

## Compliance Status

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*Brookhaven National Laboratory is subject to more than 50 sets of federal, state, and local environmental regulations; numerous site-specific permits; equivalency permits for operation of seven groundwater remediation systems; and several other binding agreements. In 2002, BNL operated in compliance with the majority of these requirements, and programs are in place to address areas for continued improvement.*

*Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide were all within permit limits. Approximately 1,000 pounds of ozone-depleting refrigerants were recovered for recycling. Monitoring of the BNL potable water system showed that the potable water supply met all primary 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 2002, liquid effluents discharged to surface water and groundwater met all applicable New York State Pollutant Discharge Elimination System permit requirements with the exception of two excursions at the Sewage Treatment Plant and three at other outfalls. The five permit excursions were reported to the New York State Department of Environmental Conservation (NYSDEC).*

*Nineteen reportable spills of petroleum products occurred on site in 2002. Seventeen were less than 10 gallons, and all were cleaned up or addressed to the satisfaction of NYSDEC. The largest releases were associated with tank removal projects. BNL underwent 12 environmental audits by external regulatory agencies in 2002. These audits included inspections of petroleum storage, hazardous waste operations, air emissions from the Central Steam Facility, Sewage Treatment Plant operations, other regulated outfalls and recharge basins, and the potable water system. Of more than 1,000 New York State hazardous waste compliance requirements, BNL met all but three, receiving a Preliminary Finding and Administrative Complaint for three administrative deficiencies. Immediate corrective actions were taken to address one of the three and the two remaining issues are being reviewed for relevance to BNL operations. The Major Petroleum Facility was found to be in substantial compliance with the license, although several minor issues were identified. Corrective actions were implemented to address these issues. BNL continues to work with NYSDEC to resolve open items associated with past inspections of the Chemical Bulk Storage program.*

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### 3.1 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

Brookhaven National Laboratory (BNL) is subject to more than 50 sets of federal, state, and local environmental regulations; several site-specific permits; 10 equivalency permits for operation of groundwater remediation systems; and several other binding agreements. The federal, state, and local environmental statutes and regulations that BNL operates under are summarized in Table 3-1, along with a discussion of BNL's compliance status with regard to each requirement.

### 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, which are briefly described below.

- State Pollutant Discharge Elimination System permit
- Major Petroleum Facility license
- Resource Conservation and Recovery Act permit for the Waste Management Facility
- Registration certificate from the New York State Department of Environmental Conservation (NYSDEC) for tanks storing bulk quantities of hazardous substances
- Seven radiological emission authorizations issued under the National Emission Standards for Hazardous Air Pollutants by the U.S. Environmental Protection Agency
- Air emissions permit issued by NYSDEC under Title V of the Clean Air Act Amendments authorizing the operation of 14 emissions units
- Four permits for construction activities within the Peconic River corridor
- Underground Injection Control (UIC) Area permit for the operation of 90 UIC wells
- Permit for the operation of six domestic water supply wells
- Ten equivalency permits for the operation of seven groundwater remediation systems installed under the Inter-Agency Agreement (Federal Facility Agreement under the Com-

prehensive 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

A permit from the State Pollution Discharge Elimination System (SPDES) authorizes discharges from the BNL Sewage Treatment Plant (STP) to the Peconic River, and discharges of cooling water and stormwater to recharge basins, including discharges from Relativistic Heavy Ion Collider (RHIC) facilities. In November 2001, BNL submitted a request to revise its SPDES permit. The revisions included deleting Outfalls 002A and 004 because the operations contributing to these releases either ceased or were redirected to another point source; constructing two new recharge basins for increased drainage capacity to prevent overloading of existing basins; increasing the monitoring of three existing discharges (Outfalls 002, 008, and 010) to include metals analyses; decreasing monitoring of Outfall 007 because evaluation of iron releases from the Water Treatment Plant has shown no detrimental impact on the environment; and decreasing monitoring of corrosion control chemical residuals for Outfall 003 because cooling tower discharges have ceased. These requested modifications were approved in February 2002.

##### 3.2.2.2 Air Emissions Permits

Air emissions permits are granted by the New York State Department of Environmental Conservation. Permits are issued either as "equivalency" permits for restoration projects conducted under CERCLA, or as changes to the BNL Title V draft operating permit, which was issued in final form in January 2002. Permitting activities for 2002 are discussed below.

*CERCLA.* In March 2002, BNL submitted an equivalency permit application to NYSDEC for a newly constructed air stripping treatment system in Operable Unit III. The treatment system was designed to remediate groundwater contaminated with volatile organic compounds (VOCs). The application stated that anticipated

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 <b>Comprehensive Environmental Response, Compensation &amp; Liability Act (CERCLA)</b> provides the regulatory framework for remediation of releases of hazardous substances and remediation of inactive hazardous waste disposal sites.	In 1989, BNL entered into a tri-party agreement among EPA, NYSDEC, and DOE. Remediation of the BNL site 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 <b>National Environmental Policy Act (NEPA)</b> requires federal agencies to follow a prescribed process to evaluate 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 the NEPA requirements. The Laboratory has established sitewide procedures for the implementation of NEPA requirements.	3.3
Advisory Council on Historic Preservation: 36 CFR 60 36 CFR 63 36 CFR 79 36 CFR 800 43 CFR 7	The <b>National Historic Preservation Act</b> identifies, evaluates, and protects historic properties eligible for listing in the National Register of Historic Places. Historic properties can be archeological sites, historic structures, or historic documents, records, or objects.	The High Flux Beam Reactor, Brookhaven Graphite Research Reactor (BGRR) complex, and World War I trenches in the area of the Relativistic Heavy Ion Collider project have been determined to be eligible for inclusion in the National Register of Historic Places. The former Cosmotron building was identified as being potentially eligible in an April 1991 letter from the New York State Historic Preservation Officer (NYSHPO). Any activities involving these facilities are identified through the NEPA process and an evaluation is initiated to determine if the proposed action would impact the 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. BNL is currently developing a Cultural Resource Management Plan to ensure compliance with applicable cultural resource regulations.	3.4
EPA: 40 CFR 50 – 80 40 CFR 82 NYSDEC: 6 NYCRR 200 – 258 6 NYCRR 307	The <b>Clean Air Act (CAA)</b> and the New York State Environmental Conservation Laws regulate the release of air pollutants through permits and air quality limits. Emissions of radionuclides are regulated by the EPA, via the <b>National Emission Standards for Hazardous Air Pollutants (NESHAPs)</b> authorizations.	All air emission sources have permits 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 40 CFR 403 NYSDEC: 6 NYCRR 700 – 703 6 NYCRR 750 – 758	The <b>Clean Water Act (CWA)</b> and corresponding New York State Environmental Conservation Laws seek to improve the quality of surface waters by implementing a permitting program and establishing water quality standards. Wastewater discharges are permitted by NYSDEC.	Permitted discharges include treated sanitary waste, and cooling tower and stormwater discharges. With the exception of five excursions, these discharges met the State Pollutant Discharge Elimination System permit limits in 2002.	3.6
EPA: 40 CFR 141 – 149 NYSDOH: 10 NYCRR 5	The <b>Safe Drinking Water Act (SDWA)</b> 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 primary drinking water standards as well as operational and maintenance requirements.	3.7
EPA: 40 CFR 112 40 CFR 328 40 CFR 355 40 CFR 370 40 CFR 372	The <b>Oil Pollution Act, Emergency Planning and Community Right-to-Know Act (EPCRA)</b> , and the <b>Superfund Amendment Reauthorization Act (SARA)</b> require that facilities storing large quantities of petroleum products and/or chemicals prepare emergency planning documents and report the inventory of such chemicals to EPA, the state, and local emergency planning groups.	Since facilities at BNL store or use chemicals or petroleum in quantities exceeding threshold planning quantities, BNL is subject to these requirements. BNL is in full compliance with all emergency planning requirements.	3.8.1 3.8.2 3.8.3

