

# Compliance Status

# 3

*Brookhaven National Laboratory (BNL) is subject to more than 100 sets of federal, state, and local environmental regulations; numerous site-specific permits; 17 equivalency permits for operation of 14 groundwater remediation systems; and several other binding agreements. In 2009, 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; however, a warning notice was received from the New York State Department of Environmental Conservation (NYSDEC) in October for failure to report opacity violations within 2 days of the date of occurrence. Corrective actions have been implemented to prevent recurrence of the delayed reporting.*

*Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide from the Central Steam Facility were all within permit limits. There were 24 individual opacity excursions noted during 2009. These occurred in the first (3 instances), second (16 instances), and fourth (5 instances) quarters. Approximately 1,232 pounds of ozone-depleting refrigerants were recovered for eventual reuse by other DOE facilities or other federal agencies. These reductions included the disposition of eight cylinders of Halon 1301 from fixed fire suppression systems that were removed from operation, and eight cylinders of Halon 1211 associated with portable fire extinguishing systems. These materials have been transferred to storage for shipment to the Department of Defense Ozone Depleting Substances Reserve in 2010. Monitoring of BNL's potable water system showed that all drinking water requirements were met. During 2009, most of the liquid effluents discharged to surface water and groundwater met applicable New York State Pollutant Discharge Elimination System permit requirements. Two minor excursions above permit limits were reported for the year; one at the Sewage Treatment Plant and one at Outfall 006. The permit excursions were reported to NYSDEC and the Suffolk County Department of Health Services. Groundwater monitoring at the 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 2009. There were 12 reportable spills of petroleum products, antifreeze, or chemicals. While the total number of spills increased by two from 2008, the severity of releases was less. All releases were cleaned up to the satisfaction of NYSDEC.*

*BNL participated in nine environmental inspections by external regulatory agencies in 2009. 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 regula-

tory 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.**

<b>Regulator: Codified Regulation</b>	<b>Regulatory Program Description</b>	<b>Compliance Status</b>	<b>Report Sections</b>
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. Reactor D&D will continue under the CERCLA program in 2009.	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 2008.	3.6

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
EPA: 40 CFR 141–149 NYSDOH: 10 NYCRR 5	The Safe Drinking Water Act (SDWA) and New York State Department of Health (NYSDOH) standards for public water supplies establish minimum drinking water standards and monitoring requirements. SDWA requirements are enforced by the Suffolk County Department of Health Services (SCDHS).	BNL maintains a sitewide public water supply. This water supply met all primary drinking water standards, as well as operational and maintenance requirements.	3.7
EPA: 40 CFR 112 40 CFR 300 40 CFR 302 40 CFR 355 40 CFR 370 40 CFR 372	The Oil Pollution Act, the Emergency Planning and Community Right-to-Know Act (EPCRA), and the Superfund Amendment Reauthorization Act (SARA) require facilities with large quantities of petroleum products or chemicals to prepare emergency plans and report their inventories to EPA, the state, and local emergency planning groups.	Since some facilities at BNL store or use chemicals or petroleum in quantities exceeding threshold planning quantities, the Laboratory is subject to these requirements. BNL fully 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, overflow 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 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 2009, there were two projects permitted under the NYS Fresh Water Program.	3.12
U.S. Fish & Wildlife Service: 50 CFR 17 NYSDEC: 6 NYCRR 182	The Endangered Species Act and corresponding New York State regulations prohibit activities that would jeopardize the continued existence of an endangered or threatened species, or cause adverse modification to a critical habitat.	BNL is host to numerous species of flora 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: Codified Regulation	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 Safety and Health 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: Codified Regulation	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 2009, 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 2009. An audit of the EMS by the Brookhaven Site Office in December 2008 found that the system should be ready to declare conformance to the requirements of 450.1A by June 2009.	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

- 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
- Two permits issued by NYSDEC for construction activities within the Peconic River corridor
- An EPA Underground Injection Control (UIC) Area permit for the operation of 90 UIC wells
- Permit for the operation of six domestic water supply wells, issued by NYSDEC
- Seventeen 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 Air Emissions Permits*

Air emission permits are granted by NYSDEC. The Title V permit consolidates all applicable federal and state requirements for BNL's regulated emission sources into a single document. The Laboratory has a variety of nonradioactive air emission sources covered under the permit that are subject to federal or state regulations. Section 3.5 describes the more significant sources and the methods used by the Laboratory to comply with the applicable regulatory requirements. In June 2008, BNL's Title V permit was renewed by NYSDEC after a two-year review. The renewed permit includes numerous changes to reflect the removal of certain processes previously included in the permit, as well as the addition of new processes. These changes are reflected in Table 3-2. There were no permit actions related to the Title V permit in 2009.

Air emissions permits are also issued as "equivalency" permits for the installation and

CHAPTER 3: COMPLIANCE STATUS

Table 3-2. BNL Environmental Permits.

Issuing Agency	Bldg. or Facility	Process/Permit Description	Permit ID No.	Expiration or Completion	Emission Unit ID	Source ID
EPA - NESHAPs	510	Calorimeter Enclosure	BNL-689-01	None	NA	NA
EPA - NESHAPs	705	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 - SDWA	BNL	Underground Injection Control	NYU500001	11-Feb-11	NA	NA
NYSDEC - Air Equivalency	517	Middle Road System	1-51-009	NA	NA	NA
NYSDEC - Air Equivalency	518	South Boundary 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	Middle Road System	1-51-009	NA	NA	NA
NYSDEC - SPDES Equivalency	518	South Boundary 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
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	29-Jun-13	U-61005	6101A

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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	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 - NESHAPs	REF	Radiation Effects/Neutral Beam	BNL-789-01	None	NA	NA
NYSDEC - NESHAPs	RTF	Radiation Therapy Facility	BNL-489-01	None	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	01-Mar-10	NA	NA
NYSDEC - Water Quality	1010	Install A/C @ 1010A and 1012A	1-4722-00032/00139	30-Jun-09	NA	NA
NYSDEC - Water Quality	1004	Installation of Blockhouse	1-4722-00032/00140	29-Jan-13	NA	NA

## Notes:

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

RHIC = Relativistic Heavy Ion Collider

RTF = Radiation Therapy Facility

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

operation of groundwater remediation systems under CERCLA, or as changes to the BNL Title V operating permit. During 2009, no CERCLA air equivalency permits were issued or revised.

### 3.2.2.2 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 is provided to allow studies to be completed to identify controllable sources of metal-bearing waste waters, evaluate alterna-

tive treatment or disposal options, and propose effluent limits attainable through these alternatives. The studies commenced in September and continued through the end of 2009. A report detailing the results of these evaluations is due to NYSDEC by July 1, 2010.

### 3.2.2.3 NESHAPs Authorization

In April 2009, an authorization application was submitted to EPA to construct and modify the existing stationary stack at the Brookhaven Linear Isotope Production (BLIP) facility. After the authorization was approved in August 2009, the stack was modified before the start of BLIP facility operations for 2010. The modification entailed the removal of an existing 12-inch diameter duct just after the HEPA and charcoal filtration system and the installation of a new 6-inch diameter galvanized steel duct within the building. Outside the building, an 8-inch diameter duct was installed, 10 feet away from the adjacent roof of the BLIP facility, to a total height of 39 feet above local grade (15 feet above the adjacent structure). The exit nozzle size of the duct was reduced to a 4-inch diameter to increase the exit velocity and enhance the momentum rise of the exhaust stream. The total exhaust volume is 375 cubic feet per minute. A new emission sampling system that is compliant with the ANSI N13 Standard was installed as part of the upgrade, which includes sampling for particulates, tritium, and short-lived gases. The new stack and sampling system will be operational and tested in 2010.

