3 Compliance Status

Brookhaven National Laboratory (BNL) is subject to more than 100 sets of federal, state, and local environmental regulations; numerous site-specific permits; 16 equivalency permits for operation of 14 groundwater remediation systems; and several other binding agreements. In 2010, 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. Routine inspections conducted during the year found no significant instances of noncompliance. The Laboratory received a Notice of Violation and a fine of $5,000 from the State of Utah in July for a shipment of mixed waste received at Energy Solutions in February 2010. The waste contained higher than expected levels of alpha-emitting isotopes, which resulted in a violation of their license.

Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide from the Central Steam Facility were all within permit limits. There was a single opacity excursion noted during the fourth quarter of 2010 for Boiler 7, which occurred during boiler start-up. Approximately 180 pounds of ozone-depleting refrigerants were recovered for eventual reuse by other DOE facilities or other federal agencies. These materials were transferred to storage for shipment to the Department of Defense Ozone Depleting Substances Reserve in 2011 or for on-site reuse. Monitoring of BNL's potable water system showed that all drinking water requirements were met. During 2010, most of the liquid effluents discharged to surface water and groundwater met applicable New York State Pollutant Discharge Elimination System permit requirements. Three minor excursions above permit limits were reported for the year; all occurred at the Sewage Treatment Plant (two for iron and one for total nitrogen load). The permit excursions were reported to the New York State Department of Environmental Conservation and the Suffolk County Department of Health Services. Groundwater monitoring at BNL's Major Petroleum Facility continued to demonstrate that current oil storage and transfer operations are not affecting groundwater quality.

Laboratory efforts to minimize spills of materials continued in 2010. There were 15 reportable spills of petroleum products, antifreeze, or chemicals. While the total number of spills increased by three from 2009, the severity of releases were minor and all releases were cleaned up to the satisfaction of the New York State Department of Environmental Conservation.

BNL participated in 12 environmental inspections or reviews by external regulatory agencies in 2010. These inspections included petroleum and chemical storage, Sewage Treatment Plant operations, waste water discharges to other regulated outfalls and recharge basins, hazardous waste management facilities, and the potable water system. Immediate corrective actions were taken to address all issues raised during these inspections.

3.1 COMPLIANCE WITH REQUIREMENTS

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

3.2 ENVIRONMENTAL PERMITS

3.2.1 Existing Permits

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

- State Pollutant Discharge Elimination System (SPDES) permit, issued by the New York State Department of Environmental Conservation (NYSDEC)
- Major Petroleum Facility (MPF) license, issued by NYSDEC
- Resource Conservation and Recovery Act (RCRA) permit, issued by NYSDEC for the Waste Management Facility

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

Regulator: Requirement	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 1989, BNL entered into a tri-party agreement with EPA, NYSDEC, and DOE. BNL site remediation is conducted by the Environmental Restoration Program in accordance with milestones established under this agreement. In 2005, BNL completed the restoration portion of the cleanup project and entered the surveillance and maintenance mode. Significant work was completed at the HFBR to transition the facility to long-term surveillance and maintenance and at the BGRR in 2010. Additional D&D at the BGRR will continue under the CERCLA program in 2011.	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 the 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 High Flux Beam Reactor (HFBR), the Brookhaven Graphite Research Reactor (BGRR) complex, World War I training trenches near the Relativistic Heavy Ion Collider 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 process and evaluated to determine if the action would affect the features that make the facility eligible. Some actions required for D&D of the BGRR were determined to affect its eligibility, and mitigative actions are proceeding according to 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 three excursions, these discharges met the SPDES permit limits in 2010.	3.6

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

Regulator: Requirement	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 complies with all reporting and emergency planning requirements.	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 Safety 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, 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 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 2010, there were three projects permitted under the NYS Fresh Water Program; both were requested for closure by the end of 2010.	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 NYS as endangered, threatened, or of special concern. The Laboratory's Natural Resource Management Plan outlines activities to protect these vulnerable species and protect 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 individuals.	3.13

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

Regulator: Requirement	Regulatory Program Description	Compliance Status	Report Sections
DOE: 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: senior management provides planning, organization, direction, control, and support to achieve DOE objectives; line organizations achieve and maintain quality while minimizing safety and health risks and environmental impacts, and maximizing reliability and performance; 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 430.2B	DOE-O-430.2B implements the energy conservation, renewable energy, transportation management, and sustainable building program objectives of Executive Orders 13423 and 13514. The goal of the order is to provide requirements and responsibilities for managing DOE facilities and sites in meeting or exceeding the energy requirement goals of all applicable laws, Executive Orders, and Federal Regulations. These goals include continuous improvements in energy efficiencies and water conservation; distributed renewable and clean energy resources; increased number of sustainable buildings; and optimized utilization of alternative fuels, hybrids and plug-in electric vehicles. In addition, the program requires the maximum utilization of private sector financing, particularly from Energy Savings Performance Contracts (ESPC) and Utility Energy Service Contracts (UESC). The program establishes certain Departmental Leadership Goals, which must be tracked over time and met within certain time limits.	Compliance with the requirements is documented each year in an Executable Plan, which identifies the Laboratory's respective contributions toward meeting the Departmental Leadership Goals. This document is prepared and updated by BNL's Energy Management Group. In addition, many of the requirements of Sustainability Goals are implemented through BNL's Environmental Management System (EMS) by establishing and implementing institutional level objectives and targets. Progress on achieving these targets is reviewed annually.	2.3.3 2.3.4.4
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 BNL has the management systems, administrative controls, and physical controls to comply with DOE Order 435.1.	2.3.4.3

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

Regulator: Requirement	Regulatory Program Description	Compliance Status	Report Sections
DOE: Order 450.1A (former Order 5400.1)	The Environmental Protection Program objective is to implement sound stewardship practices that protect the air, water, land, and other natural and cultural resources affected by DOE operations, in a cost-effective manner, meeting or exceeding applicable environmental; public health; and resource protection laws, regulations, and DOE requirements. DOE facilities meet this objective by implementing an Environmental Management System (EMS) that is part of an Integrated Safety Management System (ISMS). Other components include establishing sound environmental monitoring programs to comply with former DOE Order 5400.1. The Standards-Based Management System (SBMS) provides staff with procedural guidance. In 2008, Order 450.1A was finalized and requires all federal agencies and contractors to include the goals of Executive Order 13423 in their EMS. These goals include energy and water conservation, renewable energy, use of alternate fuels, and other "green" initiatives.	BNL's EMS was officially registered to the ISO 14001:1996 standard in 2001 and recertified to the revised standard in 2004 and 2007. In June 2010, a surveillance audit was conducted that found the BNL EMS to be robust. The BNL ISMS Program Description presents the Laboratory's approach to integrating environment, safety, and health (ES&H) requirements into the processes for planning and conducting work at the Laboratory. It describes BNL's programs, including the SBMS, for accomplishing work safely and provides the road map of the systems and processes. In accordance with DOE Order 450.1A, the Laboratory has included the Executive Order objectives in its Objectives and Targets for 2010.	Chapter 2
DOE: Order 5400.5, Change 2	To protect members of the public and the environment against undue risk from radiation, the Radiation Protection of the Public and Environment Program establishes standards and requirements for operations of DOE and DOE contractors.	BNL uses the guidance values provided in DOE Order 5400.5 to ensure that effluents and emissions do not affect the environment or public and worker safety and health, and to ensure that all doses meet the "As Low As Reasonably Achievable" (ALARA) policy.	Chapters 4, 5, 6, and 8

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

- Registration certificate from NYSDEC for tanks storing bulk quantities of hazardous substances
- Seven 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 Amendments authorizing the operation of 37 emission sources
- Three permits issued by NYSDEC for construction activities within the Peconic River corridor
- An EPA Underground Injection Control (UIC) Area permit for the operation of 133 UIC wells
- Permit for the operation of six domestic water supply wells, issued by NYSDEC
- Sixteen equivalency permits for the operation of 14 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 June 2009, NYSDEC finalized a major modification to BNL's SPDES permit. This modification was initiated in 2007 as a comprehensive review of the Laboratory's waste water treatment facility and evaluation of point source discharges from BNL operations. The modified permit seeks significant reductions in the concentration of six metals (copper, iron, lead, mercury, nickel, and zinc) discharged from BNL's wastewater treatment facility to the Peconic River. While the target effluent limits are significantly less than the former limits, an interim period was provided to allow studies to be completed to identify controllable sources of metal-bearing waste waters, evaluate alternative treatment or disposal options, and propose effluent limits attainable through these alternatives. The studies were completed and a report (D&B, 2010) detailing the recommendations was submitted to NYSDEC in July 2010.

