Brookhaven National Laboratory (BNL) Field Sampling Technician collecting an environmental compliance groundwater sample.

Chapter 3

Compliance Status

Brookhaven National Laboratory (BNL) is subject to more than 100 sets of federal, state, and local environmental regulations; numerous site-specific permits; 11 equivalency permits for operation of groundwater remediation systems; and several other binding agreements.

In 2024, the Laboratory operated in compliance with most of the requirements defined in these governing documents. Instances of noncompliance were reported to regulatory agencies and corrected expeditiously.

Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide from the Central Steam Facility (CSF) were all well within permit limits in 2024. There were two recorded excess opacity measurements and no recorded excess nitrogen oxide measurements. The two excess opacity readings were recorded by Boiler 6 and were due to a fuel meter/fan automatic control issue. All excursions were documented in quarterly Site-Wide Air Emissions and Monitoring Systems Performance Reports submitted to the New York State Department of Environmental Conservation (NYSDEC).

There were no discharges of Halon 1211 from portable fire extinguishers or Halon 1301 from accidental or fire induced activation of fixed fire suppression systems. Halon portable fire extinguishers continue to be removed and replaced by dry-chemical or clean agent units as part of an ongoing program to phase out the use of chlorofluorocarbons as extinguishing agents. BNL's drinking water and the supply and distribution system were in compliance with all applicable county, state, and federal regulations regarding drinking water quality, monitoring, operations, and reporting in 2024. The liquid effluents discharged to surface water and groundwater also met applicable New York State Pollutant Discharge Elimination System (SPDES) permit requirements with no noncompliance events occurring for any of the permitted outfalls.

Groundwater monitoring at the Laboratory's Major Petroleum Facility (MPF) continued to demonstrate that current oil storage and transfer operations were not affecting groundwater quality. Efforts to implement release prevention measures and minimize impacts of spills of materials continued in 2024. There were ten spills in 2024 and two of those spills met regulatory agency reporting criteria.

BNL was inspected on eight occasions by regulatory authorities. These inspections included Sewage Treatment Plant (STP) operations and all Lab-wide SPDES Discharge Outfalls, Resource Conservation and Recovery Act (RCRA) Department of Environmental Conservation (DEC) Part 373 Permitted Hazardous Waste Management Facilities, Underground Storage Tanks, and the potable water system. Immediate corrective actions were taken to address all compliance issues raised during these inspections.

3.1
Compliance with Requirements

The federal, state, and local environmental statutes and regulations that BNL operates under are summarized in Table 3-1, along with a discussion of the Laboratory's compliance status. A list of all applicable environmental regulations is contained in Appendix D.

Table 3-1. Federal, State, and Local Environmental Statutes and Regulations Applicable to BNL.

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
EPA: 40 CFR 300 40 CFR 302 40 CFR 355 40 CFR 370	The Comprehensive Environmental Response, Compensation & Liability Act (CERCLA) provides the regulatory framework for remediation of releases of hazardous substances and remediation (including decontamination and decommissioning [D&D]) of inactive hazardous waste disposal sites. Regulators include Environmental Protection Agency (EPA), Department of Energy (DOE), and the New York State Department of Environmental Conservation (NYSDEC).	In 1992, BNL became subject to a tri-party agreement among EPA, NYSDEC, and DOE. BNL site remediation is conducted by the Environmental Protection Division in accordance with milestones established under this agreement. The cleanup is currently in the long-term surveillance and maintenance mode for the groundwater treatment systems, former soil/sediment cleanup areas, and the reactors, and includes monitoring of institutional controls. The HFBR reactor vessel is scheduled for decontamination and decommissioning by 2072. All groundwater treatment systems operated as required in 2024. Management of the characterization and remediation of PFOS, PFOA, and 1,4-dioxane was formally included under the BNL CERCLA program.	2.4.8, Chapter 7
Council for Env. Quality: 40 CFR 1500–1508 DOE: 10 CFR 1021	The National Environmental Policy Act (NEPA) requires federal agencies to follow a prescribed process to anticipate the impacts on the environment of proposed major federal actions and alternatives. DOE codified its implementation of NEPA in 10 CFR 1021.	BNL is in full compliance with NEPA requirements. The Laboratory has established site-wide procedures for implementing NEPA requirements.	3.3
Advisory Council on Historic Preservation: 36 CFR 60 36 CFR 63 36 CFR 79 36 CFR 800 16 USC 470	The National Historic Preservation Act (NHPA) identifies, evaluates, and protects historic properties eligible for listing in the National Register of Historic Places, commonly known as the National Register. Such properties can be archeological sites or historic structures, documents, records, or objects. NHPA is administered by state historic preservation offices (SHPOs; in New York State, NYSHPO). At BNL, structures that are subject to NHPA include the High Flux Beam Reactor (HFBR) complex (Bldgs. 750 and 751), the Brookhaven Graphite Research Reactor (BGRR) complex (Bldgs. 701, 703, and 801), 1960's era Apartments (Bldgs. 364 and 365,), Bldg. 120, Berkner Hall (Bldg.488), Chemistry (Bldg. 555), Physics (Bldg. 510), Computational Sciences (Bldg. 515), Instrumentation (Bldg. 535), Medical (Bldgs. 490 and 491), WWII-era water tower (ST0-49), Accelerator Test Facility (Bldgs. 820, 820A, and 820B), Environment, Biology, Nuclear Science and Nonproliferation (EBNN) research (Bldg. 830), Magnet Division (Bldg. 902), Alternating Gradient Synchrotron complex (Bldgs. 901, 901A, 911, 912, 913, 913a-e, and 930), the Gamma Forest, and the WWI training trenches found throughout the site.	There are now multiple buildings and features at BNL that have been determined to be National Register Eligible (see list to the left). Any proposed activities involving these facilities must be identified through the NEPA/NHPA processes and evaluated to determine if the action would affect the features that make the facility eligible. BNL has a Cultural Resource Management Plan to ensure compliance with cultural resource regulations. Buildings that are 50 years old or older are reviewed under Section 106 of NHPA when proposed projects may significantly alter the structure or for building demolition. See Chapter 6 for detailed information on Cultural Resources.	3.4, Chapter 6

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Table 3-1. Federal, State, and Local Environmental Statutes and Regulations Applicable to BNL *(continued).*

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
EPA: 40 CFR 50 40 CFR 60-61 40 CFR 63 40 CFR 80 40 CFR 82 40 CFR 98 NYSDEC: 6 NYCRR 200-202, 205, 207, 208, 211, 212, 215, 217, 218, 225, 226, 227-231, 239, 241, 248, 257. 6 NYCRR 307	The Clean Air Act (CAA) and the NY State Environmental Conservation Laws regulate the release of air pollutants through permits and air quality limits. Emissions of radionuclides are regulated by EPA via the National Emission Standards for Hazardous Air Pollutants (NESHAPs) authorizations.	All air emission sources are incorporated into the BNL Title V permit or have been exempted under the New York State air program, which is codified under the New York Codes, Rules, and Regulations (NYCRR). All applicable CAA and NYCRR regulations are incorporated into the BNL Title V permit. Radiological air emission sources are registered with the EPA.	3.5, Chapters 4 and 8
EPA: 40 CFR 109-136 40 CFR 230, 231 40 CFR 401, 403 NYSDEC: 6 NYCRR 700–703 6 NYCRR 750	The Clean Water Act (CWA) and NY State Environmental Conservation Laws seek to improve surface water quality by establishing standards and a system of permits. Wastewater discharges are regulated by NYSDEC permits through the State Pollutant Discharge Elimination System (SPDES).	At BNL, permitted discharges include treated sanitary waste and cooling tower and stormwater discharges. Review of the analytical data shows that all parameters met their respective SPDES effluent limitations in 2024.	3.6
EPA: 40 CFR 141–149 NYSDOH: 10 NYCRR 5	The Safe Drinking Water Act (SDWA) and New York State Department of Health (NYSDOH) standards for public water supplies establish minimum drinking water standards and monitoring requirements. SDWA requirements are enforced by the Suffolk County Department of Health Services (SCDHS).	BNL maintains a site-wide public water supply. BNL's drinking water and the supply and distribution system were in compliance with all applicable county, state, and federal regulations regarding drinking-water quality, monitoring, operations, and reporting in 2024. Corrective actions for all identified operation and maintenance deficiencies identified during the annual SCDHS sanitary survey were established and communicated with SCDHS and are being addressed by the Laboratory's Energy and Utilities Division.	3.7
EPA: 40 CFR 112 40 CFR 300 40 CFR 302 40 CFR 355 40 CFR 370 40 CFR 372	The Oil Pollution Act, the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Superfund Amendment Reauthorization Act (SARA) require facilities with large quantities of petroleum products or chemicals to prepare emergency plans and report their inventories to EPA, the state, and local emergency planning groups.	Since some facilities at BNL store or use chemicals or petroleum in quantities exceeding threshold planning quantities, the Laboratory is subject to these requirements. BNL fully complied with all reporting and emergency planning requirements in 2024.	3.8.1 3.8.2 3.8.3
EPA: 40 CFR 280 NYSDEC: 6 NYCRR 596–598 6 NYCRR 613 SCDHS: SCSC Article 12 SCSC Article 18	Federal, state, and local regulations govern the storage of chemicals and petroleum products to prevent releases of these materials to the environment. Suffolk County Sanitary Codes (SCSC) are more stringent than federal and state regulations.	The regulations require that these materials be managed in facilities equipped with secondary containment, overfill protection, and leak detection. BNL complies with all federal and state requirements and continues to conform to county codes.	3.8.4 3.8.5 3.8.6
EPA: 40 CFR 260–280 NYSDEC: 6 NYCRR 360, 361, 363-365, 367,371-374, and 376	The Resource Conservation Recovery Act (RCRA) and New York State Solid Waste Disposal Act govern the generation, storage, handling, and disposal of hazardous wastes.	BNL is defined as a large-quantity generator of hazardous waste and has a permitted waste management facility.	3.9
EPA: 40 CFR 700–763	The Toxic Substances Control Act (TSCA) regulates the manufacture, use, and distribution of all chemicals.	BNL manages all TSCA-regulated materials, including PCBs, and is in compliance with all requirements.	3.10

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Table 3-1. Federal, State, and Local Environmental Statutes and Regulations Applicable to BNL *(continued).*

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
EPA: 40 CFR 162–171 NYSDEC: 6 NYCRR 320 6 NYCRR 325–329	The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and corresponding New York State regulations govern the manufacture, use, storage, and disposal of pesticides, herbicides, biocides, rodenticides, fungicides, tickicides, as well as the pesticide containers and residuals.	BNL contracts and/or employs NYSDEC-certified pesticide applicators for specific pesticide categories to apply pesticides, herbicides, biocides, rodenticides, fungicides, and tickicides. Each applicator attends Continuing Education training, as needed, to maintain current category certifications and BNL (or the contractor that applies regulated materials) files an annual report to the NYSDEC Pesticide Bureau detailing the above applications including EPA Registration Nos., dates of applications, method of application, target organisms, types, locations, quantity, and dosage rates of pesticides applied.	3.11
DOE: 10 CFR 1022 NYSDEC: 6 NYCRR 663 6 NYCRR 666	DOE regulations require its facilities to comply with floodplain/wetland review requirements. The New York State Fresh Water Wetlands and Wild, Scenic, and Recreational Rivers rules govern development in the state's natural waterways. Development or projects within a half-mile of regulated waters must have NYSDEC permits.	BNL is in the Peconic River watershed and has several jurisdictional wetlands; consequently, development of locations in the north and east of the site requires NYSDEC permits and review for compliance under DOE wetland/floodplain regulations. BNL currently has no open wetland or scenic river permits.	3.12
U.S. Fish & Wildlife Service: 50 CFR 17 NYSDEC: 6 NYCRR 182	The Endangered Species Act and corresponding New York State regulations prohibit activities that would jeopardize the continued existence of an endangered or threatened species or cause adverse modification to a critical habitat.	BNL is host to numerous species of flora and fauna. Many species have been categorized by New York State as endangered, threatened, or of special concern; and one endangered species has been designated under the Endangered Species Act. The Laboratory's Natural Resource Management Plan outlines activities to protect these vulnerable species and their habitats (see Chapter 6 for details).	3.13, Chapter 6
U.S. Fish & Wildlife Service: Migratory Bird Treaty Act 16 USC 703-712 The Bald and Golden Eagle Protection Act 16 USC 668 a-d	The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful. Birds protected under the act include all common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, native doves and pigeons, swifts, martins, swallows, and others, and includes their body parts (feathers, plumes, etc.), nests, and eggs. The Bald and Golden Eagle Protection Act (BGEPA) prohibits any form of possession or taking of both bald and golden eagles.	Compliance with the MBTA and the BGEPA are documented through the BNL Natural Resource Management Plan. The plan includes provisions for enhancing local habitat through the control of invasive species, planting of native grasses as food sources, and construction of nesting sites. All construction activities, including demolition, are reviewed to ensure there are no impacts to nesting birds. Bald Eagles have been seen routinely at various locations on the BNL site. See Chapter 6 for more on migratory birds and bald eagles.	3.13, Chapter 6
DOE: Order 231.1B Chg.1	The Environment, Safety, and Health Reporting program objective is to ensure timely collection, reporting, analysis, and dissemination of information on environment, safety, and health issues as required by law or regulations or as needed to ensure that DOE is kept fully informed on a timely basis about events that could adversely affect the health and safety of the public, workers, the environment, the intended purpose of DOE facilities, or the credibility of the Department. Included in the order are the requirements for the Occurrence Reporting and Processing of Operations Program (ORPS).	BNL prepares an annual Site Environmental Report and provides data for DOE to prepare annual NEPA summaries and other Safety, Fire Protection, and Occupational Health and Safety Administration (OSHA) reports. The Laboratory developed the ORPS Subject Area for staff and management who perform specific duties related to discovery, response, notification, investigation, and reporting of occurrences to BNL and DOE management. The ORPS Subject Area is supported by: Occurrence Reporting Program Description, Occurrence Categorizer's Procedure, and the ORPS Office Procedure.	All chapters

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Table 3-1. Federal, State, and Local Environmental Statutes and Regulations Applicable to BNL *(concluded).*

