8/18	APTIM-Revetment	10/8/2018	Yes	10/8/18	TO-0096	Postings on T-posts installed within Parcel E-2 Fenceline to Prevent theft of aluminum postings. Posings hung on fenceline are stolen during non-working hours
26	Wood	No RWP during work with licensed materials	1/8/19	1/8/19	Wood	1/9/2019	Yes	1/9/19	TO-0096	RWP's HTP-19-001 and HTP-19-002 produced
27	Wood	No Q1/2019 quarterly routine survey perfoemed at RSY-4	5/9/19	5/9/19	Wood	5/14/2019	Yes	5/14/19	X0-62	Quarterly survey performed on 5/14/2019
28	Gilbane	Employee observed with coffee cup with the Site 32 RCA	7/10/19	7/10/19	Gilbane	7/11/2019	Yes	7/11/19	X0-62	RWP refresher training conducted/class roster submitted
29	APTIM-Parcel F	RSI RS-700 function testing with Co-60 and no Th-232 count	8/19/2019	8/19/2019	APTIM-Parcel F	9/19/2019	Yes	10/1/2019	X0-62	APTIM FCR #3 approves use of Cabrera RS-700 (CLASS) WI
30	Gilbane	No radiological air sampler running at Site 32 during soil moving	11/25/2019	11/25/2019	Gilbane Site 12	11/25/2019	Yes	12/3/2019	X0-62	Airsampler observed running on 12/3/2019 - Photograph
31	Gilbane	No radioactive materials bin tracking sheet available at Site	1/14/2021	1/14/2021	Gilbane Buildings 211/253	1/14/2021	Yes	1/14/2021	X0-62	Gilbane PRSO sent Bin Transfer sheet to APRSO who is on site
32	APTIM-Basewide	Q4/2020 source leak test collected but not counted/documented	3/29/2021	3/29/2021	APTIM-Basewide	3/29/2021	Yes	3/29/2021	X0-62	Q4/2020 source leak test smears counted on 3/26/2021 after Battelles request for the last two source leak tests
33	Kemron/Perma-Fix	Posts lacking on shared RCA boundary / Gap in RCA fence line	4/13/2022	4/13/2022	Kemron/Perma-Fix	4/13/2022	Yes	4/13/2022	X0-84	Postings added to RCA boundary, Rad rope placed over fence.
34	Jacobs	No QC specification given for % error during survey positioning system checks.	5/10/2022	5/16/2022	Jacobs	4/13/2022	Yes	9/6/2022	X0-84	Condition addressed within FCR #002.
35	GES	Radiological posting interval gaps greater than 30m	7/6/2022	7/7/2022	GES	7/7/2022	Yes	7/7/2022	X0-84	M. Chi collected follow-up picts for report generator A. Berry.
36	APTIM Parcel E Phases 1/3	RS-700 Function Test - CS-137 count too short, 5000 cnts. collected	8/4/2022	8/4/2022	APTIM Parcel E Phases 1/3	8/17/2022	Yes	8/17/2022	X0-84	50,000 cnts. Required
37	APTIM Building 5 FCR-0001	Loaded LLRW bin not posted.	8/10/2022	8/10/2022	APTIM Parcel Building 5	8/10/2022	Yes	8/10/2022	TO-F4258	Miscomunication between PRSO and Sr. HP Tech.
38	GES Parcel B Rework	RS-700 scan speed observed at 0.48 m/s. WP calls for < 0.25 m/s	10/25/2022	10/26/2022	GES Parcel B Re-work	12/21/2022	Yes	12/21/2022	X0-84	New tractor purchased capable of 0.25 m per second.
39	GES Parcel B Rework	Building 113-A, SU-009 No data logging during alpha/beta scans	3/9/2023	3/9/2023	GES Parcel B Re-work	4/20/2023	Yes	4/20/2023	TO-4042	Received WI from S. McRay on 4/12/2023. Questions regarding data population were transmitted to the Navy. BRAC Ok'ed on 4/18/2023
40	APTIM O&M Basewide	Loaded 5 trucks from the wrong debris pile - Trucks called back to site.	6/11/23	6/11/23	APTIM Parcel E Phases 1/3	6/28/2023	Yes	6/28/23	TO-4042	Initally assigned to O&M Basewide. Re-assigned to Parcel E Phases 1/3 revetment project on 6/27/2023 per root cause analysis.
41	APTIM O&M Basewide	Radiological Posting gaps greater than 15 meters / 50' at Salvage Yard	9/20/23	9/20/23	APTIM O&M Basewide	9/20/2023	Yes	9/20/23	TO-4042	Corrective action included posting 2 more Restricted Area signs.

ATTACHMENTS

Quality Assurance Surveillance Report

Surveillance Checklist Number(s) HPNS-QAS-2023-0223 Surveillance Date 11/6/2023

Surveillance Report Number HPNS-QAR-2023-0223 Surveillance Report Generation Date 11/6/2023

Number of Surveillance Photographs Taken 4 Project Name GES Parcel B Rework Buildings

Describe the work event, contractor, site location, date, and weather:

This surveillance observed a building survey performed by GES. Approximately 20 minutes of GES staff time was taken to accommodate this surveillance. The weather was 64°F and sunny.

Describe what was observed:

The Battelle QA team arrived at Parcel B to observe a building survey of SU-14 in Building 113A. SU-14 was a Class 2 survey unit that included the upper walls. Only biased static measurements were being collected at locations that exceeded the 2 alpha click rule during the scan survey that was performed previously (Figure 1). 2-minute biased static measurements were collected with the Ludlum 43-37-1 detector on contact of the surveyed surface (Figure 2). The Ludlum 2360 w/43-37-1 instrument was verified to be used within the annual calibration window (Figure 3). The static measurements were recorded on a Static Log spreadsheet via a tablet (Figure 4).

All observed aspects of GES building survey were in compliance with all approved work documentation.

Describe any contractor deficient conditions observed with reference:

None.

Recommendations, Process Improvements, or Suggestions:

None.

Battelle Project Signatories

X

Battelle Quality Assurance Field Team Member

Surveillance Photographs HPNS-QAR-2023-0223

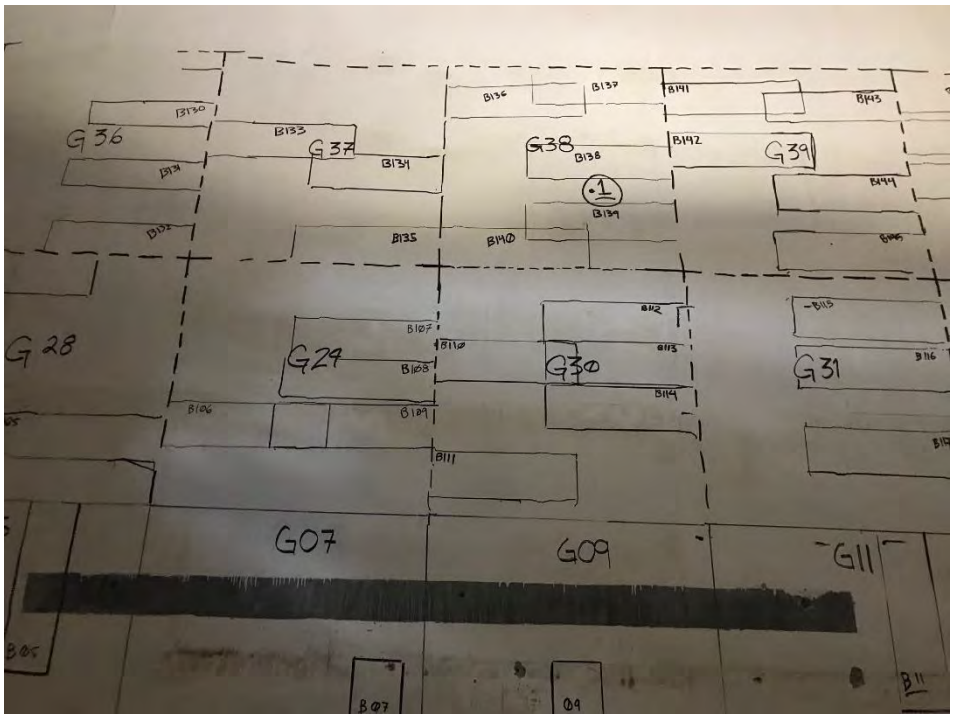


Figure 1 – Biased static locations marked on the upper walls with a black marker

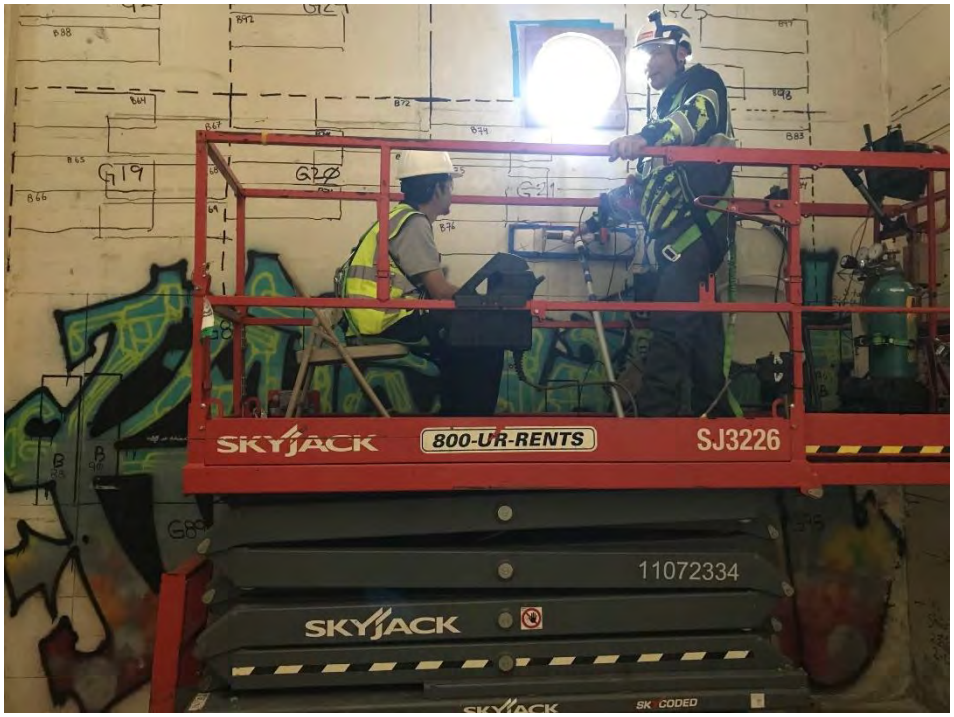


Figure 2 – RCTs performing a biased static measurement on a scissor lift

Surveillance Photographs HPNS-QAR-2023-0223 (Continued)

Figure 3 – Ludlum 2360, serial #184935, calibration due date 7/9/2024

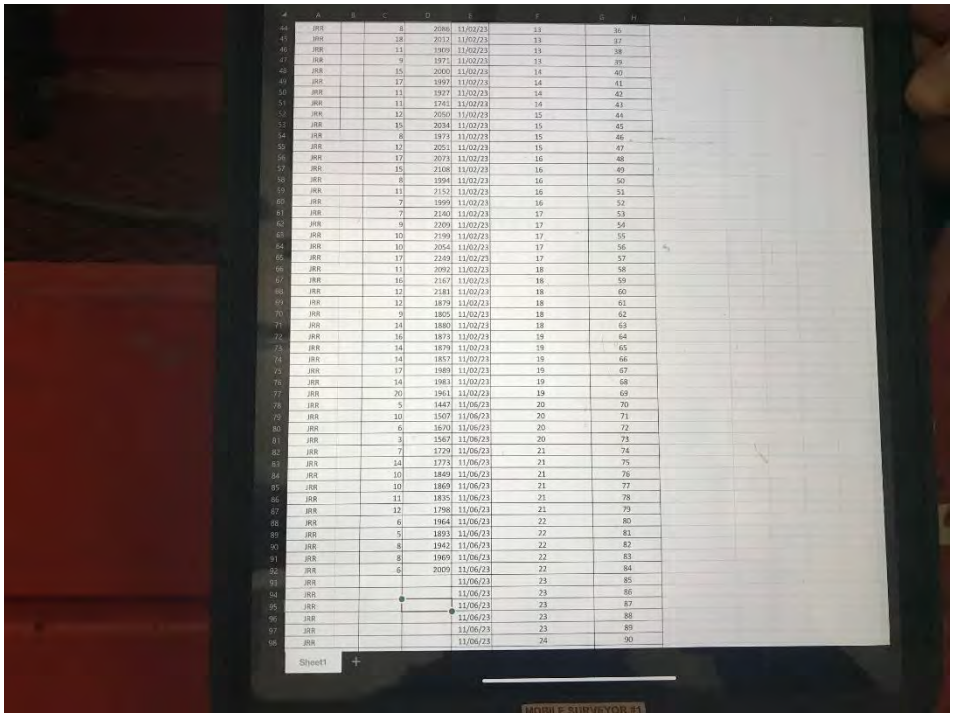


Figure 4 – Static Log spreadsheet used for recording the biased static measurements

Battelle QA Form - GES Parcel B Phases 1/2 Building Survey

Date/Time:	Date: 11/6/2023 Time: 0800-0845	**QA Inspector:**	M. Chi
Contractor/Survey #:	GES	**Surveillance #**	HPNS-QAS-2023-0223
Equipment surveyed:	N/A	**Work area:**	Parcel B Building 113A SU-14

Requirement	*Comments*	*Yes/No/NA*
Before using the portable survey instruments, calibration verification, physical inspection, battery check, and source-response check will be performed. Portable survey instruments will have a current calibration label that will be verified daily before use.	**The Ludlum 2360 w/43-37-1 instrument was used within the annual calibration window.**	Y
The total surface area of remaining, accessible impacted surfaces to be scanned will be 100 percent in Class 1 SUs, 50 percent in Class 2 SUs, and up to 10 percent in Class 3 SUs.	**SU-14 was a Class 2 survey unit that included the upper walls.**	Y
Survey units will be scanned to detect alpha and beta emitters using average scan rates that ensure an alpha probability of detection of approximately 90 percent where feasible and that the beta scan MDC is less than or equal to the RGβ for the building.	**Alpha/beta scan survey was not performed during this surveillance.**	N/A
Scanning speed is surveyor-controlled, and data are automatically logged when used with an appropriate data-logging scaler/ratemeter, such as the Ludlum Model 2360 or equivalent.	**Alpha/beta scan survey was not performed during this surveillance.**	N/A
On the Interface program, select Auto Dump and setup: 10 second count Readings: Averaged Auto Scroll Grid: Checked	**Alpha/beta scan survey was not performed during this surveillance.**	N/A
Scan lane widths will be approximately 10 percent smaller than the detector's active width, in the direction of scanning, to ensure overlapping coverage.	**Alpha/beta scan survey was not performed during this surveillance.**	N/A
For locations that exceed the 2-click rule, pause probe movement over the area for 12 seconds before continuing the scan.	**Alpha/beta scan survey was not performed during this surveillance.**	N/A
Static measurements will be performed at each systematic static location and will total 18 or more in each SU and the RBA, or the revised number determined. Measurements in locations that pose safety concerns or obstructions will be relocated to the nearest safe and accessible location and noted on the field forms.	**Systematic static measurements were not performed during this surveillance.**	N/A
Biased static measurements will be used to further investigate areas with potential elevated surface activity, as indicated by beta scan data exceeding the beta scan IL or systematic static data exceeding the applicable alpha or beta static IL.	**2-minute biased static measurements were performed at locations that exceeded the 2 alpha click rule during the scan survey performed previously.**	Y
Swipe samples will be taken at all locations of systematic and biased static measurements. They will be taken dry, using moderate pressure, over an area of approximately 100 cm2. Swipe samples will be measured for gross alpha and beta activity using a Ludlum Model 3030 or equivalent.	**Swipe samples were not collected during this surveillance.**	N/A
Any residual materials and equipment from past operations, such as piping, ventilation, shelving, or machinery will undergo radioactivity surveys. These surveys may include a combination of static measurements, swipe samples, and material samples.	**Not observed during this surveillance.**	N/A

References: "Final Parcel B Removal Site Evaluation Work Plan, Former Hunters Point Naval Shipyard, San Francisco, CA" April 2022
"Envirachem FM-070-03-20 Ludlum 2360 Datalogging, Hunters Point Parcel B/C Radiological Rework, San Francisco, CA" March 2023

Signature:		**Date:**	11/6/2023

Battelle QA Form - GES Parcel B Phases 1/2 Building Survey

Date/Time:	11/6/2023 0800 - 0845	**QA Inspector:**	M. CHI
Contractor/Survey #:	GES	**Surveillance #**	HPNS-QAS-2023-0223
Equipment surveyed:	N/A	**Work area:**	SU-14 BLDG 113A

Requirement	*Comments*	*Yes/No/NA*
Before using the portable survey instruments, calibration verification, physical inspection, battery check, and source-response check will be performed. Portable survey instruments will have a current calibration label that will be verified daily before use.	THE LUDLUM 2360 W/ 43-37-1 INSTRUMENT WAS USED WITHIN THE ANNUAL CALIBRATION WINDOW.	Y
The total surface area of remaining, accessible impacted surfaces to be scanned will be 100 percent in Class 1 SUs, 50 percent in Class 2 SUs, and up to 10 percent in Class 3 SUs.	SU-14 WAS A CLASS 2 SU THAT INCLUDED THE UPPER WALLS.	Y
Survey units will be scanned to detect alpha and beta emitters using average scan rates that ensure an alpha probability of detection of approximately 90 percent where feasible and that the beta scan MDC is less than or equal to the RGβ for the building.	ALPHA/BETA SCAN SURVEY WAS NOT PERFORMED DURING THIS SURVEILLANCE.	N/A
Scanning speed is surveyor-controlled, and data are automatically logged when used with an appropriate data-logging scaler/ratemeter, such as the Ludlum Model 2360 or equivalent.		N/A
On the Interface program, select Auto Dump and setup: **10 second count** **Readings: Averaged** **Auto Scroll Grid: Checked**		N/A
Scan lane widths will be approximately 10 percent smaller than the detector's active width, in the direction of scanning, to ensure overlapping coverage.		N/A
For locations that exceed the 2-click rule, pause probe movement over the area for 12 seconds before continuing the scan.		N/A
Static measurements will be performed at each systematic static location and will total 18 or more in each SU and the RBA, or the revised number determined. Measurements in locations that pose safety concerns or obstructions will be relocated to the nearest safe and accessible location and noted on the field forms.	SYSTEMATIC STATIC MEASUREMENTS NOT PERFORMED DURING THIS SURVEILLANCE.	N/A
Biased static measurements will be used to further investigate areas with potential elevated surface activity, as indicated by beta scan data exceeding the beta scan IL or systematic static data exceeding the applicable alpha or beta static IL.	2-MINUTE BIASED STATIC MEASUREMENTS PERFORMED AT LOCATIONS EXCEEDING THE 2-ALPHA CLICK RULE DURING THE SCAN SURVEY.	Y
Swipe samples will be taken at all locations of systematic and biased static measurements. They will be taken dry, using moderate pressure, over an area of approximately 100 cm2. Swipe samples will be measured for gross alpha and beta activity using a Ludlum Model 3030 or equivalent.	SWIPE SAMPLES WERE NOT COLLECTED DURING THIS SURVEILLANCE.	N/A
Any residual materials and equipment from past operations, such as piping, ventilation, shelving, or machinery will undergo radioactivity surveys. These surveys may include a combination of static measurements, swipe samples, and material samples.	NOT OBSERVED DURING THIS SURVEILLANCE.	N/A

References: "Final Parcel B Removal Site Evaluation Work Plan, Former Hunters Point Naval Shipyard, San Francisco, CA" April 2022
"Envirachem FM-070-03-20 Ludlum 2360 Datalogging, Hunters Point Parcel B/C Radiological Rework, San Francisco, CA" March 2023

Signature:		**Date:**	11/6/2023

64°F, CLOUDY

Quality Assurance Surveillance Report

Surveillance Checklist Number(s) HPNS-QAS-2023-0224 Surveillance Date 11/6/2023

Surveillance Report Number HPNS-QAR-2023-0224 Surveillance Report Generation Date 11/7/2023

Number of Surveillance Photographs Taken 4 Project Name APTIM Parcel G Rework Phase 2

Describe the work event, contractor, site location, date, and weather:

This surveillance observed a gamma walkover survey performed by APTIM. Approximately 20 minutes of APTIM staff time was taken to accommodate this surveillance. The weather was 68°F and sunny.