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	11-Feb-11	NA	NA
NYSDEC - Air Equivalency	517/518	South Bdry / 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 - SPDES Equivalency	517/518	South Bdry / 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	04-May-11	NA	NA
NYSDEC - SPDES Equivalency	598	Tritium Remediation System	1-52-009	04-May-11	NA	NA
NYSDEC - SPDES Equivalency	670	Sr-90 Treatment System	None	25-Feb-13	NA	NA
NYSDEC - SPDES Equivalency	TR 829	Carbon Tetrachloride System	None	NA	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	01-Aug-09	NA	NA
NYSDEC - SPDES Equivalency	855	Sr-90 Treatment System - BGRR/WCF	None	01-Jan-10	NA	NA
NYSDEC - SPDES Equivalency	TR 867	T-96 Remediation System	1-52-009	09-Mar-13	NA	NA
NYSDEC - Hazardous Substance	BNL	Bulk Storage Registration Certificate	1-000263	27-Jul-11	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
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

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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	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-12	NA	NA
NYSDEC - Water Quality	STP	STP and Recharge Basins	NY-0005835	28-Feb-15	NA	NA
NYSDEC - Water Quality	1004	Installation of Blockhouse	1-4722-00032/00140	22-Dec-10	NA	NA
NYSDEC - Water Quality	Site	Solar farm construction	1-4722-05846/00001	06-May-15	NA	NA
NYSDEC - Water Quality	Site	Installation of Fiber Optic Cable	1-4722-00032/00142	17-Nov-13	NA	NA

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

3.2.2.2 NESHAPs Authorization

An application to construct/modify BNL's Brookhaven Linear Isotope Producer (BLIP) stack was approved on August 03, 2009 under the authorization BNL-2009-01 issued by the EPA. By November 2009, the stack was modified to comply to the ANSI N13.1-1999 standard before the start of operations in 2010. A new emission sampling system was installed for collection of particulate, tritium, and short-lived gaseous samples. A shroud probe was installed in the 6-inch duct to extract a representative sample of particulates and the transport lines were made of non-reactive stainless steel with the shortest distance to the filter collection system. Gaseous emissions from the BLIP stack are continuously measured and recorded in real-time with an in-line, low-resolution NaI gamma spectrometer connected to the exhaust ventilation system. Details of BLIP emissions for 2010 are contained in Chapter 4.

3.2.2.3 New York State (NYS) Wetlands and Wild Scenic, Recreational Rivers Act

Several actions occurred in 2010 that required permits under the NYS Wetland and/or Wild, Scenic and Recreational Rivers Act legislation. These projects included: the installation of a trailer and construction of a concrete block house at BNL's Relativistic Heavy Ion Collider; construction of the Long Island Solar Farm on site; and the installation of a fiber-optic cable along the west side of the BNL property, which included crossing the Peconic River. Additionally, sediment removal from the Peconic River was performed under a wetlands equivalency permit.

3.2.2.4 CERCLA Groundwater Equivalency Permits

In 2010, BNL petitioned the regulatory agencies to close out a SPDES equivalency permit for the operation of the Carbon Tetrachloride Remediation System. Clean-up goals were achieved and the treatment system was decommissioned.

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 2010, environmental evaluations were completed for 74 proposed projects at BNL. Of those, 72 were considered minor actions requiring no additional documentation. Two projects were addressed by submitting notification forms to DOE, which determined that the projects were covered by existing "Categorical Exclusions" per 10 CFR 1021 or fell within the scope of a previous environmental assessment.

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 complex, the High Flux Beam Reactor complex, and the World War I Army training trenches associated with Camp Upton. An annual Department of Interior questionnaire regarding historic and cultural resources is prepared. Additional activities associated with historic preservation compliance are described in Chapter 6.

3.5 CLEAN AIR ACT

The objectives of the Clean Air Act (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" requirements. Three of the boilers can burn either residual fuel oil or natural gas; Boiler 1A burns fuel oil only. In 2010, natural gas was the predominant fuel burned at the CSF. For boilers with maximum operating heat inputs greater than or equal to 50 MMBtu/hr (14.6 MW), the requirements establish emission standards for oxides of nitrogen (NOx). Boilers with a maximum operating heat input between 50 and 250 MMBtu/hr (14.6 and 73.2 MW) can demonstrate compliance with the NOx standard using periodic emission tests or by using

continuous emission monitoring equipment. Emission tests conducted in 1995 and 2006 confirmed that boilers 1A and 5, both in this size category, met the NOx emission standards when burning residual fuel oil with low nitrogen content. To ensure continued compliance, an outside contract analytical laboratory analyzes composite samples (collected quarterly) of fuel deliveries. The analyses conducted in 2010 confirmed that the fuel-bound nitrogen content met these requirements. Compliance with the 0.30 lbs/MMBtu NOx emission standards for boilers 6 and 7 was demonstrated by continuous emission monitoring of the flue gas. In 2010, NOx emissions from Boilers 6 and 7 averaged 0.088 lbs/MMBtu and 0.077 lbs/MMBtu, respectively. There were no known exceedances of the NOx 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 2010, BNL reported one period during the fourth quarter when opacity measurements for Boiler 7 exceeded the 6-minute 20 percent average. This single excess opacity reading was the result of an electrical anomaly that caused the air supply fan to trip off during an unexpected start-up/shutdown of the boiler.

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 standard practice at BNL, 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 exceeds the leak repair provisions of 40 CFR 82.156. In 2010, six pounds of R-12, 172 pounds of R-22, and 2 pounds of R-502 were recovered and recycled from refrigeration equipment that was serviced.

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. In 2009, eight tanks containing 1,036 pounds of Halon 1301 associated with fixed fire suppression systems were declared excess property because the mission-critical or mission-essential equipment and facilities they protected from damage or loss due to fire had been removed or shut down. Two cylinders containing 94 pounds of Halon 1211 previously used to recharge Halon 1211 portable extinguishers and six 17-pound Halon 1211 extinguishers were also declared excess property and transferred to a storage trailer adjacent to the fire house. The portable extinguishers became excess property due to changes in operations or when they were replaced by ABC dry-chemical or clean agent FE-36 extinguishers. In September 2010, 387 pounds of Halon 1301 were pulled from the Halon 1301 tanks to replenish halon released from two cylinders emptied when the fixed fire suppression system protecting a phone switch facility in Building 449 was activated due to an apparent short in the wiring to the control panel. In November, another 76 pounds of Halon 1301 was transferred from these tanks to two fixed fire suppression system cylinders after their contents were released to extinguish an electrical fire in the electromagnetic relay terminal room of Building 911. The remaining excess Halon 1301 in tanks, the Halon 1211 cylinders, and the portable extinguishers will be transferred to the Department of Defense Ozone Depleting Substances Reserve in accordance with the Class I Ozone Depleting Substances Disposition Guidelines prepared by the DOE Office of Envi-

ronmental Policy and Guidance or will be used for replenishment of on-site systems.

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

In 2009, the Laboratory determined that Maximum Available Control Technology (MACT) standard 40 CFR 63 Subpart H NESHAPs for Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources would be applicable to BNL's paint spray operations. This rule establishes best management requirements for spray coating operations that are intended to minimize volatile organic compound (VOC) emissions associated with preparation, application of coatings, and with the clean-up of spray coating equipment. An initial notice of applicability was subsequently transmitted to the NYSDEC office in Albany on January 7, 2010. In December 2010, a follow-up letter was transmitted to NYSDEC noting that a subsequent review revealed that Subpart H is not applicable because any metal or spray-coated plastic parts will be used for used for research purposes only and will not be sold commercially.

3.5.2.2 Asbestos

In 2010, the Laboratory notified the EPA Region II office regarding removal of materials containing asbestos. During the year, 8,060 linear feet of pipe insulation, 20,250 square feet of siding material, and 160 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 the 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 2010 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 hypothetical maximally exposed individual resulting from BNL's airborne emissions in 2010 was 0.92 mrem (9.2 μSv).

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 5400.5, 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 to regulate wastewater effluents at the Laboratory. The permit was significantly modified in June 2009 and renewed, effective March 1, 2010. The permit specifies monitoring requirements and effluent limits for nine of 12 outfalls, as described below. See Figure 5-7 in Chapter 5 for the locations of BNL outfalls.

- Outfall 001 is used to discharge treated effluent from the Sewage Treatment Plant (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 this outfall.

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 the NYSDEC central and regional offices and the Suffolk County Department of Health Services (SCDHS). Details of the monitoring program conducted for the groundwater treatment systems and of SPDES equivalency permit performance are provided in SER Volume II, Groundwater Status Report.

