CLOSEOUT REPORT

Decontamination and Dismantlement (D&D) of Building 650 (Former Reclamation & Hot Laundry Facility)

Brookhaven National Laboratory
Upton, New York

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Prepared for:

BROOKHAVEN NATIONAL LABORATORY
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ACRONYM LIST

Am	Americium
BNL	Brookhaven National Laboratory
BSA	Brookhaven Science Associates
C&D	Construction & Demolition
CAC	Community Advisory Council
CPM	Counts Per Minute
Cs	Cesium
D&D	Decontamination and Dismantlement
DOE	Department of Energy
DPM	Disintegrations per minute
EPD	Environmental Protection Division
ERE	Exit Readiness Evaluation
F&O	Facilities and Operations
GEL	GEL Laboratories, LLC
HEMO	Heavy Equipment Machine Operator
HEPA	High Efficiency Particulate Air
IAG	Interagency Agreement
JRA	Job Risk Assessment
LLRW	Low-Level Radioactive Waste
mR/hr	millirem per hour
NaI	Sodium Iodide
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
Pu	Plutonium
Ra	Radium
RCT	Radiological Control Technician
ROD	Record of Decision
RWP	Radiological Work Permit
SBMS	Standards Based Management System
Sr	Strontium
TLD	Thermoluminescent Dosimeter
U	Uranium
UST	Underground Storage Tank
WAC	Waste Acceptance Criteria
WCF	Waste Concentration Facility
WMP	Waste Management Plan
yd^3	Cubic Yards

1.0 INTRODUCTION

1.1 Purpose

The purpose of this closeout report is to document the completed actions associated with the decontamination and dismantlement (D&D) of Building 650 (Former Reclamation and Hot Laundry Facility) at Brookhaven National Laboratory (BNL). This closeout report also documents the results of an as-left survey of the remaining concrete within the Building 650 footprint (i.e., basement/pit concrete greater than 2 feet below grade) and associated soil, site restoration and disposal of project waste. This work is referred to herein as the "Building 650 D&D Project."

Activities associated with the Building 650 D&D Project were performed by BNL's Facilities and Operations (F&O), with support from BNL's Environmental Protection Division (EPD) and Radiological Control Division (RCD), as well as F&O-seconded and task order subcontractors.

Work was performed in accordance with the *Demolition Work Plan for the Decontamination and Dismantlement (D&D) of Building 650 (Former Reclamation & Hot Laundry Facility)* (BNL, September 9, 2020), as well as task-specific technical work documents and procedures.

The scope of work for the Building 650 D&D Project included the following:

- Facility preparation activities, including radiological surveys and decontamination of isolated areas of fixed contamination, removal of radiologically contaminated piping, asbestos abatement, removal of hazardous materials (i.e., materials that may contain lead, polychlorinated biphenyls [PCBs], mercury and cadmium), removal of high efficiency particulate air (HEPA) filters from filter plenums on the roof, and a bat survey to verify the absence of bats and any other nesting animals;
- Demolition and removal of Building 650, including the structure and utilities, to at least 2′ below grade;
- Removal of asphalt, curbing, concrete walkways and any road base material surrounding Building 650;
- Completion of an as-left radiological survey of exposed soil and remaining concrete, as well as soil sampling, within the Building 650 footprint;
- Site restoration, including backfilling, grading, and seeding;
- Packaging, transport, and proper disposal of waste materials in accordance with the project Waste Management Plan (WMP); and
- Preparation of a closeout report.

1.2 Building 650 Description and Operational History

Building 650 was a one-story reinforced concrete structure that was divided into two primary areas: the High Bay (Reclamation) on the west side of the building and the Hot Laundry on the east side of the building. The High Bay was built on a reinforced concrete slab-on-grade foundation. The Hot Laundry had a partial basement with the remainder built on reinforced concrete slab-on-grade foundation. In addition, a Sandblasting Room constructed of galvanized steel sheeting and the Sandblasting Room Basement, referred to herein as the Sandblasting Pit, extended off the south wall of the High Bay. The Building 650 Site Plan is provided as **Figure 1-1**.

Photograph 1 – Building 650

Building 650 was constructed in the late 1950s for the decontamination of radioactive clothing and heavy equipment. The facility was designed for decontamination operations both inside and outside of the building.

In the past, all soiled laundry from BNL was delivered to Building 650, where potentially radioactively contaminated laundry was segregated from routine laundry. The radioactively contaminated laundry was cleaned with dedicated equipment and the residual water was transferred to, and contained in, the facility's underground storage tanks (USTs) until the level of radiological activity could be determined. These USTs were located on

the north side of the building. The liquid waste was emptied from the USTs about three times per year and taken to the BNL Waste Concentration Facility (WCF) by tanker truck.

Building 650 also served as a decontamination facility for radioactively contaminated equipment. The radioactively contaminated equipment was steam cleaned on a 30-foot by 30-foot concrete pad on the north side of the building. The radioactively contaminated water from the steam cleaning operation collected in a drain in the middle of the inward sloping concrete pad, known as the Building 650 Sump. Depending on the expected level of contamination, the effluent was supposed to be either piped into the sanitary sewer system or into the Building 650 USTs. However, an investigation in 1969 revealed that the drainage pipe from the Building 650 Sump led to a natural depression in a wooded area approximately 800 feet northwest of Building 650, rather than the sanitary sewer system or USTs. The practice of decontaminating radioactively contaminated equipment on the concrete pad was discontinued after the 1969 incident. The natural wooded depression is referred to as the Building 650 Sump Outfall Area.

The Building 650 Hoppers were previously located on the south side of Building 650, adjacent to the Sandblasting Room. The hoppers were used to collect dust generated from sandblasting activities, including the sandblasting of radiologically contaminated lead bricks. The Building 650 Hoppers, including the elevated bag house, support structure and associated equipment and piping were removed from the south side of Building 650 in 2005.

1.3 Radiological Status of Building 650 Prior to Demolition

As previously noted, Building 650 was divided into two primary areas: the High Bay (Reclamation) on the west side of the building and the Hot Laundry on the east side of the building. Based on process knowledge and previous radiological surveys, the High Bay was considered radiologically contaminated. Areas of isolated fixed contamination were also present on the Hot Laundry side of the building. Areas of known radiological contamination in the building are illustrated on **Figure 1-2a** (first floor) and **Figure 1-2b** (basement).

2.0 DECONTAMINATION AND DISMANTLEMENT (D&D) ACTIVITIES

The objective of the Building 650 D&D Project was to safely complete the demolition and removal of Building 650, including the structure and utilities, to at least 2′ below grade; and to remove the surrounding asphalt, curbing, concrete walkways and road base material. An as-left survey was performed to document the radiological and chemical status of the Building 650 footprint and surrounding area. Upon completion of D&D activities, including verification that demolition debris had been removed, excavated areas were backfilled and the worksite was graded and seeded. The Building 650 D&D Project was completed between August 2020 and June 2021.

Project-specific work procedures, Job Risk Assessments (JRAs), and Radiological Work Permits (RWPs), were developed to address hazards and work steps associated with the Building 650 D&D Project. Project work plans were provided to federal, state and county regulatory agencies for review. The information presented in the project plans was also reviewed by the site workers prior to initiating the project work activities. Copies of project plans were available onsite at all times for site workers to thoroughly review.

In accordance with the work planning documents referenced above, wet methods were used for dust mitigation and the following personal and general monitoring were performed (as necessary) during the Building 650 D&D Project:

- Radiological personal and area monitoring;
- Silica personal and area monitoring;
- Asbestos area monitoring; and
- Noise surveillance

Industrial hygiene (IH) and radiological oversight and monitoring are further discussed in **Section 5.0**. Completion of the Building 650 D&D Project was accomplished without any worker injuries categorized as lost time accidents.

Stakeholders were updated on the progress of the Building 650 D&D Project during regular BNL Community Advisory Council (CAC) meetings; and regulatory agencies were provided updates during regular Interagency Agreement (IAG) meetings.

2.1 Facility Preparation Activities

Facility preparation activities were completed between August 2020 and February 10, 2021, and included the following:

- Facility walkthroughs
- Radiological surveys and decontamination of isolated areas of fixed contamination;
- Removal of radiologically contaminated piping and ductwork;

- Asbestos abatement and removal of hazardous materials (i.e., materials that may contain lead, polychlorinated biphenyls [PCBs], mercury and cadmium);
- Removal of HEPA filters from filter plenums on the roof;
- Removal of equipment, debris, plywood and glass windows;
- Removal of trees adjacent to the building; and
- A bat survey to verify the absence of bats and any other nesting animals.

2.1.1 Decontamination and Removal of Contaminated Piping and Ductwork

As discussed in **Section 1.4**, areas of isolated fixed radiological contamination were present on the Hot Laundry side of Building 650. These areas were further defined by radiological surveys; and contaminated concrete was removed with a floor scabbler coupled with a high efficiency particulate air (HEPA) vacuum, as well as additional powered hand tools, to the extent possible prior to building demolition. The associated concrete debris was packaged for disposal as Low-Level Radioactive Waste (LLRW). Fixed radiological contamination that was not removed prior to building demolition, due to its location within or directly adjacent to loadbearing building components, was demarcated so that the associated debris could be later segregated for proper packaging and disposal as LLRW (discussed further in **Section 2.2.2**).

Photograph 2 – Portions of fixed radiological contamination removed from Hot Laundry side of Building 650.

In addition, a radiologically contaminated drain line and associated laterals that were suspended from the Hot Laundry basement ceiling, as well as radiologically contaminated ductwork, were removed with powered hand tools prior to building demolition and packaged for disposal as LLRW.

2.1.2 Asbestos Abatement and Hazardous Materials Removal

An asbestos survey of the interior of Building 650 was completed on May 6, 2008 to address findings of the 2007 Building 650 Exit Readiness Evaluation (ERE). As documented in the ERE Action Detail Report for Action 4104.1.7 – Finding 12, sample results were all below the 0.1 fiber/cc exposure limit. As part of the Building 650 D&D Project, asbestos abatement inside the building was limited to the removal of asbestos pipe wrap in the Hot Laundry basement and removal of a short length of asbestos pipe wrap that was identified in the annular space of the Hot Laundry concrete masonry unit (CMU) walls during the removal of radiologically contaminated drainpipe discussed in **Section 2.1.1**. The pipe wrap was removed and packaged by BNL asbestos abatement workers for disposal in accordance with BNL Standards Based Management System (SBMS) Subject Area, *Asbestos*.

The majority of materials that contained or were suspected to contain lead (e.g., roof flashings, gutters, lead-acid batteries), PCBs (e.g., light ballasts, electrical equipment), mercury (e.g., electrical equipment) and cadmium were removed from Building 650, and any liquids (e.g., oils, etc.) were drained from remaining equipment, in the years prior Building 650 D&D Project. Additional hazardous materials removed prior to building demolition as part of the Building 650 D&D Project included one mercury switch and less than 1 gallon of non-PCB oil from a compressor located in the Hot Laundry basement. These materials were packaged and disposed of in accordance with the BNL SBMS Subject Areas on Hazardous and Mixed Waste.

2.1.3 HEPA Filter Removal

Activities associated with the removal of HEPA filters from the roof of the High Bay (Reclamation) portion of Building 650 were completed between January 4, and January 12, 2021. To allow access to the filters, each of the three remaining T1-11 fan enclosures were removed from the High Bay roof using a National Crane 13110A Hydraulic Crane in accordance with an approved pre-engineered lift procedure.

Photograph 3 – Removal of one of three T1-11 fan enclosures on the roof the Building 650 High Bay.

A containment tent was secured around each filter plenum and the building roof inside the tent was covered with herculite prior to removing the plenum doors. Additionally, a water mist was applied to potentially contaminated surfaces of the HEPA filter and plenum interior prior to removing the filters. Once removed, HEPA filters were placed directly into pre-staged filter disposal boxes, which were then double-bagged, sealed with duct tape and placed into a B-25 container for disposal as LLRW. The T1-11 fan enclosure located at the southwestern corner of the High Bay roof included transite panels. These panels were removed and packaged by BNL asbestos abatement workers in accordance with the BNL SBMS Subject Area, *Asbestos* prior to the removal of the associated HEPA filters.

Photograph 4 – Containment tent constructed for asbestos abatement at southwestern T1-11 fan enclosure.

2.2 Building Demolition

Building demolition was completed between February 11, 2021 and May 4, 2021. Structural demolition was completed using standard heavy equipment, including excavators fitted with demolition attachments and front-end loaders.

Building demolition was completed in two phases: Phase I included demolition of the High Bay (Reclamation) side of Building 650, and Phase II included demolition of the Hot Laundry side of Building 650. The location of the High Bay and Hot Laundry are illustrated on the Building 650 Site Plan (**Figure 1-1**).

2.2.1 Building Demolition - Phase I

Phase I of building demolition was completed between February 11, 2021 and March 17, 2021. It included demolition and removal of the High Bay (Reclamation) on the west side of Building 650 down to the concrete slab and demolition and removal of the Sandblasting Room/Pit down to a minimum of two feet below existing grade. The wall that separated the High Bay from the Hot Laundry side of Building 650 was left in place for removal during Phase II of building demolition. The floor of the Sandblasting Pit was demolished with a hammer attachment on the excavator to facilitate future stormwater drainage. Phase I demolition debris was packaged and shipped as LLRW in accordance with the WMP.

Photograph 5 – Demolition of the High Bay during Phase I

2.2.2 Building Demolition – Phase II

Phase II of building demolition was completed between March 22, 2021 and May 4, 2021. Phase II included the demolition and removal of the Hot Laundry on the east side of the building, the High Bay concrete slab, and the surrounding asphalt, curbing, concrete walkways and road base material; all to at least two feet below grade.

Photograph 6 – Demolition of the Hot Laundry 1st floor during Phase II.

Due to the potential for asbestos pipe insulation within the annular space of CMU walls, an Asbestos Work Area was established and posted in accordance with BNL SBMS Subject Area: *Asbestos*, prior to initiating structural demolition of the Hot Laundry side of Building 650. Phase II demolition debris was inspected by a BNL Asbestos Inspector/Supervisor;

additional asbestos containing material was not identified during Phase II of the building demolition.

As discussed in **Section 2.1.1**, it was not feasible to decontaminate all areas of fixed radiological contamination in the Hot Laundry side of Building 650. This concrete was segregated during demolition and disposed of as LLRW in accordance with the WMP. In addition, the sump located in the Hot Laundry basement was also segregated during demolition and disposed of as LLRW. The remaining Phase II demolition concrete debris was either transported to the onsite borrow pit for recycling or shipped offsite for disposal as construction and demolition (C&D) waste. Metal debris was segregated and shipped offsite for recycling.

The Hot Laundry basement floor was demolished with a hammer attachment on the excavator to facilitate future stormwater drainage.

Photograph 7 – Removal of the Hot Laundry sump floor during Phase II.

2.2.3 Post-Demolition Survey

As discussed in **Section 2.3**, as-left surveys of the Hot Laundry Sump and Sandblasting Pit concrete were completed prior to the demolition of Building 650. Once the building was demolished, the associated debris was removed, and the worksite was backfilled, a preliminary 100% walkover gamma survey of the building footprint and the surrounding worksite was performed with a 3 x 3 uncollimated Sodium Iodide (NaI) detector. The post-demolition survey identified several isolated areas of radiological contamination ("hot spots") on the western half of the worksite, where count rates ranged from 60,000 to 999,000 counts per minute (cpm). Material associated with the radiological hots spots was either removed with a hand shovel or a backhoe until the NaI detector indicated count rates were less than 21,500 cpm, which is a count rate established on previous remediation projects at BNL to approximate a Cs-137 concentration of 15 pCi/g in soil at the ground

surface when using the uncollimated NaI gamma scintillation detector. Material removed from the hot spots was packaged and disposed of as LLRW in accordance with the WMP.

Photograph 8 – Backhoe excavating radiological hotspots and scanning areas with NaI detector.

2.3 As-Left Survey

The as-left survey was performed in accordance with the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismantlement (D&D) of Building 650* (BNL, September 9, 2020), referred to herein as the FSP. As further specified below, the as-left survey associated with portions of the building basement/foundation that were left in place (i.e., greater than 2 feet below grade) was completed prior to the start of building demolition; and the as-left survey within the building footprint and the surrounding area was completed after building demolition, as well as after the Hot Laundry basement and Sandblasting Pit were backfilled.

Photograph 9 – Performing as-left walkover radiological survey.

2.3.1 As-Left Survey Design

In accordance with the FSP, the as-left survey included alpha/beta scans, gamma scans, fixed point gamma readings, as well as the collection of concrete and soil samples for laboratory analysis. The following were included in the as-left survey:

- Sandblasting Pit: Floor (150 ft^2) and remaining portion of walls
- Soil below Sandblasting Pit
- Hot Laundry basement: floor (4900 ft^2) and remaining portion of walls
- Hot Laundry sump: Floor (100 ft^2) and remaining portion of walls
- Soil below Hot Laundry sump
- Soil before backfilling and grading: previous slab-on-grade areas within footprint of Building 650
- Soil before backfilling and grading: outside footprint of Building 650
- Soil after backfilling and grading: remaining areas within footprint of Building 650 (i.e., areas where a basement was present)

Although the Operable Unit (OU) I Record of Decision (ROD) (BNL, 1999b) does not directly apply to the Building 650 D&D Project, the associated cleanup levels provided below in **Table 2-1** and **Table 2-2** were used as a reference for documenting as-left conditions. These cleanup levels are referred to herein as the OU I ROD cleanup criteria.

Table 2-1 – Residential Use Soil Cleanup Levels for Principal Radiological Contaminants at BNL and Additional Radionuclides

Radionuclide	Soil Cleanup Level (pCi/g)
*Cesium-137 (Cs-137)	23
*Strontium-90 (Sr-90)	15
*Radium-226[a] (Ra-226)	5
Tritium	1,010
Uranium-235[b] (U-235)	4.6
Uranium-238[b] (U-238)	4.7
Plutonium-238 (Pu-238)	57
Plutonium-239/240 (Pu-239/240	35
Americium-241 (Am-241)	34

* Principal Radiological Contaminant at BNL

a- Radium-226 is not expected at levels exceeding the cleanup criteria, but it is listed as a radioactive contaminant of concern based on its specific listing in the OU I ROD and guidance from DOE.

b- Values listed for uranium are based on 4 millirem per year from groundwater consumption.

Table 2-2 – Residential Use Soil Cleanup Levels for Principal Chemical Contaminants at BNL

Contaminant	Soil Cleanup Level (mg/kg)[a]
Lead	400
Mercury	1.84

The soil cleanup levels are based on EPA's soil screening level guidance (OSWER 9355.4-23).

The results of the as-left survey are discussed below. Tabulated analytical results and radiological survey reports are included in **Appendix A**.

2.3.2 As-Left Survey of Hot Laundry Basement

Sixteen concrete samples were collected from the Hot Laundry basement floor at locations specified on Figure 3 of the FSP; and four concrete samples were collected from the remaining Hot Laundry basement walls (one sample from the approximate center of each wall, 3 feet above the floor). The 16 floor samples and 4 wall samples were analyzed by gamma spectroscopy. In addition, 3 samples were composited from the 16 floor samples and were analyzed for Sr-90, Ra-226, tritium, U-235, U-238, Pu-238, Pu-239, Am-241, lead and mercury. Laboratory analysis of the Hot Laundry basement concrete samples was performed by GEL. All radionuclides and metals were either not detected in the concrete samples or were detected at concentrations below the OU I ROD cleanup criteria.

Fixed point gamma readings were taken, and gross alpha and beta wipes were collected at each concrete sample location. In addition, alpha, beta and gamma surveys were performed for 100% of the Hot Laundry basement floor and for 10% of the remaining Hot Laundry basement walls. Radiological survey results for the Hot Laundry basement floor and walls indicated discrete isolated areas exceeding the free release criteria for total contamination levels specified in Table 2-6 of the BNL Radiological Control Manual. These areas are illustrated on **Figure 2-1**.

Hot Laundry basement concrete sample results and BNL radiological survey reports are provided in **Appendix A**.

2.3.3 As-Left Survey of Hot Laundry Sump (Concrete and Underlying Soil)

Concrete

As discussed in Section 2.2.2, although the Hot Laundry Sump was part of the planned as-left survey, the sump was subsequently removed and disposed of as LLRW.

Prior to removal, four concrete samples were collected from the floor of the Hot Laundry Sump and two concrete samples were collected from the sump walls. Each of the Hot Laundry Sump floor and wall samples was analyzed by gamma spectroscopy. In addition, a composite of the four floor samples was analyzed for Sr-90, Ra-226, tritium, U-235, U-238, Pu-238, Pu-239, Am-241, lead and mercury. Laboratory analysis was performed by GEL. All wall sample results were below the OU I ROD cleanup criteria. In the floor composite sample, Cs-137 was detected at a concentration of 1,180 pCi/g, Plutonium 239/240 was detected at a concentration of 51.2 pCi/g and tritium was detected at a concentration of 976 pCi/g. The floor composite sample also exhibited a concentration of lead (40,900 mg/kg) in exceedance of the OU I ROD cleanup criteria. Cs-137 was also detected at a concentration of 37.3 pCi/g in one of the four individual floor samples. All other radionuclides and metals were either not detected or detected below the OU I ROD cleanup criteria in the sump floor samples.

Fixed point gamma readings were taken and gross alpha and beta wipes were collected at each sump concrete sample location. In addition, alpha, beta and gamma surveys were performed for 100% of the sump floor and for 10% of the sump walls. Radiological survey results for the subsequently removed sump floor and walls indicated discrete isolated areas exceeding the free release criteria for total contamination levels specified in Table 2-6 of the BNL Radiological Control Manual.

Hot Laundry Sump concrete sample results and BNL radiological survey reports are provided in **Appendix A**.

Underlying Soil

One boring was performed from 0 to 4 feet beneath the Hot Laundry Sump prior to its removal. Each 1-foot interval (0-1', 1-2', 2-3' and 3-4') was analyzed by gamma

spectroscopy; and a composite sample (0-4') was analyzed for gamma spectroscopy, Sr-90, Ra-226, tritium, U-235, U-238, Pu-238, Pu-239, Am-241, lead and mercury. Laboratory analysis of the soil samples was performed by GEL. All radionuclides and metals were either not detected or detected below the OU I ROD cleanup criteria in the soil samples. The Hot Laundry Sump underlying soil sample results are provided in **Appendix A**.

2.3.4 As-Left Survey of Sandblasting Pit (Concrete and Underlying Soil)

Concrete

Four concrete samples were collected from the floor, one concrete sample was collected from the east wall, and one concrete sample was collected from the west wall. Each concrete sample was analyzed by gamma spectroscopy, and a composite of the four floor samples was analyzed for Sr-90, Ra-226, tritium, U-235, U-238, Pu-238, Pu-239, Am-241, lead and mercury by GEL. All wall sample results were below the OU I ROD cleanup criteria. Cs-137 was detected in each of the floor samples at concentrations ranging from 22.8 to 55.3 pCi/g. Lead was detected at a concentration of 662 mg/kg in the floor composite sample. All other radionuclides and metals were either not detected or detected below the OU I ROD cleanup criteria in the Sandblasting pit floor samples.

Fixed point gamma readings were recorded and gross alpha and beta wipes were collected at each Sandblasting Pit concrete sample location. In addition, alpha, beta and gamma surveys were performed for 100% of the Sandblasting Pit floor and for 10% of the Sandblasting Pit walls. As illustrated on **Figure 2-1**, radiological survey results for the Sandblasting Pit floor and walls indicated discrete isolated areas exceeding the free release criteria for total contamination levels specified in Table 2-6 of the BNL Radiological Control Manual.

Sandblasting Pit concrete sample results and BNL radiological survey reports are provided in **Appendix A**.

Underlying Soil

Two soil borings were performed from 0 to 4 feet beneath the Sandblasting Pit. Each 1-foot interval (0-1', 1-2', 2-3' and 3-4') was analyzed by gamma spectroscopy; and a composite sample (0-4') from each soil boring was analyzed for gamma spectroscopy, Sr-90, Ra-226, tritium, U-235, U-238, Pu-238, Pu-239, Am-241, lead and mercury. Laboratory analysis of the soil samples was performed by GEL. Cs-137 was detected above OU I ROD cleanup criteria in all but one of the soil samples; the highest concentration (119 pCi/g) was detected in the 0 to 1 foot interval at Boring Location #2. All other radionuclides and metals were either not detected or detected below the OU I ROD cleanup criteria in the soil samples. Sandblasting Pit underlying soil sample results are provided in **Appendix A**.

2.3.5 As-Left Survey of Surface Soils

A 100% walkover gamma survey of the building footprint and the surrounding worksite was performed with a 3 x 3 uncollimated NAI detector. With the exception of the Hot Laundry Basement footprint and the Sandblasting Pit footprint, the walkover gamma survey was completed prior to the placement of backfill. As illustrated on **Figure 2-2**, results of the walkover survey exhibited count rates below 15,000 counts per minute (cpm) for much of the survey area. Although there were a few isolated areas that exhibited count rates between 15,000 and 21,499 cpm, all count rates within the survey area were less than 21,500 cpm. As discussed previously, the value of the 21,500 cpm count rate has been established on previous remediation projects at BNL to approximate a Cs-137 concentration of 15 pCi/g in soil at the ground surface when using the uncollimated NaI gamma scintillation detector.

Surface soil samples were collected at 20 locations within the boundaries of the as-left survey area, as illustrated on **Figure 2-3.** The samples were analyzed for gamma spectroscopy, Sr-90, Ra-226, tritium, U-235, U-238, Pu-238, Pu-239, Am-241, lead and mercury by GEL. All sample results were below the OU I ROD cleanup criteria. Surface soil sample results are provided in **Appendix A**. GEL laboratory reports can be made available upon request.

2.4 Waste Management

2.4.1 Waste Characterization, Handling and Disposal

The waste management strategy, waste characterization, packaging, handling, and storage were performed in accordance with the *Building 650 Waste Management Plan* (BNL, March 2021) and BNL SBMS waste management procedures. Waste generated during the Building 650 D&D Project characterized as LLRW included concrete, metal, asphalt, soil and personal protective equipment (PPE). The remaining building debris was either characterized as C&D waste, recyclable metal, or recyclable concrete.

Oversized debris was placed in a three-side metal bin ("crush box"), where it was size-reduced with the excavator. The waste shipped met the Waste Acceptance Criteria (WAC) of the disposal facilities specified below. Waste verification results were submitted to BNL's Waste Management Program. All LLRW was shipped to Energy Solutions of Utah.

Waste loading and shipping was initiated in January 2021 and was completed in March, 2022. I.C.E Service Group provided intermodal and supersack shipping containers for LLRW. Railcars and rail transportation of LLRW was provided by NAC LPT, LLC. CAST Transportation provided truck transportation of LLRW packaged in B-25 containers, which were provided from BNL EPD Waste Management's inhouse supply.

C&D waste was shipped by truck in roll-off containers provided by Eastern Environmental Solutions. Crestwood Metal Corporation provided roll-off containers and trucks for the shipment of recyclable metal. Recyclable concrete was shipped to the onsite borrow pit using BNL dump trucks.

It should be noted that concrete transported to the onsite borrow pit is subsequently crushed and processed for use as aggregate for onsite construction projects.

A project waste summary is provided below in **Table 2-3**. It should be noted that the mercury switch removed prior to building demolition, as discussed in Section 2.1.2, is not included in Table 2-3. The switch was added to 55-gallon drum used for hazardous waste accumulation, which was staged at BNL's Hazardous Waste Management Facility for future disposal. The approximate 300 cubic feet of asbestos-containing material (ACM) and less than 1 gallon of non-PCB oil discussed in Section 2.1.2 are included in the manifested volume of LLRW presented in Table 2-3 below. LLRW manifests and C&D waste tickets are provided in **Appendix B**.

Photograph 10 – Intermodals filled with LLRW after being transported to waste staging area.

Table 2-3

Project Waste Summary

Waste Type	Manifested Volume	Containers	Disposal Facility	Number/Conveyances
LLRW – Concrete, Metal, Asphalt, Soil, ACM, PPE and <1gal of non-PCB oil (solidified)	1,103 yd^3 (LLRW)	34-Intermodals 16-Supersacks 17 B-25s	Energy Solutions of Clive, Utah	5 ABC Railcars 2 Gondola Railcars 3 Trucks
C&D Debris	900 yd^3	30-Roll-off Containers	Eastern Environmental Solutions of Manorville, NY	30 Trucks
Recyclable Metal	400 yd^3	10-Roll-off Containers	Crestwood Metal Corporation of Holbrook, NY	10 Trucks
Recyclable Concrete	140 yd^3	Dump Truck	Onsite Borrow Pit	7 Trucks

Photograph 11 – LLRW packaged for shipment by rail.

2.4.2 Pollution Prevention and Waste Minimization Opportunities

Waste minimization and pollution prevention methods employed during the Building 650 D&D Project included the segregation of metal and concrete for recycling, as well as the judicious use of consumables (PPE).

2.5 Site Restoration

Site restoration included the backfilling of the Hot Laundry basement and Sandblasting Pit to grade with soil from existing onsite stockpiles, which were previously confirmed to have met the requirements of NYSDEC Part 375 Soil Cleanup Objectives, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives. Backfilled soil was compacted in 1-foot lifts. Final grade was established with the placement of topsoil and the Building 650 footprint and surrounding worksite were seeded with native grasses. Backfill soil results are provided in **Appendix C**. Upon completion of site restoration, all personnel, materials, and equipment were demobilized.

Photograph 12 – Backfilling Hot Laundry basement.

3.0 CHRONOLOGY OF EVENTS

Table 3-1 lists a chronology of the main events associated with Building 650:

Table 3-1 Chronology of Events for Building 650

Date	Event
1994	Building 650 Underground Storage Tanks removed
2002	Building 650 Sump Outfall remediated
2005	Building 650 Hoppers removed
September 2020	Building 650 Demolition Work Plan and FSP finalized
August 2020 - February 2021	Facility preparation activities for Building 650 D&D
February 11 – March 17, 2021	Phase I of Building 650 demolition completed
March 22 – May 4, 2021	Phase II of Building 650 demolition completed
January 2021 – July 2021	As-Left Survey performed
January 2021 – March 2022	Building 650 D&D Project waste shipment/disposal

4.0 PERFORMANCE STANDARDS & QUALITY CONTROL

Physical and radiological inspections were conducted on both incoming and outgoing intermodal containers. Inspections were also conducted on excavations and stormwater control measures during D&D activities. Field sampling procedures were reviewed periodically.

QA/quality control (QC) samples were collected in accordance with EM-SOP-200, *Collection and Frequency of Field Quality Control Samples.* Field duplicates were collected at a frequency of one per twenty soil samples and analyzed for the radiological contaminants of concern. Data verification, which was performed for 100% of the analytical laboratory data reports, noted four unsatisfactory findings associated with contract detection limits and missing data qualifiers. According to BNL EPD's subject matter expert, the unsatisfactory findings did not negatively impact the overall reported results. Data verification checklist are provided in **Appendix D**.

5.0 FINAL INSPECTION AND CERTIFICATIONS

There was strict adherence to industrial safety and radiological safety precautions during the Building 650 D&D Project. Work was performed under written and approved procedures, and any potentially hazardous tasks were highlighted in the procedure to ensure understanding and compliance. JRAs were developed and approved for the work. Radiological safety and oversight was provided by Radiological Control Technicians (RCTs), and all work was performed under a RWP, when applicable. Completion of the Project was accomplished without any worker injuries categorized as lost time accidents.

5.1 Industrial Hygiene Oversight & Monitoring

Industrial hygiene (IH) oversight and monitoring for the Building 650 D&D Project was conducted by BNL personnel and Contractors in accordance with BNL procedures. JRAs identified hazards associated with each of the tasks identified and specified the required controls for each hazard. A designated Site Health and Safety Officer was onsite during D&D activities to ensure controls were in place as specified in work plans and JRAs, including the use of safety equipment, safe work practices, excavation safety and contaminant controls. IH monitoring included lead, cadmium, and silica personal and area monitoring, as well as noise surveillance. All cadmium results collected were below the detectable limit. Lead and silica results were significantly below the associated American Conference of Governmental Industrial Hygienists and Occupational Safety and Health Administration regulatory limits. All IH monitoring data is maintained with the BNL Safety and Health Services Division.

5.2 Radiological Oversight & Monitoring

Radiological oversight and monitoring for the Building 650 D&D Project were conducted by BNL Radiological Control Division personnel in accordance with the BNL Radiological Control Manual and implemented via project specific radiological work permits.

All personnel were monitored for external dose using Thermoluminescent dosimeters (TLDs) when entering Controlled Areas where TLDs were required. This includes entry into posted Radiation and Contamination Areas, as well as in Soil Contamination Areas. Personnel internal contamination was monitored by whole body count and urine bioassay, which were required for select workers performing tasks such as sectioning and packaging contaminated piping systems, HEPA filer removal from the High Bay roof, and contaminated duct removal. These monitoring results indicate no internal personnel contamination.

Perimeter air monitoring was performed during demolition activities to verify no spread of airborne radioactivity. Job-specific area and personal air monitoring were required when performing tasks such as sectioning and packaging contaminated piping systems, HEPA filter removal from the High Bay roof, contaminated duct removal, and other demolition

activities where respiratory protection was required. Perimeter and area air monitoring showed no spread of airborne radioactivity.

All tools and equipment used during the Project were also monitored for radiological contamination. All items that were not able to be released from radiological control per the BNL Radiological Control Manual, Table 2-6 and FS-SOP-1005, *Radiological Surveys Required for Release of Materials from Areas Controlled for Radiological Purposes* (BNL, 2014) were labelled and disposed of as radioactive waste.

Photograph 13 – Air sampling station for radioactivity.

6.0 OPERATION AND MAINTENANCE ACTIVITIES

The BNL Land Use Controls Management Plan (2013) and the Land Use and Institutional Controls Fact Sheet/Map will be revised by Brookhaven Science Associates (BSA's) Groundwater Protection Group to reflect demolition of Building 650 and associated underground structures/utilities, current site conditions and post remediation surveillance and maintenance activities for the former Building 650 grounds. Applicable BNL site utility drawings will be updated. BSA will perform surveillance and maintenance activities, including maintaining vegetation within the building footprint and surrounding area to prevent soil erosion. In addition to maintaining institutional controls for the area, BSA will ensure that routine surveillance/inspections are performed.

7.0 OBSERVATIONS AND LESSONS LEARNED

The following is a summary of the lessons learned from this project and the corrective actions for future projects:

- It was initially assumed that demolition debris from the entire building would need to be disposed of as LLRW. The project team, however, was able to take advantage of limited site operations during the COVID-19 pandemic to perform a full radiological survey of the building, and determined the radiological contamination was limited to High Bay and isolated areas within the Hot Laundry side of the building. Significant cost savings were realized by removing and disposing the High Bay and contaminated materials within the Hot Laundry side of the building as LLRW, and demolishing and disposing the remaining Hot Laundry side of the building as C&D waste.

- The demolition work was performed in-house using BNL trade workers rather than with contracted workers, which offered a number of advantages. The BNL trade workers were experienced in working under radiological conditions and, therefore, were more efficient than a contracted worker with no radiological work experience. In addition, since the demolition work was performed during the late winter/early spring, inclement weather affected the work schedule. If weather conditions were not conducive for the demolition work (i.e., high winds, heavy rain, snow/ice), the BNL trade workers could be re-assigned to other duties on the BNL campus; therefore, their labor time was not charged to the project during delays. If the demolition work had been performed by contracted labor, the contractor would have been entitled to a change order for the idle time.

- Although previous asbestos surveys of the interior of Building 650 did not indicate the presence of asbestos, a small length of asbestos pipe wrap was identified in the annular space of the Hot Laundry CMU walls during facility preparation activities. Although the pipe wrap was removed and packaged by BNL asbestos abatement workers prior to building demolition, it was determined that there was a potential for encountering additional asbestos insulation during demolition of the Hot Laundry side of the building. This required that asbestos controls had to be in place prior to initiating demolition of the Hot Laundry side of the building. Additional asbestos was not encountered.

8.0 PROTECTIVENESS

Completion of the Building 650 D&D Project is protective of human health and the environment. The associated actions have removed the majority of radioactivity from the site and minimized the potential for the migration of contaminants into the underlying groundwater.

REFERENCES

BNL SBMS Subject Area: *Asbestos.*

BNL EM-SOP-200, *Collection and Frequency of Field Quality Control Samples*

BNL, 1999. *Record of Decision, Operable Unit I and Radiologically Contaminated Soils*, August 1999.

BNL, 2020. *Demolition Work Plan for the Decontamination and Dismantlement (D&D) of Building 650 (Former Reclamation & Hot Laundry Facility)*, September 9, 2020.

BNL, 2020. *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismantlement (D&D) of Building 650*, September 9, 2020.

BNL, 2021. *Building 650 Waste Management Plan*, March 2021.

BNL, 2014. FS-SOP-1005, *Radiological Surveys Required for Release of Materials from Areas Controlled for Radiological Purposes,* 2014.

Figures

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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	BNL2005	Designed by:	MM
Date:	11/2/2021	Drawn by:	PH
Scale:	AS SHOWN	Approved by:	MM

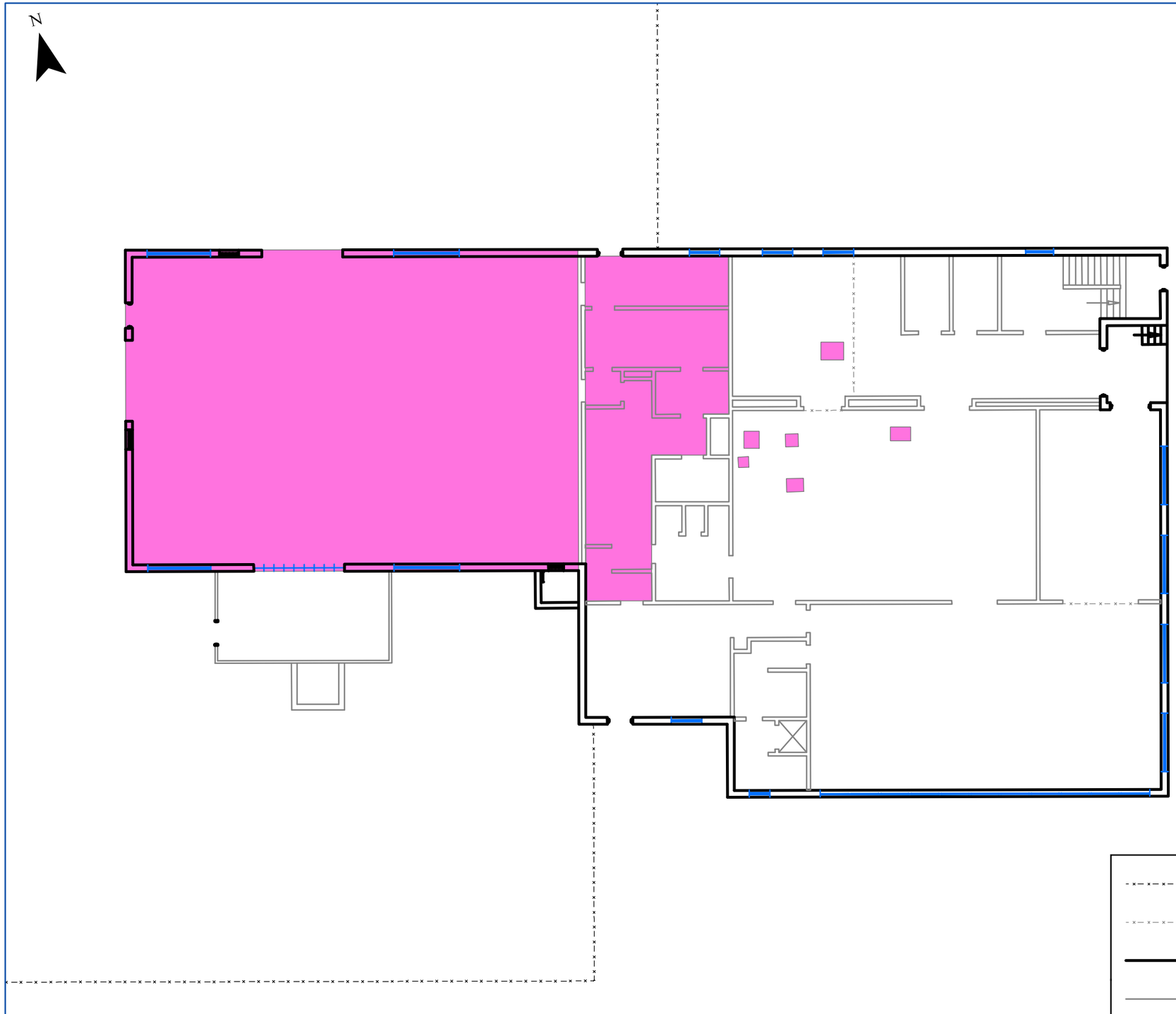
Building 650 Site Plan

Brookhaven National Lab

FIGURE NO:

1-1

Document Path: W:\Projects\A-D\BNL\2005\maps\Building650CloseoutReport\FIG01-1_SitePlan.mxd



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Scale:	AS SHOWN	Approved by:	MM

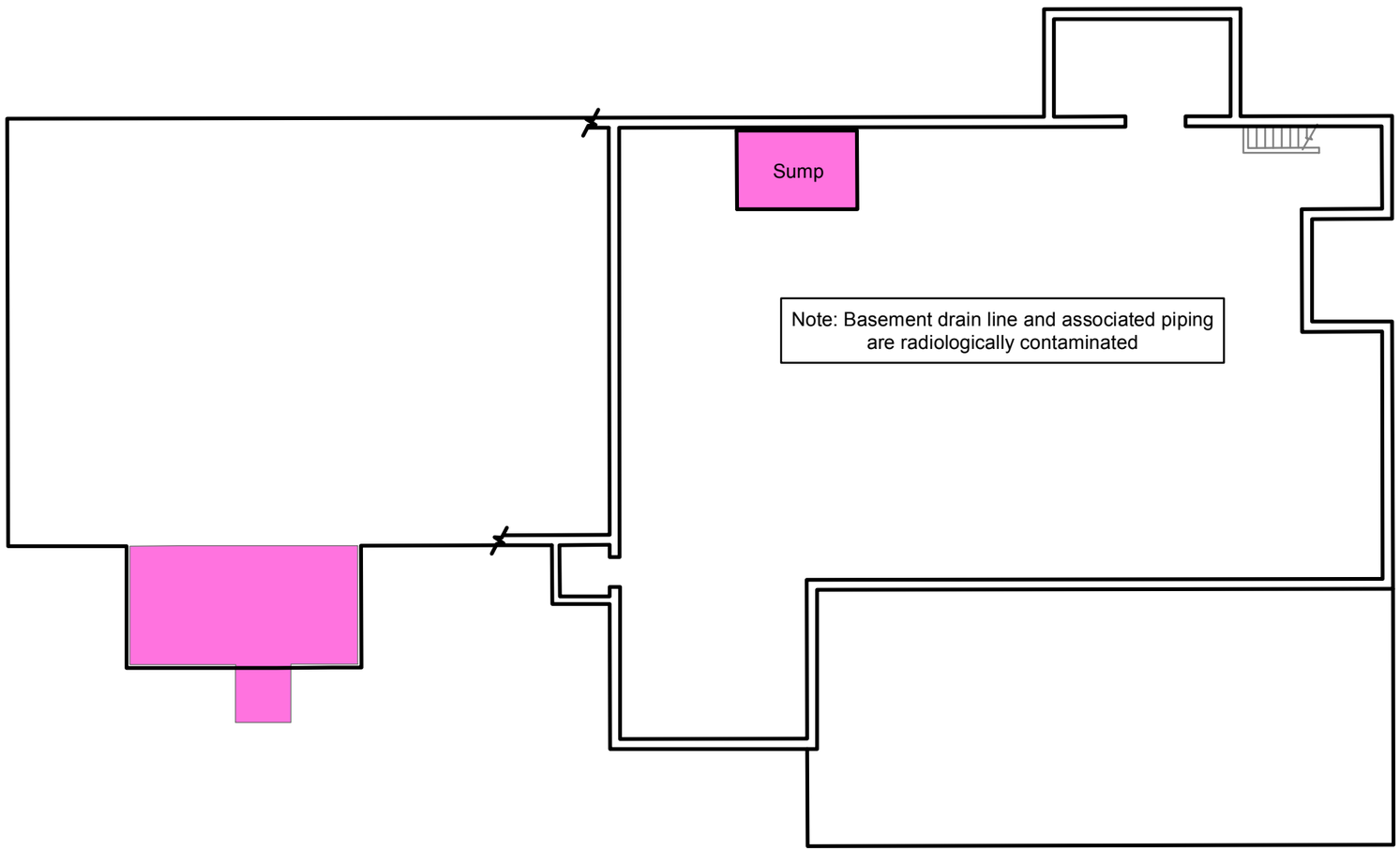
Building 650 First Floor Areas of Known Radiological Contamination

Brookhaven National Lab

FIGURE NO:

1-2a

Document Path: W:\Projects\A-D\BNL\2005\maps\FIG03-3a_AOC_firstfloor.mxd



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Project:	BNL2005	Designed by:	MM
Date:	11/2/2020	Drawn by:	PH
Scale:	AS SHOWN	Approved by:	MM

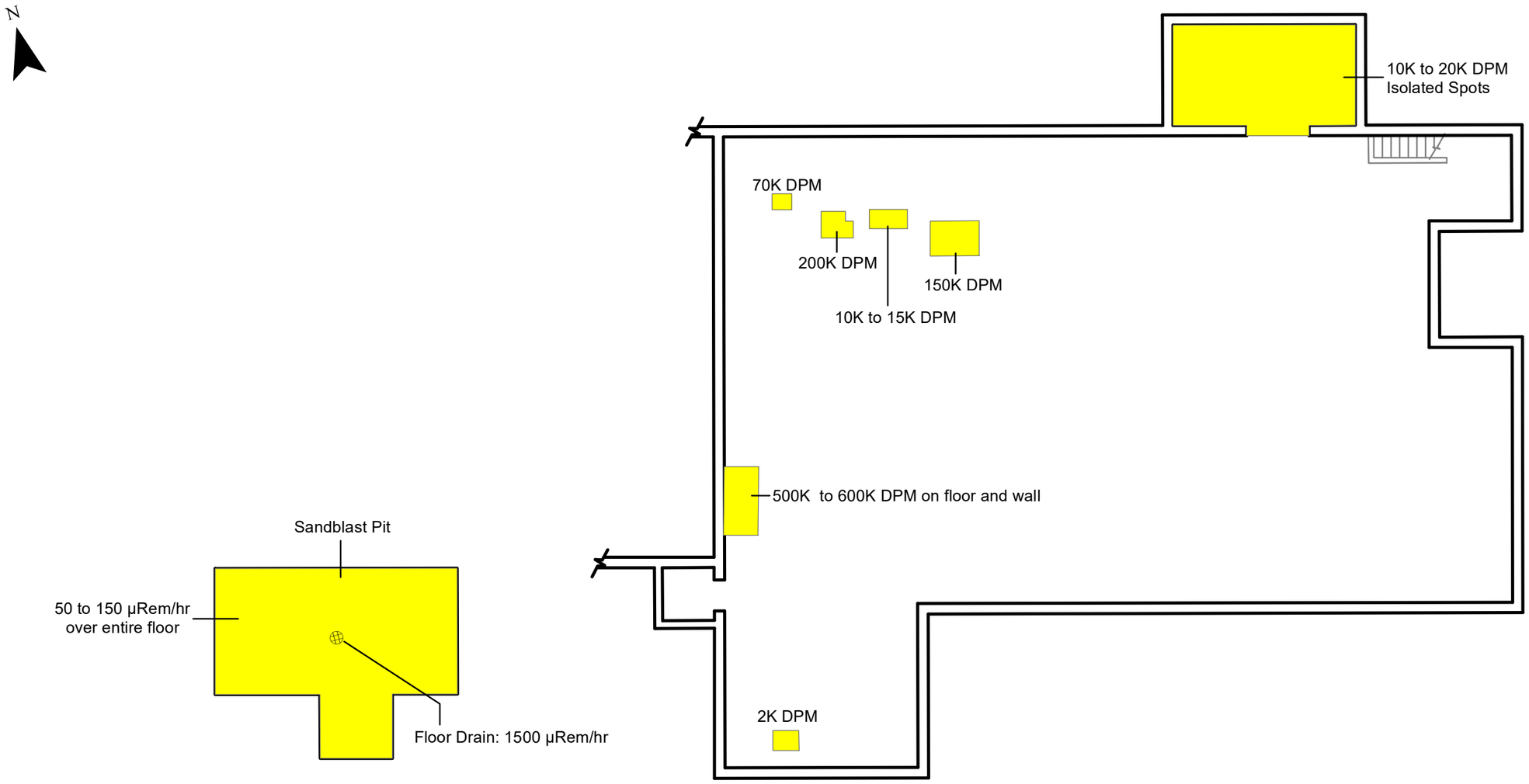
Building 650 Basement Areas of Known Radiological Contamination

Brookhaven National Lab

FIGURE NO:

1-2b

Document Path: W:\Projects\A-D\BNL\2005\maps\FIG03-3b_AOC_basement.mxd



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Project:	BNL2005	Designed by:	MM
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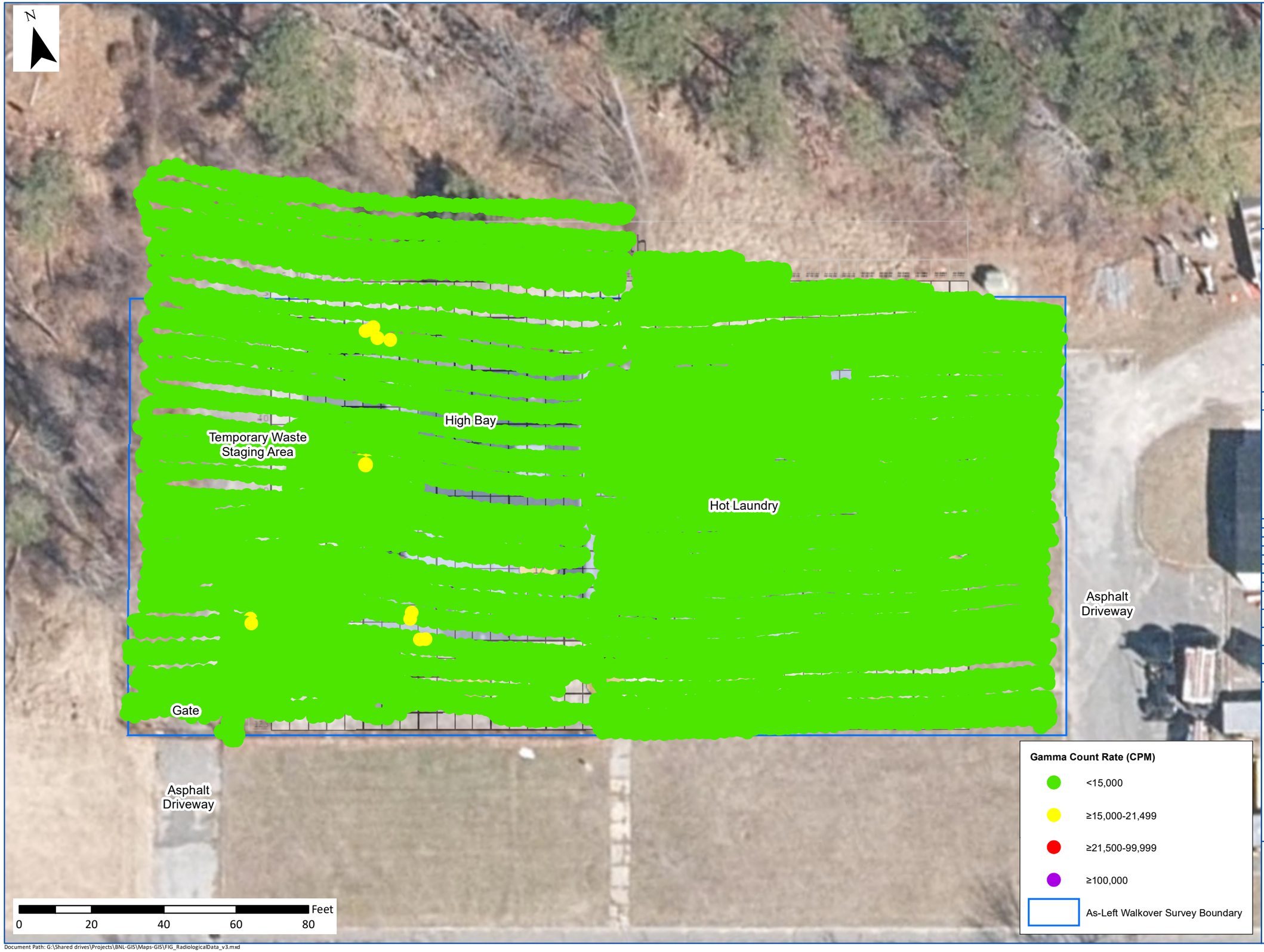
Building 650 As-Left Concrete Radiological Survey Results

Brookhaven National Lab

FIGURE NO:

2-1

Document Path: W:\Projects\A-D\BNL\2005\maps\Building650CloseoutReport\FIG_BasementRadiologicalHotspots.mxd



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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	BNL2005	Designed by:	SC
Date:	12/23/2021	Drawn by:	PH
Scale:	AS SHOWN	Approved by:	MM

Building 650 As-Left Surface Soil Walkover Gamma Survey Results

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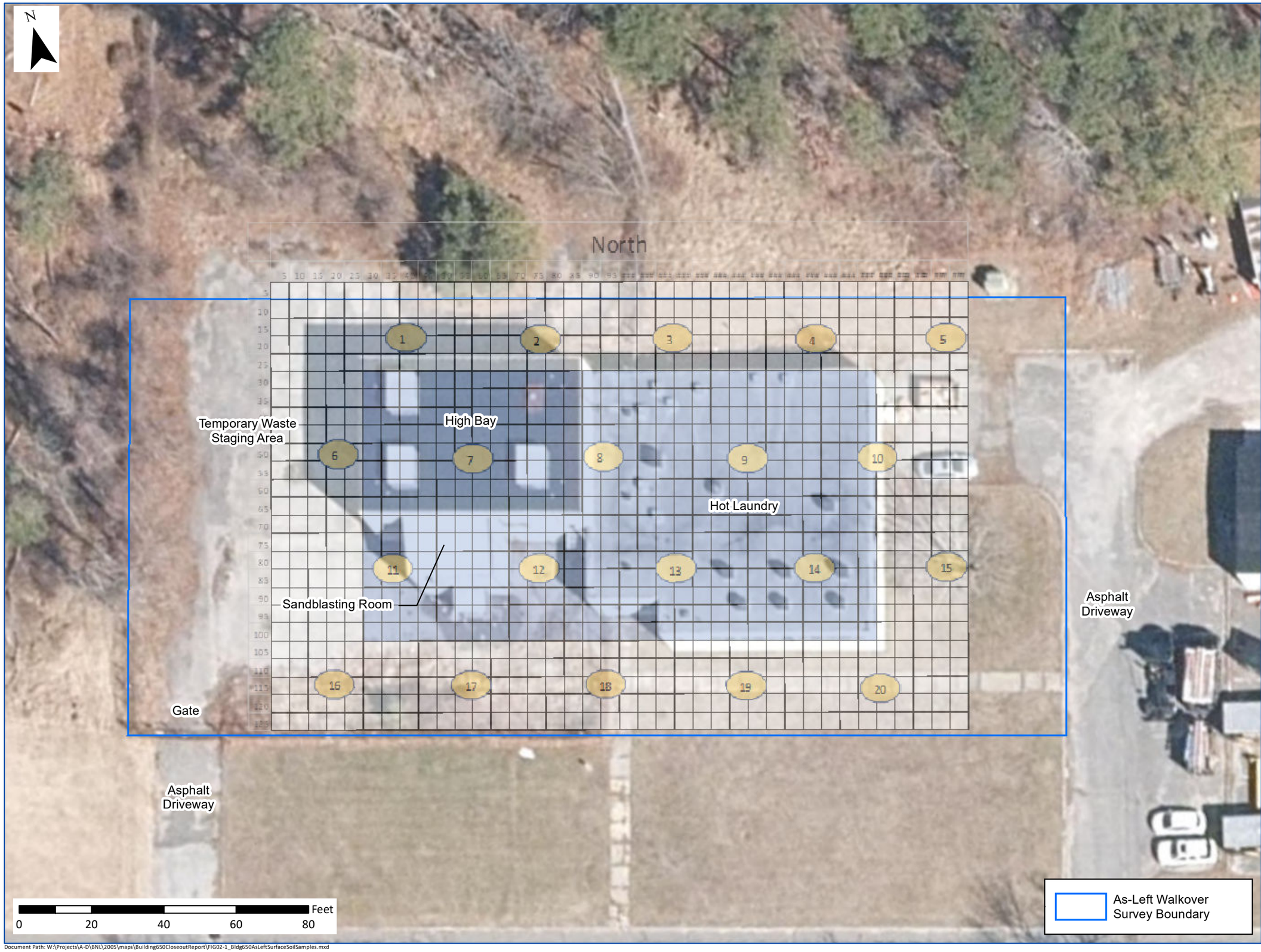
FIGURE NO:

2-2



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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	BNL2005	Designed by:	MM
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Scale:	AS SHOWN	Approved by:	MM

Building 650 As-Left Surface Soil Sample Locations

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FIGURE NO:

2-3

Document Path: W:\Projects\A-D\BNL\2005\maps\Building650CloseoutReport\FIG02-1_Bldg650AsLeftSurfaceSoilSamples.mxd

Appendix A
As-Left Survey Analytical Results and Radiological Survey Reports

Building 650 As-Left Survey
Sandblasting Pit Soil and Concrete Analytical Data

Client Sample ID:	Soil Cleanup Levels (pCi/g) [1] or (mg/kg) (2)	650 Sand Blast Pit soil 1-G1	650 Sand Blast Pit soil 1-G2	650 Sand Blast Pit soil 1-G3	650 Sand Blast Pit soil 1-G4	650 Sand Blast Pit soil 1-C1	650 Sand Blast Pit soil 2-G1	650 Sand Blast Pit soil 2-G2	650 Sand Blast Pit soil 2-G3	650 Sand Blast Pit soil 2-G4	650 Sand Blast Pit soil 2-C1	650 Sand Blast Pit floor-1	650 Sand Blast Pit floor-2	650 Sand Blast Pit floor-3	650 Sand Blast Pit floor-4	650 Sand Blast Pit floor Comp	650 Sand Blast Pit West wall	650 Sand Blast Pit soil East wall
Sample Depth:		0.0-1.0	1.0-2.0	2.0-3.0	3.0-4.0	0.0-4.0	0.0-1.0	1.0-2.0	2.0-3.0	3.0-4.0	0.0-4.0	0	0	0	0	0	0	0
UID		42605-001	42605-002	42605-003	42605-004	42605-005	42605-006	42605-007	42605-008	42605-009	42605-010	42563-001	42563-002	42563-003	42563-004	42563-005	42563-006	42563-007
Sampling Date:		12/9/2020	12/9/2020	12/9/2020	12/9/2020	12/9/2020	12/9/2020	12/9/2020	12/9/2020	12/9/2020	12/9/2020	1/20/2021	1/20/2021	1/20/2021	1/20/2021	1/20/2021	1/20/2021	1/20/2021
Alpha Spec Analysis																		
Americium-241	34	NA	NA	NA	NA	0.0732 U	NA	NA	NA	NA	0.29 J	NA	NA	NA	NA	0.306 U	NA	NA
Plutonium-238	57	NA	NA	NA	NA	0.0471 U	NA	NA	NA	NA	0.0274 U	NA	NA	NA	NA	0.0870 U	NA	NA
Plutonium-239/240	35	NA	NA	NA	NA	-0.0168 U	NA	NA	NA	NA	1.03 J	NA	NA	NA	NA	0.358 U	NA	NA
Uranium-235/236	4.6	NA	NA	NA	NA	-0.0175 U	NA	NA	NA	NA	0 U	NA	NA	NA	NA	0.286	NA	NA
Uranium-238	4.7	NA	NA	NA	NA	1.2 U	NA	NA	NA	NA	1.63	NA	NA	NA	NA	1.26	NA	NA
Gamma Spec Analysis																		
Americium-241	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.490	0.278	NA	NA
Beryllium-7	NS	-0.143 U	0.162 U	-0.365 U	-0.191 U	0.497 U	0.148 U	0.818 U	0.459 U	0.0145 U	-0.399 U	1.35 U	2.58 UI	0.180 U	-0.471 U	0.419 U	-0.302 U	-0.154 U
Cesium-137	23	**58.3**	**32.2**	**55.1**	**39.1**	**71.0**	**119**	**95.1**	**49.0**	13.9	**58.8**	**55.3**	**44.7**	**34.6**	**48.9**	**22.8**	3.47	1.06
Cobalt-57	NS	0.0283 U	0.0552 U	0.143 UI	0.0717 UI	0.00123 U	0.0668 U	0.0716 UI	0.0156 U	0.154	0.0087 U	3.16 UI	0.947 UI	8.59 UI	0.579 UI	1.69 UI	0.176 UI	0.0175 U
Cobalt-60	NS	-0.00266 U	0.0829 UI	0.0222 U	0.0235 U	0.0172 U	0.0179 U	0.0257 U	0.00630 U	0.00308 U	0.00873 U	0.478	0.803	1.12	1.04	0.372	0.00787 U	0.00628 U
Europium-152	NS	0.478	0.351	0.610	NA	0.437	2.10	0.623	1.27	0.534	0.784	9.03	12.6	23.9	14.6	4.81	0.555	NA
Europium-154	NS	NA	NA	NA	NA	0.178	0.381	NA	NA	NA	NA	1.83	3.31	10.3	2.67	1.07	NA	NA
Manganese-54	NS	0.00984 U	-0.0116 U	0.00594 U	0.0342 UI	0.0277 U	-0.00898 U	0.00276 U	0.00390 U	0.00303 U	-0.00226 U	0.00427 U	0.00239 UI	-0.0415 U	0.0244 U	0.00270 U	-0.0428 U	0.00579 U
Potassium-40	NS	8.34	8.5	7.58	7.21	7.61	7.93	8.38	7.60	7.66	7.23	4.73	5.43	3.56	4.47	3.98	5.98	6.01
Radium-226	5	0.442	0.571	0.390 U	0.296	0.520	0.800	0.459	0.554	0.443	0.587	0.304 UI	0.0558 UI	0.180 U	0.224 U	0.229 UI	0.151 U	0.261 UI
Sodium-22	NS	0.0436 U	0.0309 U	0.0144 U	0.0182 U	0.0633 U	0.135 UI	0.0215 U	0.113 UI	0.0559 UI	0.0622 UI	0.0570 U	0.272 UI	0.419 UI	0.219 UI	0.0483 U	0.0283 U	0.00910
Thorium-228	NS	0.717	0.635	0.710	0.585	0.752	0.679	0.793	0.553	0.627	0.547	0.376 UI	0.236 UI	0.270 UI	0.228 UI	0.173 UI	0.256	0.265 UI
Gas Flow Proportional Counting																		
Srtontium-90	15	NA	NA	NA	NA	5.86	NA	NA	NA	NA	0.648 U	NA	NA	NA	NA	7.46	NA	NA
Liquid Scintillation Analysis																		
Tritium	1,010	NA	NA	NA	NA	12.8 U	NA	NA	NA	NA	-38.1 U	NA	NA	NA	NA	-13.1 U	NA	NA
Chemical Analysis																		
Lead	400	41.6	NA	NA	NA	41.6	NA	NA	NA	NA	22.59	NA	NA	NA	NA	**662**	NA	NA
Mercury	1.84	0.198	NA	NA	NA	0.198	NA	NA	NA	NA	0.0719	NA	NA	NA	NA	0.555	NA	NA

