3 Compliance Status

Brookhaven National Laboratory (BNL) is subject to more than 100 sets of federal, state, and local environmental regulations; numerous site-specific permits; 17 equivalency permits for operation of 14 groundwater remediation systems; and several other binding agreements. In 2008, 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, minor deficiencies were noted during inspections conducted by the New York State Department of Environmental Conservation (NYSDEC).

Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide from the Central Steam Facility were all within permit limits. There were no opacity excursions noted for the entire year. Approximately 1,230 pounds of ozone-depleting refrigerants were recovered for eventual reuse by other DOE facilities or other federal agencies. These reductions included the disposition of 10 cylinders of Halon 1301 from fixed fire suppression systems that were removed from operation. Additionally, approximately 4,500 pounds of Ozone Depleting Substances (ODS) were transferred to the Department of Defense ODS Reserve. Monitoring BNL's potable water system showed that all drinking water requirements were met. During 2008, most of the liquid effluents discharged to surface water and groundwater met applicable New York State Pollutant Discharge Elimination System permit requirements. Three minor excursions above permit limits were reported for the year. Two of the three occurred at the Sewage Treatment Plant and were due to slightly elevated levels of nitrogen. The third was the recording of high pH in the water discharged from a cooling tower. 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 2008. There were nine reportable spills of petroleum products, antifreeze, or chemicals. While the total number of spills remained the same as 2007, there were 25 percent fewer reportable spills (nine compared to 12) in 2008. All releases were cleaned up to the satisfaction of the New York State Department of Environmental Conservation.

BNL participated in 11 environmental inspections by external regulatory agencies in 2008. These inspections included petroleum and chemical storage, Sewage Treatment Plant operations, 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. A Notice of Violation was issued for labeling deficiencies identified during the RCRA annual inspection by the NYSDEC.

3.1 COMPLIANCE WITH REQUIREMENTS

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

3.2 ENVIRONMENTAL PERMITS

3.2.1 Existing Permits

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

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
EPA: 40 CFR 300 40 CFR 302 40 CFR 355 40 CFR 370	The Comprehensive Environmental Response, Compensation & Liability Act (CERCLA) provides the regulatory framework for remediation of releases of hazardous substances and remediation (including decontamination and decommissioning [D&D]) of inactive hazardous waste disposal sites. Regulators include EPA, DOE, and the New York State Department of Environmental Conservation (NYSDEC).	In 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 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
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 in 2008.	3.7

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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 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 (SCSCs) are more stringent than federal and state regulations.	The regulations require that these materials be managed in facilities equipped with secondary containment, overfill protection, and leak detection. BNL complies with all federal and state requirements and has achieved conformance to county codes.	3.8.4 3.8.5 3.8.6
EPA: 40 CFR 260–280 NYSDEC: 6 NYCRR 360–372	The Resource Conservation Recovery Act (RCRA) and New York State Solid Waste Disposal Act govern the generation, storage, handling, and disposal of hazardous wastes.	BNL is defined as a large-quantity generator of hazardous waste and has a permitted waste management facility.	3.9
EPA: 40 CFR 700–763	The Toxic Substances Control Act (TSCA) regulates the manufacture, use, and distribution of all chemicals.	BNL manages all TSCA-regulated materials, including PCBs, in compliance with all requirements.	3.10
EPA: 40 CFR 162–171(f) NYSDEC: 6 NYCRR 320 6 NYCRR 325–329	The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and corresponding NY State regulations govern the manufacture, use, storage, and disposal of pesticides and herbicides, as well as the pesticide containers and residuals.	BNL employs NY State-certified pesticide applicators to apply pesticides and herbicides. Each applicator attends training, as needed, to maintain current certification and files an annual report to the state detailing the types and quantity of pesticides applied.	3.11
DOE: 10 CFR 1022 NYSDEC: 6 NYCRR 663 6 NYCRR 666	DOE regulations require its facilities to comply with floodplain/wetland review requirements. The New York State Fresh Water Wetlands and Wild, Scenic, and Recreational Rivers rules govern development in the state's natural waterways. Development or projects within a half-mile of regulated waters must have NYSDEC permits.	BNL is in the Peconic River watershed and has several jurisdictional wetlands; consequently, development of locations in the north and east of the site requires NYSDEC permits and review for compliance under DOE wetland/floodplain regulations. In 2008, 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 flaura and fauna. Many species have been categorized by NYS as endangered, threatened, or of special concern. The Laboratory's Natural Resource Management Plan outlines activities to protect these vulnerable species and 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 Health and Safety Administration (OSHA) reports. The Laboratory developed the ORPS Subject Area for staff and management who perform specific duties related to discovery, response, notification, investigation, and reporting of occurrences to BNL and DOE management. The ORPS Subject Area is supported by: Occurrence Reporting Program Description, Critiques Subject Area, Occurrence Categorizer's Procedure, and the ORPS Office Procedure.	All chapters
DOE: Order 414.1 10 CFR 830, Subpart A Policy 450.5	The Quality Assurance (QA) program objective is to establish an effective management system using the performance requirements of this Order, coupled with technical standards, where appropriate, to ensure: senior management provides planning, organization, direction, control, and support to achieve DOE objectives; line organizations achieve and maintain quality while minimizing safety and health risks and environmental impacts, and maximizing reliability and performance; line organizations have a basic management system in place supporting this Order; and each DOE element reviews, evaluates, and improves its overall performance and that of its contractors using a rigorous assessment process based on an approved QA Program.	BNL has a Quality Management (QM) system to implement quality management methodology throughout its management systems and associated processes to: 1) plan and perform Laboratory operations reliably and effectively to minimize the impact on the safety and health of humans and on the environment; 2) standardize processes and support continuous improvement in all aspects of Laboratory operations; and 3) enable the delivery of products and services that meet customers' requirements and expectations. Having a comprehensive program ensures that all environmental monitoring data meet QA and quality control requirements. Samples are collected and analyzed using standard operating procedures, to ensure representative samples and reliable, defensible data. Quality control in the analytical labs is maintained through daily instrument calibration, efficiency and background checks, and testing for precision and accuracy. Data are verified and validated according to project-specific quality objectives before they are used to support decision making.	Chapter 9
DOE: Order 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
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 2008, 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 BHSO in December 2008 found that the system should be ready to declare conformance to the requirements of 450.1A by June 2009.	Chapter 2

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Sections
DOE: Order 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

- 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
- 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 under 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 emissions 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.

Air emissions permits are also issued as "equivalency" permits for the installation and operation of groundwater remediation systems under CERCLA, or as changes to the BNL Title V operating permit. During 2008, no CERCLA air equivalency permits were issued or revised.

3.2.2.2 SPDES Permits

In 2007, NYSDEC initiated a review and renewal of the BNL SPDES permit because more than 10 years had passed since the last comprehensive review. The Laboratory completed an application and submitted it to NYSDEC in August 2007. In December 2008, NYSDEC requested additional clarifying information regarding the use and discharge to the sewage

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	31-Oct-06	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-09	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