### 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 2009, environmental evaluations were completed for 110 proposed projects at BNL. Of those, 98 were considered minor actions requiring no additional documentation. Eleven 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.

Also in 2009, the Laboratory prepared an Environmental Assessment (EA) for a proposed BP solar array project on site. The evaluation of the construction and operation of this proposed facility found that there would be no significant environmental impacts. The project involves DOE granting an easement to BP Solar to construct a large-scale commercial solar photovoltaic array of approximately 37 megawatts (MW) each that would cover approximately 200 acres. Electricity generated by these arrays would be connected into the regional utility power grid. The EA analyzed the potential environmental consequences of the facility and compared them to the consequences of a No Action alternative. The assessment included detailed analysis of all potential environmental, safety, and health hazards anticipated as the design, construction, and operation of the facility progresses. The EA for the BP Solar Array Project (DOE/EA-1663), and the Finding of No Significant Impact (FONSI) are available on the BNL web site.

### 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 2009, 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 ( $\text{NO}_x$ ). Boilers with a maximum operating heat input between 50 and 250 MMBtu/hr (14.6 and 73.2 MW) can demonstrate compliance with the  $\text{NO}_x$  standard using periodic emission tests or by using continuous emission monitoring equipment. Emission tests conducted in 1995 and again in 2006 confirmed that boilers 1A and 5, both in this size category, met the  $\text{NO}_x$  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 2009 confirmed that the fuel-bound nitrogen content met these requirements. Compliance with the 0.30 lbs/MMBtu  $\text{NO}_x$  emission standards for boilers 6 and 7 was demonstrated by continuous emission monitoring of the flue gas. In 2009,  $\text{NO}_x$  emissions from Boilers 6 and 7 averaged 0.119 lbs/MMBtu and 0.105 lbs/MMBtu, respectively.

There were no known exceedances of the  $\text{NO}_x$  emission standard for either boiler.

The Laboratory also maintains continuous opacity monitors for boilers 6 and 7. These monitors measure the transmittance of light through the exhaust gas and report this 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. To maintain boiler efficiency, soot that accumulates on the boiler tubes must be removed. This is accomplished by passing a mixture of high-pressure steam and air through the boiler using a series of blowers. In 2009, BNL reported one period during the first quarter, sixteen periods during the second quarter, and five periods during the fourth quarter when opacity measurements for Boiler 6 exceeded the 6-minute 20 percent average. The first twelve second-quarter excess opacity readings occurred during the initial soot blowing cycle after the boiler was brought on line while combusting natural gas. Since opacity levels began to rise immediately after the boiler came on line, it appears the combination of soot blowing and the cleansing effect of natural gas combustion was the cause of these excess readings. The remaining four excess opacity readings recorded during the second quarter were the result of dust build-up on the optical head assembly; levels dropped after the assembly was cleaned. There were no discernable causes for the excess opacity reading recorded during the first quarter and the remaining five periods in the fourth quarter. Two excess opacity readings for Boiler 7 that were recorded in February during a soot blowing cycle appear to have been isolated incidents.

##### 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 2009, one pound of R-12, 2.3 pounds of R-115, 100 pounds of R-22, and approximately 200 pounds of R-134a 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 have 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 2010, the Halon 1301 tanks, Halon 1211 cylinders, and the portable extinguishers will be transferred to the Department of Defense ODS Reserve in accordance with the Class I Ozone Depleting Substances Disposition Guidelines prepared by the DOE Office of Environmental Policy and Guidance.

### 3.5.2 Hazardous Air Pollutants

In 1970, the CAA established standards to protect the general public from hazardous air pollutants that may lead to death or an increase in irreversible or incapacitating illnesses. The

NESHAPs program was established in 1977 and the governing regulations were updated significantly in 1990. EPA developed NESHAPs to limit the emission of 189 toxic air pollutants. The program includes a list of regulated contaminants, a schedule for implementing control requirements, aggressive technology-based emission standards, industry-specific requirements, special permitting provisions, and a program to address accidental releases. The following subsections describe BNL's compliance with NESHAPs regulations.

#### 3.5.2.1 Maximum Available Control Technology

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. Compliance with the best management practice requirements for surface coating operations is documented via the submittal of a notice of compliance to NYSDEC on or before January 11, 2011. The notice of compliance must include a description of how the Laboratory complied with each of the best management practices.

#### 3.5.2.2 Asbestos

In 2009, the Laboratory notified the EPA Region II office regarding removal of materials containing asbestos. During the year, 4,640 linear feet of pipe insulation, 2,032 square feet of floor tile and roofing material, 23,254 square feet of siding material, and 128 cubic yards of asbestos-containing debris were removed and disposed of according to EPA requirements. In addition, during site preparation for construction of the National Synchrotron Light Source II, approximately 5,000 lineal feet of transite piping

were removed and disposed of by the construction contractor.

### 3.5.2.3 Radioactive Airborne Emissions

Emissions of radiological contaminants are evaluated and, if necessary, monitored to ensure that they do not impact the environment or people working or residing at or near the Laboratory. A full description of radiological emissions monitoring conducted in 2009 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  $\mu$ Sv) annual dose limit specified in 40 CFR 61 Subpart H (see Chapters 4 and 8 for more information on the estimated air dose). Using EPA modeling software, the dose to the hypothetical maximally exposed individual resulting from BNL's airborne emissions was 0.072 mrem (0.72  $\mu$ Sv) in 2009.

## 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 regulate wastewater effluents at the Laboratory. The permit was renewed in May 2005 and significantly modified in June 2009. 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 blow-down, 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 require that BNL perform several additional studies in order to characterize contributing sources of wastewater to the BNL STP and recharge basins. These studies include a Short-Term Monitoring Program to monitor waste waters discharged to BNL's 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 BNL STP, and a Mercury Minimization Program to document past and proposed practices to reduce potential sources of mercury to the STP. Work commenced in September 2009 and continued through the end of the year.

### 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 2009. One excursion of the SPDES permit limit for total iron occurred in May. The concentration in the wastewater effluent sample was measured at 0.39 mg/L, just slightly above the SPDES limit of 0.37 mg/L. All other parameters were within permit limits.

The cause of the increased iron concentration was investigated and historical data evaluated to determine if there were any trends associated with this observation. The most probable cause for the increased concentration of iron was the accumulation of sediment and iron oxide (rust)

on the exterior of the sample collection probe. The sample collection team has been reminded to check the collection probe periodically for accumulation of sediment on the probe to prevent future recurrence of the problem.

In follow-up to prior excursions for nitrogen, in March 2008 BNL started adding cafeteria waste as a supplemental food source to support bacterial populations within the treatment process necessary to provide waste denitrification. Since the addition of this alternative food source, all nitrogen values have been within SPDES permit limits. BNL continues to add waste cafeteria food scraps to the STP process daily.

