

Compliance Status

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Brookhaven National Laboratory is subject to more than 100 sets of federal, state, and local environmental regulations; numerous site-specific permits; 12 equivalency permits for operation of groundwater remediation systems; and several other binding agreements. In 2016, 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 were all well within permit limits in 2016. The only recorded excess opacity measurements occurred during quarterly quality assurance tests of the opacity monitors for Boilers 6 and 7. All of the 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).

In 2016, 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.

Monitoring of BNL's potable water system indicated that all drinking water requirements were met during 2016. Most of the liquid effluents discharged to surface water and groundwater also met applicable New York State Pollutant Discharge Elimination System permit requirements. Three excursions above permit limits were reported for the year; two non-compliance events for ammonia occurred at the Sewage Treatment Plant, and one non-compliance event was reported for Tolytriazole at Outfall 002 (HN). The permit excursions were reported to NYSDEC and the Suffolk County Department of Health Services and corrective measures were taken. Groundwater monitoring at the Laboratory's Major Petroleum Facility continued to demonstrate that current oil storage and transfer operations are not affecting groundwater quality.

Efforts to minimize impacts of spills of materials continued in 2016. There were 23 spills and only five met regulatory agency reporting criteria. The severity of releases were minor, and all releases were cleaned up to the satisfaction of NYSDEC.

BNL participated in ten environmental inspections or reviews by external regulatory agencies in 2016. These inspections included Sewage Treatment Plant operations; hazardous waste management facilities; regulated petroleum and chemical bulk storage facilities; and the potable water system. Immediate corrective actions were taken to address all 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 with each. A list of all applicable environmental regulations is contained in Appendix D.

3.2 ENVIRONMENTAL PERMITS

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.

- State Pollutant Discharge Elimination System (SPDES) permits, issued by NYSDEC
- Major Petroleum Facility (MPF) license, issued by NYSDEC
- Resource Conservation and Recovery Act (RCRA) permit, issued by NYSDEC for BNL’s Waste Management Facility
- Registration certificate from NYSDEC for

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 EPA, DOE, and the New York State Department of Environmental Conservation (NYSDEC).	In 1992, BNL became subject to a tri-party agreement with 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 a 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 High Flux Beam Reactor (HFBR) stack and reactor vessel are scheduled for D&D by 2020 and 2065, respectively.	2.3.4.8
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 sitewide 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 may be subject to NHPA include the HFBR, the Brookhaven Graphite Research Reactor (BGRR) complex, World War I training trenches near the Relativistic Heavy Ion Collider (RHIC) project, and the former Cosmotron building.	The HFBR, BGRR complex, and World War I trenches are eligible for inclusion in the National Register. The former Cosmotron building was identified as potentially eligible in an April 1991 letter from NYSHPO. 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. Actions required for D&D of the BGRR were determined to affect its eligibility, and mitigative actions have been completed based on a Memorandum of Agreement between DOE and NYSHPO. BNL has a Cultural Resource Management Plan to ensure compliance with cultural resource regulations. Buildings 50 years old or older are reviewed under Section 106 of NHPA when proposed projects may significantly alter the structure or for building demolition. In 2016, four (4) 1960s era apartments were evaluated under Section 106 requirements and were determined to be eligible for listing on the National Register of Historic Places. The package developed is expected to meet requirements for mitigation once additional documents are provided to the NYSHPO.	3.4
EPA: 40 CFR 50 40 CFR 60-61 40 CFR 63 40 CFR 80 40 CFR 82 40 CFR 98 NYSDEC: 6 NYCRR 200–257 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

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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 109–140 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. With the exception of three excursions, these discharges met the SPDES permit limits in 2016.	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 sitewide public water supply. This water supply met all primary drinking water standards in 2016. Corrective actions for all identified operation and maintenance deficiencies 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 2016.	3.8.1 3.8.2 3.8.3
EPA: 40 CFR 280 NYSDEC: 6 NYCRR 595–597 6 NYCRR 611–613 SCDHS: SCSC Article 12	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, overflow 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 360–372	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
EPA: 40 CFR 162–171(f) NYSDEC: 6 NYCRR 320 6 NYCRR 325–329	The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and corresponding NY 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. There was one active Freshwater wetlands or Wild, Scenic, and Recreational Rivers permit that expired in 2016.	3.12

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CHAPTER 3: COMPLIANCE STATUS

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
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 threatened 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
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.	3.13
DOE: Order 231.1B Manual 231.1-1A	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, Critiques Subject Area, Occurrence Categorizer's Procedure, and the ORPS Office Procedure.	All chapters
DOE: Order 414.1D 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

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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 435.1 Chg. 1	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 implementation. 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. 1.	2.3.4.3
DOE: Order 436.1	The DOE Departmental Sustainability Order replaces former DOE Orders 450.1A, <i>Environmental Protection Programs</i> , and 430.2B, <i>Departmental Energy, Renewable Energy and Transportation Management</i> . The intent of the new order is to incorporate and implement the requirements of Executive Order (EO) 13514 and to continue compliance with EO 13423. The new order is supported by DOE requirements for sound sustainability programs implemented under the DOE 2010 Strategic Sustainability Performance Plan (SSPP). Contractor requirements under the order require preparation of a Site Sustainability Plan and implementation of a sound Environmental Management System (EMS).	In accordance with the requirements of the DOE Strategic Sustainability Performance Plan, BNL has developed and implemented a Site Sustainability Plan. The Goals and Strategic Objectives of the DOE SSPP are tracked and reported on annually. BNL's EMS was officially registered to the ISO 14001:1996 standard in 2001 and recertified to the revised standard in 2004, 2007, 2010, 2013, and 2016. In April 2016, an external surveillance audit was conducted that found BNL's EMS to be fully integrated and effective, with two minor nonconformities and many system strengths.	Chapter 2
DOE: Order 458.1, Change 3	In February 2011, DOE released DOE Order 458.1, <i>Radiation Protection of the Public and Environment</i> , 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 the means by which 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 do 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, <i>Radioactive Waste Management</i> , 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. 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.	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

CHAPTER 3: COMPLIANCE STATUS

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	None	NA	NA
EPA - NESHAPs	705	Tritium Evaporator	BNL-288-01	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-389-01	None	NA	NA
EPA - NESHAPs	931	Brookhaven LINAC Isotope Producer	BNL-2009-1	None	NA	NA
NYSDEC - NESHAPs	REF	Radiation Effects/Neutral Beam	BNL-789-01	None	NA	NA
NYSDEC - NESHAPs	RTF	Radiation Therapy Facility	BNL-489-01	None	NA	NA
EPA - SDWA	BNL	Underground Injection Control	NYU500001	(a)	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	T-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 Equivalency	517/518	South Boundary/Middle Road System	1-52-009	NA	NA	NA
NYSDEC - SPDES Equivalency	539	West South Boundary System	1-52-009	NA	NA	NA
NYSDEC - SPDES Equivalency	598	OU I Remediation System	1-52-009	NA	NA	NA
NYSDEC - SPDES Equivalency	598	Tritium Remediation System	1-52-009	04-May-21	NA	NA
NYSDEC - SPDES Equivalency	670	Sr-90 Treatment System	1-52-009	25-Feb-18	NA	NA
NYSDEC - SPDES Equivalency	TR 829	Carbon Tetrachloride System	None	Closed out 2010	NA	NA
NYSDEC - SPDES Equivalency	OS-4	Airport/LIPA Treatment System	None	NA	NA	NA
NYSDEC - SPDES Equivalency	OS-2	Industrial Park East Treatment System	None	Closed out 2013	NA	NA
NYSDEC - SPDES Equivalency	OS-5	North St./North St. East Treatment System	None	NA	NA	NA
NYSDEC - SPDES Equivalency	OS-6	Ethylene Di-Bromide Treatment System	1-52-009	16-Dec-19	NA	NA
NYSDEC - SPDES Equivalency	855	Sr-90 Treatment System - BGRR/WCF	1-52-009	16-Dec-19	NA	NA
NYSDEC - SPDES Equivalency	TR 867	T-96 Remediation System	1-52-009	20-Mar-17	NA	NA
NYSDEC - SPDES Equivalency	644	Freon-11 Treatment System	1-52-009	20-Mar-17	NA	NA
NYSDEC - SPDES Equivalency	OS-2	Industrial Park Treatment System	1-52-009	30-Sep-19	NA	NA
NYSDEC - Hazardous Substance	BNL	Bulk Storage Registration Certificate	1-000263	27-Jul-17	NA	NA
NYSDEC - LI Well Permit	BNL	Domestic Potable/Process Wells	1-4722-00032/00113	13-Sep-18	NA	NA
NYSDEC - Air Quality	423	Metal Parts Cleaning Tank	1-4722-00032/00115	03-Feb-19	U-METAL	42308
NYSDEC - Air Quality	423	Gasoline Storage and Fuel Pumps	1-4722-00032/00115	03-Feb-19	U-FUELS	42309-10
NYSDEC - Air Quality	423/630	Motor Vehicle A/C Servicing	1-4722-00032/00115	03-Feb-19	U-MVACS	MVAC1- 3
NYSDEC - Air Quality	244	Paint Spray Booth	1-4722-00032/00115	03-Feb-19	U-PAINT	24402
NYSDEC - Air Quality	244	Flammable Liquid Storage Cabinet	1-4722-00032/00115	03-Feb-19	U-PAINT	244AE
NYSDEC - Air Quality	479	Metal Parts Cleaning Tank	1-4722-00032/00115	03-Feb-19	U-METAL	47908
NYSDEC - Air Quality	510	Spin Coating Operation	1-4722-00032/00115	03-Feb-19	U-INSIG	510AK
NYSDEC - Air Quality	801	Target Processing Laboratory	1-4722-00032/00115	03-Feb-19	U-INSIG	80101
NYSDEC - Air Quality	Site	Aerosol Can Processing Units	1-4722-00032/00115	03-Feb-19	U-INSIG	AEROS
NYSDEC - Air Quality	498	Aqueous Cleaning Facility	1-4722-00032/00115	03-Feb-19	U-METAL	49801
NYSDEC - Air Quality	535B	Plating Tanks	1-4722-00032/00115	03-Feb-19	U-INSIG	53501
NYSDEC - Air Quality	535B	Etching Machine	1-4722-00032/00115	03-Feb-19	U-INSIG	53502
NYSDEC - Air Quality	535B	Printed Circuit Board Process	1-4722-00032/00115	03-Feb-19	U-INSIG	53503