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

Issuing Agency	Bldg. or Facility	Process/Permit Description	Permit ID No.	Expiration or Completion	Emission Unit ID	Source ID
NYSDEC - Air Quality	610	Metal Parts Cleaning Tray	1-4722-00032/00115	29-Jun-13	U-METAL	61008
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	29-Jun-13	U-61005	6101A
NYSDEC - Air Quality	630	Gasoline Storage and Fuel Pumps	1-4722-00032/00115	29-Jun-13	U-FUELS	63001-03
NYSDEC - Air Quality	630	Parts Cleaning Tray	1-4722-00032/00115	29-Jun-13	U-METAL	630 AB
NYSDEC - Air Quality	902	Epoxy Coating/Curing Exhaust	1-4722-00032/00115	29-Jun-13	U-COILS	90206
NYSDEC - Air Quality	903	Metal Parts Cleaning Tank	1-4722-00032/00115	29-Jun-13	U-METAL	90304
NYSDEC - Air Quality	919B	Electroplating Operation	1-4722-00032/00115	29-Jun-13	U-INSIG	91904
NYSDEC - Air Quality	630	Parts Cleaning Tray	1-4722-00032/00115	29-Jun-13	U-METAL	630 AD
NYSDEC - Air Quality	922	Electroplating Operation	1-4722-00032/00115	29-Jun-13	U-INSIG	92204
NYSDEC - Air Quality	923	Electronic Equipment Cleaning	1-4722-00032/00115	29-Jun-13	U-METAL	9231A
NYSDEC - Air Quality	923	Parts Drying Oven	1-4722-00032/00115	29-Jun-13	U-METAL	9231B
NYSDEC - Air Quality	924	Magnet Coil Production Press	1-4722-00032/00115	29-Jun-13	U-INSIG	92402
NYSDEC - Air Quality	924	Vapor/Ultrasonic Degreasing Unit	1-4722-00032/00115	29-Jun-13	U-METAL	92404
NYSDEC - Air Quality	Site	Halon 1211 Portable Extinguishers	1-4722-00032/00115	29-Jun-13	U-HALON	H1211
NYSDEC - Air Quality	Site	Halon 1301 Fire Suppression Systems	1-4722-00032/00115	29-Jun-13	U-HALON	H1301
NYSDEC - Air Quality	Site	Packaged A/C Units	1-4722-00032/00115	29-Jun-13	U-RFRIG	PKG01-02
NYSDEC - Air Quality	Site	Reciprocating Chillers	1-4722-00032/00115	29-Jun-13	U-RFRIG	REC01-53
NYSDEC - Air Quality	Site	Rotary Screw Chillers	1-4722-00032/00115	29-Jun-13	U-RFRIG	ROTO1-11
NYSDEC - Air Quality	Site	Split A/C Units	1-4722-00032/00115	29-Jun-13	U-RFRIG	SPL01-02
NYSDEC - Air Quality	Site	Centrifugal Chillers	1-4722-00032/00115	29-Jun-13	U-RFRIG	CEN01-24
NYSDEC - Hazardous Waste	WMF	Waste Management	1-4722-00032/00102	19-Nov-16	NA	NA
NYSDEC - 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	31-May-12	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
RTF = Radiation Therapy Facility
RHIC = Relativistic Heavy Ion Collidar
SDWA = Safe Drinking Water Act
SPDES = State Pollutant Discharge Elimination System
Sr-90 = Strontium-90
STP = Sewage Treatment Plant
WCF = Waste Concentration Facility
WMF = Waste Management Facility

treatment plant and other outfalls of corrosion-control chemicals used in cooling water systems. A revised permit is expected shortly.

3.2.2.3 NESHAPs Authorization

In 2008, BNL petitioned EPA to raise the emissions threshold for the Brookhaven Linear Isotope Production (BLIP) facility to ensure that a nationwide need for radioisotopes used in medical imaging studies could be met without exceeding the original emissions limit. If the original limit had been exceeded, a requirement for continuous emissions monitoring would have been triggered. After due consideration, EPA raised the limit from 0.1 mrem in the year to 0.2 mrem in the year. Even with an increase

to 0.2 mrem, the emissions from this facility are still well below the EPA air emissions pathway limit of 10 mrem for a year.

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 2008, environmental evaluations were completed for 63 proposed projects at BNL. Of these, 58 were considered minor actions requiring no additional documentation. The five remaining projects were addressed by submitting notification forms to DOE, which determined that the projects were covered by existing "Categorical Exclusions" per 10 CFR 1021 or fell within the scope of a previous environmental assessment.

3.4 PRESERVATION LEGISLATION

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

BNL has three structures or sites that are eligible for listing on the National Register of Historic Places: the Brookhaven Graphite Research Reactor complex, the High Flux Beam Reactor complex, and the World War I Army training trenches associated with Camp Upton. An annual Department of Interior questionnaire regarding historic and cultural resources was submitted in March 2008. 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 2008, 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 (NO_x). Boilers with a maximum operating heat input between 50 and 250 MMBtu/hr (14.6 and 73.2 MW) can demonstrate compliance 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 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 2008 confirmed that the fuel-bound nitrogen content met these requirements. Compliance with the 0.30 lbs/MMBtu NO_x emission standards for boilers 6 and 7 was demonstrated by continuous emission monitoring of the flue gas. In 2008, NO_x emissions from Boilers 6 and 7 averaged 0.122 lbs/MMBtu and 0.100 lbs/MMBtu, respectively. There were no known exceedances of the NO_x emission standard for either boiler.

The Laboratory also maintains continuous opacity monitors for boilers 6 and 7. These

monitors measure the transmittance of light through the exhaust gas and report 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 2008, BNL had no periods when opacity measurements for Boiler 6 or Boiler 7 exceeded the 6-minute, 20 percent average during soot blowing operations.

3.5.1.2 Ozone-Depleting Substances

Refrigerant: The Laboratory's preventative maintenance program requires regular inspection and maintenance of refrigeration and air conditioning equipment that contains ozone-depleting substances such as R-11, R-12, and R-22. All refrigerant recovery and recycling equipment are certified to meet refrigerant evacuation levels specified by 40 CFR 82.158. As a matter of 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 2008, approximately 95 pounds of R-22 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. The Laboratory transferred 267 portable extinguishers containing a total of 4,523 pounds of Halon 1211 to the Department of Defense Ozone Depletion Substances (ODS) Reserve in 2008. The transferred extinguishers were declared excess property in 2006 and 2007. The transfer was made in accordance with the Class I Ozone Depleting Substances Disposition Guidelines prepared by the DOE Office of Environmental Policy and Guidance. 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 2008, 10 cylinders containing 1,230 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. The cylinders will be dispositioned to the ODS Reserve in 2009.

3.5.2 Hazardous Air Pollutants

In 1970, the CAA established standards to protect the general public from hazardous air pollutants that may lead to death or an increase in irreversible or incapacitating illnesses. The NESHAPs program was established in 1977 and the governing regulations were updated significantly in 1990. EPA developed NESHAPS to limit the emission of 189 toxic air pollutants. The program includes a list of regulated contaminants, a schedule for implementing control requirements, aggressive technology-based emission standards, industry-specific requirements, special permitting provisions, and a program to address accidental releases. The following subsections describe BNL's compliance with NESHAPs regulations.

3.5.2.1 Maximum Available Control Technology

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

3.5.2.2 Asbestos

In 2008, the Laboratory notified the EPA Region II office regarding removal of materi-

als containing asbestos. During the year, 3,402 linear feet of pipe insulation, 9,297 square feet of floor tile and roofing material, and 20 cubic yards of asbestos-containing debris were removed and dispositioned according to EPA requirements.

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 this monitoring conducted in 2008 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 offsite dose due to airborne radioactive emissions from the Laboratory continued to be far below the 10 mrem (100 μSv) annual dose limit specified in 40 CFR 61 Subpart H, (see Chapters 4 and 8 for more information on the estimated air dose). Using EPA modeling software, the dose to the hypothetical maximally exposed individual resulting from BNL's airborne emissions was 0.061 mrem (0.6 μSv) in 2008.

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. This permit was renewed in May 2005, and 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 STP to the Peconic River.
- Outfalls 002, 002B, 003, 005, 006A, 006B, 008, 010, 011, and 012 are recharge basins used to discharge cooling tower blowdown, once-through cooling water, and/or stormwater. Since only stormwater or once-through cooling water are 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.

In 2007, NYSDEC initiated a comprehensive review of the BNL SPDES permit, requiring the complete characterization of all permitted outfalls and a review of the discharges received by each outfall. Wastewater samples were collected from each outfall and analyzed for a full series of chemical and biological contaminants. The data were submitted to NYSDEC in August. No unexpected contaminants were identified through these analyses. Additional information was requested by NYSDEC in December 2008 regarding chemicals used in cooling water systems to prevent/minimize corrosion.

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 waste water and includes the following processes: settling/sedimentation, biological reduction of organic matter, and reduction of nitrogen. Chapter 5 provides a detailed description of the treatment process.