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. BNL continued to perform quarterly chronic toxicity testing using water fleas (*Ceriodaphnia*

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)	43	81	Daily	90	0	100
pH (SU)	6.2	8.0	Continuous Recorder	Min 5.8, Max. 9.0	0	100
Avg. 5-Day BOD (mg/L)	<2	<2	Twice Monthly	10	0	100
Max. 5-Day BOD (mg/L)	<2	<2	Twice Monthly	5 (b)	0	100
% BOD Removal	86	96	Monthly	85	0	100
Avg. TSS (mg/L)	<0.6	<1.1	Twice Monthly	10	0	100
Max. TSS (mg/L)	<0.6	1.4	Twice Monthly	20	0	100
% TSS Removal	93	99	Monthly	85	0	100
Settleable solids (ml/L)	0	0	Daily	0.1	0	100
Ammonia nitrogen (mg/L)	< 0.1	0.35	Twice Monthly	1.5 (c)	0	100
Total nitrogen (mg/L)	0.48	9.27	Twice Monthly	10	0	100
Total nitrogen (lbs./day)	10	17	(May – October)	20 (e)	0	100
Total phosphorus (mg/L)	0.23	1.64	Twice Monthly	NA	0	100
Cyanide (mcg/L)	< 1.5	2.6	Twice Monthly	100	0	100
Copper (mg/L)	< 0.003	0.132	Twice Monthly	0.15	0	100
Iron (mg/L)	0.099	0.388 (a)	Twice Monthly	0.37	1	96

(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*
Lead (mg/L)	0.001	0.005	Twice Monthly	0.019	0	100
Mercury (ng/L)	53	104	Twice Monthly	200 (d)	0	100
Methylene chloride (ug/L)	< 2	< 2	Twice Monthly	5	0	100
Nickel (mg/L)	0.002	0.015	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)	0.006	0.126	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)	0.29	0.79	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.21	0.33	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 ml)	<2	81	Twice Monthly	200	0	100
Max. Fecal Coliform (MPN/100 ml)	<2	240	Twice Monthly	400	0	100
HEDP (mg/L)	<0.05	<0.05	Monthly	NA (e)	0	100
Tolytriazole (mg/L)	<0.005	<0.005	Monthly	NA (e)	0	100

Notes:

See Chapter 5, Figure 5-6, for location of Outfall 001.

\* % Compliance = total no. samples – total no. exceedances/total no. of samples x 100

BOD = Biological Oxygen Demand

HEDP = 1-Hydroxyethylidene

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) One permit exceedance of the total iron limit was reported in May 2009. See Section 3.6.1 for explanation of this permit exceedance.

(b) Permit limit for maximum 5-day BOD was changed from 20 to 5.0 mg/L in July 2009.

(c) Permit limit for ammonia nitrogen was changed from 2.0 to 1.5 mg/L in July 2009.

(d) Permit limit for mercury was changed from 800 to 200 ng/L in July 2009.

(e) These analytes and associated SPDES limits were added to the SPDES permit in July 2009.

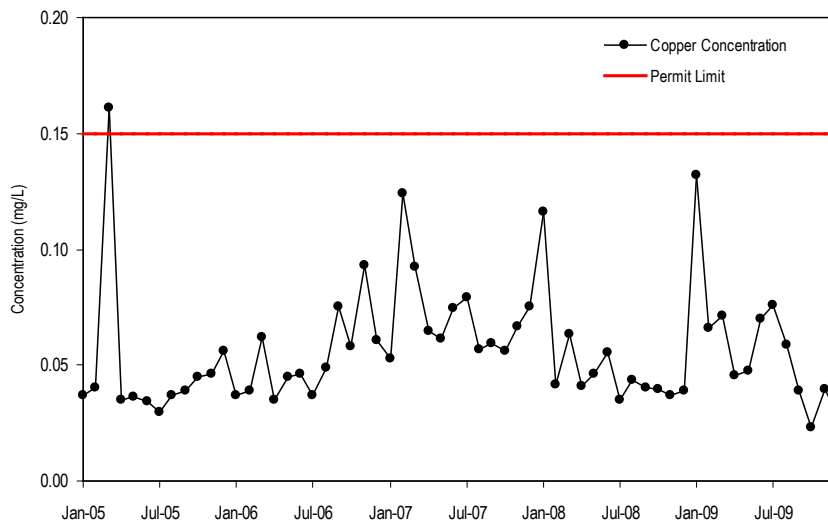


Figure 3-1. Maximum Concentrations of Copper Discharged from the BNL Sewage Treatment Plant, 2005–2009.

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Figure 3-2. Maximum Concentrations of Iron Discharged from the BNL Sewage Treatment Plant, 2005–2009.

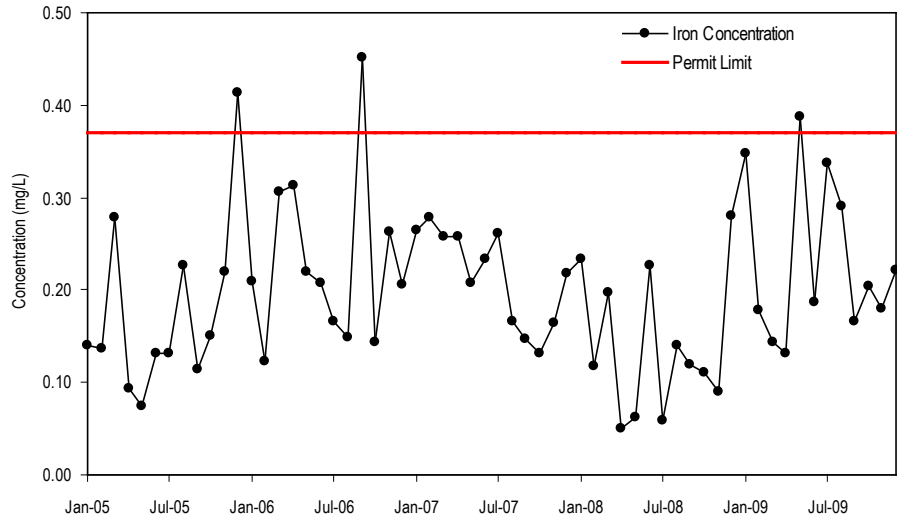


Figure 3-3. Maximum Concentrations of Lead Discharged from the BNL Sewage Treatment Plant, 2005–2009.