The modifications to the BNL SPDES permit finalized in June 2009 required that the Laboratory perform several additional studies in order to characterize contributing sources of wastewater to the STP and recharge basins. These studies included a Short-Term Monitoring Program to monitor waste waters discharged to permitted outfalls for specific contaminants identified by NYSDEC during the permit review; a Quantification and Removal Study to identify and quantify controllable sources of metals being discharged to the STP; and a Mercury Minimization Program to document past and proposed practices to reduce potential sources of mercury to the STP. Work was completed in January 2010, and a report detailing the findings was submitted to NYSDEC in July (D&B 2010). Studies identified several sources of metals upstream of the STP, including boiler blow-down from Building 610 (several metals), Buildings 463 and 555 (mercury), sanitary-only discharges, and the STP sand filters to be the most significant contributors of metals to the STP effluent. The studies then evaluated various treatment technologies and alternate discharge options to determine the most effective means to reduce impacts on the Peconic River. The preferred and recommended alternative is to replace the existing sand filters and to divert the discharge to on-site recharge basins. This alternative will completely remove the STP discharge from the Peconic River and eliminate all contributions of metals (e.g., copper, iron, lead, nickel, mercury and zinc) to the river. 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. The alternatives will be reviewed under a NEPA Environmental Assessment, which will be prepared in 2011.

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 2010. There were three excursions of the SPDES permit limits in 2010; two for iron and one for total nitrogen load. In November and December, the total iron concentrations in the wastewater effluent sample were reported at 0.52 and 0.51 mg/L respectively, which exceeded the SPDES limit of 0.37 mg/L. In June, the maximum total nitrogen load was calculated at 32.5 pounds per day, which exceeds the permit limit of 20

pounds per day. All other parameters were within permit limits.

The cause of the increased iron concentrations was investigated and historical data evaluated to determine if there were any trends associated with this observation. Evaluation and investigation failed to identify the source of iron. To mitigate the iron levels in the effluent, lime was added to the treatment process to raise the pH of the wastewater to help precipitate iron from solution and the aeration levels were increased to oxidize the soluble iron into an insoluble state. The effectiveness of these changes were not evident by the end of 2010.

The June 2009 modified SPDES permit added a total nitrogen load limit for the summer periods beginning May and ending in October. While compliance was achieved with the nitrogen concentration limits, excess maximum load was calculated for the June reporting period. Since this was the first year that monitoring for this parameter was required, there was little operational experience to rely on. Compliance with the load limit was demonstrated for the remaining five reporting periods in 2010. Review of the justification for the nitrogen load limit provided by NYSDEC showed that the limit should be an average and not a maximum. BNL will continue to monitor the nitrogen levels, and if necessary, request a change to the limit should non-compliance with the 20-pound limit recur.

Figures 3-1 through 3-7 plot the 5-year trends for the 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 2010, 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 2010 showed that there was no toxicity demonstrated in the four tests performed.

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)	45	79	Daily	90	0	100
pH (SU)	6.3	7.7	Continuous Recorder	Min 5.8, Max. 9.0	0	100
Max. 5-Day BOD (mg/L)	<2	4	Twice Monthly	5	0	100
% BOD Removal	> 89	> 99	Monthly	85	0	100
Max. TSS (mg/L)	<0.6	1.4	Twice Monthly	20	0	100
% TSS Removal	> 90	>99	Monthly	85	0	100
Settleable solids (ml/L)	0	0	Daily	0.1	0	100
Ammonia nitrogen (mg/L)	< 0.1	0.8	Twice Monthly	1.5	0	100
Total nitrogen (mg/L)	0.58	9.94	Twice Monthly	10	0	100
Total nitrogen (lbs./day)	11	33	(May – October)	20 (e)	1	83
Total phosphorus (mg/L)	0.05	1.7	Twice Monthly	NA	0	100
Cyanide (mcg/L)	< 1.7	2.9	Twice Monthly	100	0	100
Copper (mg/L)	0.025	0.11	Twice Monthly	0.15	0	100
Iron (mg/L)	0.13	0.52 (a)	Twice Monthly	0.37	2	83
Lead (mg/L)	0.001	0.019	Twice Monthly	0.019	0	100
Mercury (ng/L)	7.5	143	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)	< 2	< 2	Twice Monthly	5	0	100
Nickel (mg/L)	0.003	0.021	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)	0.035	0.114	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)	< 0.5	< 0.5	Quarterly	NA	0	100
Max. Flow (MGD)	0.36	0.80	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.26	0.47	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 ml)	<1	26	Twice Monthly	200	0	100
Max. Fecal Coliform (MPN/100 ml)	<2	50	Twice Monthly	400	0	100
HEDP (mg/L)	<0.05	0.26	Monthly	NA	0	100
Tolytriazole (mg/L)	<0.005	<0.005	Monthly	NA	0	100

Notes:
See Chapter 5, Figure 5-6, for location of Outfall 001.
All metals limits are total recoverable.
* % 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) Permit exceedances for iron were reported in two months (November and December). See Section 3.6.1 for an explanation of these permit exceedances.

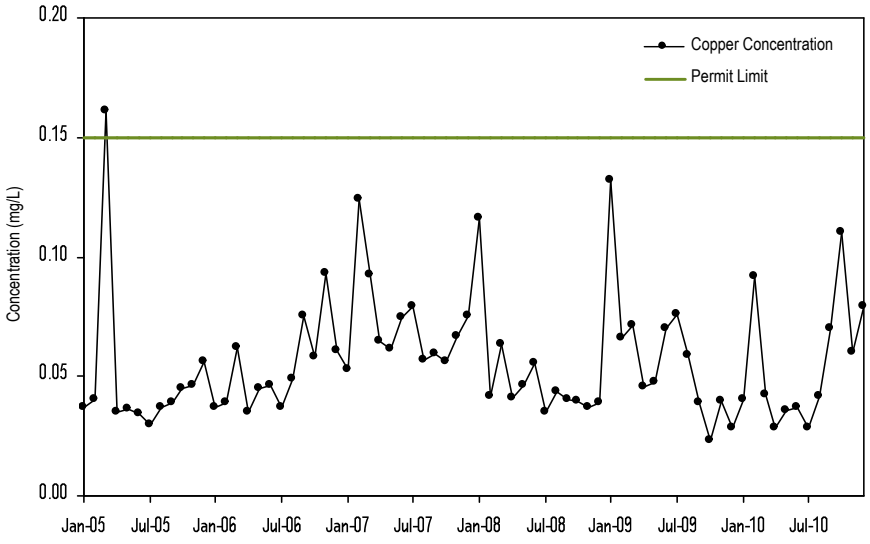


Figure 3-1. Maximum Concentrations of Copper Discharged from the BNL Sewage Treatment Plant, 2005–2010.

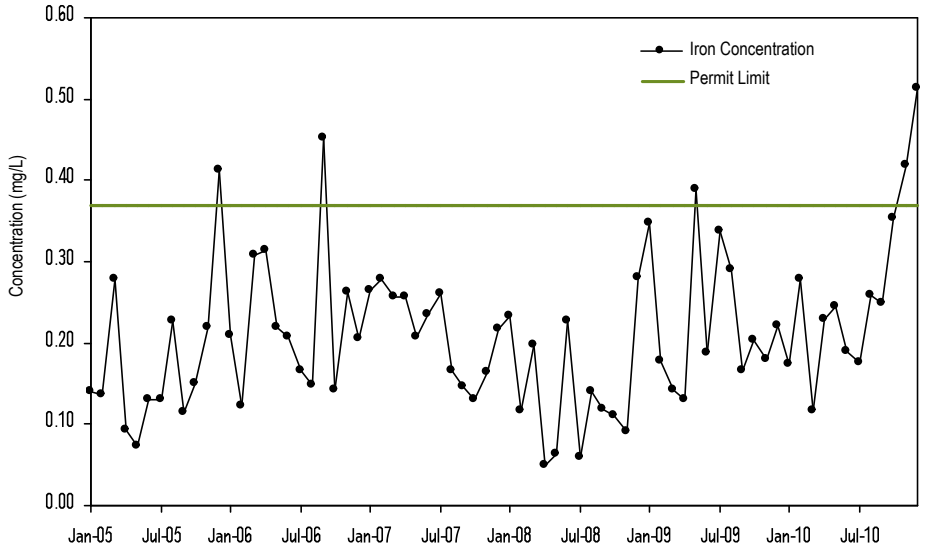


Figure 3-2. Maximum Concentrations of Iron Discharged from the BNL Sewage Treatment Plant, 2005–2010.