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
DOE: Order 414.1E 10 CFR 830, Subpart A Policy 450.5	The Quality Assurance (QA) program objective is to establish an effective management system using the performance requirements of this Order/Rule, coupled with consensus standards, where appropriate, to ensure: 1) products and services meet or exceed customers' expectations; 2) management support for planning, organization, resources, direction, and control; 3) performance and quality improvement thorough rigorous assessment and corrective action and; and 4) environmental, safety, and health risks and impacts associated with work processes are minimized while maximizing reliability and performance of work products.	BNL has a Quality Assurance (QA) Program in place to implement quality management methodology throughout its management systems and associated processes to: (1) achieve and maintain compliance with applicable environmental, safety, security, and health (ESSH) requirements; (2) continue improvement in ESSH performance; (3) provide a safe and healthy workplace; (4) protect the environment and conserve resources; (5) prevent pollution; (6) provide services and products of the highest quality consistent with the needs, expectations, and resources of our customers; and (7) continuously improve processes, systems, and capabilities to improve operations and increase the value of research products delivered to customers. Having a comprehensive program ensures that all environmental monitoring data meet QA and quality control requirements. Samples are collected and analyzed using standard operating procedures to ensure representative samples and reliable, defensible data. Quality control in the analytical labs is maintained through daily instrument calibration, efficiency and background checks, and testing for precision and accuracy. Data are verified and validated according to project-specific quality objectives before they are used to support decision making.	Chapter 9
DOE: DOE M 435.1-1 Chg. 3	The Radioactive Waste Management Program objective is to ensure that all DOE radioactive waste is managed in a manner that protects workers, public health and safety, and the environment. Order 435.1 requires all DOE organizations that generate radioactive waste to implement a waste certification program. DOE Laboratories must develop a Radioactive Waste Management Basis (RWMB) Program Description, which includes exemption and timeframe requirements for staging and storing both routine and non-routine radioactive wastes.	The BNL Waste Certification Program Plan (WCPP) in the RWMB Program description defines the radioactive waste management program's structure, logic, and methodology for waste certification. New or modified operations or activities that do not fall within the scope of the RWMB Program description must be documented and approved before imple-mentation. The Laboratory's RWMB Program description describes the BNL policies, procedures, plans, and controls demonstrating that the Laboratory has the management systems, administrative controls, and physical controls to comply with DOE Order 435.1 Chg. 2 and DOE Manual 435.1-1 Chg. 3.	2.4.3
DOE: Order 458.1, Change 4	In February 2011, DOE released DOE Order 458.1 *Radiation Protection of the Public and Environment*, which replaced former Order 5400.5. The order establishes requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE pursuant to the Atomic Energy Act of 1954, as amended. The Order requires the preparation of an Environmental Radiation Protection Plan which outlines how facilities monitor their impacts on the public and environment. Full compliance with the Order was required by August 2012.	In accordance with the requirements of DOE Order 458.1, BNL maintains and implements several plans and programs for ensuring that the management of facilities, wastes, effluents, and emissions does not present a risk to the public, workers, or environment. These plans and programs have existed for decades and were previously implemented under prior DOE Order 5400.5 and in accordance with the current DOE O 435.1, Radioactive Waste Management, and 10 CFR 835. Environmental monitoring plans are well documented, and the results are published annually in BNL's Site Environmental Report, which is prepared in accordance with DOE O 231.1B Chg. 1. The Environmental Radiation Protection Program (ERPP), which was published in September 2012, provides a record of the requirements of DOE O 458.1 and documents how the Laboratory meets these requirements. This document is reviewed annually and updated, as necessary to ensure compliance with this requirement.	Chapters 3, 4, 5, 6, and 8

Notes:
CFR = Code of Federal Regulations
NYCRR = New York Codes, Rules, and Regulations
SCSC = Suffolk County Sanitary Code

3.2 Compliance with Requirements

3.2.1 Existing Permits

Many processes and facilities at BNL operate under permits issued by environmental regulatory agencies. Table 3-2 provides a complete list of the existing permits, some of which are briefly described below.

- SPDES permits, issued by NYSDEC;
- MPF license, issued by NYSDEC;
- RCRA permit, issued by NYSDEC for BNL's Waste Management Facility (WMF);
- Registration certificate from NYSDEC for tanks storing bulk quantities of hazardous substances (e.g., fuel oil);
- Eight radiological emission authorizations issued by the U.S. Environmental Protection Agency (EPA) under the National Emission Standards for Hazardous Air Pollutants (NESHAPs);
- Air emissions permit issued by NYSDEC under Title V of the Clean Air Act (CAA) Amendments authorizing the operation of 12 emission units;
- Permit for the operation of six domestic water supply wells, one cooling water well, one irrigation well, and two fire protection wells issued by NYSDEC; and
- 11 SPDES equivalency permits for the operation of groundwater remediation systems installed via the Interagency Agreement (Federal Facility Agreement under the Comprehensive Environmental Response, Compensation and Liability Act [CERCLA]).

3.2.2 New or Modified Permits

3.2.2.1 New York State Wetlands and Wild, Scenic, Recreational Rivers Act

The New York State Wild, Scenic, and Recreational Rivers Act was created by the state legislature in 1972 to protect and preserve certain rivers considered to have remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The Laboratory had no open permits in 2024.

3.2.3 EPA's Enforcement & Compliance History Online (ECHO)

EPA's ECHO provides integrated compliance and enforcement information for more than one million regulated facilities nationwide. It allows users to search for facilities by media program (e.g., CAA, Clean Water Act [CWA], Safe Drinking Water Act [SDWA]), location, enforcement and compliance activity, or pollutant. The facility reports include three years of violation data and five years of compliance monitoring and enforcement data.

A detailed facility report for BNL including compliance status can be found in the ECHO database at: https://echo.epa.gov/. To access this report, use the following information:

ECHO Facility Name:
Brookhaven National Laboratory

Facility Registry Service (FRS) ID:
110000616726

Program Areas:
CAA, CWA, RCRA, SDWA

Table 3-2. BNL Environmental Permits.

Issuing Agency	Bldg. or Facility	Process/Permit Description	Permit ID No.	Expiration or Completion	Emission Unit ID	Source ID
EPA - NESHAPs	510	Calorimeter Enclosure	BNL-689-01[1]	None	NA	NA
EPA - NESHAPs	705	Tritium Evaporator	BNL-288-01[1]	None	NA	NA
EPA - NESHAPs	820	Accelerator Test Facility	BNL-589-01	None	NA	NA
EPA - NESHAPs	AGS	AGS Booster - Accelerator	BNL-188-01	None	NA	NA
EPA - NESHAPs	RHIC	Accelerator	BNL-388-01	None	NA	NA
EPA - NESHAPs	931	Brookhaven LINAC Isotope Producer	BNL-2009-01	None	NA	NA
EPA - NESHAPs	REF	Radiation Effects/Neutral Beam	BNL-789-01	None	NA	NA
EPA - NESHAPs	801	All-inclusive Production Hot Cells (RRPL)	BNL-2022-01	None	NA	NA
NYSDEC - Air Equivalency	517/518	South Boundary/Middle Road System	1-51-009	NA	NA	NA
NYSDEC - Air Equivalency	598	OU I Remediation System	1-52-009	NA	NA	NA
NYSDEC - Air Equivalency	539	Western South Boundary System	1-52-009	NA	NA	NA
NYSDEC - Air Equivalency	TR 867	B-96 Remediation System	1-52-009	NA	NA	NA
NYSDEC - Air Equivalency	644	Freon-11 Treatment System	1-52-009	NA	NA	NA
NYSDEC - SPDES Permit	Site	Brookhaven National Laboratory	NY0005835	31-Dec-30	NA	NA
NYSDEC - SPDES Equivalency	517/518	South Boundary/Middle Road System	1-52-009	NA	NA	NA
NYSDEC - SPDES Equivalency	539	Western South Boundary System	1-52-009	NA	NA	NA
NYSDEC - SPDES Equivalency	670	Sr-90 Treatment System - Chemical Holes	1-52-009	25-Feb-33	NA	NA
NYSDEC - SPDES Equivalency	OS-4	Airport/LIPA Treatment System	1-52-009	NA	NA	NA
NYSDEC - SPDES Equivalency	OS-5	North St./North St. East Treatment System	1-52-009	26-Mar-35	NA	NA
NYSDEC - SPDES Equivalency	OS-6	Ethylene Di-Bromide Treatment System	1-52-009	26-Mar-35	NA	NA
NYSDEC - SPDES Equivalency	855	Sr-90 Treatment System - BGRR/WCF	1-52-009	26-Mar-35	NA	NA
NYSDEC - SPDES Equivalency	TR 867	B-96 Remediation System	1-52-009	20-Mar-32	NA	NA
NYSDEC - SPDES Equivalency	OS-2	Industrial Park Treatment System	1-52-009	26-Mar-35	NA	NA
NYSDEC - SPDES Equivalency	492	Current Firehouse PFAS Treatment System	1-52-009	07-Sep-32	NA	NA
NYSDEC - SPDES Equivalency	492	Former Firehouse PFAS Treatment System	1-52-009	07-Sep-32	NA	NA
NYSDEC - Hazardous Substance	BNL	Bulk Storage Registration Certificate	1-000263	27-Jul-25	NA	NA
NYSDEC - LI Well Permit	BNL	Domestic Potable/Process Wells	1-4722-00032/00151	02-Apr-35	NA	NA
NYSDEC - Air Quality	423	Metal Parts Cleaning Tank	1-4722-00032/00115	30-Jan-25	U-METAL	42308
NYSDEC - Air Quality	423	Gasoline & E85 Storage and Fuel Pumps	1-4722-00032/00115	30-Jan-25	U-FUELS	42309-10
NYSDEC - Air Quality	423	Motor Vehicle A/C Servicing	1-4722-00032/00115	30-Jan-25	U-MVACS	MVAC2
NYSDEC - Air Quality	423	Motor Vehicle A/C Servicing	1-4722-00032/00115	30-Jan-25	U-MVACS	MVAC5
NYSDEC - Air Quality	244	Paint Spray Booth	1-4722-00032/00115	30-Jan-25	U-PAINT	24402
NYSDEC - Air Quality	244	Flammable Liquid Storage Cabinet	1-4722-00032/00115	30-Jan-25	U-PAINT	244AE
NYSDEC - Air Quality	734	Spin Coating Operation	1-4722-00032/00115	30-Jan-25	U-INSIG	734AA
NYSDEC - Air Quality	801	Target Processing Laboratory	1-4722-00032/00115	30-Jan-25	U-INSIG	80101
NYSDEC - Air Quality	Site	Aerosol Can Processing Units	1-4722-00032/00115	30-Jan-25	U-INSIG	AEROS

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Table 3-2. BNL Environmental Permits *(concluded).*

Issuing Agency	Bldg. or Facility	Process/Permit Description	Permit ID No.	Expiration or Completion	Emission Unit ID	Source ID
NYSDEC - Air Quality	498	Aqueous Cleaning Facility	1-4722-00032/00115	30-Jan-25	U-METAL	49801
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-61005	61005
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-61006	61006
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-61007	61007
NYSDEC - Air Quality	610	Metal Parts Cleaning Tray	1-4722-00032/00115	30-Jan-25	U-METAL	61008
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-61005	6101A
NYSDEC - Air Quality	902	Epoxy Coating/Curing Exhaust	1-4722-00032/00115	30-Jan-25	U-COILS	90206
NYSDEC - Air Quality	922	Electroplating Operation	1-4722-00032/00115	30-Jan-25	U-INSIG	92204
NYSDEC - Air Quality	Site	Commercial Refrigeration Equipment	1-4722-00032/00115	30-Jan-25	U-RFRIG	COMRE
NYSDEC - Air Quality	Site	Packaged A/C Units (16)	1-4722-00032/00115	30-Jan-25	U-RFRIG	PKG01-16
NYSDEC - Air Quality	Site	Reciprocating Chillers (44)	1-4722-00032/00115	30-Jan-25	U-RFRIG	REC01-65
NYSDEC - Air Quality	Site	Rotary Screw Chillers (19)	1-4722-00032/00115	30-Jan-25	U-RFRIG	ROTO1-20
NYSDEC - Air Quality	Site	Split A/C Units	1-4722-00032/00115	30-Jan-25	U-RFRIG	SPL01-02
NYSDEC - Air Quality	Site	Centrifugal Chillers (17)	1-4722-00032/00115	30-Jan-25	U-RFRIG	CEN06-29
NYSDEC - Air Quality	463	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	46301
NYSDEC - Air Quality	490	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	49006
NYSDEC - Air Quality	515	Diesel Non-Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	51501
NYSDEC - Air Quality	555	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	55503
NYSDEC - Air Quality	635	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	63501
NYSDEC - Air Quality	734	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	73401
NYSDEC - Air Quality	735	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	73501
NYSDEC - Air Quality	740	Diesel Emergency Generators (2)	1-4722-00032/00115	30-Jan-25	U-GENER	74001-02
NYSDEC - Air Quality	801	Diesel Emergency Generator	1-4722-00032/00115	30-Jan-25	U-GENER	80102
NYSDEC - Air Quality	912	Diesel Emergency Generators (3)	1-4722-00032/00115	30-Jan-25	U-GENER	912A1-A3
NYSDEC - Air Quality	30	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-SMBLR	030AB
NYSDEC - Air Quality	422	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-SMBLR	422AF
NYSDEC - Air Quality	423	Combustion Unit	1-4722-00032/00115	30-Jan-25	U-SMBLR	42304
NYSDEC - Hazardous Waste	WMF	Waste Management	1-4722-00032/00102	06-Sep-27	NA	NA
NYSDEC - Water Quality	CSF	Major Petroleum Facility	01-1700	31-Mar-27	NA	NA

Notes:
[1]Source Facility Removed and awaiting EPA termination of NESHAPs authorization.
A/C = Air Conditioning
AGS = Alternating Gradient Synchrotron
BGRR = Brookhaven Graphite Research Reactor
CSF = Central Steam Facility
EPA = Environmental Protection Agency
LIPA = Long Island Power Authority
NA = Not Applicable
NESHAPs = National Emission Standards for Hazardous Air Pollutants
NYSDEC = New York State Department of Environmental Conservation
OU = Operable Unit
PFAS = Per and Poly Fluoroalkyl Substances
REF = Radiation Effects Facility
RHIC = Relativistic Heavy Ion Collidar
RRPL = Radionuclide Research and Production Laboratory
SDWA = Safe Drinking Water Act
SPDES = State Pollutant Discharge Elimination System
Sr-90 = Strontium-90
STP = Sewage Treatment Plant
WCF = Waste Concentration Facility
WMF = Waste Management Facility

3.3
National Environmental Policy Act (NEPA) Assessments

NEPA regulations require federal agencies to evaluate the environmental effects of proposed major federal activities. The prescribed evaluation process ensures that the proper level of environmental review is performed before an irreversible commitment of resources is made. During 2024, environmental evaluations were completed for 172 proposed projects at BNL. One hundred and sixty-eight projects were considered minor actions requiring no additional documentation. Three projects were addressed by submitting a notification form to the Department of Energy (DOE), which determined that the projects were covered by existing "Categorical Exclusions" (per 10 CFR 1021) or fell within the scope of a previous environmental assessment, and one Environmental Assessment was completed to evaluate potential impacts of the Clinical Alpha Radionuclide Production Facility which resulted in a Finding of No Significant Impact from BHSO.

3.4
National Historic Preservation Act (NHPA)

The Laboratory is subject to several cultural resource laws, most notably the NHPA. The NHPA requires federal agencies to establish programs for the identification and protection of cultural resources (including buildings, sites, artifacts, and documents), and consider the effects of proposed federal actions on those resources.