Describe what was observed:

The Battelle QA team arrived at Parcel G to observe a gamma walkover survey (GWS) on the backside of the durable cover of TU-119, a Phase 2 trench unit. The Ludlum 2221 w/44-20 instrument was used within the annual calibration window (Figure 1). The GWS was performed with an antenna attached to a backpack and the scan data with the associated GPS locations were recorded onto a Trimble unit. The HPT performed the GWS by swinging the Ludlum 44-20 detector in a pendulum motion at approximately 4 inches from the surveyed surface (Figures 2 and 3). The scan speed was within the 0.5 meters per second scan speed limit. Sufficient overlap was used between the scan lanes. Once the GWS was completed, the HPT verified the scan data was recorded and that there was no data gap on the GPS map (Figure 4).

All observed aspects of APTIM gamma walkover survey were in compliance with all approved work documentation.

Describe any contractor deficient conditions observed with reference:

None.

Recommendations, Process Improvements, or Suggestions:

None.

Battelle Project Signatories

X

Battelle Quality Assurance Field Team Member

Surveillance Photographs HPNS-QAR-2023-0224

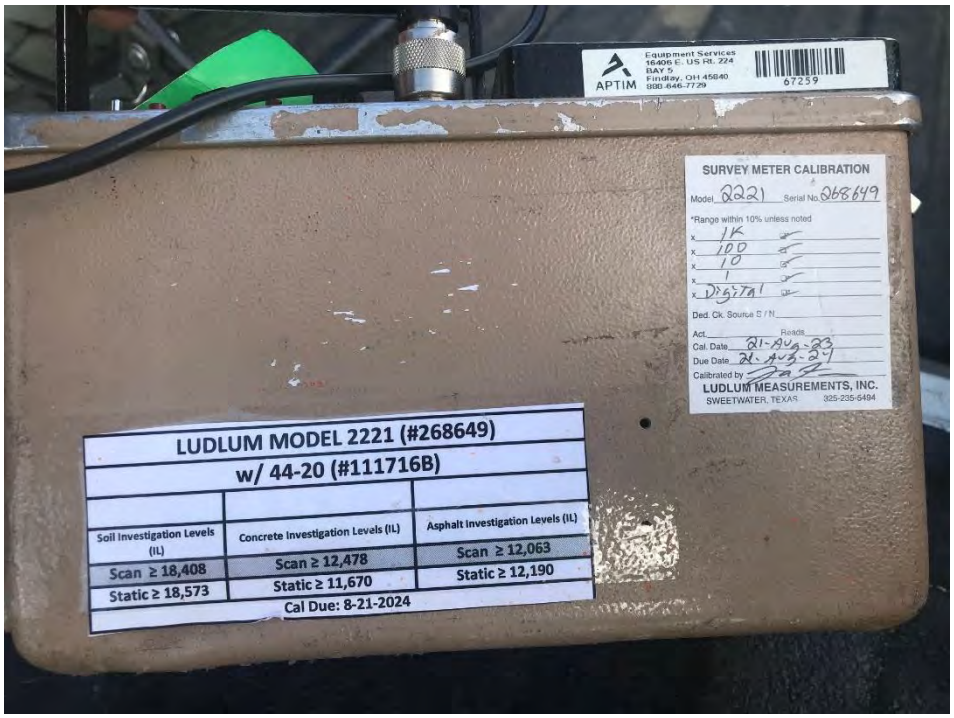


Figure 1 – Ludlum 2221, serial #268649, calibration due date 8/21/2024

Figure 2 – HPT performing the GWS on the backside of the durable cover

Surveillance Photographs HPNS-QAR-2023-0224 (Continued)

Figure 3 – Continuation of the GWS on the backside of the durable cover

Figure 4 – Trimble GPS map of the GWS data (in progress)

Battelle QA Form - APTIM Parcel G Phases 1/2 Gamma Walkover Surveys Using a Global Positioning System

Date/Time:	Date: 11/6/2023 Time: 1240-1315	**QA Inspector:**	M. Chi
Contractor/Survey #:	APTIM	**Surveillance #**	HPNS-QAS-2023-0224
Equipment surveyed:	N/A	**Work area:**	Parcel G TU-119 (Phase 2)

Requirement	*Comments*	*Yes/No/NA*
The RCT performing the survey shall verify that the Ludlum 2221 and paired gamma probe are within their annual calibration window and have passed a documented daily function test	**The Ludlum 2221 w/44-20 instrument was used within the annual calibration window. Daily function check was completed satisfactorily.**	Y
Regardless of the GWS being performed with a cart or by hand, the detector to surface distance is 4" and the scan rate is no faster than 0.5 meters per second	**The scan speed was less than 0.5 meters per second and the detector was within 4 inches from the surveyed surface.**	Y
To achieve 100% coverage of the survey area each pass should overlap the previous pass by 12 inches	**Sufficient overlap was used to ensure 100% coverage.**	Y
During operation an audible response on the scaler/ratemeter can be used to identify areas of elevated activity.	**The HPT observed both visual and audible response from both the Ludlum 2221 meter and Trimble GPS unit.**	Y
If during the walkover an area of elevated activity is identified and the count rate exceeds the investigative level for the instrument, the location will be marked	**Biased static locations will be identified once the scan data is reviewed.**	Y
A post survey function test will be performed and documented	**Performed at the next daily response check.**	Y

References: "Final, Revision 1 Parcel G Removal Site Evaluation Work Plan Addendum" July 2020
"Gamma Walkover Surveys Using a Global Positioning System" CMS-710-07-WI-40123, Revision 0, 7/30/2017

Signature:		**Date:**	11/6/2023

Battelle QA Form - APTIM Parcel G Phases 1/2 Gamma Walkover Surveys Using a Global Positioning System

Date/Time:	11/6/2023 1240 - 1315	**QA Inspector:**	M. CHI
Contractor/Survey #:	APTIM	**Surveillance #**	HPNS-QAS-2023-0224
Equipment surveyed:	N/A	**Work area:**	TU-119 PHASE2

Requirement	*Comments*	*Yes/No/NA*
The RCT performing the survey shall verify that the Ludlum 2221 and paired gamma probe are within their annual calibration window and have passed a documented daily function test	THE LUDLUM 2221 W/44-20 INSTRUMENT WAS USED WITHIN THE ANNUAL CALIBRATION WINDOW.	Y
Regardless of the GWS being performed with a cart or by hand, the detector to surface distance is 4" and the scan rate is no faster than 0.5 meters per second	SCAN SPEED WAS LESS THAN 0.5 M/S AND THE DETECTOR WAS WITHIN 4" FROM THE SURVEYED SURFACE.	Y
To achieve 100% coverage of the survey area each pass should overlap the previous pass by 12 inches	SUFFICIENT OVERLAP USED TO ENSURE 100% COVERAGE.	Y
During operation an audible response on the scaler/ratemeter can be used to identify areas of elevated activity.	THE HPT OBSERVED BOTH VISUAL AND AUDIBLE RESPONSE FROM THE LUDLUM 2221 METER.	Y
If during the walkover an area of elevated activity is identified and the count rate exceeds the investigative level for the instrument, the location will be marked	WILL BE IDENTIFIED ONCE THE SCAN DATA IS REVIEWED FOR BIASED STATIC LOCATIONS.	Y
A post survey function test will be performed and documented	PERFORMED AT THE NEXT DAILY RESPONSE CHECK.	Y

References: "Final, Revision 1 Parcel G Removal Site Evaluation Work Plan Addendum" July 2020
"Gamma Walkover Surveys Using a Global Positioning System" CMS-710-07-WI-40123, Revision 0, 7/30/2017

68°F, SUNNY

Signature:		**Date:**	11/6/2023

Quality Assurance Surveillance Report

Surveillance Checklist Number(s) HPNS-QAS-2023-0225 Surveillance Date 11/6/2023

Surveillance Report Number HPNS-QAR-2023-0225 Surveillance Report Generation Date 11/7/2023

Number of Surveillance Photographs Taken 8 Project Name GES Parcel B Rework Phase 1

Describe the work event, contractor, site location, date, and weather:

This surveillance observed an LLRO extraction performed by GES. Approximately 15 minutes of GES staff time was taken to accommodate this surveillance. The weather was 68°F and sunny.

Describe what was observed:

The Battelle QA team arrived at Parcel B to observe an LLRO extraction from RSY Pad ESU TU-45B. The LLRO was identified from reviewing of the RS-700 scan data map and verified in the field with a Ludlum 2221 w/44-10 instrument. The LLRO was located adjacent to a systematic sample location near the northeast edge of the RSY pad (Figure 1). A RCT loosened the soil around the LLRO with a pickaxe (Figure 2). Soils were then loaded onto a shovel and surveyed with the Ludlum 44-10 detector to segregate the LLRO (Figure 3). Once the LLRO was identified (Figure 4), it was bagged and surveyed (Figure 5). The radiological measurements were recorded on the Ziploc bag (Figure 6). The soil surrounding the LLRO on the RSY pad was re-scanned with the Ludlum 44-10 detector to verify there was no remaining elevated activity. The Ludlum 2221 w/44-10 and Ludlum Model 19 instruments were verified to be used within the annual calibration window (Figures 7 and 8).

The radiological measurements on the LLRO were: 169,728 cpm on contact, 240 μR/hr on contact, and 7 μR/hr at 30 cm.

All observed aspects of GES LLRO extraction were in compliance with all approved work documentation.

Describe any contractor deficient conditions observed with reference:

None.

Recommendations, Process Improvements, or Suggestions:

None.

Battelle Project Signatories

X

Battelle Quality Assurance Field Team Member

Surveillance Photographs HPNS-QAR-2023-0225

Figure 1 – Approximate location of the LLRO on the RSY pad prior to extraction (circled in red)

Figure 2 – HPT loosening the soil around the LLRO with a pickaxe

Surveillance Photographs HPNS-QAR-2023-0225 (Continued)

Figure 3 – Ludlum 44-10 detector used to identify and segregate the LLRO from the soil

Figure 4 – LLRO was identified to be a glass fragment (circled in red)

Surveillance Photographs HPNS-QAR-2023-0225 (Continued)

Figure 5 – RCT collecting an exposure rate measurement at 30 cm from the LLRO

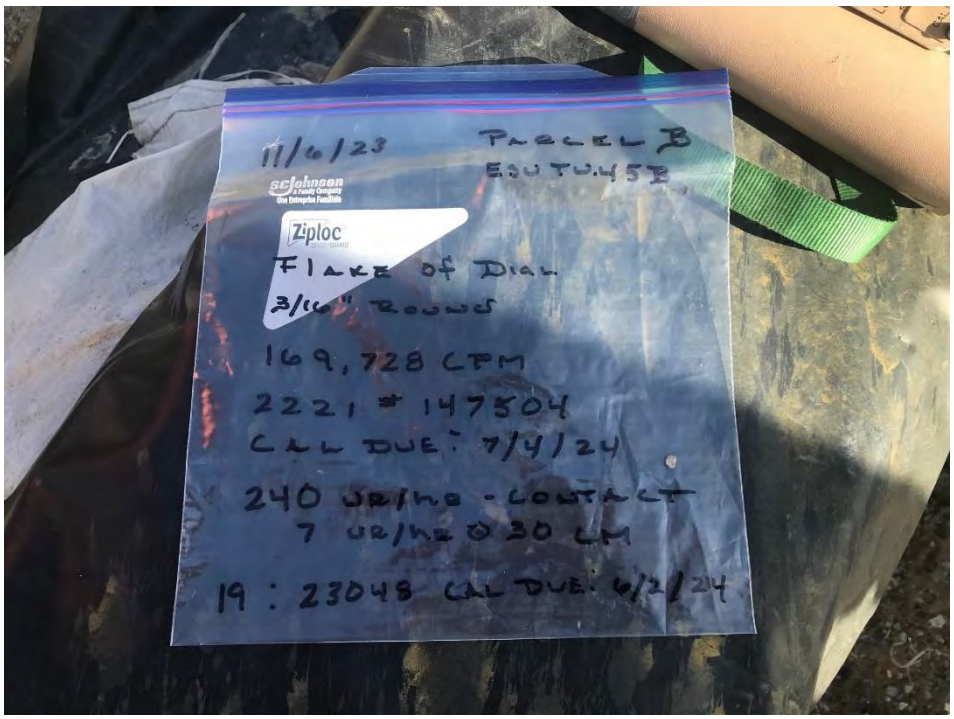


Figure 6 – LLRO placed into a Ziploc bag with information and radiological measurements

Surveillance Photographs HPNS-QAR-2023-0225 (Continued)

Figure 7 – Ludlum 2221, serial #147504, calibration due date 7/4/2024

Figure 8 – Ludlum Model 19, serial #23048, calibration due date 6/2/2024

Quality Assurance Surveillance Report

Surveillance Checklist Number(s) HPNS-QAS-2023-0226 Surveillance Date 11/8/2023

Surveillance Report Number HPNS-QAR-2023-0226 Surveillance Report Generation Date 11/8/2023

Number of Surveillance Photographs Taken 6 Project Name GES Parcel B Rework Phase 1

Describe the work event, contractor, site location, date, and weather:

This surveillance observed soil sampling performed by GES. Approximately 15 minutes of GES staff time was taken to accommodate this surveillance. The weather was 60°F and sunny.

Describe what was observed:

The Battelle QA team arrived at Parcel B to observe bounding soil sampling on RSY Pad ESU-TU45B after extraction of a LLRO. An approximate 5 ft x 5 ft area of soil around the LLRO were excavated and disposed as LLRW (Figure 1). A GES employee loosened and homogenized the soil at each corner of the excavation with a shovel. A RCT removed all large debris and then transferred the soil into Ziploc bags (Figure 2). Prior to sampling at the next sample location, the shovel and sample containers were surveyed with a Masslinn sheet and Ludlum 2360 w/43-93 instrument for surface contamination (Figures 3 and 4). A total of 4 bounding and 1 duplicate samples were collected. The sample containers were then labeled with sample identification stickers (Figure 5). A chain of custody was used to document the sample dates/times and contained all the pertinent information for the lab ROC analysis (Figure 6).

All observed aspects of GES soil sampling were in compliance with all approved work documentation.

Describe any contractor deficient conditions observed with reference:

None.

Recommendations, Process Improvements, or Suggestions:

None.