Notes:
Concentrations in pCi/g
(1) Specified in Table 1 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650*
(2) Specified in Table 2 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650,* based on EPA's soil screening level guidance (OSWER 9355.4-23)
NS - No Soil Cleanup Level
NA - Not Analyzed
MDL - Method Detection Limit
RL - Quantification Limit or Reporting Limit
U - Indicates that the analyte was not detected at the laboratory MDL
UI - Uncertain identification for gamma spectroscopy
J - Value is estimated
DL - Failed required detection limit
Highlighted text denotes concentrations exceeding Soil Cleanup Level

Building 650 As-Left Survey
Basement Sump Soil and Concrete Analytical Data

Client Sample ID:	Soil Cleanup Levels (pCi/g) [1] or (mg/kg) (2)	650 Basement Sump soil - G1	650 Basement Sump soil - G2	650 Basement Sump soil - G3	650 Basement Sump soil - G4	650 Basement Sump soil - C	650 Basement Sump floor-1	650 Basement Sump floor-2	650 Basement Sump floor-3	650 Basement Sump floor-4	650 Basement Sump floor Comp	650 Basement Sump West wall	650 Basement Sump East wall
Sample Depth:		0.0-1.0	1.0-2.0	2.0-3.0	3.0-4.0	0.0-4.0	0	0	0	0	0	0	0
UID		42606-001	42606-002	42606-003	42606-004	42606-005	42562-001	42562-002	42562-003	42562-004	42562-005	42562-006	42562-007
Sampling Date:		12/4/2020	12/4/2020	12/4/2020	12/4/2020	12/4/2020	1/7/2021	1/7/2021	1/7/2021	1/7/2021	1/7/2021	1/7/2021	1/7/2021
Alpha Spec Analysis													
Americium-241	34	NA	NA	NA	NA	0.133 U	NA	NA	NA	NA	3.72	NA	NA
Plutonium-238	57	NA	NA	NA	NA	-0.0564 U	NA	NA	NA	NA	-0.290 DL	NA	NA
Plutonium-239/240	35	NA	NA	NA	NA	-0.0141 U	NA	NA	NA	NA	**51.2**	NA	NA
Uranium-235/236	4.6	NA	NA	NA	NA	0.00 U	NA	NA	NA	NA	-0.217 U-DL	NA	NA
Uranium-238	4.7	NA	NA	NA	NA	0.573 J	NA	NA	NA	NA	1.85 U-DL	NA	NA
Gamma Spec Analysis													
Americium-241	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium-7	NS	0.00585 U-DL	-0.0777 U-DL	-0.0531 U-DL	0.0753 U-DL	0.0193 U-DL	-0.0752 U	-0.0277	-0.562 U	0.349 U	-3.56 U	-0.240 U	0.636 U
Cesium-137	23	0.309	0.0858	-0.00175 U-DL	0.000971 U-DL	0.0507	0.913	4.68	**37.3**	2.10	**1,180**	0.0447 U	0.611
Cobalt-57	NS	0.00817 U-DL	0.000532 U-DL	0.00502 U-DL	-0.00313 U-DL	-0.000126 U-DL	0.00996 U	-0.00429 U	-0.0179 U	0.0120	0.0110 U	0.000338 U	-0.00324 U
Cobalt-60	NS	0.0102 U-DL	-0.00836 U-DL	-0.00165 U-DL	0.0298 U-DL	-0.0212 U-DL	-0.00891 U	-0.0122 U	0.0115 U	0.0211 U	0.137	-0.0162 U	0.0256 U
Europium-152	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Europium-154	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese-54	NS	0.00113 U-DL	0.00220	-0.00110 U-DL	0.0367 UI	0.00426 U-DL	0.0237 U	0.0105 U	0.0131 U	0.0177 U	-0.00205 U	0.0136 U	0.0252 U
Potassium-40	NS	5.75	7.06	8.23	9.25	7.79	4.41	3.99	347	5.25	4.03	3.28	6.85
Radium-226	5	0.391	0.433	0.420	0.433	0.451	0.222 U	0.120 UI	0.104 U	0.174	0.163 U	0.212 UI	0.152 UI
Sodium-22	NS	-0.00141 U-DL	0.00243 U-DL	-0.00534 U-DL	-0.00236 U-DL	-0.00292 U-DL	0.0283 U	-0.0102 U	0.00136 U	0.0122 U	0.0356 U	0.0479 U	-0.00535 U
Thorium-228	NS	0.666	0.595	0.750	0.699	0.709	0.315 UI	0.342	0.267 UI	0.280	0.124 U	0.325	0.302
Gas Flow Proportional Counting													
Srtontium-90	15	NA	NA	NA	NA	1.34 U	NA	NA	NA	NA	**976**	NA	NA
Liquid Scintillation Analysis													
Tritium	1,010	NA	NA	NA	NA	-29.8 U	NA	NA	NA	NA	-3.17 U	NA	NA
Chemical Analysis													
Lead	400	NA	NA	NA	NA	2.04	NA	NA	NA	NA	**40,900**	NA	NA
Mercury	1.84	NA	NA	NA	NA	0.00723 U	NA	NA	NA	NA	0.0879	NA	NA

Notes:
Concentrations in pCi/g
(1) Specified in Table 1 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650*
(2) Specified in Table 2 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650,* based on EPA's soil screening level guidance (OSWER 9355.4-23)
NS - No Soil Cleanup Level
NA - Not Analyzed
MDL - Method Detection Limit
RL - Quantification Limit or Reporting Limit
U - Indicates that the analyte was not detected at the laboratory MDL
UI - Uncertain identification for gamma spectroscopy
J - Value is estimated
DL - Failed required detection limit
Highlighted text denotes concentrations exceeding Soil Cleanup Level

Building 650 As-Left Survey
Basement Concrete Analytical Data

Client Sample ID:	Soil Cleanup Levels (pCi/g) [1] or (mg/kg) (2)	650 Basement floor-1	650 Basement floor-2	650 Basement floor-3	650 Basement floor-4	650 Basement floor-5	650 Basement floor-6	650 Basement floor-7	650 Basement floor-8	650 Basement floor-9	650 Basement floor-10	650 Basement floor-11	650 Basement floor-12	650 Basement floor-13	650 Basement floor-14	650 Basement floor-15	650 Basement floor-16	650 Basement floor comp. 1	650 Basement floor comp. 2	650 Basement floor comp. 3	650 Basement North Wall	650 Basement East Wall	650 Basement South Wall	650 Basement West Wall
Sample Depth:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UID		42564-001	45264-002	42564-003	42564-004	42564-005	42564-006	42564-007	42564-008	42564-009	42564-010	42564-011	42564-012	42564-013	42564-014	42564-015	42564-016	42564-017	42564-018	42564-019	42564-020	42564-021	42564-022	42564-023
Sampling Date:		12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020	12/28/2020
Alpha Spec Analysis																								
Americium-241	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-0.315 U-DL	1.67 U-DL	0.294 U-DL	NA	NA	NA	NA
Plutonium-238	57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.06 U-DL	0.422 U-DL	-0.160 U-DL	NA	NA	NA	NA
Plutonium-239/240	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.09	0.616 U-DL	1.68 U-DL	NA	NA	NA	NA
Uranium-235/236	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.47 U-DL	1.41 U-DL	1.12 U-DL	NA	NA	NA	NA
Uranium-238	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.73 U-DL	0.0259 U-DL	-0.262 U-DL	NA	NA	NA	NA
Gamma Spec Analysis																								
Beryllium-7	NS	0.000307 U	0.00225 U	0.0683 U	-0.0793 U	0.0511 U	0.0249 U	0.00938 U	-0.100 U	0.0797 U	-0.00660 U	-0.143 U	0.0676 U	0.319 U	0.154 U	-0.207 U	-0.206 U	0.00978 U	0.172 U	0.128 U	-0.313 U	-0.0957 U	0.0362 U	0.0205 U
Cesium-137	23	0.0482 J	0.0706 J	0.0843 J	0.109	0.0972 J	0.290	0.0656 J	0.113	0.159	0.0177 U	0.0980 J	0.116	0.491	0.131	0.0982 J	0.0520 U	2.51	0.783	0.489	0.0276 U	0.0121 U	0.0129 U	0.0382 U
Cobalt-57	NS	0.00673 U	-0.00351 U	-0.00402 U	-0.00356 U	-0.0134 U	0.00626 U	-0.00612 U	0.0108 U	0.0145 U	0.00973 U	-0.00967 U	0.00416 U	0.0145 U	-0.00218 U	-0.00138 U	-0.00776 U	0.0601 UI	-0.00478 U	0.0111 U	0.00376 U	-0.000223 U	-0.00649 U	-0.00760 U
Cobalt-60	NS	-0.00244 U	0.0690 U	-0.0101 U	-0.0102 U	-0.0127 U	0.0180 U	0.0192 U	-0.0198 U	-0.000874 U	0.0163 U	-0.0201 U	-0.00285 U	0.0169 U	0.00491 U	0.0124 U	-0.00184 U	0.0115 U	0.0139 U	0.0114 U	0.0124 U	0.00645 U	0.0286 U	0.00954 U
Manganese-54	NS	-0.0124 U	0.0249 U	0.00985 U	0.0202 U	-0.00180 U	0.0181 U	0.0582 U	-0.0283 U	-0.00255 U	0.0392 U	0.0331 U	0.0298 U	0.00178 U	-0.00137 U	0.0120 U	0.00871 U	0.00793 U	-0.00260 U	0.0206 U	-0.0470 U	-0.0291 U	0.0161 U	0.0211 U
Potassium-40	NS	5.04	3.78	4.20	4.52	5.70	5.41	5.26	4.19	3.39	4.04	4.45	4.11	4.14	4.89	3.75	4.77	3.71	4.81	4.87	3.06	3.59	3.34	4.36
Radium-226	5	0.138	0.189 U	0.165	0.240	0.155 UI	0.231	0.201	0.194	0.185 UI	0.209 UI	0.175	0.300	0.256 UI	0.262	0.162	0.262	0.156	0.176	0.208	0.0899 U	0.233 UI	0.133	0.130 U
Sodium-22	NS	-0.00799 U	0.0124 U	0.0100 U	0.00678 U	-0.0218 U	0.00645 U	-0.0151 U	-0.00752 U	0.0283 U	0.0112 U	0.00541 U	0.0196 U	0.0204 U	0.00704 U	0.0100 U	0.0185 U	0.0152 U	0.00843 U	0.00730 U	0.00740 U	0.0181 U	-0.00406 U	0.0301 U
Thorium-228	NS	0.260 U	0.498 U	0.280 U	0.382 U	0.221 U	0.393 U	0.523 U	0.260 U	0.281 U	0.194 U	0.270 U	0.316 U	0.321 U	0.266 U	0.253 U	0.259 U	0.344 U	0.332 U	0.428 U	0.198 UI	0.119 U	0.345 U	0.191 U
Gas Flow Proportional Counting																								
Srtontium-90	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-4.76 U-DL	7.32 U-DL	4.95 U-DL	NA	NA	NA	NA
Liquid Scintillation Analysis																								
Tritium	1,010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-11.1 U	1.98 U	-17.5 U	NA	NA	NA	NA
Chemical Analysis																								
Lead	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	114	17.6	16.9	NA	NA	NA	NA
Mercury	1.84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.161 Hh	0.063 Hh	0.046 Hh	NA	NA	NA	NA

Notes:
Concentrations in pCi/g
(1) Specified in Table 1 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650*
(2) Specified in Table 2 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650,* based on EPA's soil screening level guidance (OSWER 9355.4-23)
NS - No Soil Cleanup Level
NA - Not Analyzed
MDL - Method Detection Limit
RL - Quantification Limit or Reporting Limit
U - Indicates that the analyte was not detected at the laboratory MDL
UI - Uncertain identification for gamma spectroscopy
J - Value is estimated
H - Analytical holding time was exceeded
h - Preparation or preservation holding time was exceeded
DL - Failed required detection limit
Highlighted text denotes concentrations exceeding Soil Cleanup Level

Building 650 As-Left Survey
Surface Soil Analytical Data

Client Sample ID:	Soil Cleanup Levels (pCi/g) [1] or (mg/kg) [2]	650 Soil-1		650 Soil-2		650 Soil-3		650 Soil-4		650 Soil-5		650 Soil-6		650 Soil-7		650 Soil-8 (3)		650 Soil-9 (3)		650 Soil-10 (3)		650 Soil-11		650 Soil-12		650 Soil-13		650 Soil-14		650 Soil-15		650 Soil-16		650 Soil-17		650 Soil-18		650 Soil-19		650 Soil-20	
Sample Depth:		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"		0-0.5"	
UID		43106-001		43106-002		43106-003		43106-004		43106-005		43106-006		43106-007		43106-008		43106-009		43106-010		43106-011		43106-012		43106-013		43106-014		43106-015		43106-016		43106-017		43106-018		43106-001		43106-001	
Sampling Date:		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021		7/1/2021	
Alpha Spec Analysis																																							
Americium-241	34	-0.117	U	0.233	U	-0.163	U	0.255	U	-0.0692	U	0.145	U	0.155	U	0.00287	U	-0.0440	U	-0.0589	U	0.0476	U	0.0706	U	0.0385	U	0.000	U	0.0576	U	0.0682	U	0.0577	U	0.00273	U	-0.132	U	-0.0382	U
Plutonium-238	57	0.157	U	0.118	U	0.227	U	0.0785	U	0.157	U	0.113	U	-0.0405	U	-0.0744	U	0.0197	U	-0.0307	U	0.0114	U	-0.169	U	0.0292	U	0.203	U	0.0556	U	-0.0385	U	-0.0205	U	0.152	U	0.000	U	0.107	U
Plutonium-239/240	35	-0.0940	U	0.395	U	-0.133	U	0.251	U	0.139	U	0.222	U	0.111	U	0.0217	U	-0.135	U	-0.178	U	0.0798	U	-0.0936	U	-0.0804	U	-0.0199	U	-0.0501	U	0.0609	U	0.0820	U	-0.0586	U	0.0334	U	0.00213	U
Uranium-235/236	4.6	0.179	U	0.113	U	0.109	U	0.172	U	-0.0164	U	0.117	U	0.142	U	0.00339	U	0.127	U	0.204	U	0.0813	U	0.0662	U	-0.0407	U	0.0502	U	0.0127	U	0.215	U	0.0705	U	0.191	U	0.000	U	0.0956	U
Uranium-238	4.7	0.405	J	0.0373	U	0.854	J	0.782	J	0.139	U	0.485	J	0.183	U	0.268	U	0.796	J	0.651	J	0.809	J	0.624	J	0.554	J	-0.0199	U	0.283	U	0.786	J	0.756	U	0.140	U	0.253	U	0.198	U
Gamma Spec Analysis																																							
Americium-241	34	0.0153	U	0.869	J	0.00626	U	0.0212	U	0.0513	U	0.0463	U	0.0284	U	-0.00479	U	0.0442	U	0.0501	U	0.186	J	0.0893	U	-0.0430	U	-0.0119	U	0.0437	U	0.0557	U	0.0133	U	-0.00532	U	0.0167	U	0.0480	U
Beryllium-7	NS	0.0692	U	0.36	UI	0.0776	U	0.0802	U	0.0698	U	0.00995	U-DL	-0.0623	U	0.139	U	-0.0589	U	0.0359	U	0.431	UI	0.0298	U	0.100	U	-0.0215	U	0.114	U	0.135	U	0.0228	U	0.167	U	0.117	U	0.0555	U
Cesium-134	NS	0.0449	UI	0.0153	U	0.0165	U	0.0256	U	0.0234	U	0.0705	UI	0.0483	UI	0.0350	J-UI	0.0578	UI	0.0552	UI	0.0412	UI	0.0479	U	0.0310	J-UI	0.00941	U	0.0365	J-UI	0.0248	U	0.0326	J-UI	0.0213	U	0.0315	J-UI	0.0316	U
Cesium-137	23	0.0983	J	3.42		1.04	J	0.00437	U	0.0352	J	1.66	J	1.72	J	1.09	J	0.0238	U	0.0799	J	2.35		0.157	J	0.0194	U	0.0423	J	0.149	J-UI	0.812	J	0.548	J	0.0521	J	0.173	J-UI	0.272	J
Cobalt-57	NS	-0.00184	U	0.0204	UI	0.000580	U	0.00712	U	0.000165	U	0.0443	UI	0.0250	UI	-0.00588	U	-0.00711	U	-0.00345	U-DL	0.179	UI	0.00475	U	0.00293	U	-0.000579	U	-0.000887	U	0.000668	U	0.0332	UI	-0.00689	U	0.000784	U	0.00881	U
Cobalt-60	NS	0.00613	U	0.0180	U	0.00452	U	-0.000969	U	0.00944	U	0.000748	U	-0.00187	U	-0.00144	U	0.00692	U	-0.00785	U	0.0407	J	0.0122	U	0.00566	U	0.00483	U	-0.00328	U	-0.00832	U	0.0313	J-UI	0.00931	U	-0.0100	U	0.0107	U
Europium-152	NS	0.00687	U	0.0140	U	0.0138	U	-0.0158	U	0.0120	U	-0.00448	U	0.0339	U	0.0143	U	0.000915	U	0.0391	U	0.565	J	-0.00423	U	-0.00123	U	-0.0153	U	0.00204	U	-0.000666	U	0.0877	J-UI	-0.0163	U	-0.00143	U	0.0185	U
Europium-154	NS	-0.00184	U	-0.000737	U	-0.00751	U	-0.00247	U	0.00526	U	0.000347	U	-0.0149	U	0.0289	U	-0.0178	U	0.0287	U	0.149	J	0.0294	U	0.0191	U	-0.00150	U	-0.00203	U	0.0119	U	0.0327	U	0.00883	U	-0.0356	U	0.0490	U
Europium-155	NS	0.0275	U	0.00831	U	0.00747	U	0.0800	J-UI	0.0208	U	0.0207	U	0.0995	J-UI	-0.00336	U	0.0849	J-UI	0.0430	U	0.0301	U	0.00190	U	0.0684	J-UI	0.00324	U	0.0115	U	0.140	J-UI	0.106	J-UI	0.0262	U	0.00624	U	0.0386	U
Manganese-54	NS	0.00741	U	0.00818	U	0.0203	U	0.00488	U	0.00750	U	0.0119	U	-0.00206	U	0.0248	J-UI	0.00442	U	0.0102	U	0.0250	J-UI	0.0174	U	0.0176	U	-0.00257	U	-0.00344	U	0.0304	J-UI	0.0232	J-UI	-0.000200	U	0.000288	U	0.00968	U
Potassium-40	NS	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Radium-226	5	0.344		0.356		0.317		0.590		0.297		0.516		0.421		0.350		0.541		0.0424	U	0.413		0.416		0.576		0.292		0.520		0.605		0.694		0.273		0.403		0.469	
Sodium-22	NS	-0.00556	U	-0.00220	U	-0.00185	U	-0.00105	U	0.00187	U	-0.000310		-0.00529	U	0.0103	U	-0.00653	U	0.0106	U	0.00843	U	0.0115	U	0.00767	U	-0.000905	U	-0.00185	U	-0.000559	U	0.0115	U	0.00378	U	-0.01280	U	0.0171	U
Thorium-228	NS	0.00128	U	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Zinc-65	NS			-0.0166	U	0.00999	U	0.0131	U	-0.0278	U	0.00510	U	-0.0220	U	0.010	U	0.0170	U	0.00484	U	-0.0191	U	0.0130	U	0.00466	U	0.0149	U	-0.00441	U	0.00556	U	-0.0305	U	-0.0246	U	-0.00934	U	-0.0118	U
Gas Flow Proportional Counting																																								
Strontium-90	15	0.745	U	0.625	U	0.578	U	1.17	U	-0.754	U	1.48	U	1.35	U	0.808	U	0.939	U	0.0417	U	1.24	U	0.0652	U	0.900	U	0.319	U	-0.732	U	-0.593	U	-0.922	U	0.539	U	0.230	U	0.634	U
Liquid Scintillation Analysis																																							
Tritium	1,010	-22.2	U	-153	U	-15.3	U	-102	U	-4.64	U	35.8	U	63.4	U	-68.7	U	29.2	U	-97.7	U	16.1	U	3.84	U	49.6	U	-10.8	U	80.4	U	135	U	110	U	88.1	U	110	U	120	U
Chemical Analysis																																							
Lead	400	3.2		63		16.1		4.73		7.54		14.5		27.3		12.6		17.9		14.7		103		14.1		7.04		6.93		20.2		42		49.8		6.01		7.44		96.1	
Mercury	1.84	0.0072		0.0434		0.0367		0.0441		0.0117		0.0536		0.116		0.0141		0.0173		0.0245		0.0915		0.0152		0.0204		0.0179		0.0502		0.0522		0.0400		0.0743	U	0.0365		0.0302	

Notes:
Concentrations in pCi/g
(1) Specified in Table 1 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650*
(2) Specified in Table 2 of the *Field Sampling Plan to Document As-Left Conditions after Decontamination and Dismanglement (D&D) of Building 650,* based on EPA's soil screening level guidance (OSWER 9355.4-23)
(3) Surface soil sample likely includes backfill material placed after building demolition.
NS - No Soil Cleanup Level
NA - Not Analyzed
MDL - Method Detection Limit
RL - Quantification Limit or Reporting Limit
U - Indicates that the analyte was not detected at the laboratory MDL
UI - Uncertain identification for gamma spectroscopy
J - Value is estimated
H - Analytical holding time was exceeded
h - Preparation or preservation holding time was exceeded
DL - Failed required detection limit
Highlighted text denotes concentrations exceeding Soil Cleanup Level

BNL RADIOLOGICAL SURVEY FORM

Date	1-8/9-21	Time	Various	Bldg#	650	Location	Posted Contam Area

Reason For Survey

- ☐ Routine
- ☐ Special
- ☒ RWP# WMD-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Floorwalker	72713	10/26/21	Y
Floorwalker	108985	02/25/21	Y
Lud-3	50662	09/10/21	Y
Lud-3	74417	10/26/21	Y
Lud-3	50524	7/7/21	Y

Alpha and Beta Floorwalker survey of 650 basement. The eastside of the floor was surveyed on 12/20/20. No alpha activity was identified on the 12/20/20 or this survey.

Dose Rate (Highest)		Airborne Activity Survey			
Contact	0.1 mR/hr 24 mRad/hr	Sample #	Volume	µCi/cc	%DAC
General Area	NA	N/A			
All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr		N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	N/A	8	N/A	15	N/A	22	N/A
2		9		16		23	
3		10		17		24	
4		11		18		25	
5		12		19		26	
6		13		20		27	
7		14		21		28	

Masslinn Survey Results (dpm)

1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

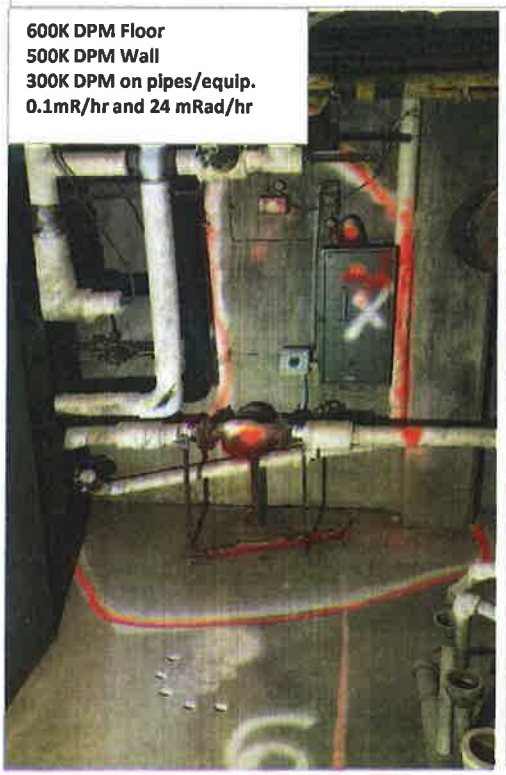
☐ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

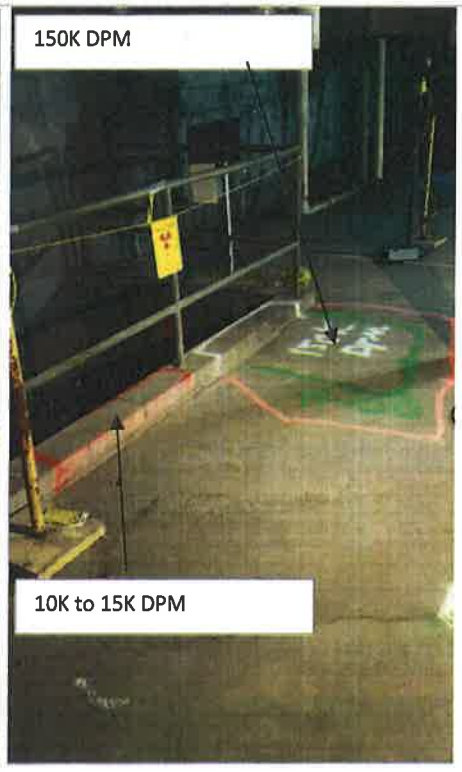
☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☐ Smears were counted for the following:(Circle) ^3H β - γ α

☐ Direct frisked various areas - # denotes direct frisk locations.

See page 2 for basement diagram

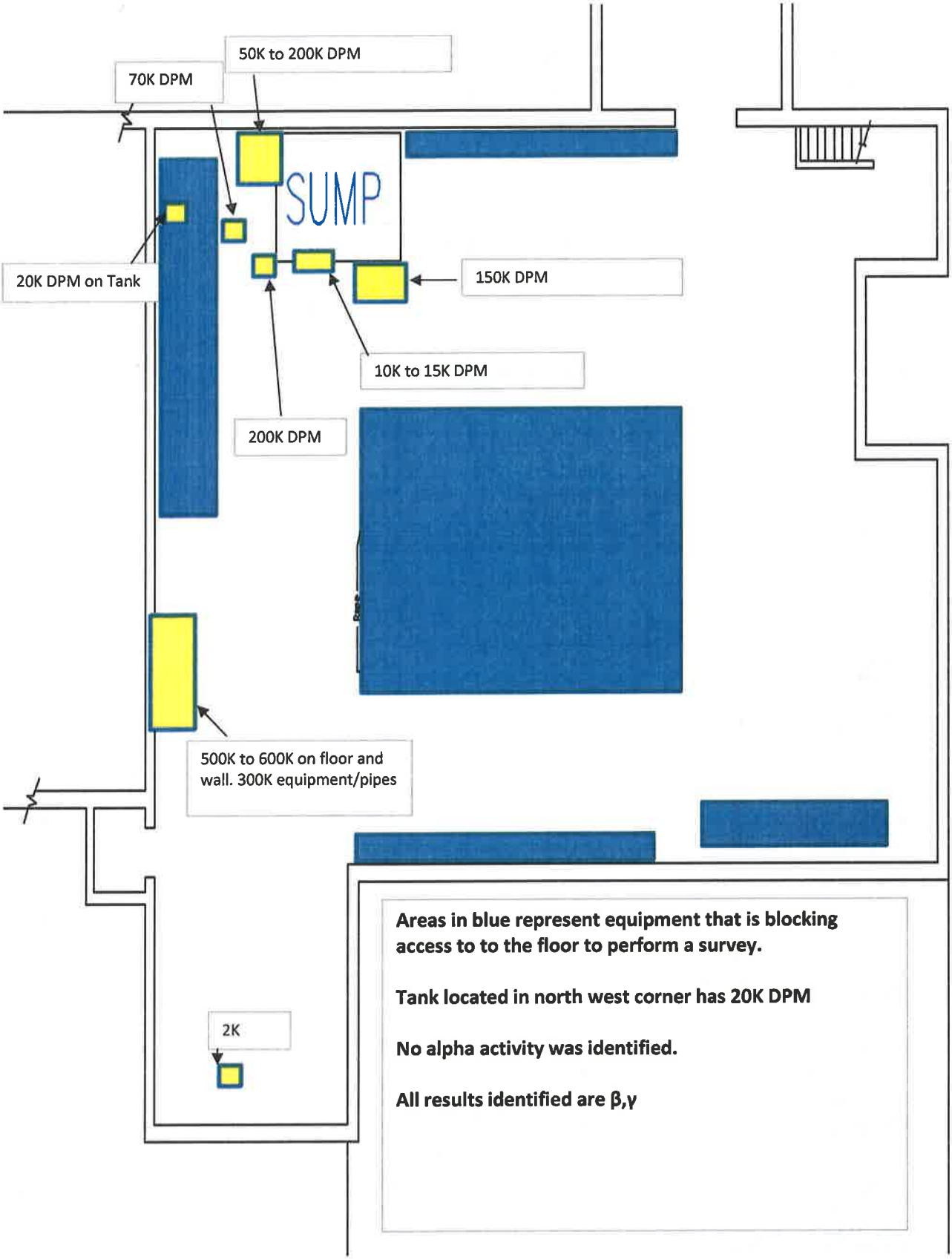




Surveyed by: Rovig/Loyd 1/9/21 — Signature / Date

Reviewed by: Nick Contos 1.20.21 — Signature / Date

FS-SOP-1000
Attachment 9.2


50K to 200K DPM
70K DPM
SUMP
20K DPM on Tank
150K DPM
10K to 15K DPM
200K DPM
500K to 600K on floor and wall. 300K equipment/pipes
2K
Areas in blue represent equipment that is blocking access to to the floor to perform a survey.
Tank located in north west corner has 20K DPM
No alpha activity was identified.
All results identified are β,γ

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-20-022
- ☐ WP#

Date	01.11.21	Time	1500	Bldg#	650	Location	Basement

Survey of select areas of basement floor after chiseling

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Tennelec	12674	10.23.21	Y
Lud-3	50662	09/10/21	Y

Dose Rate (Highest)

Contact	NA
General Area	NA

All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr

Airborne Activity Survey

Sample #	Volume	µCi/cc	%DAC
N/A			
N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1	Floor	8	Floor	15	N/A	22	N/A
2	Floor	9	Floor	16		23	
3	Floor	10	Floor	17		24	
4	Floor	11	N/A	18		25	
5	Floor	12	N/A	19		26	
6	Floor	13	N/A	20		27	
7	Floor	14	N/A	21		28	

Masslinn Survey Results (dpm)

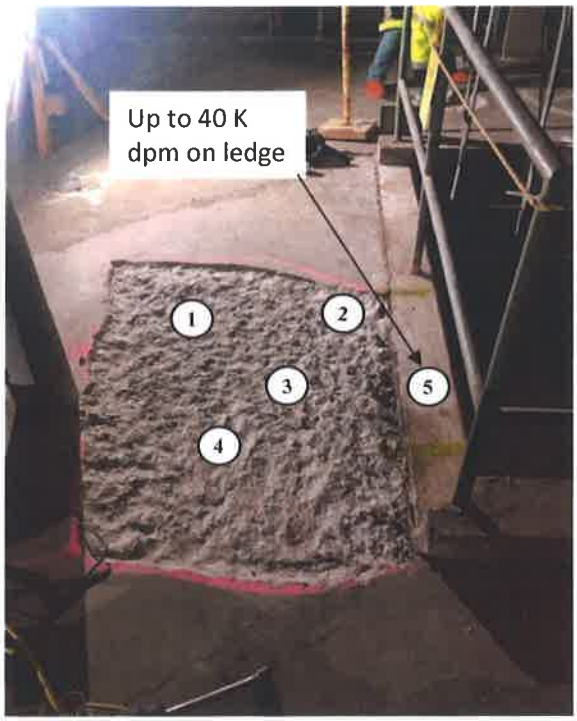
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

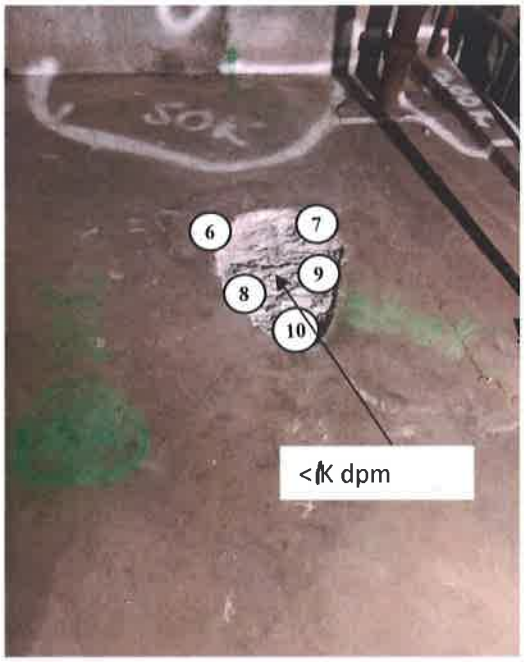
☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^{3}H (β - γ) α

☒ Direct frisked various areas - # denotes direct frisk locations.





Surveyed by: Young/Loyd 01.14.21
Signature / Date

Reviewed by: Nick Contos 1-20-21
Signature / Date

FS-SOP-1000
Attachment 9.2

650 BASEMENT CHIPPING 1-11-2021

Sample Report

Batch ID: 1min Smear - 202101111508
Group: A
Device: S5-XLBG
Batch Key: 18,802
Selected Geometry: 1/8" Stainless Steel

Count Date: 1/11/2021
Count Minutes: 1.0
Count Mode: Simultaneous
Operating Volts: 1380
Gamma Volts: 639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10 ± 0.06		**Alpha:**	24.81 ± 0.09	
Beta Rate:	1.37 ± 0.21		**Beta:**	18.78 ± 0.09	
Gamma Rate:	59.33 ± 1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210111150802-A1	Unknown	-0.40	15.17	8.70	35.24	19.75	347.098
20210111151103-A2	Unknown	-0.40	15.17	8.70	35.24	19.75	347.098
20210111151213-A3	Unknown	-0.40	15.17	14.03	35.24	102.72	347.098
20210111151323-A4	Unknown	-0.40	15.17	3.37	35.24	197.54	347.098
20210111151443-A5	Unknown	7.66	15.17	850.21	35.24	185.69	347.098
20210111151553-A6	Unknown	-0.40	15.17	8.70	35.24	79.02	347.098
20210111151703-A7	Unknown	-0.40	15.17	14.03	35.24	79.02	347.098
20210111151813-A8	Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210111151923-A9	Unknown	-0.40	15.17	14.03	35.24	173.84	347.098
20210111152043-A10	Unknown	-0.40	15.17	-1.95	35.24	43.46	347.098

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.08	DAC BETA:	0.00
SAMPLE LOCATION:	Basement 650	SAMPLE COUNT DATE:	01.14.21
AIR SAMPLE LOG # :	N/A	SAMPLE COUNT TIME:	1117
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	WA	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.11.21	INSTRUMENT CALIBRATION DUE:	10/23/21
TIME ON #1:	1350	INSTRUMENT BATCH NUMBER:	18845
TIME OFF #1:	1500	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:			
FLOW RATE (CFM):	2.00	ELAPSED TIME (min):	70
		VOLUME (CUBIC FEET):	140.00
AIR SAMPLER MODEL # :	AVS-28	VOLUME (cc):	3.96E+06
SERIAL # :	3638		
CALIBRATION DUE DATE:	09.30.21		

ACTIVITY REPORT DATA	
ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	1.61
CORRECTED ACTIVITY (dpm):	2.09
BETA ACTIVITY (dpm):	27.87

RESULTS	
ALPHA MDA (µCi/cc):	2.98E-13
MDA % DAC:	9.92%
BETA MDA (µCi/cc):	1.01E-12
MDA % DAC:	0.01%
ALPHA ACTIVITY (µCi/cc):	2.37E-13
BETA ACTIVITY (µCi/cc):	3.17E-12

COMMENTS: Chisel 650 floor by sump

INPUT BY USER

CALCULATED BY WORKSHEET

w/a a/s FROM 01.11.21 CHISEL IN BASEMENT

Sample Report

Batch ID: 10min Smear - 202101141117
Group: A
Device: S5-XLBG
Batch Key: 18,845
Selected Geometry: 1/8" Stainless Steel

Count Date: 1/14/2021
Count Minutes: 10.0
Count Mode: Simultaneous
Operating Volts: 1380
Gamma Volts: 639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210114111758-A1	Unknown	1.61	2.62	27.87	8.92	89.68	137.534

1350

1500

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.74	DAC BETA:	0.01
SAMPLE LOCATION:	Worker BZ Blakely	SAMPLE COUNT DATE:	01.14.21
AIR SAMPLE LOG # :	G N/A	SAMPLE COUNT TIME:	1134
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	Lapel BZ	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.11.21	INSTRUMENT CALIBRATION DUE:	10.23.21
TIME ON #1:	1350	INSTRUMENT BATCH NUMBER:	18846
TIME OFF #1:	1500	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:		ELAPSED TIME (min):	70
FLOW RATE (CFM):	0.16	VOLUME (CUBIC FEET):	11.20
AIR SAMPLER MODEL # :	Lapel	VOLUME (cc):	3.17E+05
SERIAL # :	28025		
CALIBRATION DUE DATE:	03.24.21		

ACTIVITY REPORT DATA

ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	1.21
CORRECTED ACTIVITY (dpm):	1.57
BETA ACTIVITY (dpm):	39.06

RESULTS

ALPHA MDA (µCi/cc):	3.72E-12
MDA % DAC:	123.99%
BETA MDA (µCi/cc):	1.27E-11
MDA % DAC:	0.13%
ALPHA ACTIVITY (µCi/cc):	2.23E-12
BETA ACTIVITY (µCi/cc):	5.55E-11

COMMENTS: Liters / 28.32 = cfm Lapel reads 4.50 LPM

INPUT BY USER

CALCULATED BY WORKSHEET

CHISEL 650 Floor by sump

lAPEL FROM 01.11.21 bLAKELY CHISEL IN BASEMENT

Sample Report

Batch ID:	10min Smear - 202101141134	**Count Date:**	1/14/2021
Group:	B	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,846	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210114113457-B2	Unknown	1.21	2.62	39.06	8.92	16.20	137.534

1350

1500

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.00	DAC BETA:	0.00
SAMPLE LOCATION:	Worker BZ Gordo	SAMPLE COUNT DATE:	01.14.21
AIR SAMPLE LOG # :	N/A G	SAMPLE COUNT TIME:	1135
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	Lapel BZ	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.11.21	INSTRUMENT CALIBRATION DUE:	10.23.21
TIME ON #1:	1350	INSTRUMENT BATCH NUMBER:	18847
TIME OFF #1:	1500	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:			
FLOW RATE (CFM):	0.16	ELAPSED TIME (min):	70
		VOLUME (CUBIC FEET):	11.20
AIR SAMPLER MODEL # :	Lapel	VOLUME (cc):	3.17E+05
SERIAL # :	28025		
CALIBRATION DUE DATE:	03.24.21		

ACTIVITY REPORT DATA	
ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	0.81
CORRECTED ACTIVITY (dpm):	0.00
BETA ACTIVITY (dpm):	14.03

RESULTS	
ALPHA MDA (µCi/cc):	3.72E-12
MDA % DAC:	123.99%
BETA MDA (µCi/cc):	1.27E-11
MDA % DAC:	0.13%
ALPHA ACTIVITY (µCi/cc):	0.00E+00
BETA ACTIVITY (µCi/cc):	1.99E-11

COMMENTS: Liters / 28.32 = cfm Lapel reads 4.50 LPM

INPUT BY USER

CALCULATED BY WORKSHEET

lAPEL FROM 01.11.21 gORDO CHISEL IN BASEMENT

Sample Report

Batch ID:	10min Smear - 202101141135	**Count Date:**	1/14/2021
Group:	C	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,847	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210114113525-C3	Unknown	0.00	2.62	14.03	8.92	23.31	137.534

1350
1500

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.00	DAC BETA:	0.00
SAMPLE LOCATION:	Basement 650	SAMPLE COUNT DATE:	01.13.21
AIR SAMPLE LOG # :	N/A	SAMPLE COUNT TIME:	1022
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	WA	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.10.21	INSTRUMENT CALIBRATION DUE:	10/23/21
TIME ON #1:	930	INSTRUMENT BATCH NUMBER:	18828
TIME OFF #1:	1120	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:			
FLOW RATE (CFM):	2.00	ELAPSED TIME (min):	110
		VOLUME (CUBIC FEET):	220.00
AIR SAMPLER MODEL # :	AVS-28	VOLUME (cc):	6.23E+06
SERIAL # :	3638		
CALIBRATION DUE DATE:	09.30.21		

ACTIVITY REPORT DATA	
ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	0.00
CORRECTED ACTIVITY (dpm):	0.00
BETA ACTIVITY (dpm):	49.71

RESULTS	
ALPHA MDA (µCi/cc):	1.89E-13
MDA % DAC:	6.31%
BETA MDA (µCi/cc):	6.45E-13
MDA % DAC:	0.01%
ALPHA ACTIVITY (µCi/cc):	0.00E+00
BETA ACTIVITY (µCi/cc):	3.59E-12

COMMENTS: Chisel 650 floor by sump

INPUT BY USER

CALCULATED BY WORKSHEET

W/A A/S from 01.10.21 650 basement chiseling

Sample Report

Batch ID:	10min Smear - 202101131022	**Count Date:**	1/13/2021
Group:	A	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,828	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210113102251-A1	Unknown	0.00	2.62	49.71	8.92	119.32	137.534

0930
1120

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.55	DAC BETA:	0.00
SAMPLE LOCATION:	Worker BZ Blakely	SAMPLE COUNT DATE:	12.23.20
AIR SAMPLE LOG # :	G N/A	SAMPLE COUNT TIME:	1108
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	Lapel BZ	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.10.21	INSTRUMENT CALIBRATION DUE:	10.23.21
TIME ON #1:	915	INSTRUMENT BATCH NUMBER:	18621
TIME OFF #1:	1120	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:		ELAPSED TIME (min):	125
FLOW RATE (CFM):	0.16	VOLUME (CUBIC FEET):	20.00
AIR SAMPLER MODEL # :	Lapel	VOLUME (cc):	5.66E+05
SERIAL # :	28025		
CALIBRATION DUE DATE:	03.24.21		

ACTIVITY REPORT DATA

ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	1.61
CORRECTED ACTIVITY (dpm):	2.09
BETA ACTIVITY (dpm):	11.36

RESULTS

ALPHA MDA (µCi/cc):	2.08E-12
MDA % DAC:	69.43%
BETA MDA (µCi/cc):	7.09E-12
MDA % DAC:	0.07%
ALPHA ACTIVITY (µCi/cc):	1.66E-12
BETA ACTIVITY (µCi/cc):	9.03E-12

COMMENTS: Liters / 28.32 = cfm Lapel reads 4.50 LPM

INPUT BY USER

CALCULATED BY WORKSHEET

CHISEL 650 Floor by sump

Lapel A/S from 01.10.21 Blakely 650 basement chisel campaign

Sample Report

Batch ID:	10min Smear - 202101131023	**Count Date:**	1/13/2021
Group:	B	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,829	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210113102345-B2	Unknown	1.61	2.62	52.37	8.92	86.13	137.534

0915
1120

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.28	DAC BETA:	0.00
SAMPLE LOCATION:	Worker BZ Gordo	SAMPLE COUNT DATE:	01.13.21
AIR SAMPLE LOG # :	G N/A	SAMPLE COUNT TIME:	1024
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	Lapel BZ	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.10.21	INSTRUMENT CALIBRATION DUE:	10.23.21
TIME ON #1:	915	INSTRUMENT BATCH NUMBER:	18830
TIME OFF #1:	1120	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:		ELAPSED TIME (min):	125
FLOW RATE (CFM):	0.16	VOLUME (CUBIC FEET):	20.00
AIR SAMPLER MODEL # :	Lapel	VOLUME (cc):	5.66E+05
SERIAL # :	28025		
CALIBRATION DUE DATE:	03.24.21		

ACTIVITY REPORT DATA	
ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	0.81
CORRECTED ACTIVITY (dpm):	1.05
BETA ACTIVITY (dpm):	16.69

RESULTS	
ALPHA MDA (µCi/cc):	2.08E-12
MDA % DAC:	69.43%
BETA MDA (µCi/cc):	7.09E-12
MDA % DAC:	0.07%
ALPHA ACTIVITY (µCi/cc):	8.35E-13
BETA ACTIVITY (µCi/cc):	1.33E-11

COMMENTS: Liters / 28.32 = cfm Lapel reads 4.50 LPM

INPUT BY USER

CALCULATED BY WORKSHEET

Lapel A/S from 01.20.21.Gordo 650 basement chisel campaign

Sample Report

Batch ID:	10min Smear - 202101131024	**Count Date:**	1/13/2021
Group:	C	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,830	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210113102432-C3	Unknown	0.81	2.62	16.69	8.92	-21.73	137.534

0915
1120

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Date	01.12.21	Time	1500	Bldg#	650	Location	Basement

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-20-022
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Tennelec	12674	10.23.21	Y
Lud-3	50662	09/10/21	Y

Air sample results for chiseling in basement....

Dose Rate (Highest)		Airborne Activity Survey			
Contact	NA	Sample #	Volume	µCi/cc	%DAC
General Area	NA	N/A			
All Dose Rate Units (Circle) mR/hr mrem/hr µrem/hr		N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	N/A	8	N/A	15	N/A	22	N/A
2		9	N/A	16		23	
3		10	N/A	17		24	
4		11	N/A	18		25	
5		12	N/A	19		26	
6		13	N/A	20		27	
7		14	N/A	21		28	

Masslinn Survey Results (dpm)

1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

Smears were counted for the following:(Circle) ^3H β - γ α

Direct frisked various areas - # denotes direct frisk locations.

Surveyed by: Young/Loyd — Signature / Date 01.15.21

Reviewed by: Nick Contos — Signature / Date 1.20.21

FS-SOP-1000
Attachment 9.2

W/A A/S FROM 01.12.21 CHISEL IN THE OLE BASEMENT OF 650

Sample Report

Batch ID:	10min Smear - 202101151123	**Count Date:**	1/15/2021
Group:	A	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,862	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210115112325-A1	Unknown	0.00	2.62	14.03	8.92	56.50	137.534

0930
1100

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.00	DAC BETA:	0.00
SAMPLE LOCATION:	Worker BZ Blakely	SAMPLE COUNT DATE:	01.15.21
AIR SAMPLE LOG # :	G N/A	SAMPLE COUNT TIME:	1134
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	Lapel BZ	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.12.21	INSTRUMENT CALIBRATION DUE:	10.23.21
TIME ON #1:	930	INSTRUMENT BATCH NUMBER:	18863
TIME OFF #1:	1100	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:			
FLOW RATE (CFM):	0.16	ELAPSED TIME (min):	90
		VOLUME (CUBIC FEET):	14.40
AIR SAMPLER MODEL # :	Lapel	VOLUME (cc):	4.08E+05
SERIAL # :	28025		
CALIBRATION DUE DATE:	03.24.21		

ACTIVITY REPORT DATA	
ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	0.00
CORRECTED ACTIVITY (dpm):	0.00
BETA ACTIVITY (dpm):	22.55

RESULTS	
ALPHA MDA (µCi/cc):	2.89E-12
MDA % DAC:	96.44%
BETA MDA (µCi/cc):	9.85E-12
MDA % DAC:	0.10%
ALPHA ACTIVITY (µCi/cc):	0.00E+00
BETA ACTIVITY (µCi/cc):	2.49E-11

COMMENTS: Liters / 28.32 = cfm Lapel reads 4.50 LPM

INPUT BY USER

CALCULATED BY WORKSHEET

CHISEL 650 Floor by sump

Lapel A/S from 01.12.21 Blakely chisel in 650 basement

Sample Report

Batch ID:	10min Smear - 202101151125	**Count Date:**	1/15/2021
Group:	B	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,863	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210115112559-B2	Unknown	0.00	2.62	22.55	8.92	37.53	137.534

Reviewed by: _____

Alpha/Beta Calculation Worksheet

AIR SAMPLE NUMBER:	N/A

DAC ALPHA:	0.00	DAC BETA:	0.00
SAMPLE LOCATION:	Basement 650	SAMPLE COUNT DATE:	01.14.21
AIR SAMPLE LOG # :	N/A	SAMPLE COUNT TIME:	1117
RWP #:	WMP-20-022	COUNT DURATION:	10
B/Z, G/A, ENV. SAMPLE:	WA	INSTRUMENT:	TENNELEC S5-XLB
PROTECTION FACTOR:	1000	INSTRUMENT SERIAL NUMBER:	12674
SAMPLE DATE:	01.12.21	INSTRUMENT CALIBRATION DUE:	10/23/21
TIME ON #1:	930	INSTRUMENT BATCH NUMBER:	18862
TIME OFF #1:	1100	ALPHA ISOTOPE DAC VALUE:	3.00E-12
TIME ON #2:		BETA ISOTOPE DAC VALUE:	1.00E-08
TIME OFF #2:		ELAPSED TIME (min):	90
FLOW RATE (CFM):	2.00	VOLUME (CUBIC FEET):	180.00
AIR SAMPLER MODEL # :	AVS-28	VOLUME (cc):	5.09E+06
SERIAL # :	3638		
CALIBRATION DUE DATE:	09.30.21		

ACTIVITY REPORT DATA

ALPHA MDA (dpm):	2.62
BETA MDA (dpm):	8.92
ALPHA ACTIVITY (dpm):	0.00
CORRECTED ACTIVITY (dpm):	0.00
BETA ACTIVITY (dpm):	14.03

RESULTS

ALPHA MDA (µCi/cc):	2.31E-13
MDA % DAC:	7.71%
BETA MDA (µCi/cc):	7.88E-13
MDA % DAC:	0.01%
ALPHA ACTIVITY (µCi/cc):	0.00E+00
BETA ACTIVITY (µCi/cc):	1.24E-12

COMMENTS: Chisel 650 floor by sump

INPUT BY USER

CALCULATED BY WORKSHEET

Lapel from 01.12.21 Gordo chisel in 650 basement

Sample Report

Batch ID:	10min Smear - 202101151126	**Count Date:**	1/15/2021
Group:	C	**Count Minutes:**	10.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,864	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210115112628-C3	Unknown	0.00	2.62	20.42	8.92	125.24	137.534

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/8/21	Time	1000	Bldg#	650	Location	EAST Basement Wall

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	09/10/21	Y
E-600	1403	8/17/21	Y
Tenn	12674	1/23/21	Y

Notes: NA

Dose Rate (Highest)		Airborne Activity Survey			
Contact	See Comments Below	Sample #	Volume	µCi/cc	%DAC
General Area	NA	N/A			
All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr		N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1	Wall	8	NA	15	NA	22	NA
2	Wall	9	NA	16	NA	23	NA
3	Wall	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

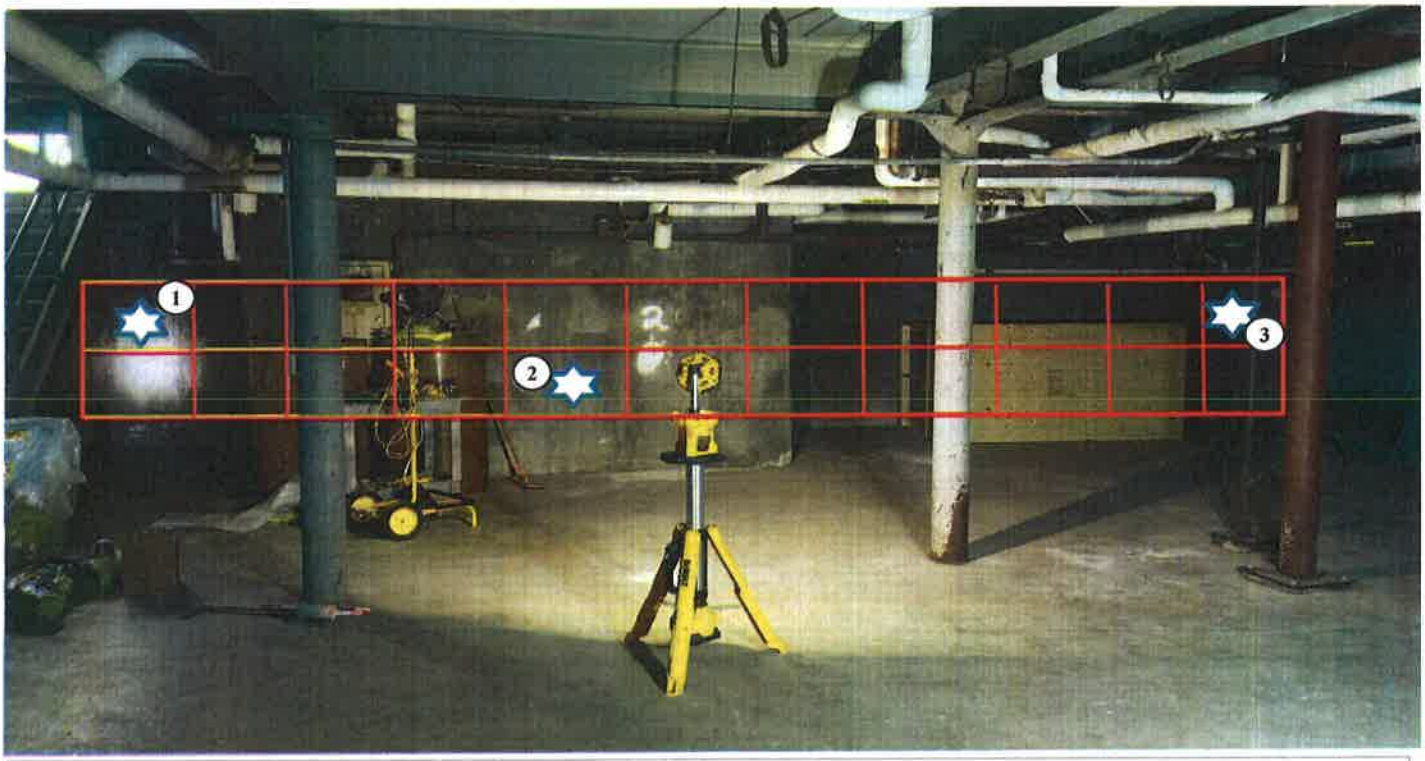
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☐ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H β - γ α

☐ Direct frisked various areas - # denotes direct frisk locations.



100% α βγ direct frisk of starred grids was </= bkg. Bkg = 40 to 50 cpm βγ and 0 to 1 cpm for α
Contact dose rate on walls in starred grids was 15 to 20 µRem/hr.
1 minute static count in starred grids for α and βγ was 0 to 2.0 for α and bkg for βγ.

Surveyed by: Rovig/Loyd 1/10/21
Signature / Date

Reviewed by: Nick Contos 1.20.21
Signature / Date

FS-SOP-1000
Attachment 9.2

650 BASE. WALL GRID SURVEY POINTS

Sample Report

Batch ID:	1min Smear - 202101091150	**Count Date:**	1/9/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,774	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210109115055-B17 1	Unknown	-0.40	15.17	3.37	35.24	114.58	347.098
20210109120946-B18 2	Unknown	-0.40	15.17	3.37	35.24	55.31	347.098
20210109121106-B19 3	Unknown	3.63	15.17	19.35	35.24	-51.36	347.098
~~20210109121216-B20~~	~~Unknown~~	~~-0.40~~	~~15.17~~	~~3.37~~	~~35.24~~	~~7.90~~	~~347.098~~
20210109121326-B21	Unknown	-0.40	15.17	8.70	35.24	-86.92	347.098
20210109121436-B22	Unknown	-0.40	15.17	-1.95	35.24	327.92	347.098
20210109121546-B23	Unknown	-0.40	15.17	8.70	35.24	126.43	347.098
20210109121706-B24	Unknown	-0.40	15.17	3.37	35.24	31.61	347.098
20210109121816-B25	Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210109121926-B26	Unknown	-0.40	15.17	-1.95	35.24	-122.48	347.098
20210109122036-B27	Unknown	3.63	15.17	8.70	35.24	19.75	347.098
20210109122146-B28	Unknown	-0.40	15.17	19.35	35.24	161.99	347.098
20210109122306-B29	Unknown	-0.40	15.17	14.03	35.24	43.46	347.098
20210109122416-B30	Unknown	-0.40	15.17	3.37	35.24	43.46	347.098

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JR

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/9/21	Time	1000	Bldg#	650	Location	Basement South Wall

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	09/10/21	Y
E-600	1403	8/17/21	Y
Tenn	12674	1/23/21	Y

Notes: NA

Dose Rate (Highest)		Airborne Activity Survey			
Contact	See Comments Below	Sample #	Volume	µCi/cc	%DAC
General Area	NA	N/A			
All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr		N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	Wall	8	NA	15	NA	22	NA
2	Wall	9	NA	16	NA	23	NA
3	Wall	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

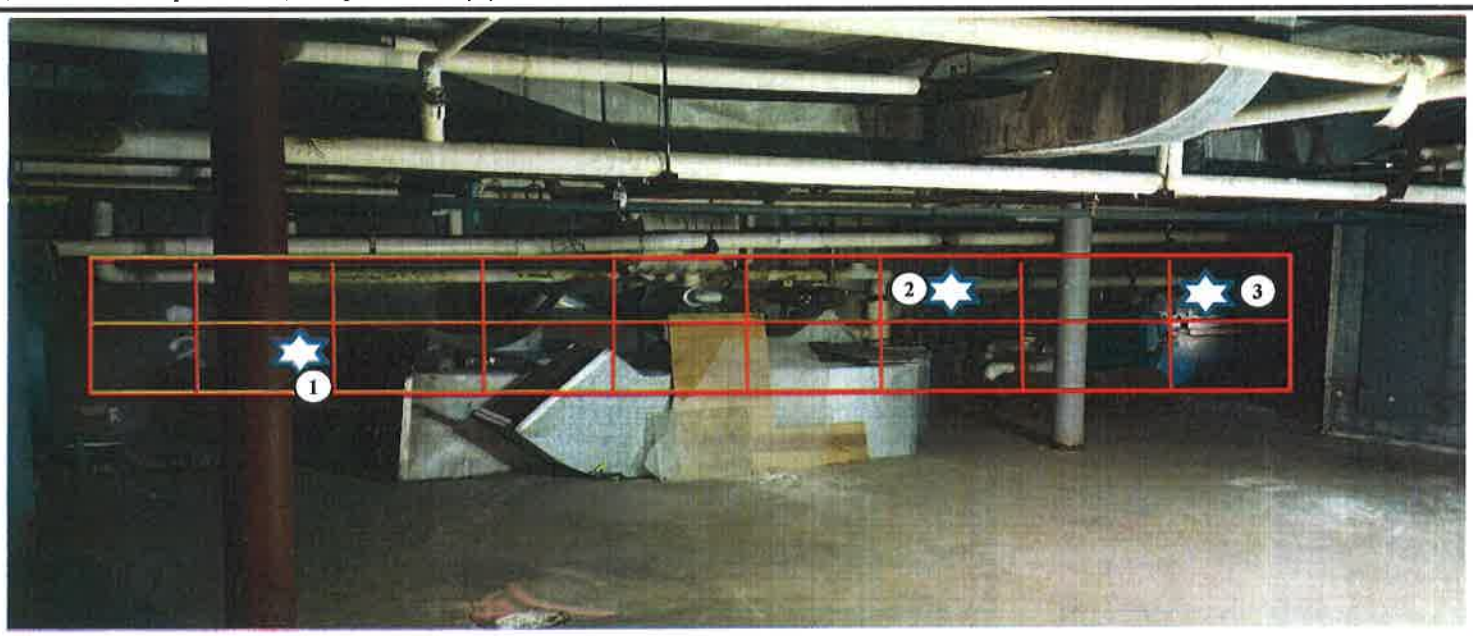
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H (β - γ α)

☐ Direct frisked various areas - # denotes direct frisk locations.