BNL has 34 structures or sites that are eligible for listing on the National Register of Historic Places: the Brookhaven Graphite Research Reactor (BGRR) complex (Buildings 701, 703, and 801), the High Flux Beam Reactor (HFBR) complex (Buildings 750, 750A, and 751), two 1960s-era efficiency apartments (Buildings 364 and 365), Berkner Hall (Building 488), the Medical Complex (Buildings 490 and 491), Chemistry (Building 555), Physics (Building 510), Computational Sciences (Building 515), Instrumentation (Building 535), Accelerator Test Facility (Buildings 820, 820A, and 820B), Environment, Biology, Nuclear Science & Nonproliferation Research (Building 830), Magnet Division (Building 902), the Alternating Gradient Synchrotron (AGS) Complex (Buildings 901, 901A, 911, 912, 913, 913A-E, and 930), the World War II (WWII) barracks portion of Building 120, the 1940s era Water Tower, the World War I (WWI) Army training trenches associated with Camp Upton, and the Gamma Forest.

Proposed activities are reviewed to determine potential adverse effects on these properties, and identify methods to avoid, mitigate, or minimize adverse effects or harm, in accordance with Section 106 and Section 110 of the NHPA. Most cultural resources reviews are integrated with the NEPA Environmental Review process to streamline the Section 106 review process. In 2024, no impacts were documented that would diminish the historic or archaeological significance of any BNL cultural resources.

Other regulations apply to BNL's cultural resource management obligations, including the Archaeological Resources Protection Act (ARPA) and 36 CFR 79 "Curation of Federally Owned and Administered Archaeological Collections." Cultural resource activities are described in Chapter 6.

3.5
Clean Air Act (CAA)

The objectives of the CAA, which is administered by EPA and NYSDEC, are to improve or maintain regional ambient air quality through operational and engineering controls on stationary or mobile sources of air pollution. Both conventional and hazardous air pollutants are regulated under the CAA.

3.5.1 Conventional Air Pollutants

The Laboratory has a variety of conventional, nonradioactive air emission sources that are subject to federal or state regulations. The following subsections describe the more significant sources and the methods used by BNL to comply with the applicable regulatory requirements.

3.5.1.1 Boiler Emissions

BNL has four boilers (Nos. 1A, 5, 6, and 7) at the CSF that are subject to NYSDEC Reasonably Available Control Technology (RACT) requirements. Boilers 5, 6 and 7 are equipped to burn either residual fuel oil, distillate fuel oil, or natural gas; Boiler 1A can burn residual fuel oil or distillate fuel oil only. In 2024, natural gas was the predominant fuel burned at the CSF. For boilers with maximum operating heat inputs greater than or equal to 25 MMBtu/hr (7.3 MW), the RACT requirements establish emission standards for oxides of nitrogen (NO_x). The NO_x RACT standard for the combustion of natural gas or fuel oil burned in the Laboratory's three large boilers (Nos. 5, 6, and 7) is 0.15 lbs/MMBtu. The NO_x RACT emission limit for the CSF's one mid-size boiler (No. 1A) is 0.20 lbs/MMBtu while burning residual fuel oil (No. 4 or No. 6) and 0.08 lbs/MMBtu while burning distillate fuel oil (No. 2).

Boilers with a maximum operating heat input between 25 and 250 MMBtu/hr. (7.3 and 73.2 MW) must demonstrate compliance with the NO_x standard either by using periodic emission tests (stack testing) or a continuous emissions monitoring system (CEMS). All four CSF boilers meet this criterion. Boilers 6 and 7 use CEMS to demonstrate compliance with NO_x standards, while Boilers 1A and 5 are periodically stack tested (once per permit term).

The most recent stack tests performed on Boilers 1A and 5 in December 2024/January 2025 demonstrated compliance with NO_x RACT limits while Boiler 1A operated on residual fuel oil and Boiler 5 operated on residual fuel oil, distillate fuel oil, or natural gas. Boiler 1A was unable to meet the NO_x RACT emission limit of 0.08 MMBtu/hr while operating on distillate fuel oil, however, the Lab does not anticipate burning distillate fuel in Boiler 1A in the foreseeable future.

CEMS reports for Boilers 6 and 7 have demonstrated compliance with NO_x RACT standards while operating on residual fuel oil or natural gas. Boilers 6 and 7 did not operate on distillate fuel oil during 2024. BNL uses an approved system averaging plan to demonstrate NO_x compliance in quarterly reports submitted to NYSDEC. Using the system averaging approach, actual weighted average NO_x emission rates for operating boilers for the first through fourth quarters were 0.108, 0.091, 0.106, and 0.095 lbs/MMBtu, respectively, which were below the corresponding quarterly permissible weighted average emissions rates of 0.150, 0.150, 0.173, and 0.150 lbs/MMBtu.

The Laboratory also maintains continuous opacity monitors for Boilers 6 and 7. These monitors measure the transmittance of light through the exhaust gas and report the measurement in percent attenuated. Opacity limitations state that no facility may emit particulates such that the opacity exceeds 20%, calculated in six-minute averages, except for one period not to exceed 27% in any one hour. During 2024, there were two (2) 6-minute average opacity readings that exceeded 27% recorded by Boiler 6 on February 28, 2024. The exceedances were due to a fuel meter/fan automatic control issue that was rectified by the operator on the same day. There were no opacity exceedances recorded by Boiler 7 in 2024. NO_x and/or opacity excursions are documented in the quarterly Site-Wide Air Emissions and Monitoring Systems Performance Reports submitted to NYSDEC. Chapter 4 discusses CSF compliance with NO_x RACT standards and opacity limits in greater detail.

3.5.1.2 Ozone-Depleting Substances

Refrigerant: The Laboratory's preventative maintenance program requires regular inspection and maintenance of refrigeration and air conditioning equipment that contains ozone-depleting substances such as R-11, R-12, and R-22. All refrigerant recovery and recycling equipment are certified to meet refrigerant evacuation levels specified by 40 CFR 82.158. As a matter of BNL's standard practice, if a refrigerant leak is found, technicians will either immediately repair the leak or isolate it and prepare a work order for the needed repairs. This practice is more stringent than the leak repair provisions of 40 CFR 82.156. In 2024, 353 pounds of R-22 and 154 pounds of R-410A (a 50:50 blend of HFC-32 and HFC-125) were recovered and recycled from refrigeration equipment that was serviced. Meanwhile, 345 pounds of R-22 and 98 pounds of R-410A leaked from refrigeration and air conditioning equipment on-site. These leaks were subsequently reported as emissions in the Annual Emissions Statement transmitted to NYSDEC.

Halon: Halon 1211 and 1301 are extremely efficient fire suppressants that are being phased out due to their effect on the earth's ozone layer. Halon recovered from excessed systems is shipped to the Department of Defense Ozone Depleting Substances Reserve in accordance with the Class I Ozone Depleting Substances Disposition Guidelines prepared by the DOE Office of Environmental Policy and Guidance. Halon 1211, which was formerly used in portable fire extinguishers on-site, is no longer utilized. It was phased out and replaced with a EPA Significant New Alternative Policy (SNAP) approved alternative. There were no discharges of Halon 1301 in 2024. The one remaining fixed fire suppression system on-site is in the process of being decommissioned and arrangements are currently being made to have the remaining Halon 1301 removed from the Lab before the end of the year.

3.5.2 Hazardous Air Pollutants (HAPs)

In 1970, the CAA established standards to protect the public from HAPs that may lead to death or an increase in irreversible or incapacitating illnesses. The NESHAPs, a stationary source standard for hazardous air pollutants, were established in 1977 and the governing regulations were updated significantly in 1990. EPA developed NESHAPs to limit the emission of air pollutants. Since 1990, EPA has modified the list through rulemaking to include 187 hazardous air pollutants. The program includes a list of regulated contaminants, a schedule for implementing control requirements, aggressive technology-based emission standards, industry-specific requirements, special permitting provisions, and a program to address accidental releases. The following subsections describe BNL's compliance with NESHAPs regulations.

3.5.2.1. Maximum Available Control Technology

Based on the Laboratory's periodic review of Maximum Available Control Technology (MACT) standards, it was determined that 40 CFR 63 NESHAPs Subpart GGGGG: Site Remediation requires the Lab's Groundwater Protection Group to document the process it uses to prove that the sum total of HAPs emissions due to site remediation activities is less than 1 megagram (2,204.62 pounds) annually. In 2024 the Laboratory's groundwater treatment systems emitted an estimated total of 34 lbs of HAPs, which is well within acceptable limits.

3.5.2.2 Asbestos

In 2024 the Laboratory notified the EPA Region II office regarding the removal of materials containing asbestos. Throughout the year, 6,960 lbs of both scheduled and non-scheduled friable asbestos from maintenance operations materials and building demolition preparation (e.g., pipe insulation, sheetrock, popcorn ceiling, transite board, floor tiles, water main pipes) were removed. Disposal of this material occurred in May 2025 in accordance with EPA requirements.

3.5.2.3 Radioactive Airborne Emissions

Minor and major sources of radiological airborne emissions from BNL's facilities and activities are evaluated to ensure that they do not impact the environment, on-site workers, or people residing at or near the Laboratory. A full description of radiological emissions monitoring conducted in 2024 is provided in Chapter 4.

BNL transmitted all data pertaining to radioactive air emissions and dose calculations to EPA in fulfillment of its annual reporting requirement. As in past years, the maximum off-site dose due to airborne radioactive emissions from the Laboratory continued to be below the 10 mrem (100 μSv) annual dose limit specified in 40 CFR 61 Subpart H (see Chapters 4 and 8 for more information on the estimated air dose). Using EPA modeling software, the dose to the maximally exposed off-site individual resulting from BNL's airborne emissions in 2024 was 1.67 mrem (16.7 μSv).

3.6
Clean Water Act (CWA)

The disposal of wastewater generated by Laboratory operations is regulated under the CWA as implemented by NYSDEC and under DOE Order 458.1, Radiation Protection of the Public and the Environment. The goals of the CWA are to achieve a level of water quality that promotes the propagation of fish, shellfish, and wildlife; to provide waters suitable for recreational purposes; and to eliminate the discharge of pollutants into surface waters. New York State was delegated CWA authority in 1975. NYSDEC has issued a SPDES permit to BNL that regulates wastewater effluents. The permit specifies monitoring requirements and effluent limits for nine of thirteen outfalls, as described below. See Figure 5-3 in Chapter 5 for the locations of the following BNL outfalls:

- Outfall 001 is used to discharge treated effluent from the STP to groundwater recharge basins.
- Outfalls 002, 002B, 003, 005, 006A, 006B, 008, 010, 011, and 012 are recharge basins used to discharge cooling tower blowdown, once-through cooling water, and/or stormwater. Because only stormwater or once-through cooling water is discharged to Outfalls 003, 011, and 012, NYSDEC imposes no monitoring requirements for these discharges.
- Outfall 007 receives backwash water from the Potable Water Treatment Plant filter building.
- Outfall 009 consists of numerous subsurface and surface wastewater disposal systems (e.g., cesspools) that receive predominantly sanitary waste and steam- and air-compressor condensate discharges. NYSDEC does not require monitoring of these disposal systems.

Each month, the Laboratory prepares Discharge Monitoring Reports (DMRs) that describe monitoring results, evaluate compliance with permit limitations, and identify corrective measures taken to address permit excursions. These reports are submitted electronically to EPA, NYSDEC central and regional offices, and Suffolk County Department of Health Services (SCDHS) through a Network DMR (NetDMR) system. Details of the monitoring program conducted for the groundwater treatment systems where SPDES equivalency permits are in effect are provided in the Site Environmental Report (SER) Volume II, Groundwater Status Report. Evaluation of the current effluent quality shows it to consistently meet groundwater effluent standards, and in most cases, ambient water quality standards for surface water. Details on monitoring results, evaluation of compliance with permit limits, and description of any corrective actions taken to address permit excursions are provided in the following sections.

3.6.1 Sewage Treatment Plant (STP)

Sanitary and process wastewater generated by BNL operations is conveyed to the STP for processing before discharge to groundwater recharge basins. The STP provides tertiary treatment of the wastewater and includes the following processes: settling/sedimentation, biological reduction of organic matter and nitrogen, and final filtration. Chapter 5 provides a detailed description of the treatment process.

A summary of SPDES monitoring results for the STP discharge at Outfall 001 is provided in Table 3-3, along with relevant SPDES permit limits. The Laboratory monitors the STP discharge for more than 100 parameters monthly and more than 200 parameters quarterly. BNL was 100% compliant with effluent limits in 2024.

Table 3-3. Analytical Results for Wastewater Discharges to Sewage Treatment Plant Outfall 001.

Analyte	Low Report	High Report	Min. Monitoring. Freq.	SPDES Limit	Exceedances	% Compliance*
pH (SU)	6.9	8.3	Continuous Recorder	Min 5.8, Max. 8.5	0	100
Solids, Total Dissolved (mg/L)	39	487	Monthly	1000	0	100
Total nitrogen (mg/L)	1.1	7.9	Twice Monthly	10	0	100
Total phosphorus (mg/L)	0.24	1.21	Twice Monthly	NA	0	100
Cyanide (mg/L)	< 0.002	< 0.002	Twice Monthly	0.1	0	100
Copper (mg/L)	0.004	0.02	Twice Monthly	0.15	0	100
Iron (mg/L)	0.09	0.32	Twice Monthly	0.6	0	100
Lead (mg/L)	<0.001	0.001	Twice Monthly	0.025	0	100
Mercury (ng/L)	1.2	10.2	Twice Monthly	200	0	100
Methylene chloride (ug/L)	< 0.5	2.46	Twice Monthly	5	0	100
Nickel (mg/L)	< 0.002	0.004	Twice Monthly	0.1	0	100
Silver (mg/L)	< 0.0003	< 0.0003	Twice Monthly	0.015	0	100
Toluene (ug/L)	< 0.3	< 0.3	Twice Monthly	5	0	100
Zinc (mg/L)	0.02	0.09	Twice Monthly	2	0	100
1,1,1-trichloroethane (ug/L)	< 0.3	< 0.3	Twice Monthly	5	0	100
Max. Flow (MGD)	0.21	0.67	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.14	0.30	Continuous Recorder	NA	0	100
HEDP (mg/L)	< 0.05	< 0.05	Monthly	0.5	0	100
Tolytriazole (mg/L)	< 0.05	< 0.05	Monthly	0.05	0	100

Notes:
See Figure 5-3 for location of Outfall 001.
* % Compliance = total no. samples – total no. exceedances/total no. of samples x 100
HEDP = 1-hydroxyethylidene diphosphonic acid
MGD = million gallons per day
NA = Not Applicable
SPDES = State Pollutant Discharge Elimination System
SU = standard unit

Figures 3-1 through 3-7 plot the five-year trends for monthly concentrations of copper, iron, lead, mercury, nickel, silver, and zinc in the STP discharge.