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)	48	81	Daily	90	0	100
pH (SU)	6.3	7.1	Continuous Recorder	Min 5.8, Max. 9.0	0	100
Avg. 5-Day BOD (mg/L)	< 1	< 1	Twice Monthly	10	0	100
Max. 5-Day BOD (mg/L)	< 2	< 2	Twice Monthly	20	0	100
% BOD Removal	> 93	> 99	Monthly	85	0	100
Avg. TSS (mg/L)	< 0.24	< 0.57	Twice Monthly	10	0	100
Max. TSS (mg/L)	< 0.3	< 1.14	Twice Monthly	20	0	100
% TSS Removal	> 97	> 99	Monthly	85	0	100
Settleable solids (ml/L)	0	0	Daily	0.1	0	100
Ammonia nitrogen (mg/L)	< 0.03	0.74	Twice Monthly	2	0	100
Total nitrogen (mg/L)	1.6	11.0 (a)	Twice Monthly	10	2	96
Total phosphorus (mg/L)	0.25	1.58	Twice Monthly	NA	0	100
Cyanide (µg/L)	< 1.5	6.1	Twice Monthly	100	0	100
Copper (mg/L)	0.023	0.116	Twice Monthly	0.15	0	100
Iron (mg/L)	0.048	0.277	Twice Monthly	0.37	0	100
Lead (mg/L)	< 0.001	0.004	Twice Monthly	0.019	0	100
Mercury (µg/L)	< 0.03	0.128	Twice Monthly	0.8	0	100
Methylene chloride (µg/L)	< 2	3.23	Twice Monthly	5	0	100
Nickel (mg/L)	0.005	0.012	Twice Monthly	0.11	0	100
Silver (mg/L)	< 0.001	0.003	Twice Monthly	0.015	0	100
Toluene (µg/L)	< 1.0	< 1.0	Twice Monthly	5	0	100
Zinc (mg/L)	0.03	0.133	Twice Monthly	0.1	0	100
1,1,1-trichloroethane (µg/L)	< 1	< 1	Twice Monthly	5	0	100
2-butanone (µg/L)	1.4	< 5	Twice Monthly	50	0	100
PCBs (µg/L)	< 0.0538	< 0.0538	Quarterly	NA	0	100
Max. Flow (MGD)	0.34	0.84	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.27	0.56	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 ml)	< 1	26	Twice Monthly	200	0	100
Max. Fecal Coliform (MPN/100 ml)	< 2	50	Twice Monthly	400	0	100

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
MGD = Million Gallons per Day
MPN = Most Probable Number
NA = Not Applicable
SU = Standard Unit
TSS = Total Suspended Solids
(a) Two permit exceedances of the total nitrogen limits were reported: one in January and one in March
Please refer to Section 3.6.1 for explanations of these permit exceedances.

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 2008. There were two excursions of the SPDES permit limits for total nitrogen: one occurred in January and one occurred in March. In both cases, the effluent concentrations for total nitrogen were just above the Laboratory's SPDES limit of 10 ppm, with discharges of 11.0 ppm in each instance. All other parameters were within permit limits.

The Laboratory has been investigating the potential sources of elevated nitrogen concentrations observed at the STP. A literature search was conducted to identify contributing causes to the increase in nitrogen levels. The standard two-step process relies on bacteria to reduce the biological load in the wastewater and to reduce the nitrogen levels. The two steps occur in the same treatment vessel. During the first step, wastewater is aerated and aerobic bacteria consume the biological matter and oxidize organic and inorganic nitrogenous compounds to nitrate. In the second step, the aeration blowers are shut off, causing the dissolved oxygen levels to drop and prompting the bacteria to seek other sources of oxygen, such as the nitrate formed in step 1. As bacteria consume oxygen in the nitrate molecules, nitrogen gas is liberated and bubbles out of the system, lowering the nitrogen content of the wastewater. At BNL, nutrient levels in the STP influent are lower than in typical municipal wastewater and too low to support both steps in the nitrogen removal process. In April 2008, the Laboratory began adding waste food scraps from the on-site cafeteria to the STP influent in an effort to increase the level of nutrients. Monitoring of the system performance showed the nutrient levels increased, with a corresponding decrease in nitrogen in the effluent. There were no nitrogen violations for the remainder of the year.

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's chronic toxicity testing program began in 1993 and continued through 2003. Toxicity testing was postponed in 2004, but was restarted in March 2005 as stipulated in the 2005 SPDES permit renewal. Under the WET testing provisions, samples are collected and tested quarterly. The program consists of seven-day chronic toxicity testing on two freshwater organisms: water fleas and fathead minnows. In each test, sets of 10 of these organisms are exposed to varying concentrations of the STP effluent (100, 50, 25, 12.5, and 6.25 percent) for 7 days. During testing, the growth rate of the fish and rate of reproduction for the water flea are measured and compared to untreated organisms (i.e., controls). The test results are submitted to NYSDEC for review.

Testing continued in 2008 using only the water flea, as there have been no toxic effects shown for the minnow in many years of testing. 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 were performed in March, June, September, and December. Test results in March showed reduced water flea reproduction rates; no impacts were identified in the remaining three tests. Because the observed impacts were minor (only evident in one of the four tests conducted), no further toxicity reduction was required. Testing will continue in 2009.

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 2008. Review of the data shows that with the exception of a single pH excursion, all discharges were in full compliance with SPDES requirements. In August, routine monitoring of the discharge to Outfall 002B showed the pH of the discharge to be 9.3 Standard Units (SU), which exceeded the permit limit of 9.0 SU. Investigation into the cause of the noncompliant discharge showed the source to be the cooling tower at Building 1004. During extended shutdown periods (e.g., summer months), the water in the tower slowly evaporates and is replaced automatically by tower control systems to maintain the water level in the basin. This continual evaporation/refilling process results in the build-up of salts, especially hydroxide salts, found in the potable water supply. The build-up of hydroxide salts results in an increase in the pH of the water in the tower basin. Water leaking through the make-up water valve was causing a slow overflow from the tower basin to the discharge to Outfall 002B. The valve was replaced to stop the discharge.

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 2008) 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 the potable water supply monitoring data for 2008. In 2008, 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 the Water Treatment Plant effectively reduces these levels to below NYS DWS limits. To ensure that BNL's water supply continually meets NYS DWS, groundwater is also treated

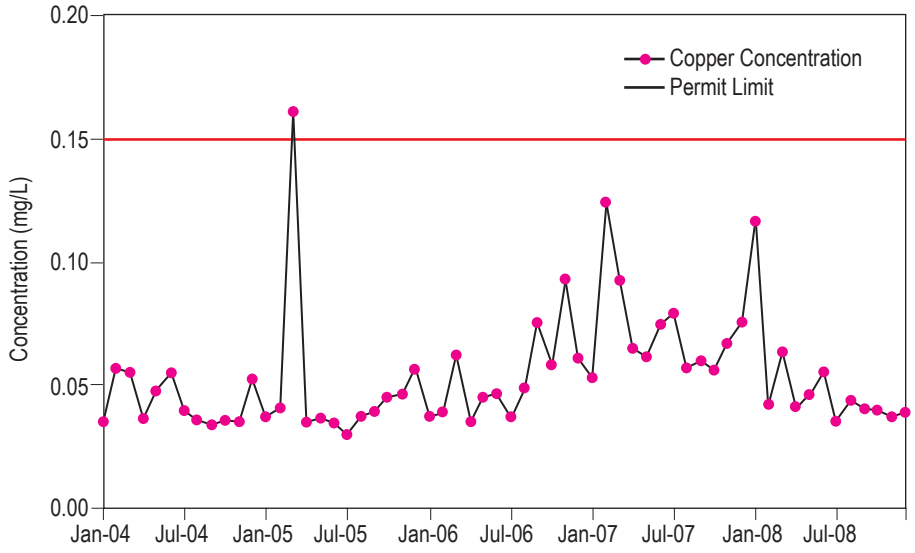


Figure 3-1. Maximum Concentrations of Copper Discharged from the BNL Sewage Treatment Plant, 2004–2008.

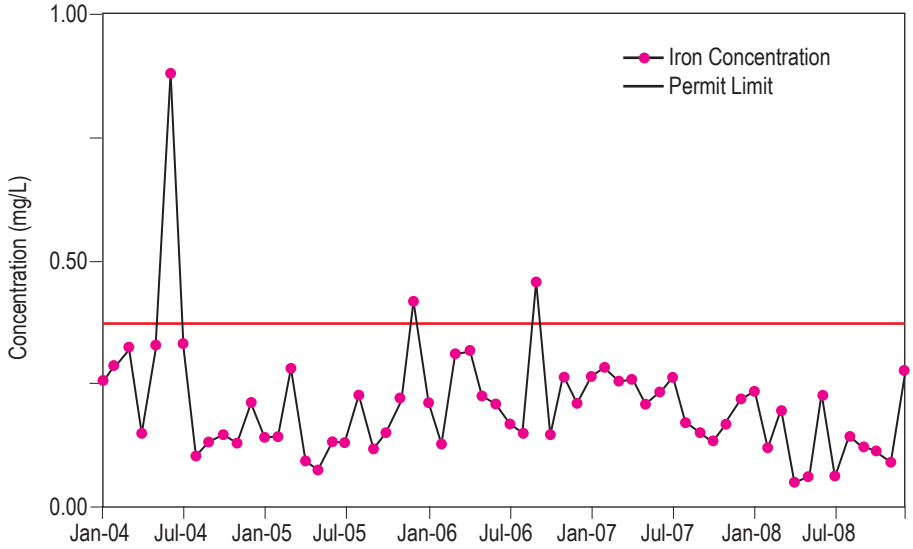


Figure 3-2. Maximum Concentrations of Iron Discharged from the BNL Sewage Treatment Plant, 2004–2008.