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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	610	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-61005	61005
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-61006	61006
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-61007	61007
NYSDEC - Air Quality	610	Metal Parts Cleaning Tray	1-4722-00032/00115	03-Feb-19	U-METAL	61008
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-61005	6101A
NYSDEC - Air Quality	630	Gasoline Storage and Fuel Pumps	1-4722-00032/00115	03-Feb-19	U-FUELS	63001-03
NYSDEC - Air Quality	902	Epoxy Coating/Curing Exhaust	1-4722-00032/00115	03-Feb-19	U-COILS	90206
NYSDEC - Air Quality	903	Metal Parts Cleaning Tank	1-4722-00032/00115	03-Feb-19	U-METAL	90304
NYSDEC - Air Quality	922	Electroplating Operation	1-4722-00032/00115	03-Feb-19	U-INSIG	92204
NYSDEC - Air Quality	923	Electronic Equipment Cleaning	1-4722-00032/00115	03-Feb-19	U-METAL	9231A
NYSDEC - Air Quality	923	Parts Drying Oven	1-4722-00032/00115	03-Feb-19	U-METAL	9231B
NYSDEC - Air Quality	Site	Halon 1211 Portable Extinguishers	1-4722-00032/00115	03-Feb-19	U-HALON	H1211
NYSDEC - Air Quality	Site	Halon 1301 Fire Suppression Systems	1-4722-00032/00115	03-Feb-19	U-HALON	H1301
NYSDEC - Air Quality	Site	Commercial Refrigeration Equipment	1-4722-00032/00115	03-Feb-19	U-RFRIG	COMRE
NYSDEC - Air Quality	Site	Packaged A/C Units	1-4722-00032/00115	03-Feb-19	U-RFRIG	PKG01-02
NYSDEC - Air Quality	Site	Reciprocating Chillers (45)	1-4722-00032/00115	03-Feb-19	U-RFRIG	REC01-53
NYSDEC - Air Quality	Site	Rotary Screw Chillers (15)	1-4722-00032/00115	03-Feb-19	U-RFRIG	ROTO1-15
NYSDEC - Air Quality	Site	Split A/C Units	1-4722-00032/00115	03-Feb-19	U-RFRIG	SPL01-02
NYSDEC - Air Quality	Site	Centrifugal Chillers (19)	1-4722-00032/00115	03-Feb-19	U-RFRIG	CEN01-26
NYSDEC - Air Quality	463	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	46301
NYSDEC - Air Quality	490	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	49006
NYSDEC - Air Quality	515	Diesel Non-Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	51501
NYSDEC - Air Quality	555	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	55503
NYSDEC - Air Quality	635	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	63501
NYSDEC - Air Quality	734	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	73401
NYSDEC - Air Quality	735	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	73501
NYSDEC - Air Quality	740	Diesel Emergency Generators (2)	1-4722-00032/00115	03-Feb-19	U-GENER	74001-02
NYSDEC - Air Quality	801	Diesel Emergency Generator	1-4722-00032/00115	03-Feb-19	U-GENER	80102
NYSDEC - Air Quality	912	Diesel Emergency Generators (3)	1-4722-00032/00115	03-Feb-19	U-GENER	912A1-A3
NYSDEC - Air Quality	30	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-SMBLR	030AB
NYSDEC - Air Quality	244	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-SMBLR	244AB
NYSDEC - Air Quality	422	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-SMBLR	422AF
NYSDEC - Air Quality	423	Combustion Unit	1-4722-00032/00115	03-Feb-19	U-SMBLR	42304
NYSDEC - Hazardous Waste	WMF	Waste Management	1-4722-00032/00102	19-Nov-16	NA	NA
NYSDEC - Water Quality	CSF	Major Petroleum Facility	1-1700	31-Mar-17	NA	NA
NYSDEC - Water Quality	Site	Construction of Fences and Platforms at RHIC	1-4722-00032/00144	11-Jul-16	NA	NA

Notes:

(a) Permit renewal under review by EPA
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
RTF = Radiation Therapy Facility
RHIC = Relativistic Heavy Ion Collider
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

- tanks storing bulk quantities of hazardous substances (e.g., fuel oil)
- Eight radiological emission authorizations issued by the United States 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 13 emission units
 - EPA Underground Injection Control (UIC) Area permit for the operation of 128 UIC wells (e.g., dry wells and cesspools)
 - Permit for the operation of six domestic water supply wells and one irrigation well, issued by NYSDEC
 - Twelve 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

3.2.2.2 *New York State Wetlands and Wild Scenic, Recreational Rivers Act*

The Laboratory had no wetland or Wild Scenic, and Recreational Rivers Act permits open in 2016. A General Construction Stormwater permit that had governed the construction of upgrades to the Sewage Treatment Plant was formally closed in 2016.

3.3 NEPA ASSESSMENTS

The National Environmental Policy Act (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 2016, environmental evaluations were completed for 91 proposed projects at BNL. Of those, 85 were considered minor actions requiring no additional documentation. Five projects were addressed by submitting notification forms to DOE, which determined that all five projects were covered by existing “Categorical

Exclusions” (per 10 CFR 1021) or fell within the scope of a previous environmental assessment. An Environmental Assessment for the Alternating Gradient Synchrotron (AGS) Complex (DOE/EA-2010), including planned upgrades for continued operations, was completed in 2016.

3.4 PRESERVATION LEGISLATION

The Laboratory is subject to several cultural resource laws, most notably the National Historic Preservation Act and the Archeological Resource Protection Act. These laws require agencies to consider the effects of proposed federal actions on historic structures, objects, and documents, as well as cultural or natural places important to Native Americans or other ethnic or cultural groups.

BNL has three structures or sites that are eligible for listing on the National Register of Historic Places: the Brookhaven Graphite Research Reactor (BGRR) complex, the High Flux Beam Reactor (HFBR) complex, and the World War I Army training trenches associated with Camp Upton. Several other structures of historic significance are identified in BNL’s Cultural Resources Management Plan (BNL 2013a), including the Brookhaven Center and Building 120. Two other buildings, Berkner Hall and the Chemistry Building, are considered “Architecturally Significant.” A Department of Interior questionnaire regarding historic and cultural resources is prepared annually.

Two cultural resource review projects associated with the proposed “Discovery Park” development were completed in 2016. These and additional activities associated with historic preservation compliance 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 Central Steam Facility (CSF) that are subject to NYSDEC “Reasonably Available Control Technology” (RACT) requirements. Three of the boilers can burn either residual fuel oil or natural gas; Boiler 1A burns fuel oil only. In 2016, 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 and No. 6 oil burned in the Laboratory’s three large boilers (Nos. 5, 6, and 7) is 0.15 lbs/MMBtu for both fuels. The NO_x RACT emission limit for the CSF’s one mid-size boiler (No. 1A) dropped from 0.30 lbs/MMBtu to 0.20 lbs/MMBtu.

Boilers with a maximum operating heat input between 25 and 250 MMBtu/hr (7.3 and 73.2 MW) can demonstrate compliance with the NO_x standard using periodic emission tests or by using continuous emission monitoring equipment; all four CSF boilers fall in this operating range. Boilers 6 and 7 use continuous emission monitoring systems (CEMS) to demonstrate compliance with NO_x standards. Because past emissions testing and CEMS results when No. 6 oil was burned have shown that all four CSF boilers cannot meet the new lower NO_x RACT standards, BNL is using an approved system averaging plan to demonstrate compliance in quarterly reports submitted to NYSDEC. 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 percent, calculated in 6-minute averages, except for one period not to exceed 27 percent in any one hour.