100% α βγ direct frisk of starred grids was </= bkg. Bkg = 40 to 50 cpm βγ and 0 to 1 cpm for α
Contact dose rate on walls in starred grids was 15 to 20 µRem/hr.
1 minute static count in starred grids for α and βγ was 0 to 6.0 for α and bkg for βγ.
Very few areas along this wall were accessable.
E-600 α eff = 12.43%

Surveyed by: Rovig/Loyd — Signature / Date

Reviewed by: Nick Contos — Signature / Date 1-20-21

FS-SOP-1000
Attachment 9.2

650 BASE. WALL GRID SURVEY POINTS

Sample Report

Batch ID:	1min Smear - 202101091150	**Count Date:**	1/9/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,774	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

NA

Sample ID		Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210109115055-B17		Unknown	-0.40	15.17	3.37	35.24	114.58	347.098
20210109120946-B18		Unknown	-0.40	15.17	3.37	35.24	55.31	347.098
20210109121106-B19		Unknown	3.63	15.17	19.35	35.24	-51.36	347.098
20210109121216-B20	1	Unknown	-0.40	15.17	3.37	35.24	7.90	347.098
20210109121326-B21	2	Unknown	-0.40	15.17	8.70	35.24	-86.92	347.098
20210109121436-B22	3	Unknown	-0.40	15.17	-1.95	35.24	327.92	347.098
20210109121546-B23		Unknown	-0.40	15.17	8.70	35.24	126.43	347.098
20210109121706-B24		Unknown	-0.40	15.17	3.37	35.24	31.61	347.098
20210109121816-B25		Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210109121926-B26		Unknown	-0.40	15.17	-1.95	35.24	-122.48	347.098
20210109122036-B27		Unknown	3.63	15.17	8.70	35.24	19.75	347.098
20210109122146-B28		Unknown	-0.40	15.17	19.35	35.24	161.99	347.098
20210109122306-B29		Unknown	-0.40	15.17	14.03	35.24	43.46	347.098
20210109122416-B30		Unknown	-0.40	15.17	3.37	35.24	43.46	347.098

NA

TR

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-20-002
- ☐ WP#

Date	1/9/21	Time	1000	Bldg#	650	Location	Basement West Wall

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	09/10/21	Y
E-600	1403	8/17/21	Y
Tenn	12674	1/23/21	Y

Notes: NA

Dose Rate (Highest)		Airborne Activity Survey			
Contact	See Comments Below	Sample #	Volume	µCi/cc	%DAC
General Area	NA	N/A			
All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr		N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y
ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1	Wall	8	NA	15	NA	22	NA
2	NA	9	NA	16	NA	23	NA
3	NA	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

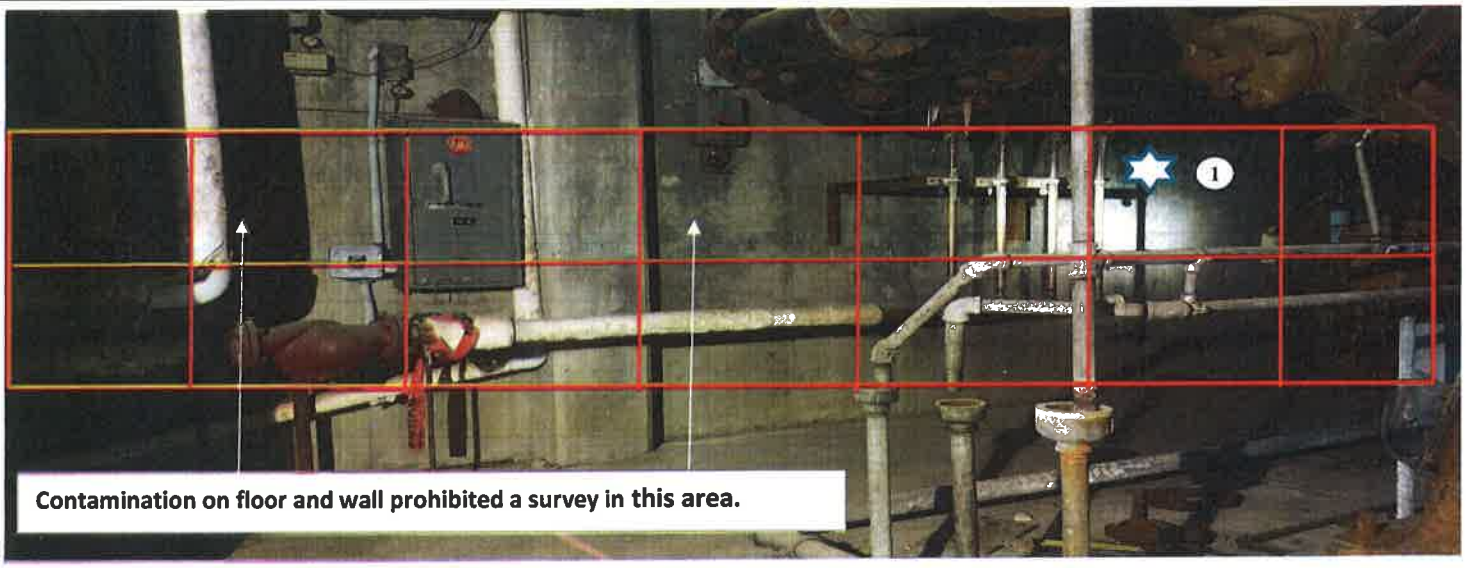
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H β - γ α

☐ Direct frisked various areas - # denotes direct frisk locations.



100% α βγ direct frisk of starred grids was </= bkg. Bkg = 40 to 50 cpm βγ and 0 to 1 cpm for α
Contact dose rate on walls in starred grids was 15 to 20 µRem/hr.
1 minute static count in starred grids for α and βγ was 0 to 2.0 for α and bkg for βγ.
E-600 α eff = 12.43%

Surveyed by: Rovig/Loyd 1/10/21
Signature / Date

Reviewed by: Nick Contos 1.20.21
Signature / Date

650 BASE. WALL GRID SURVEY POINTS

Sample Report

Batch ID:	1min Smear - 202101091150	**Count Date:**	1/9/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,774	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

NA

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210109115055-B17	Unknown	-0.40	15.17	3.37	35.24	114.58	347.098
20210109120946-B18	Unknown	-0.40	15.17	3.37	35.24	55.31	347.098
20210109121106-B19	Unknown	3.63	15.17	19.35	35.24	-51.36	347.098
20210109121216-B20	Unknown	-0.40	15.17	3.37	35.24	7.90	347.098
20210109121326-B21	Unknown	-0.40	15.17	8.70	35.24	-86.92	347.098
20210109121436-B22	Unknown	-0.40	15.17	-1.95	35.24	327.92	347.098
20210109121546-B23	Unknown	-0.40	15.17	8.70	35.24	126.43	347.098
20210109121706-B24	Unknown	-0.40	15.17	3.37	35.24	31.61	347.098
20210109121816-B25	Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210109121926-B26	Unknown	-0.40	15.17	-1.95	35.24	-122.48	347.098
20210109122036-B27	Unknown	3.63	15.17	8.70	35.24	19.75	347.098
20210109122146-B28	Unknown	-0.40	15.17	19.35	35.24	161.99	347.098
20210109122306-B29	Unknown	-0.40	15.17	14.03	35.24	43.46	347.098
20210109122416-B30	Unknown	-0.40	15.17	3.37	35.24	43.46	347.098

NA

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/9/21	Time	1000	Bldg#	650	Location	Basement S.W. wall

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	09/10/21	Y
E-600	1403	8/17/21	Y
Tenn	12674	1/23/21	Y

Notes: NA

Dose Rate (Highest)		Airborne Activity Survey			
Contact	See Comments Below	Sample #	Volume	µCi/cc	%DAC
General Area	NA	N/A			
All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr		N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y
ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

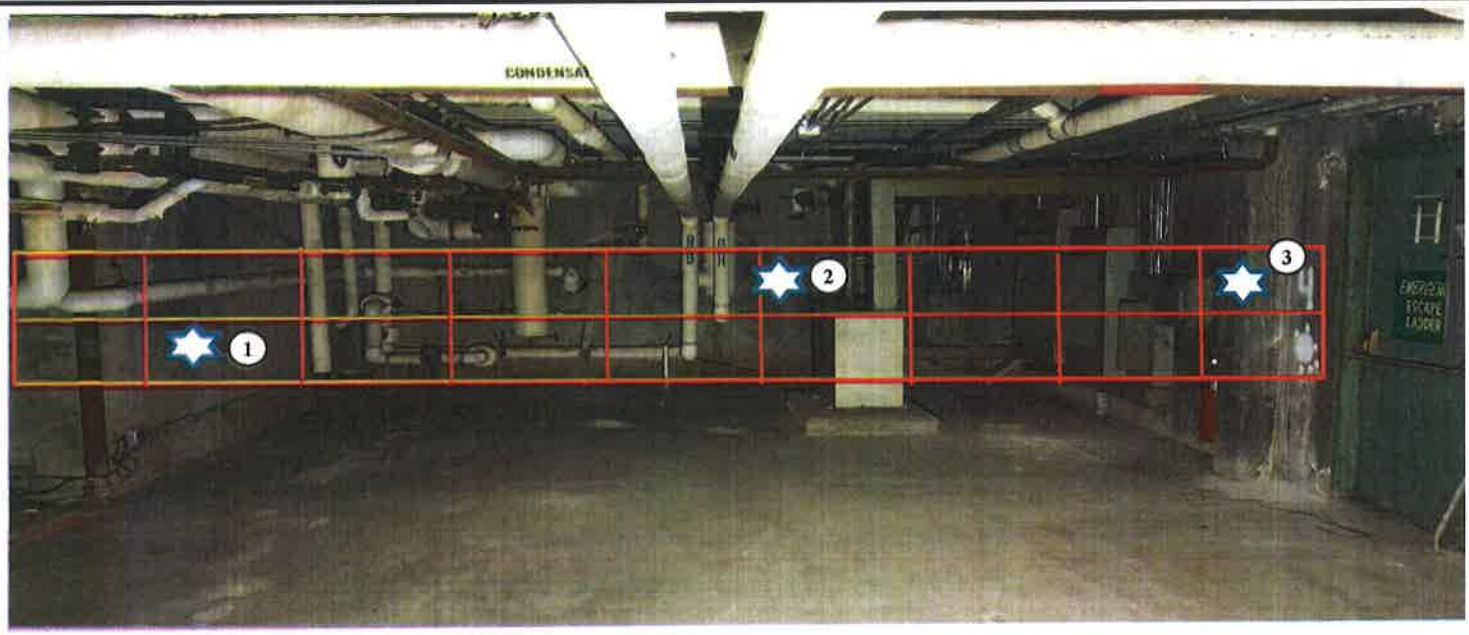
1	Wall	8	NA	15	NA	22	NA
2	Wall	9	NA	16	NA	23	NA
3	Wall	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)
☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H β - γ α
☐ Direct frisked various areas - # denotes direct frisk locations.



100% α βγ direct frisk of starred grids was </= bkg. Bkg = 40 to 50 cpm βγ and 0 to 1 cpm for α
Contact dose rate on walls in starred grids was 15 to 20 µRem/hr.
1 minute static count in starred grids for α and βγ was 0 to 2.0 for α and bkg for βγ.
E-600 α eff = 12.43%.

Surveyed by: Rovig/Loyd 1/10/20
Signature / Date

Reviewed by: Nick Contos 1-2024
Signature / Date

FS-SOP-1000
Attachment 9.2

650 BASE. WALL GRID SURVEY POINTS

Sample Report

Batch ID:	1min Smear - 202101091150	**Count Date:**	1/9/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,774	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210109115055-B17	Unknown	-0.40	15.17	3.37	35.24	114.58	347.098
20210109120946-B18	Unknown	-0.40	15.17	3.37	35.24	55.31	347.098
20210109121106-B19	Unknown	3.63	15.17	19.35	35.24	-51.36	347.098
20210109121216-B20	Unknown	-0.40	15.17	3.37	35.24	7.90	347.098
20210109121326-B21	Unknown	-0.40	15.17	8.70	35.24	-86.92	347.098
20210109121436-B22	Unknown	-0.40	15.17	-1.95	35.24	327.92	347.098
20210109121546-B23	Unknown	-0.40	15.17	8.70	35.24	126.43	347.098
20210109121706-B24	Unknown	-0.40	15.17	3.37	35.24	31.61	347.098
20210109121816-B25	Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210109121926-B26	Unknown	-0.40	15.17	-1.95	35.24	-122.48	347.098
20210109122036-B27	Unknown	3.63	15.17	8.70	35.24	19.75	347.098
20210109122146-B28	Unknown	-0.40	15.17	19.35	35.24	161.99	347.098
20210109122306-B29	Unknown	-0.40	15.17	14.03	35.24	43.46	347.098
20210109122416-B30	Unknown	-0.40	15.17	3.37	35.24	43.46	347.098

NA

NA

T.R.

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/9/21	Time	1000	Bldg#	650	Location	Basement N.W. Wall

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	09/10/21	Y
E-600	1403	8/17/21	Y
Tenn	12674	1/23/21	Y

Note: NA

Dose Rate (Highest)		Airborne Activity Survey				Legend
Contact	See Comments Below	Sample #	Volume	µCi/cc	%DAC	○ Smear Sample Location
General Area	NA	N/A				☐ Masslinn Survey Location
All Dose Rate Units:(Circle) mR/hr mrem/hr µrem/hr		N/A				△ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	Wall	8	NA	15	NA	22	NA
2	Wall	9	NA	16	NA	23	NA
3	Wall	10	NA	17	NA	24	NA
4	Wall	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

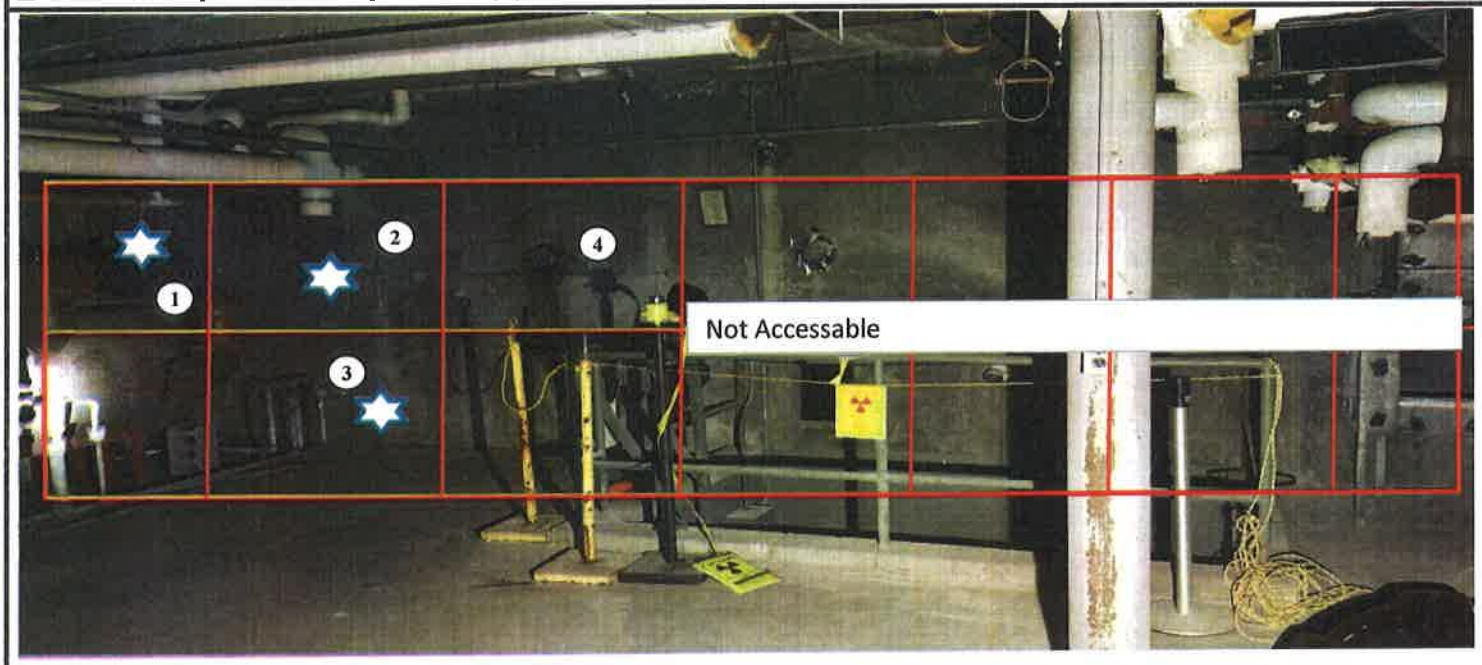
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☐ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☐ Smears were counted for the following:(Circle) ^3H β - γ α

☐ Direct frisked various areas - # denotes direct frisk locations.



100% α βγ direct frisk of starred grids was </= bkg. Bkg = 40 to 50 cpm βγ and 0 to 1 cpm for α
Contact dose rate on walls in starred grids was 15 to 20 µRem/hr.
1 minute static count in starred grids for α and βγ was 0 to 3.0 for α and bkg for βγ.
E-600 αeff = 12.43%

Surveyed by: Rovig/Loyd 1/10/21
Signature / Date

Reviewed by: Nick Contos 1.20.21
Signature / Date

FS-SOP-1000
Attachment 9.2

650 BASE. WALL GRID SURVEY POINTS

Sample Report

Batch ID:	1min Smear - 202101091150	**Count Date:**	1/9/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,774	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10 ± 0.06		**Alpha:**	24.81 ± 0.09	
Beta Rate:	1.37 ± 0.21		**Beta:**	18.78 ± 0.09	
Gamma Rate:	59.33 ± 1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
	NA						
20210109115055-B17	Unknown	-0.40	15.17	3.37	35.24	114.58	347.098
20210109120946-B18	Unknown	-0.40	15.17	3.37	35.24	55.31	347.098
20210109121106-B19	Unknown	3.63	15.17	19.35	35.24	-51.36	347.098
20210109121216-B20	Unknown	-0.40	15.17	3.37	35.24	7.90	347.098
20210109121326-B21	Unknown	-0.40	15.17	8.70	35.24	-86.92	347.098
20210109121436-B22	Unknown	-0.40	15.17	-1.95	35.24	327.92	347.098
20210109121546-B23	Unknown	-0.40	15.17	8.70	35.24	126.43	347.098
20210109121706-B24	Unknown	-0.40	15.17	3.37	35.24	31.61	347.098
20210109121816-B25	Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210109121926-B26	Unknown	-0.40	15.17	-1.95	35.24	-122.48	347.098
20210109122036-B27 (1)	Unknown	3.63	15.17	8.70	35.24	19.75	347.098
20210109122146-B28 (2)	Unknown	-0.40	15.17	19.35	35.24	161.99	347.098
20210109122306-B29 (3)	Unknown	-0.40	15.17	14.03	35.24	43.46	347.098
20210109122416-B30 (4)	Unknown	-0.40	15.17	3.37	35.24	43.46	347.098

TR

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Date	1/8/21	Time	1100	Bldg#	650	Location	Basement

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Tennelec	12674	10/23/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	9/10/21	Y
E-600 α	1403	8/17/21	Y

Comments: Static 1 minute counts for α and β,γ direct frisk and dose rate of the 16 sample locations drilled into the basement floor. E-600 eff= 12.43% for Th-230. One smear taken at each location. L-3 βγ background = 50 cpm. Dose rate background = 15 µRem/hr

Dose Rate (Highest)

Contact	15
General Area	NA

All Dose Rate Units:(Circle) mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey

Sample #	Volume	µCi/cc	%DAC
N/A			
N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1 See Comments	8 NA	15 NA	22 NA
2 NA	9 NA	16 NA	23 NA
3 NA	10 NA	17 NA	24 NA
4 NA	11 NA	18 NA	25 NA
5 NA	12 NA	19 NA	26 NA
6 NA	13 NA	20 NA	27 NA
7 NA	14 NA	21 NA	28 NA

Masslinn Survey Results (dpm)

1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H (β - γ α)

☐ Direct frisked various areas - # denotes direct frisk locations.

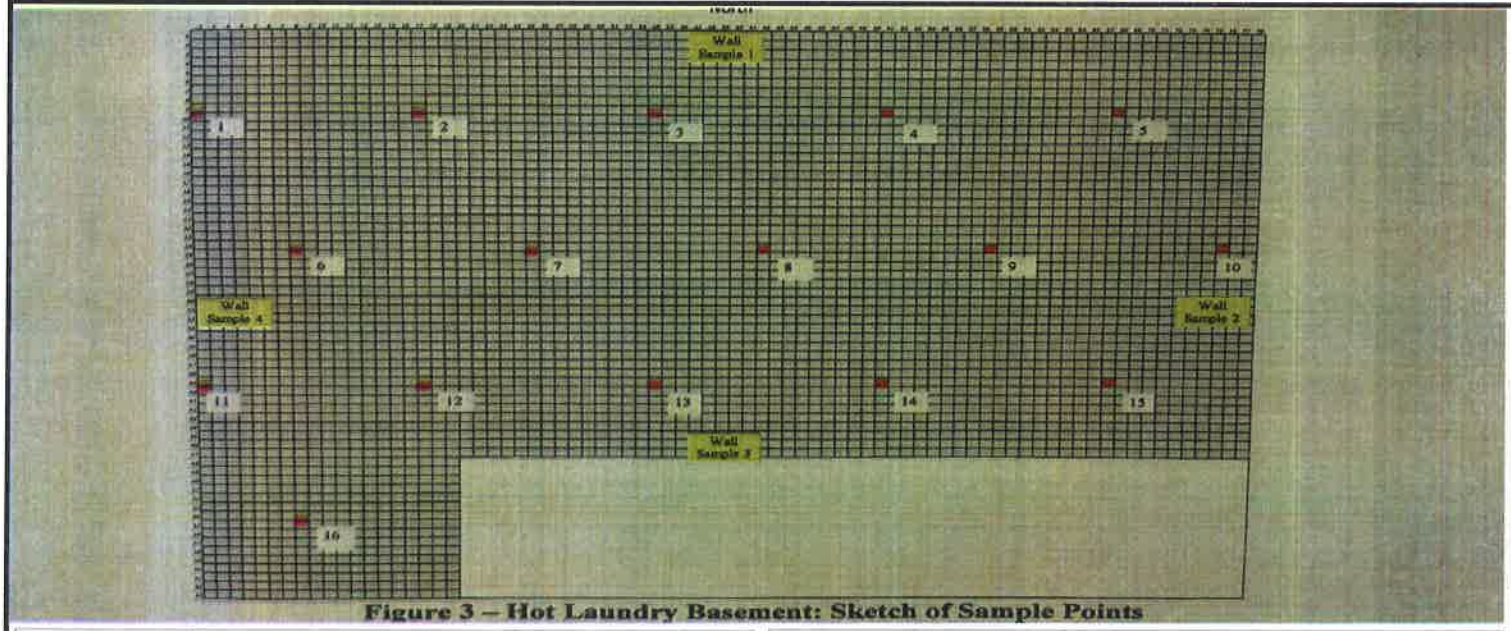


Figure 3 – Hot Laundry Basement: Sketch of Sample Points

Sample Point

1. α = 1.0 cpm βγ= 50 cpm DR= 15
2. α = 2.0 cpm βγ= 50 cpm DR= 15
3. α = 4.0 cpm βγ= 50 cpm DR= 15
4. α = 2.0 cpm βγ= 50 cpm DR= 15
5. α = 1.0 cpm βγ= 50 cpm DR= 15
6. α = 1.0 cpm To close to FC for other readings.
7. α = 1.0 cpm βγ= 50 cpm DR= 15
8. α = 1.0 cpm βγ= 50 cpm DR= 15

Divide α cpm by 12.43% to get dpm. 4.0 cpm = 32 dpm.

Sample Point

9. α = 0.0 cpm βγ= 50 cpm DR= 15
10. α = 1.0 cpm βγ= 50 cpm DR= 15
11. α = 1.0 cpm βγ= 50 cpm DR= 15
12. α = 1.0 cpm βγ= 50 cpm DR= 15
13. α = 2.0 cpm βγ= 50 cpm DR= 15
14. α = 4.0 cpm βγ= 50 cpm DR= 15
15. α = 2.0 cpm βγ= 50 cpm DR= 15
16. α = 1.0 cpm βγ= 50 cpm DR= 15

Surveyed by: Rovig/Loyd — Signature / Date 1/10/21

Reviewed by: Nick Contos — Signature / Date 1.20.21

FS-SOP-1000
Attachment 9.2

650 BASE. FLOOR SAMPLE POINT (16)

Sample Report

Batch ID:	1min Smear - 202101091147	**Count Date:**	1/9/2021
Group:	A	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,773	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10 ± 0.06		**Alpha:**	24.81 ± 0.09	
Beta Rate:	1.37 ± 0.21		**Beta:**	18.78 ± 0.09	
Gamma Rate:	59.33 ± 1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210109114734-A1	Unknown	-0.40	15.17	3.37	35.24	7.90	347.098
20210109115035-A2	Unknown	-0.40	15.17	-7.28	35.24	209.40	347.098
20210109115145-A3	Unknown	-0.40	15.17	3.37	35.24	90.87	347.098
20210109115255-A4	Unknown	-0.40	15.17	-1.95	35.24	114.58	347.098
20210109115415-A5	Unknown	-0.40	15.17	3.37	35.24	126.43	347.098
20210109115525-A6	Unknown	-0.40	15.17	-1.95	35.24	90.87	347.098
20210109115635-A7	Unknown	-0.40	15.17	24.68	35.24	126.43	347.098
20210109115745-A8	Unknown	-0.40	15.17	8.70	35.24	114.58	347.098
20210109115855-A9	Unknown	-0.40	15.17	3.37	35.24	79.02	347.098
20210109120015-A10	Unknown	-0.40	15.17	14.03	35.24	185.69	347.098
20210109120125-A11	Unknown	3.63	15.17	3.37	35.24	7.90	347.098
20210109120235-A12	Unknown	-0.40	15.17	-1.95	35.24	173.84	347.098
20210109120345-A13	Unknown	-0.40	15.17	3.37	35.24	67.16	347.098
20210109120455-A14	Unknown	-0.40	15.17	14.03	35.24	150.13	347.098
20210109120615-A15	Unknown	-0.40	15.17	-7.28	35.24	173.84	347.098
20210109120725-A16	Unknown	-0.40	15.17	8.70	35.24	-110.62	347.098

1= sample point 1 T.R.
2= sample point 2
ect.

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/16/21	Time	1100	Bldg#	650	Location	Basement

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Tennelec	12674	10/23/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	9/10/21	Y
E-600 α	1403	8/17/21	Y

Comments: Static 1 minute counts for α and β,γ direct frisk and dose rate of the 4 sample locations drilled into the basement walls. E-600 eff= 12.43% for Th-230. One smear taken at each location. L-3 βγ background = 50 cpm. Dose rate background = 15 to 20 µRem/hr

Dose Rate (Highest)	
Contact	15 to 20
General Area	NA
All Dose Rate Units:(Circle)	mR/hr mrem/hr µrem/hr

Airborne Activity Survey				
Sample #	Volume	µCi/cc	%DAC	
N/A				→
N/A				→

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	See Comments	8	NA	15	NA	22	NA
2	NA	9	NA	16	NA	23	NA
3	NA	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

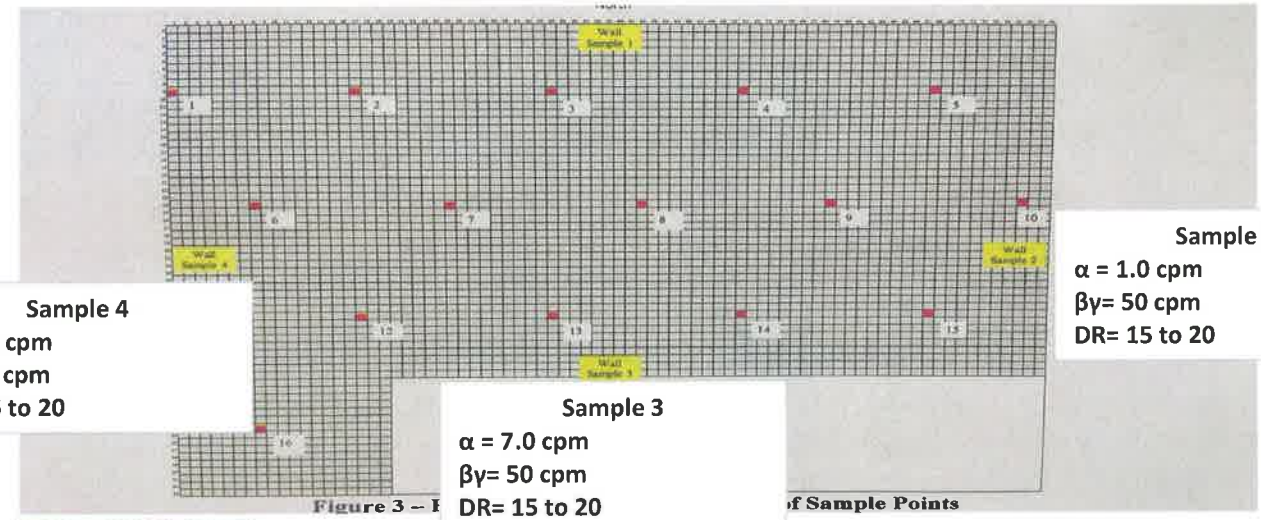
☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H β - γ α

☐ Direct frisked various areas - # denotes direct frisk locations.

Sample 1
α = 2.0 cpm
βγ= 50 cpm
DR= 15 to 20



Sample 2
α = 1.0 cpm
βγ= 50 cpm
DR= 15 to 20

Sample 4
α = 2.0 cpm
βγ= 50 cpm
DR= 15 to 20

Sample 3
α = 7.0 cpm
βγ= 50 cpm
DR= 15 to 20

Figure 3 – I … of Sample Points

Surveyed by: Rovig/Loyd 1/17/21
Signature / Date

Reviewed by: Nick Contos 1-20-21
Signature / Date

650 BASEMENT WALL SAMPLE POINTS

Sample Report

Batch ID:	1min Smear - 202101161004	**Count Date:**	1/16/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,878	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10 ± 0.06		**Alpha:**	24.81 ± 0.09	
Beta Rate:	1.37 ± 0.21		**Beta:**	18.78 ± 0.09	
Gamma Rate:	59.33 ± 1.41				

Sample ID		Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210116100418-~~B9~~	1	Unknown	-0.40	15.17	3.37	35.24	19.75	347.098
20210116101538-~~B10~~	2	Unknown	-0.40	15.17	3.37	35.24	209.40	347.098
20210116101648-~~B11~~	3	Unknown	3.63	15.17	8.70	35.24	150.13	347.098
20210116101758-~~B12~~	4	Unknown	3.63	15.17	14.03	35.24	114.58	347.098

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special — Characteriazion
- ☒ RWP# — WMP-21-002
- ☐ WP#

Date	1/30/21	Time	1000	Bldg#	650	Location	BSMT SUMP

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
LUD-3	74417	09/10/21	Y
E-600	1403	08/17/21	Y
NA			
			NA

Comments: See below

Dose Rate (Highest)

Contact	N/A
General Area	N/A

All Dose Rate Units:(Circle) mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey

Sample #	Volume	µCi/cc	%DAC
N/A			
N/A			

○ Smear Sample Location
☐ Masslinn Survey Location
△ Air Sample Location

XXX Y
ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

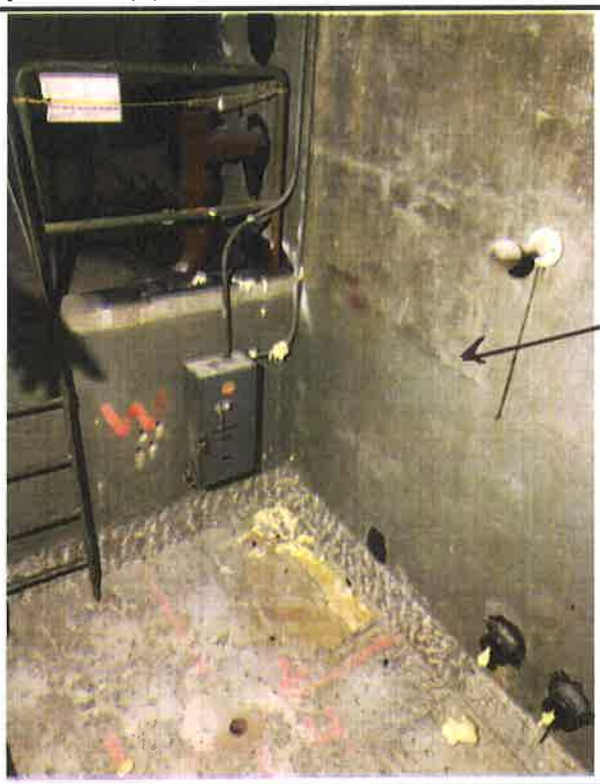
1 N/A	8 N/A	15 N/A	22 N/A
2	9	16	23
3	10	17	24
4	11	18	25
5	12	19	26
6	13	20	27
7	14	21	28

Masslinn Survey Results (dpm)

1 N/A	8 N/A		
2	9		
3	10		
4	11		
5	12		
6	13		
7	14		

☐ Refer to the 13 attachment(s) for the smear results (dpm/100 cm^2)
☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☐ Smears were counted for the following:(Circle) ^{3}H (β - γ) α
☐ Direct frisked various areas - # denotes direct frisk locations.



The N/W quartant is the only place that is reading over background, α 188 DPM, Beta-Gamma 5,000 DPM on wall . 300, 000 DPM on floor where you see the yellow paint. Surveyed 100% of floor and 10%of all 4 walls.

Surveyed by: E. Loyd 1·30·21
Signature / Date

Reviewed by: Nick Contos 2-4-21
Signature / Date

FS-SOP-1000
Attachment 9.2

BNL RADIOLOGICAL SURVEY FORM

Date	1/16/17	Time	0900	Bldg#	650	Location	Posted Contam Area

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Tennelec	12674	10/23/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	9/10/21	Y
E-600 α	1403	8/17/21	Y

Comments: Static 1 minute counts for α and β,γ direct frisk and dose rate of the 4 quandrants and walls of the sump. E-600 eff= 12.43% for Th-230. One smear taken at each location. L-3 βγ background = 50 cpm. Dose rate background = 15 to 20 outside of sump.

Dose Rate (Highest)

Contact	200
General Area	80

All Dose Rate Units:(Circle) mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey

Sample #	Volume	µCi/cc	%DAC
N/A			
N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	Floor	8	Wall	15	NA	22	NA
2	Floor	9	NA	16	NA	23	NA
3	Floor	10	NA	17	NA	24	NA
4	Floor	11	NA	18	NA	25	NA
5	Wall	12	NA	19	NA	26	NA
6	Wall	13	NA	20	NA	27	NA
7	Wall	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

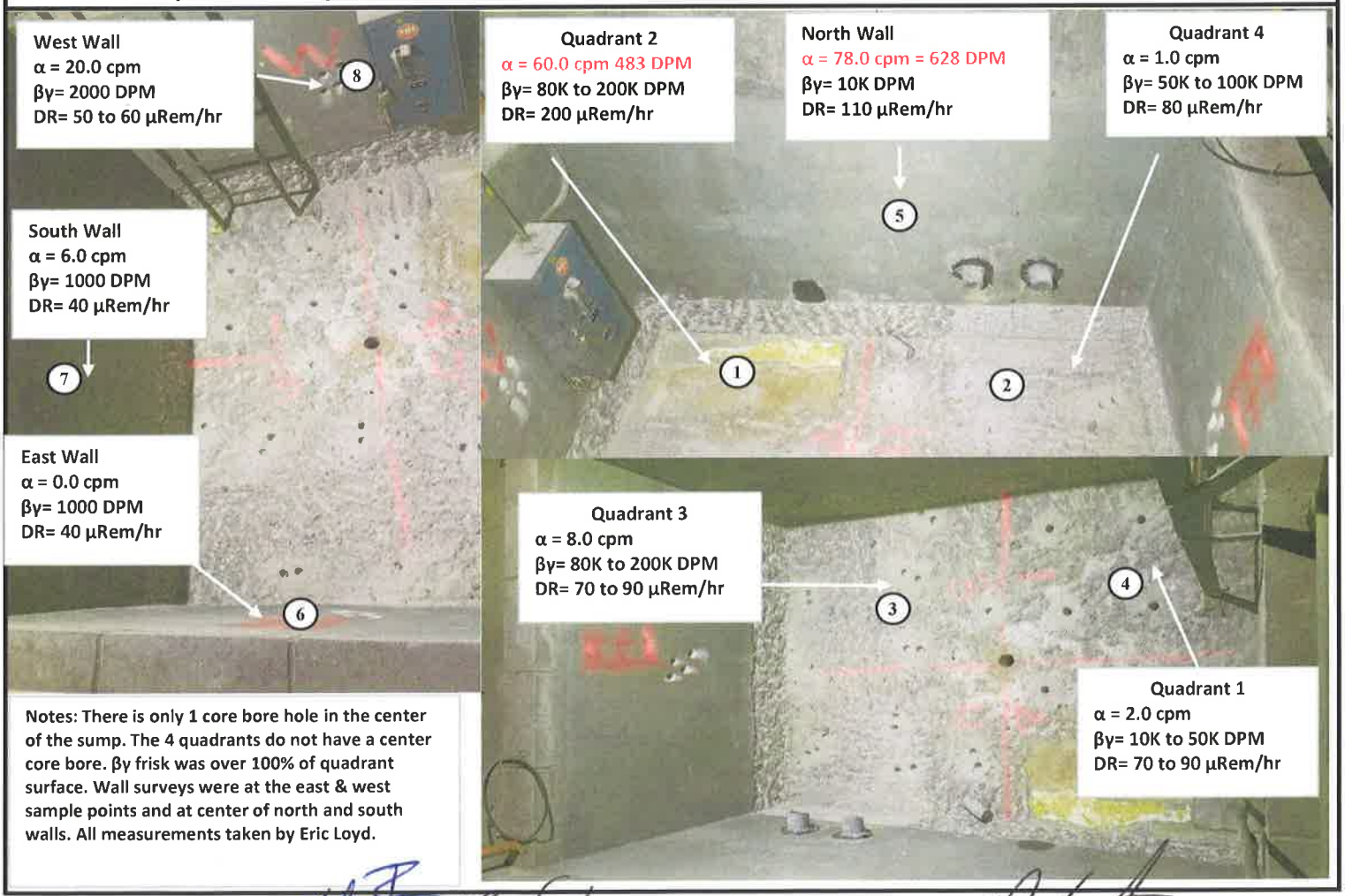
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^{3}H (β - γ) α

☐ Direct frisked various areas - # denotes direct frisk locations.



Notes: There is only 1 core bore hole in the center of the sump. The 4 quadrants do not have a center core bore. βγ frisk was over 100% of quadrant surface. Wall surveys were at the east & west sample points and at center of north and south walls. All measurements taken by Eric Loyd.

Surveyed by: Rovig/Loyd — Signature / Date 1-16-21 **Reviewed by:** Nick Contos — Signature / Date 1-20-21

650 SUMP SAMPLE POINTS/WALLS

Sample Report

Batch ID:	1min Smear - 202101161002	**Count Date:**	1/16/2021
Group:	A	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,877	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210116100256-A1	Unknown	-0.40	15.17	147.17	35.24	55.31	347.098
20210116100557-A2	Unknown	-0.40	15.17	40.66	35.24	150.13	347.098
20210116100707-A3	Unknown	-0.40	15.17	19.35	35.24	197.54	347.098
20210116100817-A4	Unknown	-0.40	15.17	-1.95	35.24	114.58	347.098
20210116100937-A5	Unknown	3.63	15.17	45.98	35.24	19.75	347.098
20210116101047-A6	Unknown	-0.40	15.17	24.68	35.24	150.13	347.098
20210116101157-A7	Unknown	3.63	15.17	19.35	35.24	-158.04	347.098
20210116101307-A8	Unknown	3.63	15.17	56.63	35.24	67.16	347.098

T. R.

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Date	1/16/17	Time	0900	Bldg#	650	Location	Posted Contam Area

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Tennelec	12674	10/23/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	9/10/21	Y
E-600 α	1403	8/17/21	Y

Comments: Static 1 minute counts for α and β,γ direct frisk and dose rate of the 4 quandrants and walls of the sump. E-600 eff= 12.43% for Th-230. One smear taken at each location. L-3 βγ background = 50 cpm. Dose rate background = 15 to 20 outside of sump.

Dose Rate (Highest)

Contact	200
General Area	80
All Dose Rate Units:(Circle)	mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey

Sample #	Volume	µCi/cc	%DAC
N/A			
N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1	Floor	8	Wall	15	NA	22	NA
2	Floor	9	NA	16	NA	23	NA
3	Floor	10	NA	17	NA	24	NA
4	Floor	11	NA	18	NA	25	NA
5	Wall	12	NA	19	NA	26	NA
6	Wall	13	NA	20	NA	27	NA
7	Wall	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^{3}H (β - γ) α

☐ Direct frisked various areas - # denotes direct frisk locations.

Notes: There is only 1 core bore hole in the center of the sump. The 4 quadrants do not have a center core bore. βγ frisk was over 100% of quadrant surface. Wall surveys were at the east & west sample points and at center of north and south walls. All measurements taken by Eric Loyd.

Surveyed by: Rovig/Loyd — Signature / Date 1/16/21 **Reviewed by:** Nick Contos — Signature / Date 1-20-21

650 SUMP SAMPLE POINTS/WALLS

Sample Report

Batch ID:	1min Smear - 202101161002	**Count Date:**	1/16/2021
Group:	A	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	18,877	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)				Efficiency (%)			
Alpha Rate:	0.10	±	0.06	**Alpha:**	24.81	±	0.09
Beta Rate:	1.37	±	0.21	**Beta:**	18.78	±	0.09
Gamma Rate:	59.33	±	1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210116100256-A1	Unknown	-0.40	15.17	147.17	35.24	55.31	347.098
20210116100557-A2	Unknown	-0.40	15.17	40.66	35.24	150.13	347.098
20210116100707-A3	Unknown	-0.40	15.17	19.35	35.24	197.54	347.098
20210116100817-A4	Unknown	-0.40	15.17	-1.95	35.24	114.58	347.098
20210116100937-A5	Unknown	3.63	15.17	45.98	35.24	19.75	347.098
20210116101047-A6	Unknown	-0.40	15.17	24.68	35.24	150.13	347.098
20210116101157-A7	Unknown	3.63	15.17	19.35	35.24	-158.04	347.098
20210116101307-A8	Unknown	3.63	15.17	56.63	35.24	67.16	347.098

T. R.

Reviewed by: _____

BNL RADIOLOGICAL SURVEY FORM

Date	1/31/21	Time	1300	Bldg#	650	Location	Sand Blast Pit γ Scan

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
NA			
			NA

Comments: See notes below.

Dose Rate (Highest)	
Contact	NA
General Area	NA
All Dose Rate Units:(Circle)	mR/hr mrem/hr µrem/hr

Airborne Activity Survey				
Sample #	Volume	µCi/cc	%DAC	
N/A				→
N/A				→

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1	NA	8	NA	15	NA	22	NA
2	NA	9	NA	16	NA	23	NA
3	NA	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

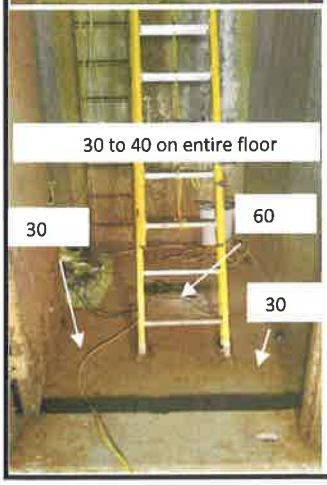
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☐ Refer to the attachment(s) for the smear results (dpm/100 cm²)

☐ Smears were counted for the following:(Circle) ^{3}H β - γ α

☐ All Masslinn wipes were <1,000 dpm/50 ft² for β-γ

☐ Direct frisked various areas - # denotes direct frisk locations.



Notes:
-Gamma scan of 100 percent of floor surface.
-50 to 150 µRem/hr over entire floor surface.
-Highest reading is 1500 µem/hr on drain.

Surveyed by: Rovig/Loyd 1/31/21 **Reviewed by:** Nick Contos 2-4-21

Signature / Date Signature / Date

FS-SOP-1000
Attachment 9.2

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/31/21	Time	1300	Bldg#	650	Location	Sand Blast Pit 10% Walls

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Tennelec	12674	10/23/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	9/10/21	Y
E-600 α	1403	8/17/21	Y

Comments: See Notes Below.

Dose Rate (Highest)

Contact	NA
General Area	NA

All Dose Rate Units:(Circle) mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey

Sample #	Volume	µCi/cc	%DAC
N/A			
N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1 NA	8 NA	15 NA	22 NA
2 NA	9 NA	16 NA	23 NA
3 NA	10 NA	17 NA	24 NA
4 NA	11 NA	18 NA	25 NA
5 NA	12 NA	19 NA	26 NA
6 NA	13 NA	20 NA	27 NA
7 NA	14 NA	21 NA	28 NA

Masslinn Survey Results (dpm)

1 N/A	8 N/A		
2	9		
3	10		
4	11		
5	12		
6	13		
7	14		

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

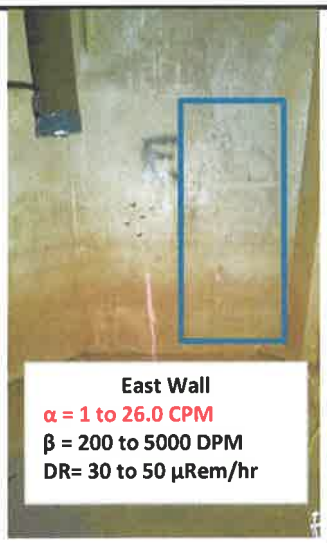
☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H (β - γ α)

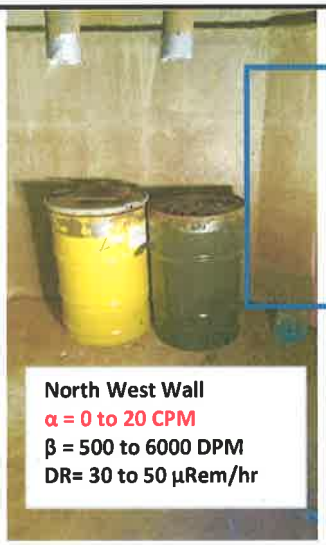
☐ Direct frisked various areas - # denotes direct frisk locations.

North East wall
α = 1 to 10 CPM
β = 200 to 6000 DPM
DR= 30 to 50 µRem/hr

West Wall
α = 1 to 6 CPM
β = 200 to 5000 DPM
DR= 30 to 50 µRem/hr



East Wall
α = 1 to 26.0 CPM
β = 200 to 5000 DPM
DR= 30 to 50 µRem/hr



North West Wall
α = 0 to 20 CPM
β = 500 to 6000 DPM
DR= 30 to 50 µRem/hr

Outclove
α = 0 to 5 CPM
β = Bkg to 2000 DPM
DR= 30 µRem/hr

Notes: Alpah, Beta and Gamma Scan OF 10% of walls up to 6 feet.
-Blue boxes represent areas that were surveyed.
-Lud-3 background in outclove = 60 to 100 cpm.
-Lud-3 background in pit = 500 cpm around head level.
-Dose rate background in pit = 50 µRem/hr at waist level.
-Dose rate in outclove = 30 to 50 µRem/hr at waist level.

Surveyed by: Rovig/Loyd 1/31/21
Signature / Date

Reviewed by: Nick Contos 2-4-21
Signature / Date

FS-SOP-1000
Attachment 9.2

BNL RADIOLOGICAL SURVEY FORM

Date	1/31/21	Time	1300	Bldg#	650	Location	Sand Blast Pit α Frisk

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
E-600 α	1403	08/17/21	Y
NA			
			NA

Comments: Alpha direct frisk of 100 percent of Sand Blast Pit floor. All results are in CPM. E-600 effiency for Th-230 is 12.43%. To get DPM divide CPM/Eff. 46 CPM = 368 DPM

Dose Rate (Highest)	
Contact	NA
General Area	NA
All Dose Rate Units:(Circle)	mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey				
Sample #	Volume	µCi/cc	%DAC	
N/A				→
N/A				→

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y
ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1	NA	8	NA	15	NA	22	NA
2	NA	9	NA	16	NA	23	NA
3	NA	10	NA	17	NA	24	NA
4	NA	11	NA	18	NA	25	NA
5	NA	12	NA	19	NA	26	NA
6	NA	13	NA	20	NA	27	NA
7	NA	14	NA	21	NA	28	NA

Masslinn Survey Results (dpm)

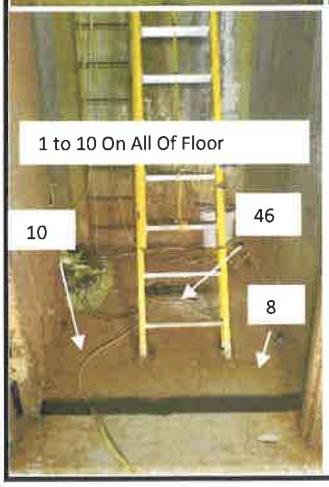
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☐ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☐ Smears were counted for the following:(Circle) ^3H (β - γ α)

☐ Direct frisked various areas - # denotes direct frisk locations.



Notes:
-Alpha frisk of 100 percent of Sand Blast Pit floor.
-4 to 25 cpm on entire surface of floor.
-Highest reading was 46 cpm on drain were ladder is to access-egress from pit.
-All results in cpm.
-See comments above for dpm results.

Surveyed by: Rovig/Loyd — Signature / Date 1/31/21

Reviewed by: Nick Contos — Signature / Date 2-4-21

FS-SOP-1000
Attachment 9.2

BNL RADIOLOGICAL SURVEY FORM

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Date	1/31/21	Time	1300	Bldg#	650	Location	Sand Blast Pit β Frisk

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Lud-3	74417	09/10/21	Y
Lud-3	50662	09/10/21	Y
NA			
			NA

Comments: Beta direct frisk of 100 percent of Sand Blast Pit floor. All results are in DPM.

Dose Rate (Highest)	
Contact	NA
General Area	NA
All Dose Rate Units:(Circle)	mR/hr mrem/hr μrem/hr

Airborne Activity Survey

Sample #	Volume	μCi/cc	%DAC
N/A			
N/A			

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ — XXX = Contact Reading; ZZZ = Reading @ 30 cm; Y = Radiation Type

Smear Survey Locations

1 NA	8 NA	15 NA	22 NA
2 NA	9 NA	16 NA	23 NA
3 NA	10 NA	17 NA	24 NA
4 NA	11 NA	18 NA	25 NA
5 NA	12 NA	19 NA	26 NA
6 NA	13 NA	20 NA	27 NA
7 NA	14 NA	21 NA	28 NA

Masslinn Survey Results (dpm)

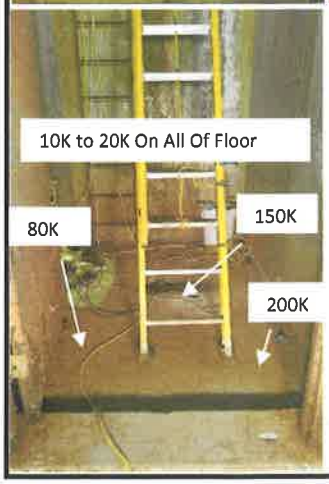
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☐ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

☐ Smears were counted for the following:(Circle) ^3H β - γ α

☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☐ Direct frisked various areas - # denotes direct frisk locations.



Notes:
- -Beta frisk of 100 percent of Sand Blast Pit Floor.
- -Beta backround = 500 cpm at head height in pit area
- -Beta background = 60 to 200 cpm at head height in outclove area.
- -10K to 100K dpm on entire surface of floor
- -All results are in dpm.
- -Highest reading is 280K dpm.

Surveyed by: Rovig/Loyd — Signature / Date

Reviewed by: Nick Contos 2-4-21 — Signature / Date

FS-SOP-1000
Attachment 9.2

BNL RADIOLOGICAL SURVEY FORM

Date	1/31/21	Time	1300	Bldg#	650	Location	Sand Blast Pit Core Holes

Reason For Survey

- ☐ Routine
- ☒ Special
- ☒ RWP# WMP-21-002
- ☐ WP#

Instruments

Model	Serial #	Cal. Due Date	Source Checked (Y / N)
Bicron	19341	09/11/21	Y
Tennelec	12674	10/23/21	Y
Lud-3	74417	09/10/21	Y
Lud-3	50662	9/10/21	Y
E-600 α	1403	8/17/21	Y

Comments: See notes below.

Dose Rate (Highest)	
Contact	NA
General Area	NA
All Dose Rate Units:(Circle)	mR/hr mrem/hr (µrem/hr)

Airborne Activity Survey				
Sample #	Volume	µCi/cc	%DAC	
N/A				
N/A				

Legend

- ○ Smear Sample Location
- ☐ Masslinn Survey Location
- △ Air Sample Location

XXX Y / ZZZ

XXX = Contact Reading
ZZZ = Reading @ 30 cm
Y = Radiation Type

Smear Survey Locations

1	Core Bore	8	Floor See Notes	15	Floor See Notes	22	NA
2	Core Bore	9	Floor See Notes	16	Floor See Notes	23	NA
3	Core Bore	10	Floor See Notes	17	Floor See Notes	24	NA
4	Core Bore	11	Floor See Notes	18	Floor See Notes	25	NA
5	Core Bore	12	Floor See Notes	19	Floor See Notes	26	NA
6	Wall	13	Floor See Notes	20	Floor See Notes	27	NA
7	Wall	14	Floor See Notes	21	Floor See Notes	28	NA

Masslinn Survey Results (dpm)

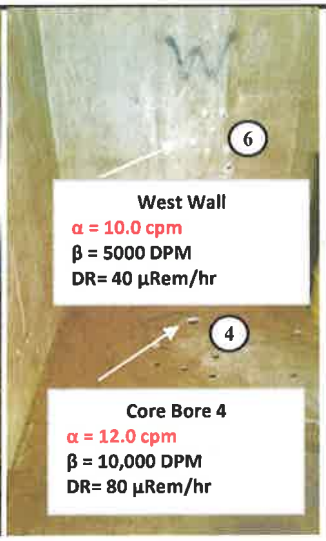
1	N/A	8	N/A
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

☒ Refer to the attachment(s) for the smear results (dpm/100 cm^2)

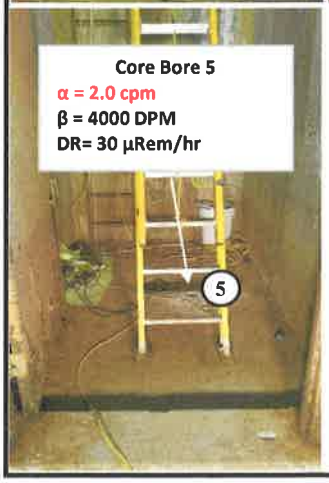
☐ All Masslinn wipes were <1,000 dpm/50 ft^2 for β-γ

☒ Smears were counted for the following:(Circle) ^3H (β - γ) α

☐ Direct frisked various areas - # denotes direct frisk locations.



There is a ledge about 6.5 feet above the floor. Loose debri such as dirt is laying on this ledge. B frisk readings on this ledge is from 20K to 150K dpm.



Notes:
-1 Minute Static scans of the 5 floor core bore holes and 2 wall sample points.
-Counted for alpha, beta and gamma.
-Smears taken at each hole and wall sample points. See page 2 for these results.
-An additional 14 smears were taken on the floor. These smears are not reflected in the pictures. See page 3 for these results.

Surveyed by: Rovig/Loyd 1/31/21
Signature / Date

Reviewed by: Nick Contos 2-4-21
Signature / Date

650 SAND BLAST BASEMENT CORE HOLES AND WALL POINTS

Sample Report

Batch ID:	1min Smear - 202101310940	**Count Date:**	1/31/2021
Group:	A	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	19,074	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10	± 0.06	**Alpha:**	24.81	± 0.09
Beta Rate:	1.37	± 0.21	**Beta:**	18.78	± 0.09
Gamma Rate:	59.33	± 1.41			

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210131094052-A1	Unknown	-0.40	15.17	67.28	35.24	114.58	347.098
20210131094353-A2	Unknown	-0.40	15.17	30.00	35.24	90.87	347.098
20210131094503-A3	Unknown	7.66	15.17	56.63	35.24	-146.18	347.098
20210131094613-A4	Unknown	7.66	15.17	67.28	35.24	19.75	347.098
20210131094733-A5	Unknown	35.87	15.17	701.08	35.24	482.01	347.098
20210131094843-A6	Unknown	7.66	15.17	88.59	35.24	-75.07	347.098
20210131094953-A7	Unknown	3.63	15.17	40.66	35.24	161.99	347.098

Reviewed by: _____

REV 010810.ELR

C:\DOCUME~1\ADMINI~1\LOCALS~1\Temp\1 min sample report bnl {2ECCD108-I

Print Date 1/31/2021
Print Time 9:51:09AM

650 SAND BLAST PIT FLOOR

Sample Report

Batch ID:	1min Smear - 202101310941	**Count Date:**	1/31/2021
Group:	B	**Count Minutes:**	1.0
Device:	S5-XLBG	**Count Mode:**	Simultaneous
Batch Key:	19,075	**Operating Volts:**	1380
Selected Geometry:	1/8" Stainless Steel	**Gamma Volts:**	639.0

Background (cpm)			Efficiency (%)		
Alpha Rate:	0.10 ± 0.06		**Alpha:**	24.81 ± 0.09	
Beta Rate:	1.37 ± 0.21		**Beta:**	18.78 ± 0.09	
Gamma Rate:	59.33 ± 1.41				

Sample ID	Sample Type	Alpha (dpm)	Alpha MDA (dpm)	Beta (dpm)	Beta MDA (dpm)	Gamma (dpm)	Gamma MDA (dpm)
20210131094129-B8	Unknown	-0.40	15.17	45.98	35.24	-110.62	347.098
20210131095220-B9	Unknown	-0.40	15.17	24.68	35.24	244.95	347.098
20210131095330-B10	Unknown	3.63	15.17	61.96	35.24	126.43	347.098
20210131095450-B11	Unknown	3.63	15.17	30.00	35.24	126.43	347.098
20210131095600-B12	Unknown	-0.40	15.17	3.37	35.24	-51.36	347.098
20210131095710-B13	Unknown	-0.40	15.17	-1.95	35.24	55.31	347.098
20210131095820-B14	Unknown	-0.40	15.17	30.00	35.24	197.54	347.098
20210131095930-B15	Unknown	3.63	15.17	19.35	35.24	67.16	347.098
20210131100050-B16	Unknown	-0.40	15.17	24.68	35.24	197.54	347.098
20210131100200-B17	Unknown	-0.40	15.17	14.03	35.24	114.58	347.098
20210131100310-B18	Unknown	3.63	15.17	40.66	35.24	150.13	347.098
20210131100420-B19	Unknown	-0.40	15.17	45.98	35.24	31.61	347.098
20210131100530-B20	Unknown	-0.40	15.17	-7.28	35.24	90.87	347.098
20210131100650-B21	Unknown	-0.40	15.17	40.66	35.24	19.75	347.098

Reviewed by: _____

Appendix B
Low-Level Radioactive Waste Manifests and Construction and Demolition Waste Tickets

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number *(Include Area Code)*
631-344-2222

Organization
Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment? ☑ YES ☐ NO

3. Total Number of packages identified on this manifest? 1

4. Does EPA regulated waste requiring a manifest accompany this shipment? ☐ YES ☑ NO
If "Yes," provide Manifest Number

EPA Manifest Number

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit: 0112001215
Shipment Number: 7314-08-0031

Contact: Glen Todzia
Phone No (Include Area Code): (631) 344-7488

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973 Railcar # HKRX50101

Contact: James Nunes
Phone No (Include Area Code): (718) 928-2304
Signature - *Authorized carrier acknowledging waste receipt*
Date

Shipper ID Number: 7314-08-0031
☐ Collector ☐ Processor ☑ Generator Type (Specify) G
EPA I.D. Number: NYD980641625
Shipping Date: 2/24/22

7. Form 540 and 540A Page 1 of 1 Page(s) Electronic ☐
Form 541 and 541A 1 Page(s) ☐
Form 542 and 542A None Page(s) ☐
Additional Information None Page(s)

8. Manifest Number: 7314-08-0031

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact: Security Department
Phone No (Include Area Code): (801)649-2175
Signature - *Authorized consignee acknowledging waste receipt*
Date

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title: Shipper
Date: 2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume (Use appropriate units)	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Super Load Wrapper ERG162	NA	NA	Solid Metal Oxide	Cs-137 Eu-152 H-3 Pu-239 Pu-240 Sr-90 Y-90	5.1227E+02	1.3845E+01	105056 LBS; 3000 FT3	R22-001B

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • Is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC.