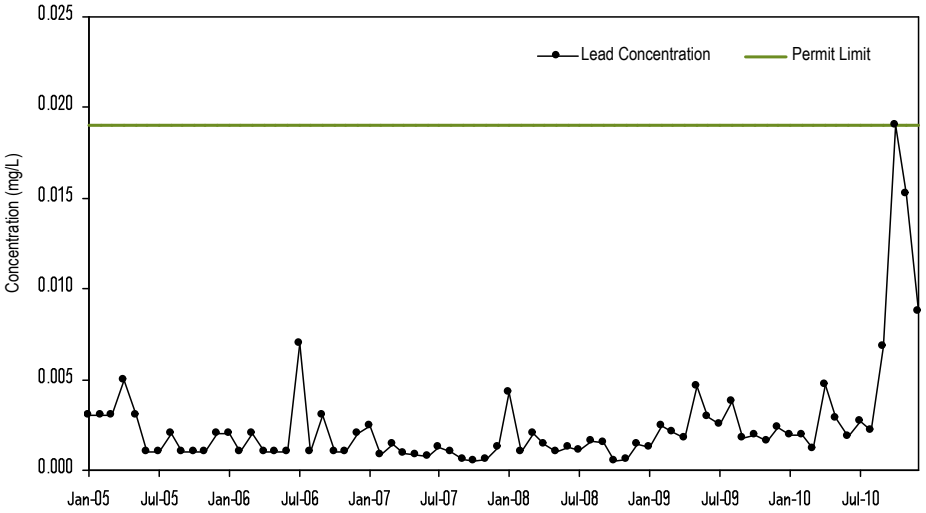


Figure 3-3. Maximum Concentrations of Lead Discharged from the BNL Sewage Treatment Plant, 2005–2010.

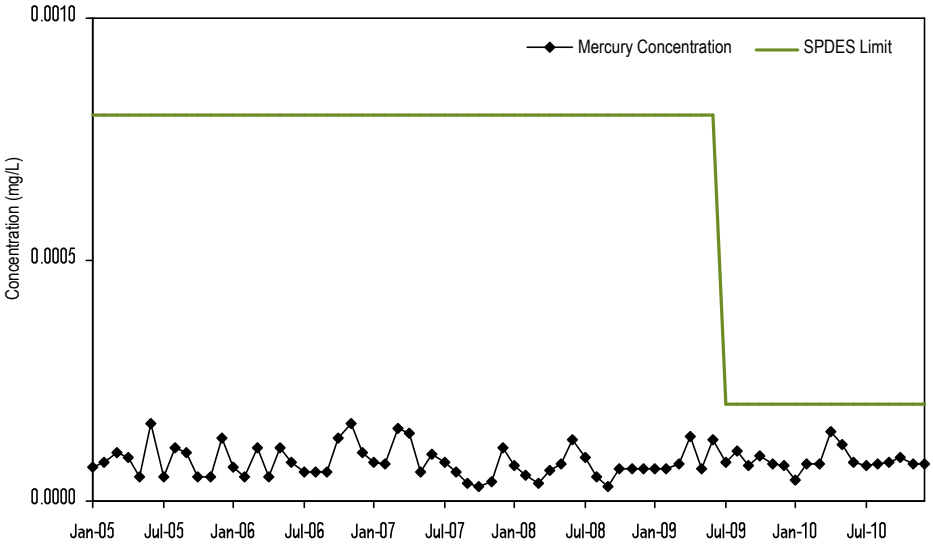


Figure 3-4. Maximum Concentrations of Mercury Discharged from the BNL Sewage Treatment Plant, 2005–2010.

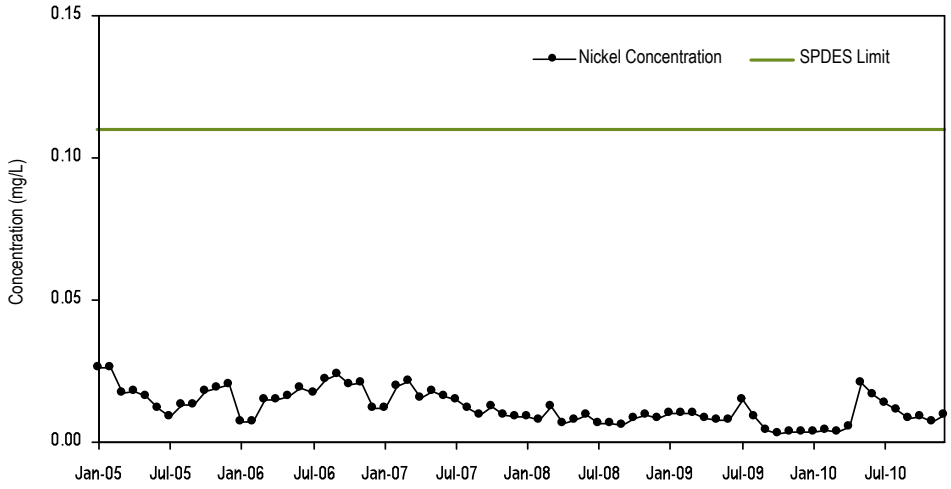


Figure 3-5. Maximum Concentrations of Nickel Discharged from the BNL Sewage Treatment Plant, 2005–2010.

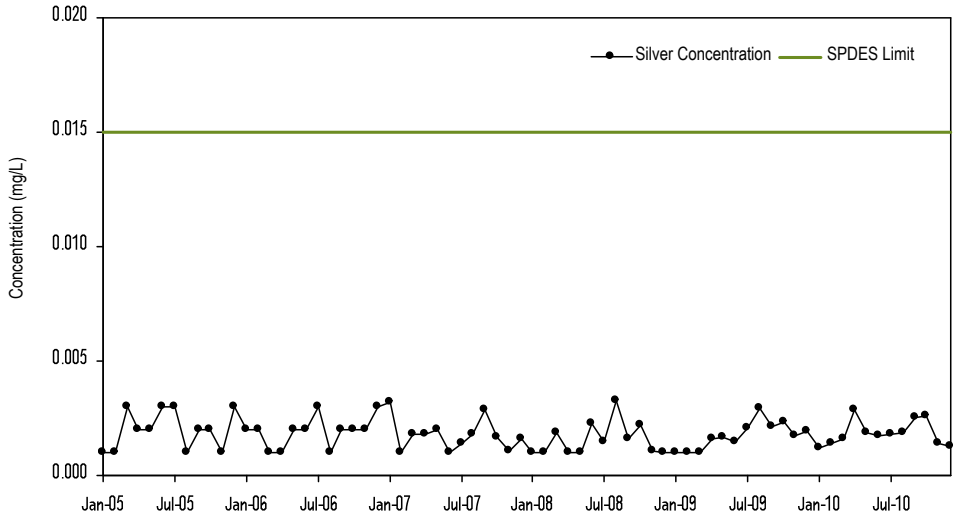
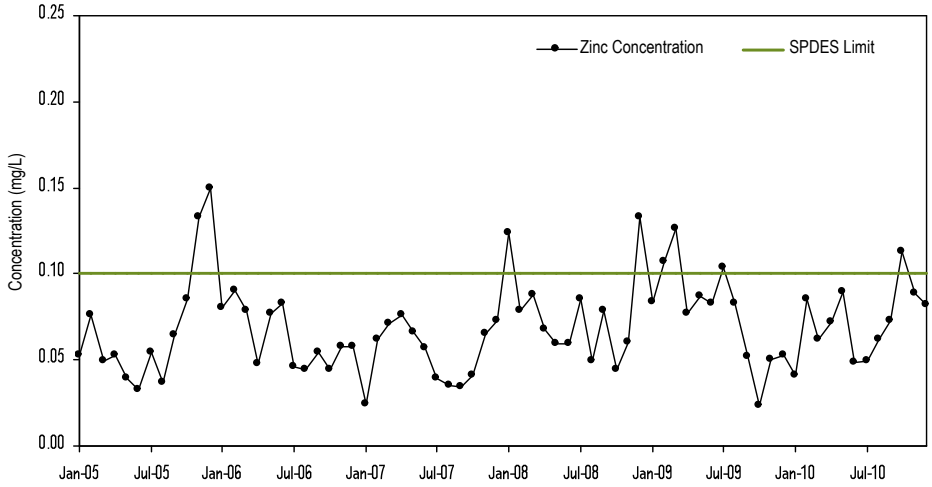


Figure 3-6. Maximum Concentrations of Silver Discharged from the BNL Sewage Treatment Plant, 2005–2010.



Note: Per New York State Department of Environmental Conservation guidance, the concentrations of zinc exhibited in the effluent during November 2005, January and December 2008, March, February, July 2009, and October 2010 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, 2005–2010.

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 2011.

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 water treatment reagents used. Table 3-4 summarizes the monitoring requirements and performance results. There were no permit excursions reported for these Outfalls in 2010.