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

Regulator: Codified Regulation	Regulatory Program Description	Compliance Status	Report Reference Sections
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.	BNL is subject to a vast set of regulations governing storage of chemicals, petroleum products, and wastes. 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 is working toward achieving full conformance to county codes.	3.8.4 3.8.5 3.8.6
EPA: 40 CFR 260 – 280 NYSDEC: 6 NYCRR 360 – 374	The <b>Resource Conservation Recovery Act (RCRA)</b> and <b>New York State Solid Waste Disposal Act</b> govern the generation, storage, handling, and disposal of hazardous wastes.	BNL is defined as a large quantity generator of hazardous waste and has a permitted waste management facility. While almost all wastes are handled and disposed in accordance with federal and state requirements, audits identified several concerns. These were immediately addressed by corrective actions.	3.9
EPA: 40 CFR 700 – 766	The <b>Toxic Substances Control Act (TSCA)</b> regulates the manufacture, use, and distribution of all chemicals.	BNL manages all TSCA-regulated materials, including PCBs, in compliance with all requirements.	3.10
EPA: 40 CFR 162 – 171 NYSDEC: 6 NYCRR 320 – 329	The <b>Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)</b> and corresponding New York State regulations govern the manufacture, use, storage, and disposal of pesticides and herbicides, as well as pesticide containers and residuals.	BNL employs New York State-certified pesticide applicators for the application of pesticides and herbicides on the site. Each applicator attends training as needed to maintain all certifications current. Annual reports detailing the types and quantity of pesticides applied are filed by each applicator each year by February 1st.	3.11
DOE: 10 CFR 1022 NYSDEC: 6 NYCRR 662 6 NYCRR 663 6 NYCRR 666	DOE regulations govern compliance with floodplain/wetland review requirements. The <b>New York State Fresh Water Wetlands</b> and <b>Wild, Scenic, and Recreational Rivers</b> regulations govern development in natural waterways. Development or projects occurring within ½ mile of regulated waters are subject to permitting by NYSDEC.	BNL is located within the Peconic River watershed and has several jurisdictional wetlands; consequently, development of locations in the north and east is subject to permitting by NYSDEC and review for compliance under DOE wetland/floodplain regulations. During 2002, two new projects were permitted under New York State programs.	3.12
U.S. Fish and Wildlife Service: 50 CFR 11 NYSDEC: 6 NYCRR 182	The <b>Endangered Species Act</b> and corresponding New York State regulation prohibit activities that would jeopardize the continued existence of an endangered or threatened species, or cause adverse modification to a critical habitat.	One New York State endangered species (the tiger salamander), three threatened (the banded sunfish, the swamp darter, and the stiff goldenrod), and eight species of special concern have been identified on site. The Laboratory has prepared a Wildlife Resource Management Plan that outlines activities to protect species and enhance their habitats.	3.13

Notes:

CFR = Code of Federal Regulations  
DOE = Department of Energy  
EPA = Environmental Protection Agency  
NYCRR = New York Codes, Rules, and Regulations

NYSDEC = New York State Department of Environmental Conservation  
NYSDOH = New York State Department of Health  
SCDHS = Suffolk County Department of Health Services  
SCSC = Suffolk County Sanitary Code

airborne emissions associated with the system would be properly controlled in conformance with 6 NYCRR 212 air pollution control requirements. NYSDEC approved the application in April and the treatment system began operating in May.

*Clean Air Act Title V.* Under the Clean Air Act Amendments of 1990 (CAAA), BNL is defined as a major emission source of criteria pollutants (NO<sub>x</sub> and SO<sub>2</sub>). As a major emission source, BNL was required to obtain a Title V operating permit. The process to obtain a Title V permit began in December 1998, when BNL filed a permit application with NYSDEC. After

NYSDEC completed their application review, they prepared a draft permit and released a notice of complete application in August 2001. The notice was subsequently published in local newspapers and the public was given an opportunity to comment on the draft permit through September 21, 2001. BNL requested several minor revisions; there were no comments from the public, and the EPA offered no objections to the terms and conditions of the draft permit. Following the comment period, NYSDEC issued a Title V operating permit to BNL on January 11, 2002.

Table 3-2. BNL Environmental Permits.

Issuing Agency	Bldg or Facility	Process/Permit Description	Permit ID No.	Expiration or Completion	Emmision Unit ID	Source ID
EPA	510	Calorimeter enclosure	BNL-689-01	None	NA	NA
EPA	705	Building ventilation	BNL-288-01	None	NA	NA
EPA	820	Accelerator test facility	BNL-589-01	None	NA	NA
EPA	AGS	AGS Booster - Accelerator	BNL-188-01	None	NA	NA
EPA	BNL	Underground Injection Control	NYU500001	11-Feb-11	NA	NA
EPA	RHIC	Accelerator	BNL-389-01	None	NA	NA
NYSDEC	517	Middle Road./S. Bndry. SPDES equiv.	1-51-009	30-Mar-02	NA	NA
NYSDEC	517	Middle Road./S. Bndry. Air equiv.	1-51-009	30-Mar-02	NA	NA
NYSDEC	521	OUIV Air Sparge - Air equiv.	NA	None	NA	NA
NYSDEC	539	W. South Bndry. - SPDES equiv.	1-52-009	31-Oct-06	NA	NA
NYSDEC	539	W. South Bndry. - Air equiv.	1-52-009	31-Oct-06	NA	NA
NYSDEC	598	OUI Remediation - SPDES equiv.	1-52-009	30-Mar-02	NA	NA
NYSDEC	598	OUI Remediation - Air equiv.	1-52-009	30-Mar-02	NA	NA
NYSDEC	598	Tritium Rem.- SPDES equiv.	1-52-009	30-Mar-02	NA	NA
NYSDEC	TR829	Carbon Tet. - SPDES equiv.	NA	None	NA	NA
NYSDEC	TR867	T-96 Remediation - Air equiv.	NA	None	NA	NA
NYSDEC	BNL	Hazardous Substance Bulk Storage Registration Certificate	1-000263	27-Jul-03	NA	NA
NYSDEC	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 and 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	PC 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 and 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
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	902	Epoxy coating/curing exhaust	1-4722-00032/00115	06-Jan-07	U-COILS	90206
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

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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	Emmision Unit ID	Source ID
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 - Haz Waste	WMF	Waste Management	1-4722-00032/00102	12-Jul-05	NA	NA
NYSDEC - Nat. Res.	AGS	Construction of AGS storage facility	1-4722-00032/00133	03-Jun-06	NA	NA
NYSDEC - Nat. Res.	RHIC	Liner installation at Bldg. 1010	1-4722-00032/00131	25-Apr-06	NA	NA
NYSDEC - Nat. Res.	RHIC	Construction of new recharge basin	1-4722-00032/00129	17-May-04	NA	NA
NYSDEC - Nat. Res.	STP	Sanitary Phase III Construction	1-4722-00032/00127	14-Mar-02	NA	NA
NYSDEC - NESHAPs	490	Asbestos test facility	1-4722-00032/00115	06-Jan-07	U-49001	4901A-1D
NYSDEC - NESHAPs	865	Lead smelting pot	1-4722-00032/00115	06-Jan-07	U-LEADM	86501
NYSDEC - NESHAPs	REF	Radiation Effects/Neutral Beam	BNL-789-01	None	NA	NA
NYSDEC - NESHAPs	RTF	Radiation Therapy Facility	BNL-489-01	None	NA	NA
NYSDEC - Water Quality	CSF	Major Petroleum Facility	1-1700	31-Mar-07	NA	NA
NYSDEC - Water Quality	STP	Sewage Plant and Recharge Basins	NY-0005835	01-Mar-05	NA	NA