During 2016, there were no recorded exceedances of the NO_x RACT limit by the Boiler 6 and 7 CEMS. Using the system averaging approach, actual weighted average NO_x emission rates for operating boilers for the first through fourth quarters were 0.121, 0.120, 0.103, and 0.101 lbs/MMBtu, respectively, which were below the corresponding quarterly permissible weighted average emissions rates of 0.158, 0.165, 0.160, and 0.152 lbs/MMBtu.

In 2016, the only recorded excess opacity measurements occurred during quarterly quality assurance tests of the Boiler 6 and 7 opacity monitors 7. All of the excursions were documented in 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 is 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 2016, 144 pounds of R-22, 5 pounds of R-401A, 3 pounds of R-407C, and 5 pounds of R-410A were recovered and recycled from refrigeration equipment that was serviced. Meanwhile, 30 pounds of R-12, 242 pounds of R-22, 3 pounds of R-134A, 32 pounds of R-401A, and 91 pounds of R-410 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, but are being phased out due to their effect on the earth’s ozone layer.

In 1998, the Laboratory purchased equipment to comply with the halon recovery and recycling requirements of the CAA, 40 CFR 82 Subpart H. When portable fire extinguishers or fixed systems are removed from service and when halon cylinders are periodically tested, Laboratory technicians use halon recovery and recycling devices to comply with CAA provisions. Halon recovered from excessed systems is stored for reuse by BNL or shipped to the Department of Defense Ozone Depleting Substances Reserve.

In 2016, 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. No excess ozone depleting substances were transferred to the Department of Defense Ozone Depleting Substances Reserve in Richmond, Virginia in 2016.

3.5.2 Hazardous Air Pollutants

In 1970, the CAA established standards to protect the general public from hazardous air pollutants that may lead to death or an increase in irreversible or incapacitating illnesses. The NESHAPs program was established in 1977 and the governing regulations were updated significantly in 1990. EPA developed NESHAPs to limit the emission of 189 toxic 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

During the year, the Laboratory reviews proposed or newly promulgated Maximum Available Control Technology (MACT) standards. In 2016, proposed revisions to 40 CFR 63 Subpart GGGGG, otherwise known as the NESHAP Site Remediation Rule, were reviewed. Under the revisions, new site remediations conducted under the authority of CERCLA or RCRA would now be subject to all applicable requirements of the Site Remediation Rule including emission limitations and work practice standards established

to mitigate hazardous air pollutant emissions from site remediation activities. All existing CERCLA or RCRA site remediation operations installed before May 13, 2016 (the date of the proposed rule), including those managed by the Laboratory's Groundwater Protection Group, are only subject to the rule's administrative recordkeeping and reporting requirements, so long as it can be demonstrated that the total hazardous air pollutant contaminant content of the remediation materials excavated, extracted, pumped, or otherwise removed during radiation activities, is less than 2,200 pounds annually.

3.5.2.2 Asbestos

In 2016, the Laboratory notified the EPA Region II office regarding the removal of materials containing asbestos. During the year, 1,250 linear feet of pipe insulation and 750 square feet of non-friable (e.g., floor tiles, siding material) materials were removed and disposed of according to 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 2016 is provided in Chapter 4.

BNL transmitted all data pertaining to radioactive air emissions and dose calculations to EPA in fulfillment of the June 30, 2016 annual reporting requirement. As in past years, the maximum off-site dose due to airborne radioactive emissions from the Laboratory continued to be far below the 10 mrem (100 μ Sv) 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 2016 was 6.19 E-01 mrem (6.19 μ Sv).

3.6 CLEAN WATER ACT

The disposal of wastewater generated by Laboratory operations is regulated under the Clean Water Act (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 9 of 12 outfalls, as described below. See Figure 5-4 in Chapter 5 for the locations of 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 blow-down, 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 SCDHS through a new Network DMR (Net-DMR) system. Details of the monitoring program conducted for the groundwater treatment systems where SPDES equivalency permits are in effect are provided in SER Volume II, *Groundwater Status Report*. Evaluation of the

current effluent quality shows it to consistently meet all 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

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's overall compliance with effluent limits was greater than 99 percent in 2016.

There were two excursions of the SPDES permit limits for ammonia at Outfall 001. Twenty-four hour composite samples collected on March 7 and 9, 2016 for routine nitrogen series analysis exhibited ammonia concentrations of 2.2 mg/L in each sample (the permit limit for ammonia is 2.0 mg/L). STP operators immediately took action to adjust system parameters by increasing aeration cycles during daytime hours (high loading periods) to improve nitrification of ammonia, and returning to normal aeration cycles during the evening. The exact cause(s) of these excursions were not determined; however, in-house process control sample results for ammonia were consistently been below permit limits after this event, indicating that the operational changes were effective in lowering ammonia concentrations below the permit limit.

As a preventative (long term) corrective action, Facilities & Operations (F&O) personnel researched, purchased, and installed an analyzer that can measure influent concentrations

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of ammonia on a continuous basis. This analyzer now provides fast response time data that will help STP operators optimize the nutrient removal process and potentially avoid future permit excursions. The data collected from this analyzer can also be trended and help with future investigations to determine processes at the Laboratory that may be contributing to higher ammonia concentrations measured in the STP

influent. Figures 3-1 through 3-7 plot the 5-year trends for monthly concentrations of copper, iron, lead, mercury, nickel, silver, and zinc in the STP discharge.

3.6.2 Recharge Basins and Stormwater

Water discharged to Outfalls 002 through 008 and Outfalls 010 through 012 recharges to groundwater, replenishing the underlying

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)	6.0	8.2	Continuous Recorder	Min 5.8, Max. 8.5	0	100
Max. 5-Day BOD (mg/L)	<2	<2	Twice Monthly	5	0	100
% BOD Removal	> 85	> 96	Monthly	85	0	100
Max. TSS (mg/L)	<0.6	1.9	Twice Monthly	20	0	100
% TSS Removal	> 94	>99	Monthly	85	0	100
Settleable solids (ml/L)	0	0	Daily	0.1	0	100
Solids, Total Dissolved (mg/L)	263	600	Monthly	1000	0	100
Ammonia nitrogen (mg/L)	< 0.1	2.2	Twice Monthly	2	2	92
Total nitrogen (mg/L)	0.4	7.1	Twice Monthly	10	0	100
Total phosphorus (mg/L)	0.9	1.9	Twice Monthly	NA	0	100
Cyanide (mg/L)	< 0.002	< 0.002	Twice Monthly	0.1	0	100
Copper (mg/L)	< 0.003	0.02	Twice Monthly	0.15	0	100
Iron (mg/L)	0.07	0.47	Twice Monthly	0.6	0	100
Lead (mg/L)	0.0006	0.003	Twice Monthly	0.025	0	100
Mercury (ng/L)	3	31	Twice Monthly	200	0	100
Methylene chloride (ug/L)	<2	< 2	Twice Monthly	5	0	100
Nickel (mg/L)	< 0.002	0.005	Twice Monthly	0.1	0	100
Silver (mg/L)	< 0.001	<0.001	Twice Monthly	0.015	0	100
Toluene (ug/L)	< 1	< 1	Twice Monthly	5	0	100
Zinc (mg/L)	0.01	0.4	Twice Monthly	2	0	100
1,1,1-trichloroethane (ug/L)	< 1	< 1	Twice Monthly	5	0	100
Max. Flow (MGD)	0.31	0.53	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.21	0.33	Continuous Recorder	NA	0	100
HEDP (mg/L)	<0.25	0.25	Monthly	0.5	0	100
Tolytriazole (mg/L)	< 0.005	< 0.005	Monthly	0.05	0	100

Notes: Notes:
 See Figure 5-2 for location of Outfall 001.
 * % Compliance = total no. samples – total no. exceedances/total no. of samples x 100
 BOD = biological oxygen demand
 HEDP = 1-hydroxyethylidene diphosphonic acid
 MGD = million gallons per day
 NA = Not Applicable
 SPDES = State Pollutant Discharge Elimination System
 SU = standard unit
 TSS = total suspended solids

