DEMOLITION COMPLETION REPORT

Brookhaven Medical Research Reactor Stack

Brookhaven National Laboratory
Upton, New York

January 20, 2023

Prepared for:

BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN SCIENCE ASSOCIATES
Under Contract No. DE-SC00-12704 with the
UNITED STATES DEPARTMENT OF ENERGY

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ACRONYM LIST

ACGIH	American Conference of Governmental Industrial Hygienists
BNL	Brookhaven National Laboratory
BMRR	Brookhaven Medical Research Reactor
CAC	Community Advisory Council
CAMP	Community Air Monitoring Plan
DOT	Department of Transportation
EPD	Environmental Protection Division
F&O	Facilities & Operations
IAG	Interagency Agreement
ICC	International Chimney Corporation
IH	Industrial Hygiene
LLRW	Low-Level Radioactive Waste
mW	Megawatt
NaI	Sodium Iodide
OSHA	Occupational Safety and Health Administration
PHA	Phase Hazard Analysis
pCi/g	picocuries per gram
PPE	Personal Protective Equipment
RCT	Radiological Control Technician
RWP	Radiological Work Permit
SHSD	Safety and Health Services Division
WMP	Waste Management Plan

1.0 INTRODUCTION

1.1 Purpose

The purpose of this closeout report is to document the completed actions associated with the demolition of the Brookhaven Medical Research Reactor (BMRR) Stack at Brookhaven National Laboratory (BNL). This work is referred to herein as the "Project."

Activities associated with the Project were performed by International Chimney Corporation (ICC) Commonwealth acting as the demolition and radiological services contractor, with support from BNL's Facilities and Operations Directorate (F&O), the Safety & Health Services Division (SHSD), the Environmental Protection Division (EPD), and Radiological Control Division (RCD).

Work was performed in accordance with the *Final Demolition Work Plan for the Brookhaven Medical Research Reactor Stack (BLDG 491)*, which was prepared by ICC dated August 3, 2022, as well as task-specific technical work documents and procedures.

The scope of work for the Project included the following:

- Preparation of the Demolition Plan (with Appendices), Community Air Monitoring Plan (CAMP), Quality Assurance Plan (QAP), Waste Management Plan (WMP), Radiation Protection Plan (RPP), and Final Status Survey (FSS) Plan;

- Site mobilization by the demolition contractor, which included: training and badging of employees, unloading of necessary equipment, establishment of the exclusion zone and drop hazard zone, the establishment of the power source and the dust suppression systems;

- Accessing and rigging the stack, which included: the installation of the fall protection vertical lifeline system; the inspection and installation of all brackets, boards, back posts, back rails, cables, turnbuckles, and other components; and a visual inspection to assess the structural condition of the Stack;

- Stack demolition preparations, which included: creating a debris opening at the base of the stack where demolition debris could be loaded out safely, installing a door to cover the opening, and the removal of the cast iron cap at the top of the brick column;

- Full height stack demolition, which utilized handheld hydraulic breaking equipment to demolish the brick in a piecemeal fashion where debris was deposited into the stack interior. As brick was removed from areas above the scaffold, the scaffold was repositioned down in approximately five-foot increments. Demolition debris was removed

from the stack at times when demolition was not taking place and loaded into intermodal containers with oversight from the BNL's Waste Management Group from the Environmental Protection Division;

- Packaging, transport, and proper disposal of waste materials; and,

- Preparation of the completion report.

1.2 BMRR Description and Operational History

The BMRR was a three (3) Megawatt (Mw) light water reactor capable of operating for short periods of time at powers up to 5 Mw; and was designed and constructed specifically to support medical and biological research at BNL. Constructed in 1958, the 150-foot-tall radial brick Stack served to discharge air emissions from the former BMRR. On December 28, 2000, the BMRR was shut down permanently. All fuel was removed from the facility in 2003 and in 2006, the facility was downgraded to a Radiological Facility. The reactor building is currently unoccupied but periodic surveillance and maintenance activities are conducted.