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) — Date: 2/24/22

on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m^3)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
1	m3 55.05	kg 47427.62	NP	NP	9.9722E-03	9.9722E-03
	ft3 1944.00	lb 104560.00			1 Container	

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	5.1227E+02	1.0508E+02	NP	NP	NP	(kg)	NA
mCi	1.3845E+01	2.8400E+00	NP	NP	NP	(lbs)	NA

2. Manifest Number: 7314-08-0031

3. Page 1 of 1 Page(s)

4. Shipper Name: Brookhaven National Laboratory

Shipment ID Number: 7314-08-0031

Disposal Container Description								Waste Description for Each Waste Type in Container						
								Physical Description			Chemical Description		Radiological Description	
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	15. Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
R22-001B/7314-08	19 SUPERLOAD WRAPPER	84.95	47652.60	47427.62	3.0000E-03	<3.3400E-07	<1.6700E-05	22,59-Concrete, 59-METAL-H	55.05	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	1.78589E+02	3.1339E+02	8.4700E+00	AU
		3000.00	105056.00	104560.00	3.0000E-01	<2.0000E+01	<1.0000E+03		1944.00				Eu-152	4.06938E+00	7.1410E+00	1.9300E-01	
													H-3	5.98810E+01	1.0508E+02	2.8400E+00	
													Pu-239 [7.8548E-03 g]	1.02683E+01	1.8019E+01	4.8700E-01	
													Pu-240 [2.1174E-03 g]	1.02683E+01	1.8019E+01	4.8700E-01	
													Sr-90	1.44221E+01	2.5308E+01	6.8400E-01	
													Y-90	1.44221E+01	2.5308E+01	6.8400E-01	
													Subtotal		5.1227E+02	1.3845E+01	
													Total		5.1227E+02	1.3845E+01	
													SNM [9.9722E-03 g]				
Shipment Totals		84.95	47652.60	47427.62									SNM [9.9722E-03 g]		5.1227E+02	1.3845E+01	
		3000.00	105056.00	104560.00													

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption

60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-08-0031
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Cs-137	3.1339E+02	8.4700E+00	8.4700E-03
Eu-152	7.1410E+00	1.9300E-01	1.9300E-04
H-3	1.0508E+02	2.8400E+00	2.8400E-03
Pu-239	1.8019E+01	4.8700E-01	4.8700E-04
Pu-240	1.8019E+01	4.8700E-01	4.8700E-04
Sr-90	2.5308E+01	6.8400E-01	6.8400E-04
Y-90	2.5308E+01	6.8400E-01	6.8400E-04

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number (Include Area Code): 631-344-2222

Organization: Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment? [x] YES [ ] NO

3. Total Number of packages identified on this manifest? 6

4. Does EPA regulated waste requiring a manifest accompany this shipment? If "Yes," provide Manifest Number [ ] YES [x] NO

EPA Manifest Number:

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit: 0112001215

Shipment Number: 7314-03-0163

Contact: Glen Todzia

Phone No (include Area Code): (631) 344-7488

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973 Railcar # HKRX80024

EPA I.D. Number: NYD980641625

Contact: James Nunes

Phone No (include Area Code): (718) 928-2304

Signature - Authorized carrier acknowledging waste receipt: James Nunes

Date: 02/26/22

Shipper ID Number: 7314-03-0163

[ ] Collector
[ ] Processor
[x] Generator Type (Specify) G

Shipping Date: 2/26/22

7. Form 540 and 540A — Page 1 of 2 Page(s); Form 541 and 541A — 2 Page(s); Form 542 and 542A — None Page(s); Additional Information — None Page(s); Electronic [ ]

8. Manifest Number: 7314-03-0163

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact: Security Department

Phone No (Include Area Code): (801)649-2175

Signature - Authorized consignee acknowledging waste receipt

Date

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title: Shipper

Date: 2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume (Use appropriate units)	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.9634E+02	1.8820E+01	51820 LBS; 755 FT3	R56008
								SLZU642412
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	7.9121E+02	2.1384E+01	57370 LBS; 755 FT3	R57013
								SLZU642461
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	7.2209E+02	1.9516E+01	52960 LBS; 755 FT3	R57945
								SLZU642419

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) 2/24/22 Date

on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 540A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER (CONTINUATION)

EnergySolutions, LLC

8. Manifest Number
7314-03-0163

Page 2 of 2

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume *(Use appropriate units)*	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	**NA**	**NA**	**Solid Metal Oxide**	**Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90**	**6.9760E+02**	**1.8854E+01**	**51500 LBS; 755 FT3**	**R57946**
								SLZU642462
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	**NA**	**NA**	**Solid Metal Oxide**	**Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90**	**6.7843E+02**	**1.8336E+01**	**50300 LBS; 755 FT3**	**R57948**
								SLZU642464
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	**NA**	**NA**	**Solid Metal Oxide**	**Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90**	**7.8233E+02**	**2.1144E+01**	**56740 LBS; 755 FT3**	**R57955**
								SLZU642439

FORM 540A (06-2021)

FORM 541 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m^3)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
6	m3 115.52	kg 121721.51	NP	NP	4.2633E-02 6 Containers	4.2633E-02
	ft3 4079.00	lb 268350.00				

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	4.3680E+03	6.8006E+02	NP	NP	NP	(kg)	NA
mCi	1.1805E+02	1.8380E+01	NP	NP	NP	(lbs)	NA

2. Manifest Number: **7314-03-0163**

3. Page **1** of **2** Page(s)

4. Shipper Name: **Brookhaven National Laboratory**

Shipment ID Number: **7314-03-0163**

Disposal Container Description								Waste Description for Each Waste Type in Container								
								Physical Description			15. Chemical Description		16. Radiological Description				17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R56008/7314-03	19 INTERMODAL SLZU642412	21.38	23505.16	19926.31	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.32226E+02	2.4494E+02	6.6200E+00	AU
		755.00	51820.00	43930.00	5.0000E-03	<2.0000E+01	<1.0000E+03		680.00				H-3	1.48046E+02	1.0915E+02	2.9500E+00	
													Pu-239 [5.4032E-03 g]	1.68120E+01	1.2395E+01	3.3500E-01	
													Pu-240 [1.4565E-03 g]	1.68120E+01	1.2395E+01	3.3500E-01	
													Sr-90	2.15294E+02	1.5873E+02	4.2900E+00	
													Y-90	2.15294E+02	1.5873E+02	4.2900E+00	
													Subtotal		6.9634E+02	1.8820E+01	
													Total		6.9634E+02	1.8820E+01	
													SNM [6.8598E-03 g]				
R57013/7314-03	19 INTERMODAL SLZU642461	21.38	26022.60	20175.79	1.0000E-04	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.79169E+02	2.8305E+02	7.6500E+00	AU
		755.00	57370.00	44480.00	1.0000E-02	<2.0000E+01	<1.0000E+03		680.00				H-3	1.64555E+02	1.2284E+02	3.3200E+00	
													Pu-239 [6.0807E-03 g]	1.86859E+01	1.3949E+01	3.7700E-01	
													Pu-240 [1.6391E-03 g]	1.86859E+01	1.3949E+01	3.7700E-01	
													Sr-90	2.39397E+02	1.7871E+02	4.8300E+00	
													Y-90	2.39397E+02	1.7871E+02	4.8300E+00	
													Subtotal		7.9121E+02	2.1384E+01	
													Total		7.9121E+02	2.1384E+01	
													SNM [7.7198E-03 g]				
R57945/7314-03	19 INTERMODAL SLZU642419	21.38	24022.25	20443.41	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.40943E+02	2.5789E+02	6.9700E+00	AU
		755.00	52960.00	45070.00	5.0000E-03	<2.0000E+01	<1.0000E+03		680.00				H-3	1.48704E+02	1.1248E+02	3.0400E+00	
													Pu-239 [5.5323E-03 g]	1.67781E+01	1.2691E+01	3.4300E-01	
													Pu-240 [1.4913E-03 g]	1.67781E+01	1.2691E+01	3.4300E-01	
													Sr-90	2.15719E+02	1.6317E+02	4.4100E+00	
													Y-90	2.15719E+02	1.6317E+02	4.4100E+00	
													Subtotal		7.2209E+02	1.9516E+01	
													Total		7.2209E+02	1.9516E+01	
													SNM [7.0236E-03 g]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A. Gondola
B. Intermodal
C. End-Dump
D. Roll-off
E. Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G. Dewatered
H. Solid
I. Combustible
J. Non-combustible
K. Air Filtration Filters
L. Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption
60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. Manifest Number: 7314-03-0163

3. Page 2 of 2 Page(s)

Disposal Container Description								Waste Description for Each Waste Type in Container										
								Physical Description			15. Chemical Description		16. Radiological Description				17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R57946/7314-03	19 INTERMODAL SLZU642462	21.38	23360.01	19781.16	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.40730E+02	2.4938E+02	6.7400E+00	AU
		755.00	51500.00	43610.00	5.0000E-03	<2.0000E+01	<1.0000E+03		680.00				H-3	1.48121E+02	1.0841E+02	2.9300E+00	
													Pu-239 [5.3548E-03 g]	1.67837E+01	1.2284E+01	3.3200E-01	
													Pu-240 [1.4435E-03 g]	1.67837E+01	1.2284E+01	3.3200E-01	
													Sr-90	2.15358E+02	1.5762E+02	4.2600E+00	
													Y-90	2.15358E+02	1.5762E+02	4.2600E+00	
													Subtotal		6.9760E+02	1.8854E+01	
													Total		6.9760E+02	1.8854E+01	
													SNM [6.7983E-03 g]				
R57948/7314-03	19 INTERMODAL SLZU642464	21.38	22815.70	19236.85	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.24	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.41014E+02	2.4272E+02	6.5600E+00	AU
		755.00	50300.00	42410.00	5.0000E-03	<2.0000E+01	<1.0000E+03		679.50				H-3	1.48154E+02	1.0545E+02	2.8500E+00	
													Pu-239 [5.2097E-03 g]	1.67908E+01	1.1951E+01	3.2300E-01	
													Pu-240 [1.4044E-03 g]	1.67908E+01	1.1951E+01	3.2300E-01	
													Sr-90	2.15213E+02	1.5318E+02	4.1400E+00	
													Y-90	2.15213E+02	1.5318E+02	4.1400E+00	
													Subtotal		6.7843E+02	1.8336E+01	
													Total		6.7843E+02	1.8336E+01	
													SNM [6.6140E-03 g]				
R57955/7314-03	19 INTERMODAL SLZU642439	21.38	25736.83	22157.99	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.24	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.40737E+02	2.7935E+02	7.5500E+00	AU
		755.00	56740.00	48850.00	5.0000E-03	<2.0000E+01	<1.0000E+03		679.50				H-3	1.48480E+02	1.2173E+02	3.2900E+00	
													Pu-239 [6.0000E-03 g]	1.67886E+01	1.3764E+01	3.7200E-01	
													Pu-240 [1.6174E-03 g]	1.67886E+01	1.3764E+01	3.7200E-01	
													Sr-90	2.15725E+02	1.7686E+02	4.7800E+00	
													Y-90	2.15725E+02	1.7686E+02	4.7800E+00	
													Subtotal		7.8233E+02	2.1144E+01	
													Total		7.8233E+02	2.1144E+01	
													SNM [7.6174E-03 g]				
Shipment Totals		128.28	145462.55	121721.51									SNM [4.2633E-02 g]		4.3680E+03	1.1805E+02	
		4530.00	320690.00	268350.00													

FORM 541A (06-2021)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-03-0163
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Cs-137	1.5573E+03	4.2090E+01	4.2090E-02
H-3	6.8006E+02	1.8380E+01	1.8380E-02
Pu-239	7.7034E+01	2.0820E+00	2.0820E-03
Pu-240	7.7034E+01	2.0820E+00	2.0820E-03
Sr-90	9.8827E+02	2.6710E+01	2.6710E-02
Y-90	9.8827E+02	2.6710E+01	2.6710E-02

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number *(Include Area Code)*
631-344-2222

Organization
Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment?
☑ YES ☐ NO

3. Total Number of packages identified on this manifest?
7

4. Does EPA regulated waste requiring a manifest accompany this shipment?
If "Yes," provide Manifest Number
☐ YES ☑ NO

EPA Manifest Number

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit
0112001215

Shipment Number
7314-03-0164

Contact
Glen Todzia

Phone No (Include Area Code)
(631) 344-7488

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973
Railcar # HKRX80029

EPA I.D. Number
NYD980641625

Shipping Date
2/26/22

Contact
James Nunes

Phone No (Include Area Code)
(718) 928-2304

Signature - *Authorized Carrier acknowledging waste receipt*
James Nunes

Date
2/26/22

Shipper ID Number
7314-03-0164

☐ Collector
☐ Processor
☑ Generator Type
(Specify) G

7. Form 540 and 540A — Page 1 of 2 Page(s) — Electronic ☐
Form 541 and 541A — 2 Page(s) ☐
Form 542 and 542A — None Page(s) ☐
Additional Information — None Page(s) ☐

8. Manifest Number
7314-03-0164

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact
Security Department

Phone No (Include Area Code)
(801)649-2175

Signature - *Authorized consignee acknowledging waste receipt*

Date

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title
Shipper

Date
2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume *(Use appropriate units)*	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	8.4575E+02	2.2858E+01	39000 LBS; 960 FT3	R56004
								MHFU002413
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	5.9481E+02	1.6076E+01	45120 LBS; 755 FT3	R56009
								SLZU642451
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	8.7305E+02	2.3596E+01	40040 LBS; 960 FT3	R57736
								MHFU001641

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) 2/24/22 Date

on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 540A

EnergySolutions, LLC

8. Manifest Number
7314-03-0164

Page 2 of 2

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER (CONTINUATION)

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume *(Use appropriate units)*	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	1.0056E+03	2.7178E+01	44980 LBS; 960 FT3	R57740
								MHFU002389
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	5.8460E+02	1.5800E+01	29260 LBS; 960 FT3	R57853
								MHFU002396
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	9.5142E+02	2.5714E+01	42900 LBS; 960 FT3	R57951
								ISEU000047
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	7.1351E+02	1.9284E+01	46540 LBS; 755 FT3	R58183
								SLZU642441

FORM 541 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m^3)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
7	m3 160.87	kg 106530.71	NP	NP	5.8728E-02	5.8728E-02
	ft3 5680.00	lb 234860.00			7 Containers	

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	5.5687E+03	7.0892E+02	NP	NP	NP	(kg)	NA
mCi	1.5051E+02	1.9160E+01	NP	NP	NP	(lbs)	NA

2. Manifest Number: 7314-03-0164

3. Page 1 of 2 Page(s)

4. Shipper Name: Brookhaven National Laboratory

Shipment ID Number: 7314-03-0164

Disposal Container Description								Waste Description for Each Waste Type in Container										17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) (ft3)	8. Waste and Container Weight (kg) (lb)	9. Waste Weight (kg) (lb)	10. Surface Radiation Level (mSv/hr) (mrem/hr)	11. Surface Contamination (MBq/100 cm2) (dpm/100 cm2) Alpha	Beta-Gamma	Physical Description 12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	15. Chemical Description Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	16. Radiological Description Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent Radionuclides	pCi/gm	MBq	mCi	
R56004/7314-03	19 INTERMODAL MHFU002413	27.18	17690.10	14288.16	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94201E+02	3.1413E+02	8.4900E+00	AU
		960.00	39000.00	31500.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				H-3	1.95268E+02	1.0323E+02	2.7900E+00	
													Pu-239 [6.7581E-03 g]	2.93251E+01	1.5503E+01	4.1900E-01	
													Pu-240 [1.8217E-03 g]	2.93251E+01	1.5503E+01	4.1900E-01	
													Sr-90	3.75838E+02	1.9869E+02	5.3700E+00	
													Y-90	3.75838E+02	1.9869E+02	5.3700E+00	
													Subtotal		8.4575E+02	2.2858E+01	
													Total SNM [8.5798E-03 g]		8.4575E+02	2.2858E+01	
R56009/7314-03	19 INTERMODAL SLZU642451	21.38	20466.09	16887.25	1.0000E-04	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.40495E+02	2.1275E+02	5.7500E+00	AU
		755.00	45120.00	37230.00	1.0000E-02	<2.0000E+01	<1.0000E+03		680.00				H-3	1.48042E+02	9.2500E+01	2.5000E+00	
													Pu-239 [4.5645E-03 g]	1.67583E+01	1.0471E+01	2.8300E-01	
													Pu-240 [1.2304E-03 g]	1.67583E+01	1.0471E+01	2.8300E-01	
													Sr-90	2.14956E+02	1.3431E+02	3.6300E+00	
													Y-90	2.14956E+02	1.3431E+02	3.6300E+00	
													Subtotal		5.9481E+02	1.6076E+01	
													Total SNM [5.7950E-03 g]		5.9481E+02	1.6076E+01	
R57736/7314-03	19 INTERMODAL MHFU001641	27.18	18161.84	14895.97	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.88753E+02	3.2449E+02	8.7700E+00	AU
		960.00	40040.00	32840.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				H-3	1.93342E+02	1.0656E+02	2.8800E+00	
													Pu-239 [6.9839E-03 g]	2.90684E+01	1.6021E+01	4.3300E-01	
													Pu-240 [1.8826E-03 g]	2.90684E+01	1.6021E+01	4.3300E-01	
													Sr-90	3.71915E+02	2.0498E+02	5.5400E+00	
													Y-90	3.71915E+02	2.0498E+02	5.5400E+00	
													Subtotal		8.7305E+02	2.3596E+01	
													Total SNM [8.8665E-03 g]		8.7305E+02	2.3596E+01	

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption

60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. Manifest Number: 7314-03-0164

3. Page 2 of 2 Page(s)

Disposal Container Description								Waste Description for Each Waste Type in Container										
								Physical Description			Chemical Description		16. Radiological Description				17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R57740/7314-03	19 INTERMODAL MHFU002389	27.18	20402.59	17000.64	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94098E+02	3.7370E+02	1.0100E+01	AU
													H-3	1.95288E+02	1.2284E+02	3.3200E+00	
													Pu-239 [8.0484E-03 g]	2.93520E+01	1.8463E+01	4.9900E-01	
													Pu-240 [2.1696E-03 g]	2.93520E+01	1.8463E+01	4.9900E-01	
		960.00	44980.00	37480.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Sr-90	3.75282E+02	2.3606E+02	6.3800E+00	
													Y-90	3.75282E+02	2.3606E+02	6.3800E+00	
													Subtotal		1.0056E+03	2.7178E+01	
													Total		1.0056E+03	2.7178E+01	
													SNM [1.0218E-02 g]				
R57853/7314-03	19 INTERMODAL MHFU002396	27.18	13272.11	9870.17	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94724E+02	2.1719E+02	5.8700E+00	AU
													H-3	1.95540E+02	7.1410E+01	1.9300E+00	
													Pu-239 [4.6774E-03 g]	2.93816E+01	1.0730E+01	2.9000E-01	
													Pu-240 [1.2609E-03 g]	2.93816E+01	1.0730E+01	2.9000E-01	
		960.00	29260.00	21760.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Sr-90	3.75882E+02	1.3727E+02	3.7100E+00	
													Y-90	3.75882E+02	1.3727E+02	3.7100E+00	
													Subtotal		5.8460E+02	1.5800E+01	
													Total		5.8460E+02	1.5800E+01	
													SNM [5.9383E-03 g]				
R57951/7314-03	19 INTERMODAL ISEU000047	27.18	19459.11	16057.17	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94753E+02	3.5335E+02	9.5500E+00	AU
													H-3	1.95552E+02	1.1618E+02	3.1400E+00	
													Pu-239 [7.6129E-03 g]	2.93951E+01	1.7464E+01	4.7200E-01	
													Pu-240 [2.0522E-03 g]	2.93951E+01	1.7464E+01	4.7200E-01	
		960.00	42900.00	35400.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Sr-90	3.76158E+02	2.2348E+02	6.0400E+00	
													Y-90	3.76158E+02	2.2348E+02	6.0400E+00	
													Subtotal		9.5142E+02	2.5714E+01	
													Total		9.5142E+02	2.5714E+01	
													SNM [9.6651E-03 g]				
R58183/7314-03	19 INTERMODAL SLZU642441	21.38	21110.19	17531.35	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.59358E+02	2.3310E+02	6.3000E+00	AU
													H-3	1.48307E+02	9.6200E+01	2.6000E+00	
													Pu-239 [7.6129E-03 g]	2.69233E+01	1.7464E+01	4.7200E-01	
													Pu-240 [2.0522E-03 g]	2.69233E+01	1.7464E+01	4.7200E-01	
		755.00	46540.00	38650.00	5.0000E-03	<2.0000E+01	<1.0000E+03		680.00				Sr-90	2.69233E+02	1.7464E+02	4.7200E+00	
													Y-90	2.69233E+02	1.7464E+02	4.7200E+00	
													Subtotal		7.1351E+02	1.9284E+01	
													Total		7.1351E+02	1.9284E+01	
													SNM [9.6651E-03 g]				
Shipment Totals		178.66	130562.03	106530.71									SNM [5.8728E-02 g]		5.5687E+03	1.5051E+02	
		6310.00	287840.00	234860.00													

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-03-0164
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Cs-137	2.0287E+03	5.4830E+01	5.4830E-02
H-3	7.0892E+02	1.9160E+01	1.9160E-02
Pu-239	1.0612E+02	2.8680E+00	2.8680E-03
Pu-240	1.0612E+02	2.8680E+00	2.8680E-03
Sr-90	1.3094E+03	3.5390E+01	3.5390E-02
Y-90	1.3094E+03	3.5390E+01	3.5390E-02

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number (Include Area Code)
631-344-2222

Organization
Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment? ☑ YES ☐ NO

3. Total Number of packages identified on this manifest? 7

4. Does EPA regulated waste requiring a manifest accompany this shipment? If "Yes," provide Manifest Number ☐ YES ☑ NO

EPA Manifest Number

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit: 0112001215
Shipment Number: 7314-03-0165

Contact: Glen Todzia

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973 Railcar # HKRX80013

Contact: James Nunes

Signature - *Authorized carrier acknowledging waste receipt*: James P Nunes

Shipper ID Number: 7314-03-0165
☐ Collector ☐ Processor ☑ Generator Type (Specify) G

Phone No (Include Area Code): (631) 344-7488

EPA I.D. Number: NYD980641625

Shipping Date: 2/24/22

Phone No (Include Area Code): (718) 928-2304

Date: 2/24/22

7. Form 540 and 540A — Page 1 of 2 Page(s) — Electronic ☐
Form 541 and 541A — 3 Page(s)
Form 542 and 542A — None Page(s)
Additional Information — None Page(s)

8. Manifest Number: 7314-03-0165

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact: Security Department
Phone No (Include Area Code): (801)649-2175

Signature - *Authorized consignee acknowledging waste receipt*

Date

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title: Shipper — Date: 2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume (Use appropriate units)	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	7.2668E+02	1.9640E+01	34540 LBS; 960 FT3	R56001
								MHFU001905
UN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.9630E+02	1.8819E+01	33440 LBS; 960 FT3	R57739
								MHFU001938
UN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	7.4977E+02	2.0264E+01	35420 LBS; 960 FT3	R57884
								MHFU001892

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) Date: 2/24/22 on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 540A

EnergySolutions, LLC

8. Manifest Number
7314-03-0165

Page 2 of 2

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER (CONTINUATION)

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides				16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume *(Use appropriate units)*	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Am-241	Cs-137	H-3	Pu-239	4.3813E+02	1.1841E+01	36300 LBS; 755 FT3	R57893
				Pu-240	Sr-90	Y-90					SLZU642445
UN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Cs-137	H-3	Pu-239	Pu-240	7.8188E+02	2.1132E+01	36080 LBS; 960 FT3	R57954
				Sr-90	Y-90						ISEU000053
sUN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Cs-137	H-3	Pu-239	Pu-240	7.2172E+02	1.9506E+01	37180 LBS; 547 FT3	R58180
				Sr-90	Y-90						ISEU000011
UN 2912, Radioactive material, low specific activity (LSA-I), 7 INTERMODAL ERG162	NA	NA	Solid Metal Oxide	Cs-137	H-3	Pu-239	Pu-240	6.5882E+02	1.7806E+01	49040 LBS; 755 FT3	R58184
				Sr-90	Y-90						SLZU642431

FORM 541 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m^3)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
7	m3 150.33	kg 94923.29	NP	NP	4.7404E-02	4.7404E-02
	ft3 5308.00	lb 209270.00			7 Containers	

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	4.7733E+03	6.0676E+02	NP	NP	NP	(kg)	NA
mCi	1.2901E+02	1.6399E+01	NP	NP	NP	(lbs)	NA

2. Manifest Number: 7314-03-0165

3. Page 1 of 3 Page(s)

4. Shipper Name: Brookhaven National Laboratory

Shipment ID Number: 7314-03-0165

Disposal Container Description								Waste Description for Each Waste Type in Container								
								Physical Description			15. Chemical Description		16. Radiological Description				17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R56001/7314-03	19 INTERMODAL MHFU001905	27.18	15667.08	12265.14	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.93555E+02	2.6936E+02	7.2800E+00	AU
													H-3	1.98939E+02	9.0280E+01	2.4400E+00	
		960.00	34540.00	27040.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Pu-239 [5.8065E-03 g]	2.93516E+01	1.3320E+01	3.6000E-01	
													Pu-240 [1.5652E-03 g]	2.93516E+01	1.3320E+01	3.6000E-01	
													Sr-90	3.75049E+02	1.7020E+02	4.6000E+00	
													Y-90	3.75049E+02	1.7020E+02	4.6000E+00	
													Subtotal		7.2668E+02	1.9640E+01	
													Total		7.2668E+02	1.9640E+01	
													SNM [7.3717E-03 g]				
R57739/7314-03	19 INTERMODAL MHFU001938	27.18	15168.13	11766.19	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94078E+02	2.5863E+02	6.9900E+00	AU
													H-3	1.95391E+02	8.5063E+01	2.2990E+00	
		960.00	33440.00	25940.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Pu-239 [5.5645E-03 g]	2.93215E+01	1.2765E+01	3.4500E-01	
													Pu-240 [1.5000E-03 g]	2.93215E+01	1.2765E+01	3.4500E-01	
													Sr-90	3.75655E+02	1.6354E+02	4.4200E+00	
													Y-90	3.75655E+02	1.6354E+02	4.4200E+00	
													Subtotal		6.9630E+02	1.8819E+01	
													Total		6.9630E+02	1.8819E+01	
													SNM [7.0645E-03 g]				
R57884/7314-03	19 INTERMODAL MHFU001892	27.18	16066.24	12618.94	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.96725E+02	2.7861E+02	7.5300E+00	AU
													H-3	1.95739E+02	9.1390E+01	2.4700E+00	
		960.00	35420.00	27820.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Pu-239 [6.0000E-03 g]	2.94797E+01	1.3764E+01	3.7200E-01	
													Pu-240 [1.6174E-03 g]	2.94797E+01	1.3764E+01	3.7200E-01	
													Sr-90	3.77213E+02	1.7612E+02	4.7600E+00	
													Y-90	3.77213E+02	1.7612E+02	4.7600E+00	
													Subtotal		7.4977E+02	2.0264E+01	
													Total		7.4977E+02	2.0264E+01	
													SNM [7.6174E-03 g]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption
60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. Manifest Number: 7314-03-0165

3. Page 2 of 3 Page(s)

Disposal Container Description								Waste Description for Each Waste Type in Container										17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
								Physical Description			15. Chemical Description		16. Radiological Description					
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R57893/7314-03	19 INTERMODAL SLZU642445	21.38	16465.40	12886.56	3.0000E-02	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Am-241	2.28146E+00	1.0878E+00	2.9400E-02	AU
		755.00	36300.00	28410.00	3.0000E+00	<2.0000E+01	<1.0000E+03		680.00				Cs-137	3.40667E+02	1.6243E+02	4.3900E+00	
													H-3	1.12521E+02	5.3650E+01	1.4500E+00	
													Pu-239 [3.4839E-03 g]	1.67617E+01	7.9920E+00	2.1600E-01	
													Pu-240 [9.3913E-04 g]	1.67617E+01	7.9920E+00	2.1600E-01	
													Sr-90	2.14954E+02	1.0249E+02	2.7700E+00	
													Y-90	2.14954E+02	1.0249E+02	2.7700E+00	
													Subtotal		4.3813E+02	1.1841E+01	
													Total		4.3813E+02	1.1841E+01	
													SNM [4.4230E-03 g]				
R57954/7314-03	19 INTERMODAL ISEU000053	27.18	16365.61	12963.67	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94742E+02	2.8527E+02	7.7100E+00	AU
		960.00	36080.00	28580.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				H-3	2.25246E+02	1.0804E+02	2.9200E+00	
													Pu-239 [6.1452E-03 g]	2.93900E+01	1.4097E+01	3.8100E-01	
													Pu-240 [1.6565E-03 g]	2.93900E+01	1.4097E+01	3.8100E-01	
													Sr-90	3.75667E+02	1.8019E+02	4.8700E+00	
													Y-90	3.75667E+02	1.8019E+02	4.8700E+00	
													Subtotal		7.8188E+02	2.1132E+01	
													Total		7.8188E+02	2.1132E+01	
													SNM [7.8017E-03 g]				
R58180/7314-03	19 INTERMODAL ISEU000011	15.49	16864.57	13757.46	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	4.84104E+02	2.4642E+02	6.6600E+00	AU
		547.00	37180.00	30330.00	5.0000E-03	<2.0000E+01	<1.0000E+03		492.00				H-3	1.49011E+02	7.5850E+01	2.0500E+00	
													Pu-239 [5.2903E-03 g]	2.38417E+01	1.2136E+01	3.2800E-01	
													Pu-240 [1.4261E-03 g]	2.38417E+01	1.2136E+01	3.2800E-01	
													Sr-90	3.68529E+02	1.8759E+02	5.0700E+00	
													Y-90	3.68529E+02	1.8759E+02	5.0700E+00	
													Subtotal		7.2172E+02	1.9506E+01	
													Total		7.2172E+02	1.9506E+01	
													SNM [6.7164E-03 g]				
R58184/7314-03	19 INTERMODAL SLZU642431	21.38	22244.17	18665.33	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	19.26	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	3.41276E+02	2.3569E+02	6.3700E+00	AU
		755.00	49040.00	41150.00	5.0000E-03	<2.0000E+01	<1.0000E+03		680.00				H-3	1.48404E+02	1.0249E+02	2.7700E+00	
													Pu-239 [5.0484E-03 g]	1.67691E+01	1.1581E+01	3.1300E-01	
													Pu-240 [1.3609E-03 g]	1.67691E+01	1.1581E+01	3.1300E-01	
													Sr-90	2.15374E+02	1.4874E+02	4.0200E+00	
													Y-90	2.15374E+02	1.4874E+02	4.0200E+00	
													Subtotal		6.5882E+02	1.7806E+01	
													Total		6.5882E+02	1.7806E+01	
													SNM [6.4093E-03 g]				

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. Manifest Number: 7314-03-0165

3. Page 3 of 3 Page(s)

Disposal Container Description								Waste Description for Each Waste Type in Container							17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
								Physical Description			15. Chemical Description		16. Radiological Description				
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2)		12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent				
						Alpha	Beta-Gamma						Radionuclides	pCi/gm	MBq	mCi	
Shipment Totals		**166.97**	**118841.20**	**94923.29**									**SNM [4.7404E-02 g]**		**4.7733E+03**	**1.2901E+02**	
		5897.00	**262000.00**	**209270.00**													

FORM 541A (06-2021)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-03-0165
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Am-241	1.0878E+00	2.9400E-02	2.9400E-05
Cs-137	1.7364E+03	4.6930E+01	4.6930E-02
H-3	6.0676E+02	1.6399E+01	1.6399E-02
Pu-239	8.5655E+01	2.3150E+00	2.3150E-03
Pu-240	8.5655E+01	2.3150E+00	2.3150E-03
Sr-90	1.1289E+03	3.0510E+01	3.0510E-02
Y-90	1.1289E+03	3.0510E+01	3.0510E-02

FORM 540 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number (Include Area Code): 631-344-2222

Organization: Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment? [x] YES [ ] NO

3. Total Number of packages identified on this manifest? 7

4. Does EPA regulated waste requiring a manifest accompany this shipment? If "Yes," provide Manifest Number [ ] YES [x] NO

EPA Manifest Number:

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit: 0112001215

Shipment Number: 7314-03-0166

Contact: Glen Todzia

Phone No (Include Area Code): (631) 344-7488

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973 Railcar # HKRX80034

Contact: James Nunes

Phone No (Include Area Code): (718) 928-2304

Signature - Authorized carrier acknowledging waste receipt

Date: 2/24/22

Shipper ID Number: 7314-03-0166

[ ] Collector
[ ] Processor
[x] Generator Type (Specify) G

EPA I.D. Number: NYD980641625

Shipping Date: 2/24/22

7. Form 540 and 540A — Page 1 of 2 Page(s) — Electronic [ ]
Form 541 and 541A — 2 Page(s) [ ]
Form 542 and 542A — None Page(s) [ ]
Additional Information — None Page(s) [ ]

8. Manifest Number: 7314-03-0166

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact: Security Department

Phone No (Include Area Code): (801)649-2175

Signature - Authorized consignee acknowledging waste receipt

Date:

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title: Shipper — Date: 2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume (Use appropriate units)	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.5416E+02	1.7680E+01	31900 LBS; 960 FT3	R56002
								MHFU001712
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.6104E+02	1.7866E+01	32120 LBS; 960 FT3	R56003
								MHFU001903
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.4299E+02	1.7378E+01	31460 LBS; 960 FT3	R57886
								MHFU001280

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) 2/24/22 Date — on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 540A

EnergySolutions, LLC

8. Manifest Number
7314-03-0166

Page 2 of 2

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER (CONTINUATION)

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume *(Use appropriate units)*	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.7333E+02	1.8198E+01	32560 LBS; 960 FT3	R57887
								MHFU002129
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.6260E+02	1.7908E+01	29700 LBS; 547 FT3	R57949
								SLZU600094
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	6.4299E+02	1.7378E+01	31460 LBS; 960 FT3	R57953
								ISEU000054
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	5.7505E+02	1.5542E+01	31020 LBS; 547 FT3	R58179
								ISEU000003

FORM 540A (06-2021)

FORM 541 — EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m³)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
7	m3 150.21	kg 76724.23	NP	NP	4.8223E-02	4.8223E-02
	ft3 5304.00	lb 169148.00			7 Containers	

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	4.5122E+03	5.1726E+02	NP	NP	NP	(kg)	NA
mCi	1.2195E+02	1.3980E+01	NP	NP	NP	(lbs)	NA

2. Manifest Number: **7314-03-0166**

3. Page **1** of **2** Page(s)

4. Shipper Name: **Brookhaven National Laboratory**

Shipment ID Number: **7314-03-0166**

Disposal Container Description / Waste Description for Each Waste Type in Container

5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	15. Chemical Description: Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	16. Radiological Description: Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent — Radionuclides	pCi/gm	MBq	mCi	17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
R56002/7314-03	19 INTERMODAL MHFU001712	27.18	14469.60	11067.65	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.93625E+02	2.4309E+02	6.5700E+00	AU
													H-3	1.95164E+02	7.9920E+01	2.1600E+00	
													Pu-239 [5.2419E-03 g]	2.93650E+01	1.2025E+01	3.2500E-01	
		960.00	31900.00	24400.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Pu-240 [1.4130E-03 g]	2.93650E+01	1.2025E+01	3.2500E-01	
													Sr-90	3.74969E+02	1.5355E+02	4.1500E+00	
													Y-90	3.74969E+02	1.5355E+02	4.1500E+00	
													Subtotal		6.5416E+02	1.7680E+01	
													Total		6.5416E+02	1.7680E+01	
													SNM [6.6550E-03 g]				
R56003/7314-03	19 INTERMODAL MHFU001903	27.18	14569.39	11167.44	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.93693E+02	2.4531E+02	6.6300E+00	AU
													H-3	1.95211E+02	8.0660E+01	2.1800E+00	
													Pu-239 [5.2903E-03 g]	2.93712E+01	1.2136E+01	3.2800E-01	
		960.00	32120.00	24620.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Pu-240 [1.4261E-03 g]	2.93712E+01	1.2136E+01	3.2800E-01	
													Sr-90	3.76095E+02	1.5540E+02	4.2000E+00	
													Y-90	3.76095E+02	1.5540E+02	4.2000E+00	
													Subtotal		6.6104E+02	1.7866E+01	
													Total		6.6104E+02	1.7866E+01	
													SNM [6.7164E-03 g]				
R57886/7314-03	19 INTERMODAL MHFU001280	27.18	14270.02	11004.15	4.0000E-03	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.87054E+02	2.3902E+02	6.4600E+00	AU
													H-3	1.92656E+02	7.8440E+01	2.1200E+00	
													Pu-239 [5.1452E-03 g]	2.89892E+01	1.1803E+01	3.1900E-01	
		960.00	31460.00	24260.00	4.0000E-01	<2.0000E+01	<1.0000E+03		864.00				Pu-240 [1.3870E-03 g]	2.89892E+01	1.1803E+01	3.1900E-01	
													Sr-90	3.70771E+02	1.5096E+02	4.0800E+00	
													Y-90	3.70771E+02	1.5096E+02	4.0800E+00	
													Subtotal		6.4299E+02	1.7378E+01	
													Total		6.4299E+02	1.7378E+01	
													SNM [6.5321E-03 g]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stablization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption
60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification
90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. Manifest Number: 7314-03-0166

3. Page 2 of 2 Page(s)

Disposal Container Description								Waste Description for Each Waste Type in Container									
								Physical Description			15. Chemical Description		16. Radiological Description				17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R57887/7314-03	19 INTERMODAL MHFU002129	27.18	14768.97	11329.83	7.0000E-04	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.95776E+02	2.4975E+02	6.7500E+00	AU
													H-3	1.95944E+02	8.2140E+01	2.2200E+00	
													Pu-239 [5.3871E-03 g]	2.94799E+01	1.2358E+01	3.3400E-01	
													Pu-240 [1.4522E-03 g]	2.94799E+01	1.2358E+01	3.3400E-01	
		960.00	32560.00	24978.00	7.0000E-02	<2.0000E+01	<1.0000E+03		864.00				Sr-90	3.77766E+02	1.5836E+02	4.2800E+00	
													Y-90	3.77766E+02	1.5836E+02	4.2800E+00	
													Subtotal		6.7333E+02	1.8198E+01	
													Total		6.7333E+02	1.8198E+01	
													SNM [6.8393E-03 g]				
R57949/7314-03	19 INTERMODAL SLZU600094	15.49	13471.69	10323.76	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.25005E+02	2.0054E+02	5.4200E+00	AU
													H-3	1.50140E+02	5.7350E+01	1.5500E+00	
													Pu-239 [7.5645E-03 g]	4.54294E+01	1.7353E+01	4.6900E-01	
													Pu-240 [2.0391E-03 g]	4.54294E+01	1.7353E+01	4.6900E-01	
		547.00	29700.00	22760.00	5.0000E-03	<2.0000E+01	<1.0000E+03		492.00				Sr-90	4.84322E+02	1.8500E+02	5.0000E+00	
													Y-90	4.84322E+02	1.8500E+02	5.0000E+00	
													Subtotal		6.6260E+02	1.7908E+01	
													Total		6.6260E+02	1.7908E+01	
													SNM [9.6037E-03 g]				
R57953/7314-03	19 INTERMODAL ISEU000054	27.18	14270.02	10868.07	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.94405E+02	2.3902E+02	6.4600E+00	AU
													H-3	1.95068E+02	7.8440E+01	2.1200E+00	
													Pu-239 [5.1452E-03 g]	2.93522E+01	1.1803E+01	3.1900E-01	
													Pu-240 [1.3870E-03 g]	2.93522E+01	1.1803E+01	3.1900E-01	
		960.00	31460.00	23960.00	5.0000E-03	<2.0000E+01	<1.0000E+03		864.00				Sr-90	3.75413E+02	1.5096E+02	4.0800E+00	
													Y-90	3.75413E+02	1.5096E+02	4.0800E+00	
													Subtotal		6.4299E+02	1.7378E+01	
													Total		6.4299E+02	1.7378E+01	
													SNM [6.5321E-03 g]				
R58179/7314-03	19 INTERMODAL ISEU000003	15.49	14070.44	10963.33	2.0000E-04	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	4.84345E+02	1.9647E+02	5.3100E+00	AU
													H-3	1.48678E+02	6.0310E+01	1.6300E+00	
													Pu-239 [4.2097E-03 g]	2.38068E+01	9.6570E+00	2.6100E-01	
													Pu-240 [1.1348E-03 g]	2.38068E+01	9.6570E+00	2.6100E-01	
		547.00	31020.00	24170.00	2.0000E-02	<2.0000E+01	<1.0000E+03		492.00				Sr-90	3.68503E+02	1.4948E+02	4.0400E+00	
													Y-90	3.68503E+02	1.4948E+02	4.0400E+00	
													Subtotal		5.7505E+02	1.5542E+01	
													Total		5.7505E+02	1.5542E+01	
													SNM [5.3445E-03 g]				
Shipment Totals		166.88	99890.13	76724.23									SNM [4.8223E-02 g]		4.5122E+03	1.2195E+02	
		5894.00	220220.00	169148.00													

FORM 541A (06-2021)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-03-0166
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Cs-137	1.6132E+03	4.3600E+01	4.3600E-02
H-3	5.1726E+02	1.3980E+01	1.3980E-02
Pu-239	8.7135E+01	2.3550E+00	2.3550E-03
Pu-240	8.7135E+01	2.3550E+00	2.3550E-03
Sr-90	1.1037E+03	2.9830E+01	2.9830E-02
Y-90	1.1037E+03	2.9830E+01	2.9830E-02

FORM 540 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number (Include Area Code)
631-344-2222

Organization
Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment?
☑ YES ☐ NO

3. Total Number of packages identified on this manifest?
7

4. Does EPA regulated waste requiring a manifest accompany this shipment?
If "Yes," provide Manifest Number
☐ YES ☑ NO

EPA Manifest Number

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit
0112001215

Shipment Number
7314-03-0167

Contact
Glen Todzia

Shipper ID Number
7314-03-0167
☐ Collector
☐ Processor
☑ Generator Type
(Specify) **G**

Phone No (Include Area Code)
(631) 344-7488

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973 Railcar # HKRX80008

EPA I.D. Number
NYD980641625

Shipping Date
2/26/22

Contact
James Nunes

Phone No (Include Area Code)
(718) 928-2304

Signature - *Authorized carrier acknowledging waste receipt*

Date 2/26/22

7. Form 540 and 540A Page 1 of 2 Page(s) Electronic
Form 541 and 541A 2 Page(s) ☐
Form 542 and 542A None Page(s) ☐
Additional Information **None** Page(s) ☐

8. Manifest Number
7314-03-0167

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact
Security Department

Phone No (Include Area Code)
(801)649-2175

Signature - *Authorized consignee acknowledging waste receipt*

Date

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title Shipper

Date 2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume (Use appropriate units)	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	**NA**	**NA**	**Solid Metal Oxide**	**Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90**	**5.0697E+02**	**1.3702E+01**	**26400 LBS; 960 FT3**	**R57952**
								ISEU000043
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	**NA**	**NA**	**Solid Metal Oxide**	**Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90**	**3.4040E+02**	**9.2000E+00**	**20240 LBS; 960 FT3**	**R57956**
								MHFU001854
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	**NA**	**NA**	**Solid Metal Oxide**	**Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90**	**3.4954E+02**	**9.4470E+00**	**21521 LBS; 547 FT3**	**R58175**
								SLZU600128

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

B. TITLE: Upon acceptance at the disposal site by EnergySolutions, LLC, and all appropriate regulatory authorities, title to the Waste Material which conforms to Generator's representations herein shall thereupon transfer from Generator and be vested in EnergySolutions, LLC

C. WASTE MATERIAL: Generator represents and warrants that all data set forth in this (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST) are true and correct in all respects and in accordance with all applicable governmental laws, rules, regulations and EnergySolutions LLC's facility license.

D. INDEMNIFICATION: Generator agrees to indemnify EnergySolutions, LLC, its officers, employees and agents against all losses and liability whatsoever if such losses or liability results from the failure of the Waste Material to conform in all material respects to the data supplied on the (UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST,) or if this shipment fails to meet the standards prescribed by the Department of Transportation or any governmental agency having jurisdiction over such matters.

FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) 2/24/22 Date

on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 540A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

SHIPPING PAPER (CONTINUATION)

EnergySolutions, LLC

8. Manifest Number
7314-03-0167

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume *(Use appropriate units)*	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	5.0808E+02	1.3732E+01	28160 LBS; 547 FT3	R58176
								SLZU600054
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	4.8122E+02	1.3006E+01	27060 LBS; 547 FT3	R58177
								SLZU601457
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	4.7700E+02	1.2892E+01	26880 LBS; 547 FT3	R58178
								ISEU000040
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Intermodal ERG162	NA	NA	Solid Metal Oxide	Cs-137 H-3 Pu-239 Pu-240 Sr-90 Y-90	4.8433E+02	1.3090E+01	25520 LBS; 960 FT3	R58181
								ISEU000041

FORM 541 EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m^3)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
7	m3 118.59	kg 57056.49	NP	NP	3.0408E-02	3.0408E-02
	ft3 4188.00	lb 125788.00			7 Containers	

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	3.1476E+03	3.5368E+02	NP	NP	NP	(kg)	NA
mCi	8.5069E+01	9.5590E+00	NP	NP	NP	(lbs)	NA

2. Manifest Number: 7314-03-0167

3. Page 1 of 2 Page(s)

4. Shipper Name: Brookhaven National Laboratory

Shipment ID Number: 7314-03-0167

Disposal Container Description								Waste Description for Each Waste Type in Container									
								Physical Description					16. Radiological Description				
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	15. Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
R57952/7314-03	19 INTERMODAL ISEU000043	27.18	11974.84	8399.62	1.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	6.05983E+02	1.8833E+02	5.0900E+00	AU
		960.00	26400.00	18518.00	1.0000E-03	<2.0000E+01	<1.0000E+03		864.00				H-3	1.98819E+02	6.1790E+01	1.6700E+00	
													Pu-239 [4.0484E-03 g]	2.98824E+01	9.2870E+00	2.5100E-01	
													Pu-240 [1.0913E-03 g]	2.98824E+01	9.2870E+00	2.5100E-01	
													Sr-90	3.83353E+02	1.1914E+02	3.2200E+00	
													Y-90	3.83353E+02	1.1914E+02	3.2200E+00	
													Subtotal		5.0697E+02	1.3702E+01	
													Total		5.0697E+02	1.3702E+01	
													SNM [5.1397E-03 g]				
R57956/7314-03	19 INTERMODAL MHFU001854	27.18	9180.71	5778.77	7.0000E-04	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	24.47	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.91825E+02	1.2654E+02	3.4200E+00	AU
		960.00	20240.00	12740.00	7.0000E-02	<2.0000E+01	<1.0000E+03		864.00				H-3	1.93814E+02	4.1440E+01	1.1200E+00	
													Pu-239 [2.7419E-03 g]	2.94182E+01	6.2900E+00	1.7000E-01	
													Pu-240 [7.3913E-04 g]	2.94182E+01	6.2900E+00	1.7000E-01	
													Sr-90	3.73784E+02	7.9920E+01	2.1600E+00	
													Y-90	3.73784E+02	7.9920E+01	2.1600E+00	
													Subtotal		3.4040E+02	9.2000E+00	
													Total		3.4040E+02	9.2000E+00	
													SNM [3.4811E-03 g]				
R58175/7314-03	19 INTERMODAL SLZU600128	15.49	9761.76	6613.38	2.0000E-03	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	4.86895E+02	1.1914E+02	3.2200E+00	AU
		547.00	21521.00	14580.00	2.0000E-01	<2.0000E+01	<1.0000E+03		492.00				H-3	1.49546E+02	3.6593E+01	9.8900E-01	
													Pu-239 [2.5645E-03 g]	2.40423E+01	5.8830E+00	1.5900E-01	
													Pu-240 [6.9130E-04 g]	2.40423E+01	5.8830E+00	1.5900E-01	
													Sr-90	3.71975E+02	9.1020E+01	2.4600E+00	
													Y-90	3.71975E+02	9.1020E+01	2.4600E+00	
													Subtotal		3.4954E+02	9.4470E+00	
													Total		3.4954E+02	9.4470E+00	
													SNM [3.2558E-03 g]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S," and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption

60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

FORM 541A

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION (CONTINUATION)

EnergySolutions, LLC

2. Manifest Number: 7314-03-0167

3. Page 2 of 2 Page(s)

Disposal Container Description								Waste Description for Each Waste Type in Container										17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
								Physical Description			15. Chemical Description		16. Radiological Description					
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) / (ft3)	8. Waste and Container Weight (kg) / (lb)	9. Waste Weight (kg) / (lb)	10. Surface Radiation Level (mSv/hr) / (mrem/hr)	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Alpha	11. Surface Contamination (MBq/100 cm2) / (dpm/100 cm2) Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) / (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R58176/7314-03	19 INTERMODAL SLZU600054	15.49	12773.16	9625.23	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	4.86225E+02	1.7316E+02	4.6800E+00	AU
		547.00	28160.00	21220.00	5.0000E-03	<2.0000E+01	<1.0000E+03		492.00				H-3	1.50647E+02	5.3650E+01	1.4500E+00	
													Pu-239 [3.7258E-03 g]	2.39996E+01	8.5470E+00	2.3100E-01	
													Pu-240 [1.0044E-03 g]	2.39996E+01	8.5470E+00	2.3100E-01	
													Sr-90	3.70902E+02	1.3209E+02	3.5700E+00	
													Y-90	3.70902E+02	1.3209E+02	3.5700E+00	
													Subtotal		5.0808E+02	1.3732E+01	
													Total		5.0808E+02	1.3732E+01	
													SNM [4.7302E-03 g]				
R58177/7314-03	19 INTERMODAL SLZU601457	15.49	12274.21	9126.28	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	4.86510E+02	1.6428E+02	4.4400E+00	AU
		547.00	27060.00	20120.00	5.0000E-03	<2.0000E+01	<1.0000E+03		492.00				H-3	1.50117E+02	5.0690E+01	1.3700E+00	
													Pu-239 [3.5161E-03 g]	2.38872E+01	8.0660E+00	2.1800E-01	
													Pu-240 [9.4783E-04 g]	2.38872E+01	8.0660E+00	2.1800E-01	
													Sr-90	3.70361E+02	1.2506E+02	3.3800E+00	
													Y-90	3.70361E+02	1.2506E+02	3.3800E+00	
													Subtotal		4.8122E+02	1.3006E+01	
													Total		4.8122E+02	1.3006E+01	
													SNM [4.4640E-03 g]				
R58178/7314-03	19 INTERMODAL ISEU000040	15.49	12192.56	9085.46	5.0000E-05	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	4.84293E+02	1.6280E+02	4.4000E+00	AU
		547.00	26880.00	20030.00	5.0000E-03	<2.0000E+01	<1.0000E+03		492.00				H-3	1.49691E+02	5.0320E+01	1.3600E+00	
													Pu-239 [3.4839E-03 g]	2.37744E+01	7.9920E+00	2.1600E-01	
													Pu-240 [9.3913E-04 g]	2.37744E+01	7.9920E+00	2.1600E-01	
													Sr-90	3.68723E+02	1.2395E+02	3.3500E+00	
													Y-90	3.68723E+02	1.2395E+02	3.3500E+00	
													Subtotal		4.7700E+02	1.2892E+01	
													Total		4.7700E+02	1.2892E+01	
													SNM [4.4230E-03 g]				
R58181/7314-03	19 INTERMODAL ISEU000041	27.18	11575.68	8427.75	1.2000E-03	<3.3400E-07	<1.6700E-05	59-Concrete,METAL,WOOD-H	13.93	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	5.77856E+02	1.8019E+02	4.8700E+00	AU
		960.00	25520.00	18580.00	1.2000E-01	<2.0000E+01	<1.0000E+03		492.00				H-3	1.89850E+02	5.9200E+01	1.6000E+00	
													Pu-239 [3.8710E-03 g]	2.84775E+01	8.8800E+00	2.4000E-01	
													Pu-240 [1.0435E-03 g]	2.84775E+01	8.8800E+00	2.4000E-01	
													Sr-90	3.64275E+02	1.1359E+02	3.0700E+00	
													Y-90	3.64275E+02	1.1359E+02	3.0700E+00	
													Subtotal		4.8433E+02	1.3090E+01	
													Total		4.8433E+02	1.3090E+01	
													SNM [4.9145E-03 g]				
Shipment Totals		143.50	79732.92	57056.49									SNM [3.0408E-02 g]		3.1476E+03	8.5069E+01	
		5068.00	175781.00	125788.00													

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-03-0167
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Cs-137	1.1144E+03	3.0120E+01	3.0120E-02
H-3	3.5368E+02	9.5590E+00	9.5590E-03
Pu-239	5.4945E+01	1.4850E+00	1.4850E-03
Pu-240	5.4945E+01	1.4850E+00	1.4850E-03
Sr-90	7.8477E+02	2.1210E+01	2.1210E-02
Y-90	7.8477E+02	2.1210E+01	2.1210E-02

FORM 540 — **EnergySolutions, LLC**

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

1. Emergency Telephone Number *(Include Area Code)*
631-344-2222

Organization
Brookhaven National Laboratory

2. Is this an "Exclusive Use" Shipment?
☑ YES ☐ NO

3. Total Number of packages identified on this manifest?
1

4. Does EPA regulated waste requiring a manifest accompany this shipment?
If "Yes," provide Manifest Number
☐ YES ☑ NO

EPA Manifest Number

5. Shipper - Name and Facility
Brookhaven National Laboratory
for the Department of Energy
120 E. 5th Street, Bldg. 860
Upton, NY 11973

Utah Generator Site Access Permit: 0112001215
Shipment Number: 7314-08-0032

Contact: Glen Todzia
Phone No (Include Area Code): (631) 344-7488

6. Carrier - Name and Address
New York and Atlantic Railroad
Upton Rail Yard
Upton, NY 11973 Railcar # HKRX50097

Contact: James Nunes
Phone No (Include Area Code): (718) 928-2304

Signature - *Authorized carrier acknowledging waste receipt*
Date: 2/24/22

Shipper ID Number: 7314-08-0032
☐ Collector
☐ Processor
☑ Generator Type
(Specify) G

EPA I.D. Number: NYD980641625
Shipping Date: 2/24/22

7. Form 540 and 540A — Page 1 of 1 Page(s) — Electronic ☐
Form 541 and 541A — 1 Page(s)
Form 542 and 542A — None Page(s)
Additional Information — None Page(s)

8. Manifest Number
7314-08-0032

9. Consignee - Name and Facility
EnergySolutions, LLC
Clive Disposal Site (Bulk Waste Facility)
Interstate 80, Exit 49
Clive, UT 84029

Contact: Security Department
Phone No (Include Area Code): (801)649-2175

Signature - *Authorized consignee acknowledging waste receipt*
Date

10. CERTIFICATION

"This is to certify that the herein-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, the Commission, and equivalent state regulations. For materials that are consigned to a land disposal facility or waste collector, this certifies that the materials are classified per the applicable requirements of 10 CFR Part 61, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements of 10 CFR Parts 20 and 61, or equivalent state regulations. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification."

Authorized Signature and Title: Shipper
Date: 2/24/22

11. U.S. Department of Transportation Description (Including UN ID number, proper shipping name, hazard class, and any additional information)	12. DOT Labels	13. Transport Index	14. Physical and Chemical Form	15. Individual Radionuclides	16. Maximum Package Activity MBq	16. Maximum Package Activity mCi	17. Total Weight or Volume (Use appropriate units)	18. Identification Number of Package
UN 2912, Radioactive material, low specific activity (LSA-I), 7 Super Load Wrapper ERG162	NA	NA	Solid Metal Oxide	Cs-137 Eu-152 H-3 Pu-239 Pu-240 Sr-90 Y-90	7.5680E+02	2.0454E+01	140700 LBS; 3000 FT3	R22-002B

FOR CONSIGNEE USE ONLY

____ Record Waste Description Inadequate
____ Contamination or Leakage Detected
____ Unexpected Exposure Rates Detected
____ Labels, Markings, etc. Inadequate
____ Container Integrity Inadequate
____ Other
____ No Violations Detected on this Shipment

19. TERMS AND CONDITIONS

A. HAZARDOUS MATERIALS: Generator represents & warrants that Waste Material __ is (or) • is not a hazardous waste as defined in 40 CFR 261. Where the material is a hazardous waste, this shipment is also accompanied by a separate and completed hazardous waste manifest, along with the appropriate land-disposal restriction notice and/or certification as required by 40 CFR 268.1.

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FORM 540 (06-2021)

Reviewed By (of Brookhaven Science Associates) 2/24/22 Date — on behalf of the U.S. Department of Energy at Brookhaven National Laboratory

FORM 541

EnergySolutions, LLC

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST

CONTAINER AND WASTE DESCRIPTION

Additional Nuclear Regulatory Commission (NRC) Requirements for Control, Transfer and Disposal of Radioactive Waste

1. Manifest Totals

No. of Pkgs/ Disposal Containers	Net Waste Volume (m³)	Net Waste Weight (kg)	Special Nuclear Material (grams) U-233	U-235	Pu	Total
1	m3 46.55	kg 63595.47	NP	NP	1.3351E-02	1.3351E-02
	ft3 1644.00	lb 140204.00			1 Container	

Activity	All Nuclides	Tritium	C-14	Tc-99	I-129	Source (kg)	
MBq	7.5680E+02	1.4282E+02	NP	NP	NP	(kg)	NA
mCi	2.0454E+01	3.8600E+00	NP	NP	NP	(lbs)	NA

2. Manifest Number: **7314-08-0032**

3. Page **1** of **1** Page(s)

4. Shipper Name: **Brookhaven National Laboratory**

Shipment ID Number: **7314-08-0032**

Disposal Container Description								Waste Description for Each Waste Type in Container									
								Physical Description			15. Chemical Description		16. Radiological Description				17. Waste Class AS-Class A Stable AU-Class A Unstable B-Class B C-Class C
5. Container Identification Number/Generator ID Number(s)	6. Container Description (See Note 1 & Note 1A)	7. Volume (m3) (ft3)	8. Waste and Container Weight (kg) (lb)	9. Waste Weight (kg) (lb)	10. Surface Radiation Level (mSv/hr) (mrem/hr)	11. Surface Contamination (MBq/100 cm2) (dpm/100 cm2) Alpha	Beta-Gamma	12. Waste Descriptor (See Notes 2 & 2A)	13. Approximate Waste Volume(s) in Container (m3) (ft3)	14. Sorbent Solidification, Stabilization, Media (See Note 3)	Chemical Form/ Chelating Agent	Weight % Chelating Agent if > 0.1%	Individual Radionuclides and Activity (MBq) and Container Total; or Container Total Activity and Radionuclide Percent: Radionuclides	pCi/gm	MBq	mCi	
R22-002B/7314-08	19 SUPERLOAD WRAPPER	84.95	63820.45	63595.47	3.0000E-03	<3.3400E-07	<1.6700E-05	22,59-Concrete, 59-METAL-H	46.55	99 - WASTE LOCK 770	NONE/NP	NP	Cs-137	2.07563E+02	4.8840E+02	1.3200E+01	AU
		3000.00	140700.00	140204.00	3.0000E-01	<2.0000E+01	<1.0000E+03		1644.00				Eu-152	4.05691E+00	9.5460E+00	2.5800E-01	
													H-3	6.06965E+01	1.4282E+02	3.8600E+00	
													Pu-239 [1.0516E-02 g]	1.02524E+01	2.4124E+01	6.5200E-01	
													Pu-240 [2.8348E-03 g]	1.02524E+01	2.4124E+01	6.5200E-01	
													Sr-90	1.44036E+01	3.3892E+01	9.1600E-01	
													Y-90	1.44036E+01	3.3892E+01	9.1600E-01	
													Subtotal		7.5680E+02	2.0454E+01	
													Total		7.5680E+02	2.0454E+01	
													SNM [1.3351E-02 g]				
Shipment Totals		84.95	63820.45	63595.47											7.5680E+02	2.0454E+01	
		3000.00	140700.00	140204.00									SNM [1.3351E-02 g]				

Note 1: Container Description Codes. For containers/ waste requiring disposal in approved structural over-packs the numerical code must be followed by "-OP."

1. Wooden Box or Crate
2. Metal Box
3. Plastic Drum or Pail
4. Metal Drum or Pail
5. Metal Tank or Liner
6. Concrete Tank or Liner
7. Polyethlene Tank or Liner
8. Fiberglass Tank or Liner
9. Demineralizer
10. Gas Cylinder
11. Bulk, Unpackaged Waste
12. Unpackaged Components
13. High Integrity Container
19. Other. Describe in Item 6, or additional page

Note 1A: Bulk Packaging Description Codes. (Choose one code as may be applicable.)

A Gondola
B Intermodal
C End-Dump
D Roll-off
E Seavan

Note 2: Waste Descriptor Codes. (Choose up to three which predominate by volume.)

20. Charcoal
21. Incinerator Ash
22. Soil
23. Gas
24. Oil
25. Aqueous Liquid
26. Filter Media
27. Mechanical Filter
28. EPA or State Hazardous
29. Demolition Rubble
30. Cation Ion-exchange Media
31. Anion Ion-exchange Media
32. Mixed Bed Ion-exchange Media
33. Contaminated Equipment
34. Organic Liquid (except oil)
35. Glassware or Labware
36. Sealed Source/Device
37. Paint or Plating
38. Evaporator Bottoms/Sludges/ Concentrates
39. Compactible Trash
40. Noncompactible Trash
41. Animal Carcass
42. Biological Material (except animal carcass)
43. Activated Material
59. Other. Describe in item 12, or additional page

Note 2A: Specific Waste Descriptions (Choose all applicable codes.)

G Dewatered
H Solid
I Combustible
J Non-combustible
K Air Filtration Filters
L Asbestos

Note 3: Solidification and Stabilization Media Codes. (Choose up to three which predominate by volume.) For media meeting disposal site structural stability requirements, the numerical code must be followed by "-S." and the media vendor and brand name must also be identified in Item 14. Code 100=NONE REQUIRED.