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 2010) 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 2010, only iron and color exceeded New York State Drinking Water Standards (NYS DWS) in samples collected from three of the wells (wells 4, 6, and 7) before distribution. Groundwater from these three wells is treated to reduce naturally occurring iron and the color index of the water. Treatment at BNL's Water Treatment Plant effectively reduces these levels to below NYS DWS limits. To ensure that the Laboratory's

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	CR	CR			
	Min.	0.015	0.0004	0.2	0.04	0.015	0.12	0.0002	0.002	NA		
	Max.	0.45	0.2	1.1	0.34	0.06	0.38	0.018	0.44	NA	NA	NA
pH (SU)	Min.	6.4	6.8	6.7	7	7.1	6.8	7.5	7	NA		
	Max.	8.8	8.2	8.5	8.6	8.6	8.9	8.4	8.2	8.5, 9.0 (a)	0	100
Oil and grease (mg/L)	N	12	12	12	12	12	NR	11	8			
	Min.	1.5	1.6	< 1.2	< 1.1	< 1.4	NR	< 1.6	1.7	NA		
	Max.	5.7	2.6	3.2	4.5	4.7	NR	3.8	5.1	15	0	100
Copper (mg/L)	N	NR	NR	4	NR	NR	NR	NR	4			
	Min.	NR	NR	< 0.003 (T)	NR	NR	NR	NR	< 0.003 (D)	NA		
	Max.	NR	NR	0.014	NR	NR	NR	NR	0.008 (D)	1.0	0	100
Aluminum (mg/L)	N	4	NR	NR	NR	NR	NR	4	4			
	Min.	0.08 (T)	NR	NR	NR	NR	NR	0.18 (D)	< 0.07 (D)	NA		
	Max	0.29	NR	NR	NR	NR	NR	0.38 (D)	0.12 (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	4			
	Min.	NR	NR	NR	NR	NR	NR	NR	< 0.0005	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.0007	0.05	0	100
Vanadium, Dissolved (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	4			
	Min.	NR	NR	NR	NR	NR	NR	NR	0.003	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.006	NPL	NA	NA
Chloroform (mg/L)	N	4	NR	NR	NR	NR	NR	NR	NR			
	Min.	< 1	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	1.5	NR	NR	NR	NR	NR	NR	NR	7	0	100
Bromodichloromethane (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	50	0	100
1,1,1-trichloroethane (mg/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 (mg/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.	<0.05	<0.05	<0.05	<0.05	<0.05	NR	NR	NR	NA		
	Max.	0.3	< 0.05	<0.05	<0.05	0.3	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.	<0.005	<0.005	<0.005	<0.005	<0.005	NR	NR	NR	0.2	0	100

Notes:
See Chapter 5, Figure 5-6, 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.

water supply continually meets NYS DWS, groundwater is also treated with air stripping to remove VOCs. At the point of consumption, drinking water complied with all NYS DWS during 2010. 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 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) by the end of May, a deadline required by the SDWA. This report provides information regarding BNL's source water, supply system, the analytical tests conducted, and the detected contaminants as 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 as a special edition of the Laboratory's weekly newsletter to all BNL employees and on-site residents, and is also available electronically at http://www.bnl.gov/bnlweb/pubaf/water/reports.htm and http://www.bnl.gov/bnlweb/pubaf/bulletin.asp.

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 2010, 154 cross-connection control units were tested at BNL, including primary and secondary devices. If a problem with a cross-connection device is encountered during testing, the device is repaired and retested to ensure proper function. Copies of the cross-connection device test reports are filed with SCDHS throughout the year.

3.7.3 Underground Injection Control (UIC)

UIC wells are regulated under the SDWA. At the Laboratory, UICs include drywells, cesspools, septic tanks, and leaching pools, all of which are classified by EPA as Class V injection wells. Proper management of UIC devices is vital for protecting underground sources of drinking water. In New York State, the UIC program is implemented through EPA because NYSDEC has not adopted UIC regulatory requirements. (Note: New York State regulates the discharges of pollutants to cesspools under the SPDES program.) Under EPA's UIC program, all Class V injection wells must be included in an inventory maintained with the agency. In 2010, there were no Class V injection wells added or deleted from BNL's permit. In June, an application was filed with EPA to renew the Class V UIC permit for the site. Renewal of the permit is still pending EPA approval.

In addition to the UICs maintained for routine Laboratory discharges of sanitary waste and stormwater, UICs also are maintained at several on- and off-site treatment facilities used for groundwater remediation. Contaminated groundwater is treated and then returned to the aquifer via drywells, injection wells, or recharge basins. Discharges to these UICs are "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)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	SNS
Chlorides (mg/L)	45	29	33	37	31	44	250
Color (units)	< 5	< 5	< 5	< 5	< 5	< 5	15
Conductivity (µmhos/cm)	210	140	170	220	222	269	SNS
Cyanide (µg/L)	< 20	< 20	< 20	< 20	< 20	< 20	SNS
MBAS (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	SNS
Nitrates (mg/L)	< 0.5	< 0.5	< 0.5	< 0.5	0.5	0.23	10
Nitrites (mg/L)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	1
Odor (units)	0	0	0	0	0	0	3
pH (Standard Units)	5.9	5.9	5.9	5.8	6	6.7	SNS
Sulfates (mg/L)	8	7	8	8	9.5	9	250
Total coliform	ND	ND	ND	ND	ND	1***	Negative
Metals							
Antimony (µg/L)	< 5	< 5	< 5	< 5	< 5	< 5	6
Arsenic (µg/L)	< 5	< 5	< 5	< 5	< 5	< 5	50
Barium (mg/L)	0.042	0.028	0.025	0.043	0.032	0.034	2
Beryllium (µg/L)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	>0.001	4
Cadmium (µg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<1.0	5
Chromium (mg/L)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.1
Fluoride (mg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2.2
Iron (mg/L)	1.9*	3.8*	2.2*	0.04	0.03	0.09	0.3
Lead (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	15
Manganese (mg/L)	0.27	0.11	0.07	< 0.010	< 0.010	< 0.010	0.3
Mercury (µg/L)	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	2
Nickel (mg/L)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.01	SNS
Selenium (µg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	50
Sodium (mg/L)	25	16	19	22	23	24	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)	< 1	< 1	< 1	< 1	< 1	< 1	100
Thallium (μg/L)	< 2	< 2	< 2	< 2	< 2	< 2	2
Zinc (mg/L)	0.01	0.02	0.02	0.02	< 0.01	0.02	5
Radioactivity							
Gross alpha activity (pCi/L)	< 1.72	< 1.93	< 1.99	< 1.91	<1.99	NR	15
Gross beta activity (pCi/L)	< 2.28	1.83	< 1.85	< 1.71	< 1.81	NR	(a)
Radium-228 (pCi/L)	1.38	1.21	< 0.93	2.5	< 1.04	NR	5
Strontium-90 (pCi/L)	< 0.851	< 0.647	< 0.726	< 0.865	< 0.744	NR	8
Tritium (pCi/L)	< 259	< 258	< 260	< 259	< 260	NR	20,000
Other							
Alkalinity (mg/L)	20	18	18	34	34	44	SNS
Asbestos (M. fibers/L)	NR	NR	NR	NR	NR	< 0.20	7
Calcium (mg/L)	6.4	5.5	5.9	11	9.6	12	SNS
HAA5 (mg/L)	NR	NR	NR	NR	NR	0.007	0.06**
Residual chlorine - MRDL (mg/L)	NR	NR	NR	NR	NR	0.6	4
TTHM (mg/L)	NR	NR	NR	NR	NR	0.017	0.08**

Notes:
See Figure 7-3 for well locations.
Well 12 was not operational for 2010. No testing was completed during this time.
All metals limits are total recoverable.
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 cannot 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 below.

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

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
Dichlorodifluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloromethane	< 0.5	< 0.5	< 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

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
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
tert-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,4-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
sec-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-Isopropyltoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroform	1.8	6.8	3.3	0.7	6.8	3	50
Bromodichloromethane	1.8	1.2	< 0.5	< 0.5	11	3.5	50
Dibromochloromethane	1.9	0.5	< 0.5	< 0.5	19	3.6	50
Bromoform	0.7	< 0.5	< 0.5	< 0.5	17	1.4	50
Methyl tert-butyl ether	< 0.5	< 0.5	< 0.5	0.6	< 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
Picloram	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	< 0.04	< 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	0.66	0.66	0.66	< 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
Aldicarb Sulfone	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Aldicarb Sulfoxide	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Aldicarb	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	SNS
Oxamyl	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
3-Hydroxycarbofuran	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Carbofuran	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	40
Carbaryl	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Methomyl	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Glyphosate	NR	< 6	< 6	< 6	< 6	< 6	50
Diquat	NR	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	50

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	NYS DWS
	µg/L						
1,2-dibromoethane (EDB)	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
1,2-dibromo-3-chloropropane	NR	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.2
2,4,-D	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Alachlor	NR	< 1	< 1	< 1	< 1	< 1	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
Endothall	NR	< 9	< 9	< 9	< 9	< 9	100
Propachlor	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
1,2-dibromo-3-chloropropane	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.2
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
Endothall	NR	< 9	< 9	< 9	< 9	< 9	100
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 EcoTest 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.
Well 12 was offline and remained unused during 2010.

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

event of a major spill. BNL's SPCC Plan (Chaloupka 2007) is filed with NYSDEC, EPA, and DOE. BNL remained in full compliance with SPCC requirements in 2010.