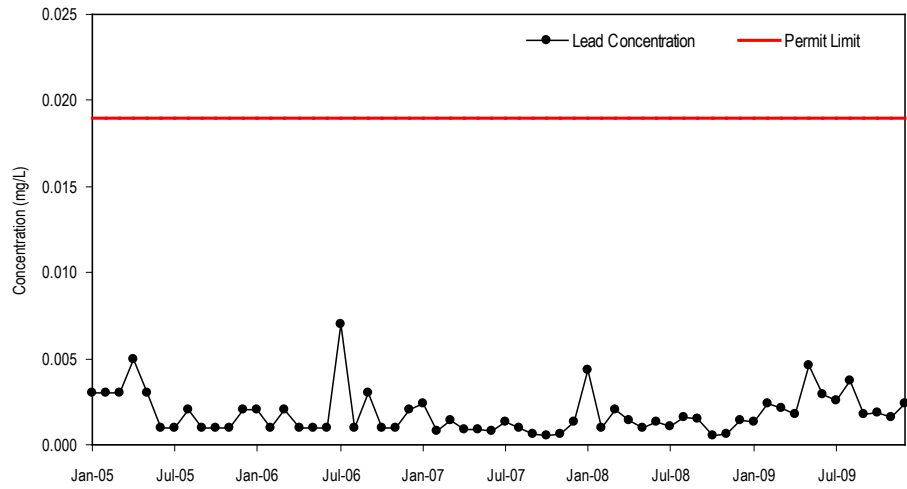
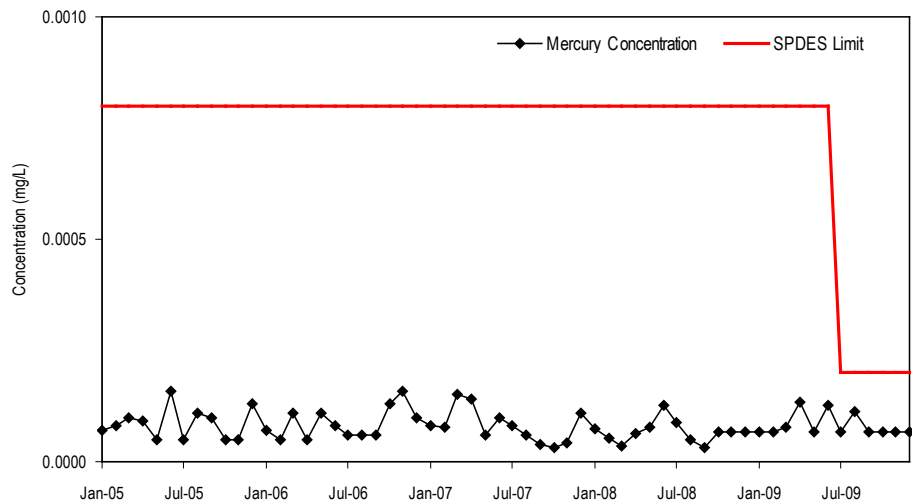
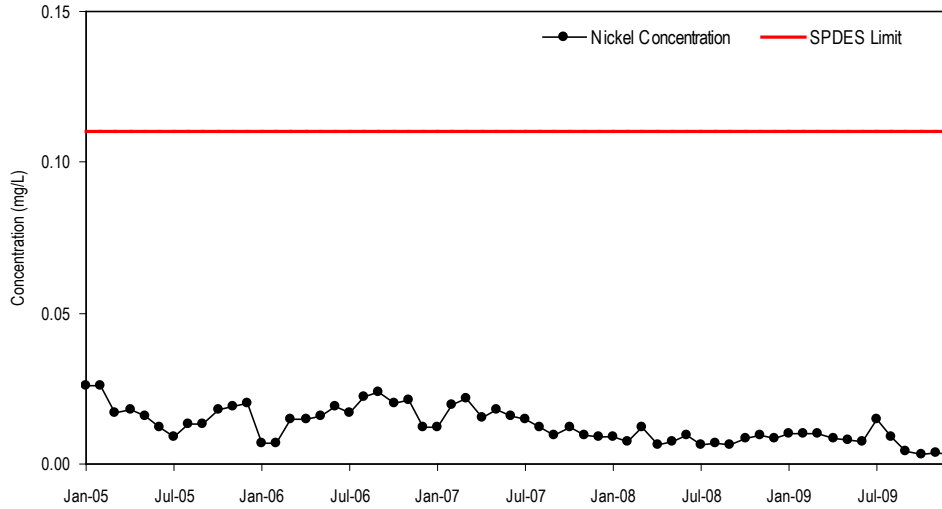
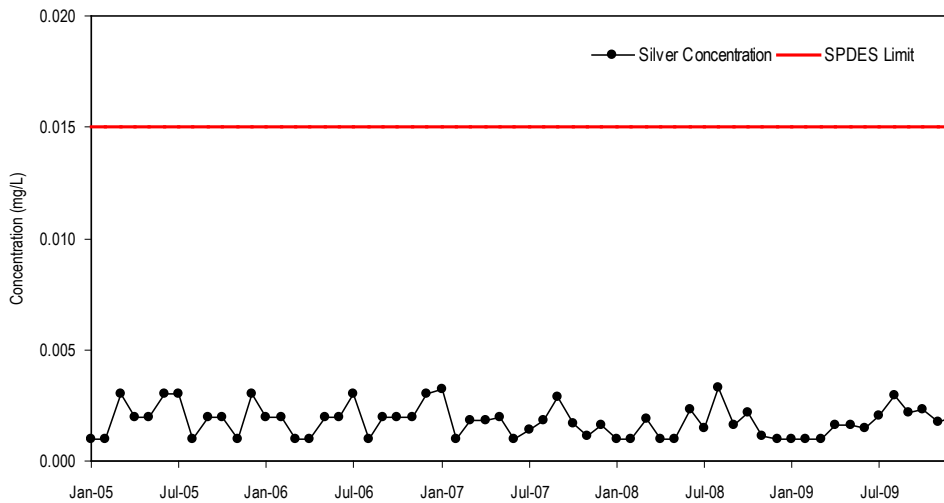


Figure 3-4. Maximum Concentrations of Mercury Discharged from the BNL Sewage Treatment Plant, 2005–2009.

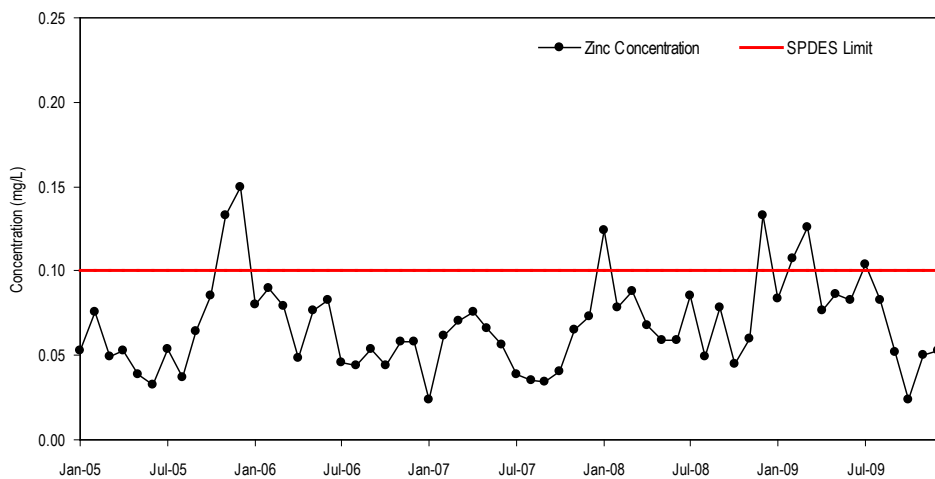




**Figure 3-5. Maximum Concentrations of Nickel Discharged from the BNL Sewage Treatment Plant, 2005–2009.**



**Figure 3-6. Maximum Concentrations of Silver Discharged from the BNL Sewage Treatment Plant, 2005–2009.**



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

*dubia*) in 2009. Under the WET testing provisions, samples are collected and tested quarterly. 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 2009 showed that during one test period in June, the rate of reproduction in the water flea was “significantly different” (less) than the controls. During the test, water fleas in the control had an average reproduction rate of 18.9 neonates per adult, whereas the water fleas in the pure effluent only had 14.9. The exact cause of the decreased reproduction rate was not evident based on chemical analysis of the wastewater. Comparison of the statistics with past tests showed that differences greater than 4 neonates were not significant. During past tests, the cause for reduced water flea reproduction rates has been linked to water hardness and alkalinity levels; consequently, the alkalinity and hardness of the dilution water used in the tests is adjusted to mimic that of the Peconic River. Tests performed in March, September, and December showed no impact on the organisms. Because the observed impacts in the June test were minor and all other tests showed no impact, no further toxicity reduction evaluation was required. Under the terms of the modified SPDES permit, testing is required throughout the term of the permit; consequently, testing will continue in 2010.