Notes:  
 AGS = Alternating Gradient Synchrotron  
 CSF = Central Steam Facility  
 EPA = Environmental Protection Agency  
 NYSDEC = New York State Department of Environmental Conservation  
 NA = Not Applicable  
 REF = Radiation Effects Facility  
 RTF = Radiation Therapy Facility  
 RHIC = Relativistic Heavy Ion Collider  
 STP = Sewage Treatment Plant  
 WMF = Waste Management Facility

This 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 most 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 Underground Injection Control 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. Several changes to the permit occurred in 2002, essentially due to a change in the number of active UICs. During 2002, two UICs were closed and applications were filed for the installation of 12 new devices (see Section 3.7.3 for more details).

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 2002, environmental evaluations were completed for 114 proposed projects. Of these projects, 101 were considered minor actions requiring no additional documentation. The remaining 13 projects were addressed through the submission of Environmental Evaluation Notification Forms to the Department of Energy. Evaluation of these projects resulted in the determination that they were covered by existing Categorical Exclusions, as defined by 10 CFR 1021.

3.4 HISTORIC PRESERVATION AND ARCHAEOLOGY

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 training trenches associated with Camp Upton. In 2002, 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:

- Buildings 89, 90, and 91 – Warehouses
- Buildings 93 and 168 – Well houses
- Building 194 - Storage/laboratories/offices
- Building 318 – Laboratories/offices
- Building 324 – Apartments
- Building 426 – Laboratories/offices
- Building 428 - Incinerator

The annual Department of Interior questionnaire regarding historic and cultural resources was completed and submitted as required.

Additional activities in 2002 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 most 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 2002, natural gas was the predominant fuel burned in Boiler 6, whereas Boilers 5 and 7 burned mostly low nitrogen residual fuel oil.

For boilers with maximum operating heat inputs greater than or equal to 50 MMBtu/hr (14.6 MW), RACT requirements establish emission standards for oxides of nitrogen ( $\text{NO}_x$ ). Boilers with a maximum operating heat input between 50 and 250 MMBtu/hr (14.6 and 73.2 MW) can demonstrate compliance using periodic emission tests or by using continuous emission monitoring equipment. Emission tests conducted in 1995 confirmed that BNL Boilers 1A and 5, both of which are in this size category, met the  $\text{NO}_x$  emission standards when burning low nitrogen and sulfur content residual fuel oil (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  $\text{NO}_x$  emission standards for Boilers 6 and 7 was demonstrated by continuous emission monitoring of the flue gas. For the year 2002,  $\text{NO}_x$  emissions from Boilers 6 and 7 averaged 0.083 lbs/MMBtu and 0.224 lbs/MMBtu, respectively, and there were no known exceedances of the  $\text{NO}_x$  emission standard for either boiler.

##### 3.5.1.2 Ozone-Depleting Substances

*Refrigerants.* All refrigerant recovery and recycling equipment used by refrigerant service technicians is certified to meet refrigerant evacuation levels specified by 40 CFR 82.158. Under the preventative maintenance program, refrigeration and air conditioning equipment containing ozone-depleting substances, such as R-12 and R-22, is regularly inspected and maintained. 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.

Approximately 1 pound of R-12 and 671 pounds of R-22 were recovered and reclaimed for future use from equipment that was serviced during 2002.

*Halon.* Halon 1211 and 1301 are extremely efficient fire suppressants but are no longer acceptable, 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. Halon recovery and recycling devices are used when portable fire extinguishers or fixed systems are removed from service and during periodic hydrostatic testing of halon cylinders. In 2002, cylinders containing 360 pounds of Halon 1301 from two fixed fire suppression systems deactivated during the year were transferred to BNL's static inventory.

### 3.5.2 Hazardous Air Pollutants

In 1970, the Clean Air Act established standards to protect the general public from pollutants that may lead to death or an increase in irreversible or incapacitating illnesses. The National Emissions Standards for Hazardous Air Pollutants, known as 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 2002 determined that no MACT standards apply to 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 2002, 5,100 linear feet of asbestos-containing pipe insulation and 62,370 square feet of asbestos-containing surface material (principally roofing and vinyl asbestos floor tile) 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 2002 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 2002, the maximum off-site dose due to airborne radioactive emissions from BNL continued to be far below the 10 mrem (100  $\mu$ Sv) annual dose limit specified in 40 CFR 61 Subpart H. (See Chapter 4 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 0.086 mrem (0.8  $\mu$ Sv). See Chapter 8 for more information.

## 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 (1990). 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 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 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.

### 3.6.1 Sewage Treatment Plant

Sanitary and process wastewater generated by BNL operations is conveyed to the Sewage Treatment Plant (STP) for processing before being discharged to the Peconic River. The STP provides tertiary treatment of sanitary and process wastewater (i.e., biological reduction of organic matter and reduction of nitrogen). This treatment process became fully functional in 1998. Chapter 5 provides a detailed description of the treatment process. In 2002, BNL completed the third phase of sanitary upgrades, which included construction of a new aerobic solids digester, replacing or relining 16,000 linear feet of piping, relining holdup ponds used to hold wastewater suspected of containing

contaminants at concentrations that could jeopardize the STP effluent quality, and repairing or replacing piping that serves the sand filtration system.

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, but there were two exceedances of SPDES permit limits in 2002: one each for total suspended solids removal and fecal coliform. Figures 3-1 through 3-7 plot five-year trends (four years for mercury) for the maximum monthly concentrations of copper, iron, lead, mercury, silver, nickel, and zinc in the STP discharge. There were no exceedances for metals at the STP in 2002.

#### 3.6.1.1 Total Suspended Solids Removal

BNL is required to measure the influent and effluent concentrations of total suspended solids (TSS) twice monthly and to calculate and report the overall percent removal of TSS achieved by the treatment process. BNL is required to achieve an 85 percent removal of TSS as per the SPDES permit. While the concentration of TSS in the sewage treatment plant effluent was always well below the monthly maximum of 20 mg/L, the very low level of TSS entering the plant and the relative high limit of detection (i.e., 4 mg/L) for the effluent prevents accurate calculation of removal. The percent removal achieved in August was reported as greater than 82 percent, which did not meet the SPDES requirement of 85 percent. BNL did not report this as a permit violation because the effluent concentration was well below the permit limit and the excursion was the result of an inaccurate calculation. However, EPA and NYSDEC listed this incident as a permit violation.