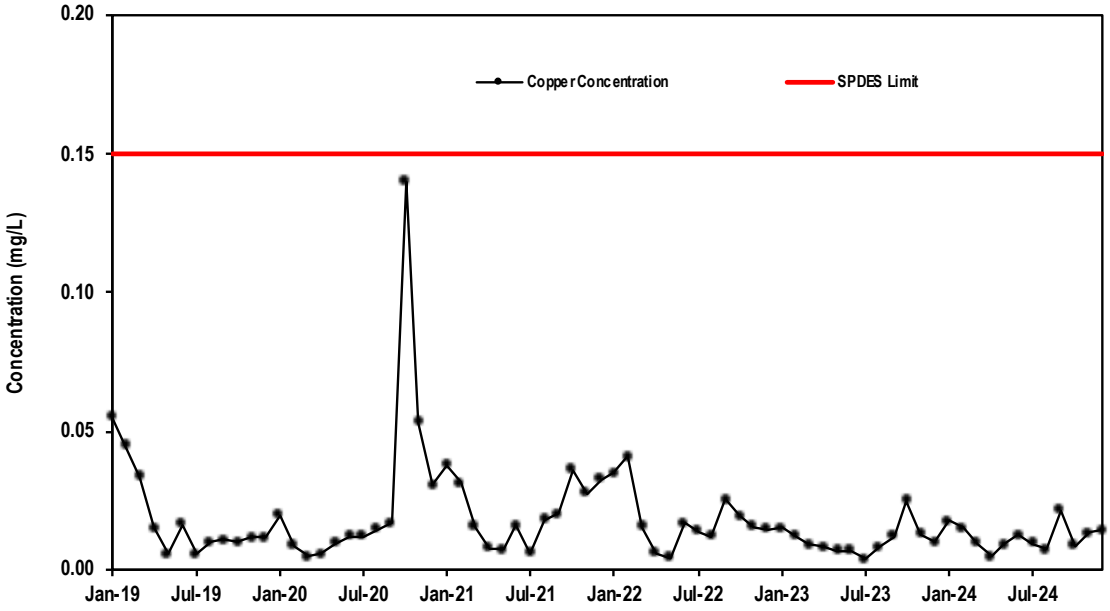

Figure 3-1. Maximum Concentrations of Copper Discharged From the BNL Sewage Treatment Plant, 2019–2024.

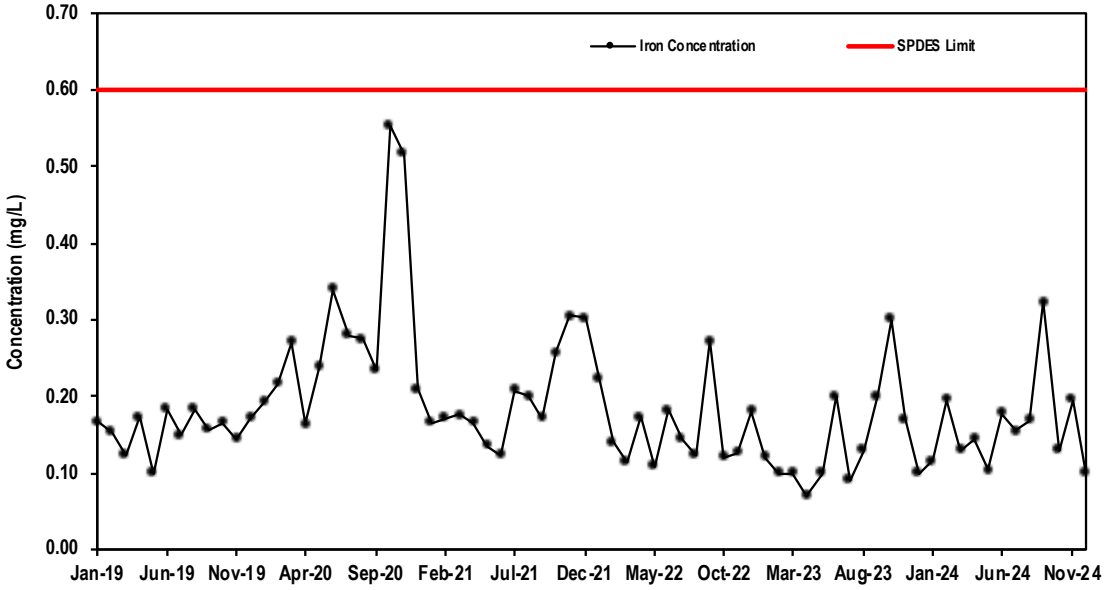

Figure 3-2. Maximum Concentrations of Iron Discharged From the BNL Sewage Treatment Plant, 2019–2024.

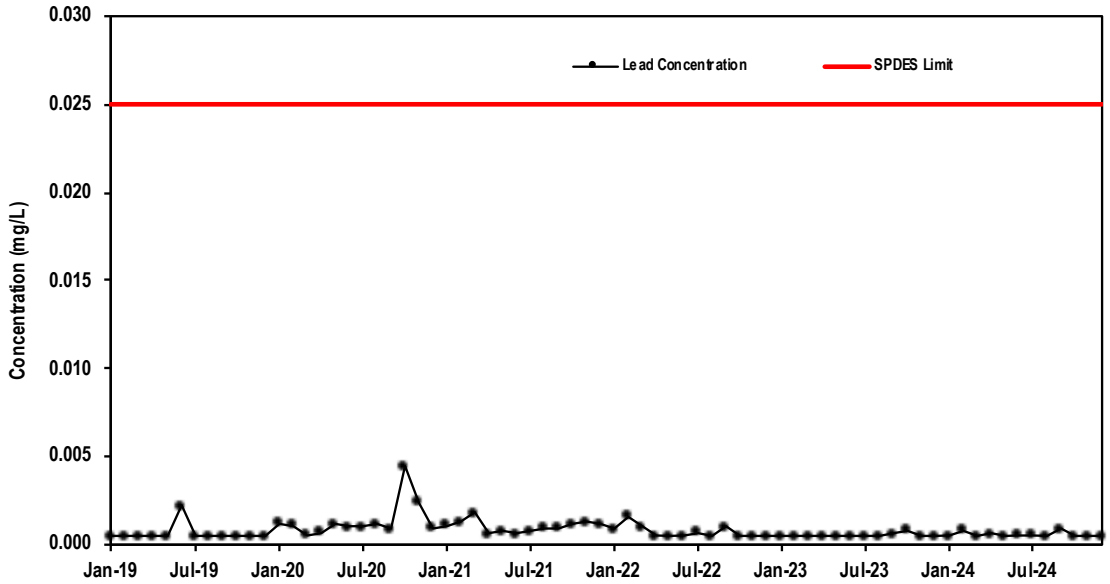

Figure 3-3. Maximum Concentrations of Lead Discharged From the BNL Sewage Treatment Plant, 2019–2024.

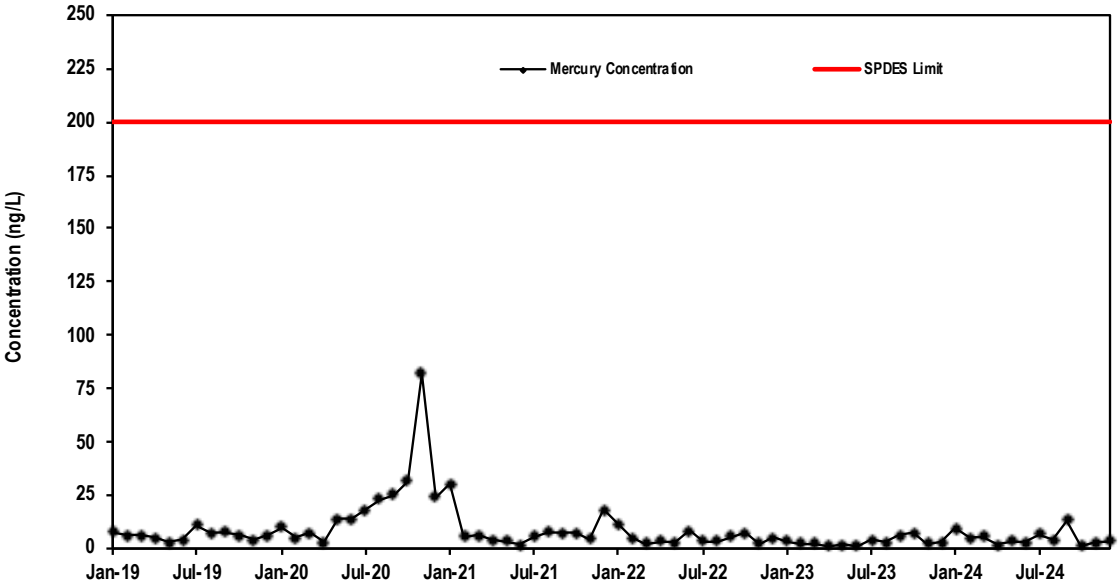

Figure 3-4. Maximum Concentrations of Mercury Discharged From the BNL Sewage Treatment Plant, 2019–2024.

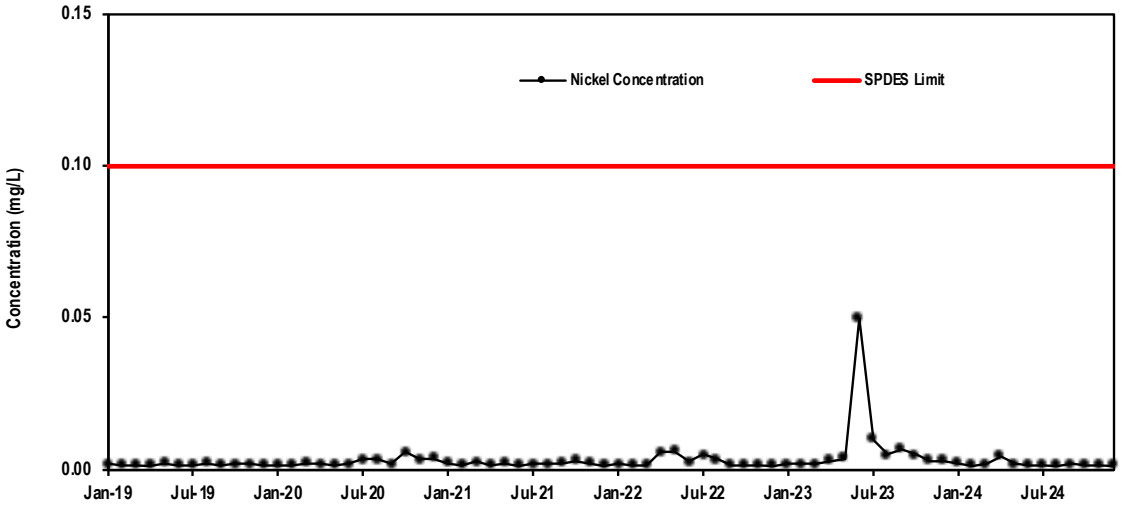

Figure 3-5. Maximum Concentrations of Nickel Discharged From the BNL Sewage Treatment Plant, 2019–2024.

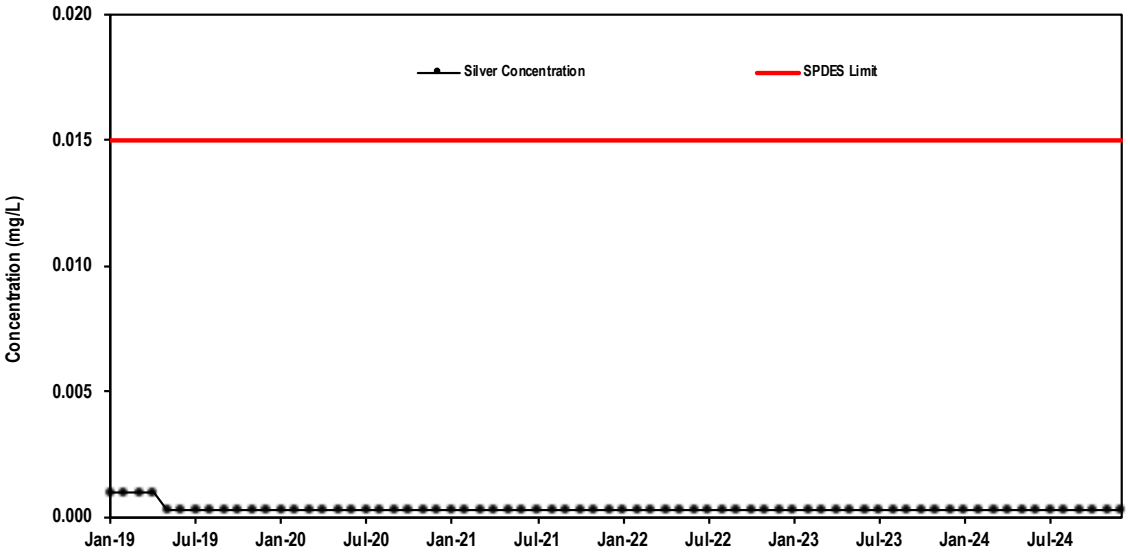

Figure 3-6. Maximum Concentrations of Silver Discharged From the BNL Sewage Treatment Plant, 2019–2024.

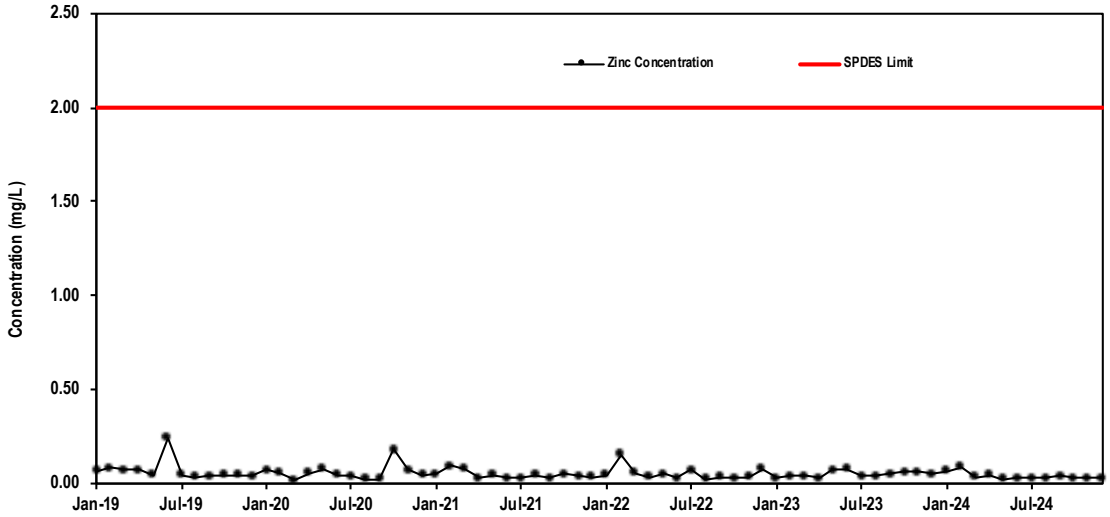

Figure 3-7. Maximum Concentrations of Zinc Discharged From the BNL Sewage Treatment Plant, 2019–2024.

