3 Compliance Status

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 2013, 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 within permit limits. There was one unexpected opacity excursion that occurred in August 2013 for Boiler 6 as a result of a localized short-term power outage that occurred during scheduled electrical system maintenance; other opacity excursions reported for Boiler 6 and 7 were only noted during testing periods. In 2013, 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 they are encountered.

Monitoring of BNL's potable water system indicated that all drinking water requirements were met during 2013. Most of the liquid effluents discharged to surface water and groundwater also met applicable New York State Pollutant Discharge Elimination System permit requirements. Six excursions above permit limits were reported for the year; five occurred at the Sewage Treatment Plant (total nitrogen, ammonia nitrogen, and total nitrogen load), and one at recharge basin 002 (Tolytriazole). The permit excursions were reported to the New York State Department of Environmental Conservation (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 2013. There were nine reportable spills of petroleum products, antifreeze, or chemicals, which was less than what was reported in 2012. The severity of releases were minor, and all releases were cleaned up to the satisfaction of NYSDEC.

BNL participated in 11 environmental inspections or reviews by external regulatory agencies in 2013. These inspections included Sewage Treatment Plant operations, waste water discharges to other regulated outfalls and recharge basins, 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 on the following page.

- 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 tanks storing bulk quantities of hazardous substances
- 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 37 emission sources

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 entered into 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 the 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.	3.4
EPA: 40 CFR 50-0 40 CFR 82 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). Radiological air emission sources are registered with the EPA.	3.5
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 six excursions, these discharges met the SPDES permit limits in 2013.	3.6

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
EPA: 40 CFR 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, as well as operational and maintenance requirements.	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 2013.	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, overfill protection, and leak detection. BNL complies with all federal and state requirements and has achieved conformance 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 and herbicides, as well as the pesticide containers and residuals.	BNL contracts and/or employs NY State-certified pesticide applicators to apply pesticides and herbicides. Each applicator attends training, as needed, to maintain current certification and files an annual report to the state detailing the types and quantity 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. In 2013, there were three projects permitted under the New York State Fresh Water Program.	3.12
U.S. Fish & Wildlife Service: 50 CFR 17 NYSDEC: 6 NYCRR 182	The Endangered Species Act and corresponding New York State regulations prohibit activities that would jeopardize the continued existence of an endangered or threatened species, or cause adverse modification to a critical habitat.	BNL is host to numerous species of flaura and fauna. Many species have been categorized by New York State as endangered, threatened, or of special concern. The Laboratory's Natural Resource Management Plan outlines activities to protect these vulnerable species and their habitats (see Chapter 6).	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 no impacts to nesting birds.	3.13

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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
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 414.1 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, coupled with technical standards, where appropriate, to ensure: 1) senior management provides planning, organization, direction, control, and support to achieve DOE objectives; 2) line organizations achieve and maintain quality while minimizing safety and health risks and environmental impacts, and maximizing reliability and performance; and 3) line organizations have a basic management system in place supporting this Order; and each DOE element reviews, evaluates, and improves its overall performance and that of its contractors using a rigorous assessment process based on an approved QA Program.	BNL has a Quality Management (QM) system to implement quality management methodology throughout its management systems and associated processes to: 1) plan and perform Laboratory operations reliably and effectively to minimize the impact on the safety and health of humans and on the environment; 2) standardize processes and support continuous improvement in all aspects of Laboratory operations; and 3) enable the delivery of products and services that meet customers' requirements and expectations. Having a comprehensive program ensures that all environmental monitoring data meet QA and quality control requirements. Samples are collected and analyzed using standard operating procedures, to ensure representative samples and reliable, defensible data. Quality control in the analytical labs is maintained through daily instrument calibration, efficiency and background checks, and testing for precision and accuracy. Data are verified and validated according to project-specific quality objectives before they are used to support decision making.	Chapter 9
DOE: Order 435.1	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.	2.3.4.3
DOE: Order 436.1	The DOE *Departmental Sustainability* Order replaces former DOE Orders 450.1A, *Environmental Protection Programs*, and 430.2B, *Departmental Energy, Renewable Energy and Transportation Management*. 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 and 2010. In May 2013, an external surveillance audit was conducted that found BNL's EMS to be fully integrated and effective, with one minor nonconformity and many system strengths.	Chapter 2

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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 458.1, Change 2	In February 2011, DOE released DOE Order 458.1 Radiation Protection of the Public and Environment, which replaced former Order 5400.5. The order establishes requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE pursuant to the Atomic Energy Act of 1954, as amended. The Order requires the preparation of an Environmental Radiation Protection Plan which outlines 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, Radioactive Waste Management, and 10 CFR 835. Environmental monitoring plans are well documented and the results are published annually in BNL's Site Environmental Report, which is prepared in accordance with DOE O 231.1B. 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 & 8

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

- Three permits issued by NYSDEC for construction activities within the Peconic River corridor or near wetlands
- EPA Underground Injection Control (UIC) Area permit for the operation of 138 UIC wells
- Permit for the operation of six domestic water supply wells, issued by NYSDEC
- Twelve equivalency permits for the operation of groundwater remediation systems installed via the Interagency Agreement (Federal Facility Agreement under the Comprehensive Environmental Response, Compensation and Liability Act [CERCLA])

3.2.2 New or Modified Permits

3.2.2.1 SPDES Permits

In November 2013, BNL received a Notice of Complete Application prepared by NYSDEC along with a draft copy of the Laboratory's updated SPDES Permit. As required, the Notice was published in a local newspaper on November 21, 2013 initiating a 30-day public comment period on the proposed SPDES Permit modification, which included relocation of the Sewage Treatment Plant discharge from the Peconic River to groundwater via recharge beds. BNL submitted its comments on the draft permit on December 20, 2013 and received a final permit in March 2014.

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

Three actions continued in 2013 that required permits under the New York State Wetland and/or Wild, Scenic and Recreational Rivers Act legislation. Continuation projects included post-construction activities associated with the on-site Long Island Solar Farm (LISF), installation of fencing and air conditioning platforms at the Relativistic Heavy Ion Collider (RHIC), and a project for the construction of recharge basins associated with upgrades to the Laboratory's Sewage Treatment Plant (STP), which will allow for the eventual discharge of tertiary-treated wastewater directly to groundwater.

3.2.2.3 Title V Permit

In December 2012, an application to renew BNL's Title V Permit was submitted to NYSDEC 6 months prior to its expiration. Supplementary information identifying some necessary administrative changes to the permit that were not included in the renewal application was submitted to NYSDEC in January 2013. The renewal application included necessary minor