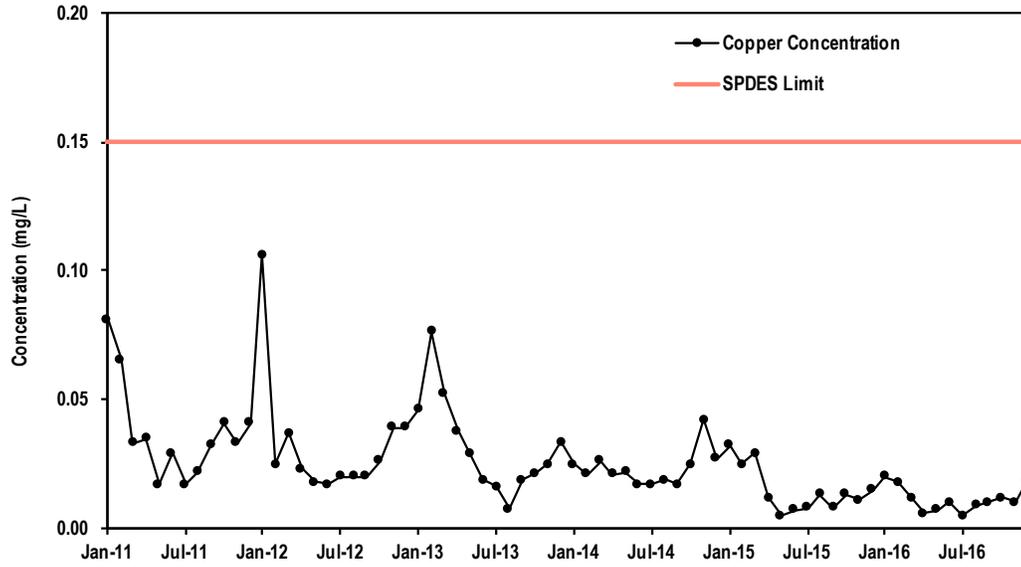


Figure 3-1. Maximum Concentrations of Copper Discharged from the BNL Sewage Treatment Plant, 2010–2016.

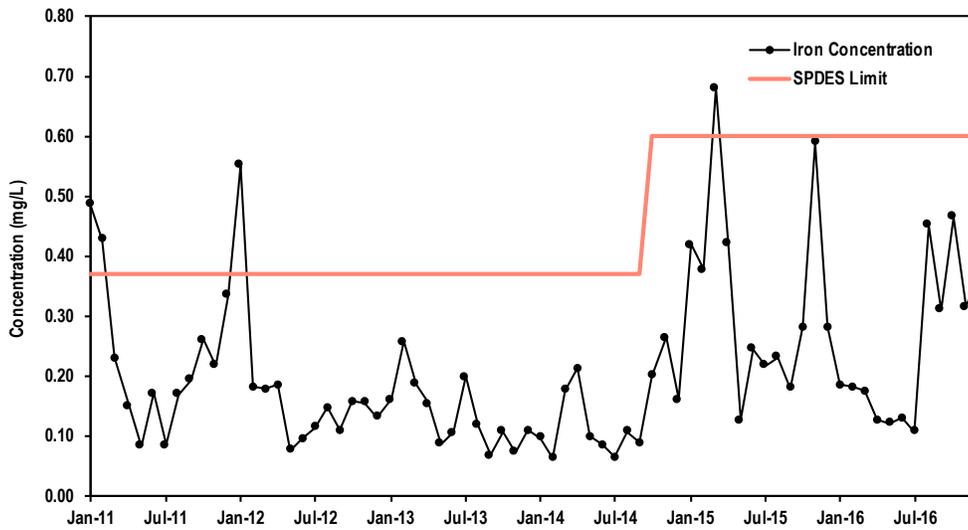


Figure 3-2. Maximum Concentrations of Iron Discharged from the BNL Sewage Treatment Plant, 2010–2016.

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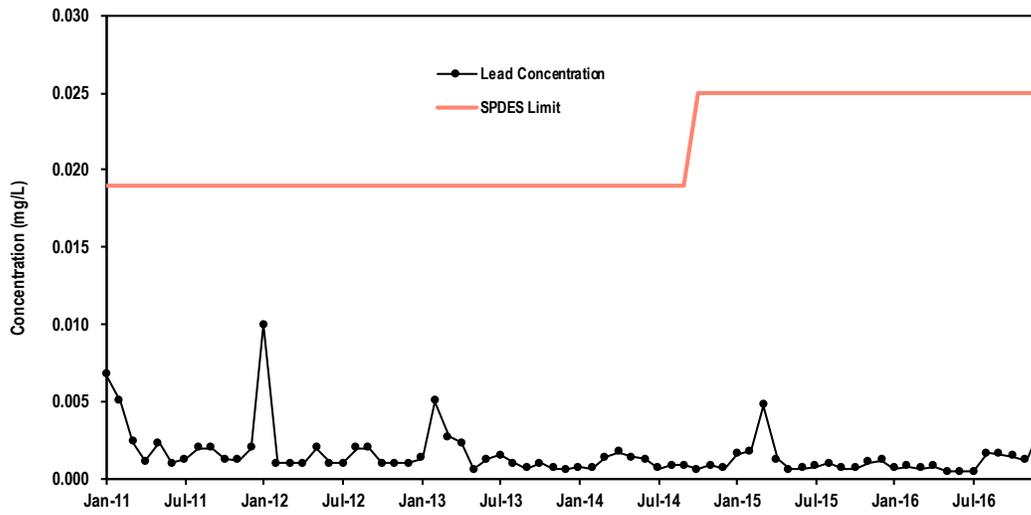


Figure 3-3. Maximum Concentrations of Lead Discharged from the BNL Sewage Treatment Plant, 2010–2016.

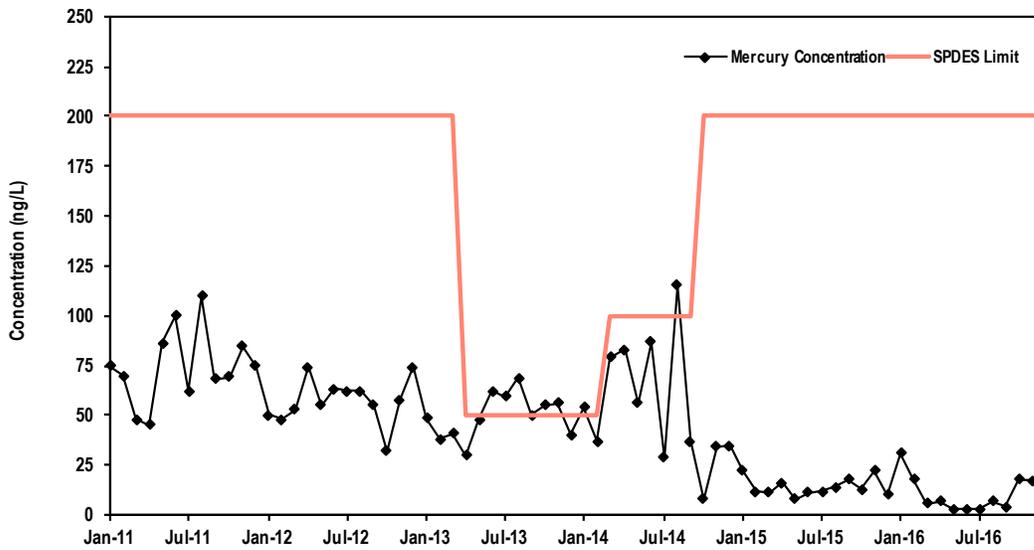


Figure 3-4. Maximum Concentrations of Mercury Discharged from the BNL Sewage Treatment Plant, 2010–2016.

Figure 3-5. Maximum Concentrations of Nickel Discharged from the BNL Sewage Treatment Plant, 2010–2016.

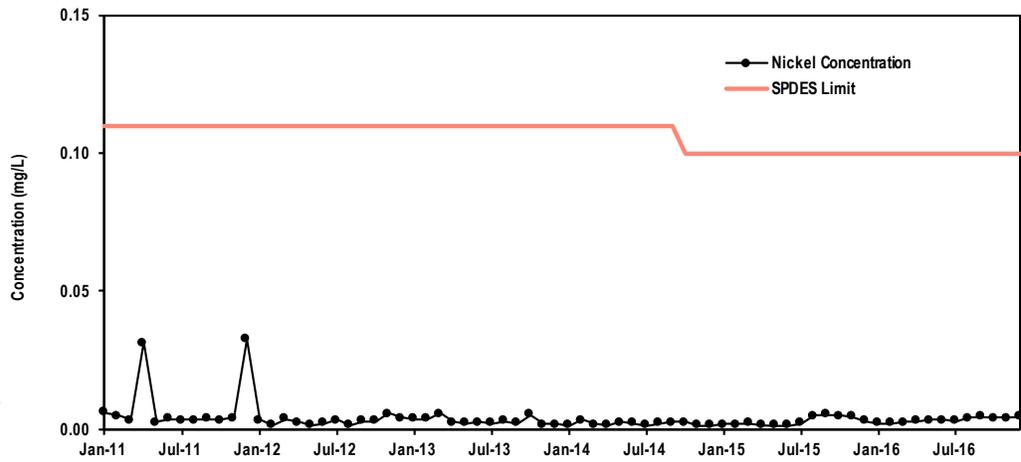


Figure 3-6. Maximum Concentrations of Silver Discharged from the BNL Sewage Treatment Plant, 2010–2016.