The BMRR Stack Site Plan is provided as **Figure 1**.

1.3 Radiological Status of the BMRR Stack Prior to Demolition

In September 2013, a radiological characterization effort was conducted that involved chipping the interior surface of the Stack wall near the base (through an access door) and coring through the interior Stack wall at the base, which are identified in Table 1 as Sample 1 and Sample 2, respectively. Each sample submitted to the analytical laboratory consisted of 100 grams of material. It is understood that the "surface sample" was from a 6-inch by 6-inch area of brick to a depth of approximately 1/16th inch and the "core" sample was from a 6-inch by 6-inch area of mortar joints to a depth of approximately ½ inch.

The laboratory analyses performed were carbon-14 (method EERF C-01-1), gamma spectroscopy (method EPA 901.1 modified), gross alpha / beta (method SW846 9310 modified), iodine by gamma spectroscopy (method EML Iodine GA-0), isotopic uranium by alpha spectroscopy (method DOE ST-RC-0055), strontium-90 (method EPA 905 modified), and tritium (method EML H3-04-RC modified). **Table 1** below provides a summary of the results.

Table 1: 2013 Radiological Characterization Data

Radionuclide	Sample 1 – "Surface" (pCi/g)	Sample 2 – "Core" (pCi/g)
Iodine-129	2.79	Non-detect
Uranium-234	0.147	0.30
Uranium-235	Non-detect	Non-detect
Uranium-238	0.179	0.46
Potassium-40 Note 1	Not tested	Not tested
Radium-226 Note 1	Not tested	Not tested
Thorium-228 Note 1	Not tested	Not tested
Cesium-137	0.48	Non-detect
Cobalt-57	0.228	Non-detect
Cobalt-60	1.19	0.38
Strontium-90	0.40	Non-detect
Carbon-14	41.9	18.4
Gross Alpha	6.5	9.5
Gross Beta	26.1	24.8

Note 1: The laboratory analysis of isotopic plutonium, which would have analyzed for potassium-40, radium-226, and thorium-228, was not performed in 2013.

In June 2022, a radiological characterization effort was conducted to obtain updated data for the Project waste characterization and involved collecting four full-depth cores through the stack wall from the exterior side. Each of the cores was then cut to obtain two samples at each location, one sample at the interior side of the core and one sample central to the core.

The laboratory analyses performed were carbon-14 (method EERF C-01 modified), gamma spectroscopy (method EML HASL-300, 4.5.2.3/Ga-01-R), gross alpha / beta (method EPA 900.0/SW846 930/SM 7110B modified), iodine by gamma spectroscopy (method EML HASL-300, I-01 modified), isotopic uranium by alpha spectroscopy (method EML HASL-300, U-02-RC modified), isotopic plutonium (method EML HASL-300, Pu-11-RC modified) strontium-90 (method EPA 905 modified), and tritium (method EPA 906.0 modified). **Table 2** below provides a summary of the highest result from each of the eight samples.

Table 2: 2022 Radiological Characterization Data

Radionuclide	Highest Result (pCi/g)
Iodine-129	Non-detect
Uranium-233/234	1.09
Uranium-235/236	0.118
Uranium-238	1.16
Potassium-40	34.7
Radium-226	1.21
Thorium-228	2.08
Cesium-137	Non-detect
Cobalt-57	Non-detect
Cobalt-60	Non-detect
Strontium-90	Non-detect
Carbon-14	5.17
Gross Alpha	17.8
Gross Beta	47.3

2.0 DEMOLITION ACTIVITIES

The objective of the Project was to safely dismantle the Stack to the top of the foundation, perform a radiological as-left survey on the exposed above-grade surfaces of the foundation, remove a 28-inch diameter steel breeching duct and a 16-inch steel breeching duct to within five-feet of an adjacent building (Building 491), remove the Stack lightning-protection rods and grounding wires, load waste into BNL-provided intermodal containers, on-site movement of intermodal containers between the work area and an on-site rail spur, and load intermodal containers onto BNL-arranged railcars.