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	Building Ventilation	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 Linear 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	1-51-009	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-16	NA	NA
NYSDEC - SPDES Equivalency	670	Sr-90 Treatment System	None	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	NA	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	None	16-Dec-14	NA	NA
NYSDEC - SPDES Equivalency	855	Sr-90 Treatment System - BGRR/WCF	None	16-Dec-14	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 - Hazardous Substance	BNL	Bulk Storage Registration Certificate	1-000263	27-Jul-15	NA	NA
NYSDEC - LI Well Permit	BNL	Domestic Potable/Process Wells	1-4722-00032/00113	13-Sep-18	NA	NA
NYSDEC - Air Quality	197	Lithographic Printing Presses	1-4722-00032/00115	29-Jun-13	U-LITHO	19709-10
NYSDEC - Air Quality	423	Metal Parts Cleaning Tanks	1-4722-00032/00115	29-Jun-13	U-METAL	42308
NYSDEC - Air Quality	423	Gasoline Storage and Fuel Pumps	1-4722-00032/00115	29-Jun-13	U-FUELS	42309-10
NYSDEC - Air Quality	423	Motor Vehicle A/C Servicing	1-4722-00032/00115	29-Jun-13	U-MVACS	MVAC1- 4
NYSDEC - Air Quality	244	Paint Spray Booth	1-4722-00032/00115	29-Jun-13	U-PAINT	244-02
NYSDEC - Air Quality	244	Flammable Liquid Storage Cabinet	1-4722-00032/00115	29-Jun-13	U-PAINT	244 AE
NYSDEC - Air Quality	479	Metal Parts Cleaning Tank	1-4722-00032/00115	29-Jun-13	U-METAL	47908
NYSDEC - Air Quality	510	Spin Coating Operation	1-4722-00032/00115	29-Jun-13	U-INSIG	510 AR
NYSDEC - Air Quality	801	Target Processing Laboratory	1-4722-00032/00115	29-Jun-13	U-INSIG	80101
NYSDEC - Air Quality	Site	Aerosol Can Processing Units	1-4722-00032/00115	29-Jun-13	U-INSIG	AEROS
NYSDEC - Air Quality	498	Aqueous Cleaning Facility	1-4722-00032/00115	29-Jun-13	U-METAL	49801
NYSDEC - Air Quality	535B	Plating Tanks	1-4722-00032/00115	29-Jun-13	U-INSIG	53501
NYSDEC - Air Quality	535B	Etching Machine	1-4722-00032/00115	29-Jun-13	U-INSIG	53502
NYSDEC - Air Quality	535B	Printed Circuit Board Process	1-4722-00032/00115	29-Jun-13	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	29-Jun-13	U-61005	61005
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	29-Jun-13	U-61006	61006
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	29-Jun-13	U-61007	61007
NYSDEC - Air Quality	610	Metal Parts Cleaning Tray	1-4722-00032/00115	29-Jun-13	U-METAL	61008
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	29-Jun-13	U-61005	6101A
NYSDEC - Air Quality	630	Gasoline Storage and Fuel Pumps	1-4722-00032/00115	29-Jun-13	U-FUELS	63001-03
NYSDEC - Air Quality	630	Parts Cleaning Tray	1-4722-00032/00115	29-Jun-13	U-METAL	630 AB
NYSDEC - Air Quality	902	Epoxy Coating/Curing Exhaust	1-4722-00032/00115	29-Jun-13	U-COILS	90206
NYSDEC - Air Quality	903	Metal Parts Cleaning Tank	1-4722-00032/00115	29-Jun-13	U-METAL	90304
NYSDEC - Air Quality	919B	Electroplating Operation	1-4722-00032/00115	29-Jun-13	U-INSIG	91904
NYSDEC - Air Quality	630	Parts Cleaning Tray	1-4722-00032/00115	29-Jun-13	U-METAL	630 AD
NYSDEC - Air Quality	922	Electroplating Operation	1-4722-00032/00115	29-Jun-13	U-INSIG	92204
NYSDEC - Air Quality	923	Electronic Equipment Cleaning	1-4722-00032/00115	29-Jun-13	U-METAL	9231A
NYSDEC - Air Quality	923	Parts Drying Oven	1-4722-00032/00115	29-Jun-13	U-METAL	9231B
NYSDEC - Air Quality	924	Magnet Coil Production Press	1-4722-00032/00115	29-Jun-13	U-INSIG	92402
NYSDEC - Air Quality	924	Vapor/Ultrasonic Degreasing Unit	1-4722-00032/00115	29-Jun-13	U-METAL	92404
NYSDEC - Air Quality	Site	Halon 1211 Portable Extinguishers	1-4722-00032/00115	29-Jun-13	U-HALON	H1211
NYSDEC - Air Quality	Site	Halon 1301 Fire Suppression Systems	1-4722-00032/00115	29-Jun-13	U-HALON	H1301
NYSDEC - Air Quality	Site	Packaged A/C Units	1-4722-00032/00115	29-Jun-13	U-RFRIG	PKG01-02
NYSDEC - Air Quality	Site	Reciprocating Chillers	1-4722-00032/00115	29-Jun-13	U-RFRIG	REC01-53
NYSDEC - Air Quality	Site	Rotary Screw Chillers	1-4722-00032/00115	29-Jun-13	U-RFRIG	ROTO1-11
NYSDEC - Air Quality	Site	Split A/C Units	1-4722-00032/00115	29-Jun-13	U-RFRIG	SPL01-02
NYSDEC - Air Quality	Site	Centrifugal Chillers	1-4722-00032/00115	29-Jun-13	U-RFRIG	CEN01-24
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	STP	STP and Recharge Basins	NY-0005835	28-Feb-15	NA	NA
NYSDEC - Water Quality	STP	STP and Recharge Basins	1-4722-00032/00148	26-Aug-15	NA	NA
NYSDEC - Water Quality	STP	STP and Recharge Basins	1-4722-00032/00149	27-Aug-15	NA	NA
NYSDEC - Water Quality	Site	Solar farm construction	1-4722-05846/00001	06-May-15	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 Collidar
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

revisions to existing emission units, as well as a summary of new regulatory requirements now applicable to existing emission sources which had been promulgated and added to the permit since it was last renewed in June 2008, and the addition of emission units identified as U-GENER and U-SMBLR covering 12 existing stationary diesel emergency generators subject to the

New Source Performance Standard 40 CFR Subpart IIII, and 4 existing small boilers with heat input capacities between 1 and 25 MMBtu/hr subject to new boiler tune-up requirements of 40 CFR 63 Subpart JJJJJJ and 6 NYCRR 227-2.4. Table 3-2 reflects both the revisions to existing emission units and the addition of new emission units to BNL's Title V Permit.

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 2013, environmental evaluations were completed for 100 proposed projects at BNL. Of those, 94 were considered minor actions requiring no additional documentation. Six projects were addressed by submitting notification forms to DOE, which determined that all six projects were covered by existing "Categorical Exclusions" (per 10 CFR 1021) or fell within the scope of a previous environmental assessment. In addition, an Environmental Assessment (EA) for Management of the White-tailed Deer (*Odocoileus virginianus*) Population at Brookhaven National Laboratory was completed in 2013 with a Finding of No Significant Impact (FONSI).

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 2013), 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. 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 2013, 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). 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. Emission tests of Boilers 1A and 5 conducted respectively in December 2012 and March 2013 confirmed

that Boilers 1A and 5, both in this size category, met the 0.30 lbs/MMBtu NO_x emission standard when burning residual fuel oil with low nitrogen content, and separate emission tests on Boiler 5 confirmed that it met the 0.20 lbs/MMBtu NO_x emission standard while burning natural gas. To ensure continued compliance with the NO_x RACT standard for residual fuel oil, an outside contract analytical laboratory analyzes composite samples (collected quarterly) of fuel deliveries to confirm that the fuel nitrogen content of residual oil burned is less than 0.3 percent by weight. The analyses of residual oil used in 2013 confirmed that the fuel-bound nitrogen content met these requirements. Compliance with the 0.30 lbs/MMBtu NO_x emission standards for Boilers 6 and 7 was demonstrated by continuous emission monitoring of the flue gas. In 2013, NO_x emissions from Boilers 6 and 7 averaged 0.083 lbs/MMBtu and 0.093 lbs/MMBtu, respectively. There were no known exceedances of the NO_x emission standard for either boiler.

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. In August 2013, there was one 6-minute period where measured opacity for Boiler 6 exceeded 20 percent. This was the result of a localized short-term power outage that occurred during scheduled electrical system maintenance. The only other reported periods when opacity measurements for Boilers 6 or 7 exceeded the 6-minute, 20 percent average, occurred during quarterly calibration error tests of the opacity monitors. These opacity measurements were artificially induced when opacity attenuator filters were inserted across the opacity transmissometer light path during the calibration error tests and are not considered excess opacity readings.

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 2013, 3,390 pounds of R-11, 27 pounds of R-12, 352 pounds of R-22, 100 pounds of R-134a, and 35 pounds of R-401a were recovered and recycled from refrigeration equipment that was serviced. In 2013, 300 pounds of R-11, 166 pounds of R-12, 845 pounds of R-22, 151 pounds of R-134a, 100 pounds of R-123, 20 pounds of R-401a, and 9 pounds of R-410A leaked from refrigeration and air conditioning equipment on site. These leaks were subsequently reported as emissions in the Annual Emissions Statement transmitted to NYSDEC.

Halon: Halon 1211 and 1301 are extremely efficient fire suppressants, 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, BNL 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 2013, 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. There were also no Laboratory transfers of excess ozone depleting substances to the Ozone Depleting Substances Reserve. Plans for 2014 include the transfer of excess cylinders of Halon 1301 from two fixed fire suppression systems scheduled for removal, several cylinders of excess R-22, and nine 1-pint bottles of unused CFC-113 to

the Ozone Depleting Substances Reserve. The transfer will be made in accordance with the Class I Ozone Depleting Substances Disposition Guidelines prepared by the DOE Office of Environmental Policy and Guidance.