Sorption

60. Speed Dri
61. Celetom
62. Floor Dry/Superfine
63. High Dri
64. Safe T Sorb
64. Safe N Dri
66. Florco
67. Florco X
68. Solid A Sorb
69. Chemsil 30
70. Chemsil 50
71. Chemsil 3030
72. Dicaperl HP200
73. Dicaperl HP500
74. Petroset
75. Petroset II
76. Aquaset
77. Aquaset II
89. Other. Describe in item 14 or additional page

Solidification

90. Cement
91. Concrete (encapsulation)
92. Bitumen
93. Vinyl Chloride
94. Vinyl Ester Styrene
99. Other. Describe in item 14, or additional page
100. None Required

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
ISOTOPES REPORT

For Manifest # 7314-08-0032
EnergySolutions, LLC

Isotope	Total Activity (MBq)	(mCi)	(Ci)
Cs-137	4.8840E+02	1.3200E+01	1.3200E-02
Eu-152	9.5460E+00	2.5800E-01	2.5800E-04
H-3	1.4282E+02	3.8600E+00	3.8600E-03
Pu-239	2.4124E+01	6.5200E-01	6.5200E-04
Pu-240	2.4124E+01	6.5200E-01	6.5200E-04
Sr-90	3.3892E+01	9.1600E-01	9.1600E-04
Y-90	3.3892E+01	9.1600E-01	9.1600E-04

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 137505
Date : 5/10/2021
Time In: 3:52:17PM
Time Out: 4:06:51PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 25339PC-EASTERN ENVIRO SOLUTIONS
Vehicle Lic#: 25339PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		1 65060 LB	2	35740 LB	29320 LB	14.66 TN	

Total QTY: **14.66**

Driver Signature

Operator: Printed: 5/10/2021 4:07:42PM

33358

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 136170
Date : 4/29/2021
Time In: 10:14:53AM
Time Out: 10:28:20AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		1 73680 LB	2	37180 LB	36500 LB	18.25 TN	

Total QTY: **18.25**

Driver Signature

Operator: Printed: 4/29/2021 10:29:01AM

331441

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 136190
Date : 4/29/2021
Time In: 11:42:49AM
Time Out: 11:50:55AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		1 72700 LB	2	36300 LB	36400 LB	18.20 TN	

Total QTY: **18.20**

Driver Signature

Operator: Printed: 4/29/2021 11:51:34AM

33144

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

#13

Ticket #: 136217
Date : 4/29/2021
Time In: 1:09:35PM
Time Out: 1:17:27PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		1 67000 LB	2	38340 LB	28660 LB	14.33 TN	

Total QTY: **14.33**

Driver Signature

Operator: Printed: 4/29/2021 1:18:10PM

331401

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 136240
Date : 4/29/2021
Time In: 2:49:32PM
Time Out: 2:59:28PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt	Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		1 70640 LB	2 35380 LB	35260 LB	17.63 TN	

Total QTY: **17.63**

Driver Signature

Operator: Printed: 4/29/2021 3:00:07PM

33144

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 136143
Date : 4/29/2021
Time In: 8:38:40AM
Time Out: 8:48:40AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt	Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		1 76220 LB	2 36620 LB	39600 LB	19.80 TN	

Total QTY: **19.80**

Driver Signature

Operator: Printed: 4/29/2021 8:49:11AM

33144

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 135026
Date : 4/20/2021
Time In: 1:11:31PM
Time Out: 1:19:42PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 67560 LB	2	36280 LB	31280 LB	15.64 TN	

Total QTY: **15.64**

Brian P Welsh

Driver Signature

#24

331441

Operator: Printed: 4/20/2021 1:20:48PM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 134973
Date : 4/20/2021
Time In: 10:06:47AM
Time Out: 10:17:21AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt	Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 60980 LB	2 35480 LB	25500 LB	12.75 TN	

Total QTY: **12.75**

Driver Signature

14

Operator: Printed: 4/20/2021 10:18:20AM

33144

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 134659
Date : 4/16/2021
Time In: 3:17:48PM
Time Out: 3:26:58PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 75280 LB	2	38320 LB	36960 LB	18.48 TN	

Total QTY: **18.48**

Driver Signature

Operator: Printed: 4/16/2021 3:27:30PM

83144

#13

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 134641
Date : 4/16/2021
Time In: 2:11:05PM
Time Out: 2:19:56PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 70500 LB	2	36120 LB	34380 LB	17.19 TN	

Total QTY: **17.19**

Driver Signature

Operator: Printed: 4/16/2021 2:20:35PM

33144

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 134567
Date : 4/16/2021
Time In: 10:02:40AM
Time Out: 10:18:15AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 66260 LB	2	36260 LB	30000 LB	15.00 TN	

Total QTY: **15.00**

Driver Signature

Operator: Printed: 4/16/2021 10:18:52AM

33144

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132670
Date : 3/31/2021
Time In: 11:55:37AM
Time Out: 12:02:42PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 133465
Date : 4/7/2021
Time In: 10:33:26AM
Time Out: 10:45:44AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 68860 LB	2	36240 LB	32620 LB	16.31 TN	

Total QTY: **16.31**

Brian Fiddler

Driver Signature

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132648
Date : 3/31/2021
Time In: 10:40:44AM
Time Out: 10:52:17AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 63900 LB	2	35620 LB	28280 LB	14.14 TN	

Total QTY: **14.14**

Driver Signature

Bx 14

32915

Operator: Printed: 3/31/2021 10:52:59AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132624
Date : 3/31/2021
Time In: 9:06:38AM
Time Out: 9:10:46AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 65120 LB	2	36500 LB	28620 LB	14.31 TN	

Total QTY: **14.31**

Driver Signature

Box 24

32915

Operator: Printed: 3/31/2021 9:12:16AM

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 131923
Date : 3/24/2021
Time In: 2:36:29PM
Time Out: 2:44:59PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 65760 LB	2	36440 LB	29320 LB	14.66 TN	

Total QTY: **14.66**

Driver Signature

32915

Operator: Printed: 3/24/2021 2:45:50PM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 131939
Date : 3/24/2021
Time In: 3:35:50PM
Time Out: 3:42:38PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 70660 LB	2	36300 LB	34360 LB	17.18 TN	

Total QTY: **17.18**

Driver Signature

Operator: Printed: 3/24/2021 3:43:12PM

32915

Page 1 of 1

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 131990
Date : 3/25/2021
Time In: 9:20:34AM
Time Out: 9:28:43AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 67560 LB	2	37020 LB	30540 LB	15.27 TN	

Total QTY: **15.27**

BOBBY

Driver Signature

32915

Operator: Printed: 3/25/2021 9:30:14AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132017
Date : 3/25/2021
Time In: 11:49:58AM
Time Out: 11:58:14AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 66340 LB	2	36380 LB	29960 LB	14.98 TN	

Total QTY: **14.98**

Bobby

Driver Signature

32915

Box 5

Operator: Printed: 3/25/2021 11:59:49AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132042
Date : 3/25/2021
Time In: 1:39:54PM
Time Out: 1:49:23PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 62240 LB	2	38420 LB	23820 LB	11.91 TN	

Total QTY: **11.91**

BOBBY

Driver Signature

32915

Operator: Printed: 3/25/2021 1:51:04PM

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132506
Date : 3/30/2021
Time In: 11:31:19AM
Time Out: 11:42:56AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 60080 LB	2	36520 LB	23560 LB	11.78 TN	

Total QTY: **11.78**

Driver Signature

Operator: Printed: 3/30/2021 11:44:07AM

SYSTEM GENERATED

WINTERS BROS. WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132485
Date : 3/30/2021
Time In: 10:00:22AM
Time Out: 10:11:10AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 64500 LB	2	36420 LB	28080 LB	14.04 TN	

Total QTY: **14.04**

Driver Signature

Box 17

32915

Operator: Printed: 3/30/2021 10:12:16AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132468
Date : 3/30/2021
Time In: 8:35:30AM
Time Out: 8:41:07AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 64160 LB	2	36540 LB	27620 LB	13.81 TN	

Total QTY: **13.81**

Driver Signature

Box 15

32915

Operator: Printed: 3/30/2021 8:41:46AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132353
Date : 3/29/2021
Time In: 11:23:16AM
Time Out: 11:34:22AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 64920 LB	2	36900 LB	28020 LB	14.01 TN	

Total QTY: **14.01**

Driver Signature

NO #

32915

Operator: Printed: 3/29/2021 11:35:21AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132410
Date : 3/29/2021
Time In: 2:46:46PM
Time Out: 2:53:17PM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 64600 LB	2	36660 LB	27940 LB	13.97 TN	

Total QTY: **13.97**

Box 15

Driver Signature

32915

Operator: Printed: 3/29/2021 2:54:12PM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

3-24

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 132332
Date : 3/29/2021
Time In: 10:03:16AM
Time Out: 10:14:49AM
Inbound Load

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
IN C & D TONS		M 62360 LB	2	36440 LB	25920 LB	12.96 TN	

Total QTY: **12.96**

Driver Signature

Operator: Printed: 3/29/2021 10:16:31AM

32915

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #:

Date : 3/
Time In: 1:
Time Out: 1:
Inbou

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Q
IN C & D TONS		M 62240 LB	2	38420 LB	23820 LB	11.91 T

Total QTY: **11.91**

BOBBY

Driver Signature

32915

Operator: Printed: 3/25/2021 1:51:04PM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #:

Date : 3/2
Time In: 11:4
Time Out: 11:5
Inbou

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty
IN C & D TONS		M 66340 LB	2	36380 LB	29960 LB	14.98 TN

Total QTY: **14.98**

BOBBY

Driver Signature

32916

Box E

Operator: Printed: 3/25/2021 11:59:49AM

TED

'TERS
3R♣S.
/ASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #: 131990
Date : 3/25/2021
Time In: 9:20:34AM
Time Out: 9:28:43AM
Inbound Load

1-0001656
EASTERN ENVIRONMENTAL SOL
58 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

	Size	Gross Wgt		Tare Wgt	Net Wgt	Qty	Amount
S		M 67560 LB	2	37020 LB	30540 LB	15.27 TN	

Total QTY: **15.27**

, BOY

Driver Signature

32915

ted: 3/25/2021 9:30:14AM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #:

Date : 3/
Time In: 3:
Time Out: 3:
Inbou

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qt
IN C & D TONS		M 70660 LB	2	36300 LB	34360 LB	17.18 T

Total QTY: **17.18**

Driver Signature

32915

Operator: Printed: 3/24/2021 3:43:12PM

SYSTEM GENERATED

WINTERS BROS.
WASTE SYSTEMS

YAPHANK T/S - WINTERS
82A OLD DOCK ROAD
YAPHANK, NY 11980
631-205-1417

Ticket #:

Date : 3/
Time In: 2:3
Time Out: 2:4
Inbou

Cust#: 31-0001656
Customer: EASTERN ENVIRONMENTAL SOL
258 LINE RD
MANORVILLE, NY 11949120

Vehicle ID : 68850PC-EATERN ENVIRON SOL
Vehicle Lic#: 68850PC

Comment :

Material	Size	Gross Wgt		Tare Wgt	Net Wgt	Qt
IN C & D TONS		M 65760 LB	2	36440 LB	29320 LB	14.66 T

Total QTY: **14.66**

Driver Signature

Operator: Printed: 3/24/2021 2:45:50PM

32916

Appendix C
Backfill Soil Results

East Princeton Ave. Soil Piles- Brookhaven National Laboratory
TABLE No. 1
Summary of Target Analyte List (TAL) Metal Results for Composite Soil Sample Collected on 1/13/21

Analyte	Sample ID 42603-01 (ug/kg) CFR Project	Sample ID 42603-02 (ug/kg) CFR Project	Sample ID 42603-03 (ug/kg) CFR Project	Sample ID 42604-001 (ug/kg) Eastern Soil Pile	Suffolk County Action Levels/Clean-up Objectives for Soils (ug/kg)	NYSDEC Part 375 Restricted Residential Levels (ug/kg)	Site Background for Soils (ug/kg)
Arsenic	3,420	3,220(B)	3,400	2,880(B)	30,000/6,000	16,000	640 – 1,900
Barium	9,620	8,000	9,370	13,000	4,000,000/ 820,000	400,000	4,300 – 37,000
Beryllium	264(B)	207(B)	240(B)	287(B)	240,000/47,000	72,000	ND – 500
Cadmium	114(B)	U(109)	U(113)	104(B)	40,000/7,500	4,300	ND – 1,500
Chromium (total)	6,140 (all trivalent)	4,550 (all trivalent)	5,570 (all trivalent)	6,400 (all trivalent)	100,000/20,000 (trivalent)	180,000 (trivalent)	3,600 – 14,200 (trivalent)
Copper	2,630	3,290	3,610	4,010	8,500,000 /1,700,000	270,000	1,800 – 32,000
Lead	5,560	4,030	4,990	3,120	2,000,000/ 450,000	400,000	1,400 – 32,000
Manganese	49,000	51,600	53,900	77,900	NS	2,000,0000	24,000 – 122,000
Mercury	U(7.56)	U(7.71)	U(7.81)	49.9	3,700/700	810	20 – 190
Nickel	3,930	3,500	3,830	4,450	650,000/ 130,000	310,000	4,500 – 11,400
Selenium	U(544)	U(544)	U(567)	U(505)	NS	180,000	ND – 650
Silver	U(109)	U(109)	U(113)	U(101)	50,000/10,000	180,000	ND – 2,000
Zinc	10,400	8,030	9,140	10,000	NS	10,000,000	4,900 – 43,000

B=target analyte was detected in the associated blank.
U=analyte's concentration is below the minimum detection level, the minimum detection concentration, the minimum detectable activity
J=value is estimated and is below the reportable limit.
NS: There are no guidance values applicable to this contaminant in this matrix.

East Princeton Soil Volatile Organic Compound Sample Results – Table 2

Summary of Volatile Organic Compound Analytical Results for Grab Soil Samples Collected 1/13/21

Analyte	East Princeton Soil Piles 42603-004 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-005 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-006 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-007 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-008 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-009 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-010 (µg/Kg) CFR Soil Pile	East Princeton Soil Piles 42603-011 BD (µg/Kg) CFR Soil Pile	Princeton Soil Piles 42604-002 (µg/Kg) Eastern Soil Pile	East Princeton Soil Piles 42604-003 (µg/Kg) Eastern Soil Pile	East Princeton Soil Piles 42604-004 (µg/Kg) Eastern Soil Pile	Suffolk County Action Levels/Clean-up Objectives for Soils Action Levels/CU Objectives (µg/Kg)	NYSDEC Part 375 Restricted Residential Levels (µg/Kg)
Acetone	BJ(3.84)	B(5.06)	BJ(2.63)	BJ(3.8)	B(9.16)	BJ(3.3)	BJ(2.86)	BJ(1.97)	BJ(3.82)	BJ(4.96)	BJ(3.05)	*	100,000
1,2 Dichloroethane	J(0.747)	J(0.563)	J(0.908)	J(1.02)	1.27	1.14	J(0.827)	J(0.786)	J(0.649)	J(1.01)	J(0.649)	100/50	3,100

B= analyte detected in blank
J= estimated value below minimum detection level.
BD=Blind Duplicate
*=value not provided

East Princeton Soil Piles – Brookhaven National Laboratory

TABLE 3

Summary of Semi-Volatile Organic Compound Analytical Results for Composite Sample Collected on 11/12/21

Analyte	East Princeton Soil Piles 42744-001 (µg/Kg) CFR Pile	East Princeton Soil Piles 42744-002 (µg/Kg) CFR Pile	East Princeton Soil Piles 42604-001 (µg/Kg) Eastern Soil Pile	Suffolk County Action Levels/Clean-up Objectives for Soils Action Levels/CU Objectives (µg/Kg)	NYSDEC Part 375 Restricted Residential Levels (µg/Kg)
Acenaphthene	U	DU	U	200,000/98,000	100,000
Acenapthylene	U	DU	U	NS	100,000
Anthracene	U	DU	U	200,000/100,000	100,000
Benzo(a)anthracene	45.7	D(244)	J(21.5)	2,000/1,000	1,000
Benzo (a) pyrene	53.9	D(299)	J(25.2)	44,000/22,000	1,000
Benzo (b) Fluoranthene	73.0	D(389)	J(31.7)	3,400/1,700	1,000
Benzo (g,h,i) perylene	42.7	D(181)	J(16.4)	200,000/100,000	100,000
Benzo (k) Fluoranthene	J(29.4)	DJ(145)	U	3,400/1,700	3,900
Chrysene	38.6	D(195)	J(20.4)	2,000/1,000	3,900
Dibenzo (a,h)anthracene	J(11.6)	DU	U	200,000/100,000	330
Dibenzofuran	U	DU	U	NS	59,000(Pesticide list)
Fluorene	U	DU	U	200,000/100,000	100,000
Fluoranthene	59.4	D(382)	J(35.0)	200,000/100,000	100,000
Hexachlorobenzene	U	DU	U	NS	1,200(volatile list)
Indeno (1,2,3-cd) pyrene	37.5	D(176)	J(27.7)	16,000/8,000	500
Napthalene	U	DU	U	NS	100,000
Pentachlorophenol	U	DU	U	NS	6,700
Phenanthrene	J(16.4)	DJ(137)	U	200,000/100,000	100,000
Phenol	U	DU	U	NS	100,000
Pyrene	82.9	D(423)	J(30.3)	200,000/100,000	100,000
Cresols (m.p)	U	DU	U	NS	200,000(m,p)
Cresol, (o)	U	DU	U	NS	100,000

U = Below detectable limits
DU= Value is estimated from a diluted aliquot and is below detectable limits
J= Value is estimated, concentration is below the effective Minimum Detection Level (MDL and below the effective Practical Quantitation Limit (PQL)
NS = there are no guidance values applicable to this contaminant in this matrix.
ND= Results are reported from a diluted aliquot of sample and were not detected above the: Minimum Detection Level (MDL), Minimum Detection Concentrate (MDC), Minimum Detection Amount (MDA) or Limit of Detection (LOD).

CSI Soil Piles at East Princeton
Brookhaven National Laboratory
TABLE 4
Summary of Herbicides, Pesticides and PCB Analytical Results for Soil Sample Collected on 1/26/21

Analyte	Sample ID 42744-001 (µg/Kg) CFR Soil Pile	Sample ID 42744-002 (µg/Kg) CFR Soil Pile	Sample ID 42604-001 (µg/Kg) Eastern Soil Pile	NYSDEC Part 375 Restricted-Residential Soil Cleanup Objectives (µg/Kg)
2,4,5-TP Acid (Silvex)	U(5.2)	U(5.18)	U	100,000
4,4'-DDE	DJ(4.12)	DU(6.82)	J(0.484)	8,900
4,4'-DDT	D(7.23)	DU(6.82)	J(0.497)	7,900
4,4'-DDD	DU(6.83)	DU(6.82)	U	13,000
Aldrin	DU(3.42)	DU(3.41)	U	97
alpha -BHC	DU(3.42)	DU(3.41)	U	480
beta-BHC	DU(3.42)	DU(3.41)	U	360
alpha-Chlordane	DU(3.42)	DU(3.41)	U	4200
Delta-BHC	DU(3.42)	DU(3.41)	U	100,000
Dibenzofuran	U/Refer to Table 3-SemiVolatiles	U/Refer to Table 3-SemiVolatiles	U/Refer to Table 3-SemiVolatiles	59,000
Dieldrin	DU(6.83)	DU(6.82)	U	200
Endosulfan I	DU(3.42)	DU(3.41)	U	24,000
Endosulfan II	DU(6.83)	DU(6.82)	U	24,000
Endosulfan sulfate	DU(6.83)	DU(6.82)	U	24,000
Endrin	DU(6.83)	DU(6.82)	U	11,000
Heptachlor	DU(3.42)	DU(3.41)	U	2,100
Gamma-BHC (Lindane)	DU(3.42)	DU(3.41)	U	1,300
PCB's (Total isomers)	10.4	8.31	2.10	1,000

U = Below detectable limits
DU= Value is estimated from a diluted aliquot and is below detectable limits.
J= value is estimated and is below the reportable limit.
DJ = Value is estimated from a diluted aliquot, concentration is below the effective Minimum Detection Level (MDL and below the effective Practical Quantitation Limit (PQL).
Note: Suffolk County Dept. of Health Services Article 12 SOP 9-95 does not provide soil cleanup objectives for any of these analytes.

CSI Soil Piles at East Princeton– Brookhaven National Laboratory

TABLE No. 5

Summary of Radiological Analytical Results for Soil Samples Collected 1/13/21

Radionuclide	Sample Id. 42603-001 (pCi/gm) CFR Soil Pile	Sample Id. 42603-002 (pCi/gm) CFR Soil Pile	Sample Id. 42603-003 (pCi/gm) CFR Soil Pile	Sample Id. 42604-001 (pCi/gm) Eastern Soil Pile
Beryllium-7	U(0.276)	U(0.205)	U(0.313)	U(0.138)
Cesium-137	U(0.0156)	U(0.0135)	J-UI(0.0762)	U(0.007)
Cobalt-57	U(0.00782)	U(.00504)	U(.000298)	U(0.00646)
Cobalt-60	U(-0.00254)	U(-0.000326)	U(-0.0217)	U(-0.00850)
Managanese-54	U(0.0152	U(0.00407)	U(0.0252)	U(0.0310)
Potassium -40	6.47	7.42	6.27	7.82
Radium-226	0.507	0.547	0.454	0.546
Sodium-22	U(0.00727)	U(0.0144)	U(-0.00823)	U(-0.0079)
Thorium-228	0.946	0.798	0.888	0.889

U= analyte undetected sample result was > minimum detectable limit...
J= estimated value, the analyte concentration fell was >MDL but less than required detection limit.
J-UI=estimated value and uncertain identification for gamma spectroscopy.

East Princeton Soil Piles – Brookhaven National Laboratory

TABLE No. 6

Summary of PFAS (Perfluoroalkyl Substances) Analytical Results for Soil Samples Collected 1/13/21

PFAS Compound	Sample Id. 42603-001 (ng/g) CFR Soil Pile	Sample Id. 42603-002 (ng/g) CFR Soil Pile	Sample Id. 42603-003 (ng/g) CFR Soil Pile	Sample Id. 42604-001 (ng/g) Eastern Soil Pile	NYSDEC Part 375 Guidance Value Unrestricted (ppb)	NYSDEC Part 375 Guidance Value Restricted Residential (ppb.)
Perfluoooctane sulfonic acid (PFOS)	U	J(0.434)	J(0.361)	U	0.88	44
Other PFAS compounds	U	U	U	U	See Note	See Note

J= Value is estimated.

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

Note: PFOA was analyzed for, but not detected above the MDL, MDA, MDC or LOD

GEL Laboratories LLC
a member of The GEL Group INC

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

gel.com

February 05, 2021

Mr. Larry D. Singh
Brookhaven National Laboratory
Building 462
Upton, New York 11973-5000

Re: Project - ES MISC
Chain of Custody - 42603
Project Manager -S. FERRONE
Account # - 24472
Release # -532125

SDG: 42603

Dear Mr. Singh:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 14, 2021. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Clare Drennen for
Edith Kent
Project Manager

Purchase Order: 310464
Chain of Custody: 42603
Enclosures

Table of Contents

Case Narrative

Case Narrative
for
Brookhaven National Laboratory (310464)
SDG: 42603
Work Order: 532125

February 05, 2021

Laboratory Identification:

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

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on January 14, 2021 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. The gamma lab used the volume intended for the organic extraction lab for samples 532125001(42603-001), 532125002(42603-002), and 532125003(42603-003) and the lab did not have sufficient volume to perform the SVOC, Herbicides, Pesticides, and PCBs analysis. The client was notified and will send replacement sample.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
532125001	42603-001
532125002	42603-002
532125003	42603-003
532125004	42603-004
532125005	42603-005
532125006	42603-006
532125007	42603-007
532125008	42603-008
532125009	42603-009
532125010	42603-010
532125011	42603-011
532125012	42603-012
532125013	42603-013

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: GC/MS Volatile, General Chemistry, LCMSMS-Misc, Metals and Radiochemistry.

Clare Drennen for
Edith Kent
Project Manager

Chain of Custody

Bldg 725 Generator Pile

532125 ~~532083~~ MB 1/15/21

Page 1 of 2

BROOKHAVEN NATIONAL LABORATORY

P.O. # _____

Chain of Custody No. 42603

Requires EDD ☒

SAMPLING CHAIN OF CUSTODY

Analysis Requested By	Sampling Contractor	Analytical Laboratory
Name: S. Ferrone	Name: EPD Field Team	Name: General Engineering Labs
Life No: 22585 Ext. 5531	Contact: R. Lagattolla	Address: 2040 Savage Rd
Acct. No: 24472/24472 Dept: ES	Phone: 631-344-7129	City: Charleston St: SC Zip: 29407
Email Reports To:	Email/Fax: rlagattolla@bnl.gov	Contact: Edie Kent
1 Steve Ferrone	Sampler: R. Metz	Phone: 843-769-7385
2	M. Post, J. Milligan	Email/Fax:
Project Name:	Project Manager:	Field Engineer:
ES MISC	S. Ferrone	R. Lagattolla

Comments:

Type UID	Smp	Coll	Sample Information: Site ID/Bldg/Life #	Depth/RWP	Date	Time	Matrix	Additional Sample Information: Name/Description	Cont. Vol/Units	Cont. Type	# of Cont.	Preservative	Analysis Requested: Alpha/Beta	Tritium	Gamma Spectroscopy	8260D	PFAS 537.1	SVOC 8270E	[illegible]	PCBs / pesticides, herb. 8082/8081/8151	Metals 7471B, 6010C, 6020	Hexavalent chromium 3060A/7196A
001	E	C	B725 Generator Pile-C1	0.0-1.0	1/13/21	0925	S	B725 Generator Pile Composite 1 MS/MSD	8oz	P	2	----					X						
001	E	C	B725 Generator Pile-C1	0.0-1.0		↓	S	B725 Generator Pile Composite 1 MS/MSD	16oz	G	1	----						X		X	X	X
001	E	C	B725 Generator Pile-C1	0.0-1.0		↓	S	B725 Generator Pile Composite 1 MS/MSD	16oz	P	1	----			X							
002	E	C	B725 Generator Pile-C2	0.0-1.0		0935	S	B725 Generator Pile Composite 2	8oz	P	2	----					X					
002	E	C	B725 Generator Pile-C2	0.0-1.0		↓	S	B725 Generator Pile Composite 2	16oz	G	1	----						X		X	X	X
002	E	C	B725 Generator Pile-C2	0.0-1.0		↓	S	B725 Generator Pile Composite 2	16oz	P	1	----			X							
003	E	C	BD-1	0.0-1.0		0000	S	Blind Duplicate	8oz	P	2	----					X					
003	E	C	BD-1	0.0-1.0		0000	s	Blind Duplicate	16oz	G	1	----						X		X	X	X
003	E	C	BD-1	0.0-1.0		0000	s	Blind Duplicate	16oz	P	1	----			X							
004	E	G	B725 Generator Pile G1	0.0-0.5		1000	s	B725 Generator Pile Grab 1 with MS/MSD	Kit	G	12	----				X						
005	E	G	B725 Generator Pile G2	0.0-0.5		1010	s	B725 Generator Pile Grab 2	Kit	G	4	----				X						
006	E	G	B725 Generator Pile G3	0.0-0.5		1025	s	B725 Generator Pile Grab 3	Kit	G	4	----				X						
007	E	G	B725 Generator Pile G4	0.0-0.5		1030	s	B725 Generator Pile Grab 4	Kit	G	4	----				X						
008	E	G	B725 Generator Pile G5	0.0-0.5		1035	s	B725 Generator Pile Grab 5	Kit	G	4	----				X						

1 Relinquished By/Date/Time	2 Relinquished By/Date/Time	3 Relinquished By/Date/Time
Print R. Metz 1/13/21	Print	Print
Signature [signature] 1400	Signature	Signature
1 Received By/Date/Time	2 Received By/Date/Time	3 Received By/Date/Time
Print T. Lathy 1/14/21	Print	Print
Signature [signature] 955	Signature	Signature

Contractor Lab Sample Disposal:
☐ Return To Client ☒ Disposal by Lab
☐ Archive For _____ Months

Data Package: ☐ Full ☒ Summary

Turn-Around Time Required:
☐ Rush (1 Day) ☐ 14 Days ☒ 30 Days
☐ 7 Days ☐ Other ( )

BNL F 3101F (rev. 6/13)

Distribution WHITE (1) - Stays with Sample YELLOW (2) - Returned to Client with Report PINK (3) - Lab or Other GOLDENROD (4) - Field Copy - (Sampler)

Page 2 of 2

BROOKHAVEN NATIONAL LABORATORY

P.O. # _____

Chain of Custody No. 42603

Requires EDD ☒

SAMPLING CHAIN OF CUSTODY

Analysis Requested By	Sampling Contractor	Analytical Laboratory
Name: S. Ferrone	Name: EPD Field Team	Name: General Engineering Labs
Life: No: 22585 Ext. 5531	Contact: R. Lagattolla	Address: 2040 Savage Rd
Acct. No: 24472/24472 Dept: ES	Phone: 631-344-7129	City: Charleston St: SC Zip: 29407
Email Reports To:	Email/Fax: rlagattolla@bnl.gov	Contact: Edie Kent
1 Steve Ferrone	Sampler: R. Metz	Phone: 843-769-7385
2	M. Yost, J. McLigan	Email/Fax:
Project Name: ES MISC	Project Manager: S. Ferrone	Field Engineer: R. Lagattolla

Comments:

Type UiD	Smp	Colt	Site ID/Bldg/Life #	Depth/RWP	Date	Time	Matrix	Name/Description	Cont. Vol./Units	Cont. Type	# of Cont	Preservative	Alpha/Beta	Tritium	Gamma	PFAS 537.1	VOC 8260D	SVOC 8270E	Nuclide-specific Alpha	PCBs / pesticides, herb. 8082/8081/8151	Metals 7471B, 6010C, 6020	Hexavalent chromium 3060A/7196A	TAL Metals
009	E	G	B725 Generator Pile G6	0.0-0.5	1/3/21	1038	S	B725 Generator Pile Grab 6	Kit	G	4	----					X						
010	E	G	B725 Generator Pile G7	0.0-0.5		1043	S	B725 Generator Pile Grab 7	Kit	G	4	----					X						
011	E	G	BD-2	0.0-0.5		0000	S	Blind Duplicate -2	Kit	G	4	----					X						
012	E	G	EB-1	0		0750	W	Equipment Blank	500ml	P	1	HNO3											X
012	E	G	EB-1	0		0750	W	Equipment Blank	250ml	P	2	Trizma				X							
013	E	G	FRB-1	0		0905	W	Field Reagent Blank	250ml	P	2	Trizma				X							

1 Relinquished By/Date/Time	2 Relinquished By/Date/Time	3 Relinquished By/Date/Time
Print R. Metz 1/13/21	Print	Print
Signature 1400	Signature	Signature
1 Received By/Date/Time	2 Received By/Date/Time	3 Received By/Date/Time
Print T. Tatum 1/14/21	Print	Print
Signature 9:55	Signature	Signature

Contractor Lab Sample Disposal:
☐ Return To Client ☒ Disposal by Lab
☐ Archive For _____ Months

Data Package: ☐ Full ☒ Summary

Turn-Around Time Required:
☐ Rush (1 Day) ☐ 14 Days ☒ 30 Days
☐ 7 Days ☐ Other ( )

BNL F 3101F (rev. 6/13)

Distribution WHITE (1) - Stays with Sample YELLOW (2) - Returned to Client with Report PINK (3) - Lab or Other GOLDENROD (4) - Field Copy - (Sampler)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: BRC

SDG/AR/COC/Work Order: MB 1/15/21 532083 532125 E-K

Received By: Tye

Date Received: 1/14/21

Carrier and Tracking Number

Circle Applicable: FedEx Express / FedEx Ground / UPS / Field Services / Courier / Other

950788843192-2C (1 of 1)

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr. Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: (Wet Ice) Ice Packs Dry Ice None Other: *all temperatures are recorded in Celsius TEMP:_____
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR3-10 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	✓			If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ✓ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes ✓ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

9507 8884 3067-2C (1 of 1)

PM (or PMA) review: Initials MB Date 1/15/21 Page 1 of 1

GL-CHL-SR-001 Rev 7

Edie Kent

From: Lagattolla, Richard <rlagattolla@bnl.gov>
Sent: Friday, January 22, 2021 9:27 AM
To: Edie Kent
Cc: Ferrone, Steve; lsingh@bnl.gov
Subject: RE: COC 42603 - Volume Issue - Please Adivse

Edie:

We will collect another composite sometime next week.

Thanks
Rich

From: Ferrone, Steve <ferrone@bnl.gov>
Sent: Thursday, January 21, 2021 2:51 PM
To: Lagattolla, Richard <rlagattolla@bnl.gov>
Subject: FW: COC 42603 - Volume Issue - Please Adivse

YES! More soil needed.

From: Singh, Larry <lsingh@bnl.gov>
Sent: Thursday, January 21, 2021 2:38 PM
To: Ferrone, Steve <ferrone@bnl.gov>
Subject: RE: COC 42603 - Volume Issue - Please Adivse

Hi,
I think we should get more volume if we can.

From: Ferrone, Steve <ferrone@bnl.gov>
Sent: Thursday, January 21, 2021 2:37 PM
To: Singh, Larry <lsingh@bnl.gov>
Subject: FW: COC 42603 - Volume Issue - Please Adivse

Larry,

What do you think?

I vote for sending the more sample volume…

From: Lagattolla, Richard <rlagattolla@bnl.gov>
Sent: Thursday, January 21, 2021 1:32 PM
To: Ferrone, Steve <ferrone@bnl.gov>; Metz, Robert <bmetz@bnl.gov>
Subject: Re: COC 42603 - Volume Issue - Please Adivse

That up to you Steve and Larry

Get Outlook for iOS

From: Ferrone, Steve <ferrone@bnl.gov>
Sent: Thursday, January 21, 2021 12:40:54 PM
To: Metz, Robert <bmetz@bnl.gov>
Cc: Lagattolla, Richard <rlagattolla@bnl.gov>
Subject: FW: COC 42603 - Volume Issue - Please Adivse

Can we send Edie more soil from the Princeton Ave. piles?

From: Edie Kent <Edie.Kent@gel.com>
Sent: Thursday, January 21, 2021 10:01 AM
To: Singh, Larry <lsingh@bnl.gov>; Ferrone, Steve <ferrone@bnl.gov>
Cc: Team Kent <Team.Kent@gel.com>; Joanne Harley <Joanne.Harley@gel.com>
Subject: COC 42603 - Volume Issue - Please Adivse

Steve:
We have a volume issue with the organics tests (SVOC, Pesticides, PCBs, and Herbicides). The rad lab inadvertently used the glass container for the gamma analysis instead of the Nalgene container and we only have about 20 g of sample left for the 4 extractions where we need 120 g (30 g for each). While it isn't ideal, we can use the Nalgene container for the PCBs and Pesticides. There may be some bias on the results but not like there would be with the SVOCs. I'm not sure about the Herbicides. If we just use the volume we have for the SVOCs, the detection limits will be slightly elevated but not like they would be if we have to split the 20 g among the 4 extractions. Ideally, we need more sample. Is it possible for you to collect and send us more volume?

Edie

Edith M. Kent
Project Manager

GEL Laboratories LLC

2040 Savage Road, Charleston, SC 29407 | PO Box 30712, Charleston, SC 29417
Office Direct: 843.769.7385 | Office Main: 843.556.8171 | Fax: 843.766.1178
E-Mail: Edie.Kent@gel.com | Website: www.gel.com
Analytical Testing

Work Order Containers

Sample ID: 532125001
Client Sample ID: 42603−001
Description: B725 Generator Pile−C1 Soil

Label: 532125001.01 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
18−JAN−21 11:43:46	Lily Darrington	Transfered custody to batch 2082652
18−JAN−21 11:43:46	Lily Darrington	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
18−JAN−21 14:34:08	Lily Darrington	Changed batch_id from 2082652 to
18−JAN−21 14:34:08	Lily Darrington	Changed sample location from HPLC−Explosive Lab to PFC in Main Cooler 001

Label: 532125001.01.01 **Type: New Undefined**

19−JAN−21 11:06:03	Marc Bourbeau	Transfered custody to batch 2082653

Label: 532125001.02 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001

Label: 532125001.03 **Type: Plastic 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
14−JAN−21 14:52:51	Thyasia Tatum	Changed sample location from PFC in Main Cooler 001 to Main Cooler Staging− Solids
14−JAN−21 17:14:50	Ridge Gleaton	Transfered custody to batch 2081958
14−JAN−21 17:14:50	Ridge Gleaton	Changed sample location from Main Cooler Staging− Solids to Inorganic Prep
14−JAN−21 22:25:56	Ridge Gleaton	Changed batch_id from 2081958 to
14−JAN−21 22:25:56	Ridge Gleaton	Changed sample location from Inorganic Prep to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
20−JAN−21 10:34:36	Alan Stanley	Transfered custody to batch 2083502
20−JAN−21 10:34:36	Alan Stanley	Changed sample location from Main Cooler #001 (Solids and Rad) to Inorganic Prep
20−JAN−21 15:17:23	Michael Kinslow	Changed batch_id from 2083502 to
20−JAN−21 15:17:23	Michael Kinslow	Changed sample location from Inorganic Prep to Main Cooler #001 (Solids and Rad)

Label: 532125001.03.01 **Type: New Undefined**

25−JAN−21 10:13:23	Helen Camello	Transfered custody to batch 2081963
25−JAN−21 10:13:23	Helen Camello	Changed sample location from Inorganic Prep to ICP Lab

Label: 532125001.03.02 **Type: New Undefined**

21−JAN−21 09:37:22	Monifa Basdeo	Transfered custody to batch 2083503
21−JAN−21 09:37:22	Monifa Basdeo	Changed sample location from Inorganic Prep to Mercury Lab

Label: 532125001.04 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001

Work Order Containers

Sample ID: 532125001
Client Sample ID: 42603−001
Description: B725 Generator Pile−C1 Soil

Label: 532125001.04 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:52:51	Thyasia Tatum	Changed sample location from PFC in Main Cooler 001 to Main Cooler Staging− Solids
14−JAN−21 17:07:13	Celeste Drayton	Transfered custody to batch 2082025
14−JAN−21 17:07:13	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082025 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
19−JAN−21 06:38:02	Carlethea Bing	Transfered custody to batch 2082720
19−JAN−21 06:38:02	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
19−JAN−21 06:38:52	Carlethea Bing	Transfered custody to batch 2082895
19−JAN−21 12:36:04	Sirena White−Singleton	Changed batch_id from 2082895 to
19−JAN−21 12:36:04	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
19−JAN−21 13:10:20	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
21−JAN−21 13:02:46	Rachael Bell	Transfered custody to batch 2081969
21−JAN−21 13:02:46	Rachael Bell	Changed sample location from Main Cooler #001 (Solids and Rad) to General Chemistry Immediates Lab
21−JAN−21 13:02:53	Rachael Bell	Transfered custody to batch 2081977
21−JAN−21 17:21:41	Rachael Bell	Changed batch_id from 2081977 to
21−JAN−21 17:21:41	Rachael Bell	Changed sample location from General Chemistry Immediates Lab to Return Shelf Chemistry Samples
22−JAN−21 08:07:01	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 532125001.04.01 **Type: Gamma Can**

15−JAN−21 07:49:47	Rebekah Futch	Transfered custody to batch 2082100
15−JAN−21 07:49:47	Rebekah Futch	Changed sample location from Radiochemistry Soil Preparation to Radiochemisty Count Room

Sample ID: 532125002
Client Sample ID: 42603−002
Description: B725 Generator Pile−C2 Soil

Label: 532125002.01 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001

Label: 532125002.02 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
18−JAN−21 11:43:46	Lily Darrington	Transfered custody to batch 2082652

Work Order Containers

Sample ID: 532125002
Client Sample ID: 42603−002
Description: B725 Generator Pile−C2 Soil

Label: 532125002.02 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

18−JAN−21 11:43:46	Lily Darrington	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
18−JAN−21 14:34:08	Lily Darrington	Changed batch_id from 2082652 to
18−JAN−21 14:34:08	Lily Darrington	Changed sample location from HPLC−Explosive Lab to PFC in Main Cooler 001

Label: 532125002.02.01 **Type: New Undefined**

19−JAN−21 11:06:03	Marc Bourbeau	Transfered custody to batch 2082653

Label: 532125002.03 **Type: Plastic 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
14−JAN−21 14:52:51	Thyasia Tatum	Changed sample location from PFC in Main Cooler 001 to Main Cooler Staging− Solids
14−JAN−21 17:14:50	Ridge Gleaton	Transfered custody to batch 2081958
14−JAN−21 17:14:50	Ridge Gleaton	Changed sample location from Main Cooler Staging− Solids to Inorganic Prep
14−JAN−21 22:25:56	Ridge Gleaton	Changed batch_id from 2081958 to
14−JAN−21 22:25:56	Ridge Gleaton	Changed sample location from Inorganic Prep to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
20−JAN−21 10:34:36	Alan Stanley	Transfered custody to batch 2083502
20−JAN−21 10:34:36	Alan Stanley	Changed sample location from Main Cooler #001 (Solids and Rad) to Inorganic Prep
20−JAN−21 15:17:23	Michael Kinslow	Changed batch_id from 2083502 to
20−JAN−21 15:17:23	Michael Kinslow	Changed sample location from Inorganic Prep to Main Cooler #001 (Solids and Rad)

Label: 532125002.03.01 **Type: New Undefined**

25−JAN−21 10:13:23	Helen Camello	Transfered custody to batch 2081963
25−JAN−21 10:13:23	Helen Camello	Changed sample location from Inorganic Prep to ICP Lab

Label: 532125002.03.02 **Type: New Undefined**

21−JAN−21 09:37:22	Monifa Basdeo	Transfered custody to batch 2083503
21−JAN−21 09:37:22	Monifa Basdeo	Changed sample location from Inorganic Prep to Mercury Lab

Label: 532125002.04 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
14−JAN−21 14:52:51	Thyasia Tatum	Changed sample location from PFC in Main Cooler 001 to Main Cooler Staging− Solids
14−JAN−21 17:07:13	Celeste Drayton	Transfered custody to batch 2082025
14−JAN−21 17:07:13	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082025 to

Work Order Containers

Sample ID: 532125002
Client Sample ID: 42603−002
Description: B725 Generator Pile−C2 Soil

Label: 532125002.04 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
19−JAN−21 06:38:02	Carlethea Bing	Transfered custody to batch 2082720
19−JAN−21 06:38:02	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
19−JAN−21 06:38:52	Carlethea Bing	Transfered custody to batch 2082895
19−JAN−21 12:36:04	Sirena White−Singleton	Changed batch_id from 2082895 to
19−JAN−21 12:36:04	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
19−JAN−21 13:10:20	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
21−JAN−21 13:02:46	Rachael Bell	Transfered custody to batch 2081969
21−JAN−21 13:02:46	Rachael Bell	Changed sample location from Main Cooler #001 (Solids and Rad) to General Chemistry Immediates Lab
21−JAN−21 13:02:53	Rachael Bell	Transfered custody to batch 2081977
21−JAN−21 17:21:41	Rachael Bell	Changed batch_id from 2081977 to
21−JAN−21 17:21:41	Rachael Bell	Changed sample location from General Chemistry Immediates Lab to Return Shelf Chemistry Samples
22−JAN−21 08:07:01	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 532125002.04.01 **Type: Gamma Can**

15−JAN−21 07:49:47	Rebekah Futch	Transfered custody to batch 2082100
15−JAN−21 07:49:47	Rebekah Futch	Changed sample location from Radiochemistry Soil Preparation to Radiochemisty Count Room

Sample ID: 532125003
Client Sample ID: 42603−003
Description: BD−1 Soil

Label: 532125003.01 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
18−JAN−21 11:43:46	Lily Darrington	Transfered custody to batch 2082652
18−JAN−21 11:43:46	Lily Darrington	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
18−JAN−21 14:34:08	Lily Darrington	Changed batch_id from 2082652 to
18−JAN−21 14:34:08	Lily Darrington	Changed sample location from HPLC−Explosive Lab to PFC in Main Cooler 001

Label: 532125003.01.01 **Type: New Undefined**

19−JAN−21 11:06:03	Marc Bourbeau	Transfered custody to batch 2082653

Work Order Containers

Sample ID: 532125003
Client Sample ID: 42603−003
Description: BD−1 Soil

Label: 532125003.02 **Type: Plastic 125 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001

Label: 532125003.03 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
14−JAN−21 14:52:51	Thyasia Tatum	Changed sample location from PFC in Main Cooler 001 to Main Cooler Staging− Solids
14−JAN−21 17:07:13	Celeste Drayton	Transfered custody to batch 2082025
14−JAN−21 17:07:13	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082025 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
19−JAN−21 06:38:02	Carlethea Bing	Transfered custody to batch 2082720
19−JAN−21 06:38:02	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
19−JAN−21 06:38:52	Carlethea Bing	Transfered custody to batch 2082895
19−JAN−21 12:36:04	Sirena White−Singleton	Changed batch_id from 2082895 to
19−JAN−21 12:36:04	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
19−JAN−21 13:10:20	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
21−JAN−21 13:02:46	Rachael Bell	Transfered custody to batch 2081969
21−JAN−21 13:02:46	Rachael Bell	Changed sample location from Main Cooler #001 (Solids and Rad) to General Chemistry Immediates Lab
21−JAN−21 13:02:53	Rachael Bell	Transfered custody to batch 2081977
21−JAN−21 17:21:41	Rachael Bell	Changed batch_id from 2081977 to
21−JAN−21 17:21:41	Rachael Bell	Changed sample location from General Chemistry Immediates Lab to Return Shelf Chemistry Samples
22−JAN−21 08:07:01	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 532125003.03.01 **Type: Gamma Can**

15−JAN−21 07:49:47	Rebekah Futch	Transfered custody to batch 2082100
15−JAN−21 07:49:47	Rebekah Futch	Changed sample location from Radiochemistry Soil Preparation to Radiochemisty Count Room

Label: 532125003.04 **Type: Plastic 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
14−JAN−21 14:52:51	Thyasia Tatum	Changed sample location from PFC in Main Cooler 001 to Main Cooler Staging− Solids
14−JAN−21 17:14:50	Ridge Gleaton	Transfered custody to batch 2081958

Work Order Containers

Sample ID: 532125003
Client Sample ID: 42603−003
Description: BD−1 Soil

Label: 532125003.04 **Type: Plastic 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 17:14:50	Ridge Gleaton	Changed sample location from Main Cooler Staging− Solids to Inorganic Prep
14−JAN−21 22:25:56	Ridge Gleaton	Changed batch_id from 2081958 to
14−JAN−21 22:25:56	Ridge Gleaton	Changed sample location from Inorganic Prep to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
20−JAN−21 10:34:36	Alan Stanley	Transfered custody to batch 2083502
20−JAN−21 10:34:36	Alan Stanley	Changed sample location from Main Cooler #001 (Solids and Rad) to Inorganic Prep
20−JAN−21 15:17:23	Michael Kinslow	Changed batch_id from 2083502 to
20−JAN−21 15:17:23	Michael Kinslow	Changed sample location from Inorganic Prep to Main Cooler #001 (Solids and Rad)

Label: 532125003.04.01 **Type: New Undefined**

25−JAN−21 10:13:23	Helen Camello	Transfered custody to batch 2081963
25−JAN−21 10:13:23	Helen Camello	Changed sample location from Inorganic Prep to ICP Lab

Label: 532125003.04.02 **Type: New Undefined**

21−JAN−21 09:37:22	Monifa Basdeo	Transfered custody to batch 2083503
21−JAN−21 09:37:22	Monifa Basdeo	Changed sample location from Inorganic Prep to Mercury Lab

Sample ID: 532125004
Client Sample ID: 42603−004
Description: B725 Generator Pile−G1 Soil

Label: 532125004.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125004.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Work Order Containers

Sample ID: 532125004
Client Sample ID: 42603−004
Description: B725 Generator Pile−G1 Soil

Label: 532125004.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125004.04 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125004.05 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125004.06 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125004.07 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125004.08 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125004.09 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125004.10 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 532125004.11 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:32:26	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:32:26	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation

Work Order Containers

Sample ID: 532125004
Client Sample ID: 42603−004
Description: B725 Generator Pile−G1 Soil

Label: 532125004.11 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 532125004.12 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532125005
Client Sample ID: 42603−005
Description: B725 Generator Pile−G2 Soil

Label: 532125005.01 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Water

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125005.02 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Water

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125005.03 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Methanol

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125005.04 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Work Order Containers

Sample ID: 532125006
Client Sample ID: 42603−006
Description: B725 Generator Pile−G3 Soil

Label: 532125006.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125006.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125006.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125006.04 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532125007
Client Sample ID: 42603−007
Description: B725 Generator Pile−G4 Soil

Label: 532125007.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125007.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125007.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Work Order Containers

Sample ID: 532125007
Client Sample ID: 42603−007
Description: B725 Generator Pile−G4 Soil

Label: 532125007.04 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532125008
Client Sample ID: 42603−008
Description: B725 Generator Pile−G5 Soil

Label: 532125008.01 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Water

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125008.02 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Water

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125008.03 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Methanol

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125008.04 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Work Order Containers

Sample ID: 532125009
Client Sample ID: 42603−009
Description: B725 Generator Pile−G6 Soil

Label: 532125009.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125009.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125009.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125009.04 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532125010
Client Sample ID: 42603−010
Description: B725 Generator Pile−G7 Soil

Label: 532125010.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125010.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125010.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Work Order Containers

Sample ID: 532125010
Client Sample ID: 42603−010
Description: B725 Generator Pile−G7 Soil

Label: 532125010.04 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532125011
Client Sample ID: 42603−011
Description: BD−2 Soil

Label: 532125011.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532125011.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125011.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532125011.04 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 14:47:57	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Work Order Containers

Sample ID: 532125012
Client Sample ID: 42603−012
Description: EB−1 Water

Label: 532125012.01 **Type: Plastic 250 ml** **Preservative: Trizma (5g/L)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
15−JAN−21 07:58:40	Larrnisha Matthews	Transfered custody to batch 2082026
15−JAN−21 07:58:40	Larrnisha Matthews	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
15−JAN−21 16:01:02	Larrnisha Matthews	Changed batch_id from 2082026 to
15−JAN−21 16:01:02	Larrnisha Matthews	Changed sample location from HPLC−Explosive Lab to Consumed By Analysis/Laboratory

Label: 532125012.01.01 **Type: New Undefined**

15−JAN−21 16:51:32	Josh Brooks	Transfered custody to batch 2082029
15−JAN−21 16:51:32	Josh Brooks	Changed sample location from HPLC−Explosive Lab to Semivolatiles Lab

Label: 532125012.02 **Type: Plastic 250 ml** **Preservative: Trizma (5g/L)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
18−JAN−21 08:03:10	Lily Darrington	Transfered custody to batch 2082612
18−JAN−21 08:03:10	Lily Darrington	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
18−JAN−21 14:13:40	Lily Darrington	Changed batch_id from 2082612 to
18−JAN−21 14:13:40	Lily Darrington	Changed sample location from HPLC−Explosive Lab to Consumed By Analysis/Laboratory

Label: 532125012.02.01 **Type: New Undefined**

18−JAN−21 16:15:46	Josh Brooks	Transfered custody to batch 2082613
18−JAN−21 16:15:46	Josh Brooks	Changed sample location from HPLC−Explosive Lab to Semivolatiles Lab

Label: 532125012.03 **Type: Plastic 15ml PFAS Screening Vial** **Preservative: Trizma (5g/L)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001

Label: 532125012.04 **Type: Plastic 500 ml** **Preservative: Nitric pH<2**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Water
14−JAN−21 17:10:32	Ridge Gleaton	Transfered custody to batch 2081990
14−JAN−21 17:10:32	Ridge Gleaton	Changed sample location from Main Cooler Staging− Water to Inorganic Prep
14−JAN−21 17:11:03	Ridge Gleaton	Transfered custody to batch 2081971
14−JAN−21 22:25:56	Ridge Gleaton	Changed batch_id from 2081971 to
14−JAN−21 22:25:56	Ridge Gleaton	Changed sample location from Inorganic Prep to Return Shelf Chemistry Samples
15−JAN−21 08:05:25	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #003 (Non Rad Liquids)
29−JAN−21 10:49:37	Alan Stanley	Transfered custody to batch 2086877

Work Order Containers

Sample ID: 532125012
Client Sample ID: 42603−012
Description: EB−1 Water

Label: 532125012.04 **Type: Plastic 500 ml** **Preservative: Nitric pH<2**

29−JAN−21 10:49:37	Alan Stanley	Changed sample location from Main Cooler #003 (Non Rad Liquids) to Inorganic Prep
29−JAN−21 14:56:11	Caroline Gause	Changed batch_id from 2086877 to
29−JAN−21 14:56:11	Caroline Gause	Changed sample location from Inorganic Prep to Main Cooler #003 (Non Rad Liquids)

Label: 532125012.04.01 **Type: New Undefined**

22−JAN−21 15:59:56	Elizabeth Janssen	Transfered custody to batch 2081991
22−JAN−21 15:59:56	Elizabeth Janssen	Changed sample location from Inorganic Prep to ICP/MS Lab

Label: 532125012.04.02 **Type: New Undefined**

18−JAN−21 11:33:35	Helen Camello	Transfered custody to batch 2081972
18−JAN−21 11:33:35	Helen Camello	Changed sample location from Inorganic Prep to ICP Lab

Label: 532125012.04.03 **Type: New Undefined**

01−FEB−21 12:55:16	Monifa Basdeo	Transfered custody to batch 2086883
01−FEB−21 12:55:16	Monifa Basdeo	Changed sample location from Inorganic Prep to Mercury Lab

Sample ID: 532125013
Client Sample ID: 42603−013
Description: FRB−1 Water

Label: 532125013.01 **Type: Plastic 250 ml** **Preservative: Trizma (5g/L)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
15−JAN−21 07:58:40	Larrnisha Matthews	Transfered custody to batch 2082026
15−JAN−21 07:58:40	Larrnisha Matthews	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
15−JAN−21 16:01:02	Larrnisha Matthews	Changed batch_id from 2082026 to
15−JAN−21 16:01:02	Larrnisha Matthews	Changed sample location from HPLC−Explosive Lab to Consumed By Analysis/Laboratory

Label: 532125013.01.01 **Type: New Undefined**

15−JAN−21 16:51:32	Josh Brooks	Transfered custody to batch 2082029
15−JAN−21 16:51:32	Josh Brooks	Changed sample location from HPLC−Explosive Lab to Semivolatiles Lab

Label: 532125013.02 **Type: Plastic 250 ml** **Preservative: Trizma (5g/L)**

14−JAN−21 14:47:58	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
18−JAN−21 08:03:10	Lily Darrington	Transfered custody to batch 2082612
18−JAN−21 08:03:10	Lily Darrington	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
18−JAN−21 14:13:40	Lily Darrington	Changed batch_id from 2082612 to
18−JAN−21 14:13:40	Lily Darrington	Changed sample location from HPLC−Explosive Lab to Consumed By Analysis/Laboratory

Work Order Containers

Sample ID: **532125013**
Client Sample ID: **42603−013**
Description: **FRB−1 Water**

Label: 532125013.02.01 **Type: New Undefined**

18−JAN−21 16:15:46	Josh Brooks	Transfered custody to batch 2082613
18−JAN−21 16:15:46	Josh Brooks	Changed sample location from HPLC−Explosive Lab to Semivolatiles Lab

Data Review Qualifier Definitions

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 05−FEB−21

Project Specific Qualifier Definitions for GEL Client Code: BRKL

Qualifier	Qualifier Definition	Department	Fraction
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.		
J	Value is estimated		
P	Organics−−The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The target analyte was detected in the associated blank.	Organics	
E	Concentration of the target analyte exceeds the instrument calibration range	Organics	
A	The TIC is a suspected aldol−condensation product	Organics	Semi−Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Metals−−The Matrix spike sample recovery is not within specified control limits	Inorganics	
*	A quality control analyte recovery is outside of specified acceptance criteria		
N	Organics−−Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor	Organics	Semi−Volatile
H	Analytical holding time was exceeded		
**	Analyte is a surrogate compound	Organics	
<	Result is less than value reported		
>	Result is greater than value reported		
UI	Gamma Spectroscopy−−Uncertain identification	Radiological	
BD	Results are either below the MDC or tracer recovery is low	Radiological	
h	Preparation or preservation holding time was exceeded		
R	Sample results are rejected		
Z	Paint Filter Test−−Particulates passed through the filter, however no free liquids were observed.	General Chemistry	General Chem
d	5−day BOD−−The 2:1 depletion requirement was not met for this sample	General Chemistry	
B	Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL	Inorganics	Metals
^	RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.		
D	Results are reported from a diluted aliquot of the sample	Organics	
N/A	RPD or %Recovery limits do not apply.		
ND	Analyte concentration is not detected above the detection limit		
E	%difference of sample and SD is >10%. Sample concentration must meet flagging criteria	Inorganics	Metals
M	M if above MDC and less than LLD	Radiological	
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
FA	Failed analysis.	Radiological	Bioassay
E	General Chemistry−−Concentration of the target analyte exceeds the instrument calibration range	General Chemistry	General Chem
JNX	Non Calibrated Compound	Organics	Volatile
UJ	Compound cannot be extracted	Organics	Semi−Volatile

Project Specific Qualifier Definitions for GEL Client Code: BRKL

Qualifier	Qualifier Definition	Department	Fraction
UJ	Gamma Spectroscopy−−Uncertain identification	Radiological	Rad
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.		
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.	Radiological	
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.	Radiological	
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.	Radiological	
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies	Inorganics	Metals
N1	See case narrative		
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.	Inorganics	
Y	QC Samples were not spiked with this compound	Organics	
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.	General Chemistry	General Chem
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.	Radiological	Rad
**	Analyte is a Tracer compound	Radiological	
B	The target analyte was detected in the associated blank.	General Chemistry	
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor	Organics	Volatile
e	5−day BOD−−Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes	General Chemistry	General Chem
M	REMP Result > MDC/CL and < RDL	Radiological	
J	See case narrative for an explanation		

Data Review Qualifier Definitions

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

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

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

Laboratory Certifications

List of current GEL Certifications as of 05 February 2021

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122021−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−21−18
Utah NELAP	SC000122020−34
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Volatile Analysis

Case Narrative

GC/MS Volatile
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42603
Work Order #: 532125

Product: **Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer**
Analytical Method: SW846 8260D
Analytical Procedure: GL-OA-E-038 REV# 28
Analytical Batch: 2085184

Preparation Method: SW846 5035A
Preparation Procedure: GL-OA-E-039 REV# 13
Preparation Batch: 2085183

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

GEL Sample ID#	Client Sample Identification	
532125004	42603-004	B725 Generator Pile-G1
532125005	42603-005	B725 Generator Pile-G2
532125006	42603-006	B725 Generator Pile-G3
532125007	42603-007	B725 Generator Pile-G4
532125008	42603-008	B725 Generator Pile-G5
532125009	42603-009	B725 Generator Pile-G6
532125010	42603-010	B725 Generator Pile-G7
532125011	42603-011	BD-2
1204739813	Method Blank (MB)	
1204739815	Laboratory Control Sample (LCS)	
1204739816	532125004(42603-004) Post Spike (PS)	
1204739817	532125004(42603-004) Post Spike Duplicate (PSD)	

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Calibration Information

Continuing Calibration Verification Requirements
All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8260D for samples and the associated QC . However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8260D outlier acceptance criteria. The results are reported.