Battelle Project Signatories

X

Battelle Quality Assurance Field Team Member

Surveillance Photographs HPNS-QAR-2023-0226

Figure 1 – A 5 ft x 5 ft area of soil was excavated around the LLRO location

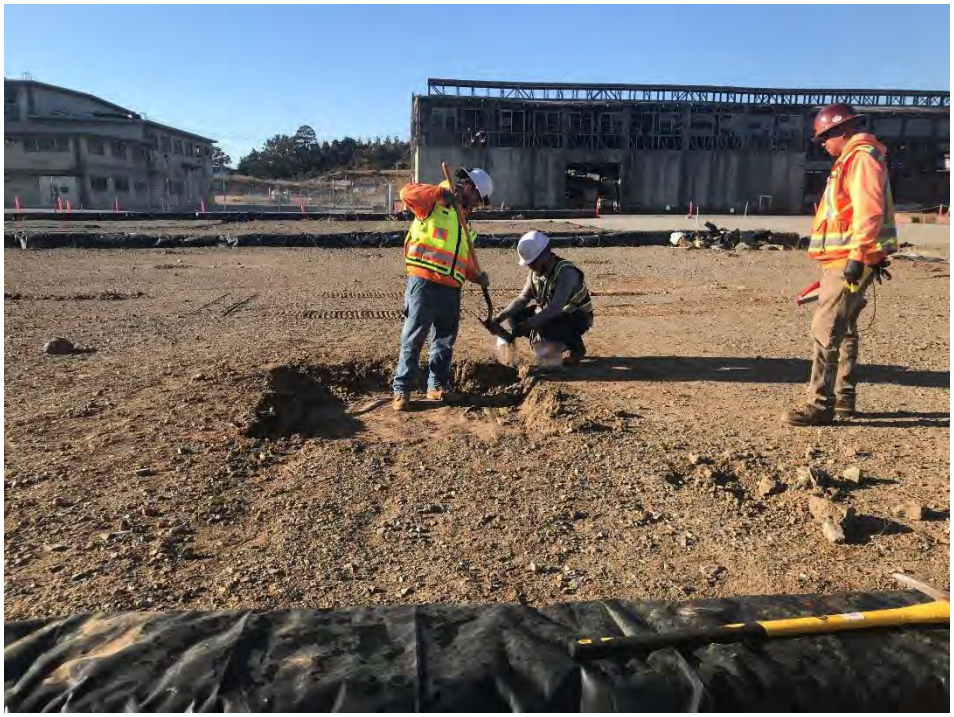


Figure 2 – Soil being transferred from the shovel directly into the sample container (Ziploc bag)

Surveillance Photographs HPNS-QAR-2023-0226 (Continued)

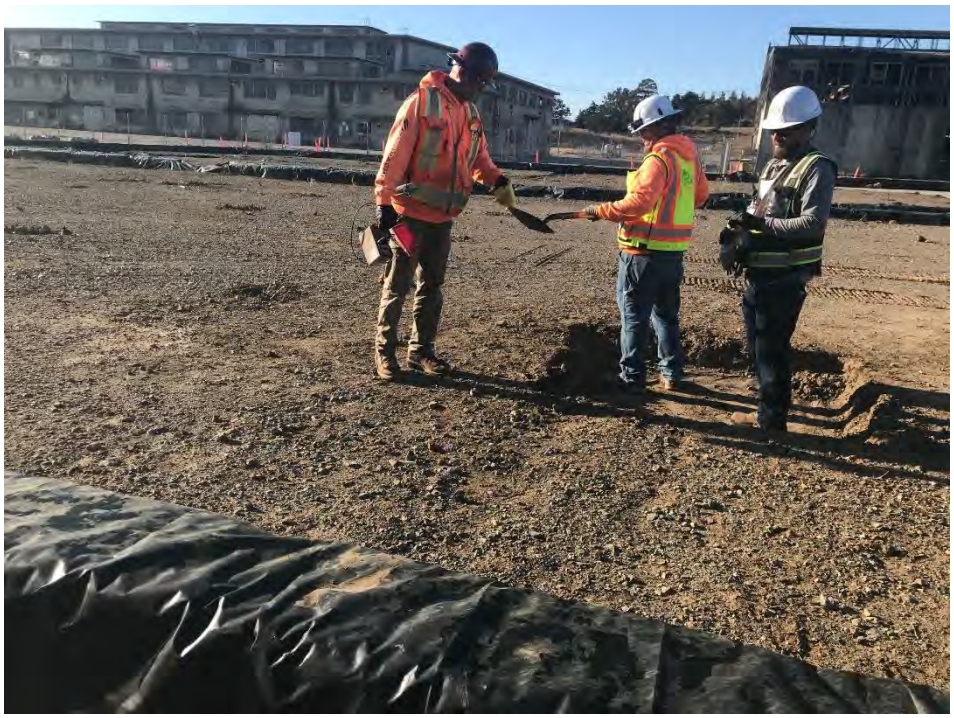


Figure 3 – Shovel being surveyed with Masslinn sheet and Ludlum 2360 w/43-93 instrument

Figure 4 – The outside of the sample containers were also surveyed for surface contamination

Surveillance Photographs HPNS-QAR-2023-0226 (Continued)

Figure 5 – Completed soil samples were double bagged with sample ID labels attached

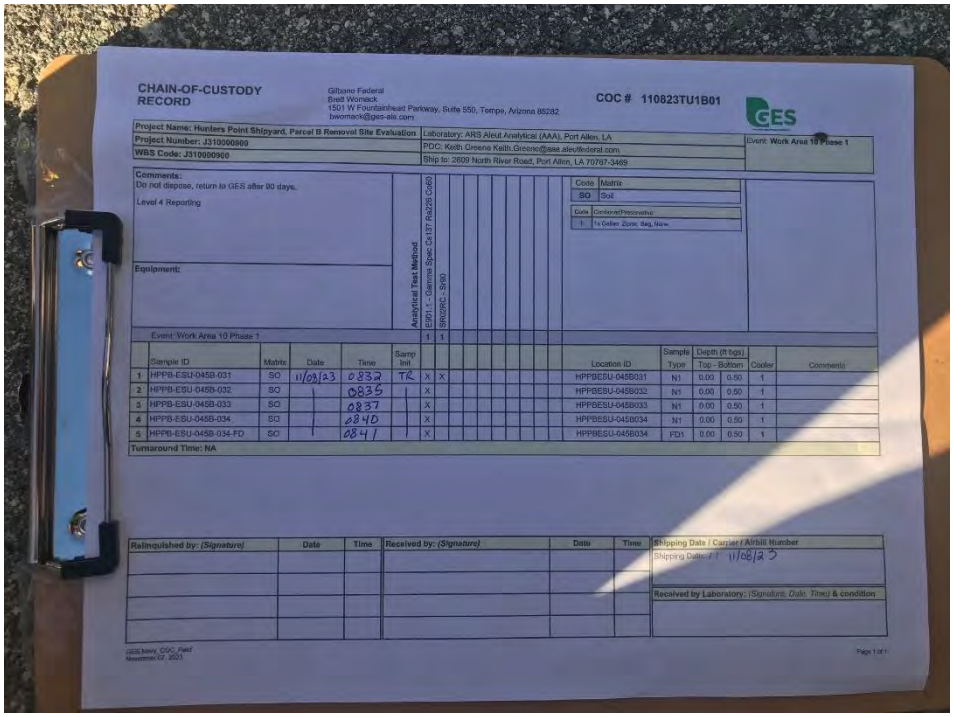


Figure 6 – Chain of custody for the bounding samples

Battelle QA Form - Gilbane Parcel B Phase 1/2 Soil/Materials Sampling

Date/Time:	Date: 11/8/2023 Time: 0830-0850	**QA Inspector:**	M. Chi
Contractor/Survey #:	GES	**Surveillance #**	HPNS-QAS-2023-0226
Equipment surveyed:	N/A	**Work area:**	Parcel B RSY Pad ESU-TU45B

Contractor Requirement	*Comments*	*Yes/No/NA*
Radiation protection personnel are responsible for performing radiological survey and sampling activities under the direction of the Project/Site RSO.	All GES employees performing the soil sampling were rad trained.	Y
Systematic soil samples will be located using Visual Sample Plan (VSP) software (or equivalent). Each TU or SU will be mapped, such that, at a minimum, 25 systematic soil samples will be collected in each TU or SU. A minimum of 3 biased samples will be collected.	**Bounding samples were collected after excavation of soil around the LLRO. A total of 4 bounding and 1 duplicate soil samples collected.**	N/A
Technicians shall don a pair of clean sampling gloves (e.g., Latex, Nitrile).	**New nitrile gloves worn at each sample location.**	Y
Using a new/clean (i.e., disposable or decontaminated) trowel, place the point of the blade on the ground. While holding the handle of the trowel, partially rotate the blade in a clockwise/counter-clockwise motion while pushing downward at an angle until the blade is inserted to the required depth or the blade is nearly covered. Be certain that the trowel is not inserted to a depth where the soil will touch the handle or the sampler's gloved hand.	**Shovel was used to collect the soil samples. The shovel was surveyed with a Masslin sheet and Ludlum 2360 w/43-93 instrument at each sample location to prevent cross-contamination.**	Y
With a prying motion, lift up the trowel with soil on the blade and place soil directly into the appropriate sample container(s) specified in the approved project plans or as provided by the analytical laboratory, or into the stainless steel mixing bowl.	**Soils were homogenized on the ground and then transferred directly to Ziploc bags with the shovel. The Ziploc bags were also surveyed for surface contamination.**	Y
When using a stainless steel mixing bowl, the technician will homogenize the sample media first, then transfer the sample directly into the appropriate sample container(s) specified in the approved project plans or as provided by the analytical laboratory.	**Soils were homogenized on the ground and then transferred directly to Ziploc bags with the shovel. The Ziploc bags were also surveyed for surface contamination.**	Y
Clean off the surface of the sample container; complete the sample label and chain- ofcustody (COC) documentation; attach the label to the jar or tube; place the sample containers in Ziplock® bag or equivalent and place the sample into a sample cooler	**The Ziploc bags were labeled with sample identification stickers. A chain of custody was used and filled properly with sample date/time and ROC analysis.**	Y

References: "Final Parcel B Removal Site Evaluation Workplan" April 2022
Gilbane Standard Operating Procedure PR-TC-02.02.01.01 v2.3, "Surface Soil: Sampling with Trowel or Spoon", 18-Jan-2021

Signature:		**Date:**	11/8/2023

Battelle QA Form - Gilbane Parcel B Phase 1/2 Soil/Materials Sampling

Date/Time:	11/8/2023 0830 - 0850	**QA Inspector:**	M. CHI
Contractor/Survey #:	GES	**Surveillance #**	HPNS-QAS-2023-0226
Equipment surveyed:	N/A	**Work area:**	PARCEL B RSY PAD ESU-TU4SB

Contractor Requirement	*Comments*	*Yes/No/NA*
Radiation protection personnel are responsible for performing radiological survey and sampling activities under the direction of the Project/Site RSO.	ALL GES EMPLOYEES PERFORMING THE SOIL SAMPLING WERE RAD TRAINED.	Y
Systematic soil samples will be located using Visual Sample Plan (VSP) software (or equivalent). Each TU or SU will be mapped, such that, at a minimum, 25 systematic soil samples will be collected in each TU or SU. A minimum of 3 biased samples will be collected.	BOUNDING SAMPLES COLLECTED AFTER EXCAVATION OF SOIL AROUND THE LLRO. 4 BOUNDING AND 1 DUPLICATE SOIL SAMPLES.	N/A
Technicians shall don a pair of clean sampling gloves (e.g., Latex, Nitrile).	NEW NITRILE GLOVES WORN AT EACH SAMPLE LOCATION.	Y
Using a new/clean (i.e., disposable or decontaminated) trowel, place the point of the blade on the ground. While holding the handle of the trowel, partially rotate the blade in a clockwise/counter-clockwise motion while pushing downward at an angle until the blade is inserted to the required depth or the blade is nearly covered. Be certain that the trowel is not inserted to a depth where the soil will touch the handle or the sampler's gloved hand.	SHOVEL USED TO COLLECT THE SOIL SAMPLES. THE SHOVEL WAS SURVEYED WITH A MASSCIN SHEET AND LUDLUM 2360 W/43-93 AT EACH SAMPLE LOCATION TO PREVENT CROSS-CONTAMINATION.	Y
With a prying motion, lift up the trowel with soil on the blade and place soil directly into the appropriate sample container(s) specified in the approved project plans or as provided by the analytical laboratory, or into the stainless steel mixing bowl.	SOILS WERE HOMOGENIZED ON THE GROUND AND THEN TRANSFERRED TO ZIPLOC BAGS WITH A SHOVEL.	Y
When using a stainless steel mixing bowl, the technician will homogenize the sample media first, then transfer the sample directly into the appropriate sample container(s) specified in the approved project plans or as provided by the analytical laboratory.	↓	Y
Clean off the surface of the sample container; complete the sample label and chain- ofcustody (COC) documentation; attach the label to the jar or tube; place the sample containers in Ziplock® bag or equivalent and place the sample into a sample cooler	THE ZIPLOC BAGS WERE LABELED WITH SAMPLE ID STICKERS. COC WAS FILLED PROPERLY AND USED.	Y

References: "Final Parcel B Removal Site Evaluation Workplan" April 2022
Gilbane Standard Operating Procedure PR-TC-02.02.01.01 v2.3, "Surface Soil: Sampling with Trowel or Spoon", 18-Jan-2021

Signature:		**Date:**	11/8/2023

60°F, SUNNY

Quality Assurance Surveillance Report

Surveillance Checklist Number(s) HPNS-QAS-2023-0227 Surveillance Date 11/8/2023

Surveillance Report Number HPNS-QAR-2023-0227 Surveillance Report Generation Date 11/8/2023

Number of Surveillance Photographs Taken 4 Project Name APTIM Basewide

Describe the work event, contractor, site location, date, and weather:

This surveillance observed radiation safety training performed by APTIM. Approximately 20 minutes of APTIM staff time was taken to accommodate this surveillance. The weather was 60°F and sunny.

Describe what was observed:

The Battelle QA team arrived at Parcel C Building 258 to observe a radiation safety training conducted by the APTIM PRSO. Prior to starting the training, the trainees signed the Training Attendance Record that will be maintained onsite (Figure 1). A total of 3 trainees participated in this training. The PowerPoint training covered many topics of radiation safety including fundamentals of ionization radiation, dose limits, dosimetry, radionuclides of concern, emergency procedures, and other pertinent topics (Figures 2 and 3). The APTIM PRSO was very communicative and engaged the trainees throughout the training to ensure effectiveness. Once the training presentation was complete, the trainees were given a written exam requiring a score of 80% or greater to pass. All trainees received a passing score (Figure 4).

All observed aspects of APTIM radiation safety training were in compliance with all approved work documentation.

Describe any contractor deficient conditions observed with reference:

None.

Recommendations, Process Improvements, or Suggestions:

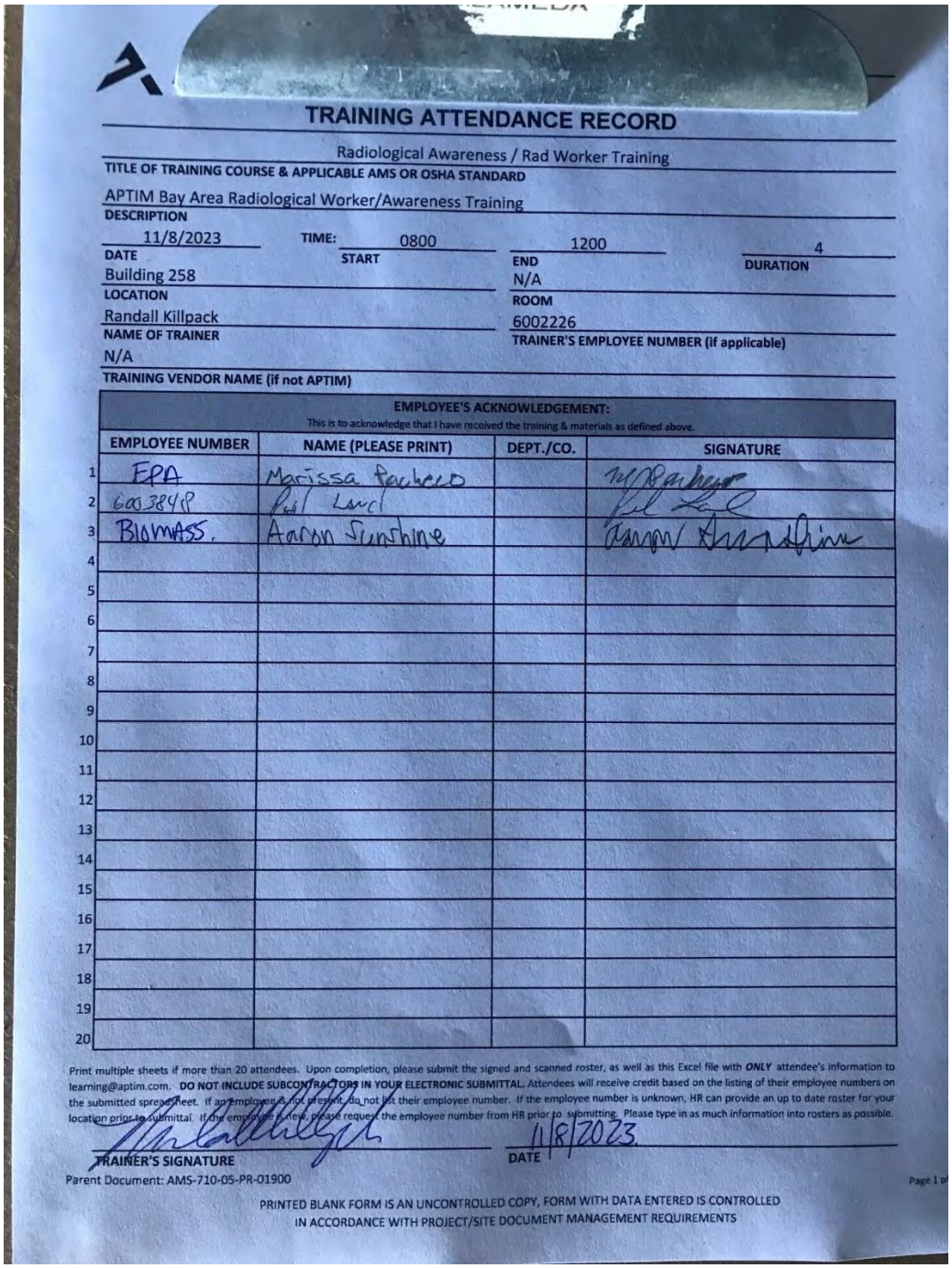
None.

Battelle Project Signatories

X

Battelle Quality Assurance Field Team Member

Surveillance Photographs HPNS-QAR-2023-0227



TRAINING ATTENDANCE RECORD

Radiological Awareness / Rad Worker Training
TITLE OF TRAINING COURSE & APPLICABLE AMS OR OSHA STANDARD

APTIM Bay Area Radiological Worker/Awareness Training
DESCRIPTION

11/8/2023 DATE | TIME: 0800 START | 1200 END | 4 DURATION

Building 258 LOCATION | N/A ROOM

Randall Killpack NAME OF TRAINER | 6002226 TRAINER'S EMPLOYEE NUMBER (if applicable)

N/A
TRAINING VENDOR NAME (if not APTIM)

EMPLOYEE'S ACKNOWLEDGEMENT:
This is to acknowledge that I have received the training & materials as defined above.

