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; equivalency permits for operation of nine groundwater remediation systems; and several other binding agreements. In 2003, BNL operated in compliance with the majority of these requirements, and programs are in place to address areas for continued improvement. Routine inspections conducted during the year found no significant instances of noncompliance.

Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide were all within permit limits. Approximately 3,900 pounds of ozone-depleting refrigerants were recovered for recycling. Monitoring of the BNL potable water system showed that the potable water supply met all drinking water requirements. Groundwater monitoring at the Major Petroleum Facility continued to demonstrate that current oil storage and transfer operations are not affecting groundwater quality. During 2003, liquid effluents discharged to surface water and groundwater met all applicable New York State Pollutant Discharge Elimination System permit requirements with the exception of one excursion at the Sewage Treatment Plant and three at other outfalls. The four permit excursions were reported to the New York State Department of Environmental Conservation (NYSDEC).

Twenty-two reportable spills of petroleum products or antifreeze occurred on site in 2003. Twelve were petroleum releases less than 10 gallons, five were small-volume antifreeze spills, four were discovered during tank or elevator upgrades, and the last was a release of chilled water. All releases were cleaned up or addressed to the satisfaction of NYSDEC.

BNL underwent nine environmental audits by external regulatory agencies in 2003. These audits included inspections of petroleum storage, air emissions from the Central Steam Facility, Sewage Treatment Plant operations, other regulated outfalls and recharge basins, and the potable water system. Immediate corrective actions were taken to address all issues raised during these inspections. NYSDEC did not conduct a Resource Conservation and Recovery Act audit in 2003. A Notice of Complaint for issues identified during the 2002 audit was received in January 2003. All corrective actions were completed before the end of the year.

3.1 COMPLIANCE WITH REQUIREMENTS

BNL is subject to more than 100 sets of federal, state, and local environmental regulations; several site-specific permits; 13 equivalency permits for the operation of nine groundwater remediation systems; and several other binding agreements. The federal, state, and local environmental statutes and regulations that BNL op-

erates under are summarized in Table 3-1, along with a discussion of BNL's compliance status with regard to each requirement. A complete listing of all environmental regulations is contained in Appendix E.

3.2 ENVIRONMENTAL PERMITS

3.2.1 Existing Permits

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

- State Pollutant Discharge Elimination System (SPDES) permit, issued by NYSDEC
- Major Petroleum Facility (MPF) license, issued by NYSDEC
- Resource Conservation and Recovery Act (RCRA) permit issued by NYSDEC for the Waste Management Facility (WMF)
- Registration certificate from NYSDEC for tanks storing bulk quantities of hazardous substances
- Seven radiological emission authorizations issued by 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 14 emissions units
- Five 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
- Thirteen equivalency permits for the operation of nine groundwater remediation systems installed under the Inter-Agency Agreement (Federal Facility Agreement under the Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] 120, Admin. Docket No. II-CERCLA-FFA-00201)

3.2.2 New or Modified Permits and Requests

3.2.2.1 State Pollutant Discharge Permits

The SPDES permit authorizes discharges from the BNL STP to the Peconic River, and discharges of cooling water and stormwater to recharge basins. In 2003, there were two requests for SPDES permit modifications. The first, submitted in June, sought to discontinue the monitoring of wastewater discharges from Building 498 (Central Shops Cleaning Facility) for the presence of volatile organic compounds (VOCs). The cleaning process used there removes mill scale and residual oils from machined parts using mild acid, alkaline, citrus-based cleanser, and ultrasonic agitation, followed by hot water rinses. The hot wastewater results in the formation of air bubbles in the sample collection vials used for subsequent VOC analyses. The presence of air in the vials nullifies the analytical results. Since organic compounds have never been detected in the discharge, the Laboratory requested that monitoring be terminated. The second permit modification requested filtration of stormwater samples prior to acid preservation, to remove suspended particulates (see Section 3.6.2).

3.2.2.2 Air Emissions Permits

Air emissions permits are granted by NYSDEC. Permits are issued either as "equivalency" permits for restoration projects conducted under CERCLA, or as changes to the BNL Title V operating permit, which was issued in January 2002 and subsequently amended in November 2002. During 2003, no CERCLA equivalency permits were issued and no changes were made to the BNL Title V operating permit.

The Title V permit consolidates all applicable federal and state requirements for BNL's regulated emission sources into a single document. BNL 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 BNL to comply with the applicable regulatory requirements.

3.2.2.3 Underground Injection Control Permit

Under the Safe Drinking Water Act (SDWA), BNL is required to maintain an Area Permit

for UIC wells (e.g., drywells, cesspools, and leaching pools). BNL received a final permit in January 2001. This permit authorizes the operation of 90 UICs, including 86 stormwater drywells and four small sanitary systems. Construction was completed on 12 new UIC devices in 2003. Applications for the installation of these devices were submitted to EPA in 2002. UICs also are used for the disposal of treated groundwater at many restoration facilities. In 2003, a formal registration program was initiated for UICs used in the restoration program. These devices are authorized by rule, as opposed to a permit, and an inventory of the devices is maintained with EPA. See Section 3.7.3 for more details.

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Reference 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 of inactive hazardous waste disposal sites.	In 1989, BNL was added to the National Priorities List. In 1992, BNL entered into a tri-party agreement among EPA, NYSDEC, and DOE. BNL site remediation is conducted by the Environmental Restoration Program in accordance with milestones established under this agreement.	2.3.4.8
Council for Env. Quality: 40 CFR 1500–1508 DOE: 10 CFR 1021	The **National Environmental Policy Act** (NEPA) requires federal agencies to follow a prescribed process to anticipate the impacts on the environment of proposed major federal actions and alternatives. DOE codified its implementation of NEPA in 10 CFR 1021.	BNL is in full compliance with NEPA requirements. The Laboratory has established sitewide procedures for implementing the NEPA requirements.	3.3
Advisory Council on Historic Preservation: 36 CFR 60 36 CFR 63 36 CFR 79 36 CFR 800 16 USC 470	The **National Historic Preservation Act** (NHPA) identifies, evaluates, and protects historic properties eligible for listing in the National Register of Historic Places, commonly known as the National Register. Such properties can be archeological sites or historic structures, documents, records, or objects. NHPA is administered by state historic preservation offices (SHPOs). In New York, that is the 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 High Flux Beam Reactor complex, Brookhaven Graphite Research Reactor complex, and World War I trenches have been determined to be eligible for inclusion in the National Register of Historic Places. Any activities involving these facilities are identified through the NEPA process and an evaluation is initiated to determine if the proposed action would impact features that extend eligibility to these facilities. Some activities associated with the decontamination and decommissioning of the BGRR were determined to impact its eligibility, and mitigative actions are proceeding according to a Memorandum of Agreement between DOE and NYSHPO. In December 2003, BNL submitted to DOE, a draft Cultural Resource Management Plan to ensure compliance with applicable cultural resource regulations.	3.4 6.9
U.S. Department of Interior 43 CFR 7	The **Archeological Resources Protection Act** (ARPA) protects archeological resources (remains of past human activities or lifestyles that are at least 100 years old) on federal lands. ARPA contains both enforcement (criminal and civil penalties for damage or looting) and permitting provisions.	Archeological permits have been issued to non-BNL sponsored organizations to conduct surveys in advance of a potential natural gas pipeline project.	3.4
EPA: 40 CFR 50-80* 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.	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 four excursions, these discharges met the SPDES permit limits in 2003.	3.6

(continued on next page)

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Reference Sections
EPA: 40 CFR 141–149 NYSDOH: 10 NYCRR 5	The **Safe Drinking Water Act** (SDWA) and New York State Department of Health 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.	BNL maintains a sitewide public water supply. This water supply met all drinking water standards as well as operational and maintenance requirements.	3.7
EPA: 40 CFR 112 40 CFR 300 40 CFR 302 40 CFR 355 40 CFR 370 40 CFR 372	The **Oil Pollution Act**, the **Emergency Planning & 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, BNL 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. The Suffolk County Department of Health and Safety (SCDHS) has safety codes (SCSC) that are more stringent than the 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 wastes and has a permitted waste management facility. While almost all wastes are handled and disposed in accordance with federal and state requirements, a 2002 audit identified several concerns, as documented in an NOV. These were immediately addressed by corrective actions.	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 New York 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. During 2003, five projects were permitted under New York State programs.	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.	Eight additional species on the NY list have been found at BNL, for a total of 37. In the "endangered" category are one insect, one amphibian, and one plant species. In the "threatened" category are one insect and two fish species. Of "special concern" are one insect, two amphibian, three plant, and four bird species. The remaining 16 species are vulnerable or rare plants. BNL's Natural Resource Management Plan outlines activities to protect species and protect their habitats (see Chapter 6).	3.13
DOE: Manual 231.1-1A and 231.1-2	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 these manuals are the requirements for the Occurrence Reporting and Processing of Operations Program, known as ORPS.	BNL prepares an annual Site Environmental Report and provides data for DOE to prepare annual NEPA summaries and other Safety, Fire Protection, and OSHA reports. BNL 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

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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 Reference Sections
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 public health and safety, workers, 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 radioactive wastes, both routine and nonroutine.	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. BNL'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 450.1	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.	BNL's EMS was officially registered to the ISO 14001:1996 standard in 2001. Annual audits to maintain certification were done in 2002 and 2003. Recertification is due in 2004. 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 BNL. It describes BNL's programs, including the SBMS, for accomplishing work safely and provides the road map of the systems and processes.	Chapter 2
DOE: Order 5400.5, Change 2	**The Radiation Protection of the Public and Environment Program** establishes standards and requirements for operations of DOE and DOE contractors to protect members of the public and the environment against undue risk from radiation.	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:
*Although there are gaps in the numbering, here the series are listed as continuous, to conserve space. For details, see Appendix E
ALARA = As Low As Reasonably Achievable
BGRR = Brookhaven Graphite Research Reactor
CAA = Clean Air Act
CERCLA = Comprehensive Environmental Response, Compensation, & Liability Act
CFR = Code of Federal Regulations
CWA = Clean Water Act
EMS = Emergency Management System
EPA = Environmental Protection Agency
EPCRA = Emergency Planning and Community Right-to-Know Act
ES&H = Environment, Safety, and Health
FIFRA = Federal Insecticide, Fungicide, and Rodenticide Act
HFBR = High Flux Beam Reactor
ISMS = Integrated Safety Management System
NEPA = National Environmental Policy Act
NESHAPs = National Emission Standards for Hazardous Air Pollutants
NYCRR = New York Codes, Rules, and Regulations
NYSDEC = New York State Department of Environmental Conservation
NYSDOH = New York State Department of Health
NYSHPO = New York State Historic Preservation Office
ORPS = Occurrence Reporting and Processing System
OSHA = Occupational Safety and Health Administration
RCRA = Resource Conservation and Recovery Act
RHIC = Relativistic Heavy Ion Collider
RWMB = Radioactive Waste Management Basis
SARA = Superfund Amendments and Reauthorization Act
SCDHS = Suffolk County Department of Health Services
SCSC = Suffolk County Sanitary Code
SDWA = Safe Drinking Water Act
SPDES = State Pollutant Discharge Elimination System
TSCS = Toxic Substances Control Act
WCPP = Waste Certification Program Plan