Project-specific work procedures Phase Hazard Analyses (PHAs), and Radiological Work Permits (RWPs), were developed to address hazards and work steps associated with the Project. 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 always available onsite for site workers to thoroughly review and reference. The Demolition Plan and CAMP were provided to the regulators for information on August 9, 2022.

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 during the Project:

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

Safety, industrial hygiene (IH) and radiological oversight and monitoring are further discussed in **Section 4.0**. Completion of the Project was accomplished without any worker injuries, first aid cases, personnel radiological contamination events, or dispersion of airborne radioactivity.

Stakeholders were updated on the progress of the Project throughout the duration, including:

- A presentation and question & answer session was provided to building occupants in an adjacent building (Building 490) in June 2022;
- The BNL populace were informed of the planned demolition during via the Lab's Monday Memo distribution in July 2022;
- Presentations were provided to the BNL Community Advisory Council (CAC) meetings in May and September 2022;
- A presentation was provided to the Brookhaven Executive Roundtable during a meeting in November 2022;

- Regulatory agencies were provided updates during monthly Interagency Agreement (IAG) teleconferences; and,
- The NYSDEC IAG Project Manager conducted a post-demolition inspection of the site in September 2022.

2.1 Preparation Activities

Preparation activities were completed during July and August of 2022 and included:

- Establishment of site access and work area boundaries at the Stack and rail spur area;
- Providing temporary electrical power to the contractor field trailers and equipment;
- Deploying air monitoring and radiological monitoring equipment enclosures;
- Providing temporary electrical power to air monitoring and radiological monitoring equipment enclosures;
- Confirming that utilities within the work zone were identified and/or de-energized, as required;
- Protecting adjacent areas from the demolition processes;
- Installing access ladders and work platforms at the top of the Stack; and,
- Staging of intermodal containers.

2.2 Stack Demolition

Stack demolition was completed between August and September 2022. The progress of demolition can be seen below in **Table 3**. The first activity for demolition was removal of a cast iron cap located at the top of the Stack. After demolition was initiated, a debris opening was created at the base of the stack and fitted with a debris shield (i.e., door) to allow for the debris to be removed from the interior of the Stack. Structural demolition was completed utilizing handheld hydraulic breaking equipment. The brick was demolished in a piecemeal fashion where debris was deposited into the Stack, which acted as its own debris chute. The two metal exhaust ducts, which were located approximately 8 feet above grade, were also removed and disposed of as demolition debris. Debris was loaded out utilizing backhoe machinery at times when demolition was not taking place and loaded into intermodals with the assistance of the BNL's Waste Management Group.

Interestingly, the Stack did not contain any vertical reinforcement bars; however, metal reinforcing rings were encountered at approximately every 20 feet in elevation, confirming the information that was available on the original design drawing from 1956.

Table 3
Stack Demolition Progress Log

Date	Beginning Height (ft.)	Ending Height (ft.)	Daily Progress (ft.)
8/8/2022	150	Final preparations, removed cast iron cap	
8/9/2022	150	140	10
8/10/2022	140	125	15
8/11/2022	125	Created opening at bottom of Stack	
8/12/2022	125	Loaded debris into intermodals	
8/13/2022	125	Weekend (no work performed)	
8/14/2022	125	Weekend (no work performed)	
8/15/2022	125	100	25
8/16/2022	100	85	15
8/17/2022	85	Loaded debris into intermodals	
8/18/2022	85	70	15
8/19/2022	70	63	7
8/20/2022	63	55	8
8/21/2022	55	Weekend (no work performed)	
8/22/2022	55	Loaded debris into intermodals	
8/23/2022	55	Loaded debris into intermodals	
8/24/2022	55	47	8
8/25/2022	47	40	7
8/26/2022	40	35	5
8/27/2022	35	25	10
8/28/2022	25	Loaded debris into intermodals	
8/29/2022	25	20	5
8/30/2022	20	Loaded debris into intermodals	
8/31/2022	20	10	10
9/1/2022	10	0	10
9/2/2022	0	Loaded debris into intermodals	