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

Based on the Laboratory's periodic review of Maximum Available Control Technology (MACT) standards in 2013, it has been determined that none of the proposed or newly promulgated MACT standards apply to the emissions from existing permitted operations or the anticipated emissions from proposed activities and operations at BNL.

3.5.2.2 Asbestos

In 2013, the Laboratory notified the EPA Region II office regarding the removal of materials containing asbestos. During the year, 5,050 linear feet of pipe insulation, 164,194 square feet of non-friable (e.g., floor tiles, siding material), and 121 cubic yards of asbestos-containing debris were removed and disposed of according to EPA requirements.

3.5.2.3 Radioactive Airborne Emissions

Minor and major sources of radiological emissions are evaluated from BNL's facilities and activities 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 2013 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 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 μSv) annual dose limit specified in 40 CFR 61 Subpart H (see Chapters 4 and 8 for more information on the estimated air dose). Using EPA modeling software, the dose to the maximally exposed off-site individual resulting from BNL's airborne emissions in 2013 was 3.65E-01 mrem (3.6 μSv).

In March 2013, a peer review assessment of BNL's NESHAPs for Radionuclide Emissions program was conducted. The peer review team included environmental professionals from Oak Ridge National Laboratory, with observers from the Department of Energy Chicago Operations and Brookhaven Site Offices. The assessment yielded no non-conformances, five programmatic strengths, and 19 Opportunities for Improvement (OFIs). In May 2013, a team of BNL Subject Matter Experts (SMEs) were assembled to analyze the OFIs and identified actions needed to improve Rad-NESHAP program implementation. A final report was completed in June, which identified corrective actions for the OFIs, most of which were completed by September 30, 2013 (BNL 2013).

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 5-2 in Chapter 5 for the locations of BNL outfalls.

- Outfall 001 is used to discharge treated effluent from the STP to the Peconic River.
- Outfalls 002, 002B, 003, 005, 006A, 006B, 008, 010, 011, and 012 are recharge basins used to discharge cooling tower blowdown, once-through cooling water, and/or stormwater. Since 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., drywells) 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 that describe monitoring results, evaluate compliance with permit limitations, and identify corrective measures taken to address permit excursions. These reports are submitted to NYSDEC central and regional offices and the SCDHS. 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 groundwater.

As stated in Section 3.2.2.1, BNL is in the process of modifying its SPDES permit to reflect an approved modified treatment process that will replace the existing sand filters with free standing self-enclosed filtration units and divert the discharge to on-site recharge basins. Final design and specifications for the modified treatment process were approved by NYSDEC and SCDHS in November 2012. Construction activities were initiated in July 2013, and are expected to be completed by September 2014.

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 the Peconic River. The STP provides tertiary treatment of the wastewater and includes the following processes: settling/sedimentation, biological reduction of organic matter and nitrogen, sand filtration, and UV disinfection. 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. The relevant SPDES permit limits are also shown. 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 2013.

There were five excursions of the SPDES permit limits at Outfall 001 in 2013: (2) total nitrogen, (2) ammonia nitrogen, and (1) for total nitrogen loading. In May, the maximum total nitrogen load was calculated at 21.1 pounds per day, which exceeded the permit limit of 20 pounds per day. Composite samples collected from Outfall 001 for routine compliance nitrogen series analysis during the week of December 9 exhibited total nitrogen concentrations of 11.6 mg/L and 13.4 mg/L and ammonia concentrations of 1.85 mg/L and 6.7 mg/L. Permit limits for total nitrogen and ammonia are 10 mg/L and 1.5 mg/L, respectively. All other parameters at Outfall 001 were within permit limits.

The total nitrogen loading excursion was due to a higher than normal total nitrogen level observed on the same day (9.0 mg/L), which was most likely the result of issues with the operating modular aeration tank's dissolved oxygen (DO) time delay equipment. Arrangements were made to have a contractor evaluate and fix the DO blower dwell timer. In-house process

control sampling and analysis of effluent for nitrates following this repair confirmed that the issue was resolved.

Several immediate and long term corrective actions were implemented to address the total nitrogen and ammonia excursions observed in December 2013, including sending a sample of the mixed liquor suspended solids (MLSS) from the aeration tank to a wastewater microbiological laboratory to evaluate the condition of the biota present within the activated sludge that is part of BNL's treatment system. A recommendation was made to raise the aeration basin pH above 7.5 with lime and caustic or magnesium hydroxide. After implementation, in-house process control samples and subsequent contract laboratory analysis indicated that ammonia and total nitrogen concentrations returned to normal concentrations and well below the permit limits. 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.

3.6.1.1 Chronic Toxicity Testing

The Laboratory's SPDES permit requires that "whole effluent toxicity" (WET) tests be conducted to ensure that chemicals present in the STP effluent are not toxic to aquatic organisms. In 2013, BNL continued to perform quarterly chronic toxicity testing using water fleas (*Ceriodaphnia dubia*). In each test, sets of 10 organisms are exposed to varying concentrations of the STP effluent (100, 75, 50, 25, and 12.5 percent) for 7 days. During testing, the rate of reproduction for the water flea is measured and compared to untreated organisms (i.e., controls). The test results are submitted to NYSDEC for review.

Testing in 2013 showed that there was no toxicity demonstrated in the four tests performed. Reproduction and survival rates were comparable to the control population, indicating that the STP effluent is not toxic to invertebrate organisms. Under the terms of BNL's SPDES permit, testing is required throughout the term of the permit; consequently, testing will continue in 2014.

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 aquifer. Monitoring requirements for each of these discharges vary, depending on the type of wastewater received and the type of cooling

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*
Max. temperature (°F)	46	70	Daily	90	0	100
pH (SU)	6.3	7.9	Continuous Recorder	Min 5.8, Max. 9.0	0	100
Max. 5-Day BOD (mg/L)	<2	<2	Twice Monthly	5	0	100
% BOD Removal	> 91	> 98	Monthly	85	0	100
Max. TSS (mg/L)	<0.5	<0.6	Twice Monthly	20	0	100
% TSS Removal	> 98	>99	Monthly	85	0	100
Settleable solids (ml/L)	0	0	Daily	0.1	0	100
Ammonia nitrogen (mg/L)	< 0.1	6.7 (a)	Twice Monthly	1.5	2	93
Total nitrogen (mg/L)	1.96	13.4 (b)	Twice Monthly	10	2	93
Total nitrogen (lbs./day)	12	21.1 (c)	(May – October)	20	1	93
Total phosphorus (mg/L)	0.7	1.9	Twice Monthly	NA	0	100
Cyanide (mcg/L)	< 1.7	3.0	Twice Monthly	100	0	100
Copper (mg/L)	0.007	0.076	Twice Monthly	0.15	0	100
Iron (mg/L)	0.062	0.257	Twice Monthly	0.37	0	100
Lead (mg/L)	<0.001	0.005	Twice Monthly	0.019	0	100
Mercury (ng/L)	30	69	Twice Monthly	200	0	100

(continued on next page)

Table 3-3. Analytical Results for Wastewater Discharges to Sewage Treatment Plant Outfall 001 *(concluded).*

Analyte	Low Report	High Report	Min. Monitoring. Freq.	SPDES Limit	Exceedances	% Compliance*
Methylene chloride (ug/L)	1.6	< 2	Twice Monthly	5	0	100
Nickel (mg/L)	<0.002	0.006	Twice Monthly	0.11	0	100
Silver (mg/L)	< 0.001	0.003	Twice Monthly	0.015	0	100
Toluene (ug/L)	< 1	< 1	Twice Monthly	5	0	100
Zinc (mg/L)	0.012	0.096	Twice Monthly	0.1	0	100
1,1,1-trichloroethane (ug/L)	< 1	< 1	Twice Monthly	5	0	100
2-butanone (ug/L)	< 5	< 5	Twice Monthly	50	0	100
PCBs (ug/L)	< 0.05	< 0.2	Quarterly	NA	0	100
Max. Flow (MGD)	0.42	0.82	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.23	0.53	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 ml)	<1	1.5	Twice Monthly	200	0	100
Max. Fecal Coliform (MPN/100 ml)	<2	<2	Twice Monthly	400	0	100
HEDP (mg/L)	<0.05	1.7	Monthly	NA	0	100
Tolytriazole (mg/L)	< 0.005	< 0.005	Monthly	NA	0	100

Notes:
See Chapter 5, 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
MPN = Most Probable Number
NA = Not Applicable
SPDES = State Pollutant Discharge Elimination System
SU = Standard Unit
TSS = Total Suspended Solids
(a) Two permit exceedances for ammonia were reported in December. See Section 3.6.1 for an explanation of this permit exceedance.
(b) Two permit exceedances for total nitrogen were reported in December.
(c) A single exceedance for total nitrogen load was reported in May.