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	521	OU IV Air Sparge System	NA	31-Dec-03	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	NA	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	W. 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	NA	NA	NA
NYSDEC - SPDES Equivalency	670	Sr-90 Treatment System	None	NA	NA	NA
NYSDEC - SPDES Equivalency	TR 829	Carbon Tetrachloride System	NA	NA	NA	NA
NYSDEC- Hazardous Substance	BNL	Bulk Storage Registration Certificate	1-000263	27-Jul-05	NA	NA
NYSDEC - LI Well Permit	BNL	Domestic Potable/Process Wells	1-4722-00032/00113	13-Sep-08	NA	NA
NYSDEC - Air Quality	197	Lithographic Printing Presses	1-4722-00032/00115	06-Jan-07	U-LITHO	19709-10
NYSDEC - Air Quality	423	Metal Parts Cleaning Tanks	1-4722-00032/00115	06-Jan-07	U-METAL	42306-08
NYSDEC - Air Quality	423	Gasoline Storage & Fuel Pumps	1-4722-00032/00115	06-Jan-07	U-FUELS	42309-10
NYSDEC - Air Quality	423	Motor Vehicle A/C Servicing	1-4722-00032/00115	06-Jan-07	U-MVACS	MVAC1&2
NYSDEC - Air Quality	458	Paint Spray Booth	1-4722-00032/00115	06-Jan-07	U-45801	45801
NYSDEC - Air Quality	458	Flammable Liquid Storage Cabinet	1-4722-00032/00115	06-Jan-07	U-45801	458AA
NYSDEC - Air Quality	473	Metal Parts Cleaning Tank	1-4722-00032/00115	06-Jan-07	U-METAL	47302
NYSDEC - Air Quality	479	Metal Parts Cleaning Tank	1-4722-00032/00115	06-Jan-07	U-METAL	47906
NYSDEC - Air Quality	490	Milling Machine/Block Cutter	1-4722-00032/00115	06-Jan-07	U-49003	49003
NYSDEC - Air Quality	490	Lead Alloy Melting	1-4722-00032/00115	06-Jan-07	U-49003	49004
NYSDEC - Air Quality	498	Aqueous Cleaning Facility	1-4722-00032/00115	06-Jan-07	U-METAL	49801
NYSDEC - Air Quality	535B	Plating Tanks	1-4722-00032/00115	06-Jan-07	U-INSIG	53501
NYSDEC - Air Quality	535B	Etching Machine	1-4722-00032/00115	06-Jan-07	U-INSIG	53502
NYSDEC - Air Quality	535B	Printed Circuit Board Process	1-4722-00032/00115	06-Jan-07	U-INSIG	53503
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	06-Jan-07	U-61005	61005
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	06-Jan-07	U-61006	61006
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	06-Jan-07	U-61007	61007
NYSDEC - Air Quality	610	Metal Parts Cleaning Tray	1-4722-00032/00115	06-Jan-07	U-METAL	61008
NYSDEC - Air Quality	610	Combustion Unit	1-4722-00032/00115	06-Jan-07	U-61005	6101A
NYSDEC - Air Quality	630	Gasoline Storage & Fuel Pumps	1-4722-00032/00115	06-Jan-07	U-FUELS	63001-03
NYSDEC - Air Quality	820	Metal Parts Cleaning Tank	1-4722-00032/00115	06-Jan-07	U-METAL	82001

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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	902	Epoxy Coating/Curing Exhaust	1-4722-00032/00115	06-Jan-07	U-COILS	90206
NYSDEC - Air Quality	903	Metal Parts Cleaning Tank	1-4722-00032/00115	06-Jan-07	U-METAL	90304
NYSDEC - Air Quality	919B	Electroplating Operation	1-4722-00032/00115	06-Jan-07	U-INSIG	91904
NYSDEC - Air Quality	922	Metal Parts Cleaning Tank	1-4722-00032/00115	06-Jan-07	U-METAL	92202-03
NYSDEC - Air Quality	922	Electroplating Operation	1-4722-00032/00115	06-Jan-07	U-INSIG	92204
NYSDEC - Air Quality	923	Electronic Equipment Cleaning	1-4722-00032/00115	06-Jan-07	U-METAL	9231A
NYSDEC - Air Quality	923	Parts Drying Oven	1-4722-00032/00115	06-Jan-07	U-METAL	9231B
NYSDEC - Air Quality	924	Magnet Coil Production Press	1-4722-00032/00115	06-Jan-07	U-INSIG	92402
NYSDEC - Air Quality	924	Vapor/Ultrasonic Degreasing Unit	1-4722-00032/00115	06-Jan-07	U-METAL	92404
NYSDEC - Air Quality	Site	Halon 1211 Portable Extinguishers	1-4722-00032/00115	06-Jan-07	U-HALON	H1211
NYSDEC - Air Quality	Site	Halon 1301 Fire Suppression Systems	1-4722-00032/00115	06-Jan-07	U-HALON	H1301
NYSDEC - Air Quality	Site	Packaged A/C Units	1-4722-00032/00115	06-Jan-07	U-RFRIG	PKG01-02
NYSDEC - Air Quality	Site	Reciprocating Chillers	1-4722-00032/00115	06-Jan-07	U-RFRIG	REC01-41
NYSDEC - Air Quality	Site	Rotary Screw Chillers	1-4722-00032/00115	06-Jan-07	U-RFRIG	ROTO1-07
NYSDEC - Air Quality	Site	Split A/C Units	1-4722-00032/00115	06-Jan-07	U-RFRIG	SPL01-02
NYSDEC - Air Quality	Site	Centrifugal Chillers	1-4722-00032/00115	06-Jan-07	U-RFRIG	CEN01-22
NYSDEC - Hazardous Waste	WMF	Waste Management	1-4722-00032/00102	12-Jul-05	NA	NA
NYSDEC - Natural Resources	AGS	Construction of AGS Storage Facility	1-4722-00032/00133	03-Jun-06	NA	NA
NYSDEC - Natural Resources	RHIC	Liner Installation at Bldg. 1010	1-4722-00032/00131	20-Oct-03	NA	NA
NYSDEC - Natural Resources	RHIC	Construction of New Recharge Basin	1-4722-00032/00129	17-May-04	NA	NA
NYSDEC - Natural Resources	RHIC	Paving at Bldgs. 1002 & 1004	1-4722-00032/00135	09-Oct-08	NA	NA
NYSDEC - Natural Resources	RHIC	Construction of 9C Alcove Building	1-4722-00032/00137	08-Sep-08	NA	NA
NYSDEC - NESHAPs	REF	Radiation Effects/Neutron 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-07	NA	NA
NYSDEC - Water Quality	STP	Sewage Plant & Recharge Basins	NY-0005835	01-Mar-05	NA	NA

Notes:
AGS = Alternating Gradient Synchrotron
CSF = Central Steam Facility
EPA = Environmental Protection Agency
LI = Long Island
NESHAPs = National Emission Standards for Hazardous Air Pollutants
NYSDEC = New York State Department of Environmental Conservation
NA = Not Applicable
OU = Operable Units
REF = Radiation Effects Facility
RTF = Radiation Therapy Facility
RHIC = Relativistic Heavy Ion Collider
SDWA = Safe Drinking Water Act
STP = Sewage Treatment Plant
TR = Trailer
WMF = Waste Management Facility

3.3 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) regulations require federal agencies to evaluate the effects of proposed major federal activities on the environment. The prescribed evaluation process ensures that the proper level of environmental review is performed before an irreversible commitment of resources is made. During 2003, environmental evaluations were completed for 138 proposed projects. Of these projects, 116 were considered minor actions requiring no additional documentation. The remaining 22 projects were addressed through the submission of Environmental Evaluation Notification Forms to DOE. Evaluation of these

projects resulted in the determination by DOE that they were covered by existing Categorical Exclusions, as defined in volume 10 of the Code of Federal Regulations, section 1021 (referred to as 10 CFR 1021). Therefore, environmental assessments were not required.

3.4 HISTORIC PRESERVATION AND ARCHEOLOGY

BNL is subject to several cultural resource laws, most notably the National Historic Preservation Act (NHPA) and the Archeological Resource Protection Act (ARPA). These acts require federal agencies to identify, evaluate, and consider the effects of federal actions on historical and archeological sites eligible for listing or inclusion on the National Register of Historic Places. The sites may include historic structures, objects, documents, and Native American Indian lands.

BNL has three structures or sites that have been determined to be eligible for listing on the National Register of Historic Places: the Brookhaven Graphite Research Reactor (BGRR) complex, the High Flux Beam Reactor (HFBR) complex, and the World War I Army training trenches associated with Camp Upton. In 2003, the New York State Historic Preservation Officer (SHPO) concurred with BNL's determination that the following WW II era buildings were not eligible for listing on the National Register of Historic Places:

- Building 118 – Physics Department Offices
- Building 184 – Library Annex/Museum
- Buildings 158, 206, 207, 208, and 209 – Warehouses
- Building 428 – Incinerator
- Building 457 – Spray Shop
- Building 458 – Boiler Plant
- Building 459 – Business Systems Division Offices.

A Stage 1 archeological survey of an area containing remnant foundations from WW I Camp Upton was performed in preparation for the construction of a new railroad spur. The annual Department of Interior questionnaire regarding historic and cultural resources was completed and submitted as required. Additional activities in 2003 associated with NHPA and ARPA compliance are identified in Chapter 6, Section 6.9, Cultural Resource Activities.

3.5 CLEAN AIR ACT

The objectives of the Clean Air Act (CAA) that 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

BNL 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 that are subject to NYSDEC Reasonably Available Control Technology (RACT) requirements. Three of the boilers can burn either residual fuel oil or natural gas; Boiler 1A burns fuel oil only. In 2003, low nitrogen residual oil was the predominant fuel burned in all four boilers.

For boilers with maximum operating heat inputs greater than or equal to 50 MMBtu/hr (14.6 MW), RACT requirements establish emissions 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 confirmed that BNL Boilers 1A and 5, both in this size category, met the NO_x emission standards when burning residual fuel oil with low nitrogen and sulfur content below 0.3 percent. To ensure continued compliance, an outside contractor laboratory analyzed composite samples of fuel deliveries (collected quarterly) and confirmed that the fuel-bound nitrogen and sulfur 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. For the year 2003, NO_x emissions from Boilers 6 and 7 averaged 0.225 lbs/MMBtu and 0.200 lbs/MMBtu, respectively, and there were no known exceedances of the NO_x emission standard for either boiler.

3.5.1.2 Ozone-Depleting Substances

Refrigerants. BNL'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 used by trained technicians is certified to meet refrigerant evacuation levels specified by 40 CFR 82.158. As a matter of standard practice at BNL, if a refrigerant leak is found, technicians will either immediately repair the leak or isolate it and prepare a work order for the needed repairs. This practice exceeds the leak repair provisions of 40 CFR 82.156.

In January, 1,050 pounds of R-11 were recovered and reclaimed for future use from two 650-ton R-11 centrifugal chillers in Building 555 that were removed from service in August 2001 when the building was connected to the Central Chilled Water Facility. Another 880 pounds of R-11 were recovered and shipped out for reclamation from two 110-ton centrifugal chillers in Building 911A that were removed from service when that building was connected to the Central Chilled Water Facility. In April, 400 pounds of R-11 were recovered and sent out for reclamation from a 130-ton R-11 centrifugal chiller in Building 488 that was then replaced with a more energy-efficient 80-ton R-134A centrifugal chiller. Approximately 550 pounds of R-11, 1 pound of R-12, 327 pounds of R-22, 650 pounds of R-123, and 4 pounds of R-134A were recovered and recycled from refrigeration equipment that was serviced in 2003.

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, BNL 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 workers use halon recovery and recycling devices, to comply with the CAA provisions.

3.5.2 Hazardous Air Pollutants

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

3.5.2.1 Maximum Available Control Technology

During preparation of the Title V Phase II application, BNL reviewed existing state and federal regulations administered under the CAA to determine applicability to BNL activities and operations. Based on this review, it was concluded that no proposed or promulgated Maximum Available Control Technology (MACT) standards apply to BNL operations. Additional evaluation conducted in 2003 determined that no MACT standards apply to the anticipated emissions from proposed activities or operations.

3.5.2.2 Asbestos

As required, BNL provided notice to the EPA Region II office regarding the removal of materials that contained asbestos. During 2003, 2,500 linear ft of asbestos-containing pipe insulation, 9,446 ft^2 of asbestos-containing surface material (principally roofing and vinyl asbestos floor tile removed during demolition or renovation activities), and 280 yd^3 of bulk asbestos waste (again principally generated during demolition of facilities) were removed and disposed of in accordance with 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 affect the environment. A full description of the monitoring conducted by BNL in 2003 is provided in Chapter 4. BNL transmitted all data pertaining to radioactive air emissions and dose calculations to EPA on schedule, in fulfillment of the June 30 annual reporting requirement. In 2003, the maximum off-site dose due to airborne radioactive emissions from BNL 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. The dose to the maximally exposed individual resulting from airborne emissions, calculated using EPA's modeling software, was 0.06 mrem (0.6 μSv).