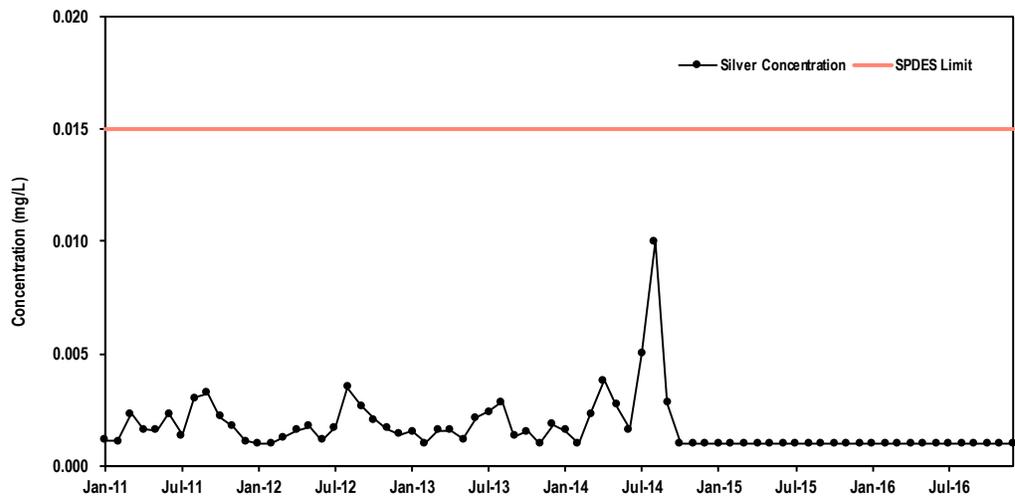


Figure 3-7. Maximum Concentrations of Zinc Discharged from the BNL Sewage Treatment Plant, 2010–2016.

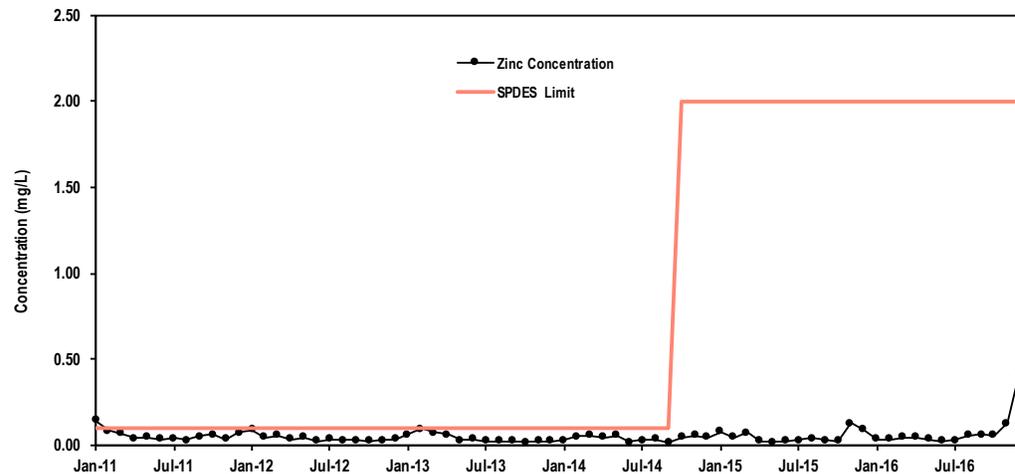


Table 3-4. Analytical Results for Wastewater Discharges to Outfalls 002, 005 - 008, and 010.

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 Min. Max.	CR 0.00003 0.03	CR 0.06 0.61	CR 0.06 0.38	CR 0.01 0.03	CR 0.08 0.16	8 0.02 0.39	8 0.004 0.1	NA NA	NA	NA
pH (SU)	Min. Max.	6.1 6.1	7.4 8.5	6.9 8.1	6.7 8.3	6.1 7.7	6.3 7.9	7.2 8.1	NA 8.5, 9.0 (a)	0	100
Oil and Grease (mg/L)	N Min. Max.	12 <1.1 1.6	12 <1.1 2.5	11 <1.1 2.2	12 <1.1 2.8	NR NR NR	NR NR NR	8 <1.1 3.0	NA NA 15	0	100
Copper (mg/L)	N Min. Max.	NR NR NR	NR NR NR	4 <0.003 (T) 0.005 (T)	NR NR NR	NR NR NR	NR NR NR	4 0.005 (D) 0.006 (D)	NA NA 1.0	0	100
Aluminum (mg/L)	N Min. Max.	4 <0.07 (T) <0.07 (T)	NR NR NR	NR NR NR	NR NR NR	NR NR NR	4 <0.07 (D) 0.2 (D)	4 <0.07 (D) 0.2 (D)	NA NA 2.0	0	100
Lead, Dissolved (mg/L)	N Min. Max.	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	4 0.001 0.001	NA NA 0.05	0	100
Vanadium, Dissolved (mg/L)	N Min. Max.	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	4 0.004 0.004	NA NA NPL	NA	NA
Chloroform (µg/L)	N Min. Max.	4 <1 1.0	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NA NA 7	0	100
Bromodichloromethane (µg/L)	N Min. Max.	4 0.4 1.0	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NA NA 50	0	100
1,1,1-trichloroethane (µg/L)	N Min. Max.	4 <1 <1	NR NR NR	NR NR NR	NR NR NR	NR NR NR	8 <1 <1	NR NR NR	NA NA 5	0	100
1,1-dichloroethane (µg/L)	N Min. Max.	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NA NA 5	0	100
Hydroxyethylidene-diphosphonic acid (mg/L)	N Min. Max.	4 <0.05 <0.25	NR NR NR	4 <0.05 <0.05	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NA NA 0.5	0	100
Tolyltriazole (mg/L)	N Min. Max.	4 <0.005 0.5	NR NR NR	4 <0.005 <0.005	NR NR NR	NR NR NR	NR NR NR	NR NR NR	NA NA 0.2	1	75

Notes:
 See Figure 5-2 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
 SU = standard unit
 T = total recoverable

aquifer. 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 2016, there was one non-compliance event reported for Outfall 002 (HN). A grab sample collected on January 7, 2016 for routine quarterly compliance analysis exhibited a Tolytriazole (TTA) concentration of 0.5 mg/L (the permit limit for TTA is 0.2 mg/L). Arrangements were made to collect an additional sample from Outfall 002 to ensure that TTA concentrations were below permit limits. A grab sample was collected on January 26, 2016 and the results indicated that the TTA concentration was < 0.005 mg/L, which is well below the permit limit. A determination was made that this exceedance was most likely due to compliance with a recent NY State mandate for disinfection of cooling towers for the prevention of Legionella bacteria. Compliance with this emergency mandate resulted in the need to drain many cooling towers within the same time frame causing an abnormal discharge of TTA in a short time frame. This condition was not a normal occurrence and is not expected to occur on a routine basis.

3.7 SAFE DRINKING WATER ACT

The extraction and distribution of drinking water is regulated under the federal Safe Drinking Water Act (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 2016) 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; five of which were active during 2016. 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 and 3-6 provide potable water supply monitoring data. In 2016, BNL's drinking water and the supply and distribution system was in full compliance with all applicable county, state, and federal regulations regarding drinking water quality, monitoring, operations, and reporting. In addition to the compliance sampling program, all wells are also sampled and analyzed quarterly under the Laboratory's environmental surveillance program. Data collected under this program are consistent with the data reported in Tables 3-5 and 3-6. This additional testing goes beyond the minimum SDWA testing requirements.

To ensure that consumers are informed about the quality of Laboratory-supplied potable water, in May of each year BNL publishes a Consumer Confidence Report (CCR), a deadline stipulated by the SDWA. This report provides information regarding source water, supply system, the analytical tests conducted, and detected contaminants are 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/>.