	EMPLOYEE NUMBER	NAME (PLEASE PRINT)	DEPT./CO.	SIGNATURE
1	EPA	Marissa Pacheco		
2	6038418	Phil Lord		
3	BIOMASS.	Aaron Sunshine		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Print multiple sheets if more than 20 attendees. Upon completion, please submit the signed and scanned roster, as well as this Excel file with ***ONLY*** attendee's information to learning@aptim.com. **DO NOT INCLUDE SUBCONTRACTORS IN YOUR ELECTRONIC SUBMITTAL.** Attendees will receive credit based on the listing of their employee numbers on the submitted spreadsheet. If an employee is not present, do not list their employee number. If the employee number is unknown, HR can provide an up to date roster for your location prior to submittal. If the employee is new, please request the employee number from HR prior to submitting. Please type in as much information into rosters as possible.

TRAINER'S SIGNATURE | 11/8/2023 DATE

Parent Document: AMS-710-05-PR-01900 Page 1 of

PRINTED BLANK FORM IS AN UNCONTROLLED COPY, FORM WITH DATA ENTERED IS CONTROLLED IN ACCORDANCE WITH PROJECT/SITE DOCUMENT MANAGEMENT REQUIREMENTS

Figure 1 – Training Attendance Record for the Radiation Safety Training

Surveillance Photographs HPNS-QAR-2023-0227 (Continued)

Figure 2 – APTIM PRSO explaining Federal and APTIM radiation dose limits

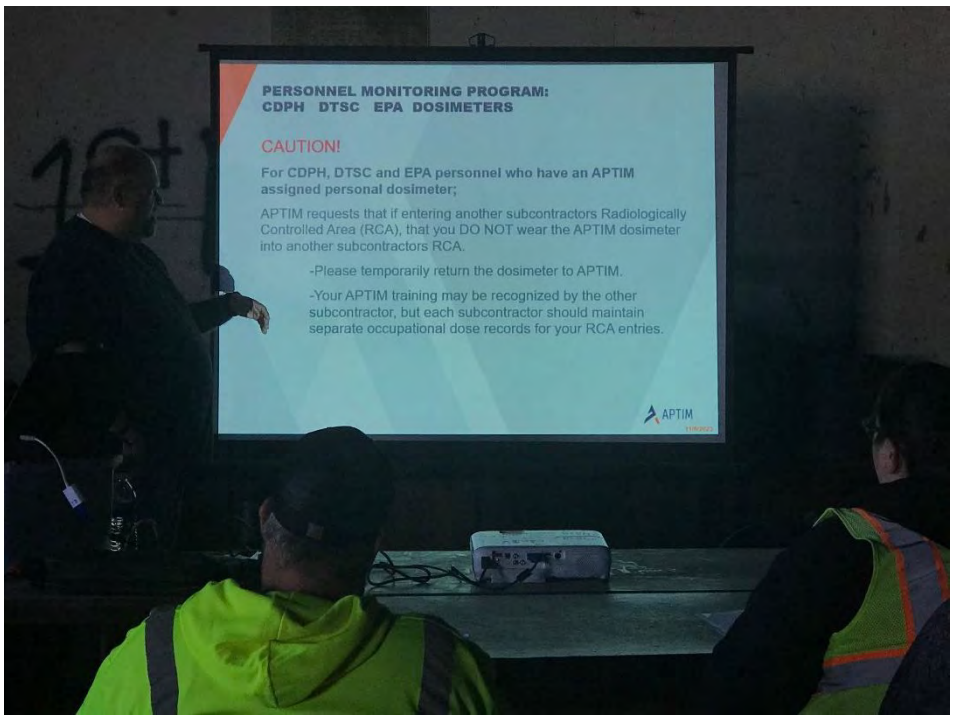
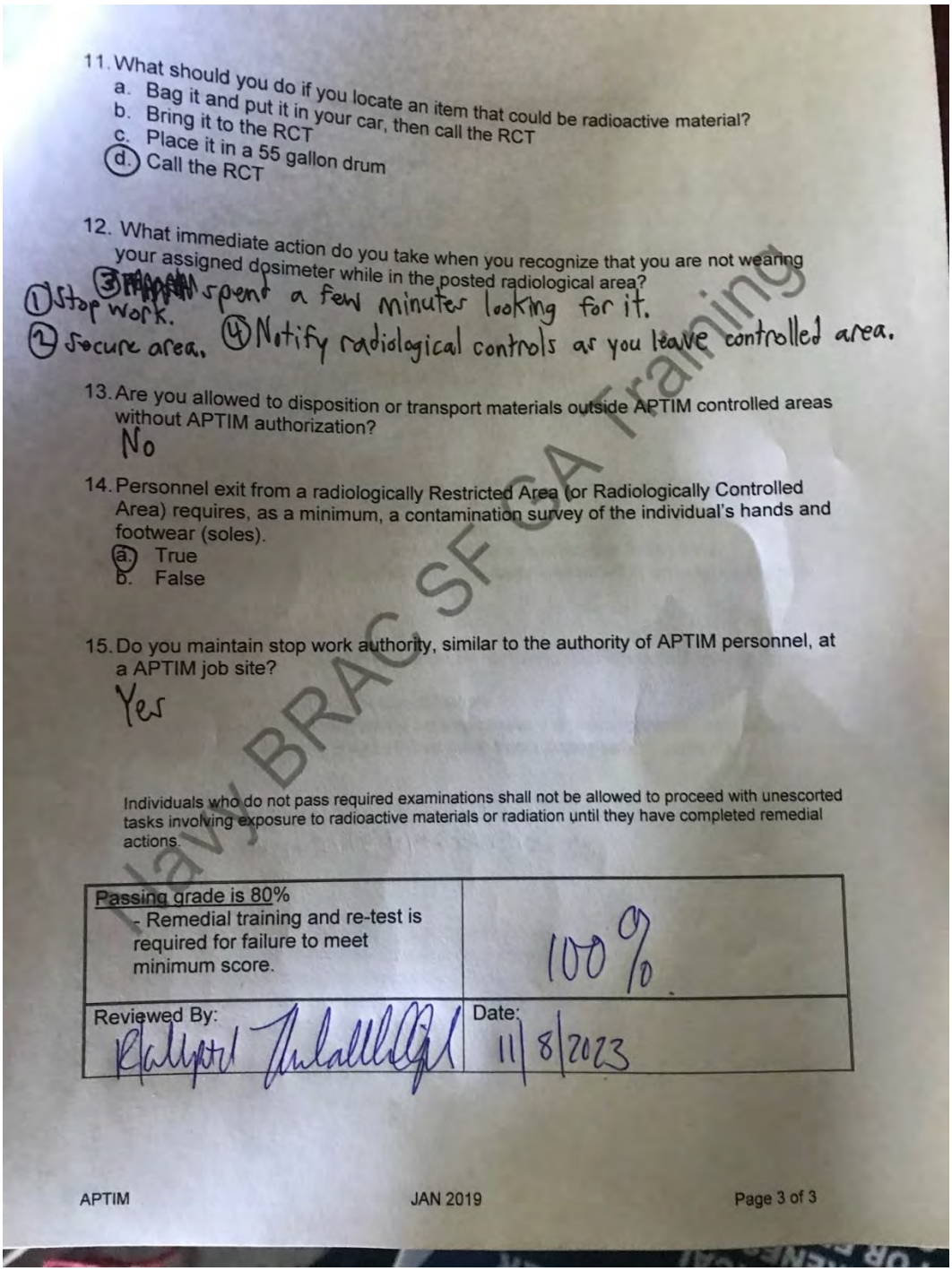


Figure 3 – APTIM PRSO explaining dosimetry for CDPH, DTSC, and EPA personnel

Surveillance Photographs HPNS-QAR-2023-0227 (Continued)



11. What should you do if you locate an item that could be radioactive material?
    a. Bag it and put it in your car, then call the RCT
    b. Bring it to the RCT
    c. Place it in a 55 gallon drum
    (d.) Call the RCT

12. What immediate action do you take when you recognize that you are not wearing your assigned dosimeter while in the posted radiological area?
    ③ spent a few minutes looking for it.
    ① Stop work.
    ② Secure area. ④ Notify radiological controls as you leave controlled area.

13. Are you allowed to disposition or transport materials outside APTIM controlled areas without APTIM authorization?
    No

14. Personnel exit from a radiologically Restricted Area (or Radiologically Controlled Area) requires, as a minimum, a contamination survey of the individual's hands and footwear (soles).
    (a.) True
    b. False

15. Do you maintain stop work authority, similar to the authority of APTIM personnel, at a APTIM job site?
    Yes

Individuals who do not pass required examinations shall not be allowed to proceed with unescorted tasks involving exposure to radioactive materials or radiation until they have completed remedial actions.

Passing grade is 80% - Remedial training and re-test is required for failure to meet minimum score.	100%
Reviewed By: [signature]	Date: 11/8/2023

APTIM JAN 2019 Page 3 of 3

Navy BRAC SF QA Training

Figure 4 – Completed examination with a passing score of 100%

Battelle QA Form - APTIM Radiation Safety Training

Date/Time:	Date: 11/8/2023 Time: 0900-1045	**QA Inspector:**	M. Chi
Contractor/Survey #:	APTIM	**Surveillance #**	HPNS-QAS-2023-0227
Equipment surveyed:	N/A	**Work area:**	Parcel C Building 258

Requirement	*Comments*	*Yes/No/NA*
Radiation safety training shall be provided to all individuals before being allowed unescorted access to radiologically restricted areas or being occupationally exposed to ionizing radiation , whether escorted or not (10 CFR 19.12 and 10 CFR 835.901(a)).	**Radiation safety training was provided to 2 contractors and an APTIM employee due to performing work within APTIM RCAs.**	Y
All project personnel designated as radiation workers shall be qualified or trained as radiation workers prior to beginning work in radiologically restricted areas. Those personnel qualified as radiation workers shall re-qualify on a yearly basis.	**None.**	Y
Sr. RCT's shall be qualified if they meet the requirements of one or more of the following categories: **• Verifiable evidence of training, experience, or combination of training and experience consistent with the requirements of American National Standards Institute/American Nuclear Society, Selection, Qualification, and Training of Personnel for Nuclear Power Plants (reaffirmed 1999) for senior health physics technicians** **• National certification with The National Registry of Radiation Protection Technologists** **• Certification as a DOE radiological control technician consistent with the requirements of 10 CFR 835, Section 835.103** **• Evidence of NAVSHIPS 389-0288, Radiological Control for Shipyards or NAVSEA 389-0153, Radiological Control, Article 108, Qualification** **• Two-Year Technical Degree in Health Physics or related field**	**No trainee during this radiation safety training was qualifying as a senior RCT.**	N/A
Training shall be conducted by a qualified individual approved by the DRS, such as a person who meets the qualifications of the radiation safety officer or authorized user (or a knowledgeable radiation protection staff person designated by the radiation safety officer) and who is familiar with the radiation safety program.	**Training was conducted by the APTIM PRSO, Mr. Randall Killpack.**	Y
All training shall be documented by a written test over the instructed topics with a score of 80% or greater	**Written test was required and completed by the trainees. Only personnel with a score of 80% or greater passed the radiation safety training.**	Y

References: Final Radiation Protection Plan, Radiological Work Tasks, Remedial Action and Maintenance of Remedies at HPNS, Oct 2017

Procedures: APTIM Procedure AMS-710-07-WI-04005 "Radiation Safety Training", 7/30/2017

Signature:		**Date:**	11/8/2023

Battelle QA Form - APTIM Radiation Safety Training

Date/Time:	11/8/2023 0900-1045	**QA Inspector:**	M. CHI
Contractor/Survey #:	APTIM	**Surveillance #**	HPNS-QAS-2023-0227
Equipment surveyed:	N/A	**Work area:**	PARCEL C BLDG 258

Requirement	*Comments*	*Yes/No/NA*
Radiation safety training shall be provided to all individuals before being allowed unescorted access to radiologically restricted areas or being occupationally exposed to ionizing radiation , whether escorted or not (10 CFR 19.12 and 10 CFR 835.901(a)).	RADIATION SAFETY TRAINING PROVIDED TO CONTRACTORS AND APTIM EMPLOYEE ENTERING APTIM RCA'S.	Y
All project personnel designated as radiation workers shall be qualified or trained as radiation workers prior to beginning work in radiologically restricted areas. Those personnel qualified as radiation workers shall re-qualify on a yearly basis.	NONE.	Y
Sr. RCT's shall be qualified if they meet the requirements of one or more of the following categories: **•Verifiable evidence of training, experience, or combination of training and experience consistent with the requirements of American National Standards Institute/American Nuclear Society, Selection, Qualification, and Training of Personnel for Nuclear Power Plants (reaffirmed 1999) for senior health physics technicians** **•National certification with The National Registry of Radiation Protection Technologists** **•Certification as a DOE radiological control technician consistent with the requirements of 10 CFR 835, Section 835.103** **•Evidence of NAVSHIPS 389-0288, Radiological Control for Shipyards or NAVSEA 389-0153, Radiological Control, Article 108, Qualification** **•Two-Year Technical Degree in Health Physics or related field**	NO TRAINEE QUALIFYING AS A SENIOR RCT.	N/A
Training shall be conducted by a qualified individual approved by the DRS, such as a person who meets the qualifications of the radiation safety officer or authorized user (or a knowledgeable radiation protection staff person designated by the radiation safety officer) and who is familiar with the radiation safety program.	TRAINING WAS CONDUCTED BY THE PRSO, RANDALL KILLPACK.	Y
All training shall be documented by a written test over the instructed topics with a score of 80% or greater	WRITTEN TEST WAS REQUIRED AND ONLY PASSED IF THE SCORE WAS 80% OR GREATER.	Y

References: Final Radiation Protection Plan, Radiological Work Tasks, Remedial Action and Maintenance of Remedies at HPNS, Oct 2017
Procedures: APTIM Procedure AMS-710-07-WI-04005 "Radiation Safety Training", 7/30/2017

Signature:		**Date:**	11/8/2023

60°F, SUNNY

Quality Assurance Surveillance Report

Surveillance Checklist Number(s) HPNS-QAS-2023-0228 Surveillance Date 11/9/2023

Surveillance Report Number HPNS-QAR-2023-0228 Surveillance Report Generation Date 11/9/2023

Number of Surveillance Photographs Taken 4 Project Name APTIM Parcel E Phase 1/2

Describe the work event, contractor, site location, date, and weather:

This surveillance observed a debris survey performed by APTIM. Approximately 20 minutes of APTIM staff time was taken to accommodate this surveillance. The weather was 59°F and sunny.

Describe what was observed:

The Battelle QA team arrived at Parcel E EOS-1 to observe a debris survey on debris cell SU-WOOD-60. The debris consisted mainly of wood accumulated over the course of the project. The gamma walkover survey of the debris cell was completed prior to this surveillance. The HPT first performed the 2-minute alpha/beta static measurement with the Ludlum 2360 w/43-93 instrument (Figure 1) and then collected a swipe sample at the associated static location (Figure 2). The Ludlum instrument was verified to be used within the annual calibration window (Figure 3). A total of 20 static measurements and 20 swipe samples were collected and recorded on the survey document (Figure 4). The swipe sample results will be filled into the survey document once they have been counted with a Ludlum 3030 later.

All observed aspects of APTIM debris survey were in compliance with all approved work documentation.

Describe any contractor deficient conditions observed with reference:

None.

Recommendations, Process Improvements, or Suggestions:

None.

Battelle Project Signatories

X

Battelle Quality Assurance Field Team Member

Surveillance Photographs HPNS-QAR-2023-0228

Figure 1 – 2-minute alpha/beta static measurement in progress

Figure 2 – HPT collecting a swipe sample at an associated static location

Surveillance Photographs HPNS-QAR-2023-0228 (Continued)

Figure 3 – Ludlum 2360, serial #268442, calibration due date 11/18/2023

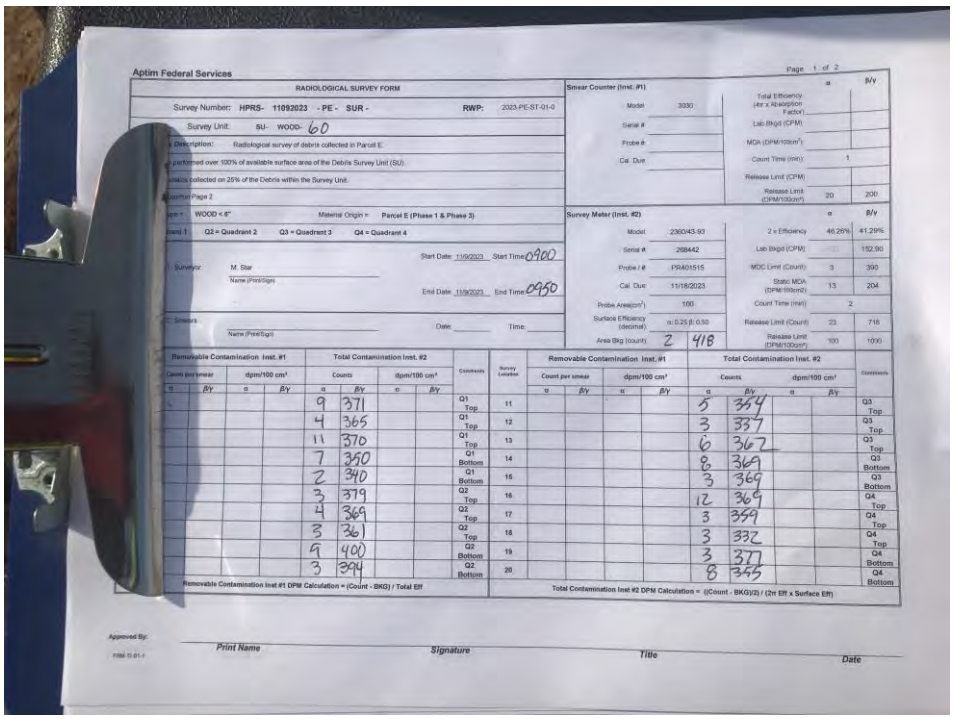


Figure 4 – Survey document with static measurements recorded (incomplete)

Battelle QA Form - APTIM Parcel E Phases 1/3 Radiation and Contamination Surveys

Date/Time:	Date: 11/9/2023 Time: 0900-0950	**QA Inspector:**	M. Chi
Contractor/Survey #:	APTIM	**Surveillance #**	HPNS-QAS-2023-0228
Equipment surveyed:	N/A	**Work area:**	Parcel E Debris cell SU-WOOD-60