**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 for 2009. Review of the data shows that with the exception of a single excursion for tolytriazole in Outfall 006B, all discharges were in full compliance with SPDES requirements. In March, routine monitoring of the discharge to Outfall 006B showed the tolytriazole concentration of the discharge to be 1.5 mg/L, which exceeded the permit limit of 0.2 mg/L. Investigation into the cause of the noncompliant discharge showed the source to be an overdose

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			
	Min. 0.03	0.008	0.11	0.08	0.008	0.12	0.0007	0.009	NA		
pH (SU)	Max. 1.2	0.09	0.59	0.27	0.17	0.32	0.93	1.91	NA	NA	NA
	Min. 6.9	6.1	6.4	6.9	7.4	6.6	6.8	6.9	NA		
Oil and grease (mg/L)	Max. 8.1	8.6	8.4	8.8	8.5	8.9	8.4	8.3	8.5, 9.0 (a)	0	100
	N 12	12	12	12	12	NR	8	8			
Copper (mg/L)	Min. < 1.4	1.4	1.4	1.8	< 1.4	NR	1.8	1.7	NA		
	Max. 6.7	6.2	7.0	7.0	6.0	NR	5.2	5.1	15	0	100
Aluminum (mg/L)	N	NR	4	NR	NR	NR	NR	4			
	Min. NR	NR	< 0.003 (T)	NR	NR	NR	NR	< 0.003 (D)	NA		
Aluminum (mg/L)	Max. NR	NR	0.004	NR	NR	NR	NR	0.09 (D)	1.0	0	100
	N 4	NR	NR	NR	NR	NR	4	4			
Aluminum (mg/L)	Min. < 0.07 (T)	NR	NR	NR	NR	NR	0.09 (D)	< 0.07 (D)	NA		
	Max. 0.07	NR	NR	NR	NR	NR	0.6 (D)	0.1 (D)	2.0	0	100

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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	4			
	Min.	NR	NR	NR	NR	NR	NR	<0.0005	NA		
	Max	NR	NR	NR	NR	NR	NR	0.0006	0.05	0	100
Vanadium, Dissolved (mg/L)	N	NR	NR	NR	NR	NR	NR	4			
	Min.	NR	NR	NR	NR	NR	NR	0.002	NA		
	Max	NR	NR	NR	NR	NR	NR	0.006	NPL	NA	NA
Chloroform (mg/L)	N	4	NR	NR	NR	NR	NR	NR			
	Min.	0.6	NR	NR	NR	NR	NR	NR	NA		
	Max.	1.6	NR	NR	NR	NR	NR	NR	7	0	100
Bromodichloromethane (µg/L)	N	4	NR	NR	NR	NR	NR	NR			
	Min.	1.0	NR	NR	NR	NR	NR	NR	NA		
	Max.	3.9	NR	NR	NR	NR	NR	NR	50	0	100
1,1,1-trichloroethane (mg/L)	N	4	NR	NR	NR	NR	8	NR			
	Min.	<1	NR	NR	NR	NR	<1	NR	NA		
	Max.	<1	NR	NR	NR	NR	<1	NR	5	0	100
1,1-dichloroethylene (mg/L)	N	NR	NR	NR	NR	NR	8	NR			
	Min.	NR	NR	NR	NR	NR	<1	NR	NA		
	Max.	NR	NR	NR	NR	NR	<1	NR	5	0	100
Hydroxyethylidene-diphosphonic acid (mg/L)	N	4	4	4	4	NR	NR	NR			
	Min.	<0.05	<0.05	<0.05	<0.05	<0.05	NR	NR	NA		
	Max.	<0.05	0.1	<0.05	<0.05	<0.05	NR	NR	0.5	0	100
Tolyltriazole (mg/L)	N	4	4	4	4	NR	NR	NR			
	Min.	<0.005	<0.005	<0.005	<0.005	<0.005	NR	NR	NA		
	Max.	<0.005	<0.005	<0.005	<0.005	1.5	NR	NR	0.2 (b)	1	95

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. There was a single pH excursion at Outfall 002B in August 2008.

(b) There was a single tolyltriazole excursion in March 2009.

of corrosion control agent to the cooling tower located at Building 919, which was not adequately monitored by the Ashland Chemical technician responsible for maintaining these systems. The overdose, in combination with low once-through cooling water and stormwater discharges, resulted in the higher effluent concentration. Ashland Chemical has committed to reviewing all changes to chemical dosing closely to ensure future discharges remain within permit limits. In addition, in coordination with the Collider Accelerator Department, Ashland Chemical is evaluating replacing the products used, to eliminate tolyltriazole from the cooling tower formulations.

### 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 2009) is prepared by BNL to comply with these requirements.

#### 3.7.1 Potable Water

The Laboratory maintains six 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 2009, 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 reduce 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 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 2009. 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.

In 2009, BNL continued its investigation into the cause of the explosion of Wellhouse 12 that occurred in October 2008. As discussed in the 2008 Site Environmental Report, a leak of propane from the auxiliary drive for the well supplied the fuel for the explosion. The cause of the leak was determined to be the propane solenoid valve that accidentally became energized during a maintenance procedure. There were no personnel present during the explosion; consequently, there were no injuries. Environmental impacts from the explosion were negligible, and there were no impacts to the well or groundwater. Well 12, however, remained out of service in 2009. Plans are to replace the wellhouse enclosure in 2011.

To ensure that BNL drinking-water consumers 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>.