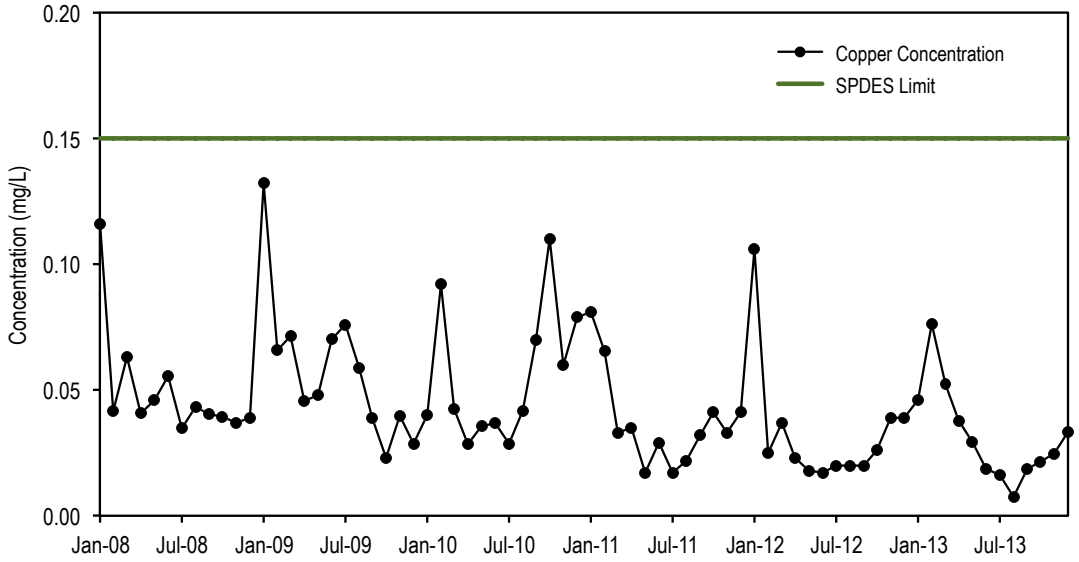


Figure 3-1. Maximum Concentrations of Copper Discharged from the BNL Sewage Treatment Plant, 2008–2013.

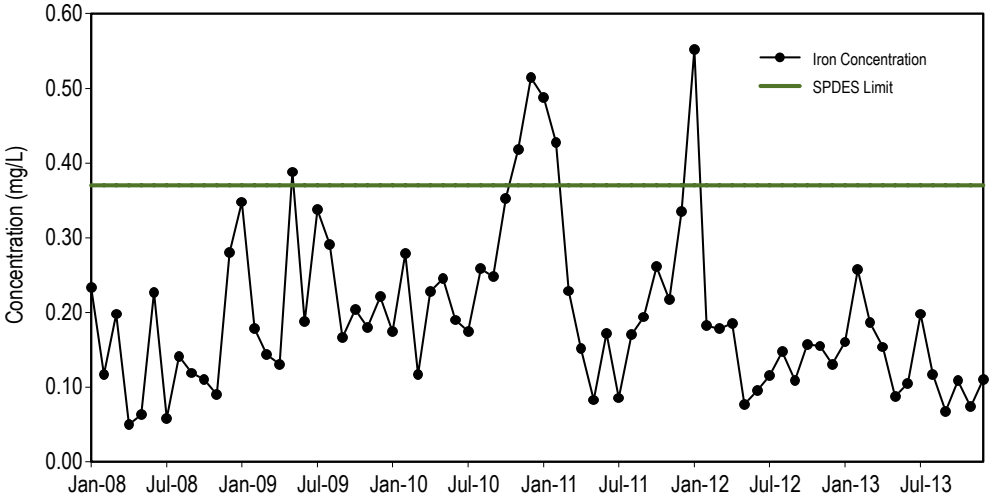


Figure 3-2. Maximum Concentrations of Iron Discharged from the BNL Sewage Treatment Plant, 2008–2013.

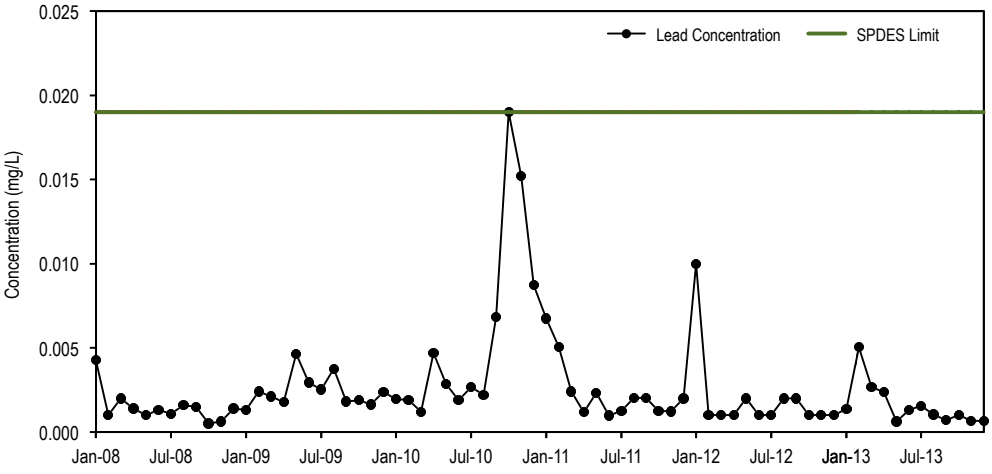


Figure 3-3. Maximum Concentrations of Lead Discharged from the BNL Sewage Treatment Plant, 2008–2013.

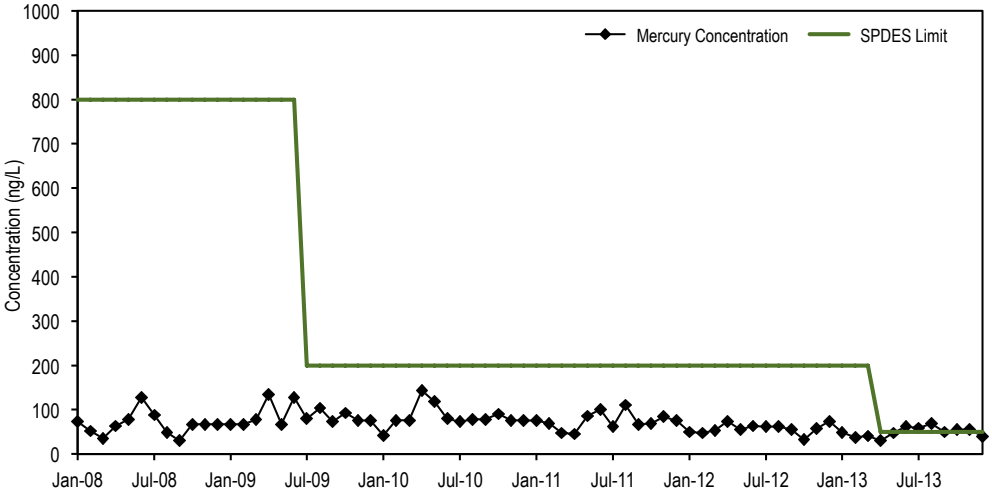


Figure 3-4. Maximum Concentrations of Mercury Discharged from the BNL Sewage Treatment Plant, 2008–2013.