#### 3.6.1.2 Fecal Coliform

A sample of STP effluent collected in July 2002 exhibited a fecal coliform concentration of 800 organisms per 100 milliliters, which exceeded the SPDES maximum limit of 400

CHAPTER 3: COMPLIANCE STATUS

**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)	48	79	Daily	90	0	100
pH (SU)	6.0	7.0	Continuous Recorder	Min. 5.8 Max. 9.0	0	100
Avg. 5-Day Biological Oxygen Demand (BOD) (mg/L)	< 2	2	Twice Monthly	10	0	100
Max. 5-Day BOD (mg/L)	< 2	2	Twice Monthly	20	0	100
% BOD Removal	> 89	> 98	Monthly	85	0	100
Avg. Total Suspended Solids (TSS) (mg/L)	< 4	< 6	Twice Monthly	10	0	100
Max. TSS (mg/L)	< 4	< 8	Twice Monthly	20	0	100
% TSS Removal	> 82	> 98	Monthly	85	1 <sup>(a)</sup>	92
Settleable Solids (ml/L)	0.0	0.0	Daily	0.1	0	100
Ammonia Nitrogen (mg/L)	< 0.1	0.47	Twice Monthly	2	0	100
Total Nitrogen (mg/L)	3.9	8.5	Twice Monthly	10	0	100
Total Phosphorus (mg/L)	1.1	2.0	Twice Monthly	NA	0	100
Cyanide (µg/L)	< 10	< 10	Twice Monthly	100	0	100
Copper (mg/L)	0.03	0.07	Twice Monthly	0.15	0	100
Iron (mg/L)	0.16	0.31	Twice Monthly	0.37	0	100
Lead (mg/L)	< 0.0008	0.004	Twice Monthly	0.019	0	100
Nickel (mg/L)	0.003	0.01	Twice Monthly	0.11	0	100
Silver (mg/L)	< 0.001	0.005	Twice Monthly	0.015	0	100
Zinc (mg/L)	0.02	0.1	Twice Monthly	0.1	0	100
Mercury (mg/L)	0.0001	0.0003	Twice Monthly	0.0008	0	100
Toluene (µg/L)	< 1	< 1	Twice Monthly	5	0	100
Methylene Chloride (µg/L)	< 1	1	Twice Monthly	5	0	100
1,1,1-Trichloroethane (µg/L)	< 1	< 1	Twice Monthly	5	0	100
2-Butanone (µg/L)	< 5	< 5	Twice Monthly	50	0	100
PCBs (µg/L)	< 0.065	< 0.065	Quarterly	NA	0	100
Max. Flow (MGD)	0.4	0.8	Continuous Recorder	2.3	0	100
Avg. Flow (MGD)	0.3	0.6	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 ml)	< 2	146	Twice Monthly	200	0	100
Max Fecal Coliform (MPN/100 ml)	< 2	800	Twice Monthly	400	1 <sup>(b)</sup>	97

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

MGD = Million Gallons per Day

MPN = Most Probable Number

NA = Not Applicable

SU = Standard Unit

<sup>(a)</sup>The calculated % TSS removal was greater than 82 percent in August. The TSS results were below the analytical detection limit and therefore the actual percent removal cannot be precisely determined.

<sup>(b)</sup>A permit exceedance of daily maximum fecal coliform concentration occurred in July of 2002. The sample was collected during cleaning of the UV disinfection system, which resulted in elevated coliform concentrations in the effluent for a very short period. The cleaning procedure has been modified to prevent future excursions.

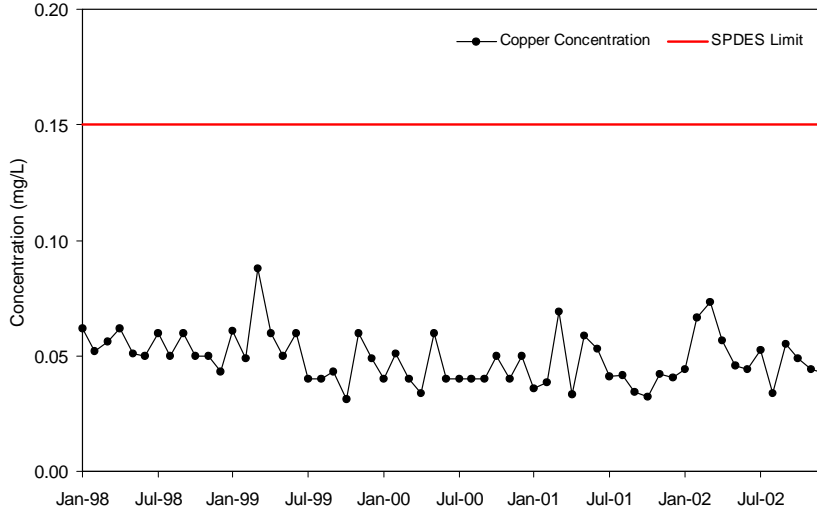


Figure 3-1. Maximum Concentration of Copper Discharged from the BNL Sewage Treatment Plant, 1998–2002.

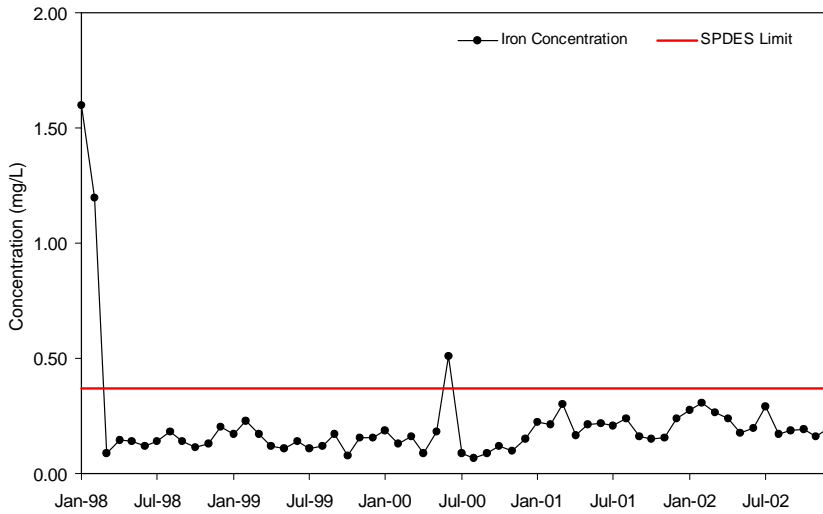


Figure 3-2. Maximum Concentration of Iron Discharged from the BNL Sewage Treatment Plant, 1998–2002.