Quality Control (QC) Information

Blank (MB) Statement
Target analytes were detected in the blank 1204739813 (MB) below the reporting limit.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the

requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42603 GEL Work Order: 532125

The Qualifiers in this report are defined as follows:

B Analyte found in the blank as well as the sample.
J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Erin Haubert **Name: Erin Haubert**

Date: 08 FEB 2021 **Title: Data Validator**

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:00**	**Matrix:**	**S**
Lab Sample ID:	**532125004**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**7.7**
Client Sample:	**B725 Generator Pile-G1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-004**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 22:52**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:00**	**Aliquot:**	**4.93 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R111.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	1.10	ug/kg	0.366	1.10
67-64-1	Acetone	BJ	3.84	ug/kg	1.83	5.50
75-35-4	1,1-Dichloroethylene	U	1.10	ug/kg	0.366	1.10
75-09-2	Methylene chloride	U	5.50	ug/kg	1.83	5.50
1634-04-4	tert-Butyl methyl ether	U	1.10	ug/kg	0.366	1.10
156-60-5	trans-1,2-Dichloroethylene	U	1.10	ug/kg	0.366	1.10
75-34-3	1,1-Dichloroethane	U	1.10	ug/kg	0.366	1.10
78-93-3	2-Butanone	U	5.50	ug/kg	1.83	5.50
156-59-2	cis-1,2-Dichloroethylene	U	1.10	ug/kg	0.366	1.10
67-66-3	Chloroform	U	1.10	ug/kg	0.366	1.10
71-55-6	1,1,1-Trichloroethane	U	1.10	ug/kg	0.366	1.10
56-23-5	Carbon tetrachloride	U	1.10	ug/kg	0.366	1.10
107-06-2	1,2-Dichloroethane	J	0.747	ug/kg	0.366	1.10
71-43-2	Benzene	U	1.10	ug/kg	0.366	1.10
79-01-6	Trichloroethylene	U	1.10	ug/kg	0.366	1.10
108-88-3	Toluene	U	1.10	ug/kg	0.366	1.10
127-18-4	Tetrachloroethylene	U	1.10	ug/kg	0.366	1.10
108-90-7	Chlorobenzene	U	1.10	ug/kg	0.366	1.10
100-41-4	Ethylbenzene	U	1.10	ug/kg	0.366	1.10
103-65-1	n-Propylbenzene	U	1.10	ug/kg	0.366	1.10
108-67-8	1,3,5-Trimethylbenzene	U	1.10	ug/kg	0.366	1.10
98-06-6	tert-Butylbenzene	U	1.10	ug/kg	0.366	1.10
95-63-6	1,2,4-Trimethylbenzene	U	1.10	ug/kg	0.366	1.10
135-98-8	sec-Butylbenzene	U	1.10	ug/kg	0.366	1.10
541-73-1	1,3-Dichlorobenzene	U	1.10	ug/kg	0.366	1.10
106-46-7	1,4-Dichlorobenzene	U	1.10	ug/kg	0.366	1.10
104-51-8	n-Butylbenzene	U	1.10	ug/kg	0.366	1.10
123-91-1	1,4-Dioxane	U	55.0	ug/kg	18.3	55.0
1330-20-7	Xylenes (total)	U	3.30	ug/kg	1.10	3.30
95-50-1	1,2-Dichlorobenzene	U	1.10	ug/kg	0.366	1.10

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:10**	**Matrix:**	**S**
Lab Sample ID:	**532125005**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**9.3**
Client Sample:	**B725 Generator Pile-G2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-005**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 23:18**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:10**	**Aliquot:**	**6.17 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R112.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.893	ug/kg	0.297	0.893
67-64-1	Acetone	B	5.06	ug/kg	1.49	4.47
75-35-4	1,1-Dichloroethylene	U	0.893	ug/kg	0.297	0.893
75-09-2	Methylene chloride	U	4.47	ug/kg	1.49	4.47
1634-04-4	tert-Butyl methyl ether	U	0.893	ug/kg	0.297	0.893
156-60-5	trans-1,2-Dichloroethylene	U	0.893	ug/kg	0.297	0.893
75-34-3	1,1-Dichloroethane	U	0.893	ug/kg	0.297	0.893
78-93-3	2-Butanone	U	4.47	ug/kg	1.49	4.47
156-59-2	cis-1,2-Dichloroethylene	U	0.893	ug/kg	0.297	0.893
67-66-3	Chloroform	U	0.893	ug/kg	0.297	0.893
71-55-6	1,1,1-Trichloroethane	U	0.893	ug/kg	0.297	0.893
56-23-5	Carbon tetrachloride	U	0.893	ug/kg	0.297	0.893
107-06-2	1,2-Dichloroethane	J	0.563	ug/kg	0.297	0.893
71-43-2	Benzene	U	0.893	ug/kg	0.297	0.893
79-01-6	Trichloroethylene	U	0.893	ug/kg	0.297	0.893
108-88-3	Toluene	U	0.893	ug/kg	0.297	0.893
127-18-4	Tetrachloroethylene	U	0.893	ug/kg	0.297	0.893
108-90-7	Chlorobenzene	U	0.893	ug/kg	0.297	0.893
100-41-4	Ethylbenzene	U	0.893	ug/kg	0.297	0.893
103-65-1	n-Propylbenzene	U	0.893	ug/kg	0.297	0.893
108-67-8	1,3,5-Trimethylbenzene	U	0.893	ug/kg	0.297	0.893
98-06-6	tert-Butylbenzene	U	0.893	ug/kg	0.297	0.893
95-63-6	1,2,4-Trimethylbenzene	U	0.893	ug/kg	0.297	0.893
135-98-8	sec-Butylbenzene	U	0.893	ug/kg	0.297	0.893
541-73-1	1,3-Dichlorobenzene	U	0.893	ug/kg	0.297	0.893
106-46-7	1,4-Dichlorobenzene	U	0.893	ug/kg	0.297	0.893
104-51-8	n-Butylbenzene	U	0.893	ug/kg	0.297	0.893
123-91-1	1,4-Dioxane	U	44.7	ug/kg	14.9	44.7
1330-20-7	Xylenes (total)	U	2.68	ug/kg	0.893	2.68
95-50-1	1,2-Dichlorobenzene	U	0.893	ug/kg	0.297	0.893

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:25**	**Matrix:**	**S**
Lab Sample ID:	**532125006**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**6.8**
Client Sample:	**B725 Generator Pile-G3**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-006**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 23:44**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:25**	**Aliquot:**	**5.85 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R113.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.917	ug/kg	0.305	0.917
67-64-1	Acetone	BJ	2.63	ug/kg	1.53	4.58
75-35-4	1,1-Dichloroethylene	U	0.917	ug/kg	0.305	0.917
75-09-2	Methylene chloride	U	4.58	ug/kg	1.53	4.58
1634-04-4	tert-Butyl methyl ether	U	0.917	ug/kg	0.305	0.917
156-60-5	trans-1,2-Dichloroethylene	U	0.917	ug/kg	0.305	0.917
75-34-3	1,1-Dichloroethane	U	0.917	ug/kg	0.305	0.917
78-93-3	2-Butanone	U	4.58	ug/kg	1.53	4.58
156-59-2	cis-1,2-Dichloroethylene	U	0.917	ug/kg	0.305	0.917
67-66-3	Chloroform	U	0.917	ug/kg	0.305	0.917
71-55-6	1,1,1-Trichloroethane	U	0.917	ug/kg	0.305	0.917
56-23-5	Carbon tetrachloride	U	0.917	ug/kg	0.305	0.917
107-06-2	1,2-Dichloroethane	J	0.908	ug/kg	0.305	0.917
71-43-2	Benzene	U	0.917	ug/kg	0.305	0.917
79-01-6	Trichloroethylene	U	0.917	ug/kg	0.305	0.917
108-88-3	Toluene	U	0.917	ug/kg	0.305	0.917
127-18-4	Tetrachloroethylene	U	0.917	ug/kg	0.305	0.917
108-90-7	Chlorobenzene	U	0.917	ug/kg	0.305	0.917
100-41-4	Ethylbenzene	U	0.917	ug/kg	0.305	0.917
103-65-1	n-Propylbenzene	U	0.917	ug/kg	0.305	0.917
108-67-8	1,3,5-Trimethylbenzene	U	0.917	ug/kg	0.305	0.917
98-06-6	tert-Butylbenzene	U	0.917	ug/kg	0.305	0.917
95-63-6	1,2,4-Trimethylbenzene	U	0.917	ug/kg	0.305	0.917
135-98-8	sec-Butylbenzene	U	0.917	ug/kg	0.305	0.917
541-73-1	1,3-Dichlorobenzene	U	0.917	ug/kg	0.305	0.917
106-46-7	1,4-Dichlorobenzene	U	0.917	ug/kg	0.305	0.917
104-51-8	n-Butylbenzene	U	0.917	ug/kg	0.305	0.917
123-91-1	1,4-Dioxane	U	45.8	ug/kg	15.3	45.8
1330-20-7	Xylenes (total)	U	2.75	ug/kg	0.917	2.75
95-50-1	1,2-Dichlorobenzene	U	0.917	ug/kg	0.305	0.917

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:30**	**Matrix:**	**S**
Lab Sample ID:	**532125007**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**10.2**
Client Sample:	**B725 Generator Pile-G4**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-007**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/26/2021 00:10**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:30**	**Aliquot:**	**4.88 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R114.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	1.14	ug/kg	0.380	1.14
67-64-1	Acetone	BJ	3.80	ug/kg	1.90	5.71
75-35-4	1,1-Dichloroethylene	U	1.14	ug/kg	0.380	1.14
75-09-2	Methylene chloride	U	5.71	ug/kg	1.90	5.71
1634-04-4	tert-Butyl methyl ether	U	1.14	ug/kg	0.380	1.14
156-60-5	trans-1,2-Dichloroethylene	U	1.14	ug/kg	0.380	1.14
75-34-3	1,1-Dichloroethane	U	1.14	ug/kg	0.380	1.14
78-93-3	2-Butanone	U	5.71	ug/kg	1.90	5.71
156-59-2	cis-1,2-Dichloroethylene	U	1.14	ug/kg	0.380	1.14
67-66-3	Chloroform	U	1.14	ug/kg	0.380	1.14
71-55-6	1,1,1-Trichloroethane	U	1.14	ug/kg	0.380	1.14
56-23-5	Carbon tetrachloride	U	1.14	ug/kg	0.380	1.14
107-06-2	1,2-Dichloroethane	J	1.02	ug/kg	0.380	1.14
71-43-2	Benzene	U	1.14	ug/kg	0.380	1.14
79-01-6	Trichloroethylene	U	1.14	ug/kg	0.380	1.14
108-88-3	Toluene	U	1.14	ug/kg	0.380	1.14
127-18-4	Tetrachloroethylene	U	1.14	ug/kg	0.380	1.14
108-90-7	Chlorobenzene	U	1.14	ug/kg	0.380	1.14
100-41-4	Ethylbenzene	U	1.14	ug/kg	0.380	1.14
103-65-1	n-Propylbenzene	U	1.14	ug/kg	0.380	1.14
108-67-8	1,3,5-Trimethylbenzene	U	1.14	ug/kg	0.380	1.14
98-06-6	tert-Butylbenzene	U	1.14	ug/kg	0.380	1.14
95-63-6	1,2,4-Trimethylbenzene	U	1.14	ug/kg	0.380	1.14
135-98-8	sec-Butylbenzene	U	1.14	ug/kg	0.380	1.14
541-73-1	1,3-Dichlorobenzene	U	1.14	ug/kg	0.380	1.14
106-46-7	1,4-Dichlorobenzene	U	1.14	ug/kg	0.380	1.14
104-51-8	n-Butylbenzene	U	1.14	ug/kg	0.380	1.14
123-91-1	1,4-Dioxane	U	57.1	ug/kg	19.0	57.1
1330-20-7	Xylenes (total)	U	3.42	ug/kg	1.14	3.42
95-50-1	1,2-Dichlorobenzene	U	1.14	ug/kg	0.380	1.14

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:35**	**Matrix:**	**S**
Lab Sample ID:	**532125008**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**7.7**
Client Sample:	**B725 Generator Pile-G5**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-008**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/26/2021 00:36**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:35**	**Aliquot:**	**5.77 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R115.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.939	ug/kg	0.313	0.939
67-64-1	Acetone	B	9.16	ug/kg	1.57	4.69
75-35-4	1,1-Dichloroethylene	U	0.939	ug/kg	0.313	0.939
75-09-2	Methylene chloride	U	4.69	ug/kg	1.57	4.69
1634-04-4	tert-Butyl methyl ether	U	0.939	ug/kg	0.313	0.939
156-60-5	trans-1,2-Dichloroethylene	U	0.939	ug/kg	0.313	0.939
75-34-3	1,1-Dichloroethane	U	0.939	ug/kg	0.313	0.939
78-93-3	2-Butanone	U	4.69	ug/kg	1.57	4.69
156-59-2	cis-1,2-Dichloroethylene	U	0.939	ug/kg	0.313	0.939
67-66-3	Chloroform	U	0.939	ug/kg	0.313	0.939
71-55-6	1,1,1-Trichloroethane	U	0.939	ug/kg	0.313	0.939
56-23-5	Carbon tetrachloride	U	0.939	ug/kg	0.313	0.939
107-06-2	1,2-Dichloroethane		1.27	ug/kg	0.313	0.939
71-43-2	Benzene	U	0.939	ug/kg	0.313	0.939
79-01-6	Trichloroethylene	U	0.939	ug/kg	0.313	0.939
108-88-3	Toluene	U	0.939	ug/kg	0.313	0.939
127-18-4	Tetrachloroethylene	U	0.939	ug/kg	0.313	0.939
108-90-7	Chlorobenzene	U	0.939	ug/kg	0.313	0.939
100-41-4	Ethylbenzene	U	0.939	ug/kg	0.313	0.939
103-65-1	n-Propylbenzene	U	0.939	ug/kg	0.313	0.939
108-67-8	1,3,5-Trimethylbenzene	U	0.939	ug/kg	0.313	0.939
98-06-6	tert-Butylbenzene	U	0.939	ug/kg	0.313	0.939
95-63-6	1,2,4-Trimethylbenzene	U	0.939	ug/kg	0.313	0.939
135-98-8	sec-Butylbenzene	U	0.939	ug/kg	0.313	0.939
541-73-1	1,3-Dichlorobenzene	U	0.939	ug/kg	0.313	0.939
106-46-7	1,4-Dichlorobenzene	U	0.939	ug/kg	0.313	0.939
104-51-8	n-Butylbenzene	U	0.939	ug/kg	0.313	0.939
123-91-1	1,4-Dioxane	U	46.9	ug/kg	15.6	46.9
1330-20-7	Xylenes (total)	U	2.82	ug/kg	0.939	2.82
95-50-1	1,2-Dichlorobenzene	U	0.939	ug/kg	0.313	0.939

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:38**	**Matrix:**	**S**
Lab Sample ID:	**532125009**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**12.3**
Client Sample:	**B725 Generator Pile-G6**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-009**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/26/2021 01:02**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:38**	**Aliquot:**	**5.99 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R116.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.952	ug/kg	0.317	0.952
67-64-1	Acetone	BJ	3.30	ug/kg	1.59	4.76
75-35-4	1,1-Dichloroethylene	U	0.952	ug/kg	0.317	0.952
75-09-2	Methylene chloride	U	4.76	ug/kg	1.59	4.76
1634-04-4	tert-Butyl methyl ether	U	0.952	ug/kg	0.317	0.952
156-60-5	trans-1,2-Dichloroethylene	U	0.952	ug/kg	0.317	0.952
75-34-3	1,1-Dichloroethane	U	0.952	ug/kg	0.317	0.952
78-93-3	2-Butanone	U	4.76	ug/kg	1.59	4.76
156-59-2	cis-1,2-Dichloroethylene	U	0.952	ug/kg	0.317	0.952
67-66-3	Chloroform	U	0.952	ug/kg	0.317	0.952
71-55-6	1,1,1-Trichloroethane	U	0.952	ug/kg	0.317	0.952
56-23-5	Carbon tetrachloride	U	0.952	ug/kg	0.317	0.952
107-06-2	1,2-Dichloroethane		1.14	ug/kg	0.317	0.952
71-43-2	Benzene	U	0.952	ug/kg	0.317	0.952
79-01-6	Trichloroethylene	U	0.952	ug/kg	0.317	0.952
108-88-3	Toluene	U	0.952	ug/kg	0.317	0.952
127-18-4	Tetrachloroethylene	U	0.952	ug/kg	0.317	0.952
108-90-7	Chlorobenzene	U	0.952	ug/kg	0.317	0.952
100-41-4	Ethylbenzene	U	0.952	ug/kg	0.317	0.952
103-65-1	n-Propylbenzene	U	0.952	ug/kg	0.317	0.952
108-67-8	1,3,5-Trimethylbenzene	U	0.952	ug/kg	0.317	0.952
98-06-6	tert-Butylbenzene	U	0.952	ug/kg	0.317	0.952
95-63-6	1,2,4-Trimethylbenzene	U	0.952	ug/kg	0.317	0.952
135-98-8	sec-Butylbenzene	U	0.952	ug/kg	0.317	0.952
541-73-1	1,3-Dichlorobenzene	U	0.952	ug/kg	0.317	0.952
106-46-7	1,4-Dichlorobenzene	U	0.952	ug/kg	0.317	0.952
104-51-8	n-Butylbenzene	U	0.952	ug/kg	0.317	0.952
123-91-1	1,4-Dioxane	U	47.6	ug/kg	15.9	47.6
1330-20-7	Xylenes (total)	U	2.85	ug/kg	0.952	2.85
95-50-1	1,2-Dichlorobenzene	U	0.952	ug/kg	0.317	0.952

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 10:43**	**Matrix:**	**S**
Lab Sample ID:	**532125010**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**2**
Client Sample:	**B725 Generator Pile-G7**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-010**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/26/2021 01:28**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 10:43**	**Aliquot:**	**5.74 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R117.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.889	ug/kg	0.296	0.889
67-64-1	Acetone	BJ	2.86	ug/kg	1.48	4.45
75-35-4	1,1-Dichloroethylene	U	0.889	ug/kg	0.296	0.889
75-09-2	Methylene chloride	U	4.45	ug/kg	1.48	4.45
1634-04-4	tert-Butyl methyl ether	U	0.889	ug/kg	0.296	0.889
156-60-5	trans-1,2-Dichloroethylene	U	0.889	ug/kg	0.296	0.889
75-34-3	1,1-Dichloroethane	U	0.889	ug/kg	0.296	0.889
78-93-3	2-Butanone	U	4.45	ug/kg	1.48	4.45
156-59-2	cis-1,2-Dichloroethylene	U	0.889	ug/kg	0.296	0.889
67-66-3	Chloroform	U	0.889	ug/kg	0.296	0.889
71-55-6	1,1,1-Trichloroethane	U	0.889	ug/kg	0.296	0.889
56-23-5	Carbon tetrachloride	U	0.889	ug/kg	0.296	0.889
107-06-2	1,2-Dichloroethane	J	0.827	ug/kg	0.296	0.889
71-43-2	Benzene	U	0.889	ug/kg	0.296	0.889
79-01-6	Trichloroethylene	U	0.889	ug/kg	0.296	0.889
108-88-3	Toluene	U	0.889	ug/kg	0.296	0.889
127-18-4	Tetrachloroethylene	U	0.889	ug/kg	0.296	0.889
108-90-7	Chlorobenzene	U	0.889	ug/kg	0.296	0.889
100-41-4	Ethylbenzene	U	0.889	ug/kg	0.296	0.889
103-65-1	n-Propylbenzene	U	0.889	ug/kg	0.296	0.889
108-67-8	1,3,5-Trimethylbenzene	U	0.889	ug/kg	0.296	0.889
98-06-6	tert-Butylbenzene	U	0.889	ug/kg	0.296	0.889
95-63-6	1,2,4-Trimethylbenzene	U	0.889	ug/kg	0.296	0.889
135-98-8	sec-Butylbenzene	U	0.889	ug/kg	0.296	0.889
541-73-1	1,3-Dichlorobenzene	U	0.889	ug/kg	0.296	0.889
106-46-7	1,4-Dichlorobenzene	U	0.889	ug/kg	0.296	0.889
104-51-8	n-Butylbenzene	U	0.889	ug/kg	0.296	0.889
123-91-1	1,4-Dioxane	U	44.5	ug/kg	14.8	44.5
1330-20-7	Xylenes (total)	U	2.67	ug/kg	0.889	2.67
95-50-1	1,2-Dichlorobenzene	U	0.889	ug/kg	0.296	0.889

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 00:00**	**Matrix:**	**S**
Lab Sample ID:	**532125011**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**9.6**
Client Sample:	**BD-2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-011**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/26/2021 01:54**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 00:00**	**Aliquot:**	**6.26 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R118.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.883	ug/kg	0.294	0.883
67-64-1	Acetone	BJ	1.97	ug/kg	1.47	4.42
75-35-4	1,1-Dichloroethylene	U	0.883	ug/kg	0.294	0.883
75-09-2	Methylene chloride	U	4.42	ug/kg	1.47	4.42
1634-04-4	tert-Butyl methyl ether	U	0.883	ug/kg	0.294	0.883
156-60-5	trans-1,2-Dichloroethylene	U	0.883	ug/kg	0.294	0.883
75-34-3	1,1-Dichloroethane	U	0.883	ug/kg	0.294	0.883
78-93-3	2-Butanone	U	4.42	ug/kg	1.47	4.42
156-59-2	cis-1,2-Dichloroethylene	U	0.883	ug/kg	0.294	0.883
67-66-3	Chloroform	U	0.883	ug/kg	0.294	0.883
71-55-6	1,1,1-Trichloroethane	U	0.883	ug/kg	0.294	0.883
56-23-5	Carbon tetrachloride	U	0.883	ug/kg	0.294	0.883
107-06-2	1,2-Dichloroethane	J	0.786	ug/kg	0.294	0.883
71-43-2	Benzene	U	0.883	ug/kg	0.294	0.883
79-01-6	Trichloroethylene	U	0.883	ug/kg	0.294	0.883
108-88-3	Toluene	U	0.883	ug/kg	0.294	0.883
127-18-4	Tetrachloroethylene	U	0.883	ug/kg	0.294	0.883
108-90-7	Chlorobenzene	U	0.883	ug/kg	0.294	0.883
100-41-4	Ethylbenzene	U	0.883	ug/kg	0.294	0.883
103-65-1	n-Propylbenzene	U	0.883	ug/kg	0.294	0.883
108-67-8	1,3,5-Trimethylbenzene	U	0.883	ug/kg	0.294	0.883
98-06-6	tert-Butylbenzene	U	0.883	ug/kg	0.294	0.883
95-63-6	1,2,4-Trimethylbenzene	U	0.883	ug/kg	0.294	0.883
135-98-8	sec-Butylbenzene	U	0.883	ug/kg	0.294	0.883
541-73-1	1,3-Dichlorobenzene	U	0.883	ug/kg	0.294	0.883
106-46-7	1,4-Dichlorobenzene	U	0.883	ug/kg	0.294	0.883
104-51-8	n-Butylbenzene	U	0.883	ug/kg	0.294	0.883
123-91-1	1,4-Dioxane	U	44.2	ug/kg	14.7	44.2
1330-20-7	Xylenes (total)	U	2.65	ug/kg	0.883	2.65
95-50-1	1,2-Dichlorobenzene	U	0.883	ug/kg	0.294	0.883

LC-MS/MS Analysis

Case Narrative

LCMSMS-Misc
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42603
Work Order #: 532125

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1
Analytical Procedure: GL-OA-E-076 REV# 10
Analytical Batches: 2082613 and 2082612

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

GEL Sample ID#	Client Sample Identification
532125012	42603-012 EB-1
532125013	42603-013 FRB-1
1204734059	Method Blank (MB)
1204734060	Laboratory Control Sample (LCS)
1204734061	532111001(NonSDG) Matrix Spike (MS)
1204734062	532111001(NonSDG) Matrix Spike Duplicate (MSD)

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

Data Summary:

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

Quality Control (QC) Information

Method Blank (MB) Statement
The blanks analyzed with this SDG did not meet the established acceptance criterion. There were confirmed hits of 6:2 FTS in the blank above the PQL. However, there is not enough sample to re-analyze. All samples were re-extracted twice and results confirmed. Data is reported is. 1204734059 (MB) and 532125013 (42603-013).

Matrix Spike (MS) Recovery Statement
The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and the data were reported.

Sample	Analyte	Value
1204734061 (Non SDG 532111001MS)	Perfluorononane sulfonic acid (PFNS)	69* (70%-130%)
1204734062 (Non SDG 532111001MSD)	Perfluorooctane sulfonamide (PFOSAm)	66* (70%-130%)
	Perfluoropentanoic acid (PFPeA)	69* (70%-130%)

MS/MSD Relative Percent Difference (RPD) Statement
The RPD values between the MS and MSD was not within the acceptance limit. As the individual MS and MSD recoveries were within the acceptance limits, the RPD failure had no adverse impact on the reported sample data.

Sample	Analyte	Value
1204734061MS and 1204734062MSD (Non SDG 532111001)	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	RPD 34* (0%-30%)

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 10
Analytical Batch: 2082653

Preparation Method: EPA 537.1 Modified
Preparation Procedure: GL-OA-E-076 REV# 10
Preparation Batch: 2082652

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

GEL Sample ID#	Client Sample Identification
532125001	42603-001 B725 Generator Pile-C1
532125002	42603-002 B725 Generator Pile-C2
532125003	42603-003 BD-1
1204734177	Method Blank (MB)
1204734178	Laboratory Control Sample (LCS)
1204734179	532125001(42603-001) Matrix Spike (MS)
1204734180	532125001(42603-001) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

Method Blank (MB) Statement
The blank analyzed with this SDG did not meet the established acceptance criteria. There was a confirmed hit of 6:2 FTS in the method blank above the PQL. However, there are no hits in the samples. The blank contamination is attributed to laboratory error and the data is reported as is. 1204734177 (MB).

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42603 GEL Work Order: 532125

The Qualifiers in this report are defined as follows:

B Analyte found in the blank as well as the sample.
J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature:  **Name: Nik-Cole Elmore**

Date: 28 JAN 2021 **Title: Analyst II**

Sample Data Summary

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 09:25**	**Matrix:**	**S**
Lab Sample ID:	**532125001**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**9.5**
Client Sample:	**B725 Generator Pile-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-001**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**2082653**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**01/19/2021 11:28**	**Analyst:**	**MB2**		
Prep Date:	**01/18/2021 08:24**	**Aliquot:**	**2.06 g**	**Final Volume:**	**10 mL**
Data File:	**PFC011421161.wiff**	**Column:**			

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
27619-97-2	1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	U	1.07	ng/g	0.418	1.07
39108-34-4	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	U	1.07	ng/g	0.413	1.07
2991-50-6	N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	1.07	ng/g	0.295	1.07
2355-31-9	N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	1.07	ng/g	0.354	1.07
375-73-5	Perfluorobutane sulfonic acid (PFBS)	U	0.536	ng/g	0.177	0.536
375-22-4	Perfluorobutanoic acid (PFBA)	U	0.536	ng/g	0.215	0.536
335-77-3	Perfluorodecane sulfonic acid (PFDS)	U	0.536	ng/g	0.177	0.536
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.07	ng/g	0.397	1.07
307-55-1	Perfluorododecanoic acid (PFDOA)	U	0.536	ng/g	0.177	0.536
375-92-8	Perfluoroheptane sulfonic acid (PFHpS)	U	0.536	ng/g	0.199	0.536
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.536	ng/g	0.177	0.536
355-46-4	Perfluorohexane sulfonic acid (PFHxS)	U	0.536	ng/g	0.177	0.536
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.536	ng/g	0.215	0.536
68259-12-1	Perfluorononane sulfonic acid (PFNS)	U	0.536	ng/g	0.177	0.536
375-95-1	Perfluorononanoic acid (PFNA)	U	0.536	ng/g	0.177	0.536
754-91-6	Perfluorooctane sulfonamide (PFOSAm)	U	0.536	ng/g	0.177	0.536
1763-23-1	Perfluorooctane sulfonic acid (PFOS)	U	0.536	ng/g	0.215	0.536
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.536	ng/g	0.215	0.536
2706-91-4	Perfluoropentane sulfonic acid (PFPeS)	U	0.536	ng/g	0.177	0.536
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.536	ng/g	0.177	0.536
376-06-7	Perfluorotetradecanoic acid (PFTDA)	U	0.536	ng/g	0.215	0.536
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.536	ng/g	0.177	0.536
2058-94-8	Perfluoroundecanoic acid (PFUnDA)	U	0.536	ng/g	0.177	0.536

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 09:35**	**Matrix:**	**S**
Lab Sample ID:	**532125002**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**9.5**
Client Sample:	**B725 Generator Pile-C2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-002**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**2082653**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**01/19/2021 11:54**	**Analyst:**	**MB2**		
Prep Date:	**01/18/2021 08:24**	**Aliquot:**	**2.11 g**	**Final Volume:**	**10 mL**
Data File:	**PFC011421164.wiff**	**Column:**			

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
27619-97-2	1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	U	1.05	ng/g	0.408	1.05
39108-34-4	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	U	1.05	ng/g	0.403	1.05
2991-50-6	N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	1.05	ng/g	0.288	1.05
2355-31-9	N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	1.05	ng/g	0.346	1.05
375-73-5	Perfluorobutane sulfonic acid (PFBS)	U	0.524	ng/g	0.173	0.524
375-22-4	Perfluorobutanoic acid (PFBA)	U	0.524	ng/g	0.209	0.524
335-77-3	Perfluorodecane sulfonic acid (PFDS)	U	0.524	ng/g	0.173	0.524
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.05	ng/g	0.387	1.05
307-55-1	Perfluorododecanoic acid (PFDOA)	U	0.524	ng/g	0.173	0.524
375-92-8	Perfluoroheptane sulfonic acid (PFHpS)	U	0.524	ng/g	0.194	0.524
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.524	ng/g	0.173	0.524
355-46-4	Perfluorohexane sulfonic acid (PFHxS)	U	0.524	ng/g	0.173	0.524
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.524	ng/g	0.209	0.524
68259-12-1	Perfluorononane sulfonic acid (PFNS)	U	0.524	ng/g	0.173	0.524
375-95-1	Perfluorononanoic acid (PFNA)	U	0.524	ng/g	0.173	0.524
754-91-6	Perfluorooctane sulfonamide (PFOSAm)	U	0.524	ng/g	0.173	0.524
1763-23-1	Perfluorooctane sulfonic acid (PFOS)	J	0.434	ng/g	0.209	0.524
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.524	ng/g	0.209	0.524
2706-91-4	Perfluoropentane sulfonic acid (PFPeS)	U	0.524	ng/g	0.173	0.524
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.524	ng/g	0.173	0.524
376-06-7	Perfluorotetradecanoic acid (PFTDA)	U	0.524	ng/g	0.209	0.524
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.524	ng/g	0.173	0.524
2058-94-8	Perfluoroundecanoic acid (PFUnDA)	U	0.524	ng/g	0.173	0.524

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 00:00**	**Matrix:**	**S**
Lab Sample ID:	**532125003**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**12.2**
Client Sample:	**BD-1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-003**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**2082653**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**01/19/2021 12:02**	**Analyst:**	**MB2**		
Prep Date:	**01/18/2021 08:24**	**Aliquot:**	**2.03 g**	**Final Volume:**	**10 mL**
Data File:	**PFC011421165.wiff**	**Column:**			

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
27619-97-2	1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	U	1.12	ng/g	0.438	1.12
39108-34-4	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	U	1.12	ng/g	0.432	1.12
2991-50-6	N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	1.12	ng/g	0.309	1.12
2355-31-9	N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	1.12	ng/g	0.370	1.12
375-73-5	Perfluorobutane sulfonic acid (PFBS)	U	0.561	ng/g	0.185	0.561
375-22-4	Perfluorobutanoic acid (PFBA)	U	0.561	ng/g	0.224	0.561
335-77-3	Perfluorodecane sulfonic acid (PFDS)	U	0.561	ng/g	0.185	0.561
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.12	ng/g	0.415	1.12
307-55-1	Perfluorododecanoic acid (PFDOA)	U	0.561	ng/g	0.185	0.561
375-92-8	Perfluoroheptane sulfonic acid (PFHpS)	U	0.561	ng/g	0.208	0.561
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.561	ng/g	0.185	0.561
355-46-4	Perfluorohexane sulfonic acid (PFHxS)	U	0.561	ng/g	0.185	0.561
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.561	ng/g	0.224	0.561
68259-12-1	Perfluorononane sulfonic acid (PFNS)	U	0.561	ng/g	0.185	0.561
375-95-1	Perfluorononanoic acid (PFNA)	U	0.561	ng/g	0.185	0.561
754-91-6	Perfluorooctane sulfonamide (PFOSAm)	U	0.561	ng/g	0.185	0.561
1763-23-1	Perfluorooctane sulfonic acid (PFOS)	J	0.361	ng/g	0.224	0.561
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.561	ng/g	0.224	0.561
2706-91-4	Perfluoropentane sulfonic acid (PFPeS)	U	0.561	ng/g	0.185	0.561
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.561	ng/g	0.185	0.561
376-06-7	Perfluorotetradecanoic acid (PFTDA)	U	0.561	ng/g	0.224	0.561
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.561	ng/g	0.185	0.561
2058-94-8	Perfluoroundecanoic acid (PFUnDA)	U	0.561	ng/g	0.185	0.561

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 07:50**	**Matrix:**	**S**
Lab Sample ID:	**532125012**	**Date Received:**	**01/14/2021 09:55**		
Client Sample:	**EB-1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-012**	**Method:**	**EPA 537.1**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**2082613**	**Inst:**	**LCMSMS8**	**Dilution:**	**1**
Run Date:	**01/19/2021 10:55**	**Analyst:**	**JMB3**		
Prep Date:	**01/18/2021 08:05**	**Aliquot:**	**291.63 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC011521133.wiff**	**Column:**			

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
27619-97-2	1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	U	3.26	ng/L	1.13	3.26
39108-34-4	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	U	3.29	ng/L	1.13	3.29
2991-50-6	N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	3.43	ng/L	1.13	3.43
2355-31-9	N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	3.43	ng/L	1.13	3.43
375-73-5	Perfluorobutane sulfonic acid (PFBS)	U	1.53	ng/L	0.566	1.53
375-22-4	Perfluorobutanoic acid (PFBA)	U	1.71	ng/L	0.686	1.71
335-77-3	Perfluorodecane sulfonic acid (PFDS)	U	1.66	ng/L	0.566	1.66
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.71	ng/L	0.566	1.71
307-55-1	Perfluorododecanoic acid (PFDOA)	U	1.71	ng/L	0.566	1.71
375-92-8	Perfluoroheptane sulfonic acid (PFHpS)	U	1.63	ng/L	0.566	1.63
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.71	ng/L	0.566	1.71
355-46-4	Perfluorohexane sulfonic acid (PFHxS)	U	1.56	ng/L	0.566	1.56
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.71	ng/L	0.566	1.71
68259-12-1	Perfluorononane sulfonic acid (PFNS)	U	1.65	ng/L	0.566	1.65
375-95-1	Perfluorononanoic acid (PFNA)	U	1.71	ng/L	0.566	1.71
754-91-6	Perfluorooctane sulfonamide (PFOSAm)	U	1.59	ng/L	0.566	1.59
1763-23-1	Perfluorooctane sulfonic acid (PFOS)	U	1.71	ng/L	0.652	1.71
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.71	ng/L	0.566	1.71
2706-91-4	Perfluoropentane sulfonic acid (PFPeS)	U	1.61	ng/L	0.566	1.61
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.71	ng/L	0.566	1.71
376-06-7	Perfluorotetradecanoic acid (PFTDA)	U	1.71	ng/L	0.566	1.71
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.71	ng/L	0.566	1.71
2058-94-8	Perfluoroundecanoic acid (PFUnDA)	U	1.71	ng/L	0.566	1.71

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**42603**	**Date Collected:**	**01/13/2021 09:05**	**Matrix:**	**S**
Lab Sample ID:	**532125013**	**Date Received:**	**01/14/2021 09:55**		
Client Sample:	**FRB-1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42603-013**	**Method:**	**EPA 537.1**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**2082613**	**Inst:**	**LCMSMS8**	**Dilution:**	**1**
Run Date:	**01/18/2021 21:36**	**Analyst:**	**JMB3**		
Prep Date:	**01/18/2021 08:05**	**Aliquot:**	**274.51 mL**	**Final Volume:**	**5 mL**
Data File:	**PFC011521118.wiff**	**Column:**			

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
27619-97-2	1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	BJ	1.26	ng/L	1.20	3.46
39108-34-4	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	U	3.50	ng/L	1.20	3.50
2991-50-6	N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	3.64	ng/L	1.20	3.64
2355-31-9	N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	3.64	ng/L	1.20	3.64
375-73-5	Perfluorobutane sulfonic acid (PFBS)	U	1.62	ng/L	0.601	1.62
375-22-4	Perfluorobutanoic acid (PFBA)	U	1.82	ng/L	0.729	1.82
335-77-3	Perfluorodecane sulfonic acid (PFDS)	U	1.77	ng/L	0.601	1.77
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.82	ng/L	0.601	1.82
307-55-1	Perfluorododecanoic acid (PFDOA)	U	1.82	ng/L	0.601	1.82
375-92-8	Perfluoroheptane sulfonic acid (PFHpS)	U	1.73	ng/L	0.601	1.73
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	1.82	ng/L	0.601	1.82
355-46-4	Perfluorohexane sulfonic acid (PFHxS)	U	1.66	ng/L	0.601	1.66
307-24-4	Perfluorohexanoic acid (PFHxA)	U	1.82	ng/L	0.601	1.82
68259-12-1	Perfluorononane sulfonic acid (PFNS)	U	1.75	ng/L	0.601	1.75
375-95-1	Perfluorononanoic acid (PFNA)	U	1.82	ng/L	0.601	1.82
754-91-6	Perfluorooctane sulfonamide (PFOSAm)	U	1.69	ng/L	0.601	1.69
1763-23-1	Perfluorooctane sulfonic acid (PFOS)	U	1.82	ng/L	0.692	1.82
335-67-1	Perfluorooctanoic acid (PFOA)	U	1.82	ng/L	0.601	1.82
2706-91-4	Perfluoropentane sulfonic acid (PFPeS)	U	1.71	ng/L	0.601	1.71
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	1.82	ng/L	0.601	1.82
376-06-7	Perfluorotetradecanoic acid (PFTDA)	U	1.82	ng/L	0.601	1.82
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	1.82	ng/L	0.601	1.82
2058-94-8	Perfluoroundecanoic acid (PFUnDA)	U	1.82	ng/L	0.601	1.82

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42603
Work Order #: 532125

Product: **Determination of Metals by ICP**
Analytical Method: SW846 3050B/6010C
Analytical Procedure: GL-MA-E-013 REV# 32
Analytical Batch: 2081963

Product: **Determination of Metals by ICP**
Analytical Method: SW846 3005A/6010C
Analytical Procedure: GL-MA-E-013 REV# 31
Analytical Batch: 2081972

Product: **Determination of Metals by ICP-MS**
Analytical Method: SW846 3005A/6020A
Analytical Procedure: GL-MA-E-014 REV# 34
Analytical Batch: 2081991

Product: **Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer**
Analytical Method: SW846 7471B
Analytical Procedure: GL-MA-E-010 REV# 38
Analytical Batch: 2083503

Product: **Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer**
Analytical Method: SW846 7470A
Analytical Procedure: GL-MA-E-010 REV# 38
Analytical Batch: 2086883

Preparation Method: SW846 3050B
Preparation Procedure: GL-MA-E-009 REV# 29
Preparation Batch: 2081958

Preparation Method: SW846 3005A
Preparation Procedure: GL-MA-E-006 REV# 14
Preparation Batches: 2081971 and 2081990

Preparation Method: SW846 7471B Prep
Preparation Procedure: GL-MA-E-010 REV# 38
Preparation Batch: 2083502

Preparation Method: SW846 7470A Prep
Preparation Procedure: GL-MA-E-010 REV# 38
Preparation Batch: 2086877

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

GEL Sample ID#	Client Sample Identification

532125001	42603-001	B725 Generator Pile-C1
532125002	42603-002	B725 Generator Pile-C2
532125003	42603-003	BD-1
532125012	42603-012	EB-1
1204732711	Method Blank (MB)**ICP**	
1204732739	Method Blank (MB)**ICP**	
1204732712	Laboratory Control Sample (LCS)	
1204732740	Laboratory Control Sample (LCS)	
1204732741	Laboratory Control Sample Duplicate (LCSD)	
1204732715	532125001(42603-001L) Serial Dilution (SD)	
1204732742	532125012(42603-012L) Serial Dilution (SD)	
1204732713	532125001(42603-001D) Sample Duplicate (DUP)	
1204732714	532125001(42603-001S) Matrix Spike (MS)	
1204732783	Method Blank (MB)**ICP-MS**	
1204732784	Laboratory Control Sample (LCS)	
1204732785	Laboratory Control Sample Duplicate (LCSD)	
1204732786	532125012(42603-012L) Serial Dilution (SD)	
1204736060	Method Blank (MB)**CVAA**	
1204743126	Method Blank (MB)**CVAA**	
1204736061	Laboratory Control Sample (LCS)	
1204743127	Laboratory Control Sample (LCS)	
1204736064	532125001(42603-001L) Serial Dilution (SD)	
1204743130	532010008(NonSDGL) Serial Dilution (SD)	
1204736062	532125001(42603-001D) Sample Duplicate (DUP)	
1204743128	532010008(NonSDGD) Sample Duplicate (DUP)	
1204736063	532125001(42603-001S) Matrix Spike (MS)	
1204743129	532010008(NonSDGS) Matrix Spike (MS)	

Samples 532125001, 002 and 003 in this SDG were analyzed for metals and mercury on a "dry weight corrected" basis. Sample 532125012 in this SDG was analyzed for metals and mercury on an "as received" basis.

Data Summary:

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

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of nickel. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 532125001 (42603-001), 532125002 (42603-002) and 532125003 (42603-003)-ICP.

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was used in place of matrix QC due to the designation of field QC. ICP and ICP-MS.

Technical Information

Preparation/Analytical Method Verification
Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42603 GEL Work Order: 532125

The Qualifiers in this report are defined as follows:

* The duplicate analysis is not within control limits.
B Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

Review/Validation

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

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

Signature:  **Name: Edmund Frampton**

Date: 02 FEB 2021 **Title: Team Leader**

Sample Data Summary

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 42603 **METHOD TYPE:** SW846

SAMPLE ID: 532125001 **CLIENT ID:** 42603−001

CONTRACT: BRKL00701

MATRIX: S **DATE RECEIVED** 14−JAN−21 **LEVEL:** Low **%SOLIDS:** 90.5

CAS No	Analyte	Result	Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
7440−38−2	Arsenic	3420	ug/kg			P	544	1	AVIO3	012521−4
7440−39−3	Barium	9620	ug/kg			P	109	1	AVIO3	012521−4
7440−41−7	Beryllium	264	ug/kg	B		P	109	1	AVIO3	012521−4
7440−43−9	Cadmium	114	ug/kg	B		P	109	1	AVIO3	012521−4
7440−47−3	Chromium	6140	ug/kg			P	163	1	AVIO3	012521−4
7440−50−8	Copper	2630	ug/kg			P	326	1	AVIO3	012521−4
7439−92−1	Lead	5560	ug/kg			P	359	1	AVIO3	012521−4
7439−96−5	Manganese	49000	ug/kg			P	218	1	AVIO3	012521−4
7439−97−6	Mercury	7.56	ug/kg	U		AV	7.56	1	HG5	012121S2−7
7440−02−0	Nickel	3930	ug/kg			P	163	1	AVIO3	012621−3
7782−49−2	Selenium	544	ug/kg	U		P	544	1	AVIO3	012621−3
7440−22−4	Silver	109	ug/kg	U		P	109	1	AVIO3	012521−4
7440−66−6	Zinc	10400	ug/kg			P	435	1	AVIO3	012521−4

***Analytical Methods:**

AV **SW846 7471B**
P **SW846 3050B/6010C**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 42603 **METHOD TYPE:** SW846

SAMPLE ID: 532125002 **CLIENT ID:** 42603−002

CONTRACT: BRKL00701

MATRIX: S **DATE RECEIVED** 14−JAN−21 **LEVEL:** Low **%SOLIDS:** 90.5

CAS No	Analyte	Result	Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
7440−38−2	Arsenic	3220	ug/kg	B		P	544	1	AVIO3	012521−4
7440−39−3	Barium	8000	ug/kg			P	109	1	AVIO3	012521−4
7440−41−7	Beryllium	207	ug/kg	B		P	109	1	AVIO3	012521−4
7440−43−9	Cadmium	109	ug/kg	U		P	109	1	AVIO3	012521−4
7440−47−3	Chromium	4550	ug/kg			P	163	1	AVIO3	012521−4
7440−50−8	Copper	3290	ug/kg			P	326	1	AVIO3	012521−4
7439−92−1	Lead	4030	ug/kg			P	359	1	AVIO3	012521−4
7439−96−5	Manganese	51600	ug/kg			P	217	1	AVIO3	012521−4
7439−97−6	Mercury	7.71	ug/kg	U		AV	7.71	1	HG5	012121S2−7
7440−02−0	Nickel	3500	ug/kg			P	163	1	AVIO3	012621−3
7782−49−2	Selenium	544	ug/kg	U		P	544	1	AVIO3	012621−3
7440−22−4	Silver	109	ug/kg	U		P	109	1	AVIO3	012521−4
7440−66−6	Zinc	8030	ug/kg			P	435	1	AVIO3	012521−4

***Analytical Methods:**

AV **SW846 7471B**

P **SW846 3050B/6010C**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 42603 **METHOD TYPE:** SW846

SAMPLE ID: 532125003 **CLIENT ID:** 42603−003

CONTRACT: BRKL00701

MATRIX: S **DATE RECEIVED** 14−JAN−21 **LEVEL:** Low **%SOLIDS:** 88

CAS No	Analyte	Result	Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
7440−38−2	Arsenic	3400	ug/kg			P	567	1	AVIO3	012521−4
7440−39−3	Barium	9370	ug/kg			P	113	1	AVIO3	012521−4
7440−41−7	Beryllium	240	ug/kg	B		P	113	1	AVIO3	012521−4
7440−43−9	Cadmium	113	ug/kg	U		P	113	1	AVIO3	012521−4
7440−47−3	Chromium	5570	ug/kg			P	170	1	AVIO3	012521−4
7440−50−8	Copper	3610	ug/kg			P	340	1	AVIO3	012521−4
7439−92−1	Lead	4990	ug/kg			P	374	1	AVIO3	012521−4
7439−96−5	Manganese	53900	ug/kg			P	227	1	AVIO3	012521−4
7439−97−6	Mercury	7.81	ug/kg	U		AV	7.81	1	HG5	012121S2−7
7440−02−0	Nickel	3830	ug/kg			P	170	1	AVIO3	012621−3
7782−49−2	Selenium	567	ug/kg	U		P	567	1	AVIO3	012621−3
7440−22−4	Silver	113	ug/kg	U		P	113	1	AVIO3	012521−4
7440−66−6	Zinc	9140	ug/kg			P	454	1	AVIO3	012521−4

***Analytical Methods:**

AV **SW846 7471B**
P **SW846 3050B/6010C**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 42603 **METHOD TYPE:** SW846

SAMPLE ID: 532125012 **CLIENT ID:** 42603−012

CONTRACT: BRKL00701

MATRIX:S **DATE RECEIVED** 14−JAN−21 **LEVEL:** Low

CAS No	Analyte	Result	Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
7429−90−5	Aluminum	68.0	ug/L	U		P	68.0	1	AVIO3	011821−2
7440−36−0	Antimony	1.00	ug/L	U		MS	1.00	1	ICPMS12	210122−5
7440−38−2	Arsenic	2.00	ug/L	U		MS	2.00	1	ICPMS12	210122−5
7440−39−3	Barium	1.00	ug/L	U		P	1.00	1	AVIO3	011821−2
7440−41−7	Beryllium	1.00	ug/L	U		P	1.00	1	AVIO3	011821−2
7440−43−9	Cadmium	1.00	ug/L	U		P	1.00	1	AVIO3	011821−2
7440−70−2	Calcium	50.0	ug/L	U		P	50.0	1	AVIO3	011821−2
7440−47−3	Chromium	1.00	ug/L	U		P	1.00	1	AVIO3	011821−2
7440−48−4	Cobalt	1.00	ug/L	U		P	1.00	1	AVIO3	011821−2
7440−50−8	Copper	0.459	ug/L	B		MS	0.300	1	ICPMS12	210122−5
7439−89−6	Iron	30.0	ug/L	U		P	30.0	1	AVIO3	011821−2
7439−92−1	Lead	0.500	ug/L	U		MS	0.500	1	ICPMS12	210122−5
7439−95−4	Magnesium	10.0	ug/L	U		MS	10.0	1	ICPMS12	210122−5
7439−96−5	Manganese	1.00	ug/L	U		MS	1.00	1	ICPMS12	210122−5
7439−97−6	Mercury	0.152	ug/L	B		AV	0.0670	1	HG4	020121W1−6
7440−02−0	Nickel	1.57	ug/L	B		P	1.50	1	AVIO3	011821−2
7440−09−7	Potassium	50.0	ug/L	U		P	50.0	1	AVIO1	011921−1
7782−49−2	Selenium	2.00	ug/L	U		MS	2.00	1	ICPMS12	210122−5
7440−22−4	Silver	0.300	ug/L	U		MS	0.300	1	ICPMS12	210122−5
7440−23−5	Sodium	100	ug/L	U		P	100	1	AVIO3	011821−2
7440−28−0	Thallium	0.600	ug/L	U		MS	0.600	1	ICPMS12	210122−5
7440−62−2	Vanadium	1.00	ug/L	U		P	1.00	1	AVIO3	011821−2
7440−66−6	Zinc	4.10	ug/L	B		P	3.30	1	AVIO3	011821−2

***Analytical Methods:**

P **SW846 3005A/6010C**
MS **SW846 3005A/6020A**

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 42603 **METHOD TYPE:** SW846

SAMPLE ID: 532125012 **CLIENT ID:** 42603−012

CONTRACT: BRKL00701

MATRIX: S **DATE RECEIVED** 14−JAN−21 **LEVEL:** Low

CAS No	Analyte	Result	Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
AV	**SW846 7470A**									

General Chem Analysis

Case Narrative

General Chemistry
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42603
Work Order #: 532125

Product: **Hexavalent Chromium**
Analytical Method: SW846 7196A
Analytical Procedure: GL-GC-E-044 REV# 22
Analytical Batch: 2081977

Preparation Method: SW846 3060A
Preparation Procedure: GL-GC-E-044 REV# 22
Preparation Batch: 2081969

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

GEL Sample ID#	Client Sample Identification
532125001	42603-001 B725 Generator Pile-C1
532125002	42603-002 B725 Generator Pile-C2
532125003	42603-003 BD-1
1204732748	Method Blank (MB)
1204732749	Laboratory Control Sample (LCS)
1204732750	Insoluble Lab Control Sample (ILCS)
1204732752	532125001(42603-001) Sample Duplicate (DUP)
1204732754	532125001(42603-001) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42603 GEL Work Order: 532125

The Qualifiers in this report are defined as follows:

* The duplicate analysis is not within control limits.

U The analyte was analyzed for but not detected below the MDL.

Review/Validation

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

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

Signature:  **Name: Aubrey Kingsbury**

Date: 27 JAN 2021 **Title: Data Validator**

Sample Data Summary

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

Certificate of Analysis

Report Date: January 27, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-001	Project:	BRKL00701
Sample ID:	532125001	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 09:25	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-C1
Collector:	Client	Vol. Recv.:	
Moisture:	9.52%		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"												
Hexavalent Chromium	U	0.0154	0.172	0.431	mg/kg	39.0	1	VH1	01/22/21	1110	2081977	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	01/21/21	1319	2081969

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7196A	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: January 27, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-002	Project:	BRKL00701
Sample ID:	532125002	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 09:35	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-C2
Collector:	Client	Vol. Recv.:	
Moisture:	9.49%		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"												
Hexavalent Chromium	U	0.0155	0.174	0.434	mg/kg	39.3	1	VH1	01/22/21	1111	2081977	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	01/21/21	1319	2081969

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7196A	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: January 27, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-003	Project:	BRKL00701
Sample ID:	532125003	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 00:00	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	BD-1
Collector:	Client	Vol. Recv.:	
Moisture:	12.2%		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"												
Hexavalent Chromium	U	0.0963	0.179	0.448	mg/kg	39.3	1	VH1	01/22/21	1111	2081977	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	01/21/21	1319	2081969

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7196A	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42603
Work Order #: 532125

Product: **Dry Weight**
Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-OA-E-020 REV# 13
Preparation Batch: 2082025

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2082025

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

GEL Sample ID#	Client Sample Identification
532125001	42603-001 B725 Generator Pile-C1
532125002	42603-002 B725 Generator Pile-C2
532125003	42603-003 BD-1
1204732853	532125001(42603-001) Sample Duplicate (DUP)

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

Data Summary:

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

Product: **Dry Weight**
Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-OA-E-020 REV# 13
Preparation Batch: 2082030

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

GEL Sample ID#	Client Sample Identification
532125004	42603-004 B725 Generator Pile-G1
532125005	42603-005 B725 Generator Pile-G2
532125006	42603-006 B725 Generator Pile-G3
532125007	42603-007 B725 Generator Pile-G4
532125008	42603-008 B725 Generator Pile-G5
532125009	42603-009 B725 Generator Pile-G6
532125010	42603-010 B725 Generator Pile-G7
532125011	42603-011 BD-2
1204732859	532125004(42603-004) Sample Duplicate (DUP)

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

Data Summary:

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

Product: **Gammaspec, Gamma, Solid**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 27
Analytical Batch: 2082100

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2082025

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

GEL Sample ID#	Client Sample Identification
532125001	42603-001 B725 Generator Pile-C1
532125002	42603-002 B725 Generator Pile-C2
532125003	42603-003 BD-1
1204733018	Method Blank (MB)
1204733019	532125001(42603-001) Sample Duplicate (DUP)
1204733020	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Qualifier Information

Qualifier	Reason	Analyte	Sample	Client Sample
UI	Results are considered a false positive due to high peak-width.	Cesium-137	532125003	42603-003

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42603 GEL Work Order: 532125

The Qualifiers in this report are defined as follows:

J Estimated value; the result was greater than the MDA but less than the required detection limit.
U Undetected; sample result < MDA
UI Uncertain identification for gamma spectroscopy.

Review/Validation

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

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

Signature:  **Name: Kate Gellatly**

Date: 12 FEB 2021 **Title: Analyst I**

Moisture LogBook

Batch: 2082025
Analyst: CXB7
Date/Time: 14-JAN-2021
Procedure Code DRY WEIGHT___PREPD
Procedure Description Dry Weight-Percent Moisture Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-OA-E-020 GL-RAD-A-021

Sample St	Sample Id	Rpd(%)
DUP	1204732853	**5.674**

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
532114001	SAMPLE		SP-39020004	17:19	13.371	586.49	536.85	573.119	523.479	8.661
532125001	SAMPLE		SP-39020004	17:19	13.412	435.61	395.43	422.198	382.018	9.516
532125002	SAMPLE		SP-39020004	17:19	13.31	493.2	447.65	479.89	434.34	9.491
532125003	SAMPLE		SP-39020004	17:19	13.403	538.69	474.65	525.287	461.247	12.191
532147001	SAMPLE		SP-39020004	17:19	6.78	89.959	72.21	83.179	65.43	21.338
532148001	SAMPLE		SP-39020004	17:19	6.789	71.449	58.86	64.66	52.071	19.469
1204732853	DUP	532125001	SP-39020004	17:19	2.399	29.244	26.54	26.845	24.141	10.072

Comments:

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

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

Moisture LogBook

Batch: 2082030
Analyst: CXB7
Date/Time: 14-JAN-2021
Procedure Code DRY WEIGHT
Procedure Description Dry Weight-Percent Moisture
Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1204732859	**2.815**

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
532044001	SAMPLE		SP-39020004	17:21	2.403	21.712	17.755	19.309	15.352	20.493
532044002	SAMPLE		SP-39020004	17:21	2.383	21.281	17.182	18.898	14.799	21.69
532044003	SAMPLE		SP-39020004	17:21	2.35	28.353	23.698	26.003	21.348	17.901
532044004	SAMPLE		SP-39020004	17:21	2.364	21.752	18.701	19.388	16.337	15.736
532114002	SAMPLE		SP-39020004	17:21	2.382	6.421	6.099	4.039	3.717	7.972
532114003	SAMPLE		SP-39020004	17:21	2.371	4.419	4.134	2.048	1.763	13.916
532114004	SAMPLE		SP-39020004	17:21	2.374	7.621	7.311	5.247	4.937	5.908
532125004	SAMPLE		SP-39020004	17:21	2.377	7.288	6.909	4.911	4.532	7.717
532125005	SAMPLE		SP-39020004	17:21	2.401	8.42	7.862	6.019	5.461	9.27
532125006	SAMPLE		SP-39020004	17:21	2.399	7.558	7.208	5.159	4.809	6.784
532125007	SAMPLE		SP-39020004	17:21	2.369	5.531	5.207	3.162	2.838	10.246
532125008	SAMPLE		SP-39020004	17:21	2.395	8.175	7.73	5.78	5.335	7.698
532125009	SAMPLE		SP-39020004	17:21	2.375	6.978	6.413	4.603	4.038	12.274
532125010	SAMPLE		SP-39020004	17:21	2.385	7.479	7.375	5.094	4.99	2.041
532125011	SAMPLE		SP-39020004	17:21	2.385	8.607	8.012	6.222	5.627	9.562
1204732859	DUP	532125004	SP-39020004	17:21	2.427	5.379	5.154	2.952	2.727	7.621

Comments:

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

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

Sample Data Summary

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-001	Project:	BRKL00701
Sample ID:	532125001	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 09:25	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-C1
Collector:	Client	Vol. Recv.:	
Moisture:	9.52%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid "Dry Weight Corrected"													
Beryllium-7	U	0.276	+/-0.286	0.337		pCi/g			RXF2	02/05/21	0551	2082100	1
Cesium-137	U	0.0156	+/-0.0202	0.0374	0.100	pCi/g							
Cobalt-57	U	0.00782	+/-0.0139	0.0279		pCi/g							
Cobalt-60	U	-0.00254	+/-0.0162	0.0304		pCi/g							
Manganese-54	U	0.0152	+/-0.0196	0.0385		pCi/g							
Potassium-40		6.47	+/-0.680	0.348		pCi/g							
Radium-226		0.507	+/-0.101	0.0610		pCi/g							
Sodium-22	U	0.00727	+/-0.0230	0.0391		pCi/g							
Thorium-228		0.946	+/-0.0796	0.0594		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXB7	01/14/21	1719	2082025

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-002	Project:	BRKL00701
Sample ID:	532125002	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 09:35	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-C2
Collector:	Client	Vol. Recv.:	
Moisture:	9.49%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid "Dry Weight Corrected"													
Beryllium-7	U	0.205	+/-0.239	0.324		pCi/g			RXF2	02/05/21	0552	2082100	1
Cesium-137	U	0.0135	+/-0.0209	0.0415	0.100	pCi/g							
Cobalt-57	U	0.00504	+/-0.0112	0.0214		pCi/g							
Cobalt-60	U	-0.000326	+/-0.0187	0.0366		pCi/g							
Manganese-54	U	0.00407	+/-0.0189	0.0381		pCi/g							
Potassium-40		7.42	+/-0.750	0.270		pCi/g							
Radium-226		0.547	+/-0.0950	0.0678		pCi/g							
Sodium-22	U	0.0144	+/-0.0180	0.0401		pCi/g							
Thorium-228		0.798	+/-0.0740	0.0487		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXB7	01/14/21	1719	2082025

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-003	Project:	BRKL00701
Sample ID:	532125003	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 00:00	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	BD-1
Collector:	Client	Vol. Recv.:	
Moisture:	12.2%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid "Dry Weight Corrected"													
Beryllium-7	U	0.0313	+/-0.190	0.379		pCi/g			RXF2	02/05/21	0552	2082100	1
Cesium-137	J-UI	0.0762	+/-0.0657	0.0375	0.100	pCi/g							
Cobalt-57	U	0.000298	+/-0.0145	0.0266		pCi/g							
Cobalt-60	U	-0.0217	+/-0.0234	0.0384		pCi/g							
Manganese-54	U	0.0252	+/-0.0230	0.0408		pCi/g							
Potassium-40		6.27	+/-0.765	0.319		pCi/g							
Radium-226		0.454	+/-0.105	0.0757		pCi/g							
Sodium-22	U	-0.00823	+/-0.0275	0.0504		pCi/g							
Thorium-228		0.888	+/-0.0852	0.0603		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXB7	01/14/21	1719	2082025

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-004	Project:	BRKL00701
Sample ID:	532125004	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:00	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G1
Collector:	Client	Vol. Recv.:	
Moisture:	7.72%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-005	Project:	BRKL00701
Sample ID:	532125005	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:10	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G2
Collector:	Client	Vol. Recv.:	
Moisture:	9.27%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462 Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-006	Project:	BRKL00701
Sample ID:	532125006	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:25	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G3
Collector:	Client	Vol. Recv.:	
Moisture:	6.78%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-007	Project:	BRKL00701
Sample ID:	532125007	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:30	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G4
Collector:	Client	Vol. Recv.:	
Moisture:	10.2%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-008	Project:	BRKL00701
Sample ID:	532125008	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:35	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G5
Collector:	Client	Vol. Recv.:	
Moisture:	7.7%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-009	Project:	BRKL00701
Sample ID:	532125009	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:38	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G6
Collector:	Client	Vol. Recv.:	
Moisture:	12.3%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-010	Project:	BRKL00701
Sample ID:	532125010	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 10:43	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	B725 Generator Pile-G7
Collector:	Client	Vol. Recv.:	
Moisture:	2.04%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42603-011	Project:	BRKL00701
Sample ID:	532125011	Client ID:	BRKL007
Matrix:	S	COC:	42603
Collect Date:	13-JAN-21 00:00	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	BD-2
Collector:	Client	Vol. Recv.:	
Moisture:	9.56%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL Laboratories LLC
a member of The GEL Group INC

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

gel.com

February 05, 2021

Mr. Larry D. Singh
Brookhaven National Laboratory
Building 462
Upton, New York 11973-5000

Re: Project - ES MISC
Chain of Custody - 42604
Project Manager -S. FERRONE
Account # - 24472
Release # -532114

SDG: 42604

Dear Mr. Singh:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 14, 2021. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Clare Drennen for
Edith Kent
Project Manager

Purchase Order: 310464
Chain of Custody: 42604
Enclosures

Table of Contents

Case Narrative

Case Narrative
for
Brookhaven National Laboratory (310464)
SDG: 42604
Work Order: 532114

February 05, 2021

Laboratory Identification:

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

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on January 14, 2021 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
532114001	42604-001
532114002	42604-002
532114003	42604-003
532114004	42604-004

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: GC Semivolatile Herbicide, GC Semivolatile PCB, GC Semivolatile Pesticide, GC/MS Semivolatile, GC/MS Volatile, General Chemistry, LCMSMS-Misc, Metals and Radiochemistry.