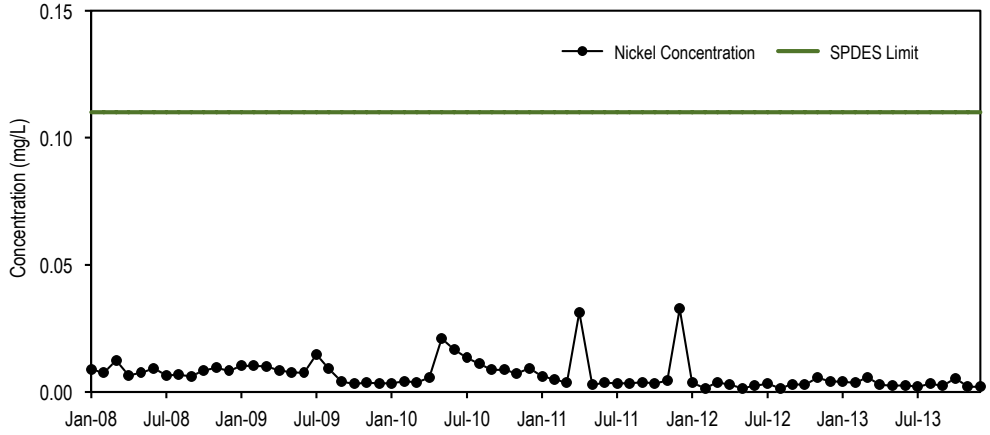


Figure 3-5. Maximum Concentrations of Nickel Discharged from the BNL Sewage Treatment Plant, 2008–2013.

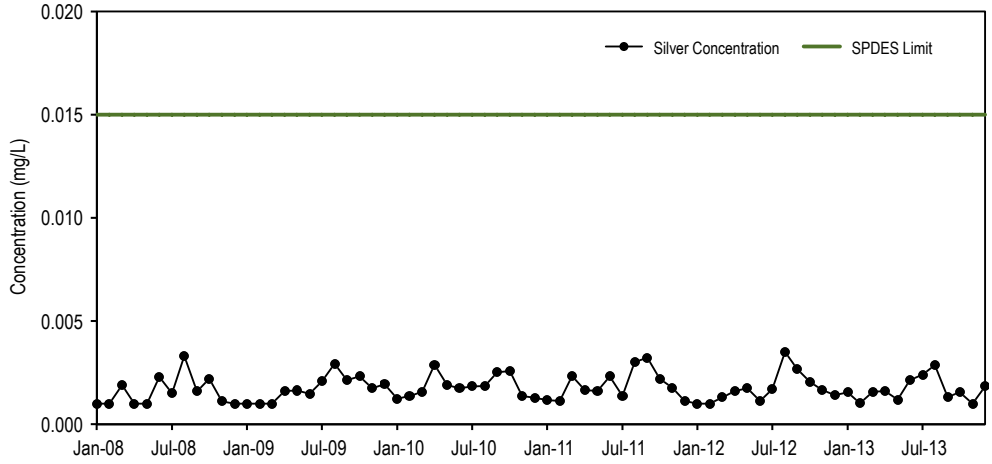
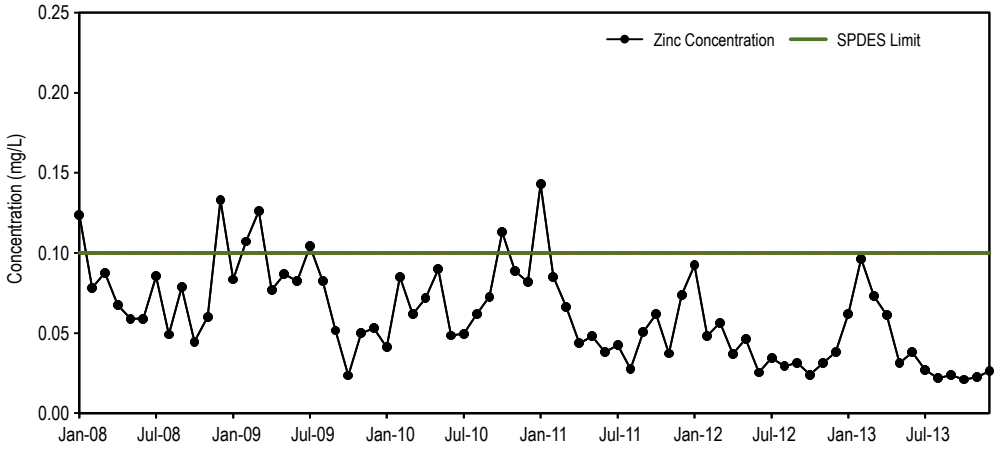


Figure 3-6. Maximum Concentrations of Silver Discharged from the BNL Sewage Treatment Plant, 2008–2013.



Note: Per New York State Department of Environmental Conservation guidance, the concentrations of zinc exhibited in the effluent during January and December 2008, February, March, July 2009, October 2010, and January 2011 were not considered in violation of the State Pollutant Discharge Elimination System effluent limit of 0.1 mg/L, due to rounding off of significant figures.

Figure 3-7. Maximum Concentrations of Zinc Discharged from the BNL Sewage Treatment Plant, 2008–2013.

water treatment reagents used. Table 3-4 summarizes the monitoring requirements and performance results.

There was only one Tolytriazole (TTA) excursion reported for these outfalls during 2013. The TTA concentration at Outfall 002 measured on January 7, 2013 was 0.73 mg/L, which exceeded the permit level of 0.2 mg/L. An investigation revealed that the restart of Cooling Tower #7 (Bldg 1005A) after maintenance with higher doses of water treatment chemicals (WTCs) to condition the system, coupled with higher than normal water loss/overflow, was the most probable cause of the excursion. The system was tested weekly after start-up, and treatment dose was adjusted to maintain the desired chemistry in tower. Testing by the WTC supplier indicated that all treatment residuals were normal and there have not been any further excursions since then.

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 (Chaloupka 2013) is prepared by BNL to comply with these requirements.

3.7.1 Potable Water

The Laboratory maintains five water supply wells for on-site distribution of potable water. 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 2013, 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 BNL environmental surveillance program. Data collected under this program are consistent with the data

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

Analyte		Outfall 002	Outfall 002B	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Compliance*
Flow (MGD)	N	CR	CR	CR	CR	CR	CR	11	11			
	Min.	1.1	0.0006	0.14	0.04	0.01	0.16	0.0006	0.00009	NA		
	Max.	3.4	0.06	0.79	0.19	0.32	0.68	0.35	0.82	NA	NA	NA
pH (SU)	Min.	6.7	7.5	6.2	7.1	7.1	6.7	7.5	7.5	NA		
	Max.	8.2	8.7	8.4	8.4	8.6	8.4	8.3	8.3	8.5, 9.0 (a)	0	100
Oil and grease (mg/L)	N	12	11	12	12	12	NR	10	10			
	Min.	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	NR	1.1	< 1.1	NA		
	Max.	3.1	2.8	2.7	2.5	2.7	NR	2.2	3.9	15	0	100
Copper (mg/L)	N	NR	NR	4	NR	NR	NR	NR	3			
	Min.	NR	NR	< 0.003 (T)	NR	NR	NR	NR	< 0.004 (D)	NA		
	Max.	NR	NR	0.004	NR	NR	NR	NR	0.033 (D)	1.0	0	100
Aluminum (mg/L)	N	4	NR	NR	NR	NR	NR	2	3			
	Min.	< 0.07 (T)	NR	NR	NR	NR	NR	< 0.07 (D)	< 0.07 (D)	NA		
	Max	< 0.07	NR	NR	NR	NR	NR	0.2 (D)	0.1 (D)	2.0	0	100

(continued on next page)