3.6 CLEAN WATER ACT

The disposal of wastewater generated by BNL 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 BNL. This permit establishes release concentration limits and specifies monitoring requirements.

The BNL SPDES permit was renewed in September 1999 with an effective date of March 1, 2000 and an expiration date of March 1, 2005. This permit provides monitoring requirements and specifies effluent limits for nine of 12 outfalls, as described below.

- Outfall 001 is used for the discharge of treated effluent from the STP to the Peconic River.
- Outfalls 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. No monitoring requirements are imposed for Outfalls 003, 011, and 012.
- Outfall 007 receives backwash water from the potable Water Treatment Plant (WTP) filter building.
- Outfall 009 consists of numerous subsurface and surface wastewater disposal systems that receive predominantly sanitary waste, and steam- and air-compressor condensate discharges. There are no monitoring requirements imposed for this outfall.

See Figure 5-6 in Chapter 5 for the locations of BNL outfalls.

Each month, BNL prepares a Discharge Monitoring Report that details monitoring data, evaluates compliance with permit limitations, and identifies corrective measures taken to address permit excursions. This report is submitted directly to the NYSDEC central and regional offices and the Suffolk County Department of Health Services (SCDHS).

3.6.1 Sewage Treatment Plant

Sanitary and process wastewater generated by BNL operations is conveyed to the STP for processing before being discharged to the Peconic River. The STP provides tertiary treatment of this wastewater (i.e., biological reduction of organic matter and reduction of nitrogen). Chapter 5 provides a detailed description of the treatment process.

A summary of the SPDES monitoring results for the STP discharge at Outfall 001 is provided in Table 3-3. The relevant SPDES permit limits are also shown. BNL monitors the STP discharge for more than 100 parameters monthly and well over 200 parameters quarterly. BNL's compliance with effluent limits was greater than 99 percent overall; there was only one excursion of SPDES permit limits in 2003. In March, a single concentration for iron exceeded the SPDES limit of 0.37 mg/L. Samples collected two days after the reported event were well within SPDES permit limits. Since this was only a one-time occurrence, no formal followup was performed. Figures 3-1 through 3-7 plot five-year trends for the maximum monthly concentrations of copper, iron, lead, silver, nickel, zinc, and mercury in the STP discharge.

Table 3-3. Analytical Results for Wastewater Discharges to Sewage Treatment Plant Outfall 001.

Analyte	Min.	Max.	Min. Monitoring Frequency	SPDES Limit	No. of Exceedances	% Compliance*
Max. Temperature (°F)	45	79	Daily	90	0	100
pH (SU)	5.9	6.9	Continuous Recorder	Min. 5.8 Max. 9.0	0	100
Avg. 5-Day BOD (mg/L)	< 2	6	Twice Monthly	10	0	100
Max. 5-Day BOD (mg/L)	< 2	14	Twice Monthly	20	0	100
% BOD Removal	> 80(a)	> 99	Monthly	85	0	100
Avg. TSS (mg/L)	< 0.4	1.3	Twice Monthly	10	0	100
Max. TSS (mg/L)	< 0.4	1.8	Twice Monthly	20	0	100
% TSS Removal	> 91	> 99	Monthly	85	0	100
Settleable Solids (ml/L)	0.0	0.0	Daily	0.1	0	100
Ammonia Nitrogen (mg/L)	< 0.10	0.11	Twice Monthly	2	0	100
Total Nitrogen (mg/L)	2.8	10	Twice Monthly	10	0	100
Total Phosphorus (mg/L)	0.77	1.7	Twice Monthly	NA	0	100
Cyanide (µg/L)	< 1.7	2.0	Twice Monthly	100	0	100
Copper (mg/L)	0.028	0.069	Twice Monthly	0.15	0	100
Iron (mg/L)	0.07	0.39(b)	Twice Monthly	0.37	1	96
Lead (mg/L)	< 0.0021	0.0058	Twice Monthly	0.019	0	100
Nickel (mg/L)	0.0024	0.0053	Twice Monthly	0.11	0	100
Silver (mg/L)	< 0.0020	0.0034	Twice Monthly	0.015	0	100
Zinc (mg/L)	0.03	0.1	Twice Monthly	0.1	0	100
Mercury (mg/L)	< 0.0001	0.0003	Twice Monthly	0.0008	0	100
Toluene (µg/L)	< 5	< 5	Twice Monthly	5	0	100
Methylene Chloride (µg/L)	< 1	4.5	Twice Monthly	5	0	100
1,1,1-Trichloroethane (µg/L)	<5	< 5	Twice Monthly	5	0	100
2-Butanone (µg/L)	< 10	< 10	Twice Monthly	50	0	100
PCBs (µg/L)	< 0.065	< 0.4	Quarterly	NA	0	100
Max. Flow (MGD)	0.38	0.77	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.28	0.53	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 mL)	< 2	2	Twice Monthly	200	0	100
Max. Fecal Coliform (MPN/100 mL)	< 2	2	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) The calculated % BOD-5 removal was > 80 percent in June of 2003. This was due to great uncertainty in many of the BOD-5 results due to dilution problems at the analytical laboratory, incorrect descriptions on a chain-of-custody form, low confidence in the proper mixing of samples before being placed in the sampling bottles for analysis, and dilute BOD-5 concentrations entering the Sewage Treatment Plant. The effluent to Outfall 001 met all permit requirements for BOD-5 concentration.
(b) A permit exceedance of the total iron concentration occurred on March 3, 2003. The total iron concentration of the samples collected on March 5 and 7, 2003 were within the permit limit. The concentration and duration of this excursion did not indicate a continual noncomplying discharge.

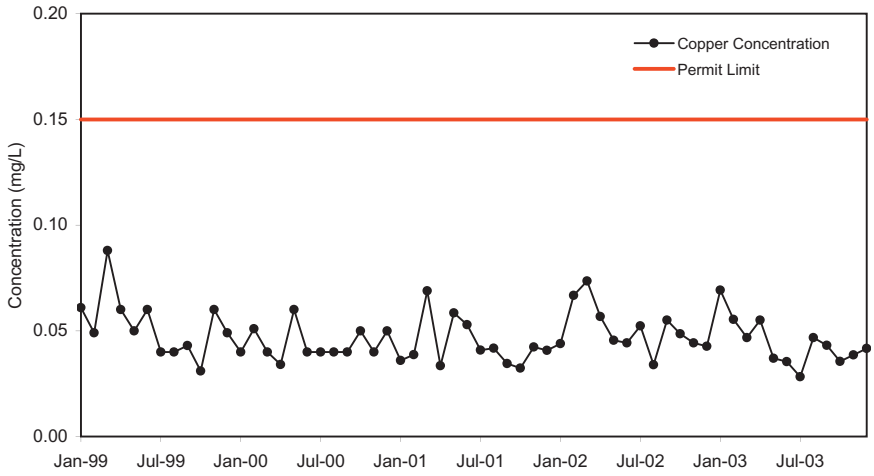

Figure 3-1. Maximum Concentration of Copper Discharged from the BNL Sewage Treatment Plant, 1999–2003.

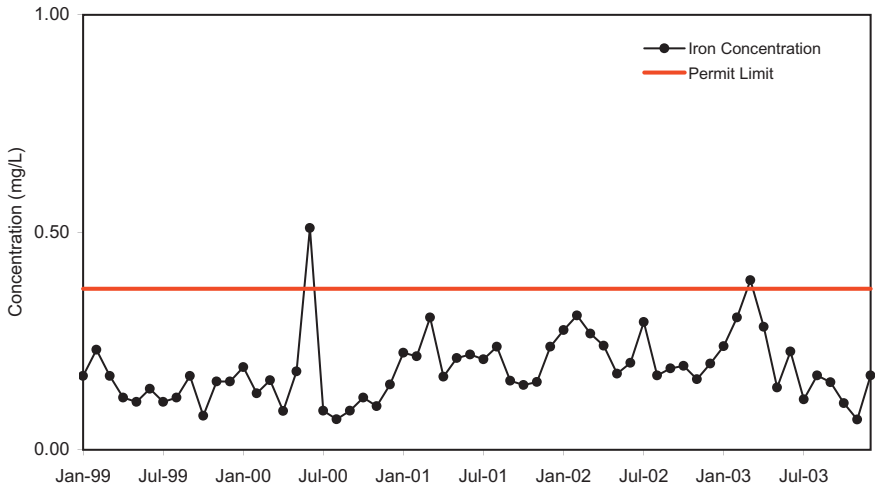

Figure 3-2. Maximum Concentration of Iron Discharged from the BNL Sewage Treatment Plant, 1999–2003.

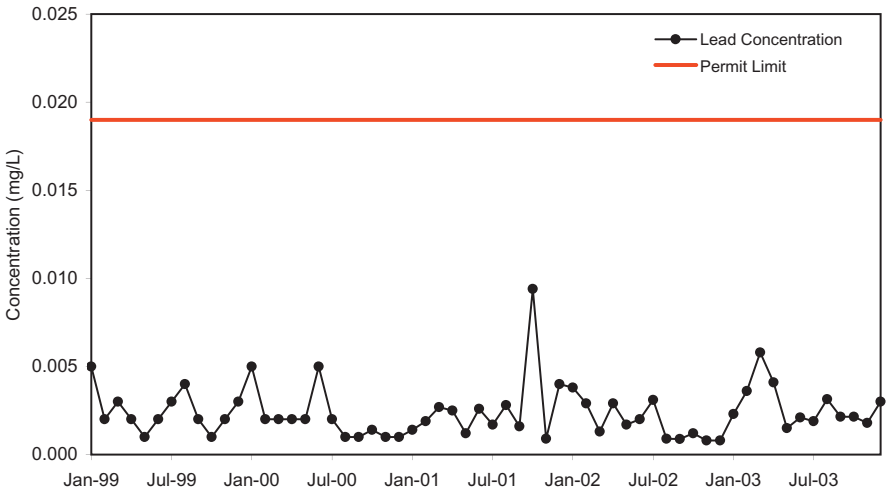

Figure 3-3. Maximum Concentration of Lead Discharged from the BNL Sewage Treatment Plant, 1999–2003.

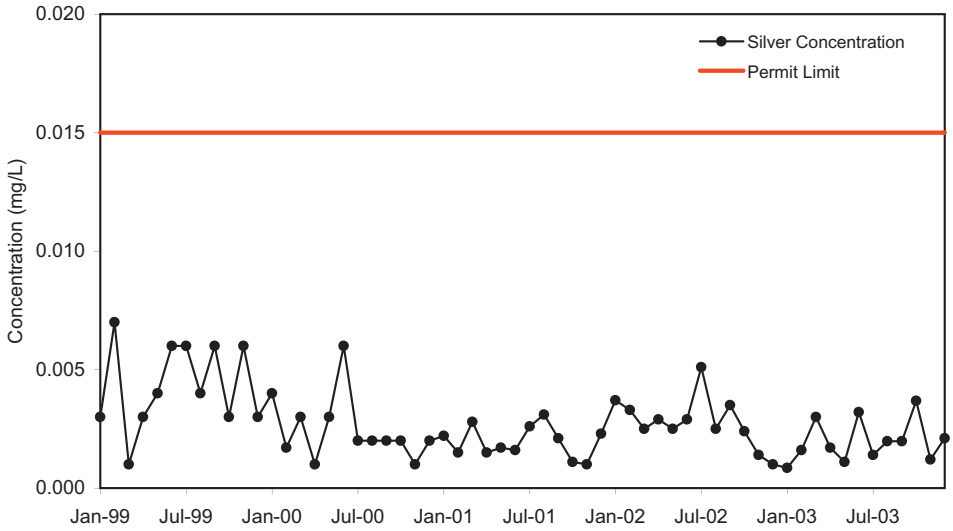

Figure 3-4. Maximum Concentration of Silver Discharged from the BNL Sewage Treatment Plant, 1999–2003.