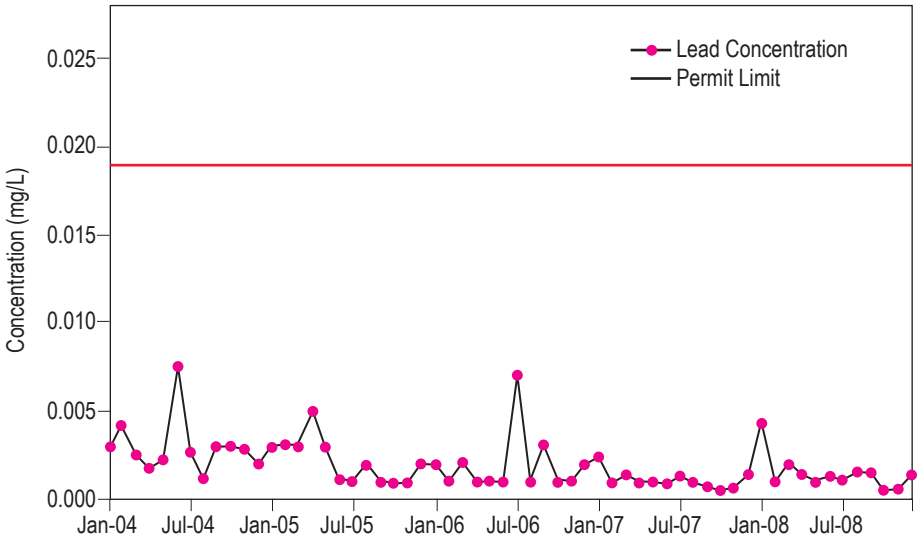


Figure 3-3. Maximum Concentrations of Lead Discharged from the BNL Sewage Treatment Plant, 2004–2008.

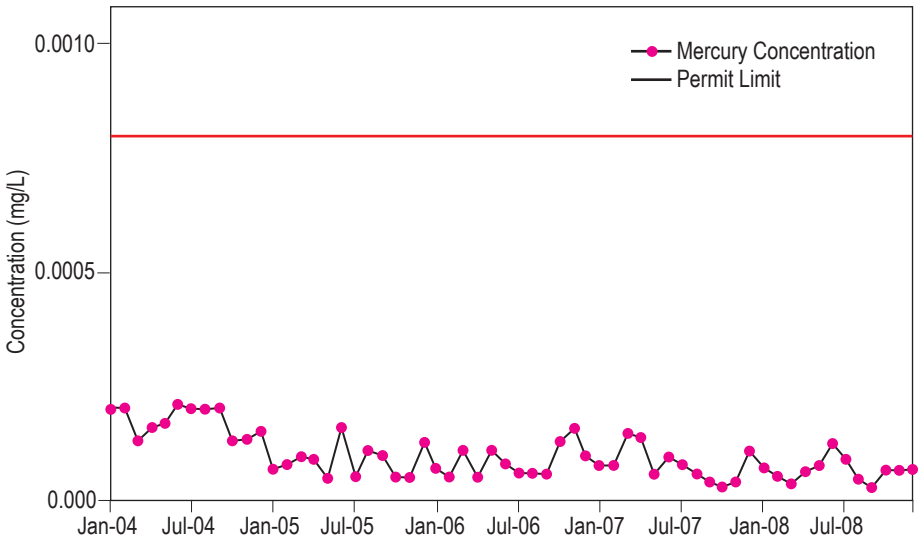


Figure 3-4. Maximum Concentrations of Mercury Discharged from the BNL Sewage Treatment Plant, 2004–2008.

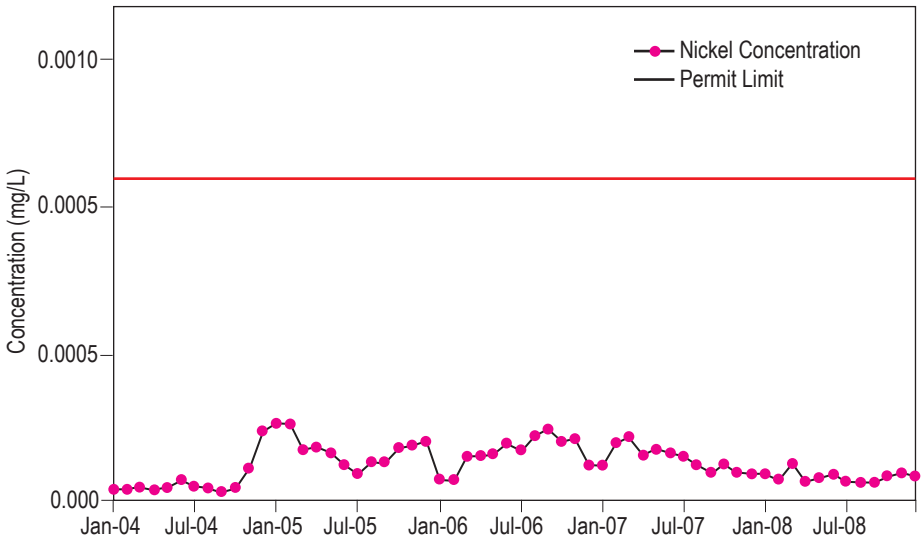


Figure 3-5. Maximum Concentrations of Nickel Discharged from the BNL Sewage Treatment Plant, 2004–2008.

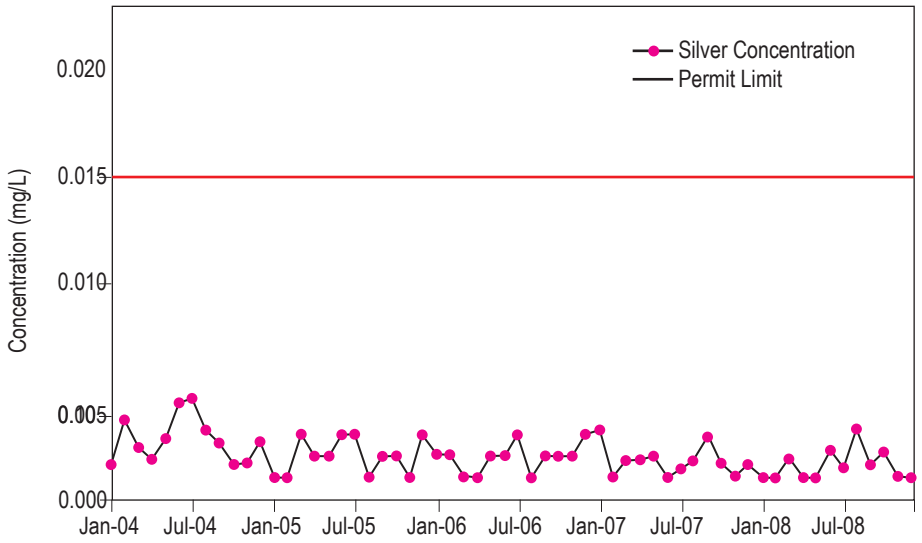
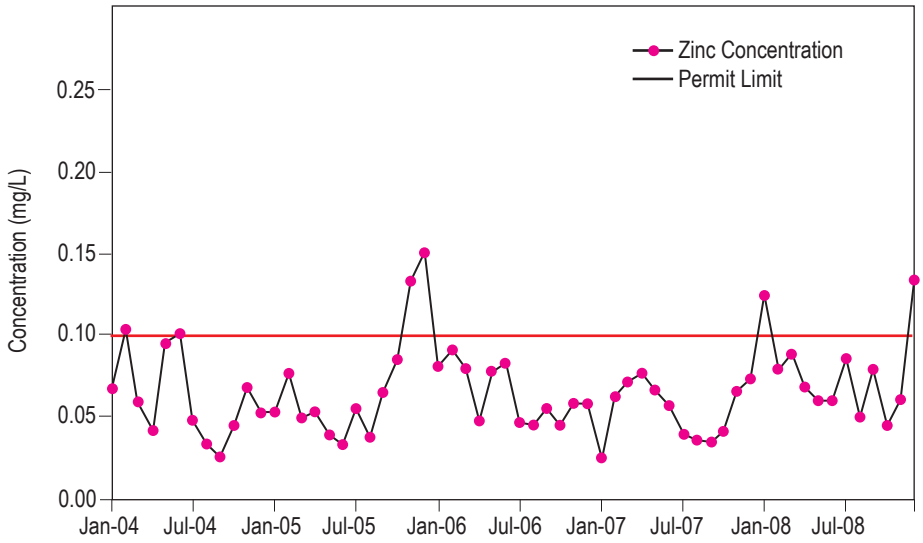


Figure 3-6. Maximum Concentrations of Silver Discharged from the BNL Sewage Treatment Plant, 2004–2008.