3.6.2 Recharge Basins and Stormwater

Water discharged to Outfalls 002 through 008 and Outfalls 010 through 012 recharges to groundwater. Monitoring requirements for each of these discharges vary, depending on the type of wastewater received and the type of cooling water treatment reagents used. Table 3-4 summarizes the monitoring requirements and performance results.

In 2024, no noncompliance events occurred for any of the permitted recharge basin outfalls.

Table 3-4. Analytical Results for Wastewater Discharges to Outfalls 002, 005 - 008, and 010.

Analyte		Outfall 002	Outfall 002B	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Compliance*
Flow (MGD)	N	CR	CR	CR	CR	CR	CR	10	10		NA	NA
	Min.	0.35	0.001	0.07	0.07	0.02	0.04	0.002	0.001	NA		
	Max.	1.1	0.04	0.5	0.19	0.14	0.12	0.24	0.08	NA		
pH (SU)	Min.	6.4	7.6	6.4	7.6	7.2	7.5	7.2	7.0	NA	0	100
	Max.	8.3	8.7	8.5	8.5	8.6	8.8	8.3	8.5	8.5, 9.0 (a)		
Oil and Grease (mg/L)	N	12	11	10	12	11	NR	10	10		0	100
	Min.	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	NR	< 1.3	< 1.4	NA		
	Max.	2.1	5.7	2.6	1.4	2.8	NR	3.8	2.7	15		
Copper (mg/L)	N	NR	NR	4	NR	NR	NR	NR	4		0	100
	Min.	NR	NR	0.003(T)	NR	NR	NR	NR	0.001	NA		
	Max.	NR	NR	0.01 (T)	NR	NR	NR	NR	0.01	1.0		
Aluminum (mg/L)	N	4	NR	NR	NR	NR	NR	4	4		0	100
	Min.	< 0.07 (T)	NR	NR	NR	NR	NR	< 0.07 (D)	< 0.07 (D)	NA		
	Max.	0.09 (T)	NR	NR	NR	NR	NR	< 0.07 (D)	0.1 (D)	2.0		
Lead, Dissolved (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	4		0	100
	Min.	NR	NR	NR	NR	NR	NR	NR	<0.0005	NA		
	Max.	NR	NR	NR	NR	NR	NR	NR	<0.0005	0.05		
Vanadium, Dissolved (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	4		NA	NA
	Min.	NR	NR	NR	NR	NR	NR	NR	0.001	NA		
	Max.	NR	NR	NR	NR	NR	NR	NR	0.013	NPL		
Chloroform (µg/L)	N	4	NR	NR	NR	NR	NR	NR	NR		0	100
	Min.	< 0.3	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	0.8	NR	NR	NR	NR	NR	NR	NR	7		

(continued on next page)

Table 3-4. Analytical Results for Wastewater Discharges to Outfalls 002, 005 - 008, and 010 *(concluded)*.

Analyte		Outfall 002	Outfall 002B	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Compliance*
Bromo-dichloro-methane (µg/L)	N	4	NR	NR	NR	NR	NR	NR	NR		0	100
	Min.	< 0.3	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	0.9	NR	NR	NR	NR	NR	NR	NR	50		
1,1,1-trichloro-ethane (µg/L)	N	5	NR	NR	NR	NR	NR	10	NR		0	100
	Min.	< 0.3	NR	NR	NR	NR	NR	< 0.3	NR	NA		
	Max.	< 0.3	NR	NR	NR	NR	NR	< 0.3	NR	5		
1,1-dicloro-ethane (µg/L)	N	NR	NR	NR	NR	NR	NR	10	NR		0	100
	Min.	NR	NR	NR	NR	NR	NR	< 0.3	NR	NA		
	Max.	NR	NR	NR	NR	NR	NR	< 0.3	NR	5		
Hydroxy-ethylidene-diphos-phonic acid (mg/L)	N	4	NR	4	4	4	NR	NR	NR		0	100
	Min.	<0.05	NR	<0.05	<0.05	<0.05	NR	NR	NR	NA		
	Max.	<0.05	NR	<0.05	<0.05	<0.05	NR	NR	NR	0.5		
Tolyltriazole (mg/L)	N	4	NR	4	4	4	NR	NR	NR		0	100
	Min.	<0.05	NR	<0.05	<0.05	<0.05	NR	NR	NR	NA		
	Max.	<0.05	NR	<0.05	<0.05	<0.05	NR	NR	NR	0.05		

Notes:
See Figure 5-3 for location of outfalls.
There are no monitoring requirements for Outfalls 009, 011, and 012.
* % Compliance = total no. samples – total no. exceedances/total no. of samples x 100
(a) pH limit is 8.5 for Outfalls 005, 008, and 010; pH limit is 9.0 for Outfalls 002, 002B, 006A, 006B, and 007
CR = continuous recorder
D = dissolved
MGD = million gallons per day
Max. = maximum value
Min. = minimum value
N = number of samples
NA = not applicable
NPL = no permit limit; monitoring only
NR = analysis not required
SPDES = State Pollutant Discharge Elimination System
SU = standard unit
T = total recoverable

3.7
Safe Drinking Water Act (SDWA)

The extraction and distribution of drinking water are regulated under the federal SDWA. In New York State, implementation of the SDWA is delegated to the New York State Department of Health (NYSDOH) and administered locally by SCDHS. Because BNL provides potable water to more than 25 full-time residents, it is subject to the same requirements as a municipal water supplier. Monitoring requirements are prescribed annually by SCDHS, and a Potable Water Sampling and Analysis Plan (Bruno, 2024) is prepared by the Laboratory to comply with these requirements.

3.7.1 Potable Water

The Laboratory has six water supply wells for on-site distribution of potable water, four of which were active during 2024. As required by NYSDOH regulations, BNL monitors the potable wells regularly for bacteria, inorganics, organics, and pesticides. The Laboratory also voluntarily monitors drinking water supplies for radiological contaminants yearly. Tables 3-5, 3-6 and 3-7 provide potable water supply monitoring data. BNL's drinking water and the supply and distribution system were in full compliance with all applicable county, state, and federal regulations regarding drinking water quality, monitoring, operations, and reporting in 2024.

In 2013, the EPA required large water providers to start testing for six common Per- and Polyfluoroalkyl Substances (PFAS) chemicals under the third Unregulated Contaminant Monitoring Rule (UCMR 3). As a medium-size system, BNL was not required to participate in this testing program. In 2017, SCDHS began routine testing of all water supply systems for PFAS, including BNL. PFAS chemicals were detected in three of BNL's active water supply wells. In these initial tests, Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) were detected at concentrations below the 2016 EPA Health Advisory Level of 70 ng/L (ppt) that was established specifically for the combined concentration of these two chemicals. Following repeated confirmed detections of PFAS in the supply wells, the Lab started routine quarterly testing for PFAS in 2018. The results for 2024 are provided in Table 3-7.

In 2020, New York State established enforceable drinking water standards for PFOS and PFOA at concentrations of 10 ng/L (ppt). The other four PFAS chemicals would continue to be regulated under the current New York State limit of 50 µg/L (ppb) for unregulated contaminants. In May 2020, Granular Activated Carbon (GAC) filters were restored on Well 11 to remove PFOS and low levels of the other PFAS chemicals that may be present. In May 2021, GAC filters were restored on Well 10 and construction for the restoration of Well 12 and its GAC filters was completed in 2022. In 2024, the GAC filters were changed out on Well 11 to ensure continued removal of PFAS chemicals and compliance with drinking water standards.

On July 1, 2024, a Notice of Violation (NOV) was received by BNL for failing to submit a Completed Works application to the SCDHS before the relocated water main was placed into service to accommodate the construction of Building 748 in March 2020. This was a violation of Section 5-1.22 of the New York State Sanitary Code. In order to satisfy the violation, BNL provided the necessary Completed Works application within 60 days and coordinated a final inspection with SCDHS.

2025 BROOKHAVEN NATIONAL LABORATORY
Water Quality
CONSUMER CONFIDENCE REPORT

BNL publishes an annual water quality report to provide on-site drinking water consumers with an overview of the Lab's water quality during the previous calendar year. The purpose of this report is to inform you about where your water comes from; what analytical tests are conducted; what they reveal; how the results compare to New York State standards; and to educate you about the importance of preventative measures. Educated consumers are more likely to help protect their drinking water sources.

BNL's drinking water supply and distribution system were in full compliance with all county, state, and federal regulations regarding drinking water quality, monitoring, operations, and reporting in 2024.

BNL's Energy & Utilities (EU) Division is committed to providing over 3,000 employees, facility users, contractors, and guests annually with safe drinking water.

BNL's drinking water is regularly tested using an independent laboratory approved by the New York State Department of Health (NYSDOH). Analytical data are reviewed by the Lab's Environmental Protection Division (EPD) to ensure that testing results comply with all applicable regulatory standards. In addition, EU and EPD work with BNL's Groundwater Protection Group to make sure our potable water supply is not adversely impacted by possible groundwater contamination or remediation operations.

Water Treatment Facility Staff
(L-R) Water Operators – R. Kelley, N. Risi, P. Halpin, S. Kelvas, W. Jensen, J. Stanisci Jr.

Where Does Our Water Come From?

The Long Island aquifer system is made up of three primary formations. From the surface to approximately 150 feet below is the Upper Glacial aquifer, from 150 to 1,000 feet below is the Magothy aquifer, and from 1,000 to about 1,600 feet below is the Lloyd aquifer. As designated by the U.S. Environmental Protection Agency (EPA), Long Island's aquifer system is one of 78 "sole source" aquifers in the nation recognized under the aquifer protection program authorized by the U.S. Safe Drinking Water Act (SDWA).

Four of the Lab's six drinking water wells are in-service and draw up to 1,000 gallons per minute, or about 1.34 million gallons of water per day from the Upper Glacial aquifer to supply drinking water, process cooling water, and fire protection. The water from Well 7 is processed at BNL's on-site Water Treatment Plant. Well 10, Well 11, and Well 12 are treated with a granular activated carbon (GAC) filter, then treated for pH adjustment and disinfection prior to entering the distribution system. Last year, BNL pumped approximately 409 million gallons of water.

For questions about this report, or to speak with someone regarding your drinking water, please contact:

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To ensure that consumers are informed about the quality of Laboratory-supplied potable water, BNL publishes a Consumer Confidence Report (CCR) in May of each year, a deadline stipulated by the SDWA. This report provides information regarding source water supply system, the analytical tests conducted and the detected contaminants which are then compared to federal drinking water standards. The CCR also describes the measures the Laboratory takes to protect its water source and limit consumer exposure to contaminants.

The CCR is distributed to all BNL employees and on-site residents, either in paper form or electronically at http://www.bnl.gov/water/.

Table 3-5. Potable Water Wells and Potable Distribution System: Analytical Results (Maximum Concentration, Maximum pH Value).

Compound	Well No. 7	Well No. 10	Well No. 11	Well No. 12	Potable Distribution Sample	NYS DWS
Water Quality Indicators						
Ammonia (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	SNS
Chlorides (mg/L)	69.1	75	66.9	45.9	65.9	250
Color (units)	30*	<5	<5	<5	<5	15
Conductivity (mmhos/cm)	291	411	389	322	390	SNS
Cyanide (mg/L)	< 10	< 10	< 10	< 10	< 10	SNS
MBAS (mg/L)	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	SNS
Nitrates (mg/L)	0.5	0.6	0.56	0.67	0.58	10
Nitrites (mg/L)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1
Odor (units)	0	0	0	0	0	3
pH (Standard Units)	6.2	8.5	8.6	8.6	8.7	SNS
Sulfates (mg/L)	10.5	9.5	10.4	11.3	11.2	250
Total coliform	ND	ND	ND	ND	ND	Negative
Metals						
Antimony (mg/L)	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	6
Arsenic (mg/L)	1.2	<1.0	<1.0	< 1.0	< 1.0	50
Barium (mg/L)	0.04	0.045	0.04	0.035	0.034	2
Beryllium (mg/L)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	4
Cadmium (mg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	5
Chromium (mg/L)	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	0.1
Copper (mg/L)	0.0031	0.003	0.006	<0.002	0.007	1.3
Fluoride (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	2.2
Hexavalent Chromium (mg/L)	NR	0.89	0.48	0.45	0.32	SNS
Iron (mg/L)	2.9*	<0.02	<0.02	<0.02	0.025	0.3
Lead (mg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	15
Manganese (mg/L)	0.063	<0.01	<0.01	< 0.01	< 0.01	0.3
Metals *(continued)*						
Mercury (mg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
Nickel (mg/L)	0.004	<0.0005	0.002	<0.0005	0.001	SNS
Selenium (mg/L)	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	50
Sodium (mg/L)	39.1	47.1	39.7	26.9	53	SNS
Silver (mg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	100
Thallium (mg/L)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	2
Zinc (mg/L)	<0.02	<0.02	<0.02	<0.02	<0.02	5

(continued on next page)

Table 3-5. Potable Water Wells and Potable Distribution System: Analytical Results (Maximum Concentration, Maximum pH Value) *(concluded)*.

Compound	Well No. 7	Well No. 10	Well No. 11	Well No. 12	Potable Distribution Sample	NYS DWS
Radioactivity						
Cesium-137 (pCi/L)	<6.94	<8.04	<8.09	<9.2	NR	200
Gross alpha activity (pCi/L)	<1.9	<1.88	<1.88	<1.8	NR	15
Gross beta activity (pCi/L)	2.94±1.34	<1.82	4.62±1.54	2.87±1.15	NR	(a)
Strontium-90 (pCi/L)	<0.78	<0.79	<0.77	<0.78	NR	8
Tritium (pCi/L)	<417	<416	<402	<404	NR	20,000
Other						
Alkalinity (mg/L)	14.7	39.8	30.8	19.9	63	SNS
Asbestos (MFL)	NR	NR	NR	NR	< 0.2	7
Calcium (mg/L)	7.7	12.6	9.4	7.4	23.7	SNS
HAA5 (mg/L)	NR	NR	NR	NR	0.002	0.06**
Residual chlorine - MRDL (mg/L)	NR	NR	NR	NR	1.4	4
Tolytriazole (mg/L)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05
TTHM (mg/L)	NR	NR	NR	NR	0.022	0.08**

Notes:
See Figure 7-1 for well locations.
HAA5 = five haloacetic acids
MBAS = methylene blue active substances
MRDL = maximum residual disinfectant level
MFL = Million Fibers per Liter
ND = not detected
NR = analysis not required
NS = not sampled
NYS DWS = New York State Drinking Water Standard
SNS = drinking water standard not specified
TTHM = total trihalomethanes
* Water from this well is treated at the Water Treatment Plant for color and iron reduction prior to distribution.
** Limit imposed on distribution samples only.
(a) The drinking water standard was changed from 50 pCi/L (concentration based) to 4 mrem/yr (dose based) in late 2003. Gross beta activity does not identify specific radionuclides; therefore, a dose equivalent can not be calculated. No specific nuclides were detected; therefore, compliance with the requirement is demonstrated.