Clare Drennen for
Edith Kent
Project Manager

Chain of Custody

Eastern Soil pile

532114

Page 1 of 1

BROOKHAVEN NATIONAL LABORATORY

P.O. # _____

Chain of Custody No. 42604

Requires EDD ☑

SAMPLING CHAIN OF CUSTODY

Analysis Requested By	Sampling Contractor	Analytical Laboratory
Name: S. Ferrone	Name: EPD Field Team	Name: General Engineering Labs
Life No: 22585 Ext. 5531	Contact: R. Lagattolla	Address: 2040 Savage Rd
Acct. No: 24472/24472 Dept: ES	Phone: 631-344-7129	City: Charleston St: SC Zip: 29407
Email Reports To:	Email/Fax: rlagattolla@bnl.gov	Contact: Edie Kent
1 Steve Ferrone	Sampler: R. Metz M. Yost J. Milligan	Phone: 843-769-7385
2		Email/Fax:
Project Name: ES MISC	Project Manager: S. Ferrone	Field Engineer: R. Lagattolla

Comments:

Type UID	Smp	Coll	Sample Information Site ID/Bldg/Life #	Depth/RWP	Date	Time	Matrix	Additional Sample Information Name/Description	Cont. Vol/Units	Cont. Type	# of Cont	Preservative	Analysis Requested: Alpha/Beta	Tritium	Gamma Spectroscopy 8260D	PFAS 537.1	SVOC 8270E	PCBs / pesticides, herb. 8082/8081/8151	Metals 7471B, 6010C, 6020	Hexavalent chromium 3060A/7196A
001	E	C	Eastern Soil Pile-C1	0.0-1.0	1/13/21	1055	S	Eastern Soil Pile Composite 1	8oz	P	2	----				X				
001	E	C	Eastern Soil Pile-C1	0.0-1.0		↓	S	Eastern Soil Pile Composite 1	16oz	G	1	----					X	X	X	X
001	E	C	Eastern Soil Pile-C1	0.0-1.0		↓	S	Eastern Soil Pile Composite 1	16oz	P	1	----			X					
002	E	G	Eastern Soil Pile-G1	0.0-0.5		1100	S	Eastern Soil Pile-Grab 1	Kit	G	4	----				X				
003	E	G	Eastern Soil Pile-G2	0.0-0.5		1105	S	Eastern Soil Pile-Grab 2	Kit	G	4	----				X				
004	E	G	Eastern Soil Pile-G3	0.0-0.5		1110	S	Eastern Soil Pile-Grab 3	Kit	G	4	----				X				

1 Relinquished By/Date/Time	2 Relinquished By/Date/Time	3 Relinquished By/Date/Time
Print R. Metz 1/13/21	Print	Print
Signature 1400	Signature	Signature
1 Received By/Date/Time	2 Received By/Date/Time	3 Received By/Date/Time
Print T. Todunk 1-14-21	Print	Print
Signature 9:55	Signature	Signature

Contractor Lab Sample Disposal:
☐ Return To Client ☑ Disposal by Lab
☐ Archive For _____ Months

Data Package: ☐ Full ☑ Summary

Turn-Around Time Required:
☐ Rush (1 Day) ☐ 14 Days ☑ 30 Days
☐ 7 Days ☐ Other ( )

BNL F 3101F (rev. 6/13)

Distribution WHITE (1) - Stays with Sample YELLOW (2) - Returned to Client with Report PINK (3) - Lab or Other GOLDENROD (4) - Field Copy - (Sampler)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: BRLL	SDG/AR/COC/Work Order: 532114 E-K
Received By: Tye	Date Received: 1/14/21
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 950788843192-2C (1 of 1)

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: (Wet Ice) Ice Packs Dry Ice None Other: *all temperatures are recorded in Celsius TEMP:_____
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR3-19 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	✓			If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ✓ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes ✓ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

9507 8884 3047-2C (1 of 1)

PM (or PMA) review: Initials MB Date 1/15/21 Page 1 of 1

GL-CHL-SR-001 Rev 7

Work Order Containers

Sample ID: 532114001
Client Sample ID: 42604−001
Description: Eastern Soil Pile−C1 Soil

Label: 532114001.01 **Type: Plastic 250 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 15:04:02	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001

Label: 532114001.02 **Type: Plastic 250 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 15:04:02	Thyasia Tatum	Changed sample location from Barcode Generated to PFC in Main Cooler 001
18−JAN−21 11:43:46	Lily Darrington	Transfered custody to batch 2082652
18−JAN−21 11:43:46	Lily Darrington	Changed sample location from PFC in Main Cooler 001 to HPLC−Explosive Lab
18−JAN−21 14:34:08	Lily Darrington	Changed batch_id from 2082652 to
18−JAN−21 14:34:08	Lily Darrington	Changed sample location from HPLC−Explosive Lab to PFC in Main Cooler 001

Label: 532114001.02.01 **Type: New Undefined**

19−JAN−21 11:06:03	Marc Bourbeau	Transfered custody to batch 2082653

Label: 532114001.03 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 15:04:02	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 18:52:20	Ridge Gleaton	Transfered custody to batch 2081958
14−JAN−21 18:52:20	Ridge Gleaton	Changed sample location from Main Cooler Staging− Solids to Inorganic Prep
14−JAN−21 22:25:56	Ridge Gleaton	Changed batch_id from 2081958 to
14−JAN−21 22:25:56	Ridge Gleaton	Changed sample location from Inorganic Prep to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
19−JAN−21 06:38:02	Carlethea Bing	Transfered custody to batch 2082720
19−JAN−21 06:38:02	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
19−JAN−21 06:38:52	Carlethea Bing	Transfered custody to batch 2082895
19−JAN−21 12:36:04	Sirena White−Singleton	Changed batch_id from 2082895 to
19−JAN−21 12:36:04	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
19−JAN−21 13:10:20	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
21−JAN−21 13:02:46	Rachael Bell	Transfered custody to batch 2081969
21−JAN−21 13:02:46	Rachael Bell	Changed sample location from Main Cooler #001 (Solids and Rad) to General Chemistry Immediates Lab
21−JAN−21 13:02:53	Rachael Bell	Transfered custody to batch 2081977
21−JAN−21 17:21:41	Rachael Bell	Changed batch_id from 2081977 to
21−JAN−21 17:21:41	Rachael Bell	Changed sample location from General Chemistry Immediates Lab to Return Shelf Chemistry Samples
22−JAN−21 08:07:01	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
25−JAN−21 06:40:02	Carlethea Bing	Transfered custody to batch 2084485

Work Order Containers

Sample ID: 532114001
Client Sample ID: 42604−001
Description: Eastern Soil Pile−C1 Soil

Label: 532114001.03	**Type: Glass 500 ml**	**Preservative: 4C (no chemical preservation)**
25−JAN−21 06:40:02	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
25−JAN−21 06:41:43	Carlethea Bing	Transfered custody to batch 2084506
25−JAN−21 09:42:09	Stacey Grant	Changed batch_id from 2084506 to
25−JAN−21 09:42:09	Stacey Grant	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
25−JAN−21 09:50:53	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
27−JAN−21 09:41:17	Sirena White−Singleton	Transfered custody to batch 2085633
27−JAN−21 09:41:17	Sirena White−Singleton	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
27−JAN−21 14:37:56	Carlethea Bing	Changed batch_id from 2085633 to
27−JAN−21 14:37:56	Carlethea Bing	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
01−FEB−21 06:45:59	Stacey Grant	Transfered custody to batch 2087218
01−FEB−21 06:45:59	Stacey Grant	Changed sample location from Return Shelf Chemistry Samples to Organic Prep (Solids)
01−FEB−21 12:03:56	Sirena White−Singleton	Changed batch_id from 2087218 to
01−FEB−21 12:03:56	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
01−FEB−21 12:27:07	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
Label: 532114001.03.01	**Type: New Undefined**	
25−JAN−21 10:13:23	Helen Camello	Transfered custody to batch 2081963
25−JAN−21 10:13:23	Helen Camello	Changed sample location from Inorganic Prep to ICP Lab
Label: 532114001.03.04	**Type: Vial (2 ml)**	
26−JAN−21 08:30:36	James Maestas	Transfered custody to batch 2084486
26−JAN−21 08:30:36	James Maestas	Changed sample location from Organic Prep (Solids) to ECD Lab
28−JAN−21 00:04:00	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis
Label: 532114001.03.05	**Type: Vial (2 ml)**	
25−JAN−21 17:12:55	Nathanael Moore	Transfered custody to batch 2084507
25−JAN−21 17:12:55	Nathanael Moore	Changed sample location from Organic Prep (Solids) to Semivolatiles Lab
27−JAN−21 00:03:31	WEBDB	Changed sample location from Semivolatiles Lab to Consumed By Analysis
Label: 532114001.03.06	**Type: Vial (2 ml)**	
01−FEB−21 06:02:18	Yiping Shi	Transfered custody to batch 2085635
01−FEB−21 06:02:18	Yiping Shi	Changed sample location from Organic Prep (Solids) to ECD Lab
03−FEB−21 00:01:28	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis

Work Order Containers

Sample ID: 532114001
Client Sample ID: 42604−001
Description: Eastern Soil Pile−C1 Soil

Label: 532114001.03.07 **Type: Vial (2 ml)**

02−FEB−21 07:48:03	Yiping Shi	Transfered custody to batch 2087219
02−FEB−21 07:48:03	Yiping Shi	Changed sample location from Organic Prep (Solids) to ECD Lab
04−FEB−21 00:04:42	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis

Label: 532114001.04 **Type: Plastic 500 ml** **Preservative: 4C (no chemical preservation)**

14−JAN−21 15:04:02	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:07:13	Celeste Drayton	Transfered custody to batch 2082025
14−JAN−21 17:07:13	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082025 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
20−JAN−21 10:34:36	Alan Stanley	Transfered custody to batch 2083502
20−JAN−21 10:34:36	Alan Stanley	Changed sample location from Main Cooler #001 (Solids and Rad) to Inorganic Prep
20−JAN−21 15:17:23	Michael Kinslow	Changed batch_id from 2083502 to
20−JAN−21 15:17:23	Michael Kinslow	Changed sample location from Inorganic Prep to Main Cooler #001 (Solids and Rad)

Label: 532114001.04.01 **Type: Gamma Can**

15−JAN−21 07:49:47	Rebekah Futch	Transfered custody to batch 2082100
15−JAN−21 07:49:47	Rebekah Futch	Changed sample location from Radiochemistry Soil Preparation to Radiochemisty Count Room

Label: 532114001.04.02 **Type: New Undefined**

21−JAN−21 09:37:22	Monifa Basdeo	Transfered custody to batch 2083503
21−JAN−21 09:37:22	Monifa Basdeo	Changed sample location from Inorganic Prep to Mercury Lab

Sample ID: 532114002
Client Sample ID: 42604−002
Description: Eastern Soil Pile−G1 Soil

Label: 532114002.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Work Order Containers

Sample ID: 532114002
Client Sample ID: 42604−002
Description: Eastern Soil Pile−G1 Soil

Label: 532114002.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532114002.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532114002.04 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532114003
Client Sample ID: 42604−003
Description: Eastern Soil Pile−G2 Soil

Label: 532114003.01 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532114003.02 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Water**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532114003.03 **Type: SO− O2SI 5035 Soil Kit (4 vial kit)** **Preservative: Frozen, Methanol**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532114003.04 **Type: Glass 40 ml vial** **Preservative: 4C (no chemical preservation)**

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to

Work Order Containers

Sample ID: 532114003
Client Sample ID: 42604−003
Description: Eastern Soil Pile−G2 Soil

Label: 532114003.04 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Sample ID: 532114004
Client Sample ID: 42604−004
Description: Eastern Soil Pile−G3 Soil

Label: 532114004.01 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Water

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer
25−JAN−21 20:51:33	James Pressley	Transfered custody to batch 2085184
25−JAN−21 20:51:33	James Pressley	Changed sample location from Volatiles Freezer to VOA/MS Lab
25−JAN−21 20:51:51	James Pressley	Transfered custody to batch 2085183
27−JAN−21 00:03:34	WEBDB	Changed sample location from VOA/MS Lab to Consumed By Analysis

Label: 532114004.02 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Water

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532114004.03 **Type:** SO− O2SI 5035 Soil Kit (4 vial kit) **Preservative:** Frozen, Methanol

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Volatiles Freezer

Label: 532114004.04 **Type:** Glass 40 ml vial **Preservative:** 4C (no chemical preservation)

14−JAN−21 15:03:26	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
14−JAN−21 17:11:55	Celeste Drayton	Transfered custody to batch 2082030
14−JAN−21 17:11:55	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
14−JAN−21 17:56:03	Celeste Drayton	Changed batch_id from 2082030 to
14−JAN−21 17:56:03	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
15−JAN−21 08:33:18	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Data Review Qualifier Definitions

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 05−FEB−21

Project Specific Qualifier Definitions for GEL Client Code: BRKL

Qualifier	Qualifier Definition	Department	Fraction
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.		
J	Value is estimated		
P	Organics−−The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The target analyte was detected in the associated blank.	Organics	
E	Concentration of the target analyte exceeds the instrument calibration range	Organics	
A	The TIC is a suspected aldol−condensation product	Organics	Semi−Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Metals−−The Matrix spike sample recovery is not within specified control limits	Inorganics	
*	A quality control analyte recovery is outside of specified acceptance criteria		
N	Organics−−Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor	Organics	Semi−Volatile
H	Analytical holding time was exceeded		
**	Analyte is a surrogate compound	Organics	
<	Result is less than value reported		
>	Result is greater than value reported		
UI	Gamma Spectroscopy−−Uncertain identification	Radiological	
BD	Results are either below the MDC or tracer recovery is low	Radiological	
h	Preparation or preservation holding time was exceeded		
R	Sample results are rejected		
Z	Paint Filter Test−−Particulates passed through the filter, however no free liquids were observed.	General Chemistry	General Chem
d	5−day BOD−−The 2:1 depletion requirement was not met for this sample	General Chemistry	
B	Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL	Inorganics	Metals
^	RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.		
D	Results are reported from a diluted aliquot of the sample	Organics	
N/A	RPD or %Recovery limits do not apply.		
ND	Analyte concentration is not detected above the detection limit		
E	%difference of sample and SD is >10%. Sample concentration must meet flagging criteria	Inorganics	Metals
M	M if above MDC and less than LLD	Radiological	
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
FA	Failed analysis.	Radiological	Bioassay
E	General Chemistry−−Concentration of the target analyte exceeds the instrument calibration range	General Chemistry	General Chem
JNX	Non Calibrated Compound	Organics	Volatile
UJ	Compound cannot be extracted	Organics	Semi−Volatile

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 05−FEB−21

Project Specific Qualifier Definitions for GEL Client Code: BRKL

Qualifier	Qualifier Definition	Department	Fraction
UJ	Gamma Spectroscopy−−Uncertain identification	Radiological	Rad
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.		
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.	Radiological	
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.	Radiological	
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.	Radiological	
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies	Inorganics	Metals
N1	See case narrative		
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.	Inorganics	
Y	QC Samples were not spiked with this compound	Organics	
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.	General Chemistry	General Chem
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.	Radiological	Rad
**	Analyte is a Tracer compound	Radiological	
B	The target analyte was detected in the associated blank.	General Chemistry	
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor	Organics	Volatile
e	5−day BOD−−Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes	General Chemistry	General Chem
M	REMP Result > MDC/CL and < RDL	Radiological	
J	See case narrative for an explanation		

Data Review Qualifier Definitions

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

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

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

Laboratory Certifications

List of current GEL Certifications as of 05 February 2021

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122021−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−21−18
Utah NELAP	SC000122020−34
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Volatile Analysis

Case Narrative

GC/MS Volatile
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Volatile Organic Compounds (VOC) by Gas Chromatograph/Mass Spectrometer**
Analytical Method: SW846 8260D
Analytical Procedure: GL-OA-E-038 REV# 28
Analytical Batch: 2085184

Preparation Method: SW846 5035A
Preparation Procedure: GL-OA-E-039 REV# 13
Preparation Batch: 2085183

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

GEL Sample ID#	Client Sample Identification
532114002	42604-002 Eastern Soil Pile-G1
532114003	42604-003 Eastern Soil Pile-G2
532114004	42604-004 Eastern Soil Pile-G3
1204739813	Method Blank (MB)
1204739815	Laboratory Control Sample (LCS)
1204739816	532125004(42603-004) Post Spike (PS)
1204739817	532125004(42603-004) Post Spike Duplicate (PSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Calibration Information

Continuing Calibration Verification Requirements
All Calibration Verification Standards (CCV) did not meet the acceptance criteria as outlined in Method 8260D for samples and the associated QC . However, the method allows for a designated number of outliers dependent on the requested analyte list. This SDG satisfied the 8260D outlier acceptance criteria. The results are reported.

Quality Control (QC) Information

Blank (MB) Statement
Target analytes were detected in the blank 1204739813 (MB) below the reporting limit.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

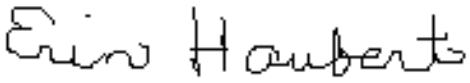
B Analyte found in the blank as well as the sample.
J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature:  **Name: Erin Haubert**

Date: 08 FEB 2021 **Title: Data Validator**

Sample Data Summary

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 11:00**	**Matrix:**	**S**
Lab Sample ID:	**532114002**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**8**
Client Sample:	**Eastern Soil Pile-G1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-002**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 21:34**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 11:00**	**Aliquot:**	**4.35 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R108.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	1.25	ug/kg	0.416	1.25
67-64-1	Acetone	BJ	3.82	ug/kg	2.08	6.24
75-35-4	1,1-Dichloroethylene	U	1.25	ug/kg	0.416	1.25
75-09-2	Methylene chloride	U	6.24	ug/kg	2.08	6.24
1634-04-4	tert-Butyl methyl ether	U	1.25	ug/kg	0.416	1.25
156-60-5	trans-1,2-Dichloroethylene	U	1.25	ug/kg	0.416	1.25
75-34-3	1,1-Dichloroethane	U	1.25	ug/kg	0.416	1.25
78-93-3	2-Butanone	U	6.24	ug/kg	2.08	6.24
156-59-2	cis-1,2-Dichloroethylene	U	1.25	ug/kg	0.416	1.25
67-66-3	Chloroform	U	1.25	ug/kg	0.416	1.25
71-55-6	1,1,1-Trichloroethane	U	1.25	ug/kg	0.416	1.25
56-23-5	Carbon tetrachloride	U	1.25	ug/kg	0.416	1.25
107-06-2	1,2-Dichloroethane	J	0.649	ug/kg	0.416	1.25
71-43-2	Benzene	U	1.25	ug/kg	0.416	1.25
79-01-6	Trichloroethylene	U	1.25	ug/kg	0.416	1.25
108-88-3	Toluene	U	1.25	ug/kg	0.416	1.25
127-18-4	Tetrachloroethylene	U	1.25	ug/kg	0.416	1.25
108-90-7	Chlorobenzene	U	1.25	ug/kg	0.416	1.25
100-41-4	Ethylbenzene	U	1.25	ug/kg	0.416	1.25
103-65-1	n-Propylbenzene	U	1.25	ug/kg	0.416	1.25
108-67-8	1,3,5-Trimethylbenzene	U	1.25	ug/kg	0.416	1.25
98-06-6	tert-Butylbenzene	U	1.25	ug/kg	0.416	1.25
95-63-6	1,2,4-Trimethylbenzene	U	1.25	ug/kg	0.416	1.25
135-98-8	sec-Butylbenzene	U	1.25	ug/kg	0.416	1.25
541-73-1	1,3-Dichlorobenzene	U	1.25	ug/kg	0.416	1.25
106-46-7	1,4-Dichlorobenzene	U	1.25	ug/kg	0.416	1.25
104-51-8	n-Butylbenzene	U	1.25	ug/kg	0.416	1.25
123-91-1	1,4-Dioxane	U	62.4	ug/kg	20.8	62.4
1330-20-7	Xylenes (total)	U	3.75	ug/kg	1.25	3.75
95-50-1	1,2-Dichlorobenzene	U	1.25	ug/kg	0.416	1.25

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 11:05**	**Matrix:**	**S**
Lab Sample ID:	**532114003**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**13.9**
Client Sample:	**Eastern Soil Pile-G2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-003**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 22:00**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 11:05**	**Aliquot:**	**4.71 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R109.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	1.23	ug/kg	0.411	1.23
67-64-1	Acetone	BJ	4.96	ug/kg	2.06	6.17
75-35-4	1,1-Dichloroethylene	U	1.23	ug/kg	0.411	1.23
75-09-2	Methylene chloride	U	6.17	ug/kg	2.06	6.17
1634-04-4	tert-Butyl methyl ether	U	1.23	ug/kg	0.411	1.23
156-60-5	trans-1,2-Dichloroethylene	U	1.23	ug/kg	0.411	1.23
75-34-3	1,1-Dichloroethane	U	1.23	ug/kg	0.411	1.23
78-93-3	2-Butanone	U	6.17	ug/kg	2.06	6.17
156-59-2	cis-1,2-Dichloroethylene	U	1.23	ug/kg	0.411	1.23
67-66-3	Chloroform	U	1.23	ug/kg	0.411	1.23
71-55-6	1,1,1-Trichloroethane	U	1.23	ug/kg	0.411	1.23
56-23-5	Carbon tetrachloride	U	1.23	ug/kg	0.411	1.23
107-06-2	1,2-Dichloroethane	J	1.01	ug/kg	0.411	1.23
71-43-2	Benzene	U	1.23	ug/kg	0.411	1.23
79-01-6	Trichloroethylene	U	1.23	ug/kg	0.411	1.23
108-88-3	Toluene	U	1.23	ug/kg	0.411	1.23
127-18-4	Tetrachloroethylene	U	1.23	ug/kg	0.411	1.23
108-90-7	Chlorobenzene	U	1.23	ug/kg	0.411	1.23
100-41-4	Ethylbenzene	U	1.23	ug/kg	0.411	1.23
103-65-1	n-Propylbenzene	U	1.23	ug/kg	0.411	1.23
108-67-8	1,3,5-Trimethylbenzene	U	1.23	ug/kg	0.411	1.23
98-06-6	tert-Butylbenzene	U	1.23	ug/kg	0.411	1.23
95-63-6	1,2,4-Trimethylbenzene	U	1.23	ug/kg	0.411	1.23
135-98-8	sec-Butylbenzene	U	1.23	ug/kg	0.411	1.23
541-73-1	1,3-Dichlorobenzene	U	1.23	ug/kg	0.411	1.23
106-46-7	1,4-Dichlorobenzene	U	1.23	ug/kg	0.411	1.23
104-51-8	n-Butylbenzene	U	1.23	ug/kg	0.411	1.23
123-91-1	1,4-Dioxane	U	61.7	ug/kg	20.6	61.7
1330-20-7	Xylenes (total)	U	3.70	ug/kg	1.23	3.70
95-50-1	1,2-Dichlorobenzene	U	1.23	ug/kg	0.411	1.23

Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 11:10**	**Matrix:**	**S**
Lab Sample ID:	**532114004**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**5.9**
Client Sample:	**Eastern Soil Pile-G3**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-004**	**Method:**	**SW846 8260D**	**SOP Ref:**	**GL-OA-E-038**
Batch ID:	**2085184**	**Inst:**	**VOA6.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 22:26**	**Analyst:**	**JP1**	**Purge Vol:**	**5 mL**
Prep Date:	**01/13/2021 11:10**	**Aliquot:**	**6.55 g**	**Final Volume:**	**5 mL**
Data File:	**012521V6\6R110.D**	**Column:**	**DB-624**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
75-01-4	Vinyl chloride	U	0.811	ug/kg	0.270	0.811
67-64-1	Acetone	BJ	3.05	ug/kg	1.35	4.06
75-35-4	1,1-Dichloroethylene	U	0.811	ug/kg	0.270	0.811
75-09-2	Methylene chloride	U	4.06	ug/kg	1.35	4.06
1634-04-4	tert-Butyl methyl ether	U	0.811	ug/kg	0.270	0.811
156-60-5	trans-1,2-Dichloroethylene	U	0.811	ug/kg	0.270	0.811
75-34-3	1,1-Dichloroethane	U	0.811	ug/kg	0.270	0.811
78-93-3	2-Butanone	U	4.06	ug/kg	1.35	4.06
156-59-2	cis-1,2-Dichloroethylene	U	0.811	ug/kg	0.270	0.811
67-66-3	Chloroform	U	0.811	ug/kg	0.270	0.811
71-55-6	1,1,1-Trichloroethane	U	0.811	ug/kg	0.270	0.811
56-23-5	Carbon tetrachloride	U	0.811	ug/kg	0.270	0.811
107-06-2	1,2-Dichloroethane	J	0.649	ug/kg	0.270	0.811
71-43-2	Benzene	U	0.811	ug/kg	0.270	0.811
79-01-6	Trichloroethylene	U	0.811	ug/kg	0.270	0.811
108-88-3	Toluene	U	0.811	ug/kg	0.270	0.811
127-18-4	Tetrachloroethylene	U	0.811	ug/kg	0.270	0.811
108-90-7	Chlorobenzene	U	0.811	ug/kg	0.270	0.811
100-41-4	Ethylbenzene	U	0.811	ug/kg	0.270	0.811
103-65-1	n-Propylbenzene	U	0.811	ug/kg	0.270	0.811
108-67-8	1,3,5-Trimethylbenzene	U	0.811	ug/kg	0.270	0.811
98-06-6	tert-Butylbenzene	U	0.811	ug/kg	0.270	0.811
95-63-6	1,2,4-Trimethylbenzene	U	0.811	ug/kg	0.270	0.811
135-98-8	sec-Butylbenzene	U	0.811	ug/kg	0.270	0.811
541-73-1	1,3-Dichlorobenzene	U	0.811	ug/kg	0.270	0.811
106-46-7	1,4-Dichlorobenzene	U	0.811	ug/kg	0.270	0.811
104-51-8	n-Butylbenzene	U	0.811	ug/kg	0.270	0.811
123-91-1	1,4-Dioxane	U	40.6	ug/kg	13.5	40.6
1330-20-7	Xylenes (total)	U	2.43	ug/kg	0.811	2.43
95-50-1	1,2-Dichlorobenzene	U	0.811	ug/kg	0.270	0.811

Semi-Volatile Analysis

Case Narrative

GC/MS Semivolatile
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**
Analytical Method: SW846 3541/8270E
Analytical Procedure: GL-OA-E-009 REV# 45
Analytical Batch: 2084507

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 9
Preparation Batch: 2084506

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204738235	Method Blank (MB)
1204738236	Laboratory Control Sample (LCS)
1204738237	532114001(42604-001) Matrix Spike (MS)
1204738238	532114001(42604-001) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Miscellaneous Information

Manual Integrations
Sample (See Below) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

Sample	Analyte	Value
532114001 (42604-001)	Benzo(ghi)perylene	Result 16.4ug/kg
	Indeno(1, 2, 3-cd)pyrene	Result 27.7ug/kg

Certification Statement

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

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Barbara Bailey **Name: Barbara Bailey**

Date: 09 FEB 2021 **Title: Data Validator**

Sample Data Summary

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**532114001**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**8.7**
Client Sample:	**Eastern Soil Pile-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-001**	**Method:**	**SW846 3541/8270E**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**2084507**	**Inst:**	**MSD4.I**	**Dilution:**	**1**
Run Date:	**01/25/2021 18:11**	**Analyst:**	**NM1**	**Inj. Vol:**	**1 uL**
Prep Date:	**01/25/2021 08:15**	**Aliquot:**	**30.03 g**	**Final Volume:**	**1 mL**
Data File:	**s012521.B\s4A2511.D**	**Column:**	**DB-5ms**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
108-95-2	Phenol	U	365	ug/kg	109	365
95-48-7	o-Cresol	U	365	ug/kg	109	365
65794-96-9	m,p-Cresols	U	365	ug/kg	109	365
91-20-3	Naphthalene	U	36.5	ug/kg	10.9	36.5
208-96-8	Acenaphthylene	U	36.5	ug/kg	10.9	36.5
83-32-9	Acenaphthene	U	36.5	ug/kg	10.9	36.5
132-64-9	Dibenzofuran	U	365	ug/kg	109	365
86-73-7	Fluorene	U	36.5	ug/kg	10.9	36.5
118-74-1	Hexachlorobenzene	U	365	ug/kg	109	365
87-86-5	Pentachlorophenol	U	365	ug/kg	109	365
85-01-8	Phenanthrene	U	36.5	ug/kg	10.9	36.5
120-12-7	Anthracene	U	36.5	ug/kg	10.9	36.5
206-44-0	Fluoranthene	J	35.0	ug/kg	10.9	36.5
129-00-0	Pyrene	J	30.3	ug/kg	10.9	36.5
56-55-3	Benzo(a)anthracene	J	21.5	ug/kg	10.9	36.5
218-01-9	Chrysene	J	20.4	ug/kg	10.9	36.5
205-99-2	Benzo(b)fluoranthene	J	31.7	ug/kg	10.9	36.5
207-08-9	Benzo(k)fluoranthene	U	36.5	ug/kg	10.9	36.5
50-32-8	Benzo(a)pyrene	J	25.2	ug/kg	10.9	36.5
193-39-5	Indeno(1,2,3-cd)pyrene	J	27.7	ug/kg	10.9	36.5
53-70-3	Dibenzo(a,h)anthracene	U	36.5	ug/kg	10.9	36.5
191-24-2	Benzo(ghi)perylene	J	16.4	ug/kg	10.9	36.5

LC-MS/MS Analysis

Case Narrative

LCMSMS-Misc
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 10
Analytical Batch: 2082653

Preparation Method: EPA 537.1 Modified
Preparation Procedure: GL-OA-E-076 REV# 10
Preparation Batch: 2082652

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204734177	Method Blank (MB)
1204734178	Laboratory Control Sample (LCS)
1204734179	532125001(42603-001) Matrix Spike (MS)
1204734180	532125001(42603-001) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

Method Blank (MB) Statement
The blank analyzed with this SDG did not meet the established acceptance criteria. There was a confirmed hit of 6:2 FTS in the method blank above the PQL. However, there are no hits in the samples. The blank contamination is attributed to laboratory error and the data is reported as is. 1204734177 (MB).

Certification Statement

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

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

B Analyte found in the blank as well as the sample.
J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature:  **Name: Nik-Cole Elmore**

Date: 28 JAN 2021 **Title: Analyst II**

Sample Data Summary

LC-MS/MS
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**532114001**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**8.7**
Client Sample:	**Eastern Soil Pile-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-001**	**Method:**	**EPA 537.1 Mod, PFAS, Co**	**SOP Ref:**	**GL-OA-E-076**
Batch ID:	**2082653**	**Inst:**	**LCMSMS9**	**Dilution:**	**1**
Run Date:	**01/19/2021 11:20**	**Analyst:**	**MB2**		
Prep Date:	**01/18/2021 08:24**	**Aliquot:**	**2.08 g**	**Final Volume:**	**10 mL**
Data File:	**PFC011421160.wiff**	**Column:**			

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
27619-97-2	1H, 1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	U	1.05	ng/g	0.411	1.05
39108-34-4	1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	U	1.05	ng/g	0.405	1.05
2991-50-6	N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	1.05	ng/g	0.289	1.05
2355-31-9	N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	1.05	ng/g	0.347	1.05
375-73-5	Perfluorobutane sulfonic acid (PFBS)	U	0.526	ng/g	0.174	0.526
375-22-4	Perfluorobutanoic acid (PFBA)	U	0.526	ng/g	0.211	0.526
335-77-3	Perfluorodecane sulfonic acid (PFDS)	U	0.526	ng/g	0.174	0.526
335-76-2	Perfluorodecanoic acid (PFDA)	U	1.05	ng/g	0.390	1.05
307-55-1	Perfluorododecanoic acid (PFDOA)	U	0.526	ng/g	0.174	0.526
375-92-8	Perfluoroheptane sulfonic acid (PFHpS)	U	0.526	ng/g	0.195	0.526
375-85-9	Perfluoroheptanoic acid (PFHpA)	U	0.526	ng/g	0.174	0.526
355-46-4	Perfluorohexane sulfonic acid (PFHxS)	U	0.526	ng/g	0.174	0.526
307-24-4	Perfluorohexanoic acid (PFHxA)	U	0.526	ng/g	0.211	0.526
68259-12-1	Perfluorononane sulfonic acid (PFNS)	U	0.526	ng/g	0.174	0.526
375-95-1	Perfluorononanoic acid (PFNA)	U	0.526	ng/g	0.174	0.526
754-91-6	Perfluorooctane sulfonamide (PFOSAm)	U	0.526	ng/g	0.174	0.526
1763-23-1	Perfluorooctane sulfonic acid (PFOS)	U	0.526	ng/g	0.211	0.526
335-67-1	Perfluorooctanoic acid (PFOA)	U	0.526	ng/g	0.211	0.526
2706-91-4	Perfluoropentane sulfonic acid (PFPeS)	U	0.526	ng/g	0.174	0.526
2706-90-3	Perfluoropentanoic acid (PFPeA)	U	0.526	ng/g	0.174	0.526
376-06-7	Perfluorotetradecanoic acid (PFTDA)	U	0.526	ng/g	0.211	0.526
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	U	0.526	ng/g	0.174	0.526
2058-94-8	Perfluoroundecanoic acid (PFUnDA)	U	0.526	ng/g	0.174	0.526

Pesticide Analysis

Case Narrative

GC Semivolatile Pesticide
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Organochlorine Pesticides and Chlorinated Hydrocarbons**
Analytical Method: SW846 3541/8081B
Analytical Procedure: GL-OA-E-041 REV# 20
Analytical Batch: 2084486

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 9
Preparation Batch: 2084485

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204738200	Method Blank (MB)
1204738201	Laboratory Control Sample (LCS)
1204738202	532114001(42604-001) Matrix Spike (MS)
1204738203	532114001(42604-001) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Calibration Information

Continuing Calibration Verification (CCV) Requirements
Calibration verification standard (ICV or CCV) requirements have not been met for sample 532114001 (42604-001) in this batch in this SDG. The bracketing standard failed with a negative or positive bias for one or more target analytes. The affected samples were re-analyzed. The bracketing standard failed in a similar manner; therefore, the standard failure was attributed to sample matrix interference and the initial bracket was reported.

Quality Control (QC) Information

MS/MSD Relative Percent Difference (RPD) Statement
The RPD values between the matrix QC samples (See Below) were not within the required acceptance limits. As the MS/MSD recovered within the spike acceptance limits, the data results were not adversely impacted.

Analyte	Sample	Value
4, 4'-DDD	1204738202MS and 1204738203MSD (42604-001)	RPD 58* (0%-30%)
4, 4'-DDE	1204738202MS and 1204738203MSD (42604-001)	RPD 64* (0%-30%)
4, 4'-DDT	1204738202MS and 1204738203MSD (42604-001)	RPD 69* (0%-30%)

Aldrin	1204738202MS and 1204738203MSD (42604-001)	RPD 63* (0%-30%)
Dieldrin	1204738202MS and 1204738203MSD (42604-001)	RPD 60* (0%-30%)
Endosulfan I	1204738202MS and 1204738203MSD (42604-001)	RPD 60* (0%-30%)
Endosulfan II	1204738202MS and 1204738203MSD (42604-001)	RPD 61* (0%-30%)
Endosulfan sulfate	1204738202MS and 1204738203MSD (42604-001)	RPD 62* (0%-30%)
Endrin	1204738202MS and 1204738203MSD (42604-001)	RPD 63* (0%-30%)
Heptachlor	1204738202MS and 1204738203MSD (42604-001)	RPD 60* (0%-30%)
alpha-BHC	1204738202MS and 1204738203MSD (42604-001)	RPD 61* (0%-30%)
beta-BHC	1204738202MS and 1204738203MSD (42604-001)	RPD 60* (0%-30%)
cis-Chlordane	1204738202MS and 1204738203MSD (42604-001)	RPD 60* (0%-30%)
delta-BHC	1204738202MS and 1204738203MSD (42604-001)	RPD 63* (0%-30%)
gamma-BHC (Lindane)	1204738202MS and 1204738203MSD (42604-001)	RPD 62* (0%-30%)

Miscellaneous Information

Manual Integrations
Samples 1204738202 (42604-001MS), 1204738203 (42604-001MSD) and 532114001 (42604-001) required manual integration to correctly position the baseline as set in the calibration standard injections.

Certification Statement

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

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Jimin Cao **Name: Jimin Cao**

Date: 10 FEB 2021 **Title: Data Validator**

Sample Data Summary

Pesticide
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**532114001**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**8.7**
Client Sample:	**Eastern Soil Pile-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-001**	**Method:**	**SW846 3541/8081B**	**SOP Ref:**	**GL-OA-E-041**
Batch ID:	**2084486**	**Inst:**	**ECD6A.I**	**Dilution:**	**1**
Run Date:	**01/26/2021 18:00**	**Analyst:**	**LOF**	**Inj. Vol:**	**1 uL**
Prep Date:	**01/25/2021 07:40**	**Aliquot:**	**30.29 g**	**Final Volume:**	**5 mL**
Data File:	**012621b\E6a2644.D**	**Column:**	**1 Description: RTX-CLP**		
	012621b\E6a2644.D		**2 P2**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
319-84-6	alpha-BHC	U	0.723	ug/kg	0.181	0.723	1
58-89-9	gamma-BHC (Lindane)	U	0.723	ug/kg	0.181	0.723	1
76-44-8	Heptachlor	U	0.723	ug/kg	0.181	0.723	1
309-00-2	Aldrin	U	0.723	ug/kg	0.181	0.723	1
319-85-7	beta-BHC	U	0.723	ug/kg	0.181	0.723	1
319-86-8	delta-BHC	U	0.723	ug/kg	0.181	0.723	1
5103-71-9	cis-Chlordane	U	0.723	ug/kg	0.181	0.723	1
72-55-9	4,4'-DDE	J	0.484	ug/kg	0.361	1.45	2
959-98-8	Endosulfan I	U	0.723	ug/kg	0.181	0.723	1
60-57-1	Dieldrin	U	1.45	ug/kg	0.361	1.45	1
72-20-8	Endrin	U	1.45	ug/kg	0.361	1.45	1
33213-65-9	Endosulfan II	U	1.45	ug/kg	0.361	1.45	1
72-54-8	4,4'-DDD	U	1.45	ug/kg	0.361	1.45	1
50-29-3	4,4'-DDT	J	0.497	ug/kg	0.361	1.45	1
1031-07-8	Endosulfan sulfate	U	1.45	ug/kg	0.361	1.45	1

PCB Analysis

Case Narrative

GC Semivolatile PCB
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Analysis of The Analysis of Polychlorinated Biphenyls by GC/ECD by ECD**
Analytical Method: SW846 3541/8082A
Analytical Procedure: GL-OA-E-040 REV# 25
Analytical Batch: 2087219

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 9
Preparation Batch: 2087218

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204743635	Method Blank (MB)
1204743636	Laboratory Control Sample (LCS)
1204743637	532722004(NonSDG) Matrix Spike (MS)
1204743638	532722004(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Technical Information

Preparation/Analytical Method Verification
All samples and QC in this batch were cleaned using alumina in order to remove oil and other high molecular weight interferences. All samples and QC in this batch were cleaned with activated copper in order to remove sulfur. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns.

Miscellaneous Information

Manual integrations
Sample 532114001 (42604-001) required manual integration to correctly position the baseline as set in the calibration standard injections and to properly identify one or more peaks.

Additional Comments
The column 1 has been chosen as the primary column. The data are reported from the column 1 for all samples in this batch.

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Jimin Cao **Name: Jimin Cao**

Date: 11 FEB 2021 **Title: Data Validator**

Sample Data Summary

PCB
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**532114001**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**8.7**
Client Sample:	**Eastern Soil Pile-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-001**	**Method:**	**SW846 3541/8082A**	**SOP Ref:**	**GL-OA-E-040**
Batch ID:	**2087219**	**Inst:**	**ECD9A.I**	**Dilution:**	**1**
Run Date:	**02/02/2021 08:32**	**Analyst:**	**YS1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/01/2021 07:21**	**Aliquot:**	**30.63 g**	**Final Volume:**	**1 mL**
Data File:	**020221.S\E9b0219.D**	**Column:**	**1 RTX-CLPEST 1**		
	020221.S\E9b0219.D		**2 RTX-CLPEST 2**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	3.57	ug/kg	1.19	3.57	1
11104-28-2	Aroclor-1221	U	3.57	ug/kg	1.19	3.57	1
11141-16-5	Aroclor-1232	U	3.57	ug/kg	1.19	3.57	1
53469-21-9	Aroclor-1242	U	3.57	ug/kg	1.19	3.57	1
12672-29-6	Aroclor-1248	U	3.57	ug/kg	1.19	3.57	1
11097-69-1	Aroclor-1254	J	2.10	ug/kg	1.19	3.57	1
11096-82-5	Aroclor-1260	U	3.57	ug/kg	1.19	3.57	1
37324-23-5	Aroclor-1262	U	3.57	ug/kg	1.19	3.57	1
PCBTOT	Aroclor-Total	J	2.10	ug/kg	1.19	3.57	1

Herbicide Analysis

Case Narrative

GC Semivolatile Herbicide
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Analysis of Chlorophenoxy Acid Herbicides by ECD**
Analytical Method: SW846 8151A
Analytical Procedure: GL-OA-E-011 REV# 25
Analytical Batch: 2085635

Preparation Method: SW846 8151A
Preparation Procedure: GL-OA-E-027 REV# 18
Preparation Batch: 2085633

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204740820	Method Blank (MB)
1204740821	Laboratory Control Sample (LCS)
1204740822	532522001(NonSDG) Matrix Spike (MS)
1204740823	532522001(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Calibration Information

Continuing Calibration Verification (CCV) Requirements
The calibration verification standards (CCV) did not meet acceptance criteria. One or more target analytes failed acceptance criteria with a negative bias on one analytical column in the standards bracketing samples and associated QC. The negative bias for the analytical data is a result of instrument response decreasing after the initial calibration. The instrument response never decreased to a point where the target analytes would not be detected. All analytes were within the established retention time windows for this method.

Miscellaneous Information

Manual Integrations
Samples 1204740821 (LCS), 1204740822 (Non SDG 532522001MS), 1204740823 (Non SDG 532522001MSD) and 532114001 (42604-001) required manual integration to correctly position the baseline as set in the calibration standard injections.

Certification Statement

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

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

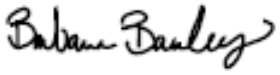
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature:  **Name: Barbara Bailey**

Date: 05 FEB 2021 **Title: Data Validator**

Sample Data Summary

Herbicide
Certificate of Analysis
Sample Summary

SDG Number:	**42604**	**Date Collected:**	**01/13/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**532114001**	**Date Received:**	**01/14/2021 09:55**	**%Moisture:**	**8.7**
Client Sample:	**Eastern Soil Pile-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42604-001**	**Method:**	**SW846 8151A**	**SOP Ref:**	**GL-OA-E-011**
Batch ID:	**2085635**	**Inst:**	**ECD3A.I**	**Dilution:**	**1**
Run Date:	**01/29/2021 13:43**	**Analyst:**	**LOF**	**Inj. Vol:**	**1 uL**
Prep Date:	**01/27/2021 13:35**	**Aliquot:**	**50.1 g**	**Final Volume:**	**10 mL**
Data File:	**012921HERB\E3a2920.D**	**Column:**	**1 CLPesticides**		
	012921HERB\E3a2920.D		**2 CLPesticides**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
93-72-1	2,4,5-TP	U	5.46	ug/kg	1.81	5.46	1

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Determination of Metals by ICP**
Analytical Method: SW846 3050B/6010C
Analytical Procedure: GL-MA-E-013 REV# 32
Analytical Batch: 2081963

Product: **Mercury Analysis Using the Perkin Elmer Automated Mercury Analyzer**
Analytical Method: SW846 7471B
Analytical Procedure: GL-MA-E-010 REV# 38
Analytical Batch: 2083503

Preparation Method: SW846 3050B
Preparation Procedure: GL-MA-E-009 REV# 29
Preparation Batch: 2081958

Preparation Method: SW846 7471B Prep
Preparation Procedure: GL-MA-E-010 REV# 38
Preparation Batch: 2083502

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204732711	Method Blank (MB)**ICP**
1204732712	Laboratory Control Sample (LCS)
1204732715	532125001(42603-001L) Serial Dilution (SD)
1204732713	532125001(42603-001D) Sample Duplicate (DUP)
1204732714	532125001(42603-001S) Matrix Spike (MS)
1204736060	Method Blank (MB)**CVAA**
1204736061	Laboratory Control Sample (LCS)
1204736064	532125001(42603-001L) Serial Dilution (SD)
1204736062	532125001(42603-001D) Sample Duplicate (DUP)
1204736063	532125001(42603-001S) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Calibration Information

CRDL/PQL Requirements

The PQL standard recoveries for SW846 6010C or 6010D met the control limits with the exception of nickel. Client sample concentrations were less than the MDL or greater than two times the PQL; therefore the data were not adversely affected. 532114001 (42604-001)-ICP.

Technical Information

Preparation/Analytical Method Verification
Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Certification Statement

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

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

* The duplicate analysis is not within control limits.
B Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

Review/Validation

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

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

Signature:  **Name: Edmund Frampton**

Date: 29 JAN 2021 **Title: Team Leader**

Sample Data Summary

METALS
−1−
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 42604 **METHOD TYPE:** SW846

SAMPLE ID: 532114001 **CLIENT ID:** 42604−001

CONTRACT: BRKL00701

MATRIX:S **DATE RECEIVED** 14−JAN−21 **LEVEL:** Low **%SOLIDS:** 91.3

CAS No	Analyte	Result	Units	C	Qual	M*	MDL	DF	Inst ID	Analytical Run
7440−38−2	Arsenic	2880	ug/kg	B		P	505	1	AVIO3	012521−1
7440−39−3	Barium	13000	ug/kg			P	101	1	AVIO3	012521−1
7440−41−7	Beryllium	287	ug/kg	B		P	101	1	AVIO3	012521−1
7440−43−9	Cadmium	104	ug/kg	B		P	101	1	AVIO3	012521−1
7440−47−3	Chromium	6400	ug/kg			P	151	1	AVIO3	012521−1
7440−50−8	Copper	4010	ug/kg			P	303	1	AVIO3	012521−1
7439−92−1	Lead	3120	ug/kg			P	333	1	AVIO3	012521−1
7439−96−5	Manganese	77900	ug/kg			P	202	1	AVIO3	012521−1
7439−97−6	Mercury	49.9	ug/kg			AV	7.38	1	HG5	012121S2−3
7440−02−0	Nickel	4450	ug/kg			P	151	1	AVIO3	012621−2
7782−49−2	Selenium	505	ug/kg	U		P	505	1	AVIO3	012621−2
7440−22−4	Silver	101	ug/kg	U		P	101	1	AVIO3	012521−1
7440−66−6	Zinc	10000	ug/kg			P	404	1	AVIO3	012521−1

***Analytical Methods:**

AV **SW846 7471B**

P **SW846 3050B/6010C**

General Chem Analysis

Case Narrative

General Chemistry
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Hexavalent Chromium**
Analytical Method: SW846 7196A
Analytical Procedure: GL-GC-E-044 REV# 22
Analytical Batch: 2081977

Preparation Method: SW846 3060A
Preparation Procedure: GL-GC-E-044 REV# 22
Preparation Batch: 2081969

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204732748	Method Blank (MB)
1204732749	Laboratory Control Sample (LCS)
1204732750	Insoluble Lab Control Sample (ILCS)
1204732752	532125001(42603-001) Sample Duplicate (DUP)
1204732754	532125001(42603-001) Matrix Spike (MS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

* The duplicate analysis is not within control limits.

U The analyte was analyzed for but not detected below the MDL.

Review/Validation

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

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

Signature:  **Name: Aubrey Kingsbury**

Date: 27 JAN 2021 **Title: Data Validator**

Sample Data Summary

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

Certificate of Analysis

Report Date: January 27, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42604-001	Project:	BRKL00701
Sample ID:	532114001	Client ID:	BRKL007
Matrix:	S	COC:	42604
Collect Date:	13-JAN-21 10:55	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	Eastern Soil Pile-C1
Collector:	Client	Vol. Recv.:	
Moisture:	8.66%		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Spectrometric Analysis												
SW846_7196A Hexavalent Chromium "Dry Weight Corrected"												
Hexavalent Chromium	U	0.0153	0.171	0.427	mg/kg	39.0	1	VH1	01/22/21	1110	2081977	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3060A	SW846_7196A Hexavalent Chromium in Soil	RXB5	01/21/21	1319	2081969

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 7196A	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42604
Work Order #: 532114

Product: **Dry Weight**
Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-OA-E-020 REV# 13
Preparation Batch: 2082025

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2082025

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204732853	532125001(42603-001) Sample Duplicate (DUP)

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

Data Summary:

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

Product: **Dry Weight**
Preparation Method: ASTM D 2216 (Modified)
Preparation Procedure: GL-OA-E-020 REV# 13
Preparation Batch: 2082030

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

GEL Sample ID#	Client Sample Identification
532114002	42604-002 Eastern Soil Pile-G1
532114003	42604-003 Eastern Soil Pile-G2
532114004	42604-004 Eastern Soil Pile-G3
1204732859	532125004(42603-004) Sample Duplicate (DUP)

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

Data Summary:

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

Product: **Gammaspec, Gamma, Solid**
Analytical Method: DOE HASL 300, 4.5.2.3/Ga-01-R
Analytical Procedure: GL-RAD-A-013 REV# 27
Analytical Batch: 2082100

Preparation Method: Dry Soil Prep
Preparation Procedure: GL-RAD-A-021 REV# 24
Preparation Batch: 2082025

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

GEL Sample ID#	Client Sample Identification
532114001	42604-001 Eastern Soil Pile-C1
1204733018	Method Blank (MB)
1204733019	532125001(42603-001) Sample Duplicate (DUP)
1204733020	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42604 GEL Work Order: 532114

The Qualifiers in this report are defined as follows:

U Undetected; sample result < MDA

Review/Validation

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

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

Signature:  **Name: Kate Gellatly**

Date: 12 FEB 2021 **Title: Analyst I**

Moisture LogBook

Batch: 2082025
Analyst: CXB7
Date/Time: 14-JAN-2021
Procedure Code DRY WEIGHT___PREPD
Procedure Description Dry Weight-Percent Moisture Dry Soil Prep GL-RAD-A-021
Lab Sop: GL-OA-E-020 GL-RAD-A-021

Sample St	Sample Id	Rpd(%)
DUP	1204732853	**5.674**

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
532114001	SAMPLE		SP-39020004	17:19	13.371	586.49	536.85	573.119	523.479	8.661
532125001	SAMPLE		SP-39020004	17:19	13.412	435.61	395.43	422.198	382.018	9.516
532125002	SAMPLE		SP-39020004	17:19	13.31	493.2	447.65	479.89	434.34	9.491
532125003	SAMPLE		SP-39020004	17:19	13.403	538.69	474.65	525.287	461.247	12.191
532147001	SAMPLE		SP-39020004	17:19	6.78	89.959	72.21	83.179	65.43	21.338
532148001	SAMPLE		SP-39020004	17:19	6.789	71.449	58.86	64.66	52.071	19.469
1204732853	DUP	532125001	SP-39020004	17:19	2.399	29.244	26.54	26.845	24.141	10.072

Comments:

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

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

Moisture LogBook

Batch: 2082030
Analyst: CXB7
Date/Time: 14-JAN-2021
Procedure Code DRY WEIGHT
Procedure Description Dry Weight-Percent Moisture
Lab Sop: GL-OA-E-020

Sample St	Sample Id	Rpd(%)
DUP	1204732859	**2.815**

Sample Id	Sample Type	Original Hsn	Balance	Run Time	Container Wt	Initial Wt	Final Wt (g)	Net Initial Wt (g)	Net Final Wt (g)	Moisture (%)
532044001	SAMPLE		SP-39020004	17:21	2.403	21.712	17.755	19.309	15.352	20.493
532044002	SAMPLE		SP-39020004	17:21	2.383	21.281	17.182	18.898	14.799	21.69
532044003	SAMPLE		SP-39020004	17:21	2.35	28.353	23.698	26.003	21.348	17.901
532044004	SAMPLE		SP-39020004	17:21	2.364	21.752	18.701	19.388	16.337	15.736
532114002	SAMPLE		SP-39020004	17:21	2.382	6.421	6.099	4.039	3.717	7.972
532114003	SAMPLE		SP-39020004	17:21	2.371	4.419	4.134	2.048	1.763	13.916
532114004	SAMPLE		SP-39020004	17:21	2.374	7.621	7.311	5.247	4.937	5.908
532125004	SAMPLE		SP-39020004	17:21	2.377	7.288	6.909	4.911	4.532	7.717
532125005	SAMPLE		SP-39020004	17:21	2.401	8.42	7.862	6.019	5.461	9.27
532125006	SAMPLE		SP-39020004	17:21	2.399	7.558	7.208	5.159	4.809	6.784
532125007	SAMPLE		SP-39020004	17:21	2.369	5.531	5.207	3.162	2.838	10.246
532125008	SAMPLE		SP-39020004	17:21	2.395	8.175	7.73	5.78	5.335	7.698
532125009	SAMPLE		SP-39020004	17:21	2.375	6.978	6.413	4.603	4.038	12.274
532125010	SAMPLE		SP-39020004	17:21	2.385	7.479	7.375	5.094	4.99	2.041
532125011	SAMPLE		SP-39020004	17:21	2.385	8.607	8.012	6.222	5.627	9.562
1204732859	DUP	532125004	SP-39020004	17:21	2.427	5.379	5.154	2.952	2.727	7.621

Comments:

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

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

Sample Data Summary

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42604-001	Project:	BRKL00701
Sample ID:	532114001	Client ID:	BRKL007
Matrix:	S	COC:	42604
Collect Date:	13-JAN-21 10:55	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	Eastern Soil Pile-C1
Collector:	Client	Vol. Recv.:	
Moisture:	8.66%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gamma Spec Analysis													
Gammaspec, Gamma, Solid "Dry Weight Corrected"													
Beryllium-7	U	0.138	+/-0.155	0.327		pCi/g			RXF2	02/05/21	0551	2082100	1
Cesium-137	U	0.00707	+/-0.0181	0.0354	0.100	pCi/g							
Cobalt-57	U	0.00646	+/-0.0117	0.0232		pCi/g							
Cobalt-60	U	-0.00850	+/-0.0202	0.0364		pCi/g							
Manganese-54	U	0.0310	+/-0.0304	0.0347		pCi/g							
Potassium-40		7.82	+/-0.788	0.354		pCi/g							
Radium-226		0.546	+/-0.111	0.0610		pCi/g							
Sodium-22	U	-0.00790	+/-0.0182	0.0330		pCi/g							
Thorium-228		0.889	+/-0.0794	0.0492		pCi/g							

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXB7	01/14/21	1719	2082025

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	DOE HASL 300, 4.5.2.3/Ga-01-R	

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42604-002	Project:	BRKL00701
Sample ID:	532114002	Client ID:	BRKL007
Matrix:	S	COC:	42604
Collect Date:	13-JAN-21 11:00	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	Eastern Soil Pile-G1
Collector:	Client	Vol. Recv.:	
Moisture:	7.97%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42604-003	Project:	BRKL00701
Sample ID:	532114003	Client ID:	BRKL007
Matrix:	S	COC:	42604
Collect Date:	13-JAN-21 11:05	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	Eastern Soil Pile-G2
Collector:	Client	Vol. Recv.:	
Moisture:	13.9%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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

Certificate of Analysis

Report Date: February 12, 2021

Company :	Brookhaven National Laboratory
Address :	Building 462
	Upton, New York 11973--5000
Contact:	Mr. Larry D. Singh
Project:	Hazardous & Radiochemical Analytical Services - Summary

Client Sample ID:	42604-004	Project:	BRKL00701
Sample ID:	532114004	Client ID:	BRKL007
Matrix:	S	COC:	42604
Collect Date:	13-JAN-21 11:10	Samp Recv.:	
Receive Date:	14-JAN-21 09:55	Client Desc.:	Eastern Soil Pile-G3
Collector:	Client	Vol. Recv.:	
Moisture:	5.91%		

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL Laboratories LLC
a member of The GEL Group INC

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

gel.com

February 11, 2021

Mr. Larry D. Singh
Brookhaven National Laboratory
Building 462
Upton, New York 11973-5000

Re: Project - ES MISC
Chain of Custody - 42744
Project Manager -S. FERRONE
Account # - 24472
Release # -533382

SDG: 42744

Dear Mr. Singh:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 27, 2021. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Zachary Worsham for
Edith Kent
Project Manager

Purchase Order: 310464
Chain of Custody: 42744
Enclosures

Table of Contents

Case Narrative

Case Narrative
for
Brookhaven National Laboratory (310464)
SDG: 42744
Work Order: 533382

February 11, 2021

Laboratory Identification:

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

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on January 27, 2021 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
533382001	42744-001
533382002	42744-002

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: GC Semivolatile Herbicide, GC Semivolatile PCB, GC Semivolatile Pesticide and GC/MS Semivolatile.

Zachary Worsham for
Edith Kent
Project Manager

Chain of Custody

533382

Page 1 of 1

BROOKHAVEN NATIONAL LABORATORY

P.O. #

Chain of Custody No. 42744

Requires EDD

SAMPLING CHAIN OF CUSTODY

Analysis Requested By	Sampling Contractor	Analytical Laboratory
Name: S. Ferrone	Name: EPD Field Team	Name: General Engineering Labs
Life No: 22585 Ext. 5531	Contact: R. Lagattolla	Address: 2040 Savage Rd
Acct. No: 24472/24472 Dept: ES	Phone: 631-344-7129	City: Charleston St: SC Zip: 29407
Email Reports To:	Email/Fax: rlagattolla@bnl.gov	Contact: Edie Kent
1 Steve Ferrone	Sampler: R. Mella, R. Lagattolla	Phone: 843-769-7385
2		Email/Fax:
Project Name: ES MISC	Project Manager: S. Ferrone	Field Engineer: R. Lagattolla

Comments: *Additional Soil For COC# 42603*

Type			Sample Information					Additional Sample Information					Analysis Requested									
UID	Smp	Coll	Site ID/Bldg/Life #	Depth/RWP	Date	Time	Matrix	Name/Description	Cont. Vol./Units	Cont. Type	# of Cont.	Preservative	Alpha/Beta	Tritium	Gamma Spectroscopy	~~8260D~~	~~PFAS 537.1~~	~~SVOC 8270E~~	~~PCBs / pesticides, herb.~~	PCBs / pesticides, herb. 8082/8081/8151	Metals 7471B, 6010C, 6020	Hexavalent chromium 3060A/7196A	TAL Metal
001	E	C	B725 Generator-C1	0.0-1.0	1/26/21	1055	S	B725 Generator Composite 1	16oz	G	1	----			Surveillance			X		X			
002	E	C	B725 Generator-C2	0.0-1.0	↓	1040	S	B725 Generator Composite 2	16oz	G	1	----						X		X			

1 Relinquished By/Date/Time	2 Relinquished By/Date/Time	3 Relinquished By/Date/Time
Print R. Mella 1/26/21	Print	Print
Signature 1130	Signature	Signature
1 Received By/Date/Time	2 Received By/Date/Time	3 Received By/Date/Time
Print Tracy 1-27-21	Print	Print
Signature Dwyasia Jadun 9:50	Signature	Signature

Contractor Lab Sample Disposal:
- ☐ Return To Client
- ☒ Disposal by Lab
- ☐ Archive For _____ Months

Data Package: ☐ Full ☒ Summary

Turn-Around Time Required:
- ☐ Rush (1 Day)
- ☐ 14 Days
- ☒ 30 Days
- ☐ 7 Days
- ☐ Other ( )

BNL F 3101F (rev. 6/13)

Distribution WHITE (1) - Stays with Sample YELLOW (2) - Returned to Client with Report PINK (3) - Lab or Other GOLDENROD (4) - Field Copy - (Sampler)

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: BHC	SDG/AR/COC/Work Order: 533902 E-K
Received By: Tye	Date Received: 1-27-21
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 9507 8884 4280-2 (2 of 2)

Suspected Hazard Information	Yes	No	
			*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP:___
4	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: IR3-19 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓		✓	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	✓			If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	✓			
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

9507 8884 4247-1 C

PM (or PMA) review: Initials CD Date 1/27/21 Page 1 of 1

GL-CHL-SR-001 Rev 7

Work Order Containers

Sample ID: 533382001
Client Sample ID: 42744−001
Description: B725 Generator−C1 Soil

Label: 533382001.01 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

27−JAN−21 15:37:41	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
27−JAN−21 17:10:00	Celeste Drayton	Transfered custody to batch 2086192
27−JAN−21 17:10:00	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
27−JAN−21 19:33:33	Celeste Drayton	Changed batch_id from 2086192 to
27−JAN−21 19:33:33	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
28−JAN−21 08:12:22	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
01−FEB−21 06:33:53	Stacey Grant	Transfered custody to batch 2086924
01−FEB−21 06:33:53	Stacey Grant	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
01−FEB−21 12:03:56	Sirena White−Singleton	Changed batch_id from 2086924 to
01−FEB−21 12:03:56	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
01−FEB−21 12:27:07	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
03−FEB−21 07:10:23	Jillian−Dene Murray	Transfered custody to batch 2087907
03−FEB−21 07:10:23	Jillian−Dene Murray	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
03−FEB−21 13:12:16	Jillian−Dene Murray	Changed batch_id from 2087907 to
03−FEB−21 13:12:16	Jillian−Dene Murray	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
03−FEB−21 13:23:38	Michael Kinslow	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
04−FEB−21 06:35:54	Jillian−Dene Murray	Transfered custody to batch 2088501
04−FEB−21 06:35:54	Jillian−Dene Murray	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
04−FEB−21 14:14:37	Jillian−Dene Murray	Changed batch_id from 2088501 to
04−FEB−21 14:14:37	Jillian−Dene Murray	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
04−FEB−21 14:44:23	Michael Kinslow	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
08−FEB−21 06:40:00	Carlethea Bing	Transfered custody to batch 2090156
08−FEB−21 06:40:00	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
08−FEB−21 14:28:44	Carlethea Bing	Changed batch_id from 2090156 to
08−FEB−21 14:28:44	Carlethea Bing	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
08−FEB−21 15:08:33	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 533382001.01.01 **Type: Vial (2 ml)**

02−FEB−21 05:40:12	James Maestas	Transfered custody to batch 2086925
02−FEB−21 05:40:12	James Maestas	Changed sample location from Organic Prep (Solids) to ECD Lab

Work Order Containers

Sample ID: 533382001
Client Sample ID: 42744−001
Description: B725 Generator−C1 Soil

Label: 533382001.01.01 **Type: Vial (2 ml)**

04−FEB−21 00:04:42	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis

Label: 533382001.01.02 **Type: Vial (2 ml)**

03−FEB−21 16:14:11	Lindsey Jensen	Transfered custody to batch 2087911

Label: 533382001.01.03 **Type: Vial (2 ml)**

05−FEB−21 06:27:48	Yiping Shi	Transfered custody to batch 2088505
05−FEB−21 06:27:48	Yiping Shi	Changed sample location from Organic Prep (Solids) to ECD Lab
07−FEB−21 00:00:49	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis

Label: 533382001.01.04 **Type: Vial (2 ml)**

10−FEB−21 12:35:33	Lloyd O Fox	Transfered custody to batch 2090157
10−FEB−21 12:35:33	Lloyd O Fox	Changed sample location from Organic Prep (Solids) to Semivolatiles Lab

Sample ID: 533382002
Client Sample ID: 42744−002
Description: B725 Generator−C2 Soil

Label: 533382002.01 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

27−JAN−21 15:37:41	Thyasia Tatum	Changed sample location from Barcode Generated to Main Cooler Staging− Solids
27−JAN−21 17:10:00	Celeste Drayton	Transfered custody to batch 2086192
27−JAN−21 17:10:00	Celeste Drayton	Changed sample location from Main Cooler Staging− Solids to Radiochemistry Soil Preparation
27−JAN−21 19:33:33	Celeste Drayton	Changed batch_id from 2086192 to
27−JAN−21 19:33:33	Celeste Drayton	Changed sample location from Radiochemistry Soil Preparation to Return Shelf Chemistry Samples
28−JAN−21 08:12:22	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
01−FEB−21 06:33:53	Stacey Grant	Transfered custody to batch 2086924
01−FEB−21 06:33:53	Stacey Grant	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
01−FEB−21 12:03:56	Sirena White−Singleton	Changed batch_id from 2086924 to
01−FEB−21 12:03:56	Sirena White−Singleton	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
01−FEB−21 12:27:07	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
03−FEB−21 07:10:23	Jillian−Dene Murray	Transfered custody to batch 2087907
03−FEB−21 07:10:23	Jillian−Dene Murray	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
03−FEB−21 13:12:16	Jillian−Dene Murray	Changed batch_id from 2087907 to
03−FEB−21 13:12:16	Jillian−Dene Murray	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples

Work Order Containers

Sample ID: 533382002
Client Sample ID: 42744−002
Description: B725 Generator−C2 Soil

Label: 533382002.01 **Type: Glass 500 ml** **Preservative: 4C (no chemical preservation)**

03−FEB−21 13:23:38	Michael Kinslow	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
04−FEB−21 06:35:54	Jillian−Dene Murray	Transfered custody to batch 2088501
04−FEB−21 06:35:54	Jillian−Dene Murray	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
04−FEB−21 14:14:37	Jillian−Dene Murray	Changed batch_id from 2088501 to
04−FEB−21 14:14:37	Jillian−Dene Murray	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
04−FEB−21 14:44:23	Michael Kinslow	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)
08−FEB−21 06:40:00	Carlethea Bing	Transfered custody to batch 2090156
08−FEB−21 06:40:00	Carlethea Bing	Changed sample location from Main Cooler #001 (Solids and Rad) to Organic Prep (Solids)
08−FEB−21 14:28:44	Carlethea Bing	Changed batch_id from 2090156 to
08−FEB−21 14:28:44	Carlethea Bing	Changed sample location from Organic Prep (Solids) to Return Shelf Chemistry Samples
08−FEB−21 15:08:33	Caroline Gause	Changed sample location from Return Shelf Chemistry Samples to Main Cooler #001 (Solids and Rad)

Label: 533382002.01.01 **Type: Vial (2 ml)**

02−FEB−21 05:40:12	James Maestas	Transfered custody to batch 2086925
02−FEB−21 05:40:12	James Maestas	Changed sample location from Organic Prep (Solids) to ECD Lab
04−FEB−21 00:04:42	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis

Label: 533382002.01.02 **Type: Vial (2 ml)**

03−FEB−21 16:14:11	Lindsey Jensen	Transfered custody to batch 2087911

Label: 533382002.01.03 **Type: Vial (2 ml)**

05−FEB−21 06:27:48	Yiping Shi	Transfered custody to batch 2088505
05−FEB−21 06:27:48	Yiping Shi	Changed sample location from Organic Prep (Solids) to ECD Lab
07−FEB−21 00:00:49	WEBDB	Changed sample location from ECD Lab to Consumed By Analysis

Label: 533382002.01.04 **Type: Vial (2 ml)**

10−FEB−21 12:35:33	Lloyd O Fox	Transfered custody to batch 2090157
10−FEB−21 12:35:33	Lloyd O Fox	Changed sample location from Organic Prep (Solids) to Semivolatiles Lab

Data Review Qualifier Definitions

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 (843) 556−8171

Report Date: 11−FEB−21

Project Specific Qualifier Definitions for GEL Client Code: BRKL

Qualifier	Qualifier Definition	Department	Fraction
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.		
J	Value is estimated		
P	Organics−−The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.	Organics	
C	Analyte has been confirmed by GC/MS analysis	Organics	Pesticide
B	The target analyte was detected in the associated blank.	Organics	
E	Concentration of the target analyte exceeds the instrument calibration range	Organics	
A	The TIC is a suspected aldol−condensation product	Organics	Semi−Volatile
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
N	Metals−−The Matrix spike sample recovery is not within specified control limits	Inorganics	
*	A quality control analyte recovery is outside of specified acceptance criteria		
N	Organics−−Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor	Organics	Semi−Volatile
H	Analytical holding time was exceeded		
**	Analyte is a surrogate compound	Organics	
<	Result is less than value reported		
>	Result is greater than value reported		
UI	Gamma Spectroscopy−−Uncertain identification	Radiological	
BD	Results are either below the MDC or tracer recovery is low	Radiological	
h	Preparation or preservation holding time was exceeded		
R	Sample results are rejected		
Z	Paint Filter Test−−Particulates passed through the filter, however no free liquids were observed.	General Chemistry	General Chem
d	5−day BOD−−The 2:1 depletion requirement was not met for this sample	General Chemistry	
B	Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL	Inorganics	Metals
^	RPD of sample and duplicate evaluated using +/−RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.		
D	Results are reported from a diluted aliquot of the sample	Organics	
N/A	RPD or %Recovery limits do not apply.		
ND	Analyte concentration is not detected above the detection limit		
E	%difference of sample and SD is >10%. Sample concentration must meet flagging criteria	Inorganics	Metals
M	M if above MDC and less than LLD	Radiological	
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier		
FA	Failed analysis.	Radiological	Bioassay
E	General Chemistry−−Concentration of the target analyte exceeds the instrument calibration range	General Chemistry	General Chem
JNX	Non Calibrated Compound	Organics	Volatile
UJ	Compound cannot be extracted	Organics	Semi−Volatile

Project Specific Qualifier Definitions for GEL Client Code: BRKL

Qualifier	Qualifier Definition	Department	Fraction
UJ	Gamma Spectroscopy−−Uncertain identification	Radiological	Rad
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.		
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.	Radiological	
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.	Radiological	
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.	Radiological	
FB	Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies	Inorganics	Metals
N1	See case narrative		
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.	Inorganics	
Y	QC Samples were not spiked with this compound	Organics	
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.	General Chemistry	General Chem
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.	Radiological	Rad
**	Analyte is a Tracer compound	Radiological	
B	The target analyte was detected in the associated blank.	General Chemistry	
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor	Organics	Volatile
e	5−day BOD−−Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes	General Chemistry	General Chem
M	REMP Result > MDC/CL and < RDL	Radiological	
J	See case narrative for an explanation		

Data Review Qualifier Definitions

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

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

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

Laboratory Certifications

List of current GEL Certifications as of 11 February 2021

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122021−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−21−19
Utah NELAP	SC000122020−34
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Semi-Volatile Analysis

Case Narrative

GC/MS Semivolatile
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42744
Work Order #: 533382

Product: **Analysis of Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry**
Analytical Method: SW846 3541/8270E
Analytical Procedure: GL-OA-E-009 REV# 45
Analytical Batch: 2087911

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 9
Preparation Batch: 2087907

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

GEL Sample ID#	Client Sample Identification
533382001	42744-001 B725 Generator-C1
533382002	42744-002 B725 Generator-C2
1204745204	Method Blank (MB)
1204745205	Laboratory Control Sample (LCS)
1204745206	533755001(NonSDG) Matrix Spike (MS)
1204745207	533755001(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

Surrogate Recoveries
Samples (See Below) did not meet surrogate recovery acceptance criteria. The samples were analyzed at a dilution. As a result, one or more surrogates were diluted out of the acceptance limits.