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, 2004–2008.

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	12	12			
	Min.	0.02	0.000	0.13	0.04	0.002	0.12	0.006	0.005	NA		
	Max.	106	0.08	0.52	0.23	0.47	0.36	5.1	2.1	NA	NA	NA
pH (SU)	*Min.*	6.2	6.2	6.7	7	6.6	6.6	6.9	6.4	NA		
	Max.	8.3	9.3	8.3	8.1	8.3	8.8	8.4	8.4	8.5, 9.0 (a)	1	99
Oil and grease (mg/L)	*N*	12	12	12	12	12	NR	12	12			
	Min.	< 1.3	< 1.4	1.7	< 1.4	< 1.4	NR	< 1.4	< 1.4	NA		
	Max.	5.1	4.6	5.6	4.7	5.3	NR	5	3.8	15	0	100
Copper (mg/L)	*N*	NR	NR	4	NR	NR	NR	NR	3			
	Min.	NR	NR	<0.003 (T)	NR	NR	NR	NR	< 0.003 (D)	NA		
	Max.	NR	NR	0.004	NR	NR	NR	NR	0.008 (D)	1.0	0	100
Aluminum (mg/L)	*N*	4	NR	NR	NR	NR	NR	4	4			
	Min.	< 0.07 (T)	NR	NR	NR	NR	NR	< 0.07 (D)	< 0.07 (D)	NA		
	Max	0.07	NR	NR	NR	NR	NR	1.4 (D)	0.2 (D)	2.0	0	100
Lead, Dissolved (mg/L)	*N*	NR	NR	NR	NR	NR	NR	NR	4			
	Min.	NR	NR	NR	NR	NR	NR	NR	< 0.0005	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.001	0.05	0	100
Vanadium, Dissolved (mg/L)	*N*	NR	NR	NR	NR	NR	NR	NR	4			
	Min.	NR	NR	NR	NR	NR	NR	NR	< 0.001	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.006	NPL	NA	NA
Chloroform (mg/L)	*N*	4	NR	NR	NR	NR	NR	NR	NR			
	Min.	0.3	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	1.3	NR	NR	NR	NR	NR	NR	NR	7	0	100
Bromodichloromethane (mg/L)	*N*	4	NR	NR	NR	NR	NR	NR	NR			
	Min.	0.4	NR	NR	NR	NR	NR	NR	NR	NA		
	Max.	1.6	NR	NR	NR	NR	NR	NR	NR	5	0	100
1,1,1-trichloroethane (mg/L)	*N*	4	NR	NR	NR	NR	NR	12	NR			
	Min.	< 1.0	NR	NR	NR	NR	NR	< 1.0	NR	NA		
	Max.	< 1.0	NR	NR	NR	NR	NR	< 1.0	NR	5	0	100

(continued on next page)

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

Analyte		Outfall 002	Outfall 002B	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Compliance*
1,1-dicloroethylene (µg/L)	*N*	NR	NR	NR	NR	NR	NR	12	NR			
	Min.	NR	NR	NR	NR	NR	NR	< 1.0	NR	NA		
	Max.	NR	NR	NR	NR	NR	NR	< 1.0	NR	5	0	100
Hydroxyethylidene-diphosphonic acid (mg/L)	*N*	4	4	4	4	4	NR	NR	NR			
	Min.	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	NR	NR	NA		
	Max.	< 0.05	< 0.05	< 0.05	< 0.05	0.3	NR	NR	NR	0.5	0	100
Tolyltriazole (mg/L)	*N*	4	4	4	4	4	NR	NR	NR			
	Min.	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NR	NR	NR	NA		
	Max.	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NR	NR	NR	0.2	0	100

Notes:
See Chapter 5, Figure 5-6, for location of outfalls.
There are no monitoring requirements for Outfalls 009, 011, and 012.
* % Compliance = total no. samples – total no. exceedances/total no. of samples x 100
CR = Continuous Recorder
D = Dissolved
MGD = Million Gallons per Day
Max. = Maximum value
Min. = Minimum value
N = Number of samples
NA = Not Applicable
NPL = No permit limit, monitoring only
NR = Analysis Not Required
SU = Standard Unit
T = Total Recoverable
(a) pH limit is 8.5 for Outfalls 005, 008, and 010 and pH limit is 9.0 for Outfalls 002, 002B, 006A, 006B, and 007. There was a single pH excursion at Outfall 002B in August 2008.

with activated carbon or air stripping to remove volatile organic compounds (VOCs). At the point of consumption, drinking water complied with all NYSDWS during 2008. Chapter 7 provides additional data on environmental surveillance tests performed on potable wells. This additional testing goes beyond the minimum SDWA testing requirements.

Several events occurred in 2008 that impacted BNL's potable water system. Review of several years of monitoring data showed that organic contaminant levels in Wells 10, 11, and 12 had dropped to levels far below the NYS DWS and in most instances have been non-detectable. In 2007, BNL petitioned SCDHS to remove the activated carbon adsorption vessels from service at these three wells. The request was approved in 2007 and by September 2008 all carbon vessels were emptied and the vessels by-passed. On October 13, 2008, potable well 12 became inoperable due to a propane explosion that destroyed the structure housing the well drive and controls. 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, which occurred at 2135 hours; consequently, there were no injuries. Environmental impacts from the explosion were negligible.

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 it 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
Water Quality Indicators								
Ammonia (mg/L)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	SNS
Chlorides (mg/L)	33.1	15.2	28.7	34	48.1	30.2	31.7	250
Color (units)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	15
Conductivity (μmhos/cm)	191	125	153	186	232	182	226	SNS
Cyanide (μg/L)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	SNS
MBAS (mg/L)	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	SNS
Nitrates (mg/L)	0.3	< 0.10	0.28	0.59	0.72	0.64	0.27	10
Nitrites (mg/L)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.0
Odor (units)	0	0	0	0	0	0	0	3
pH (Standard Units)	5.6	5.6	5.7	5.7	5.6	5.7	6.2	SNS
Sulfates (mg/L)	9.1	9.1	11	7.6	11.2	13.6	10.5	250
Total coliform	ND	ND	ND	ND	ND	ND	1***	Negative
Metals								
Antimony (μg/L)	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90	< 5.90	6.0
Arsenic (μg/L)	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	50
Barium (mg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2.0
Beryllium (μg/L)	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	4.0
Cadmium (μg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0
Chromium (mg/L)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.1
Fluoride (mg/L)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.2
Iron (mg/L)	1.2*	2.7*	2.3*	0.029	0.018	0.086	0.17	0.3
Lead (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	15
Manganese (mg/L)	0.22	0.17	0.07	< 0.010	< 0.010	< 0.010	0.04	0.3
Mercury (μg/L)	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	2.0
Nickel (mg/L)	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	< 0.040	SNS
Selenium (μg/L)	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	50.0
Sodium (mg/L)	19.3	10.1	17.8	17	25.5	18.7	18.8	SNS
Silver (μg/L)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	100
Thallium (μg/L)	< 1.90	< 1.90	< 1.90	< 1.90	< 1.90	< 1.90	< 1.90	2.0
Zinc (mg/L)	< 0.020	0.035	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	5.0
Radioactivity								
Gross alpha activity (pCi/L)	< 1.88	< 1.86	< 1.95	< 1.96	1.95 ± 1.44	< 1.96	NR	15.0
Gross beta activity (pCi/L)	< 2.18	< 2.25	< 2.09	< 2.62	< 2.12	2.85 ± 0.85	NR	(a)
Radium-228 (pCi/L)	< 0.83	1.78	1.75	1.24	0.99	0.92	NR	5.0
Strontium-90 (pCi/L)	< 0.71	< 0.81	< 0.78	< 0.50	< 0.89	< 0.73	NR	8.0
Tritium (pCi/L)	< 310	< 310	< 310	< 310	< 310	< 320	NR	20,000

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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
Other								
Alkalinity (mg/L)	11.8	8.9	14	23.3	18.8	19.2	28.1	SNS
Asbestos (M. fibers/L)	NR	NR	NR	NR	NR	NR	< 0.20	7
Calcium (mg/L)	6.3	4	5.4	9.3	7	7.6	10.4	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	0.02	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 can not 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.