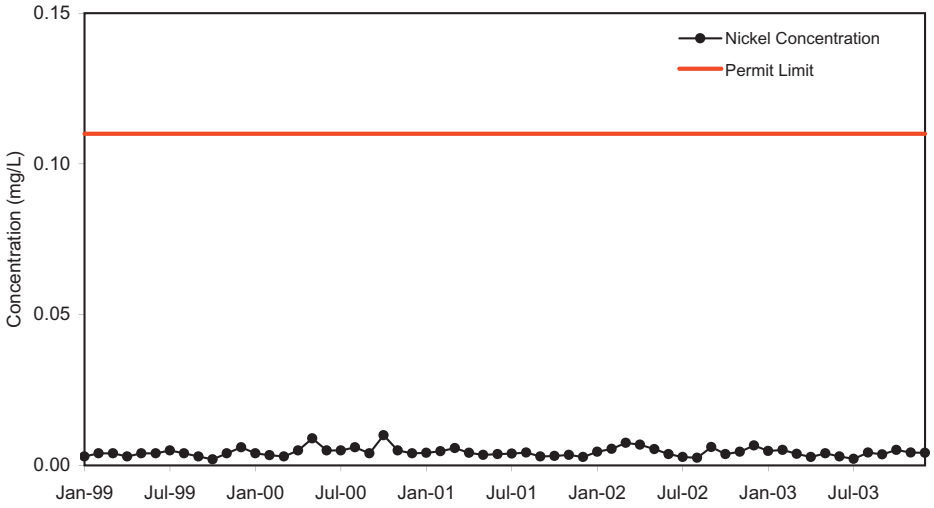

Figure 3-5. Maximum Concentration of Nickel Discharged from the BNL Sewage Treatment Plant, 1999–2003.

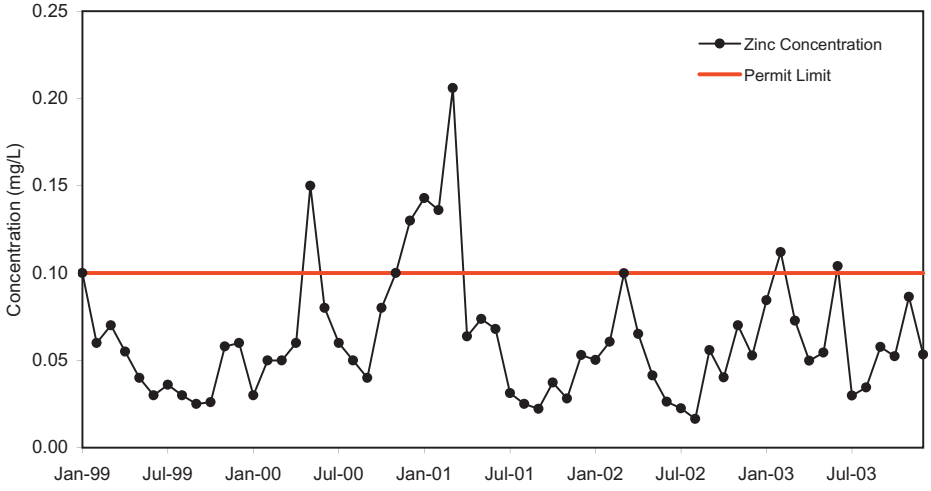

Figure 3-6. Maximum Concentration of Zinc Discharged from the BNL Sewage Treatment Plant, 1999–2003.

Note: Per NYSDEC guidance, the concentration of zinc exhibited in the effluent during February and June was not considered in violation of the SPDES effluent limit of 0.1 mg/L due to rounding off of significant figures.

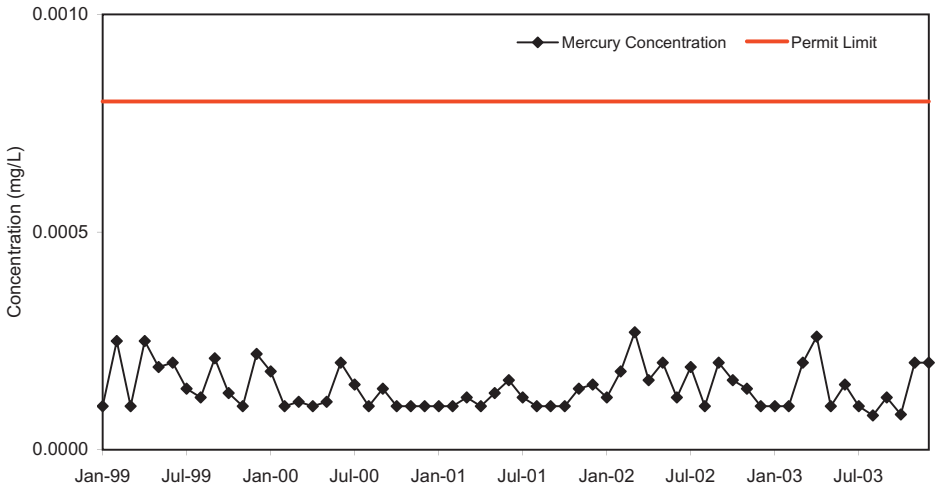

Figure 3-7. Maximum Concentration of Mercury Discharged from the BNL Sewage Treatment Plant, 1999–2003.

3.6.1.1 Chronic Toxicity Testing

BNL's SPDES permit requires that "whole effluent toxicity" 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. Samples are collected and tested quarterly. The program consists of performing seven-day chronic toxicity tests on two freshwater organisms, water fleas and fathead minnows. 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 seven days in each test. During testing, the size of fish and/or 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.

In 2003, toxicity was not exhibited for either of the two test organisms in the four tests conducted; consequently, there was no need to proceed with the Toxicity Reduction Evaluation established with NYSDEC in 2002. Since there was no documented toxicity exhibited in the last five rounds of tests (December 2002 through December 2003), BNL petitioned NYSDEC for testing relief until the next permit cycle starting in 2005. This request is pending.

3.6.2 Recharge Basins and Stormwater

Outfalls 002 through 008 and Outfalls 010 through 012 discharge 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 2003.

There were three permit excursions at these outfalls in 2003. Two were for exceedances of effluent limits for aluminum at Outfalls 008 and 010. As part of the SPDES permit revision in 2002, metals analyses are performed for several stormwater discharges quarterly. Resuspension of sediment due to scouring of earthen channels and roadway runoff causes elevated metals levels (e.g., aluminum and iron) in water samples collected during rain events due to natural sources (i.e., soil). Since suspended soil does not adversely affect the recharge basins or groundwater, in 2003 BNL requested that water samples undergoing subsequent metals analyses be filtered before acid preservation. Discussions with NYSDEC indicate that this request is likely to be approved in early 2004. The third exceedance was for a release of excess cooling tower treatment reagent (tolytriazole) resulting from a broken valve. The valve was repaired upon discovery and the levels of this compound returned to below SPDES limits.

3.7 SAFE DRINKING WATER ACT

The distribution and supply of drinking water is regulated under the federal SDWA. In New York State, implementation of the SDWA is

Table 3-4. Analytical Results for Wastewater Discharges to Outfalls 002–008 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	N	CR	CR	CR	CR	CR	CR	10	10			
(MGD)	Min.	0.09	0.0001	0.2	0.001	0.04	0.20	0.0005	0.005	NA		
	Max.	9.6	0.044	4.60	0.21	0.58	0.32	0.53	0.19	NA	NA	NA
pH	Min.	6.6	6.8	6.3	6.8	6.9	6.3	6.7	6.6	NA		
(SU)	Max.	8.4	8.6	8.5	8.3	8.2	8.9	7.9	8.5	8.5, 9.0 (a)	0	100
Oil and	N	12	11	12	12	10	NR	10	10			
Grease	Min.	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NR	< 5.0	< 5.0	NA		
(mg/L)	Max.	9.4	2	3.6	3.7	2.1	NR	3.6	3.4	15	0	100
Copper	N	NR	NR	4	NR	NR	NR	NR	4			
(mg/L)	Min.	NR	NR	0.003	NR	NR	NR	NR	0.006	NA		
	Max.	NR	NR	0.006	NR	NR	NR	NR	0.022	1.0	0	100
Aluminum	N	4	NR	NR	NR	NR	NR	4	4			
(mg/L)	Min.	0.02	NR	NR	NR	NR	NR	0.14	0.08	NA		
	Max	0.46	NR	NR	NR	NR	NR	2.3 (b)	3.2 (b)	2.0	2	83
Lead	N	NR	NR	NR	NR	NR	NR	NR	4			
(mg/L)	Min.	NR	NR	NR	NR	NR	NR	NR	0.002	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.017	0.05	0	100
Vanadium	N	NR	NR	NR	NR	NR	NR	NR	4			
(mg/L)	Min.	NR	NR	NR	NR	NR	NR	NR	0.008	NA		
	Max	NR	NR	NR	NR	NR	NR	NR	0.018	NPL	NA	NA
Chloroform	N	4	NR	NR	NR	NR	NR	NR	NR			
(µg/L)	Min.	< 1	NR	NR	NR	NR	NR	NR	NR	NA	NA	
	Max.	1.5	NR	NR	NR	NR	NR	NR	NR	7	0	100
Bromo-	N	4	NR	NR	NR	NR	NR	NR	NR			
dichloromethane	Min.	< 1	NR	NR	NR	NR	NR	NR	NR	NA	NA	
(µg/L)	Max.	< 2	NR	NR	NR	NR	NR	NR	NR	5	0	100
1,1,1-trichloroethane	N	4	NR	NR	NR	NR	NR	4	NR			
(µg/L)	Min.	< 1	NR	NR	NR	NR	NR	< 1	NR	NA	NA	
	Max.	< 2	NR	NR	NR	NR	NR	< 5	NR	5	0	100
1,1-dicloroethylene	N	NR	NR	NR	NR	NR	NR	4	NR			
(µg/L)	Min.	NR	NR	NR	NR	NR	NR	< 1	NR	NA	NA	
	Max.	NR	NR	NR	NR	NR	NR	< 5	NR	5	0	100
Hydroxyethylidene-	N	4	4	4	4	4	NR	NR	NR			
diphosphonic acid	Min.	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NR	NR	NR	NA	NA	
(mg/L)	Max.	< 0.05	< 0.05	< 0.05	< 0.05	0.09	NR	NR	NR	0.5	0	100
Tolyltriazole	N	4	4	4	4	4	NR	NR	NR			
(mg/L)	Min.	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NR	NR	NR	NA	NA	
	Max.	0.99 (c)	< 0.005	< 0.005	< 0.005	< 0.005	NR	NR	NR	0.2	1	95

Notes:
See Chapter 5, Figure 5-6 for locations 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
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
(a) pH limit is 8.5 for Outfalls 005, 008, and 010. pH limit is 9.0 for Outfalls 002, 002B, 006A, 006B,and 007.
(b) The total aluminum concentration exceeded the permit limit (Outfall 010 in April and Outfall 008 in July) due to resuspension of sediments at the outfall. Filtered samples were below the permit limit.
(c) The elevated concentrations were due to a broken valve on the feed equipment for the water treatment chemicals added to a cooling tower discharging to this outfall. The problem was repaired once it was discovered.

delegated to the New York State Department of Health (NYSDOH) and administered by the Suffolk County Department of Health Services. Because BNL provides potable water to "more than 25 full-time residents," it is subject to the same requirements as a public water supplier. Monitoring requirements are prescribed annually by SCDHS, and a Potable Water Sampling and Analysis Plan (Chaloupka 2003) is prepared to comply with these requirements.

3.7.1 Potable Water

BNL maintains six groundwater wells for on-site distribution of potable water. To meet drinking water standards, groundwater is treated with activated carbon or air stripping to remove VOCs. Groundwater from three of the six wells is also treated to reduce naturally occurring iron. As required by NYSDOH regulations, BNL monitors the potable wells regularly for bacteria, inorganics, organics, and pesticides. BNL also voluntarily monitors drinking water supplies for radiological contaminants. Tables 3-5 and 3-6 provide the potable water supply monitoring data for 2003. Color and iron exceeded drinking water standards in samples collected from three of the wells, before distribution. Treatment at the Water Treatment Plant effectively reduced these levels to below drinking water standards. At the point of consumption, drinking water complied with all drinking water standards during 2003. Chapter 7 provides additional data on environmental surveillance tests performed on potable wells. This additional testing goes beyond the minimum SDWA testing requirements.