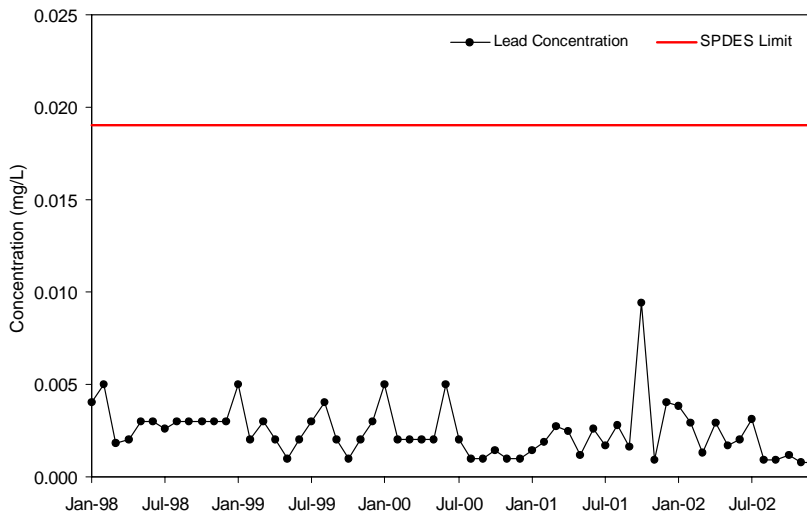
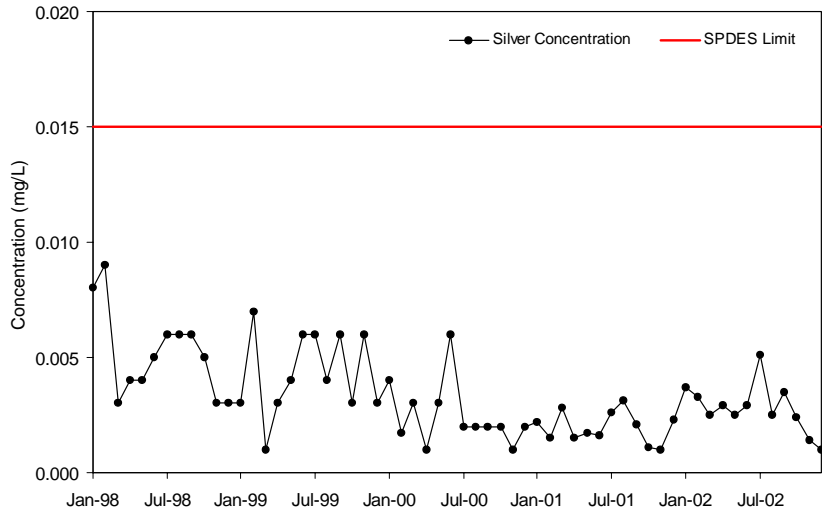
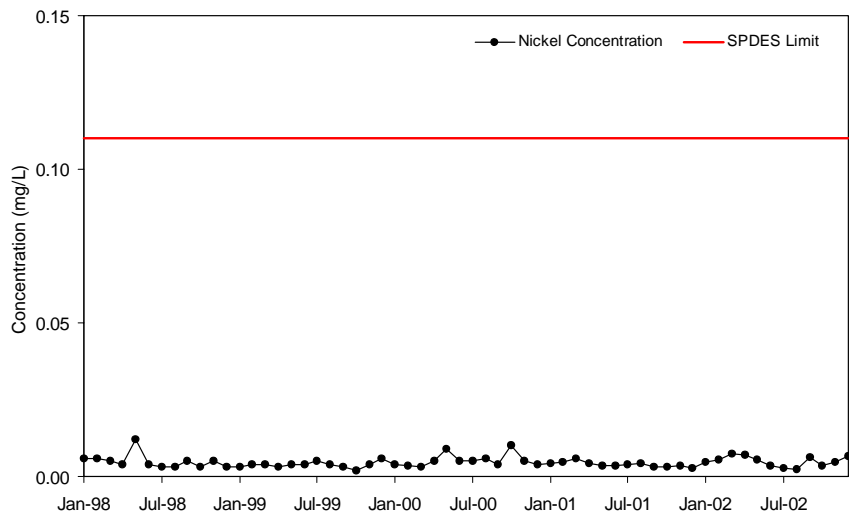


Figure 3-3. Maximum Concentration of Lead Discharged from the BNL Sewage Treatment Plant, 1998–2002.

**Figure 3-4. Maximum Concentration of Silver Discharged from the BNL Sewage Treatment Plant, 1998–2002.**



**Figure 3-5. Maximum Concentration of Nickel Discharged from the BNL Sewage Treatment Plant, 1998–2002.**



organisms per 100 milliliters. Investigation of the incident showed that the wastewater sample was collected immediately after the UV disinfection system light bulbs were cleaned. Although every effort is taken to ensure that at least one bank of UV disinfection lights is functional, a slug of water lying between the two banks could have elevated levels of coliform. Changes to the cleaning sequence were implemented to prevent this from recurring. There were no other excursions of coliform found in subsequent samples.

*3.6.1.3 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 2002. Samples are collected and tested quarterly. The program consists of performing seven-day chronic toxicity tests on two freshwater organisms: water fleas (*Ceriodaphnia dubia*) and fathead minnows (*Pimephales promelas*). Sets of 10 animals 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 were measured and compared to untreated organisms (i.e., controls). The test results are submitted to NYSDEC for review.



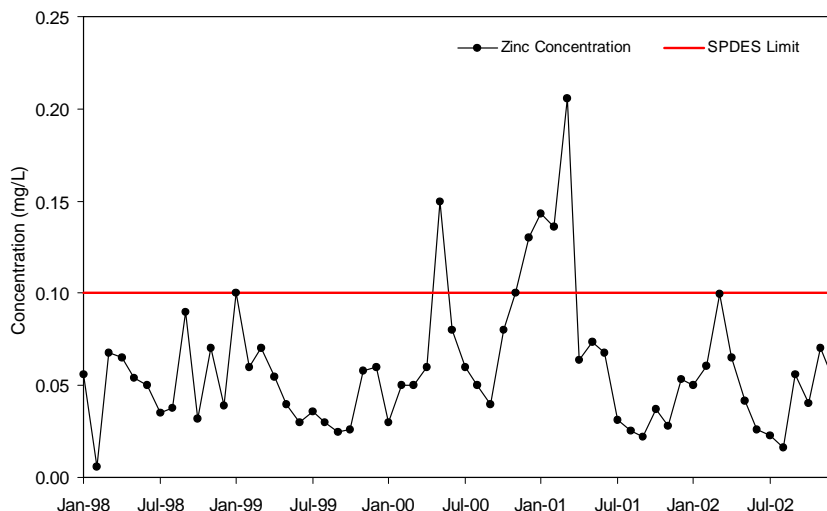


Figure 3-6. Maximum Concentration of Zinc Discharged from the BNL Sewage Treatment Plant, 1998–2002.

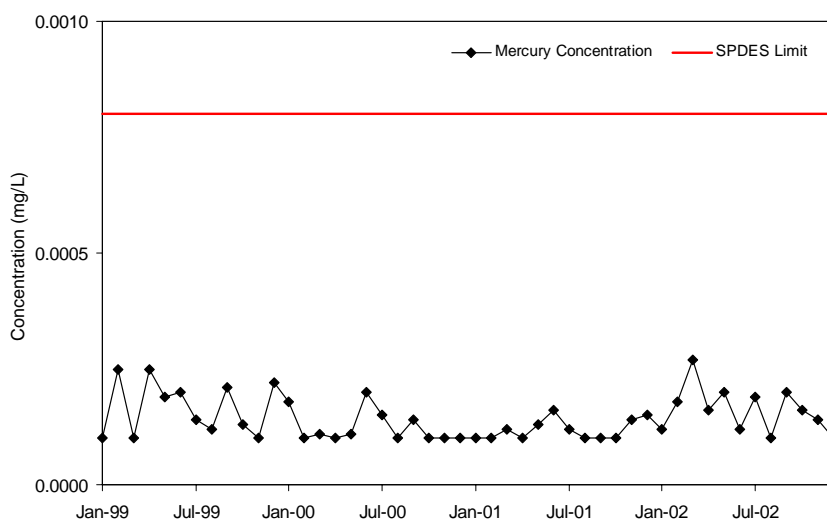


Figure 3-7. Maximum Concentration of Mercury Discharged from the BNL Sewage Treatment Plant, 1998–2002.

In 2002, two of the five tests for water flea reproduction and three of the five tests for the minnow (i.e., two growth and one survival) revealed toxicity. Comparison of chemical data to the toxicity data gave no indication of any single element or compound that would have contributed to these observations. In August 2002, NYSDEC notified BNL that because BNL was unable to document that the STP effluent had no toxicity on the test organisms, a toxicity reduction evaluation (TRE) had to be performed. A TRE is a series of toxicity tests performed using samples of the STP effluent after treatment. Treatments may include pH adjustment, treatment with a chelating agent, or treatment with activated

carbon. The TRE sequence that BNL and NYSDEC developed includes treatment with carbon, with EDTA (a chelating agent), and with thiosulfate (another chelating agent). Due to the intermittent nature of toxicity, the TRE only needs to be performed if toxicity is found in concentrations less than 50 percent. Tests conducted in September and December did not fail this criterion, so TREs were not performed in 2002.