Sample	Analyte	Value
1204745206 (Non SDG 533755001MS)	2-Fluorophenol	22* (30%-108%)
1204745207 (Non SDG 533755001MSD)	Phenol-d5	13* (29%-116%)

Spike Recovery Statement
The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and that the samples were analyzed at a dilution. The data were reported.

Sample	Analyte	Value

1204745206 (Non SDG 533755001MS)	Acenaphthene	0* (17%-113%)
	Acenaphthylene	0* (23%-112%)
	Anthracene	0* (21%-113%)
	Benzo(a)anthracene	0* (24%-116%)
	Benzo(a)pyrene	0* (23%-120%)
	Benzo(b)fluoranthene	0* (22%-122%)
	Benzo(ghi)perylene	0* (15%-120%)
	Benzo(k)fluoranthene	0* (22%-130%)
	Chrysene	0* (23%-120%)
	Dibenzo(a, h)anthracene	0* (17%-118%)
	Dibenzofuran	0* (24%-116%)
	Fluoranthene	0* (24%-122%)
	Fluorene	0* (20%-119%)
	Hexachlorobenzene	0* (27%-113%)
	Indeno(1, 2, 3-cd)pyrene	0* (14%-122%)
	Naphthalene	0* (18%-110%)
	Pentachlorophenol	0* (17%-128%)
	Phenanthrene	0* (20%-117%)
	Phenol	0* (18%-119%)
	Pyrene	0* (22%-124%)
	m, p-Cresols	0* (24%-120%)
	o-Cresol	0* (20%-120%)
1204745207 (Non SDG 533755001MSD)	Acenaphthene	0* (17%-113%)
	Acenaphthylene	0* (23%-112%)
	Anthracene	0* (21%-113%)
	Benzo(a)anthracene	0* (24%-116%)
	Benzo(a)pyrene	0* (23%-120%)
	Benzo(b)fluoranthene	0* (22%-122%)
	Benzo(ghi)perylene	0* (15%-120%)
	Benzo(k)fluoranthene	0* (22%-130%)
	Chrysene	0* (23%-120%)
	Dibenzo(a, h)anthracene	0* (17%-118%)
	Dibenzofuran	0* (24%-116%)
	Fluoranthene	0* (24%-122%)
	Fluorene	0* (20%-119%)
	Hexachlorobenzene	0* (27%-113%)
	Indeno(1, 2, 3-cd)pyrene	0* (14%-122%)
	Naphthalene	0* (18%-110%)

	Pentachlorophenol	0* (17%-128%)
	Phenanthrene	0* (20%-117%)
	Phenol	0* (18%-119%)
	Pyrene	0* (22%-124%)
	m, p-Cresols	0* (24%-120%)
	o-Cresol	0* (20%-120%)

Technical Information

Sample Dilutions
Samples 1204745206 (Non SDG 533755001MS), 1204745207 (Non SDG 533755001MSD) and 533382002 (42744-002) were diluted because the extracts were very dark and/or viscous. The data from the dilutions are reported. Samples 1204745206 (Non SDG 533755001MS) and 1204745207 (Non SDG 533755001MSD) were diluted due to extract final volume greater than 1.0 mL.

Miscellaneous Information

Manual Integrations
Samples (See Below) required manual integration in order to properly identify one or more peaks and/or to correctly position the baseline as set in the calibration standard injections.

Sample	Analyte	Value
533382001 (42744-001)	Benzo(ghi)perylene	Result 42.7ug/kg
	Dibenzo(a, h)anthracene	Result 11.6ug/kg
533382002 (42744-002)	Benzo(ghi)perylene	Result 181ug/kg
	Indeno(1, 2, 3-cd)pyrene	Result 176ug/kg

Certification Statement

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

GEL LABORATORIES LLC

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42744 GEL Work Order: 533382

The Qualifiers in this report are defined as follows:

D Results are reported from a diluted aliquot of sample.
J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Barbara Bailey **Name: Barbara Bailey**

Date: 25 FEB 2021 **Title: Data Validator**

Sample Data Summary

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**533382001**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**4.3**
Client Sample:	**B725 Generator-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-001**	**Method:**	**SW846 3541/8270E**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**2087911**	**Inst:**	**MSD8.I**	**Dilution:**	**1**
Run Date:	**02/03/2021 23:00**	**Analyst:**	**LXA1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/03/2021 08:47**	**Aliquot:**	**30.62 g**	**Final Volume:**	**1 mL**
Data File:	**s020321\s8B0319.D**	**Column:**	**Serial Number: AB001**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
108-95-2	Phenol	U	341	ug/kg	102	341
95-48-7	o-Cresol	U	341	ug/kg	102	341
65794-96-9	m,p-Cresols	U	341	ug/kg	102	341
91-20-3	Naphthalene	U	34.1	ug/kg	10.2	34.1
208-96-8	Acenaphthylene	U	34.1	ug/kg	10.2	34.1
83-32-9	Acenaphthene	U	34.1	ug/kg	10.2	34.1
132-64-9	Dibenzofuran	U	341	ug/kg	102	341
86-73-7	Fluorene	U	34.1	ug/kg	10.2	34.1
118-74-1	Hexachlorobenzene	U	341	ug/kg	102	341
87-86-5	Pentachlorophenol	U	341	ug/kg	102	341
85-01-8	Phenanthrene	J	16.4	ug/kg	10.2	34.1
120-12-7	Anthracene	U	34.1	ug/kg	10.2	34.1
206-44-0	Fluoranthene		59.4	ug/kg	10.2	34.1
129-00-0	Pyrene		82.9	ug/kg	10.2	34.1
56-55-3	Benzo(a)anthracene		45.7	ug/kg	10.2	34.1
218-01-9	Chrysene		38.6	ug/kg	10.2	34.1
205-99-2	Benzo(b)fluoranthene		73.0	ug/kg	10.2	34.1
207-08-9	Benzo(k)fluoranthene	J	29.4	ug/kg	10.2	34.1
50-32-8	Benzo(a)pyrene		53.9	ug/kg	10.2	34.1
193-39-5	Indeno(1,2,3-cd)pyrene		37.5	ug/kg	10.2	34.1
53-70-3	Dibenzo(a,h)anthracene	J	11.6	ug/kg	10.2	34.1
191-24-2	Benzo(ghi)perylene		42.7	ug/kg	10.2	34.1

Semi-Volatile
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:40**	**Matrix:**	**S**
Lab Sample ID:	**533382002**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**3.8**
Client Sample:	**B725 Generator-C2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-002**	**Method:**	**SW846 3541/8270E**	**SOP Ref:**	**GL-OA-E-009**
Batch ID:	**2087911**	**Inst:**	**MSD8.I**	**Dilution:**	**5**
Run Date:	**02/03/2021 23:32**	**Analyst:**	**LXA1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/03/2021 08:47**	**Aliquot:**	**30.09 g**	**Final Volume:**	**1 mL**
Data File:	**s020321\s8B0320.D**	**Column:**	**Serial Number: AB001**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ
108-95-2	Phenol	DU	1730	ug/kg	518	1730
95-48-7	o-Cresol	DU	1730	ug/kg	518	1730
65794-96-9	m,p-Cresols	DU	1730	ug/kg	518	1730
91-20-3	Naphthalene	DU	173	ug/kg	51.8	173
208-96-8	Acenaphthylene	DU	173	ug/kg	51.8	173
83-32-9	Acenaphthene	DU	173	ug/kg	51.8	173
132-64-9	Dibenzofuran	DU	1730	ug/kg	518	1730
86-73-7	Fluorene	DU	173	ug/kg	51.8	173
118-74-1	Hexachlorobenzene	DU	1730	ug/kg	518	1730
87-86-5	Pentachlorophenol	DU	1730	ug/kg	518	1730
85-01-8	Phenanthrene	DJ	137	ug/kg	51.8	173
120-12-7	Anthracene	DU	173	ug/kg	51.8	173
206-44-0	Fluoranthene	D	382	ug/kg	51.8	173
129-00-0	Pyrene	D	423	ug/kg	51.8	173
56-55-3	Benzo(a)anthracene	D	244	ug/kg	51.8	173
218-01-9	Chrysene	D	195	ug/kg	51.8	173
205-99-2	Benzo(b)fluoranthene	D	389	ug/kg	51.8	173
207-08-9	Benzo(k)fluoranthene	DJ	145	ug/kg	51.8	173
50-32-8	Benzo(a)pyrene	D	299	ug/kg	51.8	173
193-39-5	Indeno(1,2,3-cd)pyrene	D	176	ug/kg	51.8	173
53-70-3	Dibenzo(a,h)anthracene	DU	173	ug/kg	51.8	173
191-24-2	Benzo(ghi)perylene	D	181	ug/kg	51.8	173

Pesticide Analysis

Case Narrative

GC Semivolatile Pesticide
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42744
Work Order #: 533382

Product: **Organochlorine Pesticides and Chlorinated Hydrocarbons**
Analytical Method: SW846 3541/8081B
Analytical Procedure: GL-OA-E-041 REV# 20
Analytical Batch: 2086925

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 9
Preparation Batch: 2086924

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

GEL Sample ID#	Client Sample Identification
533382001	42744-001 B725 Generator-C1
533382002	42744-002 B725 Generator-C2
1204743191	Method Blank (MB)
1204743192	Laboratory Control Sample (LCS)
1204743193	533298001(42742-001) Matrix Spike (MS)
1204743194	533298001(42742-001) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Quality Control (QC) Information

Surrogate Recoveries
Matrix QC samples (See Below) failed to meet acceptance criteria for surrogate recovery. This non-compliance had no adverse effects on the data as the parent sample of the MS/MSD met surrogate recovery acceptance criteria.

Sample	Analyte	Value
1204743193 (42742-001MS)	4cmx	139* (19%-137%)
	Decachlorobiphenyl	154* (24%-145%)

Matrix Spike (MS/MSD) Recovery Statement
The MS did not meet spike recovery acceptance criteria. This non-compliance had no adverse effects on the data as the parent sample of the MS/MSD was not detected with any of the target analytes and the MSD met spike recovery acceptance criteria.

Sample	Analyte	Value
1204743193 (42742-001MS)	Endrin	173* (30%-150%)
	beta-BHC	148* (18%-143%)

Technical Information

Preparation/Analytical Method Verification
Samples and the associated QC in this batch were cleaned with activated copper in order to remove sulfur.

Sample Dilutions
Samples 1204743193 (42742-001MS), 1204743194 (42742-001MSD), 533382001 (42744-001) and 533382002 (42744-002) were diluted prior to analysis due to dark sample extract.

Florisil
Florisil clean-up was not performed on client and quality control samples in this batch.

Certification Statement

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

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Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42744 GEL Work Order: 533382

The Qualifiers in this report are defined as follows:

D Results are reported from a diluted aliquot of sample.
J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Jimin Cao **Name: Jimin Cao**

Date: 26 FEB 2021 **Title: Data Validator**

Sample Data Summary

Pesticide
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**533382001**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**4.3**
Client Sample:	**B725 Generator-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-001**	**Method:**	**SW846 3541/8081B**	**SOP Ref:**	**GL-OA-E-041**
Batch ID:	**2086925**	**Inst:**	**ECDAA.I**	**Dilution:**	**5**
Run Date:	**02/02/2021 14:20**	**Analyst:**	**LOF**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/01/2021 11:56**	**Aliquot:**	**30.6 g**	**Final Volume:**	**5 mL**
Data File:	**020221\eAb0219.D**	**Column:**	**1 RTX-CLP**		
	020221\eAb0219.D		**2 RTX-CLP**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
319-84-6	alpha-BHC	DU	3.42	ug/kg	0.854	3.42	1
58-89-9	gamma-BHC (Lindane)	DU	3.42	ug/kg	0.854	3.42	1
76-44-8	Heptachlor	DU	3.42	ug/kg	0.854	3.42	1
309-00-2	Aldrin	DU	3.42	ug/kg	0.854	3.42	1
319-85-7	beta-BHC	DU	3.42	ug/kg	0.854	3.42	1
319-86-8	delta-BHC	DU	3.42	ug/kg	0.854	3.42	1
5103-71-9	cis-Chlordane	DU	3.42	ug/kg	0.854	3.42	1
72-55-9	4,4'-DDE	DJ	4.12	ug/kg	1.71	6.83	1
959-98-8	Endosulfan I	DU	3.42	ug/kg	0.854	3.42	1
60-57-1	Dieldrin	DU	6.83	ug/kg	1.71	6.83	1
72-20-8	Endrin	DU	6.83	ug/kg	1.71	6.83	1
33213-65-9	Endosulfan II	DU	6.83	ug/kg	1.71	6.83	1
72-54-8	4,4'-DDD	DU	6.83	ug/kg	1.71	6.83	1
50-29-3	4,4'-DDT	D	7.23	ug/kg	1.71	6.83	1
1031-07-8	Endosulfan sulfate	DU	6.83	ug/kg	1.71	6.83	1

Pesticide
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:40**	**Matrix:**	**S**
Lab Sample ID:	**533382002**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**3.8**
Client Sample:	**B725 Generator-C2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-002**	**Method:**	**SW846 3541/8081B**	**SOP Ref:**	**GL-OA-E-041**
Batch ID:	**2086925**	**Inst:**	**ECDAA.I**	**Dilution:**	**5**
Run Date:	**02/02/2021 14:36**	**Analyst:**	**LOF**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/01/2021 11:56**	**Aliquot:**	**30.5 g**	**Final Volume:**	**5 mL**
Data File:	**020221\eAb0220.D**	**Column:**	**1 RTX-CLP**		
	020221\eAb0220.D		**2 RTX-CLP**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
319-84-6	alpha-BHC	DU	3.41	ug/kg	0.852	3.41	1
58-89-9	gamma-BHC (Lindane)	DU	3.41	ug/kg	0.852	3.41	1
76-44-8	Heptachlor	DU	3.41	ug/kg	0.852	3.41	1
309-00-2	Aldrin	DU	3.41	ug/kg	0.852	3.41	1
319-85-7	beta-BHC	DU	3.41	ug/kg	0.852	3.41	1
319-86-8	delta-BHC	DU	3.41	ug/kg	0.852	3.41	1
5103-71-9	cis-Chlordane	DU	3.41	ug/kg	0.852	3.41	1
72-55-9	4,4'-DDE	DU	6.82	ug/kg	1.70	6.82	1
959-98-8	Endosulfan I	DU	3.41	ug/kg	0.852	3.41	1
60-57-1	Dieldrin	DU	6.82	ug/kg	1.70	6.82	1
72-20-8	Endrin	DU	6.82	ug/kg	1.70	6.82	1
33213-65-9	Endosulfan II	DU	6.82	ug/kg	1.70	6.82	1
72-54-8	4,4'-DDD	DU	6.82	ug/kg	1.70	6.82	1
50-29-3	4,4'-DDT	DU	6.82	ug/kg	1.70	6.82	1
1031-07-8	Endosulfan sulfate	DU	6.82	ug/kg	1.70	6.82	1

PCB Analysis

Case Narrative

GC Semivolatile PCB
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42744
Work Order #: 533382

Product: **Analysis of The Analysis of Polychlorinated Biphenyls by GC/ECD by ECD**
Analytical Method: SW846 3541/8082A
Analytical Procedure: GL-OA-E-040 REV# 25
Analytical Batch: 2088505

Preparation Method: SW846 3541
Preparation Procedure: GL-OA-E-066 REV# 9
Preparation Batch: 2088501

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

GEL Sample ID#	Client Sample Identification
533382001	42744-001 B725 Generator-C1
533382002	42744-002 B725 Generator-C2
1204746043	Method Blank (MB)
1204746044	Laboratory Control Sample (LCS)
1204746045	Laboratory Control Sample Duplicate (LCSD)
1204746046	533566003(NonSDG) Matrix Spike (MS)
1204746047	533566003(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Technical Information

Preparation/Analytical Method Verification
All samples and QC in this batch were cleaned using alumina in order to remove oil and other high molecular weight interferences. All samples and QC in this batch were cleaned with activated copper in order to remove sulfur. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns.

Miscellaneous Information

Manual integrations
Sample 533382001 (42744-001) required manual integration to correctly position the baseline as set in the calibration standard injections and to properly identify one or more peaks.

Additional Comments
The column 1 has been chosen as the primary column. The data are reported from the column 1 for all samples in this batch.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42744 GEL Work Order: 533382

The Qualifiers in this report are defined as follows:

J Estimated value, the analyte concentration fell above the effective MDL and below the effective PQL.
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature: Jimin Cao **Name: Jimin Cao**

Date: 26 FEB 2021 **Title: Data Validator**

Sample Data Summary

PCB
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**533382001**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**4.3**
Client Sample:	**B725 Generator-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-001**	**Method:**	**SW846 3541/8082A**	**SOP Ref:**	**GL-OA-E-040**
Batch ID:	**2088505**	**Inst:**	**ECD9A.I**	**Dilution:**	**1**
Run Date:	**02/08/2021 08:45**	**Analyst:**	**YS1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/04/2021 07:18**	**Aliquot:**	**30.98 g**	**Final Volume:**	**1 mL**
Data File:	**020821.S\E9b0812.D**	**Column:**	**1 RTX-CLPEST 1**		
	020821.S\E9b0812.D		**2 RTX-CLPEST 2**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	3.37	ug/kg	1.12	3.37	1
11104-28-2	Aroclor-1221	U	3.37	ug/kg	1.12	3.37	1
11141-16-5	Aroclor-1232	U	3.37	ug/kg	1.12	3.37	1
53469-21-9	Aroclor-1242	U	3.37	ug/kg	1.12	3.37	1
12672-29-6	Aroclor-1248	U	3.37	ug/kg	1.12	3.37	1
11097-69-1	Aroclor-1254		6.85	ug/kg	1.12	3.37	1
11096-82-5	Aroclor-1260		3.58	ug/kg	1.12	3.37	1
37324-23-5	Aroclor-1262	U	3.37	ug/kg	1.12	3.37	1
PCBTOT	Aroclor-Total		10.4	ug/kg	1.12	3.37	1

PCB
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:40**	**Matrix:**	**S**
Lab Sample ID:	**533382002**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**3.8**
Client Sample:	**B725 Generator-C2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-002**	**Method:**	**SW846 3541/8082A**	**SOP Ref:**	**GL-OA-E-040**
Batch ID:	**2088505**	**Inst:**	**ECD9A.I**	**Dilution:**	**1**
Run Date:	**02/08/2021 09:01**	**Analyst:**	**YS1**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/04/2021 07:18**	**Aliquot:**	**30.44 g**	**Final Volume:**	**1 mL**
Data File:	**020821.S\E9b0813.D**	**Column:**	**1 RTX-CLPEST 1**		
	020821.S\E9b0813.D		**2 RTX-CLPEST 2**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
12674-11-2	Aroclor-1016	U	3.42	ug/kg	1.14	3.42	1
11104-28-2	Aroclor-1221	U	3.42	ug/kg	1.14	3.42	1
11141-16-5	Aroclor-1232	U	3.42	ug/kg	1.14	3.42	1
53469-21-9	Aroclor-1242	U	3.42	ug/kg	1.14	3.42	1
12672-29-6	Aroclor-1248	U	3.42	ug/kg	1.14	3.42	1
11097-69-1	Aroclor-1254		4.38	ug/kg	1.14	3.42	1
11096-82-5	Aroclor-1260		3.92	ug/kg	1.14	3.42	1
37324-23-5	Aroclor-1262	U	3.42	ug/kg	1.14	3.42	1
PCBTOT	Aroclor-Total		8.31	ug/kg	1.14	3.42	1

Herbicide Analysis

Case Narrative

GC Semivolatile Herbicide
Technical Case Narrative
Brookhaven National Laboratory
SDG #: 42744
Work Order #: 533382

Product: **Analysis of Chlorophenoxy Acid Herbicides by ECD**
Analytical Method: SW846 8151A
Analytical Procedure: GL-OA-E-011 REV# 25
Analytical Batch: 2090157

Preparation Method: SW846 8151A
Preparation Procedure: GL-OA-E-027 REV# 18
Preparation Batch: 2090156

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

GEL Sample ID#	Client Sample Identification
533382001	42744-001 B725 Generator-C1
533382002	42744-002 B725 Generator-C2
1204748892	Method Blank (MB)
1204748893	Laboratory Control Sample (LCS)
1204748894	533382001(42744-001) Matrix Spike (MS)
1204748895	533382001(42744-001) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Data Summary:

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

Miscellaneous Information

Manual Integrations
Samples 1204748892 (MB), 1204748893 (LCS), 1204748894 (42744-001MS), 1204748895 (42744-001MSD), 533382001 (42744-001) and 533382002 (42744-002) required manual integration to correctly position the baseline as set in the calibration standard injections.

Certification Statement

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

GEL LABORATORIES LLC

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

Qualifier Definition Report
for

BRKL007 Brookhaven National Laboratory (310464)

Client SDG: 42744 GEL Work Order: 533382

The Qualifiers in this report are defined as follows:

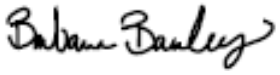
U The analyte was analyzed for but not detected below the MDL.

DL Indicates that sample is diluted.
RA Indicates that sample is re-analyzed without re-extraction.
RE Indicates that sample is re-extracted.

Review/Validation

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

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

Signature:  **Name: Barbara Bailey**

Date: 23 FEB 2021 **Title: Data Validator**

Sample Data Summary

Herbicide
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:55**	**Matrix:**	**S**
Lab Sample ID:	**533382001**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**4.3**
Client Sample:	**B725 Generator-C1**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-001**	**Method:**	**SW846 8151A**	**SOP Ref:**	**GL-OA-E-011**
Batch ID:	**2090157**	**Inst:**	**ECD3A.I**	**Dilution:**	**1**
Run Date:	**02/10/2021 14:39**	**Analyst:**	**LOF**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/08/2021 14:22**	**Aliquot:**	**50.23 g**	**Final Volume:**	**10 mL**
Data File:	**021021HERB\E3b1017.D**	**Column:**	**1 CLPesticides**		
	021021HERB\E3b1017.D		**2 CLPesticides**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
93-72-1	2,4,5-TP	U	5.20	ug/kg	1.73	5.20	1

Herbicide
Certificate of Analysis
Sample Summary

SDG Number:	**42744**	**Date Collected:**	**01/26/2021 10:40**	**Matrix:**	**S**
Lab Sample ID:	**533382002**	**Date Received:**	**01/27/2021 09:50**	**%Moisture:**	**3.8**
Client Sample:	**B725 Generator-C2**	**Client:**	**BRKL007**	**Project:**	**BRKL00701**
Client ID:	**42744-002**	**Method:**	**SW846 8151A**	**SOP Ref:**	**GL-OA-E-011**
Batch ID:	**2090157**	**Inst:**	**ECD3A.I**	**Dilution:**	**1**
Run Date:	**02/10/2021 16:08**	**Analyst:**	**LOF**	**Inj. Vol:**	**1 uL**
Prep Date:	**02/08/2021 14:22**	**Aliquot:**	**50.2 g**	**Final Volume:**	**10 mL**
Data File:	**021021HERB\E3b1020.D**	**Column:**	**1 CLPesticides**		
	021021HERB\E3b1020.D		**2 CLPesticides**		

CAS No.	Parmname	Qualifier	Result	Units	MDL/LOD	PQL/LOQ	Column
93-72-1	2,4,5-TP	U	5.18	ug/kg	1.72	5.18	2

Appendix D
Analytical Data Verification Checklists

Attachment 2

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project :	ES - MISC
Sampling Contractor :	EPD Field Sampling Team
Analytical Laboratory :	General Engineering
Analytical Method and/or Parameter :	EPA 3050B/6020A, EPA 7471A
Sample Delivery Group :	42562
COC No. / Sample IDs :	42562 / BLDG 650 BASEMENT SUMP FLOOR GRAB 1, BLDG 650 BASEMENT SUMP FLOOR GRAB 2, BLDG 650 BASEMENT SUMP FLOOR GRAB 3, BLDG 650 BASEMENT SUMP FLOOR GRAB 4, BLDG 650 BASEMENT SUMP FLOOR COMPOSITE, BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB, BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB
Date Sampled :	1/7/2021

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs :	X			
Detection Limits (CRDL) :	X			
Duplicates :			X	
Matrix Spike (MS/MSD) :	X			
MS/MSD Recoveries :	X			
Trip Blanks :			X	
Field Blanks :			X	
Equipment Blanks :			X	
Method Blanks :	X			
Chain of Custody Forms :	X			
Field Sampling Logs :			X	
Holding Times :	X			
Non-Conformance Summary :			X	
Laboratory Control Standard :			X	
Surrogates :			X	
Other :			X	

Reviewed by : Larry D. Singh
(Subject Matter Expert)

Date : 2/10/2021

Reviewed by : _____
(Project Manager)

Date : _____

Site ID Verification Data

Sample ID	Site ID
42562-001	
42562-001	BLDG 650 BASEMENT SUMP FLOOR GRAB 1
42562-002	BLDG 650 BASEMENT SUMP FLOOR GRAB 2
42562-003	BLDG 650 BASEMENT SUMP FLOOR GRAB 3
42562-004	BLDG 650 BASEMENT SUMP FLOOR GRAB 4
42562-005	
42562-005	
42562-005	
42562-005	
42562-005	
42562-005	
42562-005	BLDG 650 BASEMENT SUMP FLOOR COMPOSITE
42562-006	BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB
42562-007	BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB

Attachment 1

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project	ES - MISC
Sampling Contractor	EPD Field Sampling Team
Analytical Laboratory	General Engineering
Analytical Method	DOE HASL 300, EPA 905.0/DOE RP501, EPA 906.0 Mod
Sample Delivery Group	42562
COC No./Sample IDs	42562 / BLDG 650 BASEMENT SUMP FLOOR GRAB 1, BLDG 650 BASEMENT SUMP FLOOR GRAB 2, BLDG 650 BASEMENT SUMP FLOOR GRAB 3, BLDG 650 BASEMENT SUMP FLOOR GRAB 4, BLDG 650 BASEMENT SUMP FLOOR COMPOSITE, BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB, BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB
Date Sampled	1/7/2021
Parameter(s)	Radionuclides

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs	X			
Detection Limits (CRDL)		X		Contract Required Detection Limit for Radium-226 was not met. Contract Required Detection Limit for Uranium-238 was not met. Contract Required Detection Limit for Radium-226 was not met. Contract Required Detection Limit for Uranium-238 was not met. Lab limits are lower than groundwater standards
Duplicates			X	
Matrix Spike (MS/MSD)			X	
MS/MSD Recoveries			X	
Field Blanks			X	
Equipment Blanks			X	
Method Blanks	X			
Chain-of-Custody Forms	X			
Field Sampling Logs			X	
Holding Times	X			
Nonconformance			X	
Other			X	

Reviewed by : _____
(Project Manager)

Larry D. Singh

Date : _____

02/10/2021

Site ID Verification Data

Sample ID	Site ID
42562-001	
42562-001	BLDG 650 BASEMENT SUMP FLOOR GRAB 1
42562-002	BLDG 650 BASEMENT SUMP FLOOR GRAB 2
42562-003	BLDG 650 BASEMENT SUMP FLOOR GRAB 3
42562-004	BLDG 650 BASEMENT SUMP FLOOR GRAB 4
42562-005	
42562-005	
42562-005	
42562-005	
42562-005	
42562-005	
42562-005	BLDG 650 BASEMENT SUMP FLOOR COMPOSITE
42562-006	BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB
42562-007	BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB

Attachment 2

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project :	ES - MISC
Sampling Contractor :	EPD Field Sampling Team
Analytical Laboratory :	General Engineering
Analytical Method and/or Parameter :	EPA 3050B/6020A, EPA 7471A
Sample Delivery Group :	42563
COC No. / Sample IDs :	42563 / BLDG 650 SANDBLAST PIT SOIL 1-G1, BLDG 650 SANDBLAST PIT SOIL 2-G2, BLDG 650 SANDBLAST PIT SOIL 3-G3, BLDG 650 SANDBLAST PIT SOIL 4-G4, BLDG 650 BASEMENT SUMP FLOOR COMPOSITE, BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB, BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB
Date Sampled :	1/20/2021

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs :	X			
Detection Limits (CRDL) :	X			
Duplicates :			X	
Matrix Spike (MS/MSD) :	X			
MS/MSD Recoveries :	X			
Trip Blanks :			X	
Field Blanks :			X	
Equipment Blanks :			X	
Method Blanks :	X			
Chain of Custody Forms :	X			
Field Sampling Logs :			X	
Holding Times :	X			
Non-Conformance Summary :			X	
Laboratory Control Standard :	X			
Surrogates :			X	
Other :			X	

Reviewed by : Larry D. Singh
(Subject Matter Expert)

Date : 02/23/2021

Reviewed by : _____
(Project Manager)

Date : _____

Site ID Verification Data

Sample ID	Site ID
42563-001	
42563-001	BLDG 650 SANDBLAST PIT SOIL 1-G1
42563-002	BLDG 650 SANDBLAST PIT SOIL 2-G2
42563-003	BLDG 650 SANDBLAST PIT SOIL 3-G3
42563-004	BLDG 650 SANDBLAST PIT SOIL 4-G4
42563-005	
42563-005	
42563-005	BLDG 650 BASEMENT SUMP FLOOR COMPOSITE
42563-005	
42563-005	
42563-005	
42563-006	BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB
42563-007	BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB

Attachment 1

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project	ES - MISC
Sampling Contractor	EPD Field Sampling Team
Analytical Laboratory	General Engineering
Analytical Method	DOE HASL 300, EPA 905.0/DOE RP501, EPA 906.0 Mod
Sample Delivery Group	42563
COC No./Sample IDs	42563 / BLDG 650 SANDBLAST PIT SOIL 1-G1, BLDG 650 SANDBLAST PIT SOIL 2-G2, BLDG 650 SANDBLAST PIT SOIL 3-G3, BLDG 650 SANDBLAST PIT SOIL 4-G4, BLDG 650 BASEMENT SUMP FLOOR COMPOSITE, BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB, BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB
Date Sampled	1/20/2021
Parameter(s)	Radionuclides

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs	X			
Detection Limits (CRDL)		X		Required "U" qualifier missing from U 235/236 in sample BLDG 650 BASEMENT SUMP FLOOR COMPOSITE. "U" qualifier has been applied to data.
Duplicates			X	
Matrix Spike (MS/MSD)			X	
MS/MSD Recoveries			X	
Field Blanks			X	
Equipment Blanks			X	
Method Blanks	X			
Chain-of-Custody Forms	X			
Field Sampling Logs			X	
Holding Times	X			
Nonconformance			X	
Other			X	

Reviewed by : _____
(Project Manager)

Larry D. Singh

Date : _____

02/23/2021

Site ID Verification Data

Sample ID	Site ID
42563-001	
42563-001	BLDG 650 SANDBLAST PIT SOIL 1-G1
42563-002	BLDG 650 SANDBLAST PIT SOIL 2-G2
42563-003	BLDG 650 SANDBLAST PIT SOIL 3-G3
42563-004	BLDG 650 SANDBLAST PIT SOIL 4-G4
42563-005	
42563-005	
42563-005	BLDG 650 BASEMENT SUMP FLOOR COMPOSITE
42563-005	
42563-005	
42563-005	
42563-006	BLDG 650 BASEMENT SUMP FLOOR WEST WALL GRAB
42563-007	BLDG 650 BASEMENT SUMP FLOOR EAST WALL GRAB

Detection Limit Verification Data

Sample ID	Compound	Site ID	Value	Det. Limit	Error	Units	Lab Qual	New Qual
42563-005	U 235/236	BLDG 650 BASEMENT SUMP FLOOR COMPOSITE	0.2860	0.2860	0.3760	PCI/G		U

Attachment 2

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project :	ES - MISC
Sampling Contractor :	EPD Field Sampling Team
Analytical Laboratory :	General Engineering
Analytical Method and/or Parameter :	EPA 3050B/6020A, EPA 7471A
Sample Delivery Group :	42564
COC No. / Sample IDs :	42564 / BLDG 650 BASEMENT FLOOR GRAB 1, BLDG 650 BASEMENT FLOOR GRAB 2, BLDG 650 BASEMENT FLOOR GRAB 3, BLDG 650 BASEMENT FLOOR GRAB 4, BLDG 650 BASEMENT FLOOR GRAB 5, BLDG 650 BASEMENT FLOOR GRAB 6, BLDG 650 BASEMENT FLOOR GRAB 7, BLDG 650 BASEMENT FLOOR GRAB 8, BLDG 650 BASEMENT FLOOR GRAB 9, BLDG 650 BASEMENT FLOOR GRAB 10, BLDG 650 BASEMENT FLOOR GRAB 11, BLDG 650 BASEMENT FLOOR GRAB 12, BLDG 650 BASEMENT FLOOR GRAB 13, BLDG 650 BASEMENT FLOOR GRAB 14, BLDG 650 BASEMENT FLOOR GRAB 15, BLDG 650 BASEMENT FLOOR GRAB 16, BLDG 650 BASEMENT FLOOR COMPOSITE 1 (1-5), BLDG 650 BASEMENT FLOOR COMPOSITE 2 (6-10), BLDG 650 BASEMENT FLOOR COMPOSITE 3 (11-16), BLDG 650 BASEMENT NORTH WALL #1, BLDG 650 BASEMENT EAST WALL #2, BLDG 650 BASEMENT SOUTH WALL #3, BLDG 650 BASEMENT WEST WALL #4
Date Sampled :	12/28/2020

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs :	X			
Detection Limits (CRDL) :	X			
Duplicates :			X	
Matrix Spike (MS/MSD) :			X	
MS/MSD Recoveries :			X	
Trip Blanks :			X	
Field Blanks :			X	
Equipment Blanks :			X	
Method Blanks :	X			
Chain of Custody Forms :	X			
Field Sampling Logs :			X	
Holding Times :	X			
Non-Conformance Summary :			X	
Laboratory Control Standard :	X			
Surrogates :			X	
Other :			X	

Reviewed by : Larry D. Singh
(Subject Matter Expert)

Date : 01/30/2021

Reviewed by : _____
(Project Manager)

Date : _____

EI.90.QR.21

Site ID Verification Data

Sample ID	Site ID
42564-001	BLDG 650 BASEMENT FLOOR GRAB 1
42564-002	BLDG 650 BASEMENT FLOOR GRAB 2
42564-003	BLDG 650 BASEMENT FLOOR GRAB 3
42564-004	BLDG 650 BASEMENT FLOOR GRAB 4
42564-005	BLDG 650 BASEMENT FLOOR GRAB 5
42564-006	BLDG 650 BASEMENT FLOOR GRAB 6
42564-007	BLDG 650 BASEMENT FLOOR GRAB 7
42564-008	BLDG 650 BASEMENT FLOOR GRAB 8
42564-009	BLDG 650 BASEMENT FLOOR GRAB 9
42564-010	BLDG 650 BASEMENT FLOOR GRAB 10
42564-010	
42564-011	BLDG 650 BASEMENT FLOOR GRAB 11
42564-012	BLDG 650 BASEMENT FLOOR GRAB 12
42564-013	BLDG 650 BASEMENT FLOOR GRAB 13
42564-014	BLDG 650 BASEMENT FLOOR GRAB 14
42564-015	BLDG 650 BASEMENT FLOOR GRAB 15
42564-016	BLDG 650 BASEMENT FLOOR GRAB 16
42564-017	BLDG 650 BASEMENT FLOOR COMPOSITE 1 (1-5)
42564-018	BLDG 650 BASEMENT FLOOR COMPOSITE 2 (6-10)
42564-019	BLDG 650 BASEMENT FLOOR COMPOSITE 3 (11-16)
42564-020	BLDG 650 BASEMENT NORTH WALL #1
42564-021	BLDG 650 BASEMENT EAST WALL #2
42564-022	BLDG 650 BASEMENT SOUTH WALL #3

42564-023	BLDG 650 BASEMENT WEST WALL #4

Attachment 1

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project	ES - MISC
Sampling Contractor	EPD Field Sampling Team
Analytical Laboratory	General Engineering
Analytical Method	DOE HASL 300, EPA 905.0/DOE RP501, EPA 906.0 Mod
Sample Delivery Group	42564
COC No./Sample IDs	42564 / BLDG 650 BASEMENT FLOOR GRAB 1, BLDG 650 BASEMENT FLOOR GRAB 2, BLDG 650 BASEMENT FLOOR GRAB 3, BLDG 650 BASEMENT FLOOR GRAB 4, BLDG 650 BASEMENT FLOOR GRAB 5, BLDG 650 BASEMENT FLOOR GRAB 6, BLDG 650 BASEMENT FLOOR GRAB 7, BLDG 650 BASEMENT FLOOR GRAB 8, BLDG 650 BASEMENT FLOOR GRAB 9, BLDG 650 BASEMENT FLOOR GRAB 10, BLDG 650 BASEMENT FLOOR GRAB 11, BLDG 650 BASEMENT FLOOR GRAB 12, BLDG 650 BASEMENT FLOOR GRAB 13, BLDG 650 BASEMENT FLOOR GRAB 14, BLDG 650 BASEMENT FLOOR GRAB 15, BLDG 650 BASEMENT FLOOR GRAB 16, BLDG 650 BASEMENT FLOOR COMPOSITE 1 (1-5), BLDG 650 BASEMENT FLOOR COMPOSITE 2 (6-10), BLDG 650 BASEMENT FLOOR COMPOSITE 3 (11-16), BLDG 650 BASEMENT NORTH WALL #1, BLDG 650 BASEMENT EAST WALL #2, BLDG 650 BASEMENT SOUTH WALL #3, BLDG 650 BASEMENT WEST WALL #4
Date Sampled	12/28/2020
Parameter(s)	Radionuclides

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs	X			
Detection Limits (CRDL)		X		Contract Required Detection Limit for Plutonium-239/240 was not met. Contract Required Detection Limit for Uranium-238 was not met. Contract Required Detection Limit for Uranium-238 was not met. Contract Required Detection Limit for Uranium-238 was not met. Contract Required Detection Limit for Plutonium-239/240 was not met. Contract Required Detection Limit for Uranium-238 was not met. Contract Required Detection Limit for Plutonium-239/240 was not met. Lab limits are lower than standard limits
Duplicates			X	
Matrix Spike (MS/MSD)			X	
MS/MSD Recoveries			X	
Field Blanks			X	
Equipment Blanks			X	
Method Blanks	X			
Chain-of-Custody Forms	X			
Field Sampling Logs			X	
Holding Times	X			
Nonconformance			X	
Other			X	

Reviewed by : _____ Date : _____
(Project Manager)

Larry D. Singh 01/30/2021

Site ID Verification Data

Sample ID	Site ID
42564-001	BLDG 650 BASEMENT FLOOR GRAB 1
42564-002	BLDG 650 BASEMENT FLOOR GRAB 2
42564-003	BLDG 650 BASEMENT FLOOR GRAB 3
42564-004	BLDG 650 BASEMENT FLOOR GRAB 4
42564-005	BLDG 650 BASEMENT FLOOR GRAB 5
42564-006	BLDG 650 BASEMENT FLOOR GRAB 6
42564-007	BLDG 650 BASEMENT FLOOR GRAB 7
42564-008	BLDG 650 BASEMENT FLOOR GRAB 8
42564-009	BLDG 650 BASEMENT FLOOR GRAB 9
42564-010	BLDG 650 BASEMENT FLOOR GRAB 10
42564-010	
42564-011	BLDG 650 BASEMENT FLOOR GRAB 11
42564-012	BLDG 650 BASEMENT FLOOR GRAB 12
42564-013	BLDG 650 BASEMENT FLOOR GRAB 13
42564-014	BLDG 650 BASEMENT FLOOR GRAB 14
42564-015	BLDG 650 BASEMENT FLOOR GRAB 15
42564-016	BLDG 650 BASEMENT FLOOR GRAB 16
42564-017	BLDG 650 BASEMENT FLOOR COMPOSITE 1 (1-5)
42564-018	BLDG 650 BASEMENT FLOOR COMPOSITE 2 (6-10)
42564-019	BLDG 650 BASEMENT FLOOR COMPOSITE 3 (11-16)
42564-020	BLDG 650 BASEMENT NORTH WALL #1
42564-021	BLDG 650 BASEMENT EAST WALL #2
42564-022	BLDG 650 BASEMENT SOUTH WALL #3

42564-023	BLDG 650 BASEMENT WEST WALL #4

Attachment 2

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project :	ES - MISC
Sampling Contractor :	EPD Field Sampling Team
Analytical Laboratory :	General Engineering
Analytical Method and/or Parameter :	EPA 3050B/6020A, EPA 7471A
Sample Delivery Group :	42605
COC No. / Sample IDs :	42605 / BLDG 650 SANDBLAST PIT SOIL 1-G1, BLDG 650 SANDBLAST PIT SOIL 1-G2, BLDG 650 SANDBLAST PIT SOIL 1-G3, BLDG 650 SANDBLAST PIT SOIL 1-G4, BLDG 650 SANDBLAST PIT SOIL 1-C1, BLDG 650 SANDBLAST PIT SOIL 2-G1, BLDG 650 SANDBLAST PIT SOIL 2-G2, BLDG 650 SANDBLAST PIT SOIL 2-G3, BLDG 650 SANDBLAST PIT SOIL 2-G4, BLDG 650 SANDBLAST PIT SOIL 2-C2, BD-1
Date Sampled :	12/9/2020

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs :	X			
Detection Limits (CRDL) :	X			
Duplicates :	X			
Matrix Spike (MS/MSD) :	X			
MS/MSD Recoveries :	X			
Trip Blanks :			X	
Field Blanks :			X	
Equipment Blanks :			X	
Method Blanks :	X			
Chain of Custody Forms :	X			
Field Sampling Logs :			X	
Holding Times :	X			
Non-Conformance Summary :			X	
Laboratory Control Standard :	X			
Surrogates :			X	
Other :			X	

Reviewed by : Larry D. Singh
(Subject Matter Expert)

Date : 01/30/2021

Reviewed by : _____
(Project Manager)

Date : _____

Site ID Verification Data

Sample ID	Site ID
42605-001	BLDG 650 SANDBLAST PIT SOIL 1-G1
42605-001	
42605-002	BLDG 650 SANDBLAST PIT SOIL 1-G2
42605-003	BLDG 650 SANDBLAST PIT SOIL 1-G3
42605-004	BLDG 650 SANDBLAST PIT SOIL 1-G4
42605-005	BLDG 650 SANDBLAST PIT SOIL 1-C1
42605-005	
42605-005	
42605-005	
42605-005	
42605-005	
42605-005	
42605-005	

42605-005	
42605-005	
42605-005	
42605-006	BLDG 650 SANDBLAST PIT SOIL 2-G1
42605-007	BLDG 650 SANDBLAST PIT SOIL 2-G2
42605-008	BLDG 650 SANDBLAST PIT SOIL 2-G3
42605-009	
42605-009	
42605-009	
42605-009	
42605-009	
42605-009	BLDG 650 SANDBLAST PIT SOIL 2-G4
42605-009	
42605-009	
42605-009	
42605-009	
42605-009	
42605-010	BLDG 650 SANDBLAST PIT SOIL 2-C2
42605-011	BD-1

Attachment 1

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project	ES - MISC
Sampling Contractor	EPD Field Sampling Team
Analytical Laboratory	General Engineering
Analytical Method	DOE HASL 300, EPA 905.0/DOE RP501, EPA 906.0 Mod
Sample Delivery Group	42605
COC No./Sample IDs	42605 / BLDG 650 SANDBLAST PIT SOIL 1-G1, BLDG 650 SANDBLAST PIT SOIL 1-G2, BLDG 650 SANDBLAST PIT SOIL 1-G3, BLDG 650 SANDBLAST PIT SOIL 1-G4, BLDG 650 SANDBLAST PIT SOIL 1-C1, BLDG 650 SANDBLAST PIT SOIL 2-G1, BLDG 650 SANDBLAST PIT SOIL 2-G2, BLDG 650 SANDBLAST PIT SOIL 2-G3, BLDG 650 SANDBLAST PIT SOIL 2-G4, BLDG 650 SANDBLAST PIT SOIL 2-C2, BD-1
Date Sampled	12/9/2020
Parameter(s)	Radionuclides

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs	X			
Detection Limits (CRDL)	X			
Duplicates	X			
Matrix Spike (MS/MSD)	X			
MS/MSD Recoveries	X			
Field Blanks			X	
Equipment Blanks			X	
Method Blanks	X			
Chain-of-Custody Forms	X			
Field Sampling Logs			X	
Holding Times	X			
Nonconformance			X	
Other			X	

Reviewed by : _____
(Project Manager)

Larry D. Singh

Date : _____

01/30/2021

Site ID Verification Data

Sample ID	Site ID
42605-001	BLDG 650 SANDBLAST PIT SOIL 1-G1
42605-001	
42605-002	BLDG 650 SANDBLAST PIT SOIL 1-G2
42605-003	BLDG 650 SANDBLAST PIT SOIL 1-G3
42605-004	BLDG 650 SANDBLAST PIT SOIL 1-G4
42605-005	BLDG 650 SANDBLAST PIT SOIL 1-C1
42605-005	
42605-005	
42605-005	
42605-005	
42605-005	
42605-005	
42605-005	

42605-005	
42605-005	
42605-005	
42605-006	BLDG 650 SANDBLAST PIT SOIL 2-G1
42605-007	BLDG 650 SANDBLAST PIT SOIL 2-G2
42605-008	BLDG 650 SANDBLAST PIT SOIL 2-G3
42605-009	
42605-009	
42605-009	
42605-009	
42605-009	
42605-009	BLDG 650 SANDBLAST PIT SOIL 2-G4
42605-009	
42605-009	
42605-009	
42605-009	
42605-009	
42605-010	BLDG 650 SANDBLAST PIT SOIL 2-C2
42605-011	BD-1

Attachment 2

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project :	ES - MISC
Sampling Contractor :	EPD Field Sampling Team
Analytical Laboratory :	General Engineering
Analytical Method and/or Parameter :	EPA 3050B/6020A, EPA 7471A
Sample Delivery Group :	42606A
COC No. / Sample IDs :	42606 / BLDG 650 BASEMENT SUMP SOIL - G1, BLDG 650 BASEMENT SUMP SOIL - G2, BLDG 650 BASEMENT SUMP SOIL - G3, BLDG 650 BASEMENT SUMP SOIL - G4, BLDG 650 BASEMENT SUMP SOIL COMPOSITE, BD-1
Date Sampled :	12/4/2020

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs :	X			
Detection Limits (CRDL) :	X			
Duplicates :			X	
Matrix Spike (MS/MSD) :	X			
MS/MSD Recoveries :	X			
Trip Blanks :			X	
Field Blanks :			X	
Equipment Blanks :			X	
Method Blanks :	X			
Chain of Custody Forms :	X			
Field Sampling Logs :			X	
Holding Times :	X			
Non-Conformance Summary :			X	
Laboratory Control Standard :	X			
Surrogates :			X	
Other :			X	

Reviewed by : Larry D. Singh
(Subject Matter Expert)

Date : 01/30/2021

Reviewed by : _____
(Project Manager)

Date : _____

Site ID Verification Data

Sample ID	Site ID
42606-001	BLDG 650 BASEMENT SUMP SOIL - G1
42606-001	
42606-002	BLDG 650 BASEMENT SUMP SOIL - G2
42606-003	BLDG 650 BASEMENT SUMP SOIL - G3
42606-004	BLDG 650 BASEMENT SUMP SOIL - G4
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	BLDG 650 BASEMENT SUMP SOIL COMPOSITE
42606-006	BD-1

Attachment 1

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project	ES - MISC
Sampling Contractor	EPD Field Sampling Team
Analytical Laboratory	General Engineering
Analytical Method	DOE HASL 300, EPA 905.0/DOE RP501, EPA 906.0 Mod
Sample Delivery Group	42606A
COC No./Sample IDs	42606 / BLDG 650 BASEMENT SUMP SOIL - G1, BLDG 650 BASEMENT SUMP SOIL - G2, BLDG 650 BASEMENT SUMP SOIL - G3, BLDG 650 BASEMENT SUMP SOIL - G4, BLDG 650 BASEMENT SUMP SOIL COMPOSITE, BD-1
Date Sampled	12/4/2020
Parameter(s)	Radionuclides

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs	X			
Detection Limits (CRDL)	X			
Duplicates	X			
Matrix Spike (MS/MSD)	X			
MS/MSD Recoveries	X			
Field Blanks			X	
Equipment Blanks			X	
Method Blanks	X			
Chain-of-Custody Forms	X			
Field Sampling Logs			X	
Holding Times	X			
Nonconformance			X	
Other			X	

Reviewed by : _____ Date : _____
(Project Manager)

Larry D. Singh 01/30/2021

Site ID Verification Data

Sample ID	Site ID
42606-001	BLDG 650 BASEMENT SUMP SOIL - G1
42606-001	
42606-002	BLDG 650 BASEMENT SUMP SOIL - G2
42606-003	BLDG 650 BASEMENT SUMP SOIL - G3
42606-004	BLDG 650 BASEMENT SUMP SOIL - G4
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	
42606-005	BLDG 650 BASEMENT SUMP SOIL COMPOSITE
42606-006	BD-1

Attachment 2

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project :	ES - MISC
Sampling Contractor :	EPD Field Sampling Team
Analytical Laboratory :	General Engineering
Analytical Method and/or Parameter :	EPA 245.1/245.2, EPA 3005A/6020A, EPA 3050B/6020A, EPA 7471A
Sample Delivery Group :	43106
COC No. / Sample IDs :	43106 / BLDG 650 SOIL 1, BLDG 650 SOIL 2, BLDG 650 SOIL 3, BLDG 650 SOIL 4, BLDG 650 SOIL 5, BLDG 650 SOIL 6, BLDG 650 SOIL 7, BLDG 650 SOIL 8, BLDG 650 SOIL 9, BLDG 650 SOIL 10, BLDG 650 SOIL 11, BLDG 650 SOIL 12, BLDG 650 SOIL 13, BLDG 650 SOIL 14, BLDG 650 SOIL 15, BLDG 650 SOIL 16, BLDG 650 SOIL 17, BLDG 650 SOIL 18, BLDG 650 SOIL 19, BLDG 650 SOIL 20, BD-1, EB-1
Date Sampled :	7/1/2021

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs :	X			
Detection Limits (CRDL) :	X			
Duplicates :	X			
Matrix Spike (MS/MSD) :	X			
MS/MSD Recoveries :	X			
Trip Blanks :			X	
Field Blanks :			X	
Equipment Blanks :	X			
Method Blanks :	X			
Chain of Custody Forms :	X			
Field Sampling Logs :			X	
Holding Times :	X			
Non-Conformance Summary :			X	
Laboratory Control Standard :	X			
Surrogates :			X	
Other :			X	

Reviewed by : Larry D. Singh
(Subject Matter Expert)

Date : 08/10/2021

Reviewed by : _____
(Project Manager)

Date : _____

Site ID Verification Data

Sample ID	Site ID
43106-001	
43106-001	
43106-001	
43106-001	
43106-001	
43106-001	
43106-001	

43106-001	
43106-001	
43106-001	
43106-001	BLDG 650 SOIL 1
43106-002	BLDG 650 SOIL 2
43106-003	BLDG 650 SOIL 3
43106-004	BLDG 650 SOIL 4
43106-005	BLDG 650 SOIL 5
43106-006	BLDG 650 SOIL 6
43106-007	BLDG 650 SOIL 7
43106-008	BLDG 650 SOIL 8
43106-009	BLDG 650 SOIL 9
43106-010	BLDG 650 SOIL 10
43106-011	
43106-011	BLDG 650 SOIL 11
43106-011	
43106-012	BLDG 650 SOIL 12
43106-013	BLDG 650 SOIL 13
43106-014	BLDG 650 SOIL 14
43106-015	
43106-015	
43106-015	
43106-015	BLDG 650 SOIL 15
43106-016	
43106-016	
43106-016	
43106-016	
43106-016	
43106-016	BLDG 650 SOIL 16
43106-017	BLDG 650 SOIL 17
43106-018	BLDG 650 SOIL 18
43106-019	BLDG 650 SOIL 19
43106-019	
43106-019	
43106-019	
43106-019	
43106-020	BLDG 650 SOIL 20
43106-021	BD-1
43106-022	EB-1

Attachment 1

Brookhaven National Laboratory

Analytical Data Package Verification Checklist

Project	ES - MISC
Sampling Contractor	EPD Field Sampling Team
Analytical Laboratory	General Engineering
Analytical Method	DOE HASL 300, EPA 905.0/DOE RP501, EPA 906.0 Mod
Sample Delivery Group	43106
COC No./Sample IDs	43106 / BLDG 650 SOIL 1, BLDG 650 SOIL 2, BLDG 650 SOIL 3, BLDG 650 SOIL 4, BLDG 650 SOIL 5, BLDG 650 SOIL 6, BLDG 650 SOIL 7, BLDG 650 SOIL 8, BLDG 650 SOIL 9, BLDG 650 SOIL 10, BLDG 650 SOIL 11, BLDG 650 SOIL 12, BLDG 650 SOIL 13, BLDG 650 SOIL 14, BLDG 650 SOIL 15, BLDG 650 SOIL 16, BLDG 650 SOIL 17, BLDG 650 SOIL 18, BLDG 650 SOIL 19, BLDG 650 SOIL 20, BD-1, EB-1
Date Sampled	7/1/2021
Parameter(s)	Radionuclides

	Satisfactory	Unsatisfactory	NA	Comments
Sample IDs	X			
Detection Limits (CRDL)		X		Required "U" qualifier missing from Uranium-238 in sample BLDG 650 SOIL 13. "U" qualifier has been applied to data.
Duplicates	X			
Matrix Spike (MS/MSD)	X			
MS/MSD Recoveries	X			
Field Blanks			X	
Equipment Blanks			X	
Method Blanks	X			
Chain-of-Custody Forms	X			
Field Sampling Logs			X	
Holding Times	X			
Nonconformance			X	
Other			X	

Reviewed by : _____ Date : _____
(Project Manager)

Larry D. Singh 08/10/2021

Site ID Verification Data

Sample ID	Site ID
43106-001	
43106-001	
43106-001	
43106-001	
43106-001	
43106-001	
43106-001	

43106-001	
43106-001	
43106-001	
43106-001	BLDG 650 SOIL 1
43106-002	BLDG 650 SOIL 2
43106-003	BLDG 650 SOIL 3
43106-004	BLDG 650 SOIL 4
43106-005	BLDG 650 SOIL 5
43106-006	BLDG 650 SOIL 6
43106-007	BLDG 650 SOIL 7
43106-008	BLDG 650 SOIL 8
43106-009	BLDG 650 SOIL 9
43106-010	BLDG 650 SOIL 10
43106-011	
43106-011	BLDG 650 SOIL 11
43106-011	
43106-012	BLDG 650 SOIL 12
43106-013	BLDG 650 SOIL 13
43106-014	BLDG 650 SOIL 14
43106-015	
43106-015	
43106-015	
43106-015	BLDG 650 SOIL 15
43106-016	
43106-016	
43106-016	
43106-016	
43106-016	
43106-016	BLDG 650 SOIL 16
43106-017	BLDG 650 SOIL 17
43106-018	BLDG 650 SOIL 18
43106-019	BLDG 650 SOIL 19
43106-019	
43106-019	
43106-019	
43106-019	
43106-020	BLDG 650 SOIL 20
43106-021	BD-1
43106-022	EB-1

Detection Limit Verification Data

Sample ID	Compound	Site ID	Value	Det. Limit	Error	Units	Lab Qual	New Qual
43106-013	Uranium-238	BLDG 650 SOIL 13	0.5540	0.5540	0.4560	PCI/G	J	UJ