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

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

Compound	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Potable Distribution Sample	NYS DWS
Water Quality Indicators							
Ammonia (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	SNS
Chlorides (mg/L)	49.7	58.9	41.1	73.2	75.4	61.7	250
Color (units)	15*	5*	< 5*	< 5	5	10	15
Conductivity (mmhos/cm)	165	201	165	368	398	359	SNS
Cyanide (ug/L)	< 10	< 10	< 10	< 10	< 10	< 10	SNS
MBAS (mg/L)	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	SNS
Nitrates (mg/L)	0.23	0.34	0.25	0.49	0.77	0.25	10
Nitrites (mg/L)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1
Odor (units)	0	0	0	0	0	0	3
pH (Standard Units)	5.9	5.8	5.8	6.4	6	7.2	SNS
Sulfates (mg/L)	9.3	9.6	10	12.7	1.8	8.8	250
Total coliform	ND	ND	ND	ND	ND	ND	Negative
Metals							
Antimony (ug/L)	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	0.032	6
Arsenic (ug/L)	< 1.7	1.77	1.74	< 1.7	< 1.7	0.12	50
Barium (mg/L)	0.027	0.043	0.026	0.059	0.063	0.027	2
Beryllium (ug/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.0048	4
Cadmium (ug/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.036	5
Chromium (mg/L)	< 0.007	0.001	< 0.007	< 0.007	< 0.007	0.031	0.1
Fluoride (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	0.13	< 0.1	2.2
Iron (mg/L)	0.72*	5.5*	2.7*	0.05	0.05	0.096	0.3
Lead (ug/L)	< 1.0	< 1.0	< 1.0	< 1.0	0.87	0.043	15
Manganese (mg/L)	0.024	0.11	0.084	0.002	0.002	0.025	0.3
Mercury (ug/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.28	2
Nickel (mg/L)	0.002	0.006	0.004	0.005	0.002	0.0001	SNS
Selenium (ug/L)	1	< 2.0	< 2.0	< 2.0	0.66	1	50
Sodium (mg/L)	25	31.7	22	42	40.6	28	SNS
Silver (ug/L)	< 10	< 10	< 10	< 10	< 10	0.017	100
Thallium (ug/L)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	0.0069	2
Zinc (mg/L)	0.012	0.011	0.018	0.005	< 0.02	0.0075	5
Radioactivity							
Gross alpha activity (pCi/L)	< 1.97	1.98 ± 1.38	< 2.0	< 1.99	< 1.98	NR	15
Gross beta activity (pCi/L)	< 2.02	< 2.21	2.19 ± 1.11	2.52 ± 1.07	2.04 ± 0.613	NR	(a)
Radium-228 (pCi/L)	NS	NS	NS	NS	NS	NR	5
Strontium-90 (pCi/L)	< 0.78	< 0.70	< 0.79	< 0.77	< 0.79	NR	8
Tritium (pCi/L)	< 403	< 404	< 404	< 389	< 395	NR	20,000

(continued on next page)

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

Compound	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Potable Distribution Sample	NYS DWS
Other							
Alkalinity (mg/L)	13.3	10.3	14.8	28.3	20.7	26.9	SNS
Asbestos (M. fibers/L)	NR	NR	NR	NR	NR	< 0.20	7
Calcium (mg/L)	5.5	5.8	5.8	12.5	9.6	12.2	SNS
HAA5 (mg/L)	NR	NR	NR	NR	NR	0.007	0.06**
Residual chlorine - MRDL (mg/L)	NR	NR	NR	NR	NR	1.1	4
TTHM (mg/L)	NR	NR	NR	NR	NR	0.036	0.08**

Notes:

See Figure 7-1 for well locations.

Well 12 was not operational for 2016; no testing was completed during this time.

HAA5 = five haloacetic acids

MBAS = methylene blue active substances

MRDL = maximum residual disinfectant level

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 these wells is treated at the Water Treatment Plant for color and iron reduction prior to site 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.

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 intra-facility operations.

During 2016, the Laboratory inspected 297 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 retested to ensure proper function. Copies of the cross-connection device test reports are filed with SCDHS throughout the year.

3.7.3 Underground Injection Control (UIC)

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 must be included in an inventory maintained with the agency.

In June 2010, an application was filed with EPA to renew the Class V UIC permit for the site. In August 2012, BNL received a letter from EPA indicating that addition or removal of UICs from the existing inventory would be “authorized by rule,” pursuant to 40 CFR §144.24; however, it is still unclear if EPA intends on renewing BNL’s Class V UIC permit. 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

CHAPTER 3: COMPLIANCE STATUS

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
Dichlorodifluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloromethane	< 0.5	0.31	< 0.5	< 0.5	< 0.5	< 0.5	5
Vinyl Chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2
Bromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Trichlorofluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Methylene Chloride	< 0.5	< 0.5	0.26	< 0.5	< 0.5	< 0.5	5
trans-1,2-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloroethane	< 0.5	< 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	< 0.5	5
2,2-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Bromochloromethane	< 0.5	< 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	< 0.5	5
Carbon Tetrachloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Trichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Dibromomethane	< 0.5	< 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	< 0.5	5
cis-1,3-dichloropropene	< 0.5	< 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	< 0.5	5
1,3-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chlorobenzene	< 0.5	< 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	< 0.5	5
Bromobenzene	< 0.5	< 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	< 0.5	5
2-chlorotoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-chlorotoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,4-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichlorobenzene	< 0.5	< 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	< 0.5	5
Hexachlorobutadiene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Tetrachloroethene	< 0.5	< 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	< 0.5	5
1,2,3-trichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Toluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Ethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
m,p-xylene	< 1	< 1	< 1	< 1	< 1	< 1	5
o-xylene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Styrene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Isopropylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-propylbenzene	< 0.5	< 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	< 0.5	5
Chlorodifluoromethane	< 0.5	< 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, and Micro-Extractables.

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
Tert-butylbenzene	< 0.5	< 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	< 0.5	5
sec-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-Isopropyltoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroform	1.0	6.6	10.4	0.7	0.6	2.0	50
Bromodichloromethane	1.2	3.8	< 0.5	< 0.5	< 0.5	0.5	50
Dibromochloromethane	1.1	2.5	< 0.5	< 0.5	< 0.5	0.5	50
Bromoform	< 0.5	0.9	< 0.5	< 0.5	< 0.5	< 0.5	50
Methyl tert-butyl ether	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Toxaphene	< 1	< 1	< 1	< 1	< 1	< 1	3
Total PCB's	< 0.4	< 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	< 0.13	10
Dinoseb	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	50
Dalapon	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	50
Pichloram	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Dicamba	< 1	< 1	< 1	< 1	< 1	< 1	50
Pentachlorophenol	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	1
Hexachlorocyclopentadiene	< 0.1	0.018	< 0.1	< 0.1	< 0.1	< 0.1	5
Bis(2-ethylhexyl)Phthalate	< 0.6	< 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	< 0.6	50
Hexachlorobenzene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	5
Benzo(A)Pyrene	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	50
Aldicarb Sulfone	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	SNS
Aldicarb Sulfoxide	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Aldicarb	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Oxamyl	< 1	< 1	< 1	< 1	< 1	< 1	50
3-Hydroxycarbofuran	< 1	< 1	< 1	< 1	< 1	< 1	50
Carbofuran	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	40
Carbaryl	< 1	< 1	< 1	< 1	< 1	< 1	50
Methomyl	< 1	< 1	< 1	< 1	< 1	< 1	50
Glyphosate	< 6	< 6	< 6	< 6	< 6	< 6	50
Diquat	< 0.4	< 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	< 0.01	0.05
1,2-dibromo-3-chloropropane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2
Lindane	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
Heptachlor	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.4
Aldrin	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	5
Heptachlor Epoxide	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
Dieldrin	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	5
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2
Methoxychlor	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	40
Chlordane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
2,4,-D	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Alachlor	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
Simazine	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	50
Atrazine	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	3

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
Metolachlor	<1	<1	<1	<1	<1	<1	50
Metribuzin	<0.5	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	50
Butachlor	<1	<1	<1	<1	<1	<1	50
Endothall	<9	< 9	< 9	< 9	< 9	< 9	100
Propachlor	<1	<1	<1	<1	<1	<1	50

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.

* Water is treated at the Water Treatment Plant prior to site distribution.
 Well 12 was offline and remained unused during 2016.
 NA = not available
 NR = analysis not required
 SNS = drinking water standard not specified
 NYS DWS = New York State Drinking Water Standard
 WTP = Water Treatment Plant

Table 3-7. 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 []

to these UICs are 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. There were no changes to BNL’s total UIC inventory (125) in 2016.

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. 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. In 2016, BNL’s SPCC Plan (Bruno 2016) was updated. A comprehensive 5-year review in accordance with the regulatory requirements set forth in the EPA Oil Pollution Prevention regulation (40 CFR Part 112) was completed. As part of this review, all sections, figures, tables, maps, attachments, etc., were reviewed and updated, as necessary. The updated plan was filed with NYSDEC, EPA, and DOE and must be updated every five years. BNL remained in full compliance with SPCC requirements in 2016.

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 (SARA) 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 3-7 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 44 on-site chemicals (with thresholds greater than 10,000 pounds or 500 pounds for acutely toxic materials) via the New York State approved E-Plan computer based submittal program. The chemicals ranged from road salt (1,200 tons) to chromic chloride (1 pound). To satisfy the requirements of the Tier III submittal, the Laboratory submitted its data via the EPA approved TRI-ME computer based submittal program. BNL reported releases of lead (~ 81,043 pounds), mercury (~11 pounds), polychlorinated biphenyls (PCBs) (~5 pounds), benzo(g,h,i) perylene (<1 pound), and polycyclic aromatic compounds (<1 pound) in 2016. Releases of lead, PCBs, and mercury were predominantly 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 as byproducts of the combustion of fuel oils. In 2016, 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 5 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.

There were 23 spills in 2016 and only five met regulatory agency reporting criteria. The remaining 18 spills were small-volume releases either to containment areas or to other impermeable surfaces that did not exceed a reportable quantity. Table 3-8 summarizes each of the five reportable events, including a description of the cause and corrective actions taken. 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.