2.3 Radiological As-Left Survey

Following the demolition of the Stack, walkover scan surveys were performed by the contractor's radiological services subcontractor over the entirety of the exposed above-grade surfaces of the foundation using a Sodium Iodide (NaI) gamma detector. Alpha and beta scan surveys were also performed over the entirety of the exposed above-grade surface of the foundation using an alpha-beta scintillator detector. Direct (static) radiation measurements were collected on a systematic grid across the foundation using an alpha-beta scintillation detector. The as-left radiological survey was documented on September 2, 2022 (**Appendix A**) indicating all measurements were statistically indistinguishable from background levels. As a result, it was not necessary to apply a fixative to the exposed surfaces of the foundation.

2.4 Waste Characterization, Handling and Disposal

The waste management strategy, waste characterization, packaging, handling, and storage were performed in accordance with the Project's waste management plan. Waste generated during the Project was characterized as Department of Transportation (DOT) non-regulated waste, based upon the 2022 radiological characterization data in Table 2, and included masonry brick, metal, and personal protective equipment (PPE).

Waste loading was initiated during August of 2022 and was temporarily staged at the BNL rail spur for offsite disposal. Prior to any loading, BNL's Waste Management team inspected each intermodal to ensure they would be leak-tight. Two intermodals that were delivered to the site for loading failed inspections and were not utilized.

Following loading of intermodals, each intermodal was weighed at BNL's on-site weighing station and transported to the on-site rail spur for staging prior to loading onto railcars.

Table 4 shows the project waste summary for the Project. A net weight of 421,660 pounds of stack debris waste was loaded into sixteen (16) intermodals.

Table 4
Project Waste Summary

	Date Weighed	Container Type	Container #	Waste Type	Status	Max Capacity (lbs)	Net Weight (lbs)	Gross Weight (lbs)
1	8/25/2022	Intermodal	NRRU003060	Medical Stack Debris	Filled	59,500	27,070	34,570
2	8/25/2022	Intermodal	NRRU003080	Medical Stack Debris	Filled	59,500	30,550	38,050
3	8/25/2022	Intermodal	NRRU002087	Medical Stack Debris	Filled	59,500	31,230	38,730
4	8/29/2022	Intermodal	NRRU002079	Medical Stack Debris	Filled	59,500	26,520	34,020
5	8/29/2022	Intermodal	NRRU002006	Medical Stack Debris	Filled	59,500	26,140	33,640
6	8/29/2022	Intermodal	NRRU002107	Medical Stack Debris	Filled	59,500	31,340	38,840
7	8/30/2022	Intermodal	NRRU002122	Medical Stack Debris	Filled	59,500	19,910	27,410
8	8/30/2022	Intermodal	NRRU003024	Medical Stack Debris	Filled	59,500	26,090	33,590
9	8/30/2022	Intermodal	NRRU002001	Medical Stack Debris	Filled	59,500	25,710	33,210
10	8/30/2022	Intermodal	NNRU002056	Medical Stack Debris	Filled	59,500	28,560	36,060
11	9/1/2022	Intermodal	NRRU003091	Medical Stack Debris	Filled	59,500	30,020	37,520
12	9/1/2022	Intermodal	NRRU003005	Medical Stack Debris	Filled	59,500	25,640	33,140
13	9/1/2022	Intermodal	NRRU003098	Medical Stack Debris	Filled	59,500	26,720	34,220
14	9/1/2022	Intermodal	NRRU002060	Medical Stack Debris	Filled	59,500	25,480	32,980
15	9/2/2022	Intermodal	NRRU003093	Medical Stack Debris	Filled	59,500	21,480	28,980
16	9/3/2022	Intermodal	NRRU003089	Medical Stack Debris	Filled	59,500	19,200	26,700
17	NA	Intermodal	NRRU003022	Medical Stack Debris	Failed Inspection	59,500	NA	NA
18	NA	Intermodal	NRRU003047	Medical Stack Debris	Failed Inspection	59,501	NA	NA
						Total	**421,660**	**541,660**

3.0 CHRONOLOGY OF EVENTS

Table 5 lists a chronology of the main events associated with the Project.