In July 2002, EPA adopted significant changes to the SPCC regulations that extended the requirements to previously unregulated facilities and provided some relief to existing covered facilities. These changes, among others, included extending the plan update deadline from 3 to 5 years, and specifying that containers smaller than 55 gallons need not be counted toward reaching SPCC applicability. In November 2009, EPA extended the deadline for implementing the 2002 revisions to the SPCC requirements to November 10, 2010. Although the Laboratory had updated its SPCC Plan in May 2009, the plan was reviewed again during 2010 to ensure it complies with all SPCC requirements.

BNL also maintains a Facility Response Plan (FRP) (Lee 2006) that outlines emergency response procedures to be implemented in the event of a worst-case discharge of oil. The

BNL FRP was approved by EPA in September 2006. In March 2008, EPA conducted an unannounced government-initiated oil spill response exercise and field inspection at the Laboratory. The objective of the unannounced exercise was to test notification procedures, equipment deployment, and other actions associated with a response to an oil spill scenario identified within BNL's FRP. The exercise revealed that BNL's response procedures were effective and satisfactorily addressed the requirements of the FRP regulation (40 CFR Part 112). The Laboratory fully met the objectives of the government-initiated unannounced exercise and field inspection. BNL's FRP will undergo a 5-year review and update in 2011 to ensure that it continues to address the requirements of the FRP regulation.

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. These reports are submitted to the local emergency planning committee and the state emergency response commission. Community Right-to-Know requirements are codified under 40 CFR Parts 355, 370, and 372. The table below summarizes the applicability of the regulations to BNL. The Laboratory complied with these requirements in 2010 through the submittal of reports under EPCRA Sections 302, 303, 311, and 312 for calendar year 2009. In 2010, through the Tier III report, BNL reported releases of lead (~105,235 pounds), mercury (~298 pounds), polychlorinated biphenyls (PCBs) (~30 pounds), benzo(g,h,i)perylene (<1 pound), and polycyclic aromatic compounds (<1 pound) for calendar year 2009. 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 2010, 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 on-site 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 (i.e., 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.

During 2010, there were 40 spills, 15 of which met regulatory agency reporting criteria. The remaining 25 spills were small-volume releases either to containment areas or to other impermeable surfaces that did not exceed a reportable quantity. Table 3-7 summarizes each of the 15 reportable events, including a description of the cause and corrective actions taken. There were

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 3-7. Summary of Chemical and Oil Spill Reports.

Spill No. and Date	Material and Quantity	ORPS Report	Source/Cause and Corrective Actions
10-02 01/12/10	Fuel oil 2 gallons	No	During rehabilitation of a steam manhole, a trailer-mounted portable steam generator was being used to supply heat to Building 488. A leak developed at the fuel filter resulting in a fuel release to the floor of the trailer and the soil below the trailer. A tray was placed beneath the trailer to collect the oil. Oil absorbent pads were placed on top of the spilled oil on the floor of the trailer and impacted soil was excavated and containerized for off-site disposal.
10-04 2/01/10	Engine oil 2 gallons	No	While off-loading concrete at the National Synchrotron Light Source II (NSLS-II) construction site, a concrete pumper experienced a mechanical failure resulting in the release of motor oil to the ground. The pumper was secured and motor was repaired. Nine drums of contaminated soil were removed for off-site disposal.
10-05 2/02/10	Ethylene Glycol 0.25 gallons	No	A radiator hose failed on a contractor-owned vehicle resulting in the release of antifreeze to the ground. The spill was completely contained by asphalt. Speedy dry was immediately applied and cleaned up and containerized for off-site disposal by grounds personnel. The vehicle was moved off site by the contractor for repair.
10-08 3/22/10	Hydraulic fluid 1 gallon	No	A hydraulic hose ruptured on a crane at the NSLS-II construction site, spilling approximately 1 gallon of oil to the soil. The impacted soil was excavated and a tarp was put in place to capture residual dripping. Upon inspection, an estimated 5 gallons had collected on the tarp. Approximately 1 yard of soil was excavated and containerized for off-site disposal.
10-09 4/6/10	Hydraulic fluid 1 cup	No	Contractors noticed a leak coming from a rubber hose on a newly refurbished person-lift. The lift was parked on top of a plywood sheet to minimize the amount of fluid spilled onto the ground. Impacted soils were excavated and containerized for off-site disposal.
10-10 4/7/10	Mixed petroleum products 1 cup	No	During the demolition of the asphalt parking lot at Building 704, an underground, 1/4 inch diameter-jacketed copper line was dislodged and leaked a small amount of liquid onto the soil. The liquid inside the line had a turpentine/naphtha/petroleum odor and appeared to be mixed with water. The line was formerly part of the instrumentation used at the Brookhaven Graphite Research Reactor. Impacted soils were removed and containerized for off-site disposal.
10-12 4/19/10	Hydraulic Fluid 1 gallon	No	During routine lawn mowing of the area North of Building 555, the operator noticed a leak coming from the bottom of the lawn mower. The leak was determined to be hydraulic fluid coming from a lifting piston. The spill was primarily on the concrete sidewalk, however, stained grass was also just off the sidewalk on the western side of the semicircular driveway. Impacted soils were removed for off-site disposal.
10-13 4/19/10	Transformer oil > 1 gallon	No	On April 19, 2010, transformer oil was observed leaking from an old switch gear box attached to the side of transformer 702-TRNF-040 located on the west side outside of Building 701. The transformer had been de-energized and drained on January 1, 2000. The release impacted the concrete pad, surrounding gravel, and soil beneath the gravel and adjacent to the pad and transformer. Chemical analysis of the oil showed it was non-PCB. Impacted soils and gravel were removed and containerized for off-site disposal.
10-14 4/28/10	Hydraulic Fluid 2 gallons	No	During site preparation for construction of the Interdisciplinary Science Building, an old hydraulic lift was encountered during soil excavation. Review of World War I maps indicated that this area once had a garage and motor pool and most likely used this lift. A small amount of oil leaked from the lift during removal. The impacted soils were excavated and containerized for off-site disposal.
10-21 6/24/10	Hydraulic fluid 1 gallon	No	During site preparation for construction of the Interdisciplinary Science Building, a hydraulic hose from a backhoe ruptured, resulting in a spill of hydraulic fluid. Approximately 2 – 3 cubic feet of soil were immediately removed and containerized for disposal. The contractor assumed responsibility for the waste disposal.
10-23 7/15/10	Mixed fuel oil/water ~ 36 gallons	No	During repair of a storm water catch basin, contaminated oil was discovered in and around the basin, likely from historical spills in the area. Impacted soils and water containing oil was removed using a vacuum truck and drums. Four 55-gallon drums of contaminated water, sediment, and debris were generated and containerized for off-site disposal.
10-25 3/3/10	Hydraulic fluid (biobased) 3 – 4 gallons	No	A hydraulic lift located at the Motor Pool repair shop developed a leak resulting in the release of 3 – 4 gallons of biobased hydraulic fluid to the ground. During repair of the system, the contractor encountered oily dirt below the piston. Soil removal commenced to approximately 10 feet below grade. Due to the depth of the contaminated soils, and because the fluids were biobased, the New York State Department of Environmental Conservation agreed that they could remain.
10-30 9/23/10	Hydraulic Fluid 3 gallons	No	During clearing of wooded areas, hydraulic fluid leaked onto soil from a backhoe damaged by a tree stump. Heavy-duty plastic bags were placed under the equipment to catch any residual leakage. Stained soil was dug up and containerized for off-site disposal.

(continued on next page)

Table 3-7. Summary of Chemical and Oil Spill Reports *(concluded).*

Spill No. and Date	Material and Quantity	ORPS Report	Source/Cause and Corrective Actions
10-32 10/4/10	Construction adhesive 5 gallons	No	While NSLS II construction contractors were moving a storage trailer from the site, a pail of construction adhesive was knocked onto the soil. The contractors shoveled the liquid product and the associated stained soil into two BNL-provided 55-gallon drums. The drums were transported off-site for disposal.
10-40 12/4/10	Hydraulic fluid 1 gallon	No	During replacement of a sidewalk, a rear hydraulic line fitting leaked hydraulic oil onto concrete and adjoining soil. A plastic tray was placed under the vehicle's leaking fitting to capture further leakage. The impacted soil was removed and placed into two 55-gallon drums for off-site disposal .
10-41 11/3/10	Hydraulic Fluid < 1 gallon	No	During trenching for the extension of an electrical cable, a skid-steer hydraulic hose failed resulting in the release of less than 1 gallon of hydraulic fluid to soil. The impacted soil was removed and containerized for off-site disposal.