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

Analyte		Outfall 002	Outfall 002B	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Compliance*
Lead, Dissolved (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	3			
	Min.	NR	NR	NR	NR	NR	NR	NR	< 0.0005	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	< 0.0005	0.05	0	100
Vanadium, Dissolved (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	3			
	Min.	NR	NR	NR	NR	NR	NR	NR	0.005	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.005	NPL	NA	NA
Chloroform (µg/L)	N	4	NR	NR	NR	NR	NR	NR	NR			
	Min.	< 1	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	<1	NR	NR	NR	NR	NR	NR	NR	7	0	100
Bromodichloromethane (µg/L)	N	4	NR	NR	NR	NR	NR	NR	NR			
	Min.	0.92	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	1.0	NR	NR	NR	NR	NR	NR	NR	50	0	100
1,1,1-trichloroethane (µg/L)	N	4	NR	NR	NR	NR	NR	11	NR			
	Min.	< 1	NR	NR	NR	NR	NR	< 1	NR	NA		
	Max.	< 1	NR	NR	NR	NR	NR	< 1	NR	5	0	100
1,1-dicloroethylene (µg/L)	N	NR	NR	NR	NR	NR	NR	11	NR			
	Min.	NR	NR	NR	NR	NR	NR	< 1	NR	NA		
	Max.	NR	NR	NR	NR	NR	NR	< 1	NR	5	0	100
Hydroxyethylidene-diphosphonic acid (mg/L)	N	4	4	4	4	4	NR	NR	NR			
	Min.	<0.02	<0.05	<0.05	<0.05	<0.05	NR	NR	NR	NA		
	Max.	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	NR	NR	0.5	0	100
Tolyltriazole (mg/L)	N	4	4	4	4	4	NR	NR	NR			
	Min.	<0.005	<0.005	<0.005	<0.005	<0.005	NR	NR	NR	NA		
	Max.	0.7	<0.005	<0.005	<0.005	<0.005	NR	NR	NR	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
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
(a) pH limit is 8.5 for Outfalls 005, 008, and 010 and pH limit is 9.0 for Outfalls 002, 002B, 006A, 006B, and 007.

reported in Tables 3-5 and 3-6. This additional testing goes beyond the minimum SDWA testing requirements.

To ensure that consumers of on-site drinking water are informed about the quality of Laboratory-produced potable water, BNL annually publishes a Consumer Confidence Report (CCR) in May, a deadline stipulated by the SDWA. This report provides information regarding BNL's 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/bnlweb/pubaf/water/reports.htm*.

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 that may contain hazardous substances. 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 introduction into the domestic water system, especially under low-pressure conditions. In addition, secondary cross-connection controls at the point of use are recommended to protect users within a specific facility from hazards that may be posed by intra-facility operations.

The Laboratory maintains approximately 200 cross-connection control devices, including primary devices installed at interfaces to the potable water main, and secondary control devices at the point of use. In 2013, 209 cross-connection control units were tested, including primary and secondary devices. If a problem with a cross-connection device is encountered during testing, the device is repaired and re-tested to ensure proper function. Copies of the cross-connection device test reports are filed with SCDHS 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 2013, six UIC devices were installed at the Northeast Solar Energy Research Center site, bringing BNL's total UIC inventory up to 138. Applications for these new devices were submitted to EPA in 2012, and all six will be used solely for the disposal of storm water runoff. 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 storm water, UICs also are maintained at several on- and off-site treatment facilities used for groundwater remediation. Contaminated groundwater is treated and then returned to the aquifer via drywells, injection wells, or recharge basins. Discharges to these UICs are 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.

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)	41.6	39.8	47.9	60.8	49.5	49.9	250
Color (units)	45*	75*	5	< 5	< 5	10	15
Conductivity (μmhos/cm)	206	201	203	331	312	246	SNS
Cyanide (μg/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)	0.2	0.19	0.39	0.66	0.81	0.24	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	5.9	5.9	6	6	7.1	SNS
Sulfates (mg/L)	8.7	9.2	11.6	10.8	11.5	9.2	250
Total coliform	ND	ND	ND	ND	ND	1***	Negative
Metals							
Antimony (μg/L)	< 0.4	<0.4	<0.4	<0.4	<0.4	0.52	6
Arsenic (μg/L)	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	50
Barium (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	0.044	2
Beryllium (μg/L)	0.5	<0.2	<0.2	<0.2	<0.2	0.7	4
Cadmium (μg/L)	<0.4	<0.4	<0.4	<0.4	<0.4	<1.0	5
Chromium (mg/L)	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	0.1
Fluoride (mg/L)	0.12	0.1	0.13	< 0.1	< 0.1	< 0.1	2.2
Iron (mg/L)	2.4*	4.4*	1.4*	<0.006	<0.006	0.089	0.3
Lead (μg/L)	<1.0	<1.0	<1.0	1.21	<1.0	<1.0	15
Manganese (mg/L)	0.26	0.1	0.065	< 0.01	< 0.01	0.028	0.3
Mercury (μg/L)	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.2	2
Nickel (mg/L)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	SNS
Selenium (μg/L)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	50
Sodium (mg/L)	26.2	20.1	25	28.5	24.8	26.2	SNS

(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
Silver (μg/L)	<10	<10	<10	<10	<10	<10	100
Thallium (μg/L)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	2
Zinc (mg/L)	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	5
Radioactivity							
Gross alpha activity (pCi/L)	< 1.96	< 1.97	< 1.99	<1.93	1.32 ± 0.95	NR	15
Gross beta activity (pCi/L)	< 1.14	1.61 ± 0.78	1.51 ± 0.67	1.35 ± 0.77	1.58 ± 0.85	NR	(a)
Radium-228 (pCi/L)	NS	NS	NS	NS	NS	NR	5
Strontium-90 (pCi/L)	< 0.7	< 0.7	< 0.75	< 0.78	< 0.68	NR	8
Tritium (pCi/L)	< 440	< 460	< 500	< 450	< 470	NR	20,000
Other							
Alkalinity (mg/L)	13.3	12.9	17.7	25.7	22.6	48.2	SNS
Asbestos (M. fibers/L)	NR	NR	NR	NR	NR	< 0.20	7
Calcium (mg/L)	6.2	5.5	6.3	12.5	9	12.7	SNS
HAA5 (mg/L)	NR	NR	NR	NR	NR	0.016	0.06**
Residual chlorine - MRDL (mg/L)	NR	NR	NR	NR	NR	1.4	4
TTHM (mg/L)	NR	NR	NR	NR	NR	0.028	0.08**

Notes:
See Figure 7-3 for well locations.
Well 12 was not operational for 2013. 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 single sample tested positive for coliform. Upon retesting, all samples were negative.
(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.

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. BNL's SPCC Plan

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

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	< 0.5	< 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	< 0.5	< 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
1,1,2,2-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

(continued on next page)

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
1,3,5-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
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	3	9	88*	2	0.8	0.9	50
Bromodichloromethane	2	2	5	< 0.5	< 0.5	< 0.5	50
Dibromochloromethane	2	0.7	0.8	< 0.5	< 0.5	< 0.5	50
Bromoform	2	< 0.5	< 0.5	< 0.5	< 0.5	0.9	50
Methyl tert-butyl ether	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Toxaphene	NR	< 1	< 1	< 1	< 1	< 1	3
Total PCB's	NR	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.5
2,4,5,-TP (Silvex)	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	10
Dinoseb	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	50
Dalapon	NR	< 1	< 1	< 1	< 1	< 1	50
Pichloram	NR	0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Dicamba	NR	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	50
Pentachlorophenol	NR	0.069	< 0.04	< 0.04	< 0.04	< 0.04	1
Hexachlorocyclopentadiene	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	5
Bis(2-ethylhexyl)Phthalate	NR	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	50
Bis(2-ethylhexyl)Adipate	NR	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	50
Hexachlorobenzene	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	5
Benzo(A)Pyrene	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	50
Lindane	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
Heptachlor	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.4
Aldrin	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	5
Heptachlor Epoxide	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
Dieldrin	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	5
Endrin	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2
Methoxychlor	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	40
Chlordane	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
2,4,-D	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Alachlor	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2
Simazine	NR	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	50
Atrazine	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	3
Metolachlor	NR	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	50
Metribuzin	NR	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	50
Butachlor	NR	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	50
Propachlor	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50

Notes:
See Chapter 7, Figure 7-3, 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 H2M Labs Inc., a New York State-certified contractor laboratory.
The minimum detection limits for principal organic compound analytes are 0.5 µg/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 2013.
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

(Chaloupka 2011) is filed with NYSDEC, EPA, and DOE. BNL remained in full compliance with SPCC requirements in 2013.

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 (i.e., Tier II Report) and releases (i.e., Tier III Report) 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 reports under EPCRA Sections 302, 303, 311, 312, and 313. In fulfillment of the Tier II requirements, BNL submitted an inventory of 42 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. These chemicals ranged from road salt (1,200 tons) to nitric acid (604 pounds). To satisfy the requirements of the Tier III submittal, BNL submitted its data via the EPA approved TRI-ME computer based submittal program. BNL reported releases of lead (~19,580 pounds), mercury (~55 pounds), polychlorinated biphenyls (PCBs) (~308 pounds), benzo(g,h,i)perylene (<1 pound), and polycyclic aromatic compounds (<1 pound) for calendar year 2013. 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 2013, 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 the spill is conducted, as necessary, to prevent impacts to the environment, minimize human health exposures, and restore the site.