Table 5
Chronology of Events

Date	Event
May 3, 2022	Contract awarded to ICC
June – August 2022	Preparation of contractor work plans
July 18, 2022	Contractor mobilized to the site
August 7, 2022	Notice to Proceed for demolition activities issued
August 8, 2022	Demolition of the Stack commenced
September 2, 2022	Demolition activities and radiological as-left survey completed
September 3, 2022	Contractor demobilized from the site
November 16, 2022	Waste disposal contract awarded to Energy Solutions
January 3, 2023	Stack demolition waste departed BNL by rail
January 18, 2023	Stack demolition waste arrived by rail at Energy Solution in Clive, UT

4.0 OVERSIGHT & MONITORING

There was strict adherence by the demolition contractor to BNL's safety and radiological processes during the Project. Work was performed under written and approved procedures, and potentially hazardous tasks were emphasized in the documentation to ensure understanding and mitigation. PHAs were developed and approved for the work. Radiological safety oversight was provided by the demolition contractor under the direction of RCD. Completion of the Project was accomplished without any worker injuries, first aid cases, personnel radiological contamination events, or dispersion of airborne radioactivity.

The locations of air monitoring stations for industrial hygiene and radiological concerns are provided in **Figure 2**.

4.1 Demolition Safety Oversight

Demolition safety oversight was conducted daily by personnel from BNL's Safety and Health Services Division (SHSD).

A dedicated contractor Site Health and Safety Officer was onsite during demolition activities to ensure controls were in place as specified in work plans and PHAs.

PHAs were developed and identified hazards associated with each task and specified the required controls for each hazard.

4.2 Industrial Hygiene Oversight & Monitoring

Industrial hygiene (IH) oversight and monitoring for the Project was conducted by personnel from BNL's SHSD and the Contractor in accordance with the Project procedures. IH monitoring included air sampling for respirable silica, and noise surveillance. Silica results were significantly below the associated American Conference of Governmental Industrial Hygienists (ACGIH) and Occupational Safety and Health Administration (OSHA) regulatory limits. All IH monitoring data / records for the Project are maintained by BNL's SHSD.

4.3 Radiological Oversight & Monitoring

Radiological oversight and monitoring for the project was conducted by Radiation Safety & Control Services (RSCS) under the direction of BNL Radiological Control Division personnel and in accordance with the BNL Radiological Control Manual and project specific radiological work permits.

All personnel were monitored for external radiation dose using Thermoluminescent dosimeters (TLDs) when entering Controlled Areas. This included entry into posted Radiation and Contamination Areas. These monitoring results indicated no personnel dose uptake.

Perimeter air monitoring was performed during demolition activities to verify no spread of airborne radioactivity. Perimeter and area air monitoring showed no spread of airborne radioactivity.

All personnel, tools and equipment used during the Project were also monitored for radiological contamination; and no personnel, tools or equipment were deemed to have been contaminated by the Stack materials.

5.0 OBSERVATIONS AND LESSONS LEARNED

The following is a summary of the lessons learned from this project to be utilized for future projects:

- BNL's Waste Management technicians provided support to the demolition contractor and were invaluable due to their experience in managing radiological waste. In addition, the technicians are experienced in inspecting intermodals and were able to identify deficiencies with two of the intermodals that were delivered to the site and ensured that they were not utilized. The ability of the Waste Management team to identify these issues before waste was loaded was a great asset to the project, ensuring all waste was handled and stored safely.