Table 3-6. Potable Water Wells: Analytical Results for Principal Organic Compounds, Synthetic Organic Chemicals, Pesticides, Micro-Extractables, and Perfluorinated Compounds.

Compound	WTP Effluent	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
	µg/L					
Dichlorodifluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Vinyl Chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2
Bromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Trichlorofluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Methylene Chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
trans-1,2-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
cis-1,2-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
2,2-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Bromochloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,1-trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Carbon Tetrachloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Trichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Dibromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
trans-1,3-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
cis-1,3-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,2-trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,1,2-tetrachloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Bromobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,3-trichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
2-chlorotoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-chlorotoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,4-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,4-trichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Hexachlorobutadiene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Tetrachloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,3-trichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Toluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5

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Table 3-6. Potable Water Wells: Analytical Results for Principal Organic Compounds, Synthetic Organic Chemicals, Pesticides, Micro-Extractables, and Perfluorinated Compounds *(continued).*

Compound	WTP Effluent	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
	µg/L					
Ethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
m,p-xylene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	5
o-xylene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Styrene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Isopropylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-propylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3,5-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chlorodifluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Tert-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,4-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
sec-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-Isopropyltoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroform	< 0.5	< 0.5	0.6	1.1	1.2	50
Bromodichloromethane	1.3	< 0.5	< 0.5	< 0.5	< 0.5	50
Dibromochloromethane	3.4	< 0.5	< 0.5	< 0.5	< 0.5	50
Bromoform	2.3	< 0.5	< 0.5	< 0.5	< 0.5	50
Methyl tert-butyl ether	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Toxaphene	< 1	< 1	< 1	< 1	< 1	3
Total PCB's	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.5
2,4,5,-TP (Silvex)	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	10
Dinoseb	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	50
Dalapon	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	50
Pichloram	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Dicamba	<1	<1	<1	<1	<1	50
Pentachlorophenol	< 0.04	<0.04	< 0.04	< 0.04	< 0.04	1
Hexachlorocyclopentadiene	< 0.1	0.02	< 0.1	< 0.1	< 0.1	5
Bis(2-ethylhexyl)Phthalate	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	50
Bis(2-ethylhexyl)Adipate	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	50
Hexachlorobenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	5
Benzo(A)Pyrene	0.03	< 0.02	< 0.02	< 0.02	< 0.02	50
Aldicarb Sulfone	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	SNS
Aldicarb Sulfoxide	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Aldicarb	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Oxamyl	< 1	< 1	< 1	< 1	< 1	50
3-Hydroxycarbofuran	<1	< 1	< 1	< 1	< 1	50
Carbofuran	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	40
Carbaryl	< 1	< 1	< 1	< 1	< 1	50
Methomyl	< 1	< 1	< 1	< 1	< 1	50
Glyphosate	< 6	< 6	< 6	<6	< 6	50

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Table 3-6. Potable Water Wells: Analytical Results for Principal Organic Compounds, Synthetic Organic Chemicals, Pesticides, Micro-Extractables, and Perfluorinated Compounds *(concluded)*.

Compound	WTP Effluent	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
	µg/L					
Diquat	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	50
1,2-dibromoethane (EDB)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
1,2-dibromo-3-chloropropane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2
Lindane	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
Heptachlor	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.4
Aldrin	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	5
Heptachlor Epoxide	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
Dieldrin	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	5
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2
Methoxychlor	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	40
Chlordane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
2,4,-D	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Alachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
Simazine	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	50
Atrazine	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	3
Metolachlor	< 1	< 1	< 1	< 1	< 1	50
Metribuzin	< 0.5	< 0.15	< 0.15	< 0.15	< 0.15	50
Butachlor	< 1	< 1	< 1	< 1	< 1	50
Endothall	< 9	< 9	< 9	< 9	< 9	100
Propachlor	< 1	< 1	< 1	< 1	< 1	50
Freon-113	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
1,4-Dioxane	0.09	0.12	0.06	0.04	0.04	1

Notes:
See Figure 7-1 for well locations.
For compliance determination with New York State Department of Health standards, potable water samples were analyzed quarterly for Principal Organic Compounds and annually for other organics by Pace Labs, a New York State-certified contractor laboratory.
The minimum detection limits for principal organic compound analytes are 0.5 mg/L. Minimum detection limits for synthetic organic chemicals and micro-extractables are compound-specific, and, in all cases, are less than the New York State Department of Health drinking water standard.
SNS = drinking water standard not specified
NYS DWS = New York State Drinking Water Standard
WTP = Water Treatment Plant

Table 3-7. Potable Water Wells and Potable Distribution System: Perflourinated Compounds.

Compound	Well No. 7	Well No. 10	Well No. 11	Well No. 12	Water Treatment Facility	NYS DWS
	ng/L					
Perfluorooctanesulfonate (PFOS)	1.73	<1.95	0.78	<1.88	1.74	10
Perfluoroundecanoic acid (PFUnDA)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
Perfluoropentanoic acid (PFPeA)	1.35	0.81	3.38	0.68	1.06	NS
Perfluoropentanesulfonate (PFPeS)	<1.77	<1.83	<1.76	<1.77	<1.78	NS
Fluorotelomer sulfonate 6:2 (6:2 FTS)	<14.1	<14.6	<14.1	<14.1	<14.2	NS
Perfluorohexanoic acid (PFHxA)	1.09	<1.95	2.80	0.99	1.05	NS
Perfluorododecanoic acid (PFDoA)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
Perfluorooctanoic acid (PFOA)	1.57	<1.95	1.35	0.78	1.64	10
Perfluorodecanoic acid (PFDA)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
Perfluorohexanesulfonate (PFHxS)	<1.71	<1.78	1.64	0.88	<1.72	NS
Perfluorobutyric acid (PFBA)	0.86	131.00	39.80	2.69	6.51	NS
Perfluorobutanesulfonate (PFBS)	<1.87	<1.74	1.12	<1.68	<1.68	NS
Perfluoroheptanoic acid (PFHpA)	0.65	<1.95	0.71	<1.88	0.74	NS
Perfluoroheptanesulfonate (PFHpS)	<1.79	<1.85	<1.78	<1.79	<1.80	NS
Perfluorononanoic acid (PFNA)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
1H, 1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	<3.62	<3.75	<3.6	<3.62	<3.63	NS
Fluorotelomer sulfonate 4:2 (4:2 FTS)	<3.54	<3.67	<3.52	<3.54	<3.56	NS
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	<1.77	<1.84	<1.77	<1.77	<1.78	NS
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	<1.76	<1.82	<1.75	<1.76	<1.76	NS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	<3.77	<3.90	<3.75	<3.77	<3.78	NS
Perfluoro-3-methoxypropanoic acid (PFMPA)	<3.77	<3.90	<3.75	<3.77	<3.78	NS
Perfluoro-4-methoxybutanoic acid (PFMBA)	<3.77	<3.96	<3.75	<3.77	<3.78	NS
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	<1.88	<1.95	<1.87	<1.88	<1.89	NS
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	<3.36	<3.42	<3.32	<3.35	NR	NS
Perfluorotetradecanoic acid (PFTDA)	<1.68	<1.71	<1.66	<1.68	NR	NS
Perfluorotridecanoic acid (PFTrDA)	<1.68	<1.71	<1.66	<1.68	NR	NS
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	<3.36	<3.42	<3.32	<3.35	NR	NS

Notes:
NS - No Standard. NYS currently does not have a drinking water standard for these compounds. Compounds are subjected to the 50 ug/L limit for nonregulated contaminants.
NR - Not Required. Samples were not required at this location.
Results from wells 10,11,and 12 are post Granulated Active Carbon treatment except for N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA), Perfluorotetradecanoic acid (PFTDA), Perfluorotridecanoic acid (PFTrDA) and N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA) which are untreated water analyses.

3.7.2 Cross-Connection Control

The SDWA requires that public water suppliers implement practices to protect the water supply from sanitary hazards. One of the safety requirements is to rigorously prevent cross-connections between the potable water supply and facility piping systems. Cross-connection control is the installation of control devices (e.g., double-check valves, reduced pressure zone valves, etc.) at the interface between a facility and the domestic water main. Cross-connection control devices are required at all facilities where hazardous materials are used in a manner that could result in their accidental introduction into the domestic water system, especially under low-pressure conditions. In addition, secondary cross-connection controls at the point of use are recommended to protect users within a specific facility from hazards that may be posed by intrafacility operations.

During 2024, the Laboratory inspected 289 cross-connection control devices, including primary devices installed at interfaces to the potable water main and secondary control devices at the point of use. If a problem with a cross-connection device is encountered during testing, the device is repaired and re-tested to ensure proper function. Copies of the cross-connection device test reports are filed with SCDHS each year.

3.7.3 Underground Injection Control

Underground Injection Control (UIC) wells are regulated under the SDWA. At the Laboratory, UICs include drywells, cesspools, septic tanks, and leaching pools, all of which are classified by EPA as Class V injection wells. Proper management of UIC devices is vital for protecting underground sources of drinking water. In New York State, the UIC program is implemented through EPA because NYSDEC has not adopted UIC regulatory requirements (Note: New York State regulates the discharges of pollutants to cesspools under the SPDES program). Under EPA's UIC program, all Class V injection wells are authorized by rule and must be included in an inventory maintained with the agency.

In addition to the UICs maintained for routine Laboratory discharges of sanitary waste and stormwater, UICs also are maintained at several on- and off-site treatment facilities used for groundwater remediation. Contaminated groundwater is treated and then returned to the aquifer via drywells, injection wells, or recharge basins. Discharges to these UICs are also authorized by rule rather than by permit. Under the authorized by rule requirements, a separate inventory is maintained for these treatment facilities and is periodically updated whenever a new device is added or closed.

No UIC installations occurred in 2024. BNL's total UIC inventory at the end of 2024 was 133.

3.8
Preventing and Reporting Spills

Federal, state, and local regulations are in place to address the management of storage facilities containing chemicals, petroleum, and other hazardous materials. The regulations include specifications for the design of storage facilities, requirements for written plans relating to unplanned releases, and requirements for reporting releases that do occur. BNL's compliance with these regulations is further described in the following sections.

3.8.1 Preventing Oil Pollution and Spills

As required by the Oil Pollution Act, BNL maintains a Spill Prevention Control and Countermeasures (SPCC) Plan as a condition of its license to store petroleum fuel (Bruno, 2024). The purpose of this plan is to provide information regarding release prevention measures, the design of storage facilities, and maps detailing storage facility locations. The plan also outlines mitigating and remedial actions that would be taken in the event of a major spill. BNL's SPCC plan is filed with NYSDEC, EPA, and DOE, and must be updated every five years. BNL remained in full compliance with SPCC requirements in 2024.

3.8.2 Emergency Reporting Requirements

The Emergency Planning and Community Right-to-Know Act (EPCRA) and Title III of the Superfund Amendments and Reauthorization Act require that facilities report inventories and releases of certain chemicals that exceed specific release thresholds. Community Right-to-Know requirements are codified under 40 CFR Parts 355, 370, and 372. Table 3-8 summarizes the applicability of the regulations to BNL.

The Laboratory complied with these requirements through the submittal of Tier II and Tier III Reports required under EPCRA Sections 302, 303, 311, 312, and 313. In fulfillment of the Tier II requirements, BNL submitted an inventory of 41 on-site chemicals (with thresholds greater than 10,000 pounds or 500 pounds for acutely toxic materials) via E-Plan, the New York State-approved computer-based submittal program.

Table 3-8. Applicability of EPCRA to BNL.

Applicability of EPCRA to BNL				
EPCRA 302–303	Planning Notification	YES [X]	NO [ ]	NOT REQUIRED [ ]
EPCRA 304	EHS Release Notification	YES [ ]	NO [ ]	NOT REQUIRED [X]
EPCRA 311–312	MSDS/Chemical Inventory	YES [X]	NO [ ]	NOT REQUIRED [ ]
EPCRA 313	TRI Reporting	YES [X]	NO [ ]	NOT REQUIRED [ ]

Notes:
EHS: Extremely Hazardous Substance
SDS: Safety Data Sheet
TRI: Toxic Release Inventory

To satisfy the requirements of the Tier III submittal, the Laboratory submitted its data via the EPA-approved TRI-ME computer-based submittal program. During 2024, BNL reported releases of lead (about 34,000 pounds), mercury (about 50 pounds), polychlorinated biphenyls (PCBs) (about one pound), benzo(g,h,i)perylene (less than one pound), and polycyclic aromatic compounds (less than one pound). No friable asbestos was sent off-site for disposal in 2024. Releases of lead, PCBs, and mercury were in the form of shipments of waste for off-site recycling or disposal. Releases of benzo(g,h,i)perylene and polycyclic aromatic compounds were byproducts of the combustion of fuel oils and were well below any regulatory limits. In 2024, there were no releases of extremely hazardous substances reportable under Part 304.