3.8.4 Major Petroleum Facility (MPF) License

The storage and transfer of 2.3 million gallons of fuel oil (principally No. 6 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 six 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, or other miscellaneous petroleum needs (motor oil, waste oil, lube oil). There were no changes to BNL’s MPF License in 2016.

There are currently 66 petroleum storage

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Table 3-8. Summary of Chemical and Oil Spill Reports.

Spill No. and Date	Material/Quantity	ORPS Report	Source/Cause and Corrective Actions
16-08 03/19/16	Hydraulic Fluid/ 10 gallons	No	A suction pump on an Altec bucket truck was being used to evacuate stormwater from an electrical manhole to a nearby storm drain. During this process, the pump failed and hydraulic fluid bled from the pump through the discharge hose into the storm drain. The Tower Line Crew immediately shut the pump down and called Fire Rescue to report the leak. Upon arriving at the scene, it was evident that the hydraulic fluid had spread well beyond the storm drain used by Tower Line personnel and would eventually discharge into Outfall 010, as hydraulic fluid was already present in several down-gradient storm system drains/vaults. Recognizing the need for assistance with spill mitigation efforts, a call was made to BNL's Oil Spill Response Organization (OSRO), Miller Environmental Group (MEG). A request was made for MEG to send a team with a vacuum pump truck to assist with remediation efforts. Prior to their arrival, Fire Rescue placed oil absorbent pigs at the Outfall 010 drainage pipe and a boom within the basin to mitigate impacts of any hydraulic fluid that might be discharged to the outfall. After their arrival, MEG moved the vacuum truck from one catch basin to the next in the stormwater drainage system to recover contaminated water and floating product. After all the storm drain lines were flushed clean and contaminated water was recovered, MEG personnel dropped oil absorbent pigs with attached parachute cords into each of the basins to capture any residual hydraulic fluid that might pass through during subsequent rain events. In total 1,058 gallons of contaminated water recovered by the vacuum pump truck was taken to Tradebe Recycling in Bridgeport, Connecticut for disposal. During the second significant rainfall event following the cleanup, a stormwater sample was taken from Outfall 010 to confirm the remediation was successful. Prior to sample collection, contaminated booms and pigs by the outfall and placed by MEG into stormwater collection basins were recovered and combined with other debris from prior cleanup efforts and placed into two 55-gallon drums to be disposed off site as industrial waste by Waste Management. Sample results indicated that remediation efforts were successful and no further action was required.
16-18 09/26/16	Hydraulic Fluid/ 1 gallon	No	During routine street sweeping of Sixth Street, the operator of a Tennant street sweeper noted that hydraulic fluid had leaked onto the asphalt pavement. After the operator pulled over onto the hard-pan gravel roadway separating the solar array from the Central Steam Facility, he noticed the rotary brush attachment to the street sweeper was soaked with hydraulic fluid that had leaked from a hose connected to the hydraulic fluid reservoir. After the brush attachment hydraulics were turned off, the street sweeper was driven to the Heavy Equipment Machine Operator Shop where the defective hose was replaced. Adsorbent used to clean hydraulic fluid from the pavement and stained soil and gravel recovered by Grounds personnel after the street sweeper had been moved were placed into a 5-gallon pail and transferred to a 90-day waste accumulation area in Building 452.
16-19 10/04/16	Hydraulic Oil/ 1 pint	No	While grading an area adjacent to the Building 835 parking lot for grass planting, a hydraulic system hose on the backhoe failed causing hydraulic fluid to leak onto the soil. After placing a tray and absorbent pads beneath the leaking hose, Grounds personnel repaired the hose, dug up the contaminated soil, and placed it along with the absorbent pads into a 5-gallon pail that was later transferred to the Facilities and Operations 90-day waste storage area for eventual off-site disposal as non-hazardous waste.
16-20 10/19/16	Compressor Oil/ 30 gallons	No	Approximately 30 gallons of UCON Lubricant LB 170-x oil was released in the Building 902 compressor room when a Swagelok fitting connecting a hose to the cryogenic system first stage compressor disengaged. Upon discovery of the spill, Superconducting Magnet Division and Fire Rescue personnel responded and used a combination of absorbent pads and Green Stuff® absorbent to clean areas of the floor stained with oil inside the room. An estimated pint of oil spread onto asphalt pavement beyond the room's roll-up door. Speedi-dry was worked into the pavement with brooms and then swept up to clean the oil from the pavement. Approximately two and one half 55-gallon drums were filled with absorbent materials used to clean oil-covered surfaces. The drums were transferred to Waste Management for disposal.
16-22 12/02/16	Silicon Oil/ 20 gallons	No	When a Facilities & Operations employee arrived to conduct scheduled maintenance on an electrical transformer (Equipment ID 197-TRNF-614) behind Building 197, he observed oil stains on the outside surface of the transformer, its foundation, and on soil adjacent to the foundation base that indicated the transformer had been leaking silicon oil. Fire Rescue was notified and they placed an absorbent sock at the base of the transformer to prevent further contamination of soil. Facilities and Operations grounds personnel dug out the contaminated soil around the perimeter of the foundation and placed it and the absorbent socks into two 55-gallon drums that were transferred to Waste Management for disposal off site as non-hazardous waste. After the contaminated soil and absorbent socks had been removed, Facilities and Operations personnel replaced the transformer with a like-in-kind unit.

Notes: ORPS = Occurrence Reporting and Processing System

facilities listed on the License, which expires on March 3, 2017. During 2016, BNL remained in full compliance with MPF license requirements, which include monitoring groundwater in the vicinity of the six above-ground storage tanks located at the MPF. The license also requires the Laboratory to inspect the storage facilities monthly, and test the tank leak detection systems, high-level monitoring, and secondary containment. Tank integrity is also checked periodically. Groundwater monitoring consists of monthly checks for the presence of floating products and twice-yearly analyses for VOCs and semi-volatile organic compounds (SVOCs). In 2016, no VOCs, SVOCs, or floating products attributable to MPF activities were detected. See SER Volume II, *Groundwater Status Report*, for additional information on groundwater monitoring results.

On July 19 and 20, 2016, NYSDEC conducted an inspection of all storage facilities included on the MPF license. Three findings that required corrective action were identified: overfill prevention system was inoperative for Tank #725-13, high-level alarm was inoperative for Tank #630-06, and partially covered/obscured identification labeling for Tank #488-05. All of these findings were corrected by August 19, 2016 in accordance with NYSDEC directives.

3.8.5 Chemical Bulk Storage

Title 6 of the Official Compilation of the Codes, Rules, and Regulations of the State of New York (NYCRR) Part 597 requires that all aboveground tanks larger than 185 gallons and all underground tanks that store specific chemicals be 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. In 2015, BNL renewed its Chemical Bulk Storage (CBS) Registration in accordance with NYSDEC directives and received a Hazardous Substance Bulk Storage Registration Certificate. This certificate will expire on July 27, 2017.

NYSDEC conducted an inspection of the CBS facilities in July 2016. One finding related

to an out-of-date site map for CBS tanks located in the Water Treatment Building (Tanks 624-05, -06, -07, and -08) was identified. The map did not include all piping and the transfer station, as required. The site map was updated and included in the most current Spill Prevention Report in accordance with NYSDEC directives.

3.8.6 County Storage Requirements

Article 12 of the Suffolk County Sanitary Code 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 their sole jurisdiction over petroleum storage at Major Oil Storage Facilities (MOSF), SCDHS notified BNL that they 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 120 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 continue to meet Article 12 requirements, BNL will continue 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

Table 3-9. 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	05/26/92	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 High Flux Beam Reactor (stack and reactor vessel are scheduled for decontamination and decommissioning by 2020 and 2072, respectively. All groundwater treatment systems operated as required in 2016.

No Notices of Violation/Enforcement Actions for 2016.

Notes:
 CERCLA = Comprehensive Environmental Response, Compensation and Liability Act
 EPA = Environmental Protection Agency
 NEPA = National Environmental Policy Act
 NYSDEC = New York State Department of Environmental Conservation
 RCRA = Resource Conservation and Recovery Act
 SCDHS = Suffolk County Department of Health Services

Laboratory will no longer submit new design plans for SCDHS review/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 RCRA REQUIREMENTS

The Resource Conservation and Recovery Act regulates hazardous wastes 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, EPA delegates the RCRA program to NYSDEC, with 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 a number of satellite

accumulation and 90-day waste storage areas. Included with the hazardous wastes regulated under RCRA are mixed wastes which are generated in small quantities at BNL. Mixed wastes are materials that are both hazardous (under RCRA guidelines) and radioactive. In 2016, BNL submitted a renewal application to the NYSDEC for its 6NYCRR Part 373 RCRA Permit, which is currently under review.