- Transport of loaded waste intermodals and placement onto the railcars was de-scoped from the demolition contractor's scope of work and handled by BNL's Facilities & Operations (F&O) Rigging Services, primarily due to their experience in loading intermodals onto railcars from recent demolition projects on site. By utilizing an experienced on-site rigging services team instead of an outside rigging contractor, this also accelerated the schedule since it eliminated the effort for contractor rigging plans and training to BNL requirements.

- BNL placed contracts for the Stack debris waste intermodals and railroad logistics / transportation early-on in the project planning phase (April 2022) and prior to the contract award to the demolition contractor (May 2022) to ensure that the intermodals would be on site prior to mobilization by the demolition contractor at the end of July 2022.

- BNL included additional intermodal containers in the contract with the railroad logistics / transportation vendor to ensure that there would be sufficient containers on site for the Stack debris. It was calculated that fourteen (14) intermodals would be needed for the

Project and twenty-six (26) intermodals were received. The Project filled sixteen (16) intermodals with waste materials (some of the intermodals were under-filled), two (2) of the intermodals were rejected, and eight (8) intermodal containers were not used. The unused intermodal containers were then returned to the railroad logistics / transportation vendor and de-scoped from the Project resulting in cost savings.

- Four air monitoring stations were located approximately 100-meters from the Stack, consistent with other Stack demolition projects that were completed at BNL. The rationale behind the locations of the air monitoring stations - shown on Figure 2 - was to place one upwind and one downwind of the Stack along the primary wind direction of southwest-to-northeast which occurs during the months of July and August on Long Island. The remaining two stations were aligned perpendicularly in a northwest-to-southeast line for coverage. The northwest and northeast monitoring stations were located on the roof of Building 490 and not on the ground due to concerns that building walls create cavity zones (i.e., turbulent areas) on the leeward side and thus could negatively affect the air monitoring data.

6.0 LONG TERM MANAGEMENT

The demolition of the BMRR Stack is reflected in revisions to the BNL Land Use and Institutional Controls Fact Sheet for the BMRR by BNL's Groundwater Protection Group and applicable drawings have been updated by F&O's Modernization Project Office for Configuration Management.

7.0 PROTECTIVENESS

Completion of the Project is protective of human health and the environment. The associated actions have removed radiological material from the site and minimized the potential for the migration of contaminants to the environment.

More importantly, since the stack foundation had been evaluated as structurally compromised, the demolition of the 64-year-old BMRR Stack eliminated the potential for an uncontrolled collapse onto adjacent buildings during a seismic or major weather event.

8.0 PHOTOGRAPHS

Photograph 1 – Prior to Start of Demolition – 150’ Height

Photograph 2 – Stack at Approximately 70’ Height

Photograph 3 – Stack at Approximately 35’ Height

Photograph 4 – Stack at Approximately 15' Height

Photograph 5 – Stack Demolition Complete

Photograph 6 – Intermodals Staged at the BNL Rail Yard

Photograph 7 – Intermodals Loaded on Railcars for Offsite Disposal

Photograph 8 – Deployed Air Monitoring Enclosure

Photograph 9 – Backhoe Loading Debris into Intermodal

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Figures

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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	BNL2203	Designed by:	NR
Date:	12/15/2022	Drawn by:	AM
Scale:	AS SHOWN	Approved by:	NR