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 connections between the potable water supply and connections to systems containing hazardous substances ("cross-connections"). Cross-connection control is the installation of control devices (e.g., double check valves, reduced pressure zone valves) 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 might be posed by intra-facility operations.

BNL has installed and maintains approximately 200 cross-connection control devices at interfaces to the potable water main, and secondary control devices at the point of use. Approximately 160 cross-connection control units were tested in 2003, including primary and secondary devices. If a problem is encountered during testing, the device is repaired and retested to ensure proper function.

3.7.3 Underground Injection Control

Underground injection control wells are regulated under the SDWA. At BNL, 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, since NYSDEC did not adopt UIC regulatory requirements. (New York State regulates discharges of pollutants to cesspools under the SPDES program.) Under the EPA's UIC program, all Class V injection wells must be included in an inventory maintained with the agency.

During 2003, BNL completed construction of 12 new UICs for managing stormwater: nine new UICs at Building 974 and single UICs at Buildings 634, 635, and 637, based on applications filed in late 2002. The UIC inventory on file with EPA has been updated to reflect these changes.

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

Table 3-5. Potable Water Wells and Potable Distribution System: Bacteriological, Inorganic Chemical, and Radiological 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								
Total Coliform	ND	ND	ND	ND	ND	ND	ND	Negative
Color (Units)	30*	30*	5	< 5	< 5	< 5	< 5	15
Odor (Units)	0	0	0	0	0	0	0	3
Cyanide (μg/L)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NS
Conductivity (μmhos/cm)	156	160	178	208	282	285	275	SNS
Chlorides (mg/L)	29.2	21.9	21.9	4.4	17.1	15.1	28.7	250
Sulfates (mg/L)	9.3	10.5	9.2	5.9	9.3	9.4	9.1	250
Nitrates (mg/L)	0.23	0.31	0.21	0.11	0.56	0.54	0.26	10
Nitrites (mg/L)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.0
Ammonia (mg/L)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	SNS
pH (Standard Units)	6.1	6.0	5.9	6.5	6.0	5.9	6.8	SNS
MBAS (mg/L)	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	SNS
Metals								
Antimony (μg/L)	< 5.9	< 5.9	< 5.9	< 5.9	< 5.9	< 5.9	< 5.9	6.0
Arsenic (μg/L)	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	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)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1
Fluoride (mg/L)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.2
Iron (mg/L)	1.12*	3.23*	1.84*	< 0.02	0.03	< 0.02	0.23	0.3
Lead (μg/L)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	15
Manganese (mg/L)	0.13	0.13	0.06	< 0.01	< 0.01	< 0.01	0.04	0.3
Mercury (μg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2.0
Nickel (mg/L)	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	SNS
Selenium (μg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	50.0
Sodium (mg/L)	15.1	12.4	12.7	6.2	12.3	10.9	16.5	SNS
Silver (μg/L)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	100
Thallium (μg/L)	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	2.0
Zinc (mg/L)	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	5.0
Radioactivity								
Gross Alpha Activity (pCi/L)	2.62	2.11	2.08	NA	1.31	2.16	NR	15.0
Beta (pCi/L)	3.92	2.70	< 1.98	NA	< 1.98	2.67	NR	50.0
Tritium (pCi/L)	< 363	< 363	< 363	NA	< 363	< 395	NR	20,000
Strontium-90 (pCi/L)	< 0.56	< 0.56	< 0.64	NA	< 0.58	< 0.48	NR	8.0
Other								
Asbestos (million fibers/L)	NR	NR	NR	NR	NR	NR	< 0.68	7
Calcium (mg/L)	4.8	4.6	4.9	6.5	6.4	7.0	10.1	SNS
Alkalinity (mg/L)	11.9	10.4	12.3	13.9	20.5	22.4	53.4	SNS

Notes:
See Figure 7-3 for well locations.
MBAS = Methylene Blue Active Substances
NA = Not Analyzed due to well shutdown
ND = Not Detected
NR = Analysis Not Required
NYSDWS = New York State Drinking Water Standard
SNS = Drinking Water Standard Not Specified
* Wells are treated at the Water Treatment Plant for color and iron reduction prior to site distribution.

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
				µg/L				
Dichlorodifluoromethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Chloromethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Vinyl Chloride	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	2
Bromomethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Chloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Trichlorofluoromethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1-dichloroethene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Methylene Chloride	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
trans-1,2-dichloroethene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1-dichloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
cis-1,2-dichloroethene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
2,2-dichloropropane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Bromochloromethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1,1-trichloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Carbon Tetrachloride	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1-dichloropropene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2-dichloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Trichloroethene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2-dichloropropane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Dibromomethane	< MDL	< MDL	< MDL	1.5	< MDL	< MDL	< MDL	5
trans-1,3-dichloropropene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
cis-1,3-dichloropropene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1,2-trichloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Trihalomethanes	3.6	3.4	5.6	1.0	21.7	< MDL	< MDL	100
1,3-dichloropropane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Chlorobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1,1,2-tetrachloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Bromobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2,3-trichloropropane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
2-chlorotoluene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
4-chlorotoluene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,3-dichlorobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,4-dichlorobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2-dichlorobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2,4-trichlorobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Hexachlorobutadiene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Tetrachloroethene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,1,2,2-Tetrachloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2,3-trichlorobenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Benzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Toluene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Ethylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
m,p-xylene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
o-xylene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5

(continued on next page)

Table 3-6. Potable Water Wells: Analytical Results for Principal Organic Compounds, Synthetic Organic Chemicals, Pesticides, and Micro-Extractables (Maximum Concentration) *(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				
Styrene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Isopropylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
n-propylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,3,5-trimethylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
tert-butylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2,4-trimethylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
sec-butylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
4-Isopropyltoluene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
n-butylbenzene	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Methyl tert-butyl ether	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Lindane	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.2
Heptaclor	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.4
Aldrin	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Heptachlor Epoxide	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.2
Dieldrin	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Endrin	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.2
Methoxychlor	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	40
Toxaphene	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	3
Chlordane	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	2
Total PCB's	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.5
2,4,5,-TP (Silvex)	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	10
Dinoseb	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Dalapon	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Picloram	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Dicamba	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Pentachlorophenol	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	1
Hexachlorocyclopentadiene	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Bis(2-ethylhexyl)Phthalate	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Bis(2-ethylhexyl)Adipate	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Hexachlorobenzene	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Benzo(A)Pyrene	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Aldicarb Sulfone	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	SNS
Aldicarb Sulfoxide	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	SNS
Aldicarb	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	SNS
Oxamyl	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
3-Hydroxycarbofuran	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Carbofuran	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	40
Carbaryl	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Methomyl	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Glyphosate	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Diquat	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
1,2-dibromomethane	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.05
1,2-dibromoethane	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.05

(continued on next page)

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Well No. 12	NYS DWS
	µg/L							
1,2-dibromo-3-chloropropane	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	0.2
2,4,-D	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Alachor	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	2
Simazine	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Atrazine	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	3
Metolachor	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Metribuzin	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Butachlor	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Endothall	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	100
Propachlor	NR	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	50
Tetrachloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL
1,1,2,2-Tetrachloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL

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 during the year by H2M Labs Inc., a New York State–certified contractor laboratory.
The minimum detection limits for principal organic compound analytes are 0.5 µg/L. Minimum detection limits for synthetic organic chemicals, and micro-extractables are compound-specific, and in all cases are less than the New York State Department of Health drinking water standard.
< MDL = Less than the Minimum Detection Limit for the analyte in question
NR = Analysis Not Required
SNS = Drinking Water Standard Not Specified
NYSDWS = New York State Drinking Water Standard
WTP = Water Treatment Plant

basins. Discharges to UICs are regulated by EPA, and a separate inventory is maintained for these treatment facilities.

3.8 SPILL PREVENTION, EMERGENCY PLANNING, AND REPORTING

Several federal, state, and local regulations address the management of storage facilities containing chemicals, petroleum, and other hazardous materials. These regulations include specifications for storage facilities, requirements for release planning documentation, and release reporting. The following subsections describe BNL's compliance with these regulations.

3.8.1 Preventing Oil Pollution and Spills

BNL must maintain a Spill Prevention Control and Countermeasures (SPCC) Plan as a condition of its Major Petroleum Facility License and as required by the Oil Pollution Act. This plan is part of BNL'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 their locations. The SPCC Plan is filed with NYSDEC, EPA, and DOE. The plan was last updated in December 2000 (Chaloupka 2000). In July 2002, EPA adopted significant changes to the SPCC regulations, which extended the requirements to previously unregulated facilities and provided some relief to existing covered facilities. These changes, among others, included extending the update requirements from three to five years and revising the *de minimus* quantity of oil to be counted toward reaching SPCC applicability (containers < 55 gallons need not be counted). Existing facilities have until August 2004 to revise existing SPCC plans. These revised plans must be implemented by February 2005. BNL is proceeding with changes to its

SPCC plan in accordance with these requirements. BNL remained in full compliance with the SPCC requirements in 2003.

BNL also maintains a Facility Response Plan that outlines emergency response procedures to be implemented in the event of a worst-case discharge of oil. EPA again reviewed this plan in 2002 and identified several technical deficiencies and formatting issues. The EPA comments were reviewed and a revised plan was transmitted to the EPA in September 2002. Due to the time needed to revise several maps, these were transmitted to the EPA in November 2002. There were no actions on the Facility Response Plan in 2003.

3.8.2 Local and State Reporting Requirements

The Emergency Planning and Community Right-to-Know Act (EPCRA) and Title III of the Superfund Amendments and Reauthorization Act (SARA) require that facilities report inventories and releases of certain chemicals that exceed specific thresholds 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. BNL complied with these requirements in 2003 through the submittal of the required reports under EPCRA Sections 302, 303, 311, and 312. During 2000 and 2001, the Part 313 Toxic Release Inventory (TRI) thresholds were significantly lowered for mercury, polychlorinated biphenyls (PCBs), and lead. Mercury and PCB thresholds were lowered from 10,000 pounds to 10 pounds, and lead from 10,000 to 100 pounds. In 2003, BNL was required to submit Tier III reports for these three classes of chemicals. In total, 140 pounds of mercury, 371,128 pounds of lead, and 25 pounds of PCBs were reported in the Form R TRI Report, which was submitted in June 2003. Due to an oversight, PCBs were not reported in the 2001 TRI report. A revised report was submitted in April 2003, documenting the off-site disposal of 14 pounds of PCBs in 2001. The significant increase in lead reported was due to decommissioning activities being conducted at the HFBR and BGRR, and alterations at the Alternating Gradient Synchrotron experimental facility. Large quantities of lead sheet, bricks, and other shielding components were disposed of in 2003. There were no releases of extremely hazardous substances reported under Part 304 during 2003.

3.8.3 Spills and Releases

When a spill of hazardous material occurs, BNL personnel are required to immediately notify the on-site Fire Rescue Group, whose members are trained to respond to such releases. The initial step in spill 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 the regulatory agencies. Any release of petroleum products to soil is reportable to both NYSDEC and SCDHS, and any release impacting a surface water is also reportable to the EPA National Response Center. In addition, releases of petroleum products in volumes greater than 5 gallons to impermeable surfaces or containment areas are also reported. Spills of chemicals in quantities greater than CERCLA-reportable quantities are reportable to the EPA National Response Center, NYSDEC, and SCDHS. Remediation of the spill is conducted as necessary to restore the site.