3.8.3 Spills and Releases

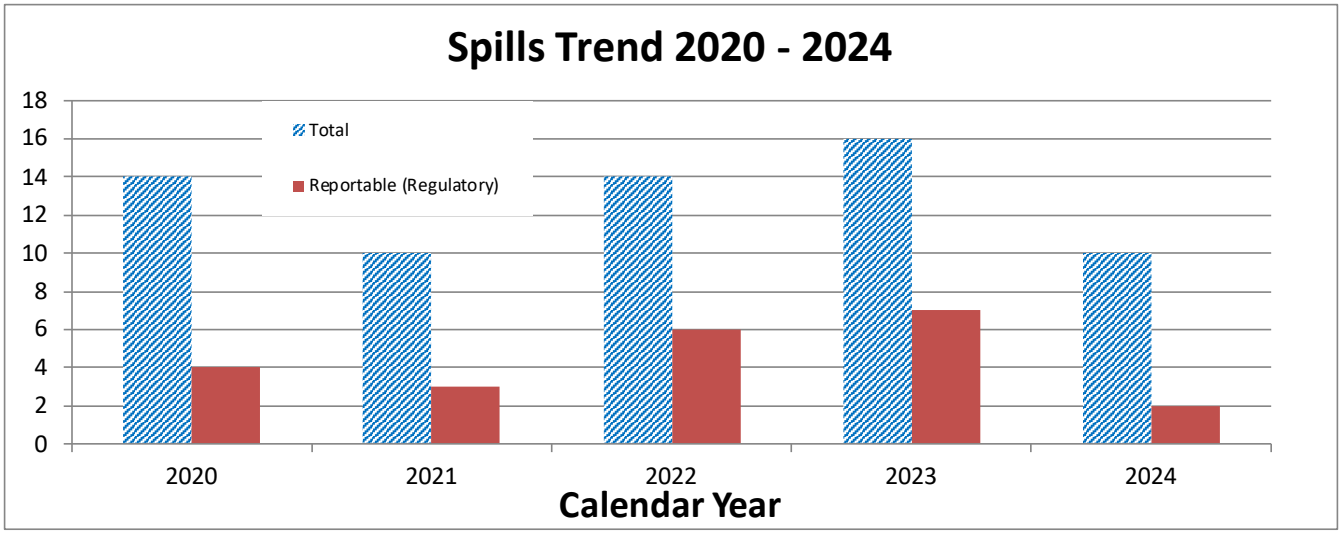
When a spill of hazardous material occurs, Laboratory and contractor personnel are required to immediately notify the BNL Fire Rescue Group, whose members are trained to respond to such releases. Fire Rescue's initial response is to contain and control any release and to notify additional response personnel (e.g., BNL environmental professionals, industrial hygienists, etc.). Environmental professionals reporting to the scene assess the spill for environmental impact and determine if it is reportable to regulatory agencies. Any release of petroleum products to soil must be reported to both NYSDEC and SCDHS, and any release affecting surface water is also reported to the EPA National Response Center. In addition, a release of more than five gallons of petroleum product to impermeable surfaces or containment areas must be reported to NYSDEC and SCDHS. Spills of chemicals in quantities greater than the CERCLA-reportable limits must be reported to the EPA National Response Center, NYSDEC, and SCDHS. Remediation of spills is conducted, as necessary, to prevent impacts to the environment, minimize human health exposures, and restore the site.

Table 3-9. Summary of Chemical and Oil Spill Reports.

BNL Spill No. and Date	Material/ Quantity	ORPS Report	Source/Cause and Corrective Actions
24-05 (4/15/24)	Hydraulic fluid 1 quart	No	Leak observed by Public Service Enterprise Group (PSEG) Contractor coming from boom on tree trimming vehicle (NYS Plate: ZVG5022). Boom was enclosed and leak was not observed until hydraulic oil travelled down from the top of the boom enclosure and sprayed onto grass below vehicle. Contractor wiped down sprayed oil on the vehicle's roof and walking surface. Vehicle's boom was retracted to its normal highway condition and was re-positioned in order to facilitate cleanup. Contractors removed and bagged the top layer of oil-stained grass and then dug up the base grass and soil below the grass. Oil-contaminated grass/soil was containerized into 55-gallon drums and was properly disposed of at an off-site Treatment, Storage, and Disposal Facility (TSDF) by PSEG Contractors.
24-06 (4/30/24)	Hydraulic fluid 3 gallons	No	A hydraulic line failed on a BNL-owned dump trailer releasing ~3 gallons of hydraulic fluid to nearby soil adjacent to the roadway. BNL Grounds Department staff placed the contaminated soil into two (2) 55-gallon drums. Environmental Protection Division personnel managed the drums for proper off-site disposal.

There were 10 spills in 2024 and two of those spills met regulatory agency reporting criteria. The remaining spills were small-volume releases either to containment areas or to other impermeable surfaces that did not exceed a reportable quantity. Table 3-9 summarizes each of the two reportable events, including a description of the cause and corrective actions taken. Figure 3-8 is a five-year trend of spills that have occurred at BNL. The decreased trend in the number of spills over the last year is due to a decrease in major exterior construction activities and more staff awareness. There were no long-term effects from these releases and no significant impact on the environment. In all instances, any recoverable material was removed, spill absorbents were used to remove the residual product, and all materials were collected and containerized for off-site disposal. For releases to soil, contaminated soil was removed to the satisfaction of the State inspector and containerized for off-site disposal.

Figure 3-8. Spills Trend 2020-2024.



3.8.4 Major Petroleum Facility (MPF) License

The storage and transfer of 1.9 million gallons of fuel oil (principally No. 6 oil and No. 2 oil) subjects the Laboratory to MPF licensing by NYSDEC. The fuel oil used at the CSF to produce high-pressure steam to heat and cool BNL facilities is stored in five tanks with capacities ranging from 300,000 to 600,000 gallons.

The remaining storage facilities at BNL have capacities that range from 100 to 10,000 gallons and are located throughout the site where there is a need for building heat, emergency power, fuel, or other miscellaneous petroleum needs (e.g., motor oil, used oil, lube oil, biodiesel).

There are currently 56 active petroleum storage facilities listed on the license. BNL remained in full compliance with MPF license requirements in 2024, which includes monitoring groundwater near five active above-ground storage tanks at the MPF. The license also requires the Laboratory to inspect the storage facilities monthly, test the tank leak detection systems, and ensure high-level monitoring and secondary containment is functional. Tank integrity is also checked periodically. Groundwater monitoring consists of monthly checks for the presence of floating products and twice-yearly analyses for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). In 2024, no VOCs or floating products attributable to MPF activities were detected above detectable limits. Low level (estimated) concentrations of several SVOCs (e.g., Bis(2-ethylhexyl) phthalate, Di-n-butyl phthalate, and Phenol) were reported for samples collected from the upgradient well and all seven downgradient wells. Bis(2-ethylhexyl) phthalate and Phenol were found just above New York State Ambient Water Quality Standards. See SER Volume II, Groundwater Status Report, for additional information on groundwater monitoring results in areas where bulk petroleum products are being stored.

In August 2024, five inspectors from U.S. EPA Region 2 performed a 40 CFR Part 280 regulatory inspection of the Lab's Underground Storage Tanks (USTs). The inspection included review of records and field inspections of the UST sumps, piping, overfill and leak detection, and Automatic Tank Gauge Systems. The final UST Compliance Evaluation Inspection letter indicated that no concerns were uncovered. A NYSDEC bulk storage tank inspection did not occur in 2024; however, there is an inspection scheduled for March 2025.

3.8.5 Chemical Bulk Storage (CBS)

Title 6 of the Official Compilation of the Codes, Rules, and Regulations of the State of New York (NYCRR) Part 596 requires that all aboveground tanks larger than 185 gallons and all underground tanks that store specific chemicals are registered with NYSDEC. The Laboratory holds a Hazardous Substance Bulk Storage Registration Certificate for six tanks that store treatment chemicals for potable water (sodium hydroxide and sodium hypochlorite). The tanks range in capacity from 200 to 1,000 gallons. There were no NYSDEC CBS Facility inspections in 2024; however, the NYSDEC scheduled a regulatory inspection for March of 2025.

3.8.6 County Storage Requirements

Article 12 of the Suffolk County Sanitary Code (SCSC) regulates the storage and handling of toxic and hazardous materials in aboveground or underground storage tanks, drum storage facilities, piping systems, and transfer areas. Article 12 specifies design criteria to prevent environmental impacts resulting from spills or leaks, and specifies administrative requirements such as identification, registration, and spill reporting procedures. In 1987, the Laboratory entered into a voluntary Memorandum of Agreement with SCDHS, in which DOE and BNL agreed to conform to the environmental requirements of Article 12.

In April 2010, due to a directive from NYSDEC asserting its sole jurisdiction over petroleum storage at Major Oil Storage Facilities, SCDHS notified BNL that it will cease permitting activities (e.g., review/approval for new construction and modifications, issuance of operating permits, and registration requirement) for all petroleum bulk storage facilities. In 2011, the Laboratory received further information that indicated SCDHS had ceased applying Article 12 requirements to both petroleum and chemical storage at BNL regardless of whether the storage is regulated by NYSDEC. Currently, there are approximately 125 active storage facilities that are not regulated by NYSDEC that would normally fall under SCSC Article 12 jurisdiction. This includes storage of wastewater and chemicals, as well as storage facilities used to support BNL research.

To ensure that storage of chemicals and petroleum continues to meet Article 12 requirements, BNL continues to abide by the original 1987 agreement with Suffolk County and will maintain conformance with applicable requirements of Article 12. These requirements include design, operational, and closure requirements for current and future storage facilities. Although the Laboratory will no longer submit new design plans for SCDHS review and approval or continue to perform other administrative activities such as registration of exempt facilities and updates of shared databases, it will continue to inspect all storage facilities to ensure operational requirements of SCSC Article 12 are maintained.

3.9 Resource Conservation and Recovery Act (RCRA) Requirements

The RCRA regulates hazardous waste that, if mismanaged, could present risks to human health or the environment. The regulations are designed to ensure that hazardous wastes are managed from the point of generation to final disposal. In New York State, U.S. EPA delegates the RCRA program to NYSDEC with U.S. EPA retaining an oversight role. Because the Laboratory may generate greater than 1,000 Kg (2,200 pounds) of hazardous waste in a month, it is considered a large quantity generator and has a RCRA permit to store hazardous wastes for up to one year before shipping the wastes off-site to licensed treatment and disposal facilities.

As noted in Chapter 2, BNL also has several satellite accumulation and 90-Day Hazardous Waste Accumulation Areas. Included with the hazardous wastes regulated under RCRA are mixed wastes which are typically generated in small quantities from research activities at BNL. Mixed wastes are materials that are both hazardous (under RCRA guidelines) and radioactive.

During 2024, BNL completed the RCRA Closure of four 90-Day Hazardous Waste Storage Areas. This required the sampling and analysis of surfaces where wastes were stored to demonstrate the absence of contamination. These closures were witnessed and certified completed by the NYSDEC.

In June 2024, the U.S. EPA conducted a hazardous waste compliance evaluation inspection (CEI) at BNL to fulfill the statutory requirement under RCRA to annually inspect all federally owned and/or operated hazardous waste treatment, storage, and disposal facilities (TSDFs). The inspection involved the review of shipping manifests, the WMF's Part 373 RCRA Permit, inspection and training records, and a visit to the NYSDEC Permitted TSDF and site 90-Day and Satellite Accumulation hazardous waste storage areas. A letter documenting an inspection in June was received from the U.S. EPA on September 16, 2024, indicating that the review of information provided by the facility uncovered no concerns.

3.10 Polychlorinated Biphenyls (PCBs)

The storage, handling, and use of PCBs are regulated under the Toxic Substance and Control Act. Capacitors manufactured before 1979 that are believed to be oil filled are handled as if they contain PCBs, even when that cannot be verified from the manufacturer's records. All equipment containing PCBs must be inventoried, except for capacitors containing less than three pounds of dielectric fluid and items with a concentration of PCB source material of less than 50 parts per million. Certain PCB-containing articles or PCB containers must be labeled. The inventory is updated by July 1 of each year.

The Laboratory responds to any PCB spill in accordance with standard emergency response procedures. BNL was in compliance with all applicable PCB regulatory requirements during 2024 and disposed of 22 pounds of PCB-contaminated oil, debris, and other equipment comprised predominantly of lighting ballasts and small capacitors.

The Laboratory has aggressively approached a reduction in its PCB inventory, reducing it by more than 99% since 1993. The only known regulated PCB-contaminated piece of electrical equipment remaining on-site is a one-of-a-kind klystron located in BNL's Chemistry Department.

3.11 Pesticides

The storage and application of pesticides (e.g., insecticides, rodenticides, herbicides, and algicides) are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act and the NYSDEC Pesticide Regulations. BNL uses an Integrated Pest Management approach that was developed over a decade ago and was assessed in 2021 by a third-party (Cornell Cooperative) and is scheduled for an assessment in January of 2025. Pesticides are used at the Laboratory to control undesirable insects and mice and microbial growth in cooling towers and to maintain certain areas free of vegetation (e.g., around fire hydrants and inside secondary containment berms). Insecticides are also applied in research on greenhouses on-site and the Biology Field. Herbicide use is minimized wherever possible (e.g., through spot treatment of weeds). Pesticides are applied by BNL-employed, NYSDEC pesticide-certified applicators. On an infrequent basis and for special projects, an outside vendor who also possesses the required NYSDEC application licenses applies pesticides. Cooling towers are regularly treated by another vendor that has NYSDEC-licensed pesticide applicators using NYSDEC approved biocides, corrosion inhibitors, and disinfectants to prevent corrosion and to disinfect the towers on-site.

In 2024, BNL-licensed pesticide applicators, in conjunction with the Environmental Protection Division (EPD) subject matter experts, reduced the amount of corn being placed inside the 4-Poster™ Tick Control Devices to 100 lbs per week (see Chapter 6 for more details on these devices) to more effectively treat the target species (deer) and to minimize non-target species corn consumption. This strategy has resulted in the reduction of the amount of pesticide applied to the rollers on the devices. The amount of overall pesticide usage in 2024 versus previous years has decreased while maintaining effectiveness at a 75% reduction in the number of ticks compared to when the Lab began using the devices in 2013. Prior to February 1 of every year, each BNL pesticide applicator submits application records to EPD staff for review and electronic submittal using a NYSDEC-approved software application. This annual report details insecticide, rodenticide, algaecide, and herbicide use for the previous year by licensed BNL staff members. Contractors who apply pesticides and cooling tower biocides are responsible for filing their own reports.

3.12 Wetlands and River Permits

As noted in Chapter 1, portions of the site are situated in the Peconic River floodplain. Portions of the Peconic River are listed by NYSDEC as "scenic" under the New York Wild, Scenic, and Recreational River Systems Act. The Laboratory also has six areas regulated as wetlands and several vernal (seasonal) pools. Construction or modification activities performed within these areas require permits from NYSDEC.

Activities that could require review under the BNL Natural and Cultural Resource Management Programs (BNL 2021 and BNL 2023a) are identified during the NEPA process (see Section 3.3). In the preliminary design stages of a construction project, design details required for the permit application process are specified. These design details ensure that the construction activity will not negatively affect the area, or if it does, that the area will be restored to its original condition. When design is near completion, permit applications are filed. During and after construction, the Laboratory must comply with the permit conditions. There were no open permits in 2024.

3.13 Protection of Wildlife

3.13.1 Endangered Species Act

BNL updates its list of species that are endangered, threatened, and/or of special concern (see Table 6-1 in Chapter 6) as data from state and federal sources are provided. The northern long-eared bat *(Myotis septentrionalis)* is the first federally listed species known to be present at the Laboratory. This species is known historically to utilize the site at least during the summer months, and management options have been established for the protection of this species on-site.

State-recognized endangered (E) or threatened (T) species that have historically been found at BNL include: eastern tiger salamander (E), peregrine falcon (E), persius dusky-wing (E), bracken fern (E), crested fringed orchid (E), Engelman spikerush (E), dwarf huckleberry (E), prostrate knotweed (E), possum haw (E), ipecac spurge (E), swamp darter (T), banded sunfish (T), frosted elfin (T), little bluet (T), scarlet bluet (T), pine barrens bluet (T), northern harrier (T), stargrass (T), eastern showy aster (T), and stiff-leaved goldenrod (T).