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	Well No. 12	Potable Distribution Sample	NYS DWS
<b>Water Quality Indicators</b>								
Ammonia (mg/L)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NS	< 0.10	SNS
Chlorides (mg/L)	44	30	33	30	33	NS	34	250
Color (units)	< 5	< 5	< 5	< 5	< 5	NS	< 5	15
Conductivity (µmhos/cm)	143	148	154	226	212	NS	280	SNS
Cyanide (µg/L)	< 20	< 20	< 20	< 20	< 20	NS	< 10	SNS
MBAS (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NS	< 0.04	SNS
Nitrates (mg/L)	< 0.5	< 0.5	< 0.5	0.7	0.7	NS	0.7	10
Nitrites (mg/L)	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	NS	< 0.10	1.0
Odor (units)	0	0	0	0	0	NS	0	3
pH (Standard Units)	5.0	5.6	5.3	5.7	5.3	NS	7.5	SNS
Sulfates (mg/L)	9	10	11	9.5	10	NS	12.1	250
Total coliform	ND	ND	ND	ND	ND	NS	1***	Negative
<b>Metals</b>								
Antimony (µg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NS	0.18	6.0
Arsenic (µg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NS	< 5.0	50
Barium (mg/L)	0.038	0.023	0.022	0.029	0.027	NS	0.031	2.0
Beryllium (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	4.0
Cadmium (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	5.0
Chromium (mg/L)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NS	< 0.005	0.1
Fluoride (mg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NS	< 0.2	2.2
Iron (mg/L)	1.1*	2.8*	2.1*	0.01	< 0.01	NS	0.085	0.3
Lead (µg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	15
Manganese (mg/L)	0.25	0.08	0.07	< 0.01	< 0.01	NS	0.01	0.3
Mercury (µg/L)	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	NS	< 0.25	2.0
Nickel (mg/L)	< 0.01	0.05	< 0.01	< 0.01	< 0.01	NS	< 0.01	SNS
Selenium (µg/L)	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NS	< 0.7	50.0
Sodium (mg/L)	24	17	18	17	20	NS	37	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	Well No. 12	Potable Distribution Sample	NYS DWS
Silver (µg/L)	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	NS	< 0.1	100
Thallium (µg/L)	< 2	< 2	< 2	< 2	< 2	NS	< 2	2.0
Zinc (mg/L)	0.03	0.02	0.02	0.02	0.01	NS	0.02	5.0
<b>Radioactivity</b>								
Gross alpha activity (pCi/L)	< 1.85	2.28 ± 0.8	< 1.77	< 2.61	< 1.52	NS	NR	15.0
Gross beta activity (pCi/L)	3.61 ± 1.28	< 1.77	2.03 ± 1.1	< 3.64	2.18 ± 1.07	NS	NR	(a)
Radium-228 (pCi/L)	1.85	< 1.96	< 1.43	1.36	< 1.35	NS	NR	5.0
Strontium-90 (pCi/L)	< 0.55	< 0.61	< 0.55	< 0.61	< 0.59	NS	NR	8.0
Tritium (pCi/L)	< 297	< 320	< 320	< 320	< 320	NS	NR	20,000
<b>Other</b>								
Alkalinity (mg/L)	18	18	20	42	26	NS	54	SNS
Asbestos (M. fibers/L)	NR	NR	NR	NR	NR	NR	< 0.15	7
Calcium (mg/L)	5.5	5.3	5.8	9.8	7.1	NS	13	SNS
HAA5 (mg/L)	NR	NR	NR	NR	NR	NR	0.003	0.06**
Residual chlorine - MRDL (mg/L)	NR	NR	NR	NR	NR	NR	0.6	4.0
TTHM (mg/L)	NR	NR	NR	NR	NR	NR	0.013	0.08**

Notes:  
 See Figure 7-3 for well locations.  
 HAA5 = Five Haloacetic Acids  
 MBAS = Methylene Blue Active Substances  
 MRDL = Maximum Residual Disinfectant Level  
 ND = Not Detected  
 NR = Analysis Not Required  
 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.

**3.7.2 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.



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

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CHAPTER 3: COMPLIANCE STATUS

**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	Well No. 12	NYS DWS
	µg/L							
Toluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
Ethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
m,p-xylene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NR	5
o-xylene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
Styrene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
Isopropylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
n-propylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
1,3,5-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
tert-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
1,2,4-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
sec-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
4-Isopropyltoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
n-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	5
Chloroform	2.7	12	17.0	0.7	1.1	< 0.5	NR	50
Bromodichloromethane	3.3	5	1.4	< 0.5	0.9	< 0.5	NR	50
Dibromochloromethane	< 0.5	3.6	< 0.5	< 0.5	1	< 0.5	NR	50
Bromoform	0.5	1.1	< 0.5	< 0.5	0.7	< 0.5	NR	50
Methyl tert-butyl ether	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5	NR	50
Lindane	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NR	0.2
Heptachlor	NR	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	NR	0.4
Aldrin	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	5
Heptachlor Epoxide	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NR	0.2
Dieldrin	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	5
Endrin	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NR	0.2
Methoxychlor	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NR	40
Toxaphene	NR	< 1	< 1	< 1	< 1	< 1	NR	3
Chlordane	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NR	2
Total PCB's	NR	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	NR	0.5
2,4,5,-TP (Silvex)	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	10
Dinoseb	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NR	50
Dalapon	NR	< 1	< 1	< 1	< 1	< 1	NR	50
Picloram	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NR	50
Dicamba	NR	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	NR	50
Pentachlorophenol	NR	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	NR	1
Hexachlorocyclopentadiene	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NR	5
Bis(2-ethylhexyl)Phthalate	NR	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	NR	50
Bis(2-ethylhexyl)Adipate	NR	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	NR	50
Hexachlorobenzene	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NR	5

(continued on next page)

**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	Well No. 12	NYS DWS
	µg/L							
Benzo(A)Pyrene	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NR	50
Aldicarb Sulfone	NR	< 1	< 1	< 1	< 1	< 1	NR	SNS
Aldicarb Sulfoxide	NR	< 1	< 1	< 1	< 1	< 1	NR	SNS
Aldicarb	NR	< 1	< 1	< 1	< 1	< 1	NR	SNS
Oxamyl	NR	< 1	< 1	< 1	< 1	< 1	NR	50
3-Hydroxycarbofuran	NR	< 1	< 1	< 1	< 1	< 1	NR	50
Carbofuran	NR	< 1	< 1	< 1	< 1	< 1	NR	40
Carbaryl	NR	< 1	< 1	< 1	< 1	< 1	NR	50
Methomyl	NR	< 1	< 1	< 1	< 1	< 1	NR	50
Glyphosate	NR	< 6	< 6	< 6	< 6	< 6	NR	50
Diquat	NR	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	NR	50
1,2-dibromoethane (EDB)	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NR	0.05
1,2-dibromo-3-chloropropane	NR	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NR	0.2
2,4,-D	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NR	50
Alachlor	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NR	2
Simazine	NR	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	NR	50
Atrazine	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NR	3
Metolachlor	NR	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	NR	50
Metribuzin	NR	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	NR	50
Butachlor	NR	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	NR	50
Endothall	NR	< 9	< 9	< 9	< 9	< 9	NR	100
Propachlor	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NR	50

**Notes:**

See Chapter 7, Figure 7-3, for well locations.

For compliance determination with New York State Department of Health standards, potable water samples were analyzed quarterly for Principal Organic Compounds and annually for other organics by H2M Labs Inc., a New York State-certified contractor laboratory.

The minimum detection limits for principal organic compound analytes are 0.5 mg/L. Minimum detection limits for synthetic organic chemicals and micro-extractables are compound-specific, and, in all cases, are less than the New York State Department of Health drinking water standard.

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

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 2009, 190 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 re-tested to ensure proper function. Copies of the cross-connection device test reports are filed with SCDHS annually.

### 3.7.3 Underground Injection Control

Underground Injection Control (UIC) wells are regulated under the SDWA. At the Laboratory, UICs include drywells, cesspools, septic tanks, and leaching pools, all of which are classified by EPA as Class V injection wells. Proper management of UIC devices is vital for protecting underground sources of drinking water. In New York State, the UIC program is implemented through EPA because NYSDEC has not adopted UIC regulatory requirements. (Note: New York State regulates the discharges

of pollutants to cesspools under the SPDES program.) Under EPA's UIC program, all Class V injection wells must be included in an inventory maintained with the agency. In 2009, seven stormwater drywells were closed due to site preparation for the construction of the National Synchrotron Light Source II (NSLS-II); three formerly located near Building T-100, three near former Building T-89, and the last found during site preparation for the NSLS-II project. All drywells were tested and found to meet Suffolk County Action Levels for contaminants in soils. In order to alleviate flooding and moisture problems at several BNL facilities, 16 new drywells were installed in 2009. These included four new drywells in the parking lot for Building 464 and 12 around the perimeter of Building 134. Applications detailing the installation of these devices were submitted to the EPA.