### 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, depend-

ing on the type of wastewater received and the type of cooling water treatment reagents used. In 2002, there were many changes to the monitoring requirements for several of the recharge basins resulting from the change to the BNL SPDES permit. These changes include no monitoring of Outfalls 003 and 012, deletion of Outfalls 002A and 004, reduced monitoring at Outfall 007, and increased monitoring for Outfalls 002, 008, and 010. No monitoring requirements are imposed for Outfalls 009 and 011. Table 3-4 summarizes the monitoring requirements and performance results for 2002.

There were three permit excursions at these outfalls in 2002. Two were for exceedances of effluent limits for lead at Outfall 010. As reported in the 2000 and 2001 SERs, an area of lead-contaminated soil was discovered at Outfall 010. Resuspension of the sediment due to scouring causes elevated lead levels in water samples collected during rain events. To prevent further violation of the SPDES permit limits, a geotextile liner was installed at Outfall 010 in October. Subsequent sampling showed all lead levels to be within permit limits. A draft remedial action workplan has been prepared to remediate the contaminated soils. The third exceedance was for pH measured at Outfall 002. Investigation attributed the elevated pH to stormwater runoff from a construction site. Water samples collected immediately downstream of the site measured approximately 10 SU. The most probable cause was contact with freshly poured concrete and a new, crushed concrete parking lot base. Benchtop pH measurements of water mixed with crushed concrete were similar to those measured in the runoff. Improved erosion control measures should minimize future excursions of this nature.

**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 delegated to the New York State Department of Health (NYSDOH) and administered by the Suffolk County Department of Health Services (SCDHS). Because BNL provides potable water to “more than 25 full-time residents,” it is subject to the same requirements as a public water

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

Analyte	Outfall 002	Outfall 002B	Outfall 003 (a)	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007 (a)	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Comp.
Flow (MGD)	N	CR	CR	CR	CR	CR	CR	11	10	NA	NA	NA
	Min. 0.007	0.00001	0.5	0.047	0.037	0.12	0.16	0.00008	0.00007	NA	NA	NA
	Max. 0.51	0.006	0.5	0.30	0.10	0.71	0.36	0.54	0.21	NA	NA	NA
pH (SU)	Min. 6.3	7.2	6.7	6.2	7.2	7	6.7	6.5	6.5	NA	1	>99
	Max. 9.4 (b)	8.6	7.8	8.4	8.2	8.3	7.8	8.1	8.0	8.5, 9.0 (c)	0	100
Oil and Grease (mg/L)	N	10	2	12	12	12	NR	11	10	NA	0	100
	Min. <5	<5	<5	<5	<5	<1	NR	<5	<5	NA	0	100
	Max. <5	<5	<5	<5	<5	<5	NR	<5	<5	15	0	100
Copper (mg/L)	N	NR	NR	4	NR	NR	NR	NR	4	NA	0	100
	Min. NR	NR	NR	0.004	NR	NR	NR	NR	0.006	NA	0	100
	Max. NR	NR	NR	0.008	NR	NR	NR	NR	0.04	1.0	0	100
Aluminum (mg/L)	N	NR	NR	NR	NR	NR	NR	4	4	NA	0	100
	Min. 0.03	NR	NR	NR	NR	NR	NR	0.1	0.6	NA	0	100
	Max. 0.067	NR	NR	NR	NR	NR	NR	1	1.8	2.0	0	100

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

Analyte	Outfall 002	Outfall 002B	Outfall 003 <sup>(a)</sup>	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007 <sup>(a)</sup>	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances	% Comp.
Lead (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	4	NA	2	50
	Min.	NR	NR	NR	NR	NR	NR	NR	0.01	0.05		
	Max.	NR	NR	NR	NR	NR	NR	NR	0.1 <sup>(c)</sup>			
Vanadium (mg/L)	N	NR	NR	NR	NR	NR	NR	NR	4	NA	NA	NA
	Min.	NR	NR	NR	NR	NR	NR	NR	0.01			
	Max.	NR	NR	NR	NR	NR	NR	NR	0.04	NPL		
Iron (total) (mg/L)	N	NR	NR	NR	NR	NR	2	NR	NR	NA	NA	100
	Min.	NR	NR	NR	NR	NR	53.4	NR	NR	NA	NA	
	Max.	NR	NR	NR	NR	NR	160	NR	NR	NA	0	
Iron (dissolved) (mg/L)	N	NR	NR	NR	NR	NR	2	NR	NR	NA	NA	100
	Min.	NR	NR	NR	NR	NR	0.16	NR	NR	NA	NA	
	Max.	NR	NR	NR	NR	NR	2.32	NR	NR	NA	0	
Chloroform (µg/L)	N	NR	NR	NR	NR	NR	NR	NR	NR	NA	NA	100
	Min.	<0.5	NR	NR	NR	NR	NR	NR	NR	7	0	
	Max.	<1	NR	NR	NR	NR	NR	NR	NR			
Bromo-dichloromethane (µg/L)	N	NR	NR	NR	NR	NR	NR	NR	NR	NA	NA	100
	Min.	<0.5	NR	NR	NR	NR	NR	NR	NR	NA	0	
	Max.	<1	NR	NR	NR	NR	NR	NR	NR	5	0	
1,1,1-trichloroethane (µg/L)	N	NR	4	NR	NR	NR	NR	11	NR	NA	NA	100
	Min.	<1	NR	<1	NR	NR	NR	<1	NR	NA	0	
	Max.	<1	NR	<1	NR	NR	NR	<1	NR	5	0	
1,1-dichloroethylene (µg/L)	N	NR	NR	NR	NR	NR	NR	NR	NR	NA	NA	100
	Min.	NR	NR	NR	NR	NR	NR	NR	NR	NA	0	
	Max.	NR	NR	NR	NR	NR	NR	NR	NR	5	0	
Hydroxyethylidene-diphosphonic Acid (mg/L)	N	4	4	NA	4	4	NR	NR	NR	NA	NA	100
	Min.	<0.05	<0.05	NA	<0.05	<0.05	NR	NR	NR	NA	0	
	Max.	0.1	0.13	NA	<0.05	0.0	0.3	NR	NR	0.5	0	
Tolyltriazole (mg/L)	N	4	4	NA	4	4	NR	NR	NR	NA	NA	100
	Min.	<0.005	<0.005	NA	<0.005	<0.005	<0.005	NR	NR	NA	0	
	Max.	<0.005	<0.005	NA	<0.005	<0.005	<0.005	NR	NR	0.2	0	

Notes:

See Chapter 5, Figure 5-6 for locations of outfalls.  
 There are no monitoring requirements for Outfall 009, 011, and 012.  
 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  
<sup>(a)</sup> All monitoring at Outfall 003 and the total and dissolved iron monitoring at Outfall 007 was removed from the BNL SPDES permit with the February 2002 permit modification.  
<sup>(b)</sup> The pH at Outfall 002 on 12/20/02 was 9.4 due to interaction of crushed concrete and newly poured concrete with stormwater at a construction site within the drainage area for this recharge basin.  
<sup>(c)</sup> pH limit is 8.5 for Outfalls 005, 008, and 010. pH limit is 9.0 for Outfalls 002, 002B, 003, 006A, 006B, and 007.  
<sup>(d)</sup> The total lead concentration exceeded permit limits in March and September due to resuspension of contaminated sediments at the outfall. Filtered samples were below the permit limit.

supplier. Monitoring requirements are prescribed annually by SCDHS, and a *Potable Water Sampling and Analysis Plan* (Chaloupka 2002) is prepared to comply with these requirements. The 1996 amendments to the SDWA required preparation of a source water assessment for all sources of public drinking water. In December 2000, the *BNL Source Water Assessment for Drinking Water Supply Wells* was prepared in satisfaction of this requirement (Bennett et al. 2000). The assessment is designed as a management tool to further protect the sole-source aquifer system underlying the BNL site.