Similar to 2012, there were 42 spills in 2013, however, only nine of the spills met regulatory agency reporting criteria. The remaining 33 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 nine

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 [ ]

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

Spill No. and Date	Material and Quantity	ORPS Report	Source/Cause and Corrective Actions
13-14 04/06/13	Hydraulic Fluid/ 4 gallons	No	The auxiliary hydraulic line to a sander attachment on a Freightline Dump Truck failed, resulting in vegetable oil leaking onto the pavement and adjacent soil along East Street. Absorbent pigs and speedy dry were used to clean up the spill, and the recovered contaminated soil was placed in a 55-gallon drum for off-site disposal.
13-15 04/18/13	HCFC-22/ 275 pounds	Yes	During a scheduled preventative maintenance inspection of a rotary screw chiller in Building 911, a pinhole leak in a solenoid valve was discovered after causing the entire refrigerant charge to be released. A work order was prepared to replace the failed solenoid valve.
13-18 05/22/13	HCFC-22/ 28 pounds	Yes	As an A/C engineer was recharging a rotary screw chiller in Building 911 after replacing the liquid solenoid valve, the hot gas pressure relief valve opened. The engineer stopped recharging the unit and recovered the balance of refrigerant that had been added. The pressure relief valve was rebuilt and reinstalled.
13-19 05/29/13	Hydraulic Fluid/ 15-20 gallons	No	While cleaning accumulated tree debris with a street sweeper, a worker noticed a path of hydraulic fluid following the sweeper. Clean sand was used to absorb the spill. Subsequent inspection of the sweeper after being towed to the Heavy Equipment Shop for repairs revealed that the leak started when a hose blew off a highly corroded accumulator valve. The valve and all hydraulic hoses were replaced.
13-21 06/18/13	Power Steering Fluid/< 5 gallons	No	After inspecting an out-of-service clamshell crane and backhoe that were scheduled to be auctioned, Heavy Equipment Shop personnel observed stained soil beneath both vehicles. After the vehicles were transferred to BNL's scrap metal yard, the contaminated soil was excavated and placed in three 55-gallon drums for off-site disposal.
13-28 08/09/13	Hydraulic Fluid/ 25 gallons	No	Hydraulic oil leaked onto the freight elevator service room floor in Building 734 when a brass fitting on a feed line from the hydraulic oil storage tank failed. A vacuum pump was used to recover and transfer 25 gallons of oil into 5-gallon pails. Custodial staff cleaned up the residual oil with detergent, which generated approximately 8 gallons of rinsate.
13-33 10/14/13	Fuel Oil/ Unknown	No	During a berm liner replacement project involving the excavation of soil at Tank #3 at the Central Steam Plant, historical/legacy petroleum contamination was found in the soil adjacent to the tank's concrete base. There was no evidence to suggest that the current #6 fuel oil storage tank was the source of the spill. After a work plan was developed, the contaminated soil was stockpiled within the tank berm area and subsequently transferred to bulk storage containers for off site disposal.
13-34 10/17/13	Diesel Fuel and Sulfuric Acid/ 4 gallons	No	A spontaneous fire caused by either an engine malfunction or battery failure melted a plastic saddle fuel tank and the casing on the battery of a Toro lawnmower as it was being utilized near Building 703. The flames were extinguished and containment trays were placed under the leaking tank and battery to capture the dripping fuel and battery acid. The stained grass and soil beneath the lawnmower from the leaks were excavated and placed into a 5-cubic yard waste container. The stained grass and soil from runoff after Fire Rescue personnel hosed down the area during the fire was also recovered and placed into the waste container.
13-39 11/22/13	Hydraulic Fluid/ 0.5 gallons	No	Using a backhoe to excavate a pipe in front of Apartment 42, a hydraulic line ruptured and caused hydraulic fluid to leak onto soil. Absorbent pads were placed beneath the backhoe to capture the leaking fluid. The contaminated soil and absorbent pads were placed in a 55-gallon drum for disposal.

Note:
ORPS = Occurrence Reporting and Processing System

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. All but two of the reported events were 5 gallons or less in volume or associated with a loss of refrigerant. Five of the releases occurred during Laboratory construction/operational activities, either by leaks from construction equipment (e.g. backhoe, lawn mower, and street sweeper), vehicles, or from operational equipment. The two larger-volume petroleum-based releases included a 15 to 20 gallon spill of hydraulic oil from a failed accumulator valve on a street sweeper and an approximate 25 gallon release of hydraulic oil that leaked onto the freight

elevator service room floor in Building 734 when a brass fitting on a feed line from the hydraulic oil storage tank failed. In all cases, the releases were cleaned up to the satisfaction of NYSDEC.

Two of the releases were reported to DOE through BNL's Occurrence Report Processing System (ORPS), a system for identifying, categorizing, notifying, investigating, analyzing, and reporting to DOE events or conditions discovered on site. Both releases were associated with loss of refrigerant (Freon-22) from air conditioning systems. New York State has very stringent release reporting requirements for certain chemicals. The reporting threshold for Freon-22 is one pound to the air. Any release reported to an outside regulatory agency as non-routine is reportable to DOE through ORPS unless specifically exempted (e.g., small volume releases of oil and ethylene glycol are exempt from ORPS reporting). In August 2012, BNL submitted a letter to NYSDEC requesting that refrigerant leaks of Freon 22 and Freon 113 to atmosphere from air conditioning and refrigeration units would not have to be reported in accordance with 6NYCRR Part 595 as long as the release was due to routine refrigeration equipment leaks discovered during preventative maintenance inspections or service calls. A summary of these types of releases would be included in the annual update to BNL's Spill Prevention Report submitted pursuant to 6 NYCRR 598.1(k) and annual Emission Statements submitted pursuant to BNL's Title V Facility Permit. NYSDEC approval of this request would exempt reporting of these types of release to DOE through BNL's ORPS. NYSDEC approval was received in May 2013 just after the second ORPS was reported for the Freon-22 release on May 22 (See Table 3-8).

In all instances described above, 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 or local 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 bulk of the fuel is used at the CSF to produce high-pressure steam to heat and cool BNL facilities, and is stored in six tanks with capacities ranging from 300,000 to 600,000 gallons. The remaining storage facilities on the license 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).

In October 2013, BNL worked with NYSDEC to update the tank listing associated with the MPF license, which expires on March 3, 2017. The update recognized the removal of a tank from Building 526 and the addition of three tanks adjacent to Building 814 bringing the total amount of licensed petroleum storage facilities to 66. During 2013, BNL remained in full compliance with MPF license requirements, which include monitoring groundwater in the vicinity of the six above-ground storage tanks. 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 2013, 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 March 12 and 13, 2013, NYSDEC conducted its annual inspection of all storage facilities included on the MPF license. Five conditions that required corrective action were identified: faded/illegible color coding and tank identification labels and four instances where electronic leak detectors or high level alarm systems were not fully functional. All conditions were corrected in 2013 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 June 2013, BNL renewed its Chemical Bulk Storage Registration in accordance with NYSDEC directives and received a Hazardous Substance Bulk Storage Registration Certificate in June 2013, which will not expire until July 27, 2015.

NYSDEC conducted an inspection of the Chemical Bulk Storage facilities in March 2013; there were no findings.

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 (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 121 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. The 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. BNL 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 1 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. Since the completion of RCRA closure of the former Mixed Waste Building 870 in 2012, all mixed wastes have been compliantly stored

in segregated areas within the Hazardous Waste Storage Building 855. In 2013, NYSDEC performed an unannounced inspection of Hazardous Waste activities at BNL; there were no findings.

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 2013. 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, algaecide, and herbicide use for the previous year. On May 16, 2013, a BNL employee holding a Commercial Pesticides Technician Certification was issued a NYSDEC Notice of Violation for failure to file a 2012 Applicator/Technician Pesticide Annual Report by the February 1, 2013 deadline. Once identified, the required paperwork was immediately submitted to NYSDEC to fulfill the requirement and corrective actions were taken to prevent this administrative violation from occurring again (see Table 3-9 for details).