The Laboratory maintains approximately 200 cross-connection control devices at interfaces to the potable water main, and secondary control devices at the point of use. In 2008, 213 cross-connection control units were tested at BNL, including primary and secondary devices. If a problem with a cross-connection device is encountered during testing, the device is repaired and retested to ensure proper function. Copies of the cross-connection device test reports are filed with SCDHS 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 2008, four storm water drywells were proposed for closure: three near Building T-100 and one near Building 423. All drywells were tested and found to meet Suffolk County Action Levels for contaminants in soils. Only the drywell at 423 was permanently closed in 2008. The drywells at T-100 will be closed in early 2009 as part of the site preparation for the construction of the National Synchrotron Light Source II.

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	< 0.5	5
Chloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Vinyl Chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2
Bromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Trichlorofluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Methylene Chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
trans-1,2-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
cis-1,2-dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
2,2-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Bromochloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,1-trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Carbon Tetrachloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Trichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Dibromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
trans-1,3-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
cis-1,3-dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,2-trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3-dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,1,2-tetrachloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Bromobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,3-trichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
2-chlorotoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-chlorotoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,4-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2-dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,4-trichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Hexachlorobutadiene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Tetrachloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,3-trichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
	µg/L							
Benzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Toluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Ethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
m,p-xylene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
o-xylene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Styrene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Isopropylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-propylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,3,5-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
tert-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
1,2,4-trimethylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
sec-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
4-Isopropyltoluene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
n-butylbenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
Chloroform	2	2	1.1	0.8	0.6	< 0.5	< 0.5	50
Bromodichloromethane	2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Dibromochloromethane	2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Bromoform	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Methyl tert-butyl ether	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	50
Lindane	NR	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.2
Heptachlor	NR	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.4
Aldrin	NR	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	5
Heptachlor Epoxide	NR	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	0.2
Dieldrin	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	5
Endrin	NR	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.2
Methoxychlor	NR	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	40
Toxaphene	NR	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	3
Chlordane	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2
Total PCB's	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5
2,4,5,-TP (Silvex)	NR	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	10
Dinoseb	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	50
Dalapon	NR	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	50
Picloram	NR	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	50
Dicamba	NR	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	50
Pentachlorophenol	NR	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	1
Hexachlorocyclopentadiene	NR	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	5
Bis(2-ethylhexyl)Phthalate	NR	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	50
Bis(2-ethylhexyl)Adipate	NR	< 1	< 1	< 1	< 1	< 1	< 1	50

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
	µg/L							
Hexachlorobenzene	NR	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	5
Benzo(A)Pyrene	NR	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	50
Aldicarb Sulfone	NR	< 1	< 1	< 1	< 1	< 1	< 1	SNS
Aldicarb Sulfoxide	NR	< 1	< 1	< 1	< 1	< 1	< 1	SNS
Aldicarb	NR	< 1	< 1	< 1	< 1	< 1	< 1	SNS
Oxamyl	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
3-Hydroxycarbofuran	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
Carbofuran	NR	< 1	< 1	< 1	< 1	< 1	< 1	40
Carbaryl	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
Methomyl	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
Glyphosate	NR	< 10	< 10	< 10	< 10	< 10	< 10	50
Diquat	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
1,2-dibromoethane (EDB)	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05
1,2-dibromo-3-chloropropane	NR	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.2
2,4,-D	NR	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	50
Alachlor	NR	< 1	< 1	< 1	< 1	< 1	< 1	2
Simazine	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Atrazine	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	3
Metolachlor	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
Metribuzin	NR	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	50
Butachlor	NR	< 1	< 1	< 1	< 1	< 1	< 1	50
Endothall	NR	< 50	< 50	< 50	< 50	< 50	< 50	100
Propachlor	NR	< 1	< 1	< 1	< 1	< 1	< 1	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

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 are 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 2008.

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 December 2008, the proposed deadline for updating and implementing BNL's SPCC plan was once again extended by EPA, this time to November 2009. Although the Laboratory has recently updated its SPCC Plan ahead of schedule, the plan will be reviewed again prior to the November 2009 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. In October 2005, EPA reviewed the Laboratory's FRP and responded with numerous comments. The revised FRP was approved by EPA in September 2006. Updates to the plan were published in 2007 to ensure all telephone notification lists remained current. In March 2008, EPA conducted an unannounced government-initiated oil spill response exercise and a field inspection at BNL. 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 the Laboratory's response procedures were effective and satisfactorily addressed the requirements of the FRP regulation (40 CFR Part 112). BNL 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. Table 3-1 summarizes the applicability of the regulations to BNL. The Laboratory complied with these requirements in 2008 through the submittal of reports under EPCRA Sections 302, 303, 311, and 312. In 2008, through the Tier III report, BNL reported releases of lead (~21,075 pounds), mercury (~118 pounds), PCBs (~5 pounds),

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

benzo(g,h,i)perylene (<1 pound), and polycyclic aromatic compounds (<1 pound). Releases of lead, PCBs, and mercury were predominantly in the form of shipments of waste for off-site recycling or disposal. Releases of benzo(g,h,i)perylene and polycyclic aromatic compounds were as byproducts of the combustion of fuel oils. In 2008, there were no releases of "extremely hazardous substances" reportable under Part 304.

3.8.3 Spills and Releases

When a spill of hazardous material occurs, Laboratory and contractor personnel are required to immediately notify the on-site Fire Rescue Group, whose members are trained to respond to such releases. Fire Rescue's initial response is to contain and control any release and to notify additional response personnel (i.e., BNL environmental professionals, industrial hygienists, etc.). Environmental professionals reporting to the scene assess the spill for environmental impact and determine if it is reportable to regulatory agencies. Any release of petroleum products to soil must be reported to both NYSDEC and SCDHS, and any release affecting surface water is also reported to the EPA National Response Center. In addition, a release of more than 5 gallons of petroleum product to impermeable surfaces or containment areas must be reported to NYSDEC and SCDHS. Spills of chemicals in quantities greater than the CERCLA-reportable limits must be reported to the EPA National Response Center, NYSDEC, and SCDHS. Remediation of the spill is conducted, as necessary, to prevent impacts to the environment, minimize human health exposures, and restore the site.

During 2008, there were 22 spills, nine of which met regulatory agency reporting criteria. The remaining 13 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 nine reportable events, including a description of the cause and corrective actions taken. Each of the events was unique. There were no long-term effects from these releases and no significant impact on the environment. Five of the events were 5 gallons or less in volume, three ranged from 10 to 15 gallons, and one was the release of 70 gallons of heat transfer fluid that was contained within the facility. In all instances, any recoverable material was pumped out of the secondary containment, then spill absorbents were used to remove residual product. All contaminated absorbents and impacted soils were containerized for off-site disposal. Three of the events were also reportable through the DOE Occurrence Reporting and Processing System (ORPS), a system for identifying, categorizing, notifying, investigating, analyzing, and reporting to DOE events or conditions discovered on site. In addition, there were three other incidents reportable through ORPS in 2008 that were environmental in nature. These included the mischaracterization of wastes shipped to the Waste Management Facility, the issuance of a Notice of Violation for deficiencies identified during the 2008 NYSDEC annual waste inspection, and the finding of loose radioactive material (Naturally Occurring Uranium Oxide) in a sink in Building 490A. A description of each event is provided in Table 3-8.