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.

### 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 any releases that do occur. BNL's compliance with these regulations is described further in the subsections of this section.

#### 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 SPCC Plan is part of the Laboratory's emergency preparedness program and outlines mitigating and remedial actions that would be taken in the event of a major petroleum release. The plan also provides information regarding release prevention measures, the design of storage facilities, and maps detailing storage facility locations. The SPCC Plan is filed with NYSDEC, EPA, and DOE, and was updated in October 2007 (Chaloupka 2007). BNL remained in full compliance with SPCC requirements in 2009.

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 again extended the deadlines for implementing the 2002 revisions to the SPCC requirements. Facilities must be in compliance with the provisions by November 10, 2010. Although the Laboratory has recently updated its SPCC Plan ahead of schedule, the plan will be reviewed again prior to the November 2010 deadline 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.

### 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 2009 through the submittal of reports under EPCRA Sections 302, 303, 311, and 312 for calendar year 2008. In 2009, through the Tier III report, BNL reported releases of lead (~110,255 pounds), mercury (~162 pounds), PCBs (~100 pounds), benzo(g,h,i)perylene (<1 pound), and polycyclic aromatic compounds (<1 pound) for calendar year 2008. 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 by-products of the combustion of fuel oils. In 2009, 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 profession-

als 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 2009, there were 33 spills, 12 of which met regulatory agency reporting criteria. The remaining 21 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 12 reportable events, including a description of the cause and corrective actions taken. There were no long-term effects from these releases and no significant impact on the environment. Eight of the reported events were 5 gallons or less in volume, one was of 5-6 gallons, and two were more than 50 gallons and associated with hydraulic lift or elevator replacements. The twelfth spill was associated with the discovery of an unidentified petroleum storage tank located within the construction area for NSLS-II. Due to the volume of contaminated soils discovered, this incident was reported to DOE through BNL’s Occurrence Report Processing System (ORPS), a system for identifying, categorizing, notifying, investigating, analyzing, and reporting to DOE events or conditions discovered on site. In all instances, any recoverable material

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



CHAPTER 3: COMPLIANCE STATUS

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

Spill No. and Date	Material and Quantity	ORPS Report	Source/Cause and Corrective Actions
09-01 01/05/09	Hydraulic (vegetable) oil 70 gallons	No	One of the pistons associated with a vehicle lift at Bldg. 423 failed, resulting in the release of 70 gallons of oil to the containment beneath the lift. All oil was recovered and sent for disposal as "used oil." The oil is vegetable based and therefore not considered a hazardous material. The lift was replaced.
09-12 05/06/09	20% Ethylene Glycol Solution 1 gallon	No	During site preparation for the NSLS-II project, land graders unearthed an abandoned solar heat experiment that used ethylene glycol solutions as a heat transfer fluid. Polyethylene tubing was encountered by the graders and cut during the grading process, releasing approximately 1 gallon of glycol solution to the ground. An investigation ensued which revealed a complex arrangement of piping and tanks for storing solutions and studying the effects of the ground as a heat storage media. The piping systems were uncovered and the glycol solutions recovered. In total ~ 240 gallons of glycol was removed from the systems.
09-15 05/13/09	Hydraulic Oil 0.5 gallons	No	While mowing the lawn by Apartment #22, the driver noticed the mower was leaking hydraulic fluid. He stopped mowing and parked the vehicle on the pavement. Speedi-dri was used to absorb the oil from the pavement and visibly impacted soil was removed and containerized for off-site disposal.
09-16 05/19/09	Water/Diesel Fuel > 10 gallons	Yes	During site preparation of the NSLS-II project site, land graders unearthed a previously unidentified fuel storage tank. While the tank was mostly empty, residual diesel fuel and water was released to the soil due to the impact of the grader on the tank. The tank was removed from the ground and contaminated soils were excavated and containerized for offsite disposal. Examination of the tank showed several corrosion holes indicating that the contaminated soils were likely the result of past leakage.
09-18 05/29/09	Gasoline 4 gallons	No	After refueling, the gasoline tank on a BNL pick-up truck began to leak. The tank was pumped out and the gasoline reused in another vehicle. Approximately 4 gallons of gasoline leaked from the vehicle and onto the parking lot and adjacent soil before being discovered. Spill absorbents were used to recover the gasoline and impacted soils were removed for off-site disposal.
09-22 06/22/09	Transmission Fluid 2 gallons	No	A rubber transmission fluid line on a large lawnmower dislodged from its fitting, resulting in a release of 2 gallons of fluid to pavement and a small area of grass. Spill absorbents were used to recover the fluid from the asphalt and impacted soils were removed for off-site disposal.
09-24 07/22/09	Hydraulic Fluid 1 gallon	No	While clearing brush, a hydraulic line on a backhoe failed, resulting in the release of hydraulic oil to the ground. Spill absorbent pads were used to remove oil from the machine and impacted soils were excavated and containerized for off-site disposal. The backhoe was repaired prior to returning to service.
09-26 08/14/09	Hydraulic Fluid 1 gallon	No	While moving rail cars, a hydraulic fitting on a Track Mobil loosened, resulting in the release of ~1 gallon of hydraulic oil to the railroad tracks and rock ballast. Impacted rocks were removed and containerized for off-site disposal and the Track Mobil was repaired and returned to service.
09-28 09/17/09	Hydraulic Fluid 1 gallon	No	A hydraulic hose on a payloador failed, resulting in the release of 1 gallon of oil to soil. Impacted soil was excavated and containerized for off-site disposal. The payloador was returned to the heavy equipment shop for repairs.
09-29 10/19/09	Ethylene Glycol 1 gallon	No	A radiator hose on a BNL pickup truck failed, resulting in the release of 1 gallon of ethylene glycol solution to the ground. All spillage was contained on asphalt. Spill absorbent was used to clean up the release. All contaminated spill absorbent was collected and disposed of off site.
09-32 11/16/09	Diesel Fuel 5 – 6 gallons	No	A bulldozer had been parked at the compost area for a period of time. When inspected, diesel fuel was noticed leaking from the vehicle. The bulldozer was trailered and transported to the heavy equipment shop for repairs. Examination of the soil beneath the vehicle showed extensive contamination with diesel fuel. Approximately 3–4 cubic yards of contaminated soil were excavated and containerized for off-site disposal.
09-33 11/19/09	Hydraulic Fluid 60 gallons	No	During a retrofit of the elevator in Bldg. 725, oil was discovered in the casing enclosing the elevator ram. Miller Environmental Group, an EPA recognized Oil Spill Response Organization, was retained to clean the oil and any contaminated water from the elevator casing. Approximately 60 gallons of oil and 35 gallons of water were recovered. Once the casing was cleaned out, the elevator contractor completed installation of the new cylinder and ram. A small-diameter PVC monitoring device was installed to monitor for the presence of additional leakage.

Note:

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

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. With the exception of the soils associated with the discovery of the tank within the NSLS-II construction site, these releases had limited environmental impact; consequently, none of the spills were reportable through ORPS. There were no other incidents reportable through ORPS in 2009.

#### 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 2009, 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 2009, 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 December 2009, NYSDEC conducted its annual inspection of the Major Oil Storage Facility. Four conditions that required corrective action were identified: the need to properly prepare and paint some sections of Tank 611-06 and associated piping; provide confirmation that all tell-tails associated with each tank are inspected and documented properly; registration and followup inspection of a new 1,000 gallon aboveground bio-diesel tank that was installed in the transfer facility; and evaluation of

the Cathodic Protection System servicing tanks 3, 5, and 6 to ensure that it is adequately protecting the tanks. In addition, an inspection of the Laboratory's underground storage facilities and other smaller satellite fuel storage tanks identified one condition that required corrective action. This included the need to conduct and document testing of the automatic line-leak detectors for the tanks located at the on-site service station. Most conditions were corrected in accordance with NYSDEC directives prior to the end of calendar year 2009. With NYSDEC approval, the remaining conditions will be addressed in 2010.

#### 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 2009. During this inspection, three issues were identified that required corrective action: the need to properly prepare and paint a small section on the west side of Tank 635-01; recalibration or replacement of remote level gauges associated with Tanks 624-05 thru -08; and properly terminating the atmospheric vent associated with Tank 634-02 within the tank containment area. These issues were corrected in accordance with the NYSDEC request.

### 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.

Currently, there are 336 active storage facilities at BNL for wastewater, chemicals, and fuel (some fuel facilities are regulated under the MPF license), as well as storage facilities used to support BNL research. An additional 17 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 2009, the Laboratory continued to provide SCDHS with updated information regarding several registered tanks, and coordinated several field inspections that resulted in BNL receiving “Permits to Operate” for ten existing registered storage facilities. In addition, the design plans and specifications for a new drum storage area at Building 835 and aboveground bio-diesel tank at Building 639 were approved and construction was completed. Both systems were 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 these 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. Treatment options for all of the mixed waste now in storage have been identified. BNL expects to continue managing future mixed wastes within the permitted 1-year storage limitation and will continue to maintain and update its Site Treatment Plan as a reporting mechanism, should waste types or treatment facility availability change in the future.

### 3.10 POLYCHLORINATED BIPHENYLS

The storage, handling, and use of polychlorinated biphenyls (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 the regulatory requirements in 2009.

The Laboratory has aggressively approached reductions in its PCB inventory. By replacing and disposing of the last large capacitor and more than 300 small capacitors from the Collider-Accelerator Department in 2008, the inventory was reduced an additional 9 percent. Since 2003, BNL has reduced its PCB inventory by more than 99 percent. The only known regulated PCB-contaminated piece of electrical equipment remaining on site is a one-of-a-kind klystron located in the 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 2009.

### 3.12 WETLANDS AND RIVER PERMITS

As noted in Chapter 1, portions of the BNL site are situated on 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 2009, one project remained permitted under this program, one was closed-out, and a third project was reviewed and determined not to require a permit. The permit for construction of a block house at the 4 o’clock area at RHIC remained open in 2009 and will likely be closed in 2010. The installation of air conditioning upgrades was completed in 2008 and close-out documents were submitted in 2009. Also in 2009, the placement of an equipment trailer on top of the RHIC berm at the 12 o’clock position was submitted for permit review to NYSDEC and a determination of “no permit necessary” was provided by NYSDEC to DOE. Finally, a permit application was being developed by BNL on behalf of BP Solar for the construction of the approved Long Island Solar Farm, a 32 MW 200-acre facility proposed for the southeast portion of the Laboratory.

### 3.13 PROTECTION OF WILDLIFE

#### 3.13.1 Endangered Species Act

In 2006, 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. A multi-year study of three ponds began in 2004 to gain a better understanding of salamander habitat requirements and migration patterns.

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.

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 (*Enallagma recurvatum*), 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 2009, BNL was inspected by federal, state, or local regulators

on nine occasions and SCDHS continued to maintain an on-site office for an inspector who provided periodic oversight of BNL activities. These inspections included:

- *Air Compliance.* NYSDEC conducted its formal inspection of the Laboratory's air compliance program in August 2009; there were no violations noted at the time of inspection.
- *Potable Water.* In July, SCDHS collected samples and conducted its annual inspection of the BNL potable water system. No issues were identified.
- *Sewage Treatment Plant.* SCDHS conducts quarterly inspections of the Laboratory's STP, to evaluate operations and sample the effluent. In 2009, no performance or operational issues were identified. NYSDEC did not perform its annual surveillance inspection in 2009.
- *Recharge Basins.* SCDHS inspected several of the SPDES-regulated outfalls and collected samples. No issues were identified.
- *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).

NYSDEC did not perform annual hazardous waste or SPDES inspections in 2009.

### 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 December 2008, BHSO, with assistance from the Chicago Office, evaluated BNL's readiness to declare conformance to DOE Order 450.1A. This order, along with its companion DOE Order 430.2B, established new requirements for DOE facilities in the areas of energy and water conservation, improved fleet management, and other sustainable practices. Order 450.1A requires DOE facilities to have an Environmental Management System (EMS) that includes objectives and targets sup-

porting the sustainability goals of the Order, and the energy, water, fleet, and other goals of Order 430.2B. Overall, the assessment found that the EMS culture at BNL was strong due to the prior long-term establishment of an ISO 14001-registered EMS, and is clearly in conformance with DOE O 450.1A. BNL formally declared its conformance to these new requirements in April 2009.

The Chicago Office conducted an assessment of BNL’s Environmentally Preferable Purchasing (EPP) program in June 2009 as part of the BHSO independent oversight program. The findings of this assessment were rolled-up into one Finding. The results indicated that, although an improvement plan was prepared with actions to comply with the requirements related to the EPP requirements of DOE O 450.1A, BNL was behind schedule on implementation of the actions. While the Laboratory committed to have all actions completed by early October 2009, one action remained opened of the end of 2009. This action, to revise and issue the Procurement subject area which includes requirements for EPP, will be completed in 2010.

*3.14.2.1 Environmental Multi-Topic Assessment*

In 2009, 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 properly managing wastes generated at BNL, including hazardous, industrial, mixed, radioactive, radioactive-regulated medical waste, and regulated medical waste.

During the self-assessment, two Noteworthy practices, seven Nonconformances, and three Observations 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 Test Site (NTS) waste generator. As part

**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.
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. All systems operated as required in 2009.

**Notices of Violation/Enforcement Actions**

None				
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Notes:  
 EPA = Environmental Protection Agency  
 NYSDEC = New York State Department of Environmental Conservation  
 SCDHS = Suffolk County Department of Health Services

of the NTS waste certification process, the NTS Maintenance and Operations Contractor conducts random unannounced inspections. NTS performed an unannounced inspection at BNL in May 2009. There were no findings noted.

### 3.15 ENFORCEMENT ACTIONS AND AGREEMENTS

There were no formal or informal enforcement actions taken against BNL operations in 2009. A “Warning Notice” was received in October 2009 for failing to report violations of the opacity standards for emissions from the CSF within 2 days of the date of occurrence. The 2-day reporting requirement was added to the revised BNL Title V permit in 2008 and was not recognized as a new enforceable action. Corrective measures have been taken to ensure that appropriate Laboratory staff is notified immediately of an opacity excursion. In addition to the rules and regulations discussed throughout this chapter, Table 3-8 lists the existing agreements with regulatory agencies that oversee BNL operations.

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