Note:
* Release is reportable to DOE under the requirements of DOE Order 231.1A, Occurrence Reporting and Processing.

no long-term effects from these releases and no significant impact on the environment. All but one of the reported events was 5 gallons or less in volume. Nine of the releases occurred during construction activities, either by leaks from construction equipment, or through discoveries made during excavation activities. The remaining spill was the discovery of oil in soil near a stormwater catch basin that was being repaired. This catch basin is located at the CSF in an area with known historic spills of fuel oil. None of the releases required reporting 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. In all instances, any recoverable material was removed and spill absorbents were used to remove residual product. For releases to soil, contaminated soils were removed to the satisfaction of the State or local inspector. All contaminated absorbents and impacted soils were containerized for off-site disposal.

3.8.4 Major Petroleum Facility License

The storage and transfer of 2.3 million gallons of fuel oil (principally No. 6 oil) subjects the Laboratory to MPF licensing by NYSDEC. The fuel 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. During 2010, BNL remained in full compliance with MPF license requirements, which include monitoring groundwater in the vicinity of the six aboveground 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 2010, 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.

In April 2010, due to a directive from NYSDEC asserting their sole jurisdiction over petroleum storage at Major Oil Storage Facilities, BNL had to update its MPF license to include an additional 54 petroleum storage facilities ranging from 100 to 10,000 gallons that were previously regulated by SCDHS under Suffolk County Sanitary Code Article 12. On December 9 and 10, 2010, NYSDEC conducted its annual inspection of all storage facilities included on the MPF license. No issues were identified with any of the larger tanks at the CSF (Building 610), Diesel Tank Farm (Building 651), or underground storage tank facilities at Buildings 423 and 630. However, five conditions that required corrective action were identified at some of the smaller satellite fuel storage tanks recently added to the MPF license: the need to properly prepare and paint a small section

of piping on the feed and return lines of BNL Tank 244-09; affixing the correct color coding at two waste oil storage tanks; ensuring that all satellite tanks had the required identification labeling (tank number and capacities) at or near the gauge/fill port; repairing the remote high level and interstitial leak detector alarms for BNL Tank 603-01; and the need to install a tank level gauge or alarm at the remote fill-port for BNL Tank 928-02. Most of the conditions were corrected in accordance with NYSDEC directives prior to the end of calendar year 2010. With NYSDEC approval, the remaining conditions will be addressed in 2011.

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. These tanks are also regulated under Suffolk County Sanitary Code (SCSC) Article 12 (SCDHS 1993) and are managed in accordance with BNL procedures designed to conform to Suffolk County requirements.

In May 2009, BNL renewed its Chemical Bulk Storage Registration in accordance with NYSDEC directives and received a Hazardous Substance Bulk Storage Registration Certificate in June 2009, which will not expire until July 2011. NYSDEC conducted an inspection of the Chemical Bulk Storage (CBS) facilities in December 2010. No issues were identified that required corrective actions.

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, 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. With this change in regulatory authority, there are now 270 active storage facilities at BNL that fall under SCSC Article 12 jurisdiction. This includes storage of wastewater and chemicals, as well as storage facilities used to support BNL research. An additional 16 storage facilities are temporarily out of service. The Laboratory has one active storage facility associated with environmental restoration activities conducted under the CERCLA program; this facility is not regulated under Article 12.

BNL has an ongoing program to upgrade or replace existing storage facilities, to ensure that the information provided to SCDHS for all registered storage facilities is accurate, and to ensure that new or modified storage facilities are designed and reviewed for full conformance with Article 12 regulations. In 2010, the Laboratory continued to provide SCDHS with updated information regarding several registered tanks, and coordinated field inspections as required. In addition, the design plans and specifications for a new liquid-tight secondary containment area for three stainless steel cleaning tanks that will be used for ultrasonic cleaning of synchrotron vacuum chambers and parts in support of BNL's National Synchrotron Light Source II construction project were submitted to SCDHS for review and approval. This containment area was designed and constructed to fully conform to SCSC Article 12 requirements for aboveground storage.

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. Mixed wastes are materials that are both hazardous (under RCRA guidelines) and radioactive. The Federal Facilities Compliance Act (1992) requires that DOE work with local regulators to develop a site treatment plan to manage mixed waste. Development of the plan has two purposes: to identify available treatment technologies and disposal facilities (federal or commercial) that are able to manage mixed waste produced at federal facilities, and to develop a schedule for treating and disposing of the waste streams. BNL's Site Treatment Plan is updated annually and submitted to NYSDEC for review. The updated plan documents the current mixed waste inventory and describes efforts undertaken to seek new commercial treatment and disposal outlets for various waste streams. Since treatment options for all of the mixed waste now in storage at BNL have been identified, the Laboratory expects to manage future mixed wastes within the permitted 1-year storage limitation and is preparing a request to NYSDEC to terminate the site treatment plan.

In 2010, BNL began proceedings to "close" the mixed hazardous/radioactive waste permitted storage facility, Building 870. The closure process included collecting subsurface soil samples from several locations within and outside the building to look for evidence of hazardous waste releases, and the preparation of a closure report. The closure was still pending at the end of 2010. The building is no longer needed for waste storage and has been changed to a general storage building.

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 2010.

The Laboratory has aggressively approached reductions in its PCB inventory, reducing its PCB inventory 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. Pesticides are used at the Laboratory to control undesirable insects, mice, and rats; bacteria 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 to agricultural research fields and in greenhouses on site. Herbicide use is minimized wherever possible (e.g., through spot treatment of weeds). All pesticides are applied by BNL-employed, New York State–certified applicators. By February 1, each applicator files an annual report with NYSDEC detailing insecticide, rodenticide, algicide, and herbicide

use for the previous year. The Laboratory was in full compliance with the legislated requirements in 2010.

3.12 WETLANDS AND RIVER PERMITS

As noted in Chapter 1, portions of the BNL 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 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 2010, three projects were permitted under this program and one was closed-out. The construction of a block house at the 4 o'clock area of BNL's Relativistic Heavy Ion Collider was completed and the permit closed in 2010. A permit for installation of fiber optic communications cable along Upton Road near the north gate of the Laboratory was prepared and the permit issued late in 2010. This project is expected to be complete in 2011. A permit application was developed by BNL on behalf of BP Solar for the construction of the Long Island Solar Farm, a 32 MW 200-acre facility being constructed in the southeast portion of the Laboratory.

3.13 PROTECTION OF WILDLIFE

3.13.1 Endangered Species Act

In 2010, the Laboratory updated its list of endangered, threatened, and species of special concern (see Table 6-1 in Chapter 6). Although the tiger salamander is no longer the only state endangered species found at BNL, 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 adopted and implemented the BNL Natural Resource Management Plan (NRMP) in December 2003. 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 Long Island Solar Farm, 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 at BNL. 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 annually during the summer months confirmed the presence of one of the three threatened species of damselflies expected to be found on site. In June 2005, the pine-barrens bluet, a threatened species, was documented at one of the many coastal plain ponds located 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, and Cooper's hawk. The management efforts for the tiger salamander also benefit the marbled salamander. At present, no additional protective measures are planned for the eastern box turtle or spotted turtle, as little activity occurs within their known habitat at the Laboratory. BNL continues to evaluate bird populations as part of the management strategy outlined in the NRMP. In addition to the bird species mentioned above, 18 other bird species listed as species of special concern and two federally threatened species have been observed during spring and fall migrations.

The Laboratory has 20 plant species that are protected under state law. One is an endangered plant, the crested fringed orchid; two are threatened plants, the stiff goldenrod and stargrass; and two are rare plants, the narrow-leafed bush clover and long-beaked bald-rush. The other 15 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 at BNL due to the large areas of undeveloped pine-barren habitat on site. As outlined in the NMRP, 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. Migratory birds are protected under the Migratory Bird Treaty Act. This protection includes protection from take, 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 then preventive measures are taken to ensure that they do not cause problems in the future. 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 protection of migratory birds, as well as maintain 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. In general, the Laboratory has no concerns with eagles and has no specific management needs concerning them.

3.14 EXTERNAL AUDITS AND OVERSIGHT

3.14.1 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 2010, BNL was inspected by federal, state, or local regulators on 12 occasions and SCDHS continued to maintain an on-site office for an inspector who provided periodic oversight of BNL activities for a portion of the year. These inspections included:

- *Air Compliance*. NYSDEC did not conduct a formal inspection of the Laboratory's air compliance program. However, a NYSDEC inspector was present during the annual relative accuracy test audit of the continuous emissions monitoring system at the CSF.
- *Potable Water*. In June, SCDHS collected samples and conducted its annual inspection of the BNL potable water system. Several maintenance items were noted as deficiencies (e.g., painting). The inspection also noted requirements for standby power for Building 624, a ventilation fan in the chlorine storage room, and availability of safety equipment in the caustic storage room. These deficiencies are being addressed by the Energy and Utilities Division.
- *Sewage Treatment Plant.* SCDHS conducts quarterly inspections of the Laboratory's STP to evaluate operations and sample the effluent. In 2010, no performance or operational issues were identified. NYSDEC performed an annual surveillance inspection in March. Two recommendations for improved operations were included in the State's inspection report.
- *Recharge Basins.* SCDHS inspected several of the SPDES-regulated outfalls and collected samples in January. Minor issues were identified, including improved storm water controls for the NSLS construction site.
- *Major Petroleum Facility.* The annual NYSDEC inspection of the MPF was conducted in December. See Section 3.8.4 for a discussion of the issues identified.
- *Chemical Bulk Storage Facilities.* The CBS facilities are inspected periodically by NYSDEC. The inspection was conducted in December (see Section 3.8.5).
- *RCRA.* NYSDEC and the EPA conducted annual RCRA inspections in 2010. Both inspections found BNL operations to be in compliance with requirements. In addition, NYSDEC made several visits to BNL to oversee Building 870 closure activities.