Requirement	*Comments*	*Yes/No/NA*
Contractor staff performing surveys must be trained and qualified per CMS-710-WI-04005, radiation safety training	**The HPT performing the debris survey was rad trained.**	Y
The contractor ensures that a daily function test has been performed on any given instrument used and that the instrument is being used within it's calibration window	**The daily function test was completed satisfactorily. The instrument was used within the annual calibration window.**	Y
The contractor radiological control technician has reviewed and signed the appropriate radiological work permit (RWP) for the survey	**RWP# 2023-PE-ST-01-0.**	Y
Contractor staff are observed wearing the appropriate PPE in accordance with the RPP and RWP	**PPE included Mod D, TLD, and nitrile gloves.**	Y
Contractor collected radiological background observations will be collected in an area representative of the area to be surveyed, but unlikely to be radiologically contaminated. Background data shall be entered on the survey report	**The background measurement was recorded on the survey document.**	Y
The contractor collects general area exposure rate measurements at waist height and records the observation on a survey report	**Exposure rate measurements were not collected.**	N/A
Contractor radiological control technicians collect and record exposure rate measurements at a distance of 30 cm from known sources of radiation or surfaces of interest to evaluate potenial whole body exposures and posting requirements	**Exposure rate measurements were not collected.**	N/A
Contact exposure rate surveys should be collected at 1/2 inch from the surface being investigated and documented on the survey report	**Exposure rate measurements were not collected.**	N/A
Contractor RCT's will survey for direct alpha/beta contamination, prior to collecting swipe samples	**None.**	Y
The contract RCT's performs scans at a predetermined rate as specified in project specific work plans	**Scan survey was not performed.**	N/A
While performing the scan, the RCT will observe the count rate audibly and visably (optional) If an audible or visual increase above background is observed, the location should be considered as an area of potential elevated activity and documented on the survey report	**Scan survey was not performed.**	N/A
The contractor records results for each 1 square meter area in cpm	**Scan survey was not performed.**	N/A
Static surveys will be performed at all areas of elevated activity (hot spots) and documented on the survey report in cpm	**20 2-minute alpha/beta static measurements were collected.**	N/A
The contractor RCT collects a background at the end of the survey to verify that the the instrument probe is not contaminated	**Will be performed during the next daily response check.**	Y
Swipe samples will be collected by smearing the swipe sample with moderate pressure in an "S" shaped pattern over 100 square centemeters	**None.**	Y
The locations of swipe samples must be identifiable prior to swipe collection. Swipe samples will be numbered accordingly	**Swipe samples collected at the associated alpha/beta static locations.**	Y
The contractor field counts swipe samples collected from within contamination or high contamination areas with a direct survey instrument	**Not required.**	N/A
The contractor contains swipe samples so that cross contamination is prevented.	**Swipe samples were contained in individual envelopes.**	Y

References: "Final Radiation Protection Plan Parcel E Remedial Action-Phase 1 and Phase 3" December 2018
APTIM work Instruction AMS-710-07-WI-40121 "Performing and Documenting Radiation And Contamination Survey" July 30, 2019

Signature:		**Date:**	11/9/2023

Battelle QA Form - APTIM Parcel E Phases 1/3 Radiation and Contamination Surveys

Date/Time:	11/9/2023 0900 - 0950	**QA Inspector:**	M. CHI
Contractor/Survey #:	APTIM	**Surveillance #**	HPNS-QAS-2023-0228
Equipment surveyed:	N/A	**Work area:**	PARCEL E SU-WOOD-60

Requirement	Comments	Yes/No/NA
Contractor staff performing surveys must be trained and qualified per CMS-710-WI-04005, radiation safety training	THE HPT WAS RAD TRAINED.	Y
The contractor ensures that a daily function test has been performed on any given instrument used and that the instrument is being used within it's calibration window	DAILY FUNCTION TEST COMPLETED SATISFACTORILY. INSTRUMENT USED WITHIN THE CALIBRATION WINDOW.	Y
The contractor radiological control technician has reviewed and signed the appropriate radiological work permit (RWP) for the survey	RWP # 2023-PE-ST-01-0.	Y
Contractor staff are observed wearing the appropriate PPE in accordance with the RPP and RWP	PPE INCLUDED MOD D, TLD, AND NITRILE GLOVES.	Y
Contractor collected radiological background observations will be collected in an area representative of the area to be surveyed, but unlikely to be radiologically contaminated. Background data shall be entered on the survey report	BACKGROUND WAS RECORDED ON THE SURVEY DOCUMENT.	Y
The contractor collects general area exposure rate measurements at waist height and records the observation on a survey report	EXPOSURE RATE MEASUREMENTS NOT COLLECTED.	N/A
Contractor radiological control technicians collect and record exposure rate measurements at a distance of 30 cm from known sources of radiation or surfaces of interest to evaluate potenial whole body exposures and posting requirements	↓	N/A
Contact exposure rate surveys should be collected at 1/2 inch from the surface being investigated and documented on the survey report	↓	N/A
Contractor RCT's will survey for direct alpha/beta contamination, prior to collecting swipe samples	NONE.	Y
The contract RCT's performs scans at a predetermined rate as specified in project specific work plans	SCAN SURVEY NOT PERFORMED.	N/A
While performing the scan, the RCT will observe the count rate audibly and visably (optional) If an audible or visual increase above background is observed, the location should be considered as an area of potential elevated activity and documented on the survey report	↓	N/A
The contractor records results for each 1 square meter area in cpm	↓	N/A
Static surveys will be performed at all areas of elevated activity (hot spots) and documented on the survey report in cpm	20 2-MINUTE STATIC MEASUREMENTS COLLECTED.	N/A
The contractor RCT collects a background at the end of the survey to verify that the the instrument probe is not contaminated	PERFORMED DURING THE NEXT DAILY RESPONSE CHECK.	Y
Swipe samples will be collected by smearing the swipe sample with moderate pressure in an "S" shaped pattern over 100 square centemeters	NONE	Y
The locations of swipe samples must be identifiable prior to swipe collection. Swipe samples will be numbered accordingly	COLLECTED AT THE ASSOCIATED STATIC LOCATIONS.	Y
The contractor field counts swipe samples collected from within contamination or high contamination areas with a direct survey instrument	NOT REQUIRED.	N/A
The contractor contains swipe samples so that cross contamination is prevented.	CONTAINED IN INDIVIDUAL ENVELOPES.	Y

References: "Final Radiation Protection Plan Parcel E Remedial Action-Phase 1 and Phase 3" December 2018
APTIM work Instruction AMS-710-07-WI-40121 "Performing and Documenting Radiation And Contamination Survey" July 30, 2019

59°F, SUNNY

Signature:		**Date:**	11/9/2023

APPENDIX F
HPNS PARCEL B RADIOLOGICAL OBJECT LABORATORY ANALYSIS SUMMARY

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Laboratory Analysis Summary – HPNS Parcel B Radioactive Object

Project Name: Parcel B Rad Sampling
Job Location: Hunters Point Shipyard, Parcel B Removal Site Evaluation
Job Number: J310000900

Description: small piece of glass approximately 3/16" in size

Analytical Laboratory: ARS Aleut Analytical, LLC (Port Allen, LA)
CA ELAP Cert # 3085
DoD NELAP Cert # ADE-1489
SDG ID: ARS1-23-02721-001
COC Number: 110623TU1B01 (attached)

Analytical Method: Ag-108m, Ag-110m, Am-241, As-73, As-74, As-76, Au-196, Au-198, Ba-133, Ba-140, Be-7, Bi-207, Bi-211, Bi-212, Bi-214, Cd-109, Ce-139, Ce-141, Ce-144, Co-57, Co-58, Co-60, Cr-51, Cs-134, Cs-136, Cs-137, Eu-152, Eu-154, Eu-155, Fe-59, Gd-153, Hf-181, Hg-203, I-129, I-131, Ir-192, K-40, Lu-177, Mn-54, Mo-99, Na-22, Nb-94, Nb-95, Nd-147, Pa-234, Pb-210, Pb-212, Pb-214, Ra-223, Ra-224, Ra-226, Ra-228, Rb-83, Rb-86, Ru-103, Ru/Rh106, Sb-122, Sb-124, Sb-125, Sb-126, Sc-46, Se-72, Se-75, Sn-113, Sr-85, Ta-182, Tb-160, Te-132, Th-227, Th-228, Th-231, Th-234, Tl-208, Tl-210, U-235, U-238, Xe-131m, Xe-133m, Y-88, Y-91, Yb-175, Zn-65, and Zr-95 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)*".

Analytical Notes: Sample was not prepared in a standard gamma geometry due to sample matrix. Sample analyzed based on size and weight of closest calibrated gamma geometry (47 mm Petri Dish). Gamma spectroscopy was performed utilizing high purity germanium (HPGe) detectors. Gamma activity is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Ra-228 is determined via secular equilibrium with its daughter, Ac-228. A 21-day ingrowth period to achieve secular equilibrium between Ra-226 and progeny was not requested and not performed. Count time was 1800 seconds.

Analytical Results: See attached gamma spectroscopy (raw data) print-out.

CHAIN-OF-CUSTODY RECORD

Gilbane Federal
Brett Womack
1501 W Fountainhead Parkway, Suite 550, Tempe, Arizona 85282
bwomack@ges-ais.com

COC # 110623TU1B01

Project: Hunters Point Shipyard, Parcel B Removal Site Evaluation	**Laboratory:** ARS Aleut Analytical (AAA), Port Allen, LA
Project Number: J310000900	**Point of Contact:** Keith Greene Keith.Greene@aaa.aleutfederal.com
WBS Code: J310000900	**Ship to:** 2609 North River Road, Port Allen, LA 70767-3469

Comments: **240 UR/HR - Contact**

7UR/HR @ 30CM

169,728 CPM

Level 2 Reporting. Only hard-copy required.

Equipment:

Analytical Test Method

	Sample ID	Matrix	Date	Time	Samp Init.	E901.1 - Gamma Spec - Full Library										Location ID	Sample Type	Depth (ft bgs) Top	Depth (ft bgs) Bottom
	Work Area 10 Phase 1																		
1	HPPB-ESU-045B-RO1		11-06-2023	1340		X													
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
Cooler:		**Turn Around Time:**																	

Relinquished by: *(Signature)*	**Date**	**Time**
[signature]	12/4/23	12:00

Received by: *(Signature)*	**Date**	**Time**
FED EX	12/4/23	1200
[signature]	12-5-23	10:15

Shipping Date / Carrier / Airbill Number

12/4/23 FED EX
7874 2323 3949

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

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Sample description
Batch ID: 23-02301-04
SDG ID: ARS1-23-02721-001 Tech: SDW

Spectrum Filename: C:\User\ARS03758.An1

Acquisition information
Start time: 12/8/2023 11:23:29 AM
Live time: 1800
Real time: 1924
Dead time: 6.45 %
Detector ID: 17

Detector system
(ARS03) MCB 129

Calibration
Filename: 2079-79-5 47mm petri cal 10-23-19.Clb
47mm petri 2079-79-5
10-23-19 EEC

Energy Calibration
Created: 10/23/2019 11:01:45 AM
Zero offset: 0.235 keV
Gain: 0.250 keV/channel
Quadratic: -1.993E-08 keV/channel^2

Efficiency Calibration
Created: 10/23/2019 12:11:47 PM
Knee Energy: 120.00 keV
Above the Knee: Quadratic Uncertainty = 0.67 %
Log(Eff): -2.756568E-01 + (2.252623E-02*Log(E)) + (-7.130618E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.41 %
Log(Eff): -6.057696E+00 + (2.088530E+00*Log(E)) + (-2.498329E-01*Log(E)^2)

Library Files
Main analysis library: DOE.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G800W064
Start channel: 10 (2.73keV)
Stop channel: 8000 (1996.46keV)
Peak rejection level: 40.000%
Peak search sensitivity: 1
Sample Size: 1.3600E+01 +/- 0.000E+00%
Activity scaling factor: 1.0000E+06/(1.0000E+00* 1.3600E+01) = 7.3529E+04
Detection limit method: Reg. Guide 4.16 Method

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	11/6/2023 1:40:00 PM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	DOE.Pbc 11/17/2023 8:20:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 0.00E+00 %
Energy Calibration
Normalized diff: 0.0689

***** 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
32.14	1948.	9.98	1.08	1.622E-01	32.84	17.800	7.434E+01	Ba133
36.72	1209.	15.90	0.99	1.693E-01				
46.62	54272.	0.62	0.86	1.788E-01	46.00	59.000	7.677E+03	SE72
					46.00	11.200	4.075E+03	TB160
					46.54	4.250	7.906E+03	PB210
					47.00	18.000	2.037E+03	GD153
53.32	13462.	1.83	0.88	1.821E-01	52.97	1.044	1.533E+06	YB175
					53.44	10.000	1.075E+03	AS73
					54.07	1.933	8.264E+05	YB175
					54.07	2.870	7.668E+04	LU177
67.33	635.	35.77	1.28	1.840E-01	66.83	44.000	3.096E+02	AU196
					67.75	41.300	1.118E+01	TA182
72.80	2665.	35.99	0.89	1.835E-01	72.80	23.000	PBC<MDA	BI207
74.88	86656.	0.43	0.89	1.832E-01	74.97	38.600	1.356E+03	BI207
					75.70	15.000	1.246E+05	AU196
77.16	151445.	0.30	0.90	1.827E-01	77.80	4.000	8.185E+05	AU196
79.36	11017.	2.33	0.90	1.823E-01	80.12	1.600	4.513E+03	CE144
81.15	831.	24.19	0.90	1.819E-01				
83.82	3170.	5.93	0.90	1.812E-01	84.20	6.400	3.020E+02	Th231
					84.40	1.190	1.677E+03	TH228
87.21	44658.	0.66	0.90	1.802E-01	86.45	32.740	8.449E+02	EU155
					86.80	13.400	2.773E+03	TB160

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					88.04	3.790	7.590E+03	CD109
89.93	17342.	1.28	0.91	1.794E-01				
92.48	577.	26.13	0.91	1.785E-01	92.38	2.570	PBC<MDA	U238
					92.60	5.410	6.599E+01	Th234
					92.80	3.000	PBC<MDA	U238
94.75	1050.	14.46	0.91	1.778E-01	94.67	15.500	HL>Cutoff	PA234
127.78	492.	30.02	0.94	1.581E-01				
130.45	474.	32.16	0.94	1.560E-01	131.28	20.000	HL>Cutoff	PA234
186.22	38409.	0.78	0.98	1.217E-01	186.21	3.590	9.701E+03	RA226
196.03	425.	39.44	0.77	1.172E-01				
241.92	60643.	0.52	1.04	1.002E-01	240.99	4.100	6.836E+06	RA224
					241.99	7.251	9.213E+03	PB214
258.74	3831.	4.45	1.16	9.523E-02				
274.46	2815.	5.45	1.26	9.098E-02	273.65	12.700	1.475E+03	CS136
					275.40	1.000	2.530E+04	ND147
281.30	347.	33.15	0.48	8.929E-02				
295.08	132467.	0.31	1.10	8.595E-02	295.22	18.420	9.240E+03	PB214
					296.00	79.000	2.159E+03	TL210
313.91	454.	26.88	1.12	8.186E-02				
349.01	1122.	11.74	1.13	7.515E-02				
351.80	215198.	0.22	1.14	7.466E-02	351.07	12.940	2.455E+04	Bi211
					351.93	35.600	8.941E+03	PB214
386.80	1197.	9.75	1.16	6.909E-02				
388.79	1686.	7.03	1.17	6.879E-02				
405.60	580.	23.93	0.90	6.639E-02				
419.99	402.	28.16	1.19	6.450E-02				
423.99	640.	17.18	1.20	6.399E-02	423.69	2.660	2.339E+03	BA140
428.24	597.	17.84	1.20	6.345E-02	427.89	29.440	3.606E+01	SB125
431.97	287.	32.10	1.20	6.299E-02				
454.66	1144.	10.57	1.05	6.032E-02				
461.63	824.	13.54	1.36	5.954E-02				
469.74	620.	14.75	1.23	5.865E-02				
474.47	436.	20.30	1.24	5.815E-02				
480.35	1664.	7.59	1.11	5.755E-02				
487.15	1569.	7.92	1.30	5.687E-02	487.02	45.500	HL>Cutoff	LA140
501.70	266.	27.93	0.65	5.544E-02				
510.75	1327.	12.48	3.32	5.458E-02	510.77	22.600	1.138E+02	TL208
533.51	833.	12.51	1.21	5.255E-02				
543.38	322.	31.60	1.73	5.171E-02				
580.09	1233.	8.58	1.40	4.881E-02				
604.39	199.	33.49	1.34	4.708E-02	604.72	97.600	4.921E+00	CS134
609.32	144821.	0.27	1.35	4.674E-02	609.32	4.549	7.520E+04	BI214
665.50	3934.	3.55	1.39	4.318E-02	666.20	99.660	5.926E+02	SB126
703.25	1283.	7.77	1.48	4.107E-02	702.50	100.000	3.446E+01	NB94
719.86	847.	10.85	1.35	4.020E-02	720.40	57.000	2.395E+02	SB126
742.35	504.	17.67	1.71	3.908E-02				
752.59	380.	22.60	2.42	3.858E-02	751.79	4.190	HL>Cutoff	LA140
768.37	12669.	1.36	1.52	3.786E-02	768.36	4.894	7.549E+03	BI214