In July 2016, EPA performed an unannounced inspection of Hazardous Waste activities at BNL. Three potential RCRA concerns were identified and were corrected prior to the end of the inspection. Some additional information was also requested and was subsequently provided to the inspectors.

3.10 POLYCHLORINATED BIPHENYLS

The storage, handling, and use of PCBs are regulated under the Toxic Substance and Control Act. Capacitors manufactured before 1970 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 3 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 2016 and disposed of 561 pounds of PCB contaminated equipment comprised predominantly of lighting ballasts and small capacitors. The Laboratory has aggressively approached reductions in its PCB inventory, reducing it by more than 99 percent 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 (insecticides, rodenticides, herbicides, and algicides) are regulated under the Federal Insecticide, Fungicide and Rodenticide Act. BNL uses an Integrated Pest Management (IPM) plan that was developed over a decade ago, and subsequently audited by a third party during 2012. Pesticides are used at the Laboratory to control undesirable insects, mice, and rats; 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 greenhouses on site. Herbicide use is minimized wherever possible (e.g., through spot treatment of weeds). All pesticides are applied by BNL-employed, New York State-certified applicators. By February 1, each applicator files an annual report with NYSDEC detailing insecticide, rodenticide, algicide, and herbicide use for the previous year.

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 Wild, Scenic, and Recreational River Systems Act. The Laboratory also has six areas regulated as wetlands and a number of 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 2016 and BNL 2013a) 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.

The following permits expired or were closed in 2016:

- A Notice of Termination for the Construction Stormwater permit associated with the construction of the STP upgrades was submitted in 2016, closing that permit.
- A 2011 permit for the installation of fencing and air conditioning platforms at the RHIC facility expired in 2016.

3.13 PROTECTION OF WILDLIFE

3.13.1 Endangered Species Act

BNL updates its list of endangered, threatened, and species 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*) was determined to be a federally threatened species on April 2, 2015 and is the first federally listed species known to be present at the Laboratory. This species is known 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 include: eastern tiger salamander (E), persius duskywing (E), bracken fern (E),

crested fringed orchid (E), engelman spikerush (E), dwarf huckleberry (E), whorled loosestrife (E), fireweed (E), prostrate knotweed (E), possum haw (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 2016) 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. As part of environmental benefits associated with the LISF, a small tiger salamander habitat was modified to ensure improved water retention for longer periods of time.

Banded sunfish and swamp darter are 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.

Long Island experienced an extended drought from 2015 through 2016 which resulted in virtually all waterbodies on the BNL site drying, including the one remaining coastal plain pond supporting banded sunfish and swamp darter. The NYSDEC reported that all but a few banded sunfish habitats experienced the same drying, and that plans must be developed for the restoration of these two species once drought conditions lift.

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. Habitat for the frosted elfin and persius duskywing exists on Laboratory property and the mottled duskywing is likely to exist on site; therefore, management of 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 14 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, horned lark, whip-poor-will, vesper sparrow, grasshopper sparrow, red-headed 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. However, BNL is working with Hofstra University to study reproductive strategies and habitat use of the eastern box turtle and it is a focal species for study within the LISF. Results of these studies may show the need for conservation and management needs. 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-leafed bush clover, wild lupine, and long-beaked bald-rush. The other 18 species are considered to be “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 considered to be likely present or possible due to presence of correct habitat. As outlined in the NRMP, locations of these rare plants must be determined, populations estimated, and management requirements established. In an effort to locate and document rare plants, the Laboratory is working with a botanist to assess the flora found on site. 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 bird’s 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 USDA-APHIS-Wildlife Services Division 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.

3.13.3 Bald and Golden Eagle Protection Act

While BNL does not have bald or golden eagles nesting on site, they do occasionally visit the area during migration. At times, immature golden eagles have spent several weeks in the area. Bald eagles are known to spend long periods of time on the north and south shores of Long Island, and the first documentation of nesting on the island occurred in 2013. Since that time, four additional nesting pairs have been documented on Long Island. Currently, the Laboratory has no concerns with eagles and no specific management requirements have been identified. The growth of the bald eagle population on Long Island is being monitored and protections will be put in place, as necessary.

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 Brookhaven National Laboratory Site Radiological Control Manual (RCM) (BNL 2013b) and are consistent with the pre-approved authorized release limits set by DOE Order 458.1.

In 2016, excess materials not identified as radioactive, such as scrap metal electronics equipment primarily as a result of the decommissioning of the JSW and EBCO accelerators associated with the Positron Emission Tomography (PET) research group which completed 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 DOE pre-approved authorized limits. There were no releases of real property in 2016.

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 2016, BNL was inspected by federal, state, or local regulators on ten occasions. These inspections included:

- *Air Compliance.* In December, a NYSDEC inspector observed the Annual Relative Accuracy Test Audit of the Central Steam Facility Continuous Emissions Monitoring System (CEMS); there were no issues or areas of concern identified.
- *Potable Water.* In September, SCDHS collected samples and conducted its annual inspection of the BNL potable water system. Corrective actions for all identified deficiencies were established and communicated with SCDHS and are being addressed by the Laboratory's Energy & Utilities Division.
- *Sewage Treatment Plant.* SCDHS conducts quarterly inspections of the Laboratory's STP to evaluate operations and sample the effluent. No performance or operational issues were identified. NYSDEC performed two additional surveillance inspections in June and November; there were no issues identified.
- *Petroleum Bulk Storage (PBS) Facilities.* NYSDEC performed an inspection of all PBS Facilities in July 2016. See Section 3.8.4 for a discussion of the issues identified.
- *Chemical Bulk Storage (CBS) Facilities.* The CBS facilities are inspected periodically by NYSDEC. An inspection was conducted in July 2016. See Section 3.8.5 for a discussion of the issues identified.
- *RCRA.* In July, EPA performed a Consolidated MultiMedia Inspection; all concerns identified during the inspection were subsequently resolved and the review of information provided by BNL uncovered no concerns.

3.15.2 DOE Assessments/Inspections

The DOE Brookhaven Site Office (BHSO) continued to provide oversight of BNL programs during 2016 and participated as an observer of the Brookhaven Sciences Associates (BSA) Multi-Topic Assessment of Brookhaven National Laboratory's (BNL's) environmental protection programs described below. BHSO also performed a surveillance of 90-Day Area Contingency Plans and Radioactive Waste Management in Building 490.

The intent of the 90-Day Area Contingency Plan surveillance was to evaluate the compliance status of a sample of two contingency plans that were prepared in accordance with the contingency planning requirements of the Resource Conservation and Recovery Act. Overall, review of the two plans concluded that they demonstrate compliance with external regulations and would provide appropriate guidance in the event of an emergency. There were three minor findings intended to improve compliance status that were addressed by BNL.

The scope of the Radioactive Waste Management subject area surveillance included walk-through inspections to determine if the subject area is being implemented. The surveillance identified that Building 490 has implemented the requirements of the subject area and that there were no findings.

3.15.3 Environmental Multi-Topic Assessment

The Environmental Protection Division (EPD) conducts routine programmatic assessments. The determination of topics for these assessments is based upon past regulatory findings, results of Tier I inspections and/or other routine self-assessments, and frequency of past assessments. In 2016, EPD conducted a programmatic self-assessment on BNL's NEPA and Cultural Resources programs. The objective of the assessment was to ensure the NEPA and Cultural Resources programs were in compliance with DOE, BSA, and regulatory agency expectations. During the course of the assessment, a representative sampling of managers, supervisors, and workers were interviewed. In addition, numerous documents and activities were reviewed to enable a comprehensive, independent, and objective

assessment of the conformance to requirements and the effectiveness of implementation.

The assessment of these programs identified two Noteworthy Practices, two Observations, and five Opportunities for Improvement. Except for the noted Observations, the assessed programs as a whole were found to be in conformance with applicable BNL Standards Based Management System and external regulatory requirements. A causal analysis was performed and a corrective action plan was prepared for the identified observations to address the issues. Progress on the actions was tracked to closure in BNL's Institutional Assessment Tracking System.

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 random unannounced inspections.

The NNSS performed surveillance on the BNL Radioactive Waste program on April 19 and 20, 2016. The team consisted of two members of the Rad-Waste Assistance Program (RWAP), one DOE Nevada staff, and one State of Nevada regulator. The team concentrated on Traceability and Radioactive Waste Characterization. Traceability is how the radioactive characterization, calibration, purchased services and items, and records can be traced to the final waste folder. Rad Characterization looks at each waste stream's characterization process to insure that the methods and records comply with the waste acceptance criteria.

The team did not issue any findings (Corrective Action Requests). BNL did receive one observation that was corrected immediately; NNSS requires that drivers be a U.S. Citizen to access the Nevada Test Site. The observation was that BNL did not document that a BNL employee verified the driver had one of the five required documents that proves U.S. Citizenship prior to loading the truck. Waste Management revised appropriate procedures to correct this observation.

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 in 2016 (see Table 3-9). There were no Notice of Violations accessed in 2016.

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