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 2011 and BNL 2013) 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.

In 2012, BNL submitted a permit package to NYSDEC for the construction of recharge basins associated with upgrades to the STP as required by wetlands regulations and the Wild, Scenic, and Recreational River Systems Act. The upgrades for the STP will allow for the eventual discharge of the tertiary treated wastewater directly to groundwater. A 2011 permit for the installation of fencing and air conditioning

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	SCDHS, DOE, and BNL	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)	EPA, DOE, and 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, Resource Conservation and Recovery Act (RCRA), and the National Environmental Policy Act (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 2065, respectively. All groundwater treatment systems operated as required in 2013.
Notices of Violation/Enforcement Actions				
None				

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

platforms at the RHIC facility continues to remain open, pending completion of work. In addition, a permit prepared by BNL for the LISF continues to be open, and will be closed once vegetation is established throughout the solar farm and invasive plants in a modified tiger salamander habitat are under control.

3.13 PROTECTION OF WILDLIFE

3.13.1 Endangered Species Act

In 2013, the Laboratory updated its list of endangered, threatened, and species of special concern (see Table 6-1 in Chapter 6). There are no federally recognized endangered species on the BNL site. However, in October 2013 the U.S. Fish & Wildlife Service published a notice in the Federal Register proposing the listing of the Northern Long-eared Bat (*Myotis septentrionalis*) as a federally endangered species. This species is known to utilize the BNL site at least during the summer months. Therefore, BNL began consideration of management options to protect this species on site in preparation for its eventual listing. The northern long-eared bat will be the first federally listed species known to be present at the Laboratory. State recognized endangered (E) or threatened (T) species include: eastern tiger salamander (E), persius duskywing (E), crested fringed orchid (E), Engelman spikerush (E), dwarf huckleberry (E), whorled loosestrife (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), and stiff-leaved goldenrod (T). Although the tiger salamander is no longer the only state endangered species found at the Laboratory, it is the most notable and best-studied species on site. 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 Laboratory updated its BNL Natural Resource Management Plan (NRMP) in October 2011 (BNL 2011). One component of the plan 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.

The 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; reducing nitrogen loading in the Peconic River; monitoring populations and water quality to ensure that habitat remains viable; and minimizing disturbances to the river and adjacent banks.

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. BNL is currently working with NYSDEC in developing a recovery plan for the frosted elfin.

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. BNL continues to evaluate bird populations as part of the management strategy outlined in the NRMP.

The Laboratory has 28 plant species that are protected under state law: four are endangered plants, the Engelman spikerush, dwarf huckleberry, whorled loosestrife, and crested fringed orchid; two are threatened plants, the stiff-leaved goldenrod and stargrass; 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. 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, BNL 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 85 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 construction and the conflict must be resolved. 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 of the Laboratory. 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. Currently, the Laboratory has no concerns with eagles and no specific management needs are 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 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 2013) and are consistent with the pre-approved authorized release limits set by DOE Order 458.1.

In 2013, excess materials such as scrap metal (174 tons) and electronics equipment (23 tons) 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 2013.

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 2013, BNL was inspected by federal, state, or local regulators on 10 occasions. These inspections included:

- *Air Compliance*. BNL representatives accompanied NYSDEC on a site inspection in September 2013; there were no issues identified.
- *Potable Water*. In August 2013, 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 and Utilities Division.
- *Sewage Treatment Plant*. SCDHS conducts quarterly inspections of the Laboratory's STP to evaluate operations and sample the effluent. In 2013, no performance or operational issues were identified. NYSDEC performed an annual surveillance inspection in March; there were no issues identified.
- *Recharge Basins*. SCDHS inspected several on-site SPDES-regulated outfalls in 2013; there were no issues identified.

- *Major Petroleum Facility*. The annual NYSDEC inspection of the MPF was performed in March 2013. 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 March 2013; there were no issues identified.
- *RCRA Inspections*. NYSDEC and EPA performed RCRA inspections in 2013; there were no issues identified.

3.15.2 DOE Assessments/Inspections

The DOE Brookhaven Site Office (BHSO) conducts environmentally-related assessments each year, some of which are supported by the DOE Chicago Office. In 2013, BHSO conducted a follow-up surveillance on Brookhaven Science Associates' (BSA) response to the Building 705 Stack Drain Tank High-Level Alarm, which occurred in July 2012, to verify the effectiveness of the corrective actions and participated in a peer assessment of BSA's NESHAP's Program along with a team of environmental professionals from Oak Ridge National Laboratory.

The Stack Drain Tank follow-up surveillance verified that BSA has successfully implemented numerous corrective actions to prevent recurrence of the overflow of the HFBR stack drain tank and lack of timely alarm response. The NESHAP's assessment yielded no non-conformances, five programmatic strengths, and 19 OFIs. In May 2013, a team of BNL Subject Matter Experts (SMEs) were assembled to analyze the OFIs and identify actions needed to improve Rad-NESHAP program implementation. A final report was completed in June, and most of the corrections were completed by September 30, 2013.

3.15.2.1 Environmental Multi-Topic Assessment

In 2013, BNL conducted a programmatic self-assessment on several aspects of the Laboratory's environmental management program. Topics for this assessment were determined based on institutional risk, DOE and regulatory agency expectations, and to ensure that key environmental requirements are being implemented as designed. The scope of the 2013 self-assessment focused on requirements related to BNL's Environmental Monitoring and Long Term Stewardship Programs. The specific elements that were focused on during this assessment included compliance and conformance with activated soil cap inspections, environmental monitoring and data quality, and historical contamination. 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 seven Noteworthy Practices and eleven OFIs for Improvement. Several of the OFI's were addressed in 2013.

3.15.2.2 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. NNSS did not perform any inspections at BNL in 2013.

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 2013 (Table 3-9). There were no Notices of Violation/Non-Compliance accessed in 2013; however, there were three environmental incidents that occurred that required reporting through ORPS. The incidents are summarized in Table 3-10. Causal analyses were performed for all incidents and corrective actions were taken to prevent recurrence of the issues.

Table 3-10. Summary of Other Environmental Occurrence Reports.

ORPS* ID: SC-BHSO-BNL-AGS-2013-0002	Date: 04/18/13
On April 17, 2013, during routine preventative maintenance of the Dunham Busch chiller in Building 911, which was shut down for the winter months, it was discovered that the refrigerant pressure was lower than normal. Follow-up investigations by Facilities and Operations maintenance personnel the following morning determined that approximately 275 pounds (full charge) of R-22 refrigerant gas had dissipated from the refrigerant system over a period of several months due to a slow leak from a solenoid valve. BNL's Environmental Protection Division (EPD) was notified of the event and immediately reported the incident to NYSDEC as a non-routine release of regulated compounds, as is required by the State. The leaking valve was replaced by A/C Mechanics.	**Status:** Closed. Repairs completed and spill report submitted.
ORPS* ID: SC-BHSO-BNL-BNL-2013-0012	**Date: 11/20/13**
On May 16, 2013, a BNL employee holding a Commercial Pesticides Technician Certification was issued a New York State Department of Environmental Conservation (NYSDEC) Notice of Violation (NOV) for failure to file a 2012 Applicator/Technician Pesticide Annual Report by a February 1, 2013 deadline. Once identified, the required paperwork was immediately submitted to NYSDEC to fulfill the requirement and corrective actions were taken to prevent this administrative violation from reoccurring.	**Status:** Closed. Corrective actions identified and completed.
ORPS* ID: SC-BHSO-BNL-BNL-2013-0006	**Date: 05/22/13**
On May 22, 2013, during maintenance repair involving recharging of refrigerant to the Dunham-Busch chiller in Building 911, a relief valve prematurely opened, resulting in a release (28 pounds) of R-22 refrigerant/oil vapor to the mechanical equipment room located on the rooftop of Building 911. As a Refrigeration and Air Conditioning Engineer left the area, he immediately secured the unit and contacted his supervisor. EPD was notified of the event and reported the incident to NYSDEC as a non-routine release of regulated compounds, as required.	**Status:** Closed. Repairs completed and spill report closed out.

Notes:
* Reportable under the Occurrence Reporting and Processing System (ORPS), established by the requirements of DOE Order 231.1B, *Environmental, Safety and Health Reporting*.

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