Tiger salamanders are listed as endangered in New York State because populations have declined due to habitat loss through development, road mortality during breeding migration, introduction of predatory fish into breeding sites, historical collection for the bait and pet trade, water level fluctuations, pollution, and general disturbance of breeding sites. The BNL Natural Resource Management Plan (NRMP) (BNL 2021) formalizes the strategy and actions needed to protect 26 confirmed tiger salamander breeding locations on-site. The strategy includes identifying and mapping habitats, monitoring breeding conditions, improving breeding sites, and controlling activities that could negatively affect breeding.

Peregrine falcons are listed as endangered in New York State due to historic declines associated with dichlorodiphenyltrichloroethane (DDT). While falcons have been documented in the past (2021 and 2022), there was no indication of nesting in 2024.

Banded sunfish and swamp darter have historically been found in the Peconic River drainage areas on-site. Both species are listed as threatened within New York State, with eastern Long Island having the only known remaining populations of these fish in New York. Measures taken, or being taken, by the Laboratory to protect the banded sunfish and swamp darter and their habitats include eliminating, reducing, or controlling pollutant discharges to the Peconic River; monitoring populations and water quality to ensure that habitat remains viable; and minimizing disturbances to the river and adjacent banks. Due to an extended drought from 2015 through mid-2023, these two fish are not likely to be found on-site. Should NYSDEC establish a recovery plan, fish may be restored to historic habitats in the future.

Three butterfly species that are endangered, threatened, or of special concern have been historically documented at the Laboratory. These include the frosted elfin, persius duskywing, and the mottled duskywing. None have been documented in recent surveys. Limited habitat for the frosted elfin and persius duskywing exists on Laboratory property and the mottled duskywing may exist on-site; therefore, the need to manage habitat and surveys for the three butterflies has been added to the NRMP.

Surveys for damselflies and dragonflies conducted periodically during the summer months confirmed the presence of one of the three threatened species of damselflies expected to be found on-site. The pine barrens bluet, a threatened species, has been documented at one of the many coastal plain ponds at BNL.

The Laboratory is also home to 12 species that are listed as species of special concern. Such species have no protection under the state endangered species laws but may be protected under other state and federal laws (e.g., Migratory Bird Treaty Act). New York State monitors species of special concern and manages their

populations and habitats, where practical, to ensure that they do not become threatened or endangered. Species of special concern found at BNL include the mottled duskywing butterfly, marbled salamander, eastern spadefoot toad, spotted turtle, eastern box turtle, eastern hognose snake, worm snake, whippoorwill, vesper sparrow, redheaded woodpecker, osprey, sharp-shinned hawk, and Cooper's hawk.

The management efforts for the tiger salamander also benefit the marbled salamander. At present, no protective measures are planned for the eastern box turtle or spotted turtle, as little activity occurs within their known habitat at the Laboratory. The Laboratory continues to evaluate bird populations as part of the management strategy outlined in the NRMP.

The Laboratory has 33 plant species that are protected under state law: eight are endangered; three are threatened (as listed above); and four are rare plants: the small-flowered false foxglove, narrow-leaved bush clover, wild lupine, and long-beaked bald rush. The other 18 species are "exploitably vulnerable," meaning that they may become threatened or endangered if factors that result in population declines continue. These plants are currently sheltered due to the large areas of undeveloped pine barren habitat on-site. Five species on the BNL list are likely present or possible due to the presence of correct habitat. As outlined in the NRMP, locations of these rare plants must be determined, populations estimated, and management requirements established. See Chapter 6 for further details.

3.13.2 Migratory Bird Treaty Act

As mentioned in Chapter 1, the Laboratory has identified more than 185 species of migratory birds since 1948; of those, approximately 84 species nest on-site. Under the Migratory Bird Treaty Act, migratory birds are protected from capture, harassment, and destruction or disturbance of nests without permits issued by the U.S. Fish and Wildlife Service. In the past, migratory birds have caused health and safety issues, especially through the deposition of fecal matter and the birds' assertive protection of nesting sites. When this occurs, proper procedures are followed to allow the birds to nest and preventive measures are taken to ensure that they do not cause problems in the future (e.g., access to nesting is closed or repaired, and/or deterrents to nesting are installed). Canada geese (*Branta canadensis*) are managed under an annual permit from the U.S. Fish and Wildlife Services goose nest management program. Occasionally, nesting migratory birds come in conflict with ongoing or planned construction activities. When this occurs, the United States Department of Agriculture, Animal Plant Health Inspection Service, Division of Wildlife Services (USDA-APHIS-WS) is called for consultation and resolution, if possible. Each incident is handled on a case-by-case basis to ensure the protection of migratory birds, while maintaining fiscal responsibility. See Chapter 6 for more information on migratory birds.

Peregrine falcon sitting on ledge at Center for Functional Nanomaterials.

3.13.3 Bald and Golden Eagle Protection Act

While BNL does not have bald or golden eagles nesting on-site, these birds are occasionally observed visiting the area during migration. Since the first documented nesting on Long Island in 2013, bald eagles have become a common site on Long Island and at BNL. Bald eagles are seen at numerous locations on the BNL site throughout the year. Further information on bald eagles is presented in Chapter 6.

3.14
Public Notification of Clearance of Property

In accordance with DOE Order 458.1, authorized releases of property suspected of containing residual radioactive material must meet DOE and other federal, state, and local radiation protection policies and requirements. Released property must be appropriately surveyed, and the Laboratory must adequately demonstrate that authorized limits are met. In addition, documentation supporting the release of property should be publicly available. The release of property off the BNL site from radiological areas is controlled. No vehicles, equipment, structures, or other materials from these areas can be released from the Laboratory unless the amount of residual radioactivity on such items is less than the authorized limits. The default authorized limits are specified in the BNL Site Radiological Control Manual (BNL 2023 Rev. 13) and are consistent with the pre-approved authorized release limits set by DOE Order 458.1.

In 2024, excess materials not identified as radioactive, such as scrap metal and electronics equipment resulting from normal operations, were released to interested parties or to an off-site location. All materials were surveyed, as required, using appropriate calibrated instruments and released based on the DOE pre-approved authorized release limits. There were no releases of real property in 2024.

3.15
External Audits and Oversight

3.15.1 Regulatory Agency Oversight

A number of federal, state, and local agencies oversee BNL activities. In addition to external audits and oversight, the Laboratory has a comprehensive self-assessment program, as described in Chapter 2. In 2024, BNL was inspected by federal, state, or local regulators on eight occasions. These inspections included:

- **Potable Water.** On July 29, SCDHS performed the Annual Water Supply Sanitary Survey of the BNL potable water system. There were no violations identified; corrective actions for any minor deficiencies were established and communicated with SCDHS and were addressed by the Laboratory's Energy & Utilities Division.
- **STP.** SCDHS conducts quarterly inspections of the Laboratory's STP to evaluate operations and sample the effluent for SPDES compliance. No performance or operational issues were identified. SCDHS also visited the site in June to collect samples and perform SPDES inspections of other permitted outfalls. No issues were identified.
- **RCRA.** In June, the U.S. EPA conducted an inspection of RCRA hazardous waste activities. A closeout letter received in September indicated that there were no violations/concerns resulting from the inspection.
- **UST.** In August, U.S. EPA performed an inspection of the Lab's Federally-regulated USTs. A letter documenting the inspection from the EPA was received declaring that no violations were observed.

3.15.2 DOE Assessments/Inspections

The DOE Brookhaven Site Office (BHSO) performs routine inspections, assessments, and surveillances of BNL operations to ensure continual improvement and success in meeting the Laboratory's mission. In 2024, BHSO performed four surveillances of waste management activities with the purpose of evaluating performance in

accordance with existing Technical Work Documents (TWDs) or Standard Operating Procedures (SOPs). They included surveillances of the pump out operation of the underground storage tank in Building 931 (Technical Work Document WM-TWD-19-002, "Pumping Building 931 BLIP Tank water into IBC containers"), WMF Weekly Inspections (WM-SOP-760, "Resource Conservation and Recovery Act [RCRA] and Safety Inspections at the Waste Management Facility"), High Dose Waste Transfer (WM-SOP-581, "High Dose IP Waste Transfer"), and On-The-Job Training procedure (WMP-005, "Waste Management Training Program").

All surveillances resulted in no findings being identified except for BHSO's review of Waste Management personnel performing a weekly inspection in accordance with WM-SOP-760. This surveillance identified two Level 3 Findings. A Level 3 Finding is defined as a singular, isolated regulatory noncompliance where there is a process in place. The Findings were reviewed and analyzed by Brookhaven Science Associates (BSA) and were addressed, as appropriate, to prevent any future nonconformances.

BHSO also participated as an observer of the BSA Multi-Topic Assessment of BNL's environmental protection program described below. BHSO participation comprised of observing BSA's scoping, assessment conduct, and reporting.

3.15.3 Environmental Multi-Topic Assessment

The BNL EPD conducts routine programmatic assessments. The determination of topics for these assessments is based upon past regulatory findings, results of environmental, safety, and health inspections and/or other routine self-assessments, and frequency of past assessments.

In 2024, EPD planned for and executed a programmatic self-assessment on the Lab's management of hazardous and universal waste. The objectives of the assessment were to assess the effectiveness of BNL's hazardous/universal waste program and its compliance with the Standards Based Management System (SBMS) Waste Subject Area and Waste Management procedural requirements. Based on the assessed organizations, BNL's management of Hazardous and Universal Waste Accumulation areas and its review of waste control forms was found in general to be compliant with the relevant requirements. The assessment resulted in identifying four (4) Strengths, six (6) Level 2 (minor) Findings, and nine (9) Opportunities for Improvement (OFIs). Most of the minor Findings were corrected immediately and corrective actions were identified for the OFIs and tracked to closure.

3.15.4 Nevada National Security Site

The Laboratory continues to be a certified Nevada National Security Site (NNSS) waste generator. As part of the NNSS waste certification process, the NNSS Maintenance and Operations Contractor conducts regular (typically annual) assessments of generator Waste Certification Programs (WCP).

BNL's WCP Program was last assessed in October 2023 by staff from Navaro (NNSS Management and Operations [M&O] Contractor) in the areas of waste traceability and packaging and transportation. The assessment resulted in no findings, observations, or OFIs, enabling BNL continued access to the NNSS for radioactive waste disposal.

3.16
Agreements, Enforcement Actions, and Other Environmental Occurrence Reports

In addition to the rules and regulations discussed throughout this chapter, there were two existing agreements between BNL, DOE, and regulatory agencies that remained in effect and one NOV assessed in 2024 (see Table 3-10). There was also an environmental event that was reported in accordance with BNL's Event/Issues Management Subject Area and documented in the Integrated Operational Performance System (IOPS). Details of the event is summarized in Table 3-11.

Table 3-10. Existing Agreements and Enforcement Actions Issued to BNL With Status.

Number	Title	Parties	Effective Date	Status
Agreements				
No Number	Suffolk County Agreement	BNL, DOE, SCDHS	Originally signed on 09/23/87	This agreement was developed to ensure that the storage and handling of toxic and hazardous materials at BNL conform to the environmental and technical requirements of Suffolk County codes.
II-CERCLA-FFA-00201	Federal Facility Agreement under the CERCLA Section 120 (also known as the Interagency Agreement or "IAG" of the Environmental Restoration Program)	DOE, EPA, NYSDEC	02/28/92	This agreement provides the framework, including schedules, for assessing the extent of contamination and conducting cleanup at BNL. Work is performed either as an Operable Unit or a Removal Action. The IAG integrates the requirements of CERCLA, RCRA, and NEPA. Cleanup is currently in long-term surveillance and maintenance mode for the groundwater treatment systems, former soil/sediment cleanup areas, and the reactors; this includes monitoring of institutional controls. The HFBR reactor vessel is scheduled for decontamination and decommissioning by 2072. All groundwater treatment systems operated as required in 2024. Management of the characterization and remediation of PFOS, PFOA and 1,4-dioxane was formally included under the BNL CERCLA program.
Notices of Violation/Enforcement Actions in 2024.				
No Number	Notice of Violation (NOV)	NYSDEC	7/1/24	On July 1, 2024, a Notice of Violation was received by the SCDHS for failing to submit a Completed Works application to the SCDHS before the relocated water main was placed into service to accommodate the construction of Building 748 in March 2020. This was a violation of Section 5-1.22 of the New York State Sanitary Code. In order to satisfy the violation, BNL provided the necessary Completed Works application within 60 days and coordinated a final inspection with SCDHS.

Notes:
CERCLA = Comprehensive Environmental Response, Compensation and Liability Act
EPA = Environmental Protection Agency
HFBR= High Flux Beam Reactor
NEPA = National Environmental Policy Act
NYSDEC = New York State Department of Environmental Conservation
PFOA= perfluorooctanoic acid
PFOS= perfluorooctanesulfonic acid
RCRA = Resource Conservation and Recovery Act
SCDHS = Suffolk County Department of Health Services

Table 3-11. Summary of Other Environmental Occurrence Reports, 2024.

IOPS* Event #: E-01774	Date: 1/3/2024
On January 2, 2024, the Collider Accellerator Department (CAD) Water Group discovered water dripping from a pipe flange in the Alternate Gradient Syncrotron (AGS) Main Magnet Cooling System (tritiated system with concentration of tritium approximately 25,000 pCi/L, which is above the drinking water standard of 20,000 pCi/L) onto the roof of building 911. The estimated total volume leaked was less than 94 gallons, over a period of approximately three weeks. Upon discovery, a container was placed to collect the leaking water. There was the potential that a small volume of the leaked water could have reached a roof drain before the leak was discovered. Water entering the roof drain mixes with a large volume of stormwater before reaching the environment via an outfall. There was no expected environmental impact and samples collected at the outfall after discovery of the release was non-detect for tritium. In response to this event and other similar previously reported events over the past several years, BNL Leadership determined additional evaluation was warranted. As such, an independent qualified cause analyst was asked to lead a team to determine commonalities and provide recommendations or opportunities for improvement to BNL Leadership. The team identified both short-term and long-term opportunities for improvement to address the commonalities identified. These opportunities were communicated to BNL Leadership in an outbrief meeting on September 6, 2024, and included actions like ensuring potential leak flow paths from tritiated water systems are understood and documented, twice-daily inspections of system, flushing and evaporating the AGS Main Magnet Cooling System to maintain water system contents below the drinking water standard for tritium, and redesign of water piping system to reduce the number of potential failure points and locate them indoors or design containment systems for outside portions of water systems. Many of the mitigating actions have been completed or planned for 2025 or during the construction period for the Electron Ion Collider following the end of the 2025 RHIC run.	Status: The C-AD Water Group completed repairs for the leaking component.

Notes:
* Reported in accordance with BNL's Event/Issues Management Subject Area and documented in the Integrated Operational Performance System (IOPS).

Field Sampling Team in front of BNL Geoprobe®.

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