During 2003, there were 75 spills, of which 22 met external agency reporting criteria. These 22 reports are summarized in Table 3-7. The remaining 53 releases were either small-volume releases to containment areas or to other impermeable surfaces that did not exceed a reportable quantity. Twelve of the 22 reported releases involved very small volumes (< 10 gallons) of petroleum products that reached soil. New York State has a “zero tolerance” level for releases of petroleum products to soil or water; consequently, spills of any amount to soil are reportable. Five of the 22 were small-volume releases of ethylene glycol from engine coolant leaks. Four of the 22 were large-volume (i.e., > 10 gallons) petroleum releases associated with equipment upgrade projects. One of these releases was the discovery of petroleum-contami-

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

Spill No. and Date	Material and Quantity	ORPS* Report	Source/Cause and Corrective Actions
03-03 1/8/03	Fuel oil > 100 gal	Yes (CH-BH-BNL-PE-2002-0006)	During planned removal of a 1,000-gal fuel oil UST at Bldg. 51, two dime-sized holes were seen on the bottom of the single-walled steel tank. NYSDEC staff observing the tank removal supervised soil removal, checking for signs of oil until further excavation became a safety concern. About 100 yd^3 of soil was removed for proper disposal. Geoprobe® samples were collected on 4/1/03 at NYSDEC request to check for groundwater contamination. All results were below laboratory detection limits and/or NY State soil cleanup guidance values, so no further action was needed.
03-10 2/27/03	Ethylene glycol 0.5 gal	No	A radiator hose on a government vehicle failed, releasing ethylene glycol to the asphalt road. BNL personnel applied absorbent material, then removed it for proper disposal. The release exceeded NYSDEC's 1-lb reportable quantity limit, although it was determined not to be ORPS reportable.
03-14 4/3/03	Hydraulic fluid 2 qt	No	As BNL workers loaded dead trees into a truck, the skid steer operator saw hydraulic oil spraying from one of the unit's hoses. He immediately moved the unit to the concrete road and shut it off. About 2 qt of oil sprayed the truck, skid steer, and ground next to the truck (~24 sq ft). Workers used oil-absorbent pads to clean the equipment. Most oil on the ground landed on a bed of leaves and dead grass, which was raked up and put in a 55-gal drum, with the absorbent pads, for proper disposal.
03-16 4/5/03	Fuel oil 7 gal	Yes (CH-BH-BNL-PE-2003-0002)	While removing debris from storm grates during a heavy rainfall, workers saw water with an oily sheen entering a storm drain. Tracing the runoff, they found oil-stained soil below a contractor's truck parked on an embankment. Fuel had leaked from the fill cap on one of the truck's 50-gal saddle tanks. The workers controlled the runoff with earthen berms and dikes of oil-absorbent material. To stop further water contact with the petroleum-soaked soil, they used plastic sheeting, anchored with blocks. Because oily water had entered the stormwater system, they put absorbent booms within the outfall weir and used absorbent pads to absorb oil already in the recharge basin. The next day, they removed the affected soil and absorbent materials for proper disposal.
03-18 5/1/03	Engine oil 4 qt	No	A deteriorating rubber hose on an employee vehicle broke, leaking oil onto asphalt, soil, and sand in the Bldg. 917 parking lot. Absorbent material was used, then removed along with the affected soil and sand for proper disposal.
03-22 5/20/03	Chilled water 28,000 gal	Yes (CH-BH-BNL-BNL-2003-0007)	A fitting on the chilled water system in Bldg. 463 failed, sending 28,000 gal of water to the floor within the building. The water was tested for pH and residual treatment chemical (chlorine from sodium hypochlorite). Discharge of the water to the STP was authorized since the chlorine level was 0.3 mg/L and pH was 7.6 SU. The cause was an inadequately restrained PVC pipe that did not withstand pressure anomalies in the chilled water system.
03-26 6/4/03	Hydraulic fluid 0.5 gal	No	BNL workers were clearing brush west of Bldg. 244 using a skid steer when a hydraulic fitting loosened, spraying fluid on the ground. Absorbent material was applied, then removed along with the affected soil for proper disposal.
03-27 6/4/03	Petroleum product 1 gal	No	An area of asphalt at the corner of Mitchell Lane and Upton Rd. was heavily stained with a petroleum product of unknown source. In a rainstorm, the oily substance migrated to soil via runoff. Absorbent material was applied to the asphalt and adjacent gutter, then removed, with soil, for proper disposal.
03-34 6/23/03	Ethylene glycol < 0.5 gal	Yes (CH-BH-BNL-BNL-2003-0009)	The radiator hose on a government vehicle failed, releasing ethylene glycol to the concrete pad and soil adjacent to trailer 575. BNL staff applied absorbent material, then removed it, with the impacted soil, for proper disposal. The release exceeded NYSDEC's 1-lb reportable quantity limit for ethylene glycol, and was ORPS reportable.
03-36 6/23/03	Form release agent < 1 pint	No	To ease the removal of concrete forms, they are treated with a release agent, often hydrocarbon based. During work near Bldg. 490, BNL staff sprayed release agent onto forms. Later that day, petroleum odor was noted near the site. Inspection revealed overspray of the release agent on the surrounding soil, which was subsequently removed for proper disposal. Different release agents or application methods are being considered for future work.

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

Spill No. and Date	Material and Quantity	ORPS* Report	Source/Cause and Corrective Actions
03-41 7/8/03	Fuel oil 5–8 gal	Yes (CH-BH-BNL-BNL-2002-0012)	(This relates to a 2002 spill report, #02-48, and ORPS Report CH-BH-BNL-BNL-2002-0012 from preliminary remediation work.) During the removal of a fuel oil UST at Bldg. 445, workers found small holes in the tank and saw darkened soil. They removed ~20 yd^3 of soil and took end point samples. The hole was backfilled to safeguard the building's foundation. Tests confirmed soil contamination, although final remediation was postponed until demolition of the building. When the site was re-excavated in Oct. 2003 under NYSDEC guidance, 60 yd^3 of soil was removed and additional samples were taken. All test results were below laboratory detection limits and/or NY State soil cleanup guidance values; therefore, no further action was needed.
03-42 7/8/03	Engine oil 0.4 gal	No	Motor oil leaked from a rented metal shearer/shredder when the unit was being picked up for transport back to the vendor for repair. BNL personnel applied absorbent material, which was removed along with the affected soil for proper disposal.
03-43 7/9/03	Hydraulic fluid < 16 gal	No	BNL is replacing single-walled hydraulic elevator units with double-walled units to prevent possible leaks of hydraulic oil around the casings. Working at Bldg. 911, a contractor saw ~16 gal of oil inside the casing; whether there had been a release to the environment could not be determined. When tested, the oil contained 148 mg/L of PCBs. The standing oil was removed and soil samples from below the shaft floor were taken. Results showed the PCBs had been contained within the casing to a depth of 5–10 ft. The remaining sand was removed from the entire casing to a depth of ~50 ft. Since the bottom of the casing seemed impermeable and the sand removed was essentially dry, it is believed that a release to the environment had not occurred.
03-50 7/28/03	Fuel oil 4 gal	No	During warehouse T-89 demolition, BNL staff noticed discolored soil and a petroleum odor. A record review on 7/29/03 suggested the likely source was a 7,000-gal UST implicated in two previous spill reports (NYSDEC 82-00515 and 82-0988) that were remediated to the satisfaction of the State. Workers removed all newly discovered discolored soil for proper disposal, ~10 yd^3, and took end point samples under the direction of a Suffolk Co. Dept. of Health engineer. All test results were below laboratory detection limits and/or NY State soil cleanup guidance values; therefore, no further action was needed.
03-51 7/30/03	Ethylene glycol and oil < 3.5 gal	No	An ethylene glycol spill was found on pavement near Bldg. 912; a significant amount collected in a 6- to 8-in. dip in the surface. Workers traced the stain trail east on E. Fifth Ave., north on Ring Rd., then west into the RHIC ring, where it ended across from Bldg. 1005E. The grass there looked wet and felt oily. The discharge was estimated at 3 gal of ethylene glycol and < 1 qt of oil. BNL staff applied absorbent material to all affected areas and collected it, along with affected soil, for proper disposal. The spill's source could not be traced to BNL equipment, so the spill was not reportable, although it exceeded the NYSDEC limit.
03-52 8/1/03	Hydraulic fluid < 1 gal	No	The hydraulic hose on the boom of a log loader failed, spilling < 1 gal of fluid to the tracks, ties, and soil below the rail spur at Power Line Rd. BNL staff spread plastic to catch leaks and applied absorbent material. After the hose was repaired, absorbent materials and the affected soil were removed for proper disposal.
03-54 8/13/03	Hydraulic fluid ~5 gal	No	A BNL vehicle developed a hole in a hydraulic line, leaking fluid to the road between Grove St. and Princeton Ave. The operator pulled off the road to report the problem, leaking fluid on ~ 50 ft of grass and soil. Absorbent materials were applied and removed, along with the affected soil and grass, for proper disposal.
03-58 9/10/03	Hydraulic fluid 80–85 gal	Yes (CH-BH-BNL-PE-2003-0003)	An elevator contractor renovating the elevator in Bldg. 463 performed preliminary safety tests for restart certification. During the "Stop Ring" test the elevator started to drop, signaling a problem. The contractor left the control room and saw hydraulic oil spraying through seams between the foundation wall and floor slab in the adjacent stairwell. The fluid loss was ~80 to 85 gal. Staff applied absorbents to clean up the oil in the stairwell and adjoining room. The remedial investigation is ongoing, with oversight from NYSDEC.

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

Spill No. and Date	Material and Quantity	ORPS* Report	Source/Cause and Corrective Actions
03-62 10/3/03	Ethylene glycol 2 gal	No	Ethylene glycol was discovered on the asphalt pavement in the parking area at Bldg. 490 near the American Red Cross Kitchen loading dock. BNL personnel applied absorbent material to the release and removed it for proper disposal. The release was reported and cleaned up by BNL for the American Red Cross. It was not ORPS reportable, as it involved a non-BNL vehicle.
03-63 10/10/03	Diesel fuel 1–2 qt	No	A BNL employee walking in the woods near recharge basin HO found a plastic bag containing ~20 to 30 used absorbent pads. The bag was open at the top and rainwater had leached diesel fuel into the nearby pine needles, logs, and soil. Given the remote location, it is likely that this bag is from a 1996 sewer line replacement project. Staff removed the contaminated soil, debris, and bag of used pads for proper disposal.
03-65 10/28/03	Hydraulic fluid 15 gal	Yes (CH-BH-BNL-PE-2003-0005)	A passenger elevator in Bldg. 463 developed a mechanical failure in the flange area of the ram assembly, spilling hydraulic oil on the elevator pit floor. BNL staff put absorbent material around the ram assembly and sleeve to prevent further release, and used absorbent material to contain the oil on the floor. The oily soil inside the elevator ram casing was removed. Subsequent soil tests showed no significant impact. A team from the manufacturer helped BNL and the elevator contractor determine the cause of the leak: a misaligned point load when a 2,760-lb Geoprobe® unit was placed in the elevator car. The elevator load-carrying capacity, by code, is reduced to 25% of its rated capacity for Class A general freight if a single point load or single object is loaded. The maximum single-point load capacity of this car is 1,000 lb.
03-72 11/18/03	Ethylene glycol 2 pints	Yes (CH-BH-BNL-PE-2003-0008)	Workers reported a release of ethylene glycol from a BNL generator that is mounted on a trailer stored outdoors, north of Bldg. 629. Absorbent material was applied to the spill. When the generator was being transported for repair, more antifreeze spilled to the pavement and nearby soil. Workers applied additional absorbent material and collected it, along with affected soil, for proper disposal. The release exceeded NYSDEC's 1-pound reportable limit for ethylene glycol and was ORPS reportable.

Notes:
*ORPS: Occurrence Reporting and Processing System, established by DOE Manual 231.1-2, Occurrence Reporting and Processing of Operations Information
NYSDEC = New York State Department of Environmental Conservation
PCBs = Polychlorinated Biphenyls
PVC = Polyvinyl Chloride
STP = Sewage Treatment Plant
SU = Standard Units
UST = Underground Storage Tank

nated soil during a tank removal at Building 51 and three were associated with elevator upgrade projects. The remaining release was the discharge of 28,000 gallons of chilled water into Building 463. This spill was reported, due to the damage caused by the flood. Table 3-7 provides information on the reportable spills, including the date of the spill, material involved, and quantity released. It also includes a summary of the cause and corrective actions taken, and notes whether the spill was reportable to DOE through the Occurrence Reporting and Processing System (ORPS).