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.91	3162.	4.16	1.50	3.707E-02	785.42	1.102	8.537E+03	BI212
806.19	2900.	3.86	1.47	3.620E-02				
821.02	344.	22.13	1.52	3.558E-02				
826.71	226.	32.92	1.52	3.535E-02				
839.04	1900.	5.88	1.51	3.488E-02				
904.17	228.	34.76	1.58	3.250E-02				
908.47	182.	37.51	1.58	3.236E-02				
934.06	6611.	2.04	1.49	3.151E-02	934.06	3.107	7.454E+03	BI214
964.23	742.	13.39	0.85	3.057E-02	964.00	14.580	1.847E+02	EU152
					964.60	5.452	4.972E+02	Ra228
1051.80	818.	12.11	1.61	2.812E-02	1050.36	1.530	2.224E+03	RU/RH1
					1050.36	1.530	2.224E+03	RU106
1069.65	559.	16.54	1.40	2.766E-02				
1104.40	378.	24.28	2.82	2.681E-02				
1120.31	29112.	0.71	1.69	2.644E-02	1120.29	14.797	8.215E+03	BI214
					1120.52	99.990	1.583E+03	SC46
					1121.28	35.000	4.213E+03	TA182
1133.70	426.	16.58	1.38	2.613E-02				
1155.20	3420.	3.06	1.74	2.566E-02				
1182.00	487.	18.28	2.30	2.508E-02				
1207.43	778.	11.22	2.04	2.456E-02				
1238.13	10550.	1.38	1.79	2.396E-02	1238.12	5.830	8.339E+03	BI214
1253.32	758.	12.69	3.11	2.368E-02				
1275.17	231.	26.11	1.85	2.327E-02	1274.54	99.940	1.120E+01	NA22
1281.03	2402.	3.22	1.85	2.316E-02				
1303.49	241.	30.56	1.62	2.277E-02				
1311.59	212.	26.14	1.87	2.262E-02				
1317.15	266.	21.08	1.88	2.253E-02	1316.00	21.000	6.202E+01	TL210
1377.65	8247.	1.29	1.92	2.153E-02	1377.67	3.990	1.060E+04	BI214
1385.40	1496.	4.57	1.92	2.141E-02	1384.30	24.285	3.467E+02	AG110M
1401.49	2281.	3.34	1.93	2.116E-02				
1407.99	3968.	2.13	1.94	2.106E-02	1408.08	21.210	9.855E+02	EU152
1415.19	286.	20.84	1.94	2.095E-02				
1436.64	174.	29.19	1.96	2.064E-02				
1443.23	157.	36.38	1.96	2.054E-02				
1509.13	3707.	3.45	1.98	1.963E-02				
1538.53	785.	8.30	2.02	1.925E-02				
1543.33	1162.	5.59	2.03	1.918E-02				
1576.08	174.	24.28	2.05	1.877E-02				
1583.25	1227.	4.91	2.05	1.869E-02				
1587.92	237.	21.71	2.05	1.863E-02				
1594.29	627.	8.41	2.06	1.855E-02	1596.21	95.400	HL>Cutoff	LA140
1599.12	650.	8.26	2.06	1.849E-02				
1607.02	357.	13.56	2.07	1.840E-02				
1611.87	221.	21.52	2.07	1.834E-02				
1616.40	195.	21.29	2.07	1.829E-02				
1661.28	1758.	5.45	2.16	1.779E-02				
1683.81	378.	12.99	2.08	1.754E-02				

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1693.10	606.	11.36	3.01	1.744E-02	1691.04	50.000	1.107E+02	SB124
1729.49	6292.	1.51	2.01	1.705E-02				
1764.41	24614.	0.70	2.13	1.670E-02	1764.49	15.357	1.059E+04	BI214
1838.39	523.	6.78	2.21	1.600E-02				
1847.34	3649.	1.84	2.21	1.592E-02				
1872.81	399.	15.29	2.33	1.569E-02				
1889.95	298.	11.78	2.24	1.554E-02				
1896.64	215.	16.28	2.24	1.549E-02				
1923.07	123.	34.80	0.50	1.526E-02				
1935.83	358.	15.35	2.76	1.516E-02				
1953.15	59.	39.73	1.55	1.501E-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	
127.77	32.14	15574.	1948.	1.201E+04	19.95	1.080	XE-138	sM
146.13	36.67	15536.	1209.	7.140E+03	31.80	0.989	XE-138	M
298.94	74.89	26468.	86646.	4.731E+05	0.86	0.893	TH-234	D
308.10	77.17	29005.	151452.	8.288E+05	0.60	0.895	PB-212	D
316.90	79.37	27391.	11021.	6.046E+04	4.66	0.897	BI-212	sD
324.04	81.15	19777.	833.	4.579E+03	48.26	0.899	AU-196	sD
334.76	83.83	16077.	3169.	1.749E+04	11.86	0.901	HG-203	D
348.31	87.21	28148.	42351.	2.350E+05	1.48	0.904	PB-212	sD
359.24	89.94	16132.	17334.	9.664E+04	2.57	0.907	AC-228	D
369.45	92.49	12609.	577.	3.229E+03	55.71	0.909	TH-234	sD
378.53	94.76	10995.	1049.	5.903E+03	28.93	0.911	AC-228	sD
510.84	127.84	10668.	492.	3.112E+03	60.03	0.940	AC-228	sD
521.53	130.51	11405.	474.	3.042E+03	64.33	0.943	NP-237	sD
784.20	196.11	12050.	425.	3.628E+03	78.88	0.767	PB-214	s
1035.41	258.71	8698.	3831.	4.023E+04	8.90	1.157	PB-214	
1098.38	274.43	7681.	2815.	3.094E+04	10.90	1.263	PB-214	s
1125.76	281.13	5591.	347.	3.883E+03	66.29	0.477	-	s
1256.39	313.84	5762.	454.	5.540E+03	53.76	1.116	PB-214	s
1396.61	349.01	8701.	937.	1.246E+04	28.92	1.133	CE-143	sD
1548.39	386.72	6209.	1197.	1.732E+04	19.50	1.165	AG-108	D
1556.34	388.70	6188.	1686.	2.451E+04	14.07	1.166	SN-113	sD
1623.70	405.68	6912.	580.	8.733E+03	47.85	0.898	J-134	M
1681.34	419.95	6217.	402.	6.239E+03	56.31	1.193	SE-75	D
1697.38	423.96	5731.	640.	1.000E+04	34.37	1.196	BA-140	sD
1729.34	431.93	4112.	287.	4.563E+03	64.20	1.203	AU-196	sD
1820.25	454.59	4815.	1144.	1.896E+04	21.14	1.046	BI-212	
1848.16	461.67	4310.	824.	1.385E+04	27.08	1.357	PB-214	s
1880.64	469.82	3870.	620.	1.057E+04	29.49	1.234	BA-140	sD
1899.59	474.55	3695.	436.	7.495E+03	40.59	1.238	CS-134	D
1923.15	480.33	4603.	1664.	2.891E+04	15.17	1.112	PB-214	

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
2008.70	501.69	2280.	266.	4.795E+03	55.85	0.648	-	sM
2044.95	510.77	5926.	1327.	2.431E+04	24.95	3.316	TL-208	sM
2136.14	533.53	3460.	833.	1.585E+04	25.03	1.211	PB-214	M
2175.66	543.42	3456.	322.	6.225E+03	63.19	1.729	TE-131	sM
2322.74	580.27	3318.	1233.	2.526E+04	17.16	1.396	PB-214	s
2420.06	604.38	2118.	198.	4.200E+03	67.35	1.344	CS-134	sD
2664.97	665.52	3879.	3934.	9.111E+04	7.09	1.392	BI-214	M
2816.22	703.28	2793.	1283.	3.124E+04	15.54	1.476	NB-94	sM
2882.74	719.93	2620.	847.	2.107E+04	21.70	1.351	SB-126	
2972.86	742.31	2556.	504.	1.288E+04	35.34	1.706	PA-234M	
3013.91	752.80	2409.	380.	9.844E+03	45.20	2.416	LA-140	sM
3147.42	785.92	3628.	3162.	8.529E+04	8.32	1.504	PB-214	
3228.68	806.28	2912.	2900.	8.011E+04	7.71	1.473	BI-214	
3288.14	821.36	2584.	344.	9.662E+03	43.19	1.515	SR-91	D
3310.91	827.04	2650.	225.	6.377E+03	65.95	1.520	CO-60	D
3360.31	838.97	3110.	1900.	5.446E+04	11.76	1.514	PB-214	M
3621.30	904.22	3022.	228.	7.009E+03	69.53	1.578	KR-89	sD
3638.53	908.52	2231.	182.	5.615E+03	75.01	1.582	J-133	sD
3862.00	964.32	2772.	742.	2.429E+04	26.79	0.849	EU-152	s
4212.93	1051.80	2427.	818.	2.908E+04	24.21	1.611	J-133	s
4284.48	1069.65	2347.	559.	2.020E+04	33.07	1.395	-	
4423.73	1104.65	2292.	378.	1.408E+04	48.56	2.820	AG-108	s
4541.15	1133.90	1627.	426.	1.630E+04	33.15	1.382	J-132	s
4627.36	1155.21	2145.	3420.	1.333E+05	6.11	1.742	BI-214	
4734.77	1182.00	2067.	487.	1.941E+04	36.57	2.295	KR-88	sM
4836.69	1207.56	1958.	778.	3.170E+04	22.44	2.041	Y-91	M
5020.61	1252.75	2181.	758.	3.202E+04	25.39	3.109	BA-139	sM
5131.67	1280.94	1788.	2402.	1.037E+05	6.44	1.851	BI-214	D
5221.69	1303.08	1566.	241.	1.057E+04	61.11	1.621	-	
5254.17	1311.37	1430.	212.	9.373E+03	52.28	1.872	BA-139	D
5276.45	1316.92	1438.	266.	1.181E+04	42.15	1.876	BR-82	sD
5549.85	1385.37	1585.	1499.	7.000E+04	9.12	1.922	AG-110M	sD
5614.55	1401.50	1763.	2281.	1.078E+05	6.68	1.933	BI-214	D
5640.59	1407.99	1593.	3968.	1.884E+05	4.26	1.937	BI-214	D
5669.47	1415.20	1638.	286.	1.366E+04	41.69	1.942	CS-138	sD
5755.43	1436.63	1205.	174.	8.437E+03	58.39	1.956	SB-124	sD
5781.87	1443.23	1553.	157.	7.645E+03	72.76	1.961	J-132	sD
6046.03	1509.28	2697.	3707.	1.889E+05	6.91	1.978	BI-214	
6163.91	1538.40	1728.	785.	4.077E+04	16.60	2.023	CS-136	D
6183.15	1543.20	1531.	1162.	6.056E+04	11.19	2.026	AG-108	D
6314.25	1576.19	804.	174.	9.272E+03	48.50	2.047	BA-139	sD
6343.01	1583.36	1201.	1229.	6.578E+04	9.81	2.052	SB-124	D
6361.73	1588.03	1206.	238.	1.278E+04	43.23	2.054	AC-228	sD
6387.25	1594.39	1275.	543.	2.928E+04	20.48	2.058	BA-139	sD
6406.62	1599.23	1137.	637.	3.445E+04	16.94	2.062	EU-154	D
6438.31	1607.13	1050.	356.	1.937E+04	27.80	2.067	-	sD
6457.74	1611.98	1012.	221.	1.206E+04	42.84	2.070	J-134	sD
6475.90	1616.51	766.	196.	1.071E+04	42.46	2.073	BI-212	sD

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
6656.01	1661.02	1325.	1758.	9.886E+04	10.90	2.163	BI-214	
6746.36	1683.76	564.	378.	2.154E+04	25.98	2.080	BA-139	
6783.59	1693.17	863.	606.	3.478E+04	22.72	3.014	KR-89	s
6929.48	1729.51	619.	6292.	3.689E+05	3.02	2.011	BI-214	
7366.15	1838.41	366.	523.	3.268E+04	13.55	2.209	Y-88	sD
7402.03	1847.36	439.	3649.	2.292E+05	3.69	2.214	BI-214	D
7504.15	1872.83	628.	399.	2.544E+04	30.58	2.330	-	
7572.87	1889.82	468.	298.	1.919E+04	23.56	2.239	-	D
7599.69	1896.50	502.	215.	1.385E+04	32.55	2.243	-	sD
7705.71	1922.96	410.	123.	8.086E+03	69.59	0.499	K-42	s
7756.84	1935.59	566.	358.	2.362E+04	30.70	2.765	RB-89	s
7826.33	1953.22	206.	59.	3.944E+03	79.45	1.551	-	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: DOE.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	185.78	46.62	21611.	54248.	30.138	1.24	0.856
AS-73	212.60	53.32	18288.	13462.	7.479	3.67	0.881
TA-182	269.04	67.41	20509.	640.	0.355	66.87	1.268s
BI-207	290.63	72.80	458798.	2665.	1.481	71.98	0.891s
RA-226	744.91	186.22	17531.	38394.	21.330	1.56	0.978
PB-214	968.04	241.92	12125.	60639.	33.688	1.05	1.035
PB-214	1180.98	295.08	10322.	132458.	73.588	0.62	1.098
Bi-211	1405.25	351.07	225701.	6798.	3.777	19.92	1.134s
PB-214	1408.70	351.93	21711.	211116.	117.287	0.48	1.135s
SB-125	1712.99	427.89	5377.	597.	0.332	35.68	1.200D
LA-140	1950.39	487.15	4473.	1569.	0.872	15.84	1.298
BI-214	2439.86	609.32	3050.	144811.	80.450	0.54	1.348D
BI-214	3077.15	768.37	4029.	12669.	7.038	2.72	1.519
BI-214	3741.10	934.06	3285.	6611.	3.673	4.07	1.487
BI-214	4487.41	1120.29	6725.	26888.	14.938	1.39	1.738D
BI-214	4959.72	1238.13	2505.	10550.	5.861	2.77	1.793
NA-22	5105.67	1274.54	1709.	231.	0.129	52.22	1.847D
BI-214	5519.05	1377.67	1579.	8246.	4.581	2.59	1.917D
BI-214	7069.51	1764.41	855.	24611.	13.673	1.40	2.129

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.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/g	Peak Energy keV	Activity pCi/g	Code	MDA Value pCi/g		COMMENTS
RA-226		9.7008E+03					5.84E+05	
			186.21	9.701E+03	(P	1.566E+02	7.78E-01 3.59E+00 G	
Ra-228		-2.0349E+01					2.10E+03	
			911.07	-2.035E+01	%(P	5.344E+01	1.01E+02 2.90E+01 G	
			968.90	-3.434E+01	% P	8.122E+01	1.05E+02 1.75E+01 G	
			338.40	2.065E+01	% P	5.185E+01	1.00E+02 1.20E+01 G	
			964.60	-1.071E+01	%	2.085E+02	5.86E+02 5.45E+00 G	
PB-210		7.9061E+03					7.45E+03	
			46.54	7.906E+03	(P	1.002E+02	6.19E-01 4.25E+00 G	
U-238		-5.2338E+01					1.63E+12	
							Energy duplication	
			63.29	-5.234E+01	%(P	1.379E+02	9.87E+01 3.90E+00 G	
			92.80	5.404E+01	% P	6.508E+02	3.65E+02 3.00E+00 G	
			92.38	6.353E+01	% P	7.587E+02	3.62E+02 2.57E+00 G	
U-235		1.7511E+01					1.39E+09	
			143.76	1.751E+01	%(P	4.539E+01	9.88E+01 1.10E+01 G	
			205.31	-6.799E+00	% P	1.193E+02	8.54E+02 5.01E+00 G	
			163.33	-2.102E+01	% P	1.051E+02	1.94E+02 5.08E+00 G	
K-40		3.7460E+01					4.68E+11	
			1460.82	3.746E+01	%(P	1.187E+02	1.58E+02 1.07E+01 G	
PB-214		8.9650E+03					5.84E+05	
			351.93	8.772E+03	?(P	2.864E+01	2.39E-01 3.56E+01 G	
			295.22	9.240E+03	(P	3.322E+01	3.08E-01 1.84E+01 G	
			241.99	9.213E+03	(P	7.837E+01	5.23E-01 7.25E+00 G	
BI-214		7.5199E+04					5.84E+05	
			609.32	7.520E+04	(P	1.351E+02	2.68E-01 4.55E+00 G	
			1764.49	1.059E+04	- P	5.982E+01	7.02E-01 1.54E+01 G	
			1120.29	7.588E+03	} P	1.086E+02	6.97E-01 1.48E+01 G	
			1238.12	8.339E+03	- P	1.865E+02	1.38E+00 5.83E+00 G	
			768.36	7.549E+03	- P	1.779E+02	1.36E+00 4.89E+00 G	
			1377.67	1.060E+04	- P	2.415E+02	1.30E+00 3.99E+00 G	
			934.06	7.454E+03	-	3.042E+02	2.04E+00 3.11E+00 G	
BI-212		-5.8495E+01					5.13E+12	
			727.33	-5.850E+01	%(	1.203E+02	8.96E+01 6.67E+00 G	
			1620.56	-5.150E+02	& P	2.257E+03	9.26E+01 1.47E+00 G	