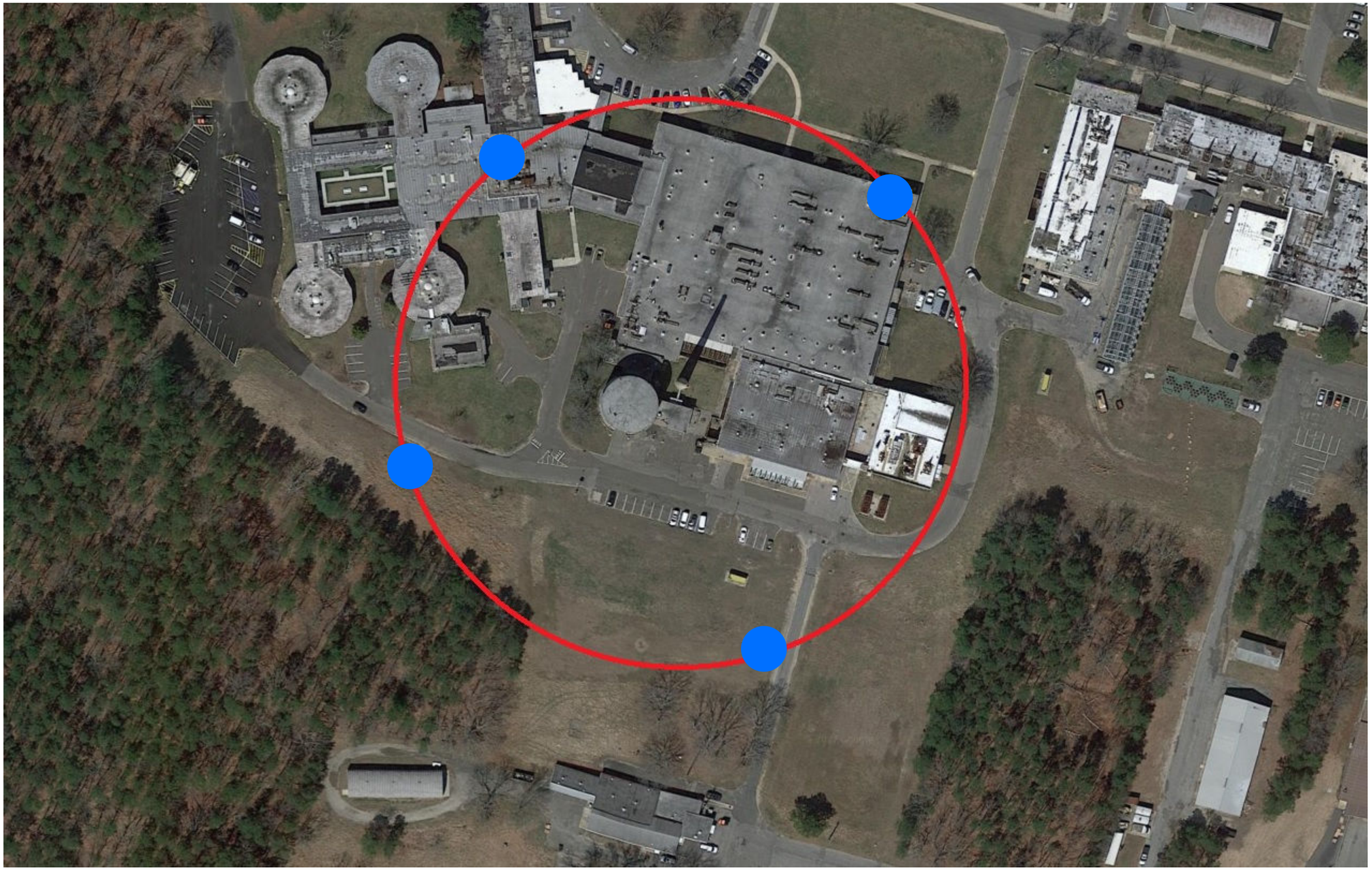
BMRR Stack Site Plan

Brookhaven National Lab
Upton, NY

FIGURE NO:

1

N



Air Monitoring Station

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REVISION	DATE	INITIAL	COMMENTS

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Project:	BNL2203	Designed by:	NR
Date:	12/21/2022	Drawn by:	PH
Scale:	AS SHOWN	Approved by:	NR

Locations of Air Monitoring Stations (Industrial Hygiene and Radiological Concerns)

Brookhaven National Lab
Upton, NY

FIGURE NO:

2

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

RADIOLOGICAL SURVEY FORM
FS-SOP-1000

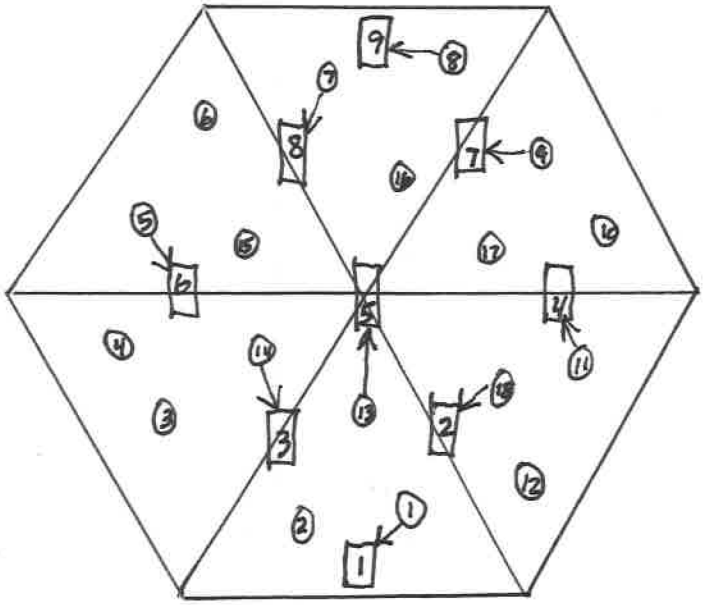
REASON FOR SURVEY: ☐ ROUTINE ☒ SPECIAL FSS of Stack ☐ RWP # _____ ☐ WP # _____

LOCATION/EQUIPMENT: Stack Platform | DATE: 9/2/2022 | TIME: 1445

INSTRUMENT Model #	Serial #	CAL DUE
3030-2	IN07845	8/1/2023
3002	25017658	3/23/2023
Model 3/4410	49054/365222	7/13/2023

Final Status Survey of Stack Platform.
1 minute Direct Static Counts were taken in 9 locations
(18) smears taken
Gamma Scan Survey of entire Platform and Courtyard Area
BKG for 3030 is: 38.4β and 0.0α
BKG for 3002 is: 138β and 0.0α
BKG for 44-10 is: 2200cpm
Courtyard measured 3000 cpm, Platform measured 3500 cpm

LEGEND
○ - SMEAR SURVEY LOCATION
Δ - AIR SAMPLE LOCATION
☐ - MASSLINN SURVEY LOCATION
☐ - 1minute Direct Static Count
XXX Y / ZZZ — XXX -CONTACT READING, Y -RADIATION TYPE, ZZZ -READING @ 30cm



Direct Static Counts
1. 3/126 cpm
2. 2/125 cpm
3. 1/168 cpm
4. 1/150 cpm
5. 0/149 cpm
6. 1/152 cpm
7. 0/135 cpm
8. 1/141 cpm
9. 3/160 cpm
α/β cpm

AIRBORNE ACTIVITY SURVEY

Sample #	Duration	Flow Rate	Field Analysis cpm	Field Analysis µCi/cc	% DAC
		N			
		A			

DOSE RATE (HIGHEST)

CONTACT READING	N
GENERAL AREA	A

MASSLINN RESULTS (in dpm)

1.		5.	
2.	N	6.	
3.	A	7.	
4.		8.	

SMEAR RESULTS (dpm/100 cm²) Circle: α / β / ³H

1 α 0/0 β	8 α 0/0 β	15 α 0/0 β
2 α 0/15 β	9 α 1/0 β	16 α 0/0 β
3 α 0/9 β	10 α 0/30 β	17 α 0/0 β
4 α 0/12 β	11 α 1/0 β	18 α 0/0 β
5 α 0/3 β	12 α 0/9 β	19
6 α 0/0 β	13 α 0/31 β	20 NA
7 α 0/0 β	14 α 0/0 β	21

100% Scan of Platform < BKG 3030 Eff: β-27%, α-37%, 3002 Eff: β-.11 α-.1788

Surveyed By: James Dimon 7321A Date: 9/2/22 Reviewed By: O L K Date: 9/3/2022

Smear results shown in ccpm - DR perTelcon w/JD