Five other incidents that were environmental in nature were reported to DOE through ORPS. These incidents are summarized in Table 3-8. All incidents were addressed through the identification and implementation of corrective actions geared toward the root cause. No off-site or on-site permanent environmental impacts arose from the ORPS incidents.

3.8.4 Major Petroleum Facility License

The storage of 2.3 million gallons of petroleum products (principally No. 6 fuel oil) subjects BNL to Major Petroleum Facility licensing by NYSDEC. BNL maintains an MPF License for storing and transferring oil at the Central Steam Facility (CSF). During 2003, BNL remained in full compliance with license requirements. The license requires BNL to monitor groundwater in the vicinity of the seven active, aboveground storage tanks that range in size from 60,000 to 600,000 gallons. The license also requires that BNL inspect storage facilities monthly and test the systems for leak detection, high level monitoring, and secondary containment. Tank integrity is also checked periodically.

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

ORPS* ID: CH-BH-BNL-BNL-2003-0001 On 1/16/03, personnel and facility contamination occurred during Strontium-90 source transfer and repackaging at the Waste Management Facility Shielded Cell in Bldg. 865. As Sr-90 source tabs were being moved from a transfer cask to a shipping container, the scope of work was changed to include transferring the source tab trays and associated rusted metal container. During this unplanned action, activated particles from debris on the source trays migrated outside the shielded cell. The ventilation system played a role in their dispersal, and the lack of real-time airborne monitoring in the shielded cell led to delayed detection of the developing contamination, possibly contributing to its spread. The individual and facility were decontaminated, and changes have been made to the facility work control process and procedures to prevent similar occurrences in the future.	**Date:** 1/16/03 **Status:** Closed. All corrective actions have been completed.
ORPS ID: CH-BH-BNL-BNL-2003-0002 A Complaint dated 1/14/03 was received from NYSDEC for three deficiencies that were identified during a comprehensive, 5-day hazardous waste inspection ending on September 9, 2002. That inspection concluded with a brief closeout meeting; other NYSDEC staff had to be consulted before a compliance determination could be made on the few concerns raised during the inspection. On 10/8/02, BNL received a request from NYSDEC for information regarding four specific concerns; a response was submitted on 10/28/02. Of the three deficiencies identified in the 1/14/03 complaint letter, one was later repealed. A final Notice of Violation arrived 10/27/03. Corrective actions have been taken to rectify the issues.	**Date:** 1/17/03 **Status:** Closed. All corrective actions have been completed.
ORPS ID: CH-BH-BNL-BNL-2003-0003 BNL shipped two decontaminated spent-fuel shipping casks (LWT-2 and LWT-4) to the Savannah River Site (SRS). In outgoing radiological surveys of the casks on 1/24/03, all results were below 1,000 disintegrations per minute per 100 square centimeters (dpm/100 cm^2). During processing at SRS on 2/5/03, contamination surveys found up to 180,000 dpm/cm^2 on cask LWT-4. BNL staff reviewed the radiological survey data and determined that the spent-fuel shipping cask was in compliance with the requirements of the Transportation Code (49 CFR Contamination Control Limits, section 173.443), which requires decontamination before shipping. The increase in removable contamination was attributed to a recognized phenomenon known as weeping, which occurs when entrapped radioactive material migrates to the surface. It probably occurred due to the climate change between BNL and SRS and the lag time at SRS between cask receipt (Jan. 29) and cask survey (Feb. 4). No further shipments of this type are expected to originate from BNL in the future.	**Date:** 2/5/03 **Status:** Closed. All corrective actions have been completed.
ORPS ID: CH-BH-BNL-PE-2003-0006 At BNL on 10/14/03, two shipments of waste oil and soapy water were made from the Central Steam Facility (CSF) tank farm. The Hazardous Waste Manifest forms were signed by untrained employees who had not taken either the BNL Hazardous Material (Haz-Mat) training or the Haz-Mat Advanced Shippers training. Haz-Mat training is required by BNL procedures and federal regulations for personnel involved in off-site Haz-Mat shipments. Also, the waste transporter was not on the DOE Motor Carrier Evaluation Program list of approved waste haulers. The wastes, generated from tank cleaning at the CSF, were originally to be recycled as fuel, but the plan was changed to off-site disposal because burning of the waste clogged the fuel lines and affected CSF operations. The Waste Management Representative (WMR) for this group was not involved in the original planning process, because no waste was to be generated. If the WMR had been involved, the waste would have been properly characterized prior to shipment. Corrective actions taken include the modification of procedures and forms, and training of personnel who may contract work involving hazardous waste or shipments, to ensure Department of Transportation and Resource Conservation and Recovery Act compliance.	**Date:** 10/30/03 **Status:** Open. Although DOE has accepted the ORPS report, one corrective action remains open: revision of the Project Safety Review procedure with regard to transportation and shipping issues.
ORPS ID: CH-BH-BNL-BNL-2003-0023 On 12/19/03, BNL personnel found the basement of the Middle Road remediation system tower (Bldg. 517) flooded with approximately 5 ft of water. Investigations revealed that the day before, staff from the Air Conditioning shop had repaired a broken blower belt and restarted the South Boundary system (Bldg. 518) without also restarting Bldg. 517. Because these two systems normally operate in parallel, they must be run simultaneously unless specific valves and switches are aligned, per operating procedures. This, and the fact that the water override switch in Bldg. 517 had been left in the override (disabled) position, caused the flooding. Some water from Bldg. 517 leaked through electrical conduit to Bldg. 518, causing automatic system shutdown, as designed. Corrective actions taken include training and the installation of warning lights and postings in the treatment buildings.	**Date:** 12/9/03 **Status:** Closed. All corrective actions have been completed.

*Reportable under the Occurrence Reporting and Processing System, established by the requirements of DOE Manual 231.1-2.

Groundwater monitoring consists of monthly checks for floating products and twice-yearly analyses for volatile and semivolatile organic compounds. In 2003, no contaminants or floating products attributable to MPF activities were found in groundwater wells. See Chapter 7 for additional information on groundwater monitoring results.

The petroleum facility is inspected annually by NYSDEC. The 2003 annual inspection was conducted in July. The inspection noted four conditions that required corrective action, one related to the management of vegetative growth in the secondary containment berms at Building 610, two related to the routine inspection of the tanks at Building 610, and one related to cracks that developed within the concrete containment at Building 326. All conditions were corrected in accordance with the NYSDEC directives.

3.8.5 Chemical Bulk Storage

All underground tanks, and all aboveground tanks larger than 185 gallons that store specific chemical substances listed in Title 6 of the Official Compilation of the Codes, Rules and Regulations of the State of New York (NYCRR), Part 597, must be registered with NYSDEC. BNL holds a Hazardous Substance Bulk Storage Registration Certificate for eight tanks. Seven of the eight tanks are used to store potable water treatment chemicals (sodium hydroxide and sodium hypochlorite) and one tank is used to store gallium trichloride formerly required in physics experiments. The tanks range in size from 200 to 1,200 gallons. These tanks are also regulated under Suffolk County Sanitary Code Article 12 and are managed in accordance with BNL procedures designed to conform to Suffolk County requirements.

NYSDEC conducted an inspection of the Chemical Bulk Storage (CBS) facilities in July 2003. Four issues were noted during this inspection that required corrective action. These issues included updating the Spill Prevention Report, adding containment for the delivery hose at Buildings 634, 635, and 637, labeling of remote fill stations, and broken alarms. All issues were corrected in accordance with the NYSDEC directives.

3.8.6 County Storage Requirements

Article 12 of the Suffolk County Sanitary Code, administered by SCDHS, 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. It also specifies administrative requirements, such as identification, registration, and spill reporting procedures. In 1987, BNL entered into a voluntary Memorandum of Agreement (MOA) with SCDHS, in which DOE and BNL agreed to conform to the environmental requirements of Article 12.

Currently BNL has approximately 466 active storage facilities listed in the Suffolk County Tanks Database. Also included in the county database are another 32 storage facilities associated with environmental restoration activities conducted under the CERCLA program; these facilities are not regulated under Article 12. BNL storage facilities listed in the database include those storing fuel (some of which are also regulated under the MPF license), wastewater, and chemicals, as well as storage facilities used to support Laboratory research.

Since the 1987 MOA was signed, BNL has made significant progress in conforming to the environmental requirements of Article 12. Accomplishments include:

- Upgrading approximately 180 storage facilities. This included, but was not limited to, the construction of secondary containment systems and installation of high-level alarms and leak detection systems for many of the existing storage facilities.
- Removal of over 100 underground storage facilities.
- Submittal of over 80 design/specification packages to SCDHS for review/approval for upgrades to existing or new storage facilities.

In 2003, BNL prepared and submitted a report to SCDHS (BNL 2003a) describing the numerous projects that have been completed and management programs initiated since the 1987 MOA, including a summary of BNL's current status with conformance to Article 12 require-

ments. The report documented that approximately 98 percent of the registered storage facilities are in full or significant conformance with Article 12. Existing storage facilities that could not be upgraded to meet all of the Article 12 requirements have equivalent controls in place to ensure that impacts to human health and the environment are avoided. Seven remaining storage facilities that currently do not conform to Article 12 have plans in place for upgrades or are being prepared for permanent abandonment.

BNL has an ongoing program to upgrade or replace existing storage facilities and to meet with representatives of SCDHS to ensure that the information provided for all registered storage facilities is accurate and that new or modified storage facilities are designed and reviewed for full conformance with Article 12 regulations.

3.9 RESOURCE CONSERVATION AND RECOVERY ACT

RCRA regulates hazardous wastes that could present risks to human health or the environment if mismanaged. 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. BNL is considered a large-quantity generator and has a RCRA permit to store hazardous wastes for one year before shipping them off site to licensed treatment and disposal facilities. As noted in Chapter 2, BNL has a number of 90-day accumulation and storage areas.

NYSDEC did not conduct an inspection of BNL hazardous waste management operations in 2003. During 2003, the Laboratory continued its discussions with NYSDEC and EPA regarding the Notice of Violation (NOV) issued in January 2003 for inspection issues identified in the August 2002 RCRA inspection. On September 26, 2003 NYSDEC issued a letter to BNL withdrawing part of its Complaint and Notice of Hearing and Consent Order pertaining to its 2002 NOV alleging the improper management of CERCLA-derived wastes. As a result, a new NOV was issued outlining the two remaining issues. One item, a missing label, was corrected during the inspection. The other involved the preparation of a Land Disposal Restriction (LDR) Notification for intra-laboratory shipments of waste. BNL modified its procedures to ensure future completion of the LDR Notification and submitted a copy of the revised procedure to NYSDEC as evidence. BNL's response to the two remaining items in the Notice of Violation were deemed satisfactory by NYSDEC, and the case was closed in December 2003.

Mixed wastes are materials that are both hazardous (under RCRA guidelines) and radioactive. The Federal Facilities Compliance Act (FFCA), issued in 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 (DOE 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 updates the BNL Site Treatment Plan annually and submits it to NYSDEC. The update 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 most of the mixed waste now in storage have been identified, and most of the current inventory was shipped off site for treatment and disposal in 2003. BNL will continue to update the treatment plan for wastes that have no identified disposal pathway.

In 2003, BNL managed 126,309 ft^3 of radioactive waste in compliance with the requirements of DOE Order 435.1, Radioactive Waste Management, and the BNL Radioactive Waste Management Basis Program Description. Of this quantity, almost 120,000 ft^3 (more than 90 percent) was generated as a result of environmental restoration activities on the BNL site, with most waste coming from the cleanup of BNL's Former Waste Management Facility. Radioactive wastes are generated by only a few departments at BNL during routine operations, and the management of those wastes is strictly regulated and controlled. Disposal of radioactive wastes occurs at two off-site fa-

cilities, DOE's Hanford Facility in the state of Washington, and a commercial facility, Envirocare of Utah. No wastes are disposed of at BNL.