### 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 2002. Color and iron exceeded drinking water standards in samples collected from three of the wells prior to distribution. Treatment at the water treatment plant effectively reduced these levels to below drinking water standards. Bacteria were detected in several samples collected from the wells. The presence of bacteria was determined to be contamination of the sample collection tap. Heating the tap effectively exterminated the bacterial source and all subsequent samples tested negative for bacteria. At the point of consumption, all drinking water complied with primary drinking water standards during 2002. 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

public 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 also recommended to protect users within a specific facility from hazards that might be posed by intrafacility 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 190 cross-connection control units were tested in 2002, including primary and secondary devices. If a problem is encountered during testing, the device is repaired and re-tested to ensure proper function.

### 3.7.3 Underground Injection Control

Underground injection control wells are regulated under the SDWA. UICs at BNL 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 2002, BNL closed one UIC at Building 318 and one at Building 960. BNL installed 12 new UICs for management of stormwater due to the unavailability of storm water management systems. Applications were filed to install new UICs at Bldg. 974 (nine



**Table 3-5. Potable Water Wells and Potable Distribution System: Bacteriological, Inorganic Chemical, and Radiological Analytical Results (Maximum Concentration, Minimum pH Value).**

Analyte	Well No. 4 <sup>a</sup>	Well No. 6	Well No. 7	Well No. 10	Well No. 11	Well No. 12	Potable Distribution Sample	NYS DWS
<b>Water Quality Indicators</b>								
Total Coliform	ND	POS <sup>1</sup>	POS <sup>1</sup>	NA	POS <sup>2</sup>	POS <sup>2</sup>	ND	Negative
Color (Units)	NA	20 <sup>b</sup>	20 <sup>b</sup>	NA	< 5	< 5	< 5	15
Odor (Units)	NA	0	0	NA	0	0	0	3
Cyanide (µg/L)	NA	< 10	< 10	NA	< 10	< 10	< 10	NS
Conductivity (µmhos/cm)	NA	101	93	NA	298	301	229	SNS
Chlorides (mg/L)	NA	24.4	18.6	NA	21.6	14.6	14.1	250
Sulfates (mg/L)	NA	10.2	10.8	NA	9.3	8.5	12.7	250
Nitrates (mg/L)	NA	0.34	0.31	NA	0.43	0.47	0.48	10
Nitrites (mg/L)	NA	< 0.10	< 0.10	NA	< 0.10	< 0.10	< 0.10	1.0
Ammonia (mg/L)	NA	< 0.10	< 0.10	NA	< 0.10	< 0.10	< 0.10	SNS
pH (Standard Units)	NA	7.1	5.8	NA	5.8	5.7	5.7	SNS
MBAS (mg/L)	NA	< 0.08	< 0.08	NA	< 0.08	< 0.08	< 0.08	SNS
<b>Metals</b>								
Antimony (µg/L)	NA	< 5.9	< 5.9	NA	< 5.9	< 5.9	< 5.9	6.0
Arsenic (µg/L)	NA	< 3.0	< 3.0	NA	< 3.0	< 3.0	< 3.0	50
Barium (mg/L)	NA	< 0.2	< 0.2	NA	< 0.2	< 0.2	< 0.2	2.0
Beryllium (µg/L)	NA	< 3.0	< 3.0	NA	< 3.0	< 3.0	< 3.0	4.0
Cadmium (µg/L)	NA	< 5.0	< 5.0	NA	< 5.0	< 5.0	< 5.0	5.0
Chromium (mg/L)	NA	< 0.01	< 0.01	NA	< 0.01	< 0.01	< 0.01	0.1
Fluoride (mg/L)	NA	< 0.10	< 0.10	NA	< 0.10	< 0.10	< 0.10	2.2
Iron (mg/L)	NA	1.83 <sup>b</sup>	0.77 <sup>b</sup>	NA	0.35 <sup>c</sup>	< 0.02	0.03	0.3
Lead (µg/L)	NA	< 1.0	1.5	NA	< 1.0	< 1.0	1.0	15
Manganese (mg/L)	NA	0.04	0.02	NA	0.01	< 0.01	0.01	0.3
Mercury (µg/L)	NA	< 0.2	< 0.2	NA	< 0.2	< 0.2	< 0.2	2.0
Nickel (mg/L)	NA	0.39	< 0.04	NA	< 0.04	< 0.04	< 0.04	SNS
Selenium (µg/L)	NA	< 5.0	< 5.0	NA	< 5.0	< 5.0	< 5.0	50.0
Sodium (mg/L)	NA	19.1	21.5	NA	15.2	12.9	25.6	SNS
Silver (µg/L)	NA	< 10	< 10	NA	< 10	< 10	< 10	100
Thallium (µg/L)	NA	< 1.9	< 1.9	NA	< 1.9	< 1.9	< 1.9	2.0
Zinc (mg/L)	NA	< 0.02	< 0.02	NA	< 0.02	< 0.02	< 0.02	5.0
<b>Radioactivity</b>								
Gross Alpha Activity (pCi/L)	< 0.58	1.03	2.86	NA	0.87	0.94	NR	15.0
Beta (pCi/L)	< 1.69	< 2.15	1.86	NA	1.79	< 2.15	NR	50.0
Tritium (pCi/L)	< 286	< 353	< 353	NA	< 353	< 353	NR	20,000
Strontium-90 (pCi/L)	< 1.0	< 1.0	< 1.0	NA	< 1.0	< 1.0	NR	8.0
<b>Other</b>								
Asbestos (M. fibers/L)	NR	NR	NR	NR	NR	NR	< 0.18	7
Calcium (mg/L)	NR	NR	NR	NR	NR	NR	9.6	SNS
Alkalinity (mg/L)	NR	NR	NR	NR	NR	NR	52.3	SNS

**Notes:**

See Figure 7-2 for well locations.

MBAS = Methylene Blue Active Substances

NA = Not Analyzed due to well shutdown

ND = Not Detected

NR = Analysis Not Required

POS = Positive for total coliform

SNS = Drinking Water Standard Not Specified

NYS DWS = New York State Drinking Water Standard

<sup>a</sup> Well #4 was not operational during the annual sampling for water quality and metals.<sup>b</sup> Water is treated at the WTP for color and iron before distribution.<sup>c</sup> Potable well #11 tested above the NYS DWS for iron on 7/11/02.

Subsequent sampling and analysis resulted in an iron concentration of 0.01 mg/L. The 7/11/02 analysis is therefore considered a false positive.

<sup>1</sup> Potable wells #6 and #7 tested positive for total coliform when sampled on 7/11 and 7/17/02. The wells tested negative for total coliform on 7/17/02 after sterilization of the sampling port.<sup>2</sup> The treated (granulated activated carbon) systems for potable wells #11 and #12 tested positive for total coliform on 7/1/02 and 10/10/02 respectively. The systems tested negative for total coliform after sterilization of the sampling ports on 7/15/02 and 10/14/02 respectively.