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		785.42	-3.485E+01	% P	1.074E+03	1.33E+03	1.10E+00 G
PB-212	-5.4176E+00					5.13E+12	
		238.63	-5.418E+00	%(P	3.331E+01	1.38E+02	4.36E+01 G
		300.09	7.363E+01	& P	7.167E+02	2.95E+02	3.30E+00 G
RA-223	-3.7315E+00					1.20E+07	
		269.46	-3.731E+00	%(P	5.921E+01	7.32E+02	1.39E+01 G
		154.21	-2.682E+01	%	9.715E+01	1.38E+02	5.70E+00 G
		323.88	-6.618E+01	%	1.556E+02	9.41E+01	3.90E+00 G
RA-224	-3.3333E+03					3.66E+00	
		240.99	-3.333E+03	%(P	1.450E+05	1.01E+03	4.10E+00 G
TL-208	3.6438E+00					5.13E+12	
		583.19	3.644E+00	%(P	1.081E+01	8.98E+01	8.50E+01 G
							Energy duplication
		510.77	-3.082E+01	& P	5.000E+01	1.47E+02	2.26E+01 G
		860.56	-4.245E+01	%	8.015E+01	8.55E+01	1.25E+01 G
		277.37	2.728E+01	% P	1.347E+02	1.50E+02	6.60E+00 G
		763.13	2.235E+02	%	1.047E+03	1.42E+02	1.79E+00 G
TL-210	4.3938E+00					5.84E+05	
		799.60	4.394E+00	%(	8.619E+00	8.88E+01	9.90E+01 G
		296.00	3.115E+00	%	2.900E+01	2.82E+02	7.90E+01 G
		1316.00	-3.114E+01	%	6.843E+01	6.66E+01	2.10E+01 G
		1210.00	-4.677E+00	&	8.135E+01	5.24E+02	1.70E+01 G
		1110.00	-8.551E+01	%	2.085E+02	7.39E+01	7.00E+00 G
		860.00	-6.055E+01	% P	1.373E+02	1.31E+02	7.00E+00 G
		1410.00	3.593E+01	%	5.539E+02	4.66E+02	5.00E+00 G
CS-137	4.0395E+00					1.10E+04	
		661.66	4.039E+00	%(	1.390E+01	1.04E+02	8.51E+01 G
CO-60	1.0402E+01					1.93E+03	
		1173.23	1.040E+01	%(	1.038E+01	4.70E+01	9.98E+01 K
		1332.49	-7.063E+00	%	1.174E+01	8.06E+01	1.00E+02 K
AM-241	4.9173E+00					1.58E+05	
		59.54	4.917E+00	%(	1.376E+01	1.07E+02	3.59E+01 G
CO-57	1.1159E-01					2.70E+02	
		122.07	1.116E-01	%(	5.261E+00	1.79E+03	8.56E+01 G
		136.47	-8.941E+00	%	4.800E+01	2.04E+02	1.07E+01 G
CS-134	3.6911E-01					7.53E+02	
		795.86	3.691E-01	%(	1.024E+01	1.25E+03	8.55E+01 K
		604.72	3.565E+00	%	4.522E+01	3.84E+02	9.76E+01 K
		569.33	-1.892E+01	&	4.976E+01	1.15E+02	1.54E+01 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		563.26	3.893E+01	&	8.372E+01	9.38E+01	8.38E+00 G
BE-7	3.9450E+01					5.34E+01	
		477.60	3.945E+01	%(	1.736E+02	1.33E+02	1.04E+01 G
PA-234	-2.7655E+01					2.79E-01	
		945.94	-2.766E+01	%(	5.132E+01	8.41E+01	2.00E+01 G
		131.28	-8.573E+00	&	2.992E+01	1.06E+02	2.00E+01 G
		94.67	1.115E+01	%	1.267E+02	3.45E+02	1.55E+01 G
		883.24	-6.499E+00	& P	8.287E+01	7.33E+02	1.20E+01 G
		926.70	-2.530E+01	& P	9.176E+01	2.15E+02	1.10E+01 G
		569.26	-3.013E+01	&	6.920E+01	1.00E+02	1.04E+01 G
		111.00	1.050E+01	%	4.644E+01	1.68E+02	8.55E+00 G
		733.00	-4.294E+00	%	9.081E+01	9.18E+02	8.50E+00 G
		949.00	2.970E+01	&	1.236E+02	1.88E+02	7.80E+00 G
		152.70	1.715E+00	%	7.668E+01	1.70E+03	7.20E+00 G
		880.51	-8.290E+01	%	1.566E+02	8.56E+01	6.50E+00 G
		226.87	-3.452E+01	%	8.764E+01	1.02E+02	6.50E+00 G
CO-58	-6.2858E+00					7.08E+01	
		810.76	-6.286E+00	&(	1.927E+01	9.28E+01	9.94E+01 G
FE-59	9.1805E+00					4.51E+01	
		1099.24	9.181E+00	%(	3.966E+01	1.31E+02	5.65E+01 K
		1291.59	-2.525E+01	&	4.258E+01	8.17E+01	4.32E+01 K
ZR-95	1.0437E+01					6.44E+01	
		756.72	1.044E+01	%(	2.627E+01	7.63E+01	5.44E+01 K
		724.19	1.211E+01	&	3.384E+01	8.46E+01	4.43E+01 K
ZN-65	1.2019E+01					2.44E+02	
		1115.54	1.202E+01	%(	7.757E+01	1.95E+02	5.06E+01 K
MN-54	5.0039E+00					3.12E+02	
		834.85	5.004E+00	%(	1.405E+01	8.51E+01	1.00E+02 G
TH-228	1.4556E+02					6.99E+02	
		84.40	1.456E+02	%(	1.679E+03	3.50E+02	1.19E+00 G
CE-144	-1.6710E+01					2.84E+02	
		133.53	-1.671E+01	%(	6.754E+01	1.22E+02	1.08E+01 K
		80.12	1.122E+02	%	1.299E+03	3.51E+02	1.60E+00 G
CE-141	-8.1251E+00					3.24E+01	
		145.45	-8.125E+00	&(	2.105E+01	9.87E+01	4.80E+01 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-140	8.7695E+01					1.28E+01	
		537.38	8.769E+01	%(	2.539E+02	8.77E+01	1.99E+01 G
		162.64	-3.937E+01	%	5.915E+02	5.72E+02	5.07E+00 G
		304.82	2.856E+02	%	8.921E+02	1.25E+02	3.65E+00 G
		423.69	7.124E+02	%	2.807E+03	1.19E+02	2.66E+00 G
		437.55	-1.159E+03	%	2.635E+03	9.51E+01	1.55E+00 G
RU-103	-6.1114E+00					3.93E+01	
		497.08	-6.111E+00	%(	1.719E+01	8.52E+01	8.64E+01 K
NA-22	1.1239E+01					9.50E+02	
		1274.54	1.124E+01	!(P	9.490E+00	2.61E+01	9.99E+01 G
CD-109	4.6939E+01					4.53E+02	
		88.04	4.694E+01	%(	5.357E+02	3.46E+02	3.79E+00 K
RB-86	2.1022E+02					1.86E+01	
		1076.63	2.102E+02	&(	5.467E+02	7.88E+01	8.76E+00 G
RB-83	-8.5287E+00					8.62E+01	
		520.35	-8.529E+00	%(	1.886E+01	9.25E+01	4.61E+01 G
		529.54	-1.353E+01	&	3.895E+01	8.72E+01	3.00E+01 G
		552.50	-1.809E+01	%	5.502E+01	1.32E+02	1.63E+01 G
SE-75	2.4031E+00					1.20E+02	
		264.65	2.403E+00	&(	1.118E+01	1.86E+02	5.86E+01 G
		136.00	3.849E+00	%	1.009E+01	9.99E+01	5.60E+01 G
		279.53	-1.138E+01	%	3.060E+01	8.15E+01	2.47E+01 G
		121.12	-4.866E+00	%	3.031E+01	2.37E+02	1.64E+01 G
		400.65	3.557E+01	%	1.100E+02	9.37E+01	1.11E+01 G
SE-72	-3.7094E+01					8.50E+00	
						Energy duplication	
		46.00	-3.709E+01	%(	1.916E+02	1.57E+02	5.90E+01 G
AS-74	1.3890E+01					1.77E+01	
		595.70	1.389E+01	%(	4.218E+01	1.32E+02	5.95E+01 G
		634.80	-9.688E+00	&	1.668E+02	7.48E+02	1.50E+01 G
AS-73	1.0747E+03					8.03E+01	
		53.44	1.075E+03	(	5.052E+01	1.83E+00	1.00E+01 G
IR-192	-2.8709E+00					7.40E+01	
		316.49	-2.871E+00	%(	1.159E+01	1.22E+02	8.70E+01 G
		468.06	-7.979E+00	% P	2.649E+01	3.09E+02	5.18E+01 G
		308.44	-1.058E+01	%	2.505E+01	9.47E+01	3.18E+01 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		
SC-46	5.2813E+00				8.38E+01		
		1120.52	5.281E+00	}	4.455E+01	1.09E+02	1.00E+02 G
		889.26	5.281E+00	&(	1.267E+01	1.09E+02	1.00E+02 G
SB-124	4.9630E+00				6.02E+01		
		602.71	4.963E+00	%(	6.313E+01	3.86E+02	9.81E+01 G
		1691.04	-1.690E+01	%	4.751E+01	8.51E+01	5.00E+01 G
		722.78	4.707E+01	%	1.213E+02	7.81E+01	1.18E+01 G
		645.84	-6.934E+01	%	1.446E+02	9.09E+01	7.24E+00 G
		1368.21	-4.053E+02	%	6.892E+02	8.24E+01	2.55E+00 G
		713.82	-2.496E+02	%	6.973E+02	8.46E+01	2.35E+00 G
		1045.12	8.678E+01	%	1.116E+03	3.88E+02	1.87E+00 G
CR-51	5.4361E+00				2.77E+01		
		320.08	5.436E+00	&(	1.318E+02	9.68E+02	1.01E+01 G
Y-91	-3.0587E+03				5.85E+01		
		1204.90	-3.059E+03	%(	6.585E+03	6.53E+01	3.00E-01 G
RU/RH106	-1.7540E+01				3.73E+02		
					Energy duplication		
		621.92	-1.754E+01	%(	7.656E+01	1.90E+02	9.80E+00 K
					Energy duplication		
		1050.36	-1.079E+02	%	8.244E+02	2.30E+02	1.53E+00 K
AG-108M	4.2373E+00				4.64E+04		
		722.94	4.237E+00	%(	1.116E+01	7.98E+01	9.09E+01 K
		433.94	1.880E+00	%	1.598E+01	2.57E+02	9.05E+01 K
		614.28	-3.016E+00	&	4.872E+01	4.90E+02	8.99E+01 K
AG-110M	-2.3659E+00				2.50E+02		
		657.76	-2.366E+00	%(	8.451E+00	1.55E+02	9.46E+01 K
		884.68	5.768E+00	%	1.473E+01	1.16E+02	7.27E+01 K
		937.49	4.657E-01	&	5.792E+01	3.76E+03	3.44E+01 G
		1384.30	-3.199E+01	&	1.319E+02	1.25E+02	2.43E+01 G
		763.94	-2.785E+00	%	9.176E+01	9.96E+02	2.23E+01 G
SB-125	3.6056E+01				1.01E+03		
		427.89	3.606E+01	&(	2.079E+01	1.78E+01	2.94E+01 K
		600.56	1.918E+01	&	2.467E+02	3.90E+02	1.78E+01 K
		635.90	-3.211E+01	%	6.605E+01	8.97E+01	1.13E+01 G
		463.38	2.983E+01	&	7.825E+01	7.95E+01	1.04E+01 G
		176.33	1.532E+01	%	8.642E+01	2.26E+02	6.79E+00 G
		606.64	6.930E+01	%	8.734E+02	3.82E+02	5.02E+00 G
AS-76	-4.3614E+00				1.10E+00		
		559.10	-4.361E+00	%(	1.561E+01	1.56E+02	4.46E+01 G
		657.10	-1.843E+00	%	1.126E+02	2.65E+03	6.40E+00 G
		1216.25	-1.606E+02	%	3.037E+02	9.16E+01	3.70E+00 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1213.00	3.435E+02 %		8.313E+02	7.33E+01	1.80E+00 G
			1228.60	1.469E+02 %		6.818E+02	2.24E+02	1.60E+00 G
NB-94		-4.3609E+00					7.41E+06	
			871.10	-4.361E+00 %(		9.853E+00	1.02E+02	1.00E+02 K
			702.50	-3.920E+00 %		9.575E+00	7.40E+01	1.00E+02 K
NB-95		5.9132E+00					3.52E+01	
			765.82	5.913E+00 %(		3.448E+01	1.76E+02	9.90E+01 K
MO-99		-6.3470E+03					2.76E+00	
			140.51	-6.347E+03 %(		1.657E+04	9.95E+01	9.09E+01 G
			739.47	-9.449E+04 %		2.275E+05	7.30E+01	1.30E+01 G
			181.09	1.065E+05 %		2.981E+05	1.12E+02	6.00E+00 G
			777.88	-1.851E+05 &		5.891E+05	1.44E+02	4.37E+00 G
Th-227	N	1.2994E+01					2.57E+11	
			236.00	1.299E+01 &(		4.846E+01	1.49E+02	1.15E+01 G K
			256.20	-3.601E+01 %		1.201E+02	1.01E+02	6.30E+00 G
Th-231	N	3.5172E+02					2.57E+11	
			102.27	3.517E+02 &(		9.471E+02	1.03E+02	4.10E-01 G
			163.12	-1.377E+03 %		3.509E+03	9.71E+01	1.53E-01 G
			84.20	2.621E+01 %		3.022E+02	3.50E+02	6.40E+00 K
Bi-211	N	7.7549E+02					2.57E+11	
			351.07	7.755E+02 ?(		2.529E+02	9.96E+00	1.29E+01 G
Th-234	N	-5.0321E+01					1.63E+12	
							Energy duplication	
			63.29	-5.032E+01 %(		1.408E+02	1.07E+02	3.80E+00 G
			92.60	3.171E+01 %		3.607E+02	3.45E+02	5.41E+00 G K
Sr-85	I	-4.2438E+00					6.48E+01	
			513.99	-4.244E+00 %(		1.277E+01	9.11E+01	9.93E+01 G
Y-88	I	1.5624E+00					1.07E+02	
			898.02	1.562E+00 %(		2.054E+01	3.97E+02	9.34E+01 G
			1836.01	-6.726E+00 %		3.014E+01	1.35E+02	9.94E+01 G K
Ba-133		-2.6587E+01					3.84E+03	
			383.85	-2.659E+01 %(		1.189E+02	1.35E+02	8.70E+00 G
			356.01	-5.381E-01 %		5.704E+01	3.21E+03	6.00E+01 G K
			32.84	-9.675E+00 &		3.921E+01	1.23E+02	1.78E+01 G
J-129		4.7393E+00					5.73E+09	
							Energy duplication	
			29.78	4.739E+00 %(		1.744E+01	1.12E+02	3.60E+01 G
			29.46	9.332E+00 %		3.375E+01	1.10E+02	1.90E+01 G
			33.60	-1.521E+01 %		6.832E+01	1.36E+02	1.00E+01 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
		39.58	2.220E+01 %		8.012E+01	1.09E+02	7.50E+00 G
							Energy duplication
		34.40	0.000E+00 %		3.074E+02	1.00E+03	2.20E+00 G
SN-113	5.9172E+00					1.15E+02	
		391.71	5.917E+00 %(		2.007E+01	1.03E+02	6.42E+01 G
SB-126	-2.2818E+01					1.25E+01	
		695.10	-2.282E+01 %(		4.545E+01	8.68E+01	9.97E+01 G
		666.20	-2.104E+01 &		6.612E+01	9.51E+01	9.97E+01 G
		414.80	2.271E+01 &		1.012E+02	1.35E+02	8.60E+01 G
		720.40	3.512E+01 %		9.305E+01	8.02E+01	5.70E+01 G
		697.00	6.910E+01 %		1.393E+02	8.78E+01	3.20E+01 G
		856.70	1.471E+02 &		3.100E+02	9.54E+01	1.75E+01 G
		593.00	1.327E+02 %		4.860E+02	1.59E+02	8.80E+00 G
		989.30	-3.744E+02 %		8.769E+02	1.10E+02	6.90E+00 G
		573.70	2.779E+02 &		6.108E+02	9.58E+01	6.80E+00 G
TE-132	2.0455E+03					3.25E+00	
		228.16	2.045E+03 &(		5.740E+03	1.12E+02	8.85E+01 G
		116.30	7.082E+04 %		1.880E+05	1.01E+02	1.95E+00 G
SB-122	-2.1799E+03					2.70E+00	
		564.08	-2.180E+03 %(		3.585E+04	7.15E+02	7.10E+01 G
		692.76	6.833E+04 &		6.741E+05	4.28E+02	3.92E+00 G
XE-131M	-6.7630E+02					1.18E+01	
		163.93	-6.763E+02 %(		1.787E+03	1.01E+02	1.96E+00 G
							Energy duplication
		34.40	0.000E+00 %		2.592E+03	1.00E+03	1.70E+00 G
XE-133M	-2.1761E+01					2.26E+00	
		233.20	-2.176E+01 &(		5.509E+01	1.01E+02	1.03E+01 G
CS-136	-3.3305E+00					1.30E+01	
		818.50	-3.331E+00 %(		7.482E+01	6.78E+02	1.00E+02 G
		1048.07	-3.947E+01 %		9.396E+01	7.21E+01	8.00E+01 G
		340.57	-2.390E+01 &		7.420E+01	1.24E+02	4.69E+01 G
		1235.34	5.115E+00 %		7.048E+02	4.16E+03	1.98E+01 G
		176.56	-1.140E+01 %		2.329E+02	8.17E+02	1.36E+01 G
		273.65	9.968E+01 &		2.870E+02	8.72E+01	1.27E+01 G
CE-139	3.0792E+00					1.38E+02	
		165.85	3.079E+00 %(		8.192E+00	1.07E+02	8.00E+01 G
		33.44	-4.576E+00 %		1.844E+01	1.22E+02	4.37E+01 G
		33.03	-8.469E+00 &		3.423E+01	1.23E+02	2.37E+01 G
		37.80	-1.517E+01 %		4.757E+01	9.51E+01	1.32E+01 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ND-147	4.4588E+01					1.11E+01	
		91.10 4.459E+01	%(	5.075E+02	3.45E+02	2.83E+01	G
		38.72 5.437E+01	%	1.840E+02	1.03E+02	2.30E+01	G
		531.00-1.739E+02	%	4.566E+02	7.95E+01	1.35E+01	G
		38.17-1.051E+02	%	3.417E+02	9.86E+01	1.20E+01	G
		43.80 1.736E+02	&	9.636E+02	1.68E+02	6.90E+00	G
		319.40 6.146E+02	&	2.023E+03	1.32E+02	2.20E+00	G
		439.80 3.682E+02	%	4.280E+03	4.85E+02	1.20E+00	G
		275.40 1.704E+03	&	5.091E+03	9.05E+01	1.00E+00	G
EU-152	5.5766E+00					4.64E+03	
		40.12 5.577E+00	%(	2.079E+01	1.13E+02	3.00E+01	K
		121.78-2.206E+00	%	1.428E+01	2.46E+02	2.92E+01	K
		344.30-1.027E+01	%	1.240E+02	3.66E+02	2.70E+01	G
		1408.08 3.301E+01	%	1.303E+02	1.19E+02	2.12E+01	G
		39.52 1.051E+01	%	3.726E+01	1.07E+02	1.60E+01	G
		964.00-3.413E+01	%	8.077E+01	7.17E+01	1.46E+01	G
		1112.07 4.492E+00	%	8.073E+01	8.40E+02	1.36E+01	G
		778.90 1.972E+01	%	6.551E+01	1.50E+02	1.30E+01	G
		1085.80-7.909E+00	&	1.025E+02	6.05E+02	1.03E+01	G
EU-154	1.9600E+00					3.10E+03	
		123.10 1.960E+00	%(	1.049E+01	2.04E+02	4.05E+01	K
		1274.80 3.634E+00	%	5.454E+01	4.53E+02	3.55E+01	K
		723.30-4.814E+00	%	5.392E+01	3.38E+02	1.97E+01	K
		1004.80 6.091E+00	&	5.785E+01	4.44E+02	1.76E+01	K
						Energy duplication	
		43.00 7.660E+00	%	7.108E+01	2.81E+02	1.31E+01	G
		873.20 9.080E+00	&	8.917E+01	4.43E+02	1.13E+01	G
		996.30 3.963E+01	&	1.010E+02	1.19E+02	1.07E+01	G
						Energy duplication	
		42.31 2.279E+01	%	1.294E+02	1.72E+02	7.30E+00	G
		248.04-3.459E+01	&	8.547E+01	9.89E+01	6.60E+00	G
		591.70-6.197E+01	&	1.579E+02	1.11E+02	4.60E+00	G
EU-155	5.2157E+00					1.81E+03	
		86.45 5.216E+00	%(	6.006E+01	3.49E+02	3.27E+01	K
		105.31-6.894E+00	%	1.847E+01	1.02E+02	2.18E+01	K
						Energy duplication	
		43.00 1.283E+01	%	7.228E+01	1.71E+02	1.29E+01	G
						Energy duplication	
		42.31 2.432E+01	%	1.383E+02	1.72E+02	6.88E+00	G
		48.70-4.211E+01	%	2.278E+02	1.64E+02	3.90E+00	G
		45.30-1.214E+02	%	6.416E+02	1.60E+02	1.36E+00	G
		60.01 1.490E+02	%	4.159E+02	1.06E+02	1.21E+00	G
GD-153	-3.1569E+00					2.42E+02	
		41.54-3.157E+00	&(	9.087E+00	1.10E+02	6.00E+01	G
		40.90 4.416E+00	%	2.232E+01	1.53E+02	3.20E+01	G
		97.50 6.300E+00	%	7.311E+01	3.52E+02	3.00E+01	G
		103.20-1.727E+00	%	1.953E+01	4.30E+02	2.18E+01	G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		47.00	-9.920E+00 %		5.119E+01	1.56E+02	1.80E+01 G
TB-160	1.3593E+01					7.21E+01	
		876.37	1.359E+01 %(		4.501E+01	1.50E+02	3.00E+01 G
		298.57	8.676E+00 &		1.161E+02	4.06E+02	2.74E+01 G
		966.17	-3.036E+01 %		6.642E+01	6.64E+01	2.55E+01 G
		1177.95	1.090E+01 %		1.169E+02	3.23E+02	1.55E+01 G
		86.80	1.713E+01 %		1.972E+02	3.49E+02	1.34E+01 G
							Energy duplication
		46.00	-1.969E+01 %		1.015E+02	1.56E+02	1.12E+01 G
		962.36	7.136E+01 &		1.652E+02	7.02E+01	1.00E+01 G
		1271.88	1.098E+02 &		3.522E+02	9.71E+01	7.60E+00 G
YB-175	-1.0291E+04					4.19E+00	
		396.32	-1.029E+04 %(		2.386E+04	9.71E+01	6.21E+00 G
		282.52	-1.619E+04 &		4.351E+04	8.14E+01	2.90E+00 G
							Energy duplication
		54.07	-1.560E+04 %		5.931E+04	1.15E+02	1.93E+00 G
		113.80	-1.652E+04 %		4.389E+04	1.01E+02	1.82E+00 G
		52.97	2.851E+04 %		1.038E+05	1.10E+02	1.04E+00 G
LU-177	-4.7694E+02					6.71E+00	
		208.36	-4.769E+02 %(		1.423E+03	1.19E+02	1.10E+01 G
		112.95	-6.284E+02 %		1.670E+03	1.01E+02	6.60E+00 G
							Energy duplication
		54.07	-1.448E+03 %		5.487E+03	1.15E+02	2.87E+00 G
HF-181	5.1441E+00					4.25E+01	
		482.16	5.144E+00 %(		2.141E+01	1.26E+02	8.60E+01 G
		133.05	-6.794E+00 %		2.578E+01	1.15E+02	4.30E+01 G
		55.79	-1.631E+01 %		6.632E+01	1.23E+02	1.65E+01 G
		345.95	-3.376E+01 %		4.000E+02	3.59E+02	1.40E+01 G
		54.61	-2.739E+01 %		1.061E+02	1.17E+02	9.50E+00 G
		136.25	4.987E+01 %		1.299E+02	9.92E+01	6.10E+00 G
TA-182	1.1270E+01					1.15E+02	
		67.75	1.127E+01 (		1.180E+01	3.34E+01	4.13E+01 G
		1121.28	1.127E+01 }		1.215E+02	3.19E+02	3.50E+01 G
		1221.42	-2.359E+00 &		5.059E+01	1.04E+03	2.74E+01 G
		1189.05	2.512E+01 %		1.123E+02	1.35E+02	1.65E+01 G
		59.32	1.368E+01 &		3.847E+01	1.07E+02	1.57E+01 G
		100.11	-1.254E+01 %		3.389E+01	1.03E+02	1.41E+01 G
		1230.97	-6.892E+01 &		2.834E+02	1.25E+02	1.16E+01 G
		57.98	-2.034E+01 %		7.007E+01	1.31E+02	8.50E+00 G
		222.10	3.586E+01 %		9.025E+01	1.01E+02	7.56E+00 G
		152.43	-1.418E+01 %		9.288E+01	2.49E+02	7.18E+00 G
AU-196	-9.0917E+01					6.18E+00	
		355.72	-9.092E+01 %(		1.299E+03	4.33E+02	9.36E+01 G
		66.83	1.125E+02 %		4.250E+02	1.14E+02	4.40E+01 G
		333.00	2.656E+01 %		9.173E+02	1.38E+03	2.44E+01 G