3.14.2 DOE Assessments/Inspections

The DOE Brookhaven Site Office (BHSO) conducts several environmentally related assessments each year, some of which are supported by the DOE Chicago Office. In February 2010, BHSO, with assistance from the DOE Chicago Office, evaluated BNL's SPCC plan and the Laboratory's Environmentally Preferable Purchasing program. Overall, the SPCC assessment found BNL's documents to be in accordance with federal requirements. Several recommendations were presented as plan improvements. These recommendations will be addressed as part of BNL's update to the plan in 2011.

The Chicago Office conducted a follow-up assessment of BNL's Environmentally Preferable Purchasing (EPP) program in February as part of the BHSO independent oversight program. There were no new findings identified during this review, and the assessor deferred to the Laboratory's internal self-assessment of BNL's Environmental Management System, during which several findings were noted.

In June 2010, BHSO and the DOE Chicago Office conducted a review of the BNL greenhouse gas (GHG) inventory and monitoring program. The review found BNL's GHG inventory to be consistent with federal guidance. Some recommendations were made to improve the inventory methodology to better designate and distinguish between Scope 1, 2, and 3 GHG contributions.

3.14.2.1 Environmental Multi-Topic Assessment

In 2010, 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 self-assessment focused on requirements related to energy and water conservation, pollution prevention, and pesticide management. During the self-assessment, 14 "Noteworthy" practices and four minor Nonconformances were noted. A causal analysis was performed and a corrective action plan prepared for the identified nonconformances to address the issues. Progress on the actions is being tracked to closure in BNL's Institutional Assessment Tracking System.

3.14.2.2 Nevada Test Site Inspection

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 performed an unannounced inspection at BNL in November 2010. There were no findings or observations noted.

3.15 ENFORCEMENT ACTIONS AND AGREEMENTS

In addition to the rules and regulations discussed throughout this chapter, Table 3-8 lists the existing agreements with regulatory agencies that oversee Laboratory operations and list formal Notice of Violations (NOVs) or enforcement actions that occurred throughout the year. In May 2010, BNL was notified by Energy Solutions that a shipment of waste received in February did not meet the site's approved waste profile and that the concentration of alpha emitting nuclides exceeded the sites handling license. The case was deferred to the State of Utah and a NOV was issued to BNL in July 2010. The NOV

Table 3-8. Existing Agreements and Enforcement Actions Issued to BNL, with Status.

Number Agreements	Title	Parties	Effective Date	Status
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. BNL is in full conformance with this requirement.
No Number	Federal Facilities Compliance Agreement on Mixed Wastes	NYSDEC and DOE	1992 (updated annually)	The Federal Facilities Compliance Act (FFCA) requires that a site treatment plan to manage mixed wastes be written and updated annually. BNL is in compliance with this requirement.
II-CERCLA-FFA-00201	Federal Facility Agreement under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 120 (also known as the Interagency Agreement or "IAG" of the Environmental Restoration Program)	EPA, DOE, and NYSDEC	05/26/92	Provides the framework, including schedules, for assessing the extent of contamination and conducting the BNL cleanup. 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). While all clean-up actions were completed in 2005, BNL continues to perform surveillance and maintenance of operating remediation systems and remediation of the BNL Brookhaven Graphic Research Reactor and High Flux Beam Reactor. All systems operated as required in 2010.
Notices of Violation/Enforcement Actions				
None	Notice of Violation and Notice of Proposed Imposition of Civil Penalty	State of Utah and BNL	07/12/10	The State of Utah issued a Notice of Violation to BNL for the shipment of mischaracterized waste to the Energy Solutions site in Clive Utah. The waste was generated from a remedial project removing old piping systems from the ground. The waste consisted of mercury-bearing sludge contained within the pipes. BNL did not accurately report the radiological content of the sludge in its waste profile. A fine of $5,000.00 was levied and 465 points assessed against BNL's generator permit.

Notes:
EPA = Environmental Protection Agency
NYSDEC = New York State Department of Environmental Conservation
SCDHS = Suffolk County Department of Health Services

Table 3-9. Summary of Other Environmental Occurrence Reports.

ORPS* ID: SC-BHSO-BNL-BNL-2010-0008	**Date:** 04/09/10
A small sealed vial of reactant chemicals was left in an oil bath overnight to complete the reaction. Upon returning the next morning, the researcher found that the vial had ruptured due to over-pressurization. The release was of sufficient force to break the glass beaker containing the oil and spread the oil outside the lab hood.	**Status:** Closed. All corrective actions have been completed.
ORPS ID: SC-BHSO-BNL-BNL-2010-0012	**Date:** 05/11/10
A self-assessment of BNL's Hazard Categorization process identified that activated Brookhaven Linear Isotope Producer (BLIP) targets exceeded Hazard Category 3 nuclear thresholds, specifically due to high P32/33 concentrations. While the manufacturing process was in compliance with DOE requirements, the shipment of the targets from Building 931 to 801 and the resultant waste from Building 801 to 865 was not. A review was performed and alternate limits were established for this process following DOE requirements.	**Status:** Report is Final. Corrective actions are being tracked in ATS.
ORPS* ID: SC-BHSO-BNL-BNL-2010-0016	**Date:** 06/18/10
In 2009, BNL removed old abandoned buried pipes and duct work that were known to be radiologically contaminated. During cleaning of the pipes after removal, metallic mercury was discovered. The wastes were appropriately packaged and shipped to Energy Solutions of Clive, Utah, for treatment as mixed waste. Characterization of the waste was based upon a previous project of similar nature. However, analysis of the waste by Energy Solutions showed the radiological content to be much higher than anticipated. The wastes were subsequently shipped to an alternate facility for treatment and disposal. The concentration of alpha contamination exceeded Energy Solution's license and the event was reported to the State of Utah.	**Status:** Report is Final. Corrective actions are being tracked in ATS.
ORPS* ID: SC-BHSO-BNL-BNL-2010-0018	**Date:** 07/09/10
A glass container containing 1 gallon of piranha etch solution ruptured due to over-pressurization after a researcher unknowingly added an organic solvent to the waste container. Piranha etch is a very strong oxidizer and the addition of the solvent resulted in a violent reaction and release of gas (e.g., CO2). While there were no injuries resulting from the release, a near-by student was hit in the leg by a piece of glass and splashed with the chemical. Personal protective equipment was adequate to protect the student. The release was cleaned up and additional controls put in place to prevent over-pressurization of the containers and to prevent the mixing of incompatible chemicals.	**Status:** Report is Final. Corrective actions are being tracked in ATS.
ORPS* ID: SCBNL - 9/16/2011	**Date:** 09/16/10
BNL was notified by Energy Solutions that a rail shipment of waste from the fan-house demolition project was received and one of the shipping containers (i.e., intermodals) had a hole in the bottom. Some of the demolition debris spilled out of the container and onto the shipping vehicle. BNL immediately checked all on-site containers waiting to be shipped and intercepted a shipment in transit to Energy Solutions to check for additional breaches of containers. Two containers were found on site and one in transit with holes in the bottom. The holes were likely the result of over-packing the containers with heavy material and sharp edges of the debris. Changes to packaging practices, including lining the bottoms of the containers with wood, were implemented to prevent further damage to containers.	**Status:** Closed. All corrective actions have been completed.

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

included a $5,000 fine and assessed 465 points against BNL's generator site access permit. Accumulation of 500 points could have resulted in BNL's inability to ship additional wastes to the site. The subject waste was generated during removal of old radioactive waste transport lines that contained mercury-bearing sludges. The waste was shipped under a former waste profile, which was expected to be similar to the waste. However, upon radiological analysis, the concentration of alpha-emitting isotopes was much higher in the newer waste.

This incident was reported to DOE through the BNL's ORPS. Three other incidents occurred in 2010 that required reporting through ORPS. The incidents are summarized in Table 3-9. In addition to the four ORPS events, the Laboratory also reported to senior management an issue reported by Energy Solutions concerning the receipt of an intermodal container that had a hole in the bottom. Causal analyses were performed for all incidents and corrective actions taken to prevent recurrence of the issues.

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