3.10 POLYCHLORINATED BIPHENYLS

The storage, handling, and use of PCBs are regulated under the Toxic Substance and Control Act (TSCA). Capacitors manufactured before 1970 that are believed to be oil filled are handled as if they contain PCBs, even when the existence of PCBs cannot be verified through an investigation of 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. The PCB inventory is updated by July 1 of each year. All PCB-containing articles or PCB-contaminated equipment must be labeled. BNL responds to any PCB spill in accordance with standard emergency response procedures. BNL was in compliance with TSCA requirements in 2003.

3.11 PESTICIDES

The storage and application of pesticides (insecticides, rodenticides, herbicides, and algicides) are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Pesticides at BNL are used to control undesirable insects, mice, and rats; to control bacteria in cooling towers; and to maintain certain areas free of vegetation (e.g., around fire hydrants and inside secondary containment berms). Insecticides also are 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, and herbicide use for the previous year. BNL was in full compliance with FIFRA requirements in 2003.

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. BNL 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 Natural Resource Protection Program 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, BNL must comply with the permit conditions.

In 2003, five projects were permitted under this program, three ongoing and two new. The three ongoing projects include construction of a new storage facility at the Alternating Gradient Synchrotron, construction of a new recharge basin, and installation of a liner at Building 1010. The new storage facility was substantially complete by the end of 2003. Final photos of the finished project and a completed project notification will be filed with NYSDEC in 2004 to close this permit. The construction of a new recharge basin within the RHIC area was also substantially complete in 2003. Planting of native vegetation and filing of photos and a completed project application will be completed in 2004. The final existing project, installation of a geomembrane at Building 1010, was completed in 2003 and a request to close this permit was submitted in October 2003. The two new projects involved construction of a modular building at RHIC to house electrical power supplies that are currently located within the RHIC ring, and paving parking areas at Buildings 1002 and 1004. By moving the electrical units outside the accelerator, maintenance can be conducted during operational periods with no radiation exposure to staff. These projects are expected to be completed in 2004.

3.13 ENDANGERED SPECIES ACT

In 2003, as part of ongoing work under the Natural Resource Management Plan (NRMP), BNL submitted a request to the New York Natural Heritage program for a list of all heritage elements located on the BNL site. The list was sent to BNL in late December. Review of the list resulted in the addition of several species to BNL's list of endangered, threatened, and species of special concern (see Table 6-1 in Chapter 6). Added to the list were two butterflies (the Persius duskywing, a state endangered species, and the mottled duskywing, a species of special concern); the eastern spadefoot toad, which was documented on site in May; two birds, the northern harrier (a state threatened species that was spotted in November), and Cooper's hawk, which was a documented nesting species in 2003; and several species of plants including stargrass, a state threatened species, crested fringed orchid, a state endangered species, and long-beaked bald-rush, a rare species. Two other species were identified in the correspondence from the Heritage Program but were not added to BNL's list since they were reported before World War II and were from areas that have since been disturbed. The two plants that were not added to the list are the dwarf huckleberry and the Virginia ground-cherry. If these plants are found to still exist in the area, they will be added to BNL's list and management activities for their conservation will be developed.

The tiger salamander is no longer the only state endangered species found at BNL. However, it is probably the most notable and best-studied species on site. Tiger salamanders are listed in New York State as endangered 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. In 2003, BNL prepared a Natural Resource Management Plan (BNL 2003b) replacing the former Wildlife Management Plan (Naidu 1999). The new plan formalizes the strategy and actions needed to protect 17 confirmed tiger salamander breeding locations identified at BNL. The strategy includes identifying and mapping habitats, monitoring breeding conditions, improving breeding sites, and controlling activities that could negatively affect breeding.

The banded sunfish and swamp darter are found in the Peconic River drainage areas at BNL. Both are listed as threatened species within New York State because eastern Long Island has the only known remaining populations of these fish in New York. Measures taken or being taken by BNL to protect the banded sunfish and swamp darter and their habitat include the following:

- Eliminating, reducing, or controlling pollutant discharges
- Upgrading the STP to reduce nitrogen loading in the Peconic River (completed in 1998)
- Monitoring populations and water quality
- Maintaining adequate flow to the river to enable the fish to survive drought
- Minimizing disturbances to the river and adjacent banks

Of the three butterfly species found at BNL that are endangered, threatened, or of special concern, both the frosted elfin and Persius duskywing depend on lupine, a wildflower in the pea family. In the past, a single area of lupine existed on BNL grounds. This habitat still exists and it is assumed that the butterflies are still present. The mottled duskywing prefers New Jersey Tea plant, which has not been found at BNL. Management of habitat and surveys for the three butterflies has been added to BNL's Natural and Cultural Resource Management Program.

BNL also has 11 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. The species of special concern found at BNL include the mottled duskywing butterfly, marbled salamander, eastern spadefoot toad, spotted turtle, eastern box turtle, eastern hognosed snake, horned lark, whip-poor-will, vesper sparrow, grasshopper

sparrow, and the Cooper's hawk. Management efforts taken 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 BNL. Observations of the eastern hognosed snake were reported on 17 different occasions in 2003, and a radio telemetry study was initiated to better understand its movements and habitat needs. BNL continues to evaluate bird populations as part of the management strategy outlined in the NRMP. Data concerning species of special concern are used appropriately in making management decisions regarding those species. 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.

BNL has 20 plant species 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. Locations of these rare plants must be determined, populations estimated, and management requirements established. Management of protected plants is included in the NRMP. See Chapter 6 for more information.

3.14 EXTERNAL AUDITS AND OVERSIGHT

A number of federal, state, and local agencies oversee BNL activities. BNL was inspected by federal, state, or local regulators on nine occasions in 2003. These inspections are summarized in Section 3.14.1. In 2003, SCDHS maintained a part-time, on-site staffer who provided day-to-day oversight of BNL activities. In addition to external audits and oversight, BNL has a comprehensive self-assessment program, as described in Chapter 2.

3.14.1 Inspections by Regulatory Agencies

- *Hazardous Waste*. NYSDEC did not conduct a RCRA/hazardous waste compliance inspection in 2003.
- *Air Compliance*. NYSDEC conducted an annual inspection of the Central Steam Facility in March. No issues were identified during this inspection.
- *Potable Water*. SCDHS conducts annual inspections of the BNL potable water system to collect samples and ensure that facilities are maintained. There were no issues identified in 2003. All sample results were within drinking water standards, except for iron, which occurs naturally in some of the wells. As noted in Section 3.7.1, BNL treats the drinking water supply to remove iron before distribution.
- *Sewage Treatment Plant.* SCDHS conducts quarterly inspections of the BNL STP. In 2003, no performance or operational issues were identified during these inspections. During these inspections, facility operations were evaluated and effluent samples were collected.
- *Recharge Basins.* As part of SCDHS oversight, inspections are conducted periodically of recharge basins and other SPDES outfalls. In 2003, SCDHS inspected the outfalls in March and collected samples during the assessment. Methyl-tertiarybutyl ether was detected in a sample collected by SCDHS from Outfall 001. Followup sampling by BNL did not confirm these results. No other issues were identified.
- *Major Petroleum Facility*. The MPF is inspected annually by NYSDEC. This inspection was conducted in July 2003. See Section 3.8.4 for a discussion of this inspection.
- *Chemical Bulk Storage Facilities*. The CBS facilities are inspected periodically by NYSDEC. This inspection was conducted in July 2003. See Section 3.8.5 for a discussion of this inspection.

3.14.2 Inspections by DOE

Neither DOE Headquarters (EH-10) nor the Chicago Operations Office conducted as-

sessments of the Laboratory's environmental programs in 2003. During 2003, the DOE Brookhaven Area Office (BAO) continued to oversee BNL programs and observed programmatic assessments of spill response procedures and procedures for storing and transferring nonhazardous and hazardous waste. BAO also reviewed BNL's program to comply with DOE Order 5400.5, and participated in a review of the specification and implementation of requirements under the Environmental Restoration Program. The results of these four assessments are summarized in the paragraphs below.

3.14.2.1 Spill Response Self-Assessment

BAO staff observed the Environmental and Waste Management Services Division (EWMS) Division programmatic assessment of the Standards-Based Management System (SBMS) subject area, Spill Response. The Spill Response assessment, which was conducted in the second quarter of 2003, reviewed Laboratory-wide compliance with spill response procedures and regulatory requirements. The assessment identified five observations and 13 areas for improvement of process-specific operations. Most of the items for improvement dealt with the availability of appropriate spill response kits in each department. Other issues identified included minor inconsistencies between regulatory and SBMS subject area requirements. A corrective action plan was prepared and all issues will be closed in early 2004.

3.14.2.2 Storage and Transfer Self-Assessment

In July and August of 2003, BAO observed the EWMS Division's self-assessment of BNL's implementation of the SBMS subject area Storage and Transfer of Hazardous and Non-Hazardous Materials. The purpose of the self-assessment was to evaluate the Laboratory-wide management of tanks and other storage facilities used to store materials, and to assess compliance with applicable regulations and guidance. The assessment identified five noteworthy practices and 21 instances where improvements were needed, which included the noncompliances identified by NYSDEC during the annual MPF and CBS inspections (see Sections 3.8.4 and 3.8.5). Most of the findings were administrative and included issues such as incorrect inspection documentation, failure to conduct an inspection, or lack of formal closure of out-of-service storage facilities. A corrective action plan was prepared and all issues are being tracked to closure.

3.14.2.3 Implementation of DOE Order 5400.5

BAO reviewed BNL's implementation of DOE Order 5400.5, Radiation Protection of the Public and the Environment. The BAO assessment primarily focused on the Laboratory's Environmental Monitoring Plan, environmental dose assessments, and justification of the environmental monitoring program. Four issues were identified: documentation of dose to biota, documentation of the technical justification for placement of thermoluminescent dosimeters (TLDs), isolated instances of inconsistent data reporting in the 2001 Site Environmental Report, and documentation of the technical justification for placement of air sampling devices during field activities. Corrective actions have been implemented to improve the Laboratory's compliance with the Order 5400.5 requirements.

3.14.2.4 Specification and Conformance to ARARs

The review for conformance to Applicable, Relevant, and Appropriate Requirements (ARARs) was conducted by Laboratory staff with observation by BAO and the Chicago Operations Office. The purpose of the review was to ensure that during restoration projects, ARARs were being identified and complied with. Three projects were reviewed for ARAR conformance: the Operable Unit (OU) III Middle Road groundwater remediation system, the OU I soil remediation project, and the OU III Industrial Park groundwater remediation system. In summary, the assessment concluded that ARARs are clearly defined and that evidence of conformance with the ARARs is readily available for the three projects reviewed.

3.14.3 Enforcement Actions and Memos

No new consent orders were issued to BNL in 2003. A Notice of Violation for administrative deficiencies was issued by NYSDEC as a

Table 3-9. Existing Agreements and Enforcement Actions Issued to BNL, with Status.

Number	Title	Parties	Effective Date	Status
Agreements				
No Number	Suffolk County Agreement	SCDHS, DOE, and BNL	Originally signed on 9/23/87	This Agreement was developed to ensure that the storage and handling of toxic and hazardous materials at BNL conform with 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 Agreement (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" on 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). All IAG scheduled milestones were met in 2003.
Enforcement Actions				
No Number	Notice of Violation–Resource Conservation and Recovery Act	NYSDEC	1/14/03	A Notice of Violation (NOV) was issued for three administrative deficiencies that were identified during the 2002 annual hazardous waste compliance inspection conducted by NYSDEC. Two of the three "deficiencies" related to CERCLA-derived wastes and were later retracted as deficiencies. The remaining item has been satisfactorily corrected.

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

result of the 2002 annual RCRA inspection (see discussion in Section 3.9). All existing enforcement actions and MOAs are listed in Table 3-9, along with a summary of their status. BNL determined that it has fully complied with the terms and conditions listed in these actions and has submitted supporting documentation to the regulatory agencies. The Laboratory continues to work with the regulators to close these actions as expeditiously as possible.

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