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		65.12	2.787E+02 %		8.972E+02	9.76E+01	2.40E+01 G
		75.70	3.922E+02 %		4.558E+03	3.52E+02	1.50E+01 G
		426.00	1.261E+02 %		6.822E+03	1.64E+03	7.00E+00 G
		77.80	1.477E+03 %		1.713E+04	3.52E+02	4.00E+00 G
AU-198	-6.7695E+03					2.70E+00	
		411.80	-6.769E+03 %(		2.994E+04	1.85E+02	9.55E+01 G
		70.82	2.117E+06 %		5.194E+06	7.45E+01	1.38E+00 G
		675.88	2.612E+05 %		2.472E+06	4.11E+02	1.06E+00 G
BI-207	1.3062E+01					1.39E+04	
		569.67	-2.653E-01 %(		7.724E+00	1.27E+03	9.80E+01 G
		1063.62	-5.032E+00 &		1.841E+01	1.11E+02	7.70E+01 G
		74.97	4.264E+00 %		4.956E+01	3.53E+02	3.86E+01 G
		72.80	6.985E+01 ?(		8.279E+01	3.60E+01	2.30E+01 G
		84.80	1.202E+01 %		1.386E+02	3.50E+02	1.40E+01 G
		1770.22	-7.984E+01 %		7.165E+02	2.72E+02	7.00E+00 G
J-131	-5.4679E+01					8.04E+00	
		364.48	-5.468E+01 %(		1.285E+02	9.84E+01	8.12E+01 G
		636.97	2.800E+02 %		1.581E+03	2.46E+02	7.27E+00 G
		284.29	-6.329E+02 %		1.887E+03	9.04E+01	6.06E+00 G
LA-140	1.6205E+01					1.68E+00	
		1596.21	-7.993E+00 %(		3.372E+01	1.28E+02	9.54E+01 G
		487.02	6.694E+01 (		1.341E+01	7.92E+00	4.55E+01 G
		815.77	1.940E+01 &		6.120E+01	9.55E+01	2.33E+01 G
		328.76	1.284E+01 %		3.001E+01	9.35E+01	2.03E+01 G
		751.79	-9.917E+01 &		2.109E+02	6.45E+01	4.19E+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	

- -

********** 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 2 Sigma Counting pCi/g	Total pCi/g	MDA pCi/g
RA-226	9.7004E+03	9.7008E+03	1.5094E+02	4.9759E+02	1.566E+02
Ra-228 #A	-2.0136E+01	-2.0349E+01	4.1028E+01	4.1047E+01	5.344E+01
PB-210	7.8826E+03	7.9061E+03	9.7802E+01	7.3112E+02	1.002E+02
U-238 #A	-5.2338E+01	-5.2338E+01	1.0330E+02	1.0337E+02	1.379E+02
U-235 #A	1.7511E+01	1.7511E+01	3.4594E+01	3.4615E+01	4.539E+01
K-40 #A	3.7460E+01	3.7460E+01	1.1825E+02	1.1828E+02	1.187E+02
PB-214	8.9646E+03	8.9650E+03	3.8996E+01	7.3463E+02	2.864E+01
BI-214	7.5196E+04	7.5199E+04	4.0347E+02	4.4578E+03	1.351E+02
BI-212 #A	-5.8495E+01	-5.8495E+01	1.0485E+02	1.0492E+02	1.203E+02
PB-212 #A	-5.4176E+00	-5.4176E+00	1.4937E+01	1.4941E+01	3.331E+01
RA-223 #A	-3.7315E+00	-3.7315E+00	5.4615E+01	5.4616E+01	5.921E+01
RA-224 #A	-7.9198E+00	-3.3333E+03	6.7358E+04	6.7358E+04	1.450E+05
TL-208 #A	3.6438E+00	3.6438E+00	6.5454E+00	6.5494E+00	1.081E+01
TL-210 #A	4.3936E+00	4.3938E+00	7.8062E+00	7.8108E+00	8.619E+00
CS-137 #A	4.0314E+00	4.0395E+00	8.4136E+00	8.4151E+00	1.390E+01
CO-60 #F	1.0283E+01	1.0402E+01	9.7770E+00	9.7841E+00	1.038E+01
AM-241 #A	4.9166E+00	4.9173E+00	1.0487E+01	1.0493E+01	1.376E+01
CO-57 #A	1.0281E-01	1.1159E-01	4.0004E+00	4.0004E+00	5.261E+00
CS-134 #B	3.5843E-01	3.6911E-01	9.2407E+00	9.2407E+00	1.024E+01
BE-7 #A	2.6073E+01	3.9450E+01	1.0513E+02	1.0516E+02	1.736E+02
PA-234 #A	-2.7655E+01	>12 Halflives	4.6497E+01	4.6528E+01	5.132E+01
CO-58 #A	-4.5990E+00	-6.2858E+00	1.1672E+01	1.1679E+01	1.927E+01
FE-59 #B	5.6222E+00	9.1805E+00	2.3966E+01	2.3972E+01	3.966E+01
ZR-95 #B	7.4035E+00	1.0437E+01	1.5919E+01	1.5932E+01	2.627E+01
ZN-65 #B	1.0977E+01	1.2019E+01	4.6981E+01	4.6987E+01	7.757E+01
MN-54 A	4.6617E+00	5.0039E+00	8.5117E+00	8.5171E+00	1.405E+01

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

TH-228	A	1.4102E+02	1.4556E+02	1.0181E+03	1.0181E+03	1.679E+03
CE-144	#B	-1.5459E+01	-1.6710E+01	4.0934E+01	4.0951E+01	6.754E+01
CE-141	#A	-4.1041E+00	-8.1251E+00	1.6042E+01	1.6051E+01	2.105E+01
BA-140	A	1.5559E+01	8.7695E+01	1.5378E+02	1.5388E+02	2.539E+02
RU-103	#B	-3.4839E+00	-6.1114E+00	1.0412E+01	1.0419E+01	1.719E+01
NA-22	#	1.0980E+01	1.1239E+01	5.8691E+00	5.9108E+00	9.490E+00
CD-109	#B	4.4704E+01	4.6939E+01	3.2490E+02	3.2492E+02	5.357E+02
RB-86	#A	6.4017E+01	2.1022E+02	3.3127E+02	3.3152E+02	5.467E+02
RB-83	#A	-6.5987E+00	-8.5287E+00	1.5782E+01	1.5791E+01	1.886E+01
SE-75	#A	1.9999E+00	2.4031E+00	8.9409E+00	8.9421E+00	1.118E+01
SE-72	#A	-2.7503E+00	-3.7094E+01	1.1615E+02	1.1621E+02	1.916E+02
AS-74	#A	3.9817E+00	1.3890E+01	3.6733E+01	3.6743E+01	4.218E+01
AS-73		8.1597E+02	1.0747E+03	3.9437E+01	8.7382E+01	5.052E+01
IR-192	#A	-2.1294E+00	-2.8709E+00	7.0181E+00	7.0203E+00	1.159E+01
SC-46	A	4.0569E+00	5.2813E+00	1.1464E+01	1.1468E+01	1.267E+01
SB-124	#A	3.4372E+00	4.9630E+00	3.8270E+01	3.8271E+01	6.313E+01
CR-51	#A	2.4467E+00	5.4361E+00	1.0521E+02	1.0521E+02	1.318E+02
Y-91	#A	-2.0960E+03	-3.0587E+03	3.9942E+03	4.2430E+03	6.585E+03
RU/RH10	#B	-1.6529E+01	-1.7540E+01	6.6589E+01	6.6616E+01	7.656E+01
AG-108M	#B	4.2353E+00	4.2373E+00	6.7636E+00	6.9113E+00	1.116E+01
AG-110M	#B	-2.1654E+00	-2.3659E+00	7.3533E+00	7.3538E+00	8.451E+00
SB-125	#F	3.5274E+01	3.6056E+01	1.2864E+01	1.2958E+01	2.079E+01
AS-76	#A	-4.3614E+00	>12 Halflives	1.3592E+01	1.3595E+01	1.561E+01
NB-94	#B	-4.3609E+00	-4.3609E+00	8.9221E+00	8.9260E+00	9.853E+00
NB-95	#B	3.1520E+00	5.9132E+00	2.0870E+01	2.0873E+01	3.448E+01
MO-99	#A	-2.0902E+00	-6.3470E+03	1.2628E+04	1.2636E+04	1.657E+04
Th-227	#B	1.2994E+01	1.2994E+01	3.8770E+01	3.8773E+01	4.846E+01
Th-231	#B	3.5172E+02	3.5172E+02	7.2167E+02	7.2188E+02	9.471E+02
Bi-211	#	7.7549E+02	7.7549E+02	1.5444E+02	1.5714E+02	2.529E+02
Th-234	#B	-5.0321E+01	-5.0321E+01	1.0738E+02	1.0741E+02	1.408E+02
Sr-85	#A	-3.0176E+00	-4.2438E+00	7.7355E+00	7.7371E+00	1.277E+01
Y-88	#B	1.2697E+00	1.5624E+00	1.2403E+01	1.2403E+01	2.054E+01
Ba-133	#B	-2.6434E+01	-2.6587E+01	7.1980E+01	7.1987E+01	1.189E+02
J-129	#A	4.7393E+00	4.7393E+00	1.0569E+01	1.0662E+01	1.744E+01
SN-113	#A	4.8828E+00	5.9172E+00	1.2162E+01	1.2168E+01	2.007E+01
SB-126	#A	-3.8897E+00	-2.2818E+01	3.9624E+01	3.9649E+01	4.545E+01
TE-132	#A	2.2488E+00	2.0455E+03	4.5949E+03	4.5967E+03	5.740E+03
SB-122	#A	-6.0429E-01	-2.1799E+03	3.1157E+04	3.1157E+04	3.585E+04
XE-131M	#A	-1.0380E+02	-6.7630E+02	1.3621E+03	1.3628E+03	1.787E+03
XE-133M	#A	-2.1761E+01	>12 Halflives	4.4108E+01	4.4128E+01	5.509E+01
CS-136	#A	-6.0614E-01	-3.3305E+00	4.5161E+01	4.5161E+01	7.482E+01
CE-139	#A	2.6217E+00	3.0792E+00	6.5628E+00	6.5658E+00	8.192E+00
ND-147	#A	6.0370E+00	4.4588E+01	3.0781E+02	3.0782E+02	5.075E+02
EU-152	#B	5.5501E+00	5.5766E+00	1.2602E+01	1.2626E+01	2.079E+01
EU-154	#B	1.9461E+00	1.9600E+00	7.9821E+00	7.9834E+00	1.049E+01
EU-155	#B	5.1524E+00	5.2157E+00	3.6430E+01	3.6432E+01	6.006E+01
GD-153	#A	-2.8808E+00	-3.1569E+00	6.9270E+00	6.9383E+00	9.087E+00
TB-160	#A	1.0003E+01	1.3593E+01	4.0706E+01	4.0714E+01	4.501E+01
YB-175	#A	-5.2510E+01	-1.0291E+04	1.9987E+04	1.9997E+04	2.386E+04

ORTEC g v - i (3263) Env32 G800W064 12/12/2023 8:17:49 AM
AAA Spectrum name: ARS03758.An1

LU-177	#A	-1.7665E+01	-4.7694E+02	1.1390E+03	1.1394E+03	1.423E+03
HF-181	#A	3.0572E+00	5.1441E+00	1.2966E+01	1.2970E+01	2.141E+01
TA-182	A	9.2983E+00	1.1270E+01	7.5362E+00	7.5834E+00	1.180E+01
AU-196	#A	-2.5426E+00	-9.0917E+01	7.8739E+02	7.8741E+02	1.299E+03
AU-198	#A	-1.8595E+00	-6.7695E+03	2.5047E+04	2.5050E+04	2.994E+04
HG-203	#A	0.0000E+00	0.0000E+00	4.0524E+00	4.0524E+00	1.768E+01
BI-207	#C	1.3041E+01	1.3062E+01	9.4024E+00	9.4376E+00	7.724E+00
J-131	#A	-3.4933E+00	-5.4679E+01	1.0763E+02	1.0768E+02	1.285E+02
RU-106	#A	0.0000E+00	0.0000E+00	2.6637E+01	2.6638E+01	7.721E+01
LA-140	A	1.6205E+01	>12 Halflives	2.5664E+00	2.7865E+00	3.372E+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 (2.7 to 1996.5 keV) 1.034E+05 pCi/g
Total Decayed Activity (2.7 to 1996.5 keV) 1.0367987E+05 pCi/g

The library has energies which are not separable.

Analyzed by: _____
Countroom

Reviewed by: _____
Supervisor

Laboratory: AAA