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 2008, BNL remained in full compliance with the MPF license requirements, which include monitoring groundwater in the vicinity of six active aboveground storage tanks. The license also requires BNL 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 2008, no VOCs, SVOCs, or floating products attributable to MPF activities were detected. See SER Volume II, Groundwater Status Report, for

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

Spill No. and Date	Material and Quantity	ORPS Report	Source/Cause and Corrective Actions
08-01 01/16/08	Gasoline 1 quart	No	An abandoned pump inside a plastic tray was found in a remote area of the site. There was evidence of spillage to the soil around the tray. Approximately 50 pounds of soil was removed from the area and containerized for off-site disposal.
08-02 01/28/08	Heat Transfer Oil 70 gallons	No	A helium compressor failed in Building 902C, resulting in spillage of heat exchange fluid to the containment area under the compressor and building floor. All spilled oil was contained within the building. Free liquids were recovered using pumps and absorbents. The remaining oil was recovered using speedy dry. All waste materials were containerized for off-site disposal.
08-04 04/28/08	Power Steering Fluid 1 quart	No	While performing work at the composting area, the power steering unit in a backhoe started to leak. A containment tray was placed beneath the unit immediately upon discovery; however, some fluid was spilled onto the soil. The impacted soil was removed for off-site disposal.
08-06 06/11/08	Hydraulic Fluid 13 gallons	Yes	A street sweeper developed a hydraulic leak while sweeping Upton Road. Upon discovery, the unit was secured to prevent further leakage. The release impacted approximately 200 feet of road surface. Speedy dry was used to absorb the oil. The sweeper was transferred to the repair shop and impacted soils and speedy dry were collected and containerized for off-site disposal.
08-13 09/12/08	Motor Oil 5 gallons	No	A BNL vehicle was being pushed to the gasoline refueling station after running out of gas. While turning to enter the driveway to the station, an unsecured 5-gallon container of motor oil fell out of the vehicle from behind the driver's seat. The container ruptured upon impact with the road. The container belonged to a BNL employee who was transporting it to the on-site service station for disposal. Impacted soils were cleaned up and speedy dry was used to absorb residual oil from the pavement. The impacted soil was containerized for off-site disposal.
08-14 10/06/08	Motor Oil/Hydraulic Oil Mixture 10 gallons	Yes	While mowing the lawn near Building 703, the lawn mower tipped on its side due to the angle of the hill being mowed. Motor oil and hydraulic oil leaked from the vehicle as it lied on its side. All oil was contained on asphalt, but was reportable due to the volume released. The spilled oil was absorbed with speedy dry and containerized for off-site disposal. There were no injuries resulting from this event.
08-15 10/13/08	Ethylene Glycol 1 gallon	No	The radiator hose on a dump truck failed, resulting in the release of 1 gallon of coolant to soil and asphalt. Spill absorbents were used to remove residual liquid. All impacted soils and spill absorbents were collected and containerized for off-site disposal.
08-16 10/13/08	Sodium Hydroxide 1 - 2 gallons	Yes	During the late evening of October 13, 2008 a propane explosion occurred resulting in the demolition of Building 637, Potable Well House 12. The falling debris caused extensive damage to the sodium hydroxide storage tank. Initial inspection of the tank revealed that the site gauge, which was constructed of Tygon tubing, broke away from the tank and complete loss of all product was suspected. Once the debris field was cleared, inspection of the tank showed that the site gauge pinched back on itself, restricting loss of hydroxide to a couple of gallons or less. All spilled product was contained by the tank's secondary containment, and there was no environmental release.
08-21 12/09/08	Hydraulic Oil 15 gallons	No	Hydraulic oil leaked from the elevator casing at Building 750. Upon inspection, the rubber hydraulic seal and fiber gasket were found to be faulty and were replaced. Approximately 15 gallons of oil were recovered from the elevator pit. Residual oil was cleaned using absorbents. All oil and absorbents were containerized for off-site disposal.

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

additional information on groundwater monitoring results.

In January 2008, NYSDEC approved engineering plans for a complete upgrade of the secondary containment basin for tanks 5 and 6. Construction was completed in June 2008 and a Certification Report was prepared by Dvirka & Bartillucci and submitted to NYSDEC in September 2008, documenting all of the corrective actions taken to reconstruct the containment basis for tanks 5 and 6. Based on a review of the report, NYSDEC determined that the secondary

Table 3-8. Summary of Other Environmental Occurrence Reports.

ORPS* ID: SC-BHSO-BNL-BNL-2008-0002 A 0.25 microcurie cesium-137 source was found packaged in a container of waste scintillation vials and fluid containing tritium. This was a violation of requirements to separate sources from other waste types. The researcher responsible for the incident has been retrained, and all future wastes generated reviewed for compliance with hazardous and radioactive waste requirements.	**Date:** 01/03/08 **Status:** Closed. All corrective actions have been completed.
ORPS ID: SC-BHSO-BNL-PE-2008-0001 While performing routine street sweeping, a 1999 Tenant Street Sweeper ruptured a hydraulic control line resulting in the release of 13 gallons of hydraulic fluid to the street. The release was immediately cleaned up and the sweeper was repaired.	**Date:** 06/11/08 **Status:** Closed. All corrective actions have been completed.
ORPS* ID: SC-BHSO-BNL-BNL-2008-0012 While mowing a small hillside near Building 911, a mower slowly rolled onto its side due to the steepness of the incline. There were no injuries. Oils (motor and hydraulic) leaked from the mower onto the pavement. The release was cleaned up to the satisfaction of the regulatory agency.	**Date:** 10/26/08 **Status:** Closed. All corrective actions have been completed.
ORPS* ID: SC-BHSO-BNL-BNL-2008-0013 On October 13, a propane explosion occurred at BNL resulting in the demolition of Building 637, Potable Well House 12. Investigation of the incident found that a propane solenoid valve was accidentally energized during maintenance at the end of the work day. Propane accumulated in the building until explosive levels accumulated within a motor control center. The propane was ignited by a relay or other electrical component within that control center. A small quantity of sodium hydroxide was released during the event. Environmental impacts of this event were negligible and there were no injuries.	**Date:** 10/13/08 **Status:** Open. Investigation into the extent of cause is ongoing.
ORPS* ID: SC-BHSO-BNL-BNL-2008-0015 The New York State Department of Environmental Conservation issued a Notice of Violation (NOV) for inadequate labeling of three waste containers discovered during the 2008 annual Resource Conservation and Recovery Act compliance inspection. All violations were immediately corrected and the NOV acknowledged that all violations had been addressed to their satisfaction subsequent to the inspection.	**Date:** 11/13/08 **Status:** Closed. All corrective actions have been completed.
ORPS ID: SC-BHSO-BNL-BNL-2008-0016 During a routine radiological survey of Lab 12-110 in Building 490A, loose contamination was discovered in one of the laboratory sinks. The incident was investigated, and it was determined that the material was naturally occurring uranium oxide used in experiments by students during the summer. Evaluation of down- stream manholes showed no impact by this material, indicating that it was contained to the sink and sink trap.	**Date:** 11/19/08 **Status:** Closed. All corrective actions have been completed.

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

containment system met the regulatory requirements of 6NYCRR Part 613.2(c)(6) and Special Conditions 3(d) and (e) of BNL's Major Oil Storage Facility License and that it could be placed back in service.

In November, NYSDEC conducted its annual inspection of the Major Oil Storage Facility. Three conditions that required corrective action were identified: repair of a malfunctioning alarm system associated with the #2 fuel oil pipeline secondary containment leak detection system, inspection and repair of a product pipe stanchion that had settled and was not providing the necessary structural support, 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 three conditions that required corrective action. They included reapplication of the proper color coding for an underground storage tank containing gasoline, addressing deficiencies associated with a satellite #2 fuel oil tank servicing Building 630, and modifying the generic BNL tank identification label to include both the design and working capacities of each tank. Most conditions were corrected in accordance with NYSDEC directives prior to the end of calendar year 2008. With NYSDEC approval, the remaining conditions will be addressed in 2009.

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 November 2008, BNL modified its Chemical Bulk Storage Registration to account for two tank closures. A 750 gallon gallium trichloride tank formerly required in physics experiments was successfully pumped out and removed from the site. In addition, due to an incident in Well House #12 (see Section 3.7.1 for details), the 1,200 gallon sodium hydroxide tank was emptied and will be permanently removed.

NYSDEC also conducted an inspection of the Chemical Bulk Storage (CBS) facilities in November 2008. During this inspection, one issue was identified that required corrective action: modifying the generic BNL tank identification label to include both the design and working capacities of each tank registered under the CBS program. This issue was corrected in accordance with the NYSDEC directive.