CHAPTER 3: COMPLIANCE STATUS

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7 µg/L	Well No. 10	Well No. 11	Well No. 12	NYS DWS
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
Fluorotrichloromethane	< 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	< MDL	7.0	17.1	12.4	< MDL	< 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
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

(continued on next page)

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7 µg/L	Well No. 10	Well No. 11	Well No. 12	NYS DWS
m,p-xylene	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	5
o-xylene	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	5
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. Butylether	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Lindane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.2
Heptaclor	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.4
Aldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	5
Heptachlor Epoxide	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.2
Dieldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	5
Endrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.2
Methoxychlor	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	40
Toxaphene	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	3
Chlordane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	2
Total PCB's	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.5
2,4,5,-TP (Silvex)	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	10
Dinoseb	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Dalapon	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Pichloram	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Dicamba	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Pentachlorophenol	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	1
Hexachlorocyclopentadiene	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	5
Bis(2-ethylhexyl)Phthalate	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Bis(2-ethylhexyl)Adipate	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Hexachlorobenzene	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	5
Benzo(A)Pyrene	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Aldicarb Sulfone	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	SNS
Aldicarb Sulfoxide	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	SNS
Aldicarb	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	SNS
Oxamyl	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
3-Hydroxycarbofuran	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Carbofuran	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	40

(continued on next page)

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

Compound	WTP Effluent	Well No. 4	Well No. 6	Well No. 7 µg/L	Well No. 10	Well No. 11	Well No. 12	NYS DWS
Carbaryl	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Methonmyl	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	SNS
Glyphosate	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Diquat	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
1,2-dibromomethane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.05
1,2-dibromoethane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.05
1,2-dibromo-3-chloropropane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	0.2
2,4,-D	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Alachor	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	2
Simazine	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Atrazine	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	3
Metolachor	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Metribuzin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Butachlor	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50
Endothall	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	100
Propachlor	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	50

Notes:

See Chapter 7, Figure 7-2 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 standards.

All values are the maximum observed concentration for all samples collected.

<MDL = Less than the minimum detection limit for the analyte in question

SNS = Drinking Water Standard not specified

NYS DWS = New York State Drinking Water Standard

WTP = Water Treatment Plant

devices) and Buildings 634, 635, and 637 (one device each). The UIC inventory on file with EPA will be updated as these devices are installed.

**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 is updated triennially and was last updated in December 2000 (Chaloupka 2000). BNL remained in full compliance with the SPCC requirements in 2002.

Revisions to the SPCC rules were issued in July 2002 to reduce the reporting burden on some facilities while making the rule language easier to understand. One benefit for BNL is the



reduced frequency of updating the SPCC plan. The revised rule calls for updates every five years as compared with the old rule of every three years. Since BNL will have to update its plan to address issues such as a revised cross-reference and an updated training section, BNL will update the plan in 2003, then modify the review cycle to five years.

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.

### 3.8.2 Local and State Reporting Requirements

The Emergency Planning and Community Right-to-Know Act (EPCRA) (42 USC 11001) and Title III of the Superfund Amendments and Reauthorization Act (SARA) require that facilities report inventories and releases of certain chemicals that exceed specific storage 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 2002 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 thresholds were significantly lowered for mercury, polychlorinated biphenyls (PCBs), and lead. Mercury and PCB thresholds were lowered from 10,000 pounds to just 10 pounds, and lead from 10,000 to 100 pounds. In 2002, BNL was required to submit reports for these three classes of chemicals. In total, 600 pounds of mercury and 30,668 pounds of lead were reported in the Form R Toxic Release Inventory Report, which was submitted in June 2002. However, due to an oversight, PCB releases were not reported with the 2002 Form R. Approximately 14 pounds of PCBs were disposed in 2002, mainly from restoration

activities and disposal of spill residuals from leaks from old fluorescent light ballasts. A revised report will be submitted in early 2003 to correct this omission. Additionally, the total weight of lead disposed in 2002 will be revised to 48,302 pounds.

There were no releases of extremely hazardous substances reported under Part 304 during 2002.

### 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 soils or surface water is reportable to both NYSDEC and SCDHS. In addition, releases of petroleum products greater than 5 gallons to outdoor impermeable surfaces or containment areas are also reported. Spills of chemicals in quantities greater than CERCLA-reportable quantities are reportable to the National Response Center, NYSDEC, and SCDHS. Remediation of the spill is conducted as necessary to restore the site.

During 2002, there were 52 spills, of which 19 met external agency reporting criteria. These 19 reports are summarized in Table 3-7. The remaining releases were either small-volume releases to containment areas or other impermeable surfaces, or were gaseous releases that did not exceed a reportable quantity. Seventeen of the 19 reported releases involved very small volumes (< 10 gallons) of petroleum products that reached soils. New York State has a “zero tolerance” level for releases of oils to soil or water; consequently, spills of any amount to soil are reportable. Of the 17 spills, eight were releases from hydraulic systems on earth-moving equipment, four were associated with diesel fuel releases, two were for gasoline

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

BNL Spill Number and Date	Material and Quantity	ORPS Report*	Source/Cause and Corrective Actions
02-02 1/16/02	Hydraulic fluid 9 gallons	No	The hydraulic line on a BNL Load Luger being used in the Plant Engineering (EP) Transfer Yard failed, resulting in a spill to soil. The operator immediately put plastic bins under the vehicle to capture the leak and put absorbent pads on the affected soil. BNL personnel removed the soil and absorbent material and containerized them for off-site disposal. The initial report to regulatory agencies estimated that 15 gal of oil had been spilled, based on the capacity of the Load Luger and the amount captured in the plastic bins. However, later calculations indicated a smaller spill, of 7 to 9 gallons.
02-04 1/28/02	Hydraulic fluid 2 quarts	No	The hydraulic line failed on a backhoe being used to chop concrete at the Brookhaven Graphite Research Reactor (BGRR) remediation project at Bldg. 701. The operator immediately put a plastic container under the backhoe, collecting most of the hydraulic fluid, but about 2 quarts went onto the ground. BNL personnel removed the impacted road base material and containerized it for off-site disposal.
02-08 3/1/02	Fuel oil (No.2) 2-5 gallons	No	During the planned removal of a 1,000-gal UST at Bldg. 575, three pin-size holes were seen in the side of the tank and the underlying soil looked dark. With a Suffolk County Sanitary Engineer present, oily soil was removed until clean soil was encountered, resulting in a hole extending about 11 ft from grade in the area below the tank. About 6 cubic yards of oily soil were collected for off-site disposal. Samples taken after excavation was complete did not show any residual contamination.
02-09 3/5/02	Gasoline 2-4 gallons	No	The operator of a BNL pickup truck noticed gasoline spilling from one of the two gas tanks on board. Investigation revealed that during installation, the rear return line had been crimped so fuel could move from one tank to the other without an equalizing return. This resulted in overfill of one of the tanks while driving. The spill impacted the asphalt road surface and nearby soil. BNL personnel removed the soil and absorbent material and containerized them for off-site disposal.
02-11 3/7/02	Hydraulic fluid 1 gallon	No	While a BNL front-end loader was clearing the area behind Bldg. 650, a hydraulic line failed and spilled less than 1 gal of fluid onto the soil. BNL spill personnel removed the soil and containerized it for off-site disposal.
02-13 3/18/02	Hydraulic fluid ~ 1 quart