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 351 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 32 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 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 2008, 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 five existing registered storage facilities. In addition, the design plans and specifications for two new diesel generator tank systems at Buildings 515 and 912A were approved and construction was completed. Both systems were designed and constructed to fully conform to SCSC Article 12 requirements for aboveground storage.

In April 2008, the last single-walled underground storage tank (UST) was removed from the ground and sent off site for recycling. The tank, a 3,000-gallon diesel fuel oil tank, was in good condition and never leaked; however, it did not meet the stringent codes for underground storage in Suffolk County. The Laboratory has been upgrading tanks for more than three decades and has removed approximately 65 USTs and spent well over $30 million to bring storage tanks into conformance with the Suffolk County Article 12 standard. Currently, BNL maintains 55 petroleum product storage tanks subject to the requirements, which call for secondary containment, leak detection, and other safety systems to protect the environment.

3.9 RCRA REQUIREMENTS

The Resource Conservation and Recovery Act regulates hazardous wastes that, if mismanaged, could present risks to human health or the environment. The regulations are designed to ensure that hazardous wastes are managed from the point of generation to final disposal. In New York State, EPA delegates the RCRA program to NYSDEC, with EPA retaining an oversight role. Because the Laboratory may generate greater than 1,000 Kg (2,200 pounds) of hazardous waste in a month, it is considered a large-quantity generator and has a RCRA permit to store hazardous wastes for up to one year before shipping the wastes off site to licensed treatment and disposal facilities. As noted in Chapter 2, BNL also has a number of satellite accumulation and 90-day waste storage areas.

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. One item was identified in the 2008 plan which required storage beyond the one-year storage limitation due to treatment facility availability. This item has been approved for shipment to DOE's Toxic Substance and Control Act (TSCA) Incinerator in Oak Ridge, Tennessee and will be treated in April 2009. The Laboratory anticipates that it will continue to manage future mixed wastes within the permitted one-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 2008.

The Laboratory has aggressively approached reductions in its PCB inventory. By replacing and disposing of the last large capacitor and over 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.

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 2008.

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 2008, two projects remained permitted under this program. These projects included the installation of air conditioning for instrument houses at multiple locations at the Relativistic Heavy Ion Collider (RHIC), and the construction of a block house at the 4 o'clock area at RHIC. Installation of the air conditioning units was substantially complete at the end of 2008; consequently, close-out documentation for this project will be completed and submitted during the first half of 2009. Work to install the block house will continue through 2009.

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 was begun 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; maintaining adequate flow to the river to enable the fish to survive drought; 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 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 over 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. 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 2008, BNL was inspected by federal, state, or local regulators on 11 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*. While NYSDEC did not conduct a formal inspection of the Laboratory's air compliance program, the agency was present during the annual Relative

Accuracy Test Audit (RATA). During the RATA, the monitoring equipment at the CSF is evaluated by a contracted testing firm to ensure the equipment is operating as required to document compliance with permit-required monitoring requirements. During the audit, NYSDEC found all conditions satisfactory and all equipment tested satisfactorily.

- *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 2008, no performance or operational issues were identified. In November, NYSDEC also inspected the STP and other SPDES regulated outfalls; no issues were identified.
- *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 November. 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 November (see Section 3.8.5).
- *Hazardous Waste.* NYSDEC performed its annual inspection of the BNL Hazardous Waste Program in September 2008. During this inspection, three instances of waste labeling were identified that did not fully comply with hazardous waste storage requirements. These included two bottles of waste that were not labeled as "Hazardous Waste" and one container of mercury switches that did not have the accumulation start date noted on the label. All items were corrected immediately upon their identification and documented in e-mail correspondence to NYSDEC on September 29, 2008. On November 13, 2008 NYSDEC issued a Notice of Violation for the three items identified above. In the letter, NYSDEC acknowledged that all violations were corrected subsequent to the inspection. For a point of reference, during the inspection approximately eighteen 90-day and 135 satellite accumulation areas, including the Treatment, Storage, and Disposal Facility storage area, were inspected and contained approximately 600 containers of waste.

3.14.2 DOE Assessments/Inspections

In 2008, the Laboratory underwent several reviews by DOE, most notably an assessment of BNL's implementation of its emergency management program by the Office of Emergency Management. That evaluation noted significant improvement in the Laboratory's emergency management program, compared with an audit conducted in 2004. Several areas for improvement were identified and a corrective action plan was prepared to continue improvements in the program.

In April 2008, the DOE Brookhaven Site Office (BHSO), in coordination with the DOE Chicago Support Center, conducted a mercury assessment of the site. This assessment focused on efforts to minimize mercury in effluents and emissions and to reduce the on-site inventory of mercury-bearing devices and chemicals. Overall, the assessment found mercury management to be satisfactory, with two recommendations for improvement: reduction of mercury in a lab in Building 815 and frequent monitoring and reporting of pH in the sludge digester at the STP. Both recommendations were addressed immediately after the assessment.

From October 2007 through March 2008, BHSO conducted an assessment of the management of the radiological inventory at the Waste Management Facility. There were two findings identified during this assessment and three noteworthy practices. Corrective actions have been implemented to address accuracy in the waste inventory and modification to personnel protective equipment for performing radiological work. All corrective actions are complete.

In August 2008, BHSO coordinated with the Chicago Operations Support Center to perform a review of long-term monitoring and surveillance activities established for the Peconic

Table 3-9. 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 2008.
Notices of Violation/Enforcement Actions				
None	NYSDEC Notice of Violation – RCRA Annual Inspection	NYSDEC	11/13/2008	During the NYSDEC annual RCRA compliance inspection, three instances of waste labeling were identified that did not fully comply with hazardous waste storage requirements. These included two bottles of waste that were not labeled as "Hazardous Waste" and one container of mercury switches that did not have the accumulation start date noted on the label. All items were corrected immediately upon their identification and documented in e-mail correspondence on 09/29/08. On 11/13/08, NYSDEC issued a Notice of Violation for the three items identified above. In the letter, the NYSDEC acknowledged that all violations were corrected subsequent to the inspection.

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

River. This assessment found the long-term stewardship to be effective and recommended two improvements: interpret data presented in the annual report, and evaluate the need to maintain or remove the sediment trap installed at the site boundary. Both recommendations are being addressed through routine discussions with the regulators and through modifications to routine reports.

3.14.2.1 Environmental Multi-Topic Assessment

In 2008, BNL conducted a programmatic self-assessment on several aspects of the environmental management program. Determination of topics for this assessment was 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 maintaining institutional and engineered controls for known or potentially contaminated areas of the site, accurately collecting and analyzing groundwater surveillance samples, and maintaining and retrieving environmental surveillance data.

During the self-assessment, no nonconformance or noncompliance issues were identified. The assessment did identify a total of six observations, seven noteworthy practices, and 15 opportunities for improvement. The six observations included:

- Formal procedures for properly maintaining the Land Use Institutional Controls web site had not been established.
- Documentation of contaminated purge water treatment during some groundwater sampling activities was inconsistent.
- A formal tracking system for the comple-

tion of semiannual cap inspections at the Brookhaven Linac Isotope Producer is needed.
- The Collider-Accelerator Department's cap maintenance verification process needs to be modified to ensure that identified repairs/maintenance items are completed in a timely manner.
- The Environmental Management Information System Data Management Description needs to be updated to reflect current operations.
- A standard operating procedure for the Environmental Information Management System's ingest process is needed.

Corrective actions for the observations are being tracked to closure using BNL's Institutional Assessment Tracking System. The completion of the Opportunities for Improvement will be tracked using BNL's Facility Assessment Tracking System.

3.14.2.2 Nevada Test Site Inspection

BNL continues to be a certified Nevada Test Site (NTS) waste generator. As part of the NTS waste certification process, random unannounced inspections are conducted by the NTS Maintenance and Operations Contractor. There were no NTS inspections in 2008.

3.15 ENFORCEMENT ACTIONS AND AGREEMENTS

A Notice of Violation was issued by NYSDEC for deficiencies identified during the 2008 annual hazardous waste inspection. The Notice of Violation has been added to the list of agreements and enforcement actions listed in Table 3-9. There were no fines or other penalties issued as a result of this Notice of Violation, since all corrective actions were completed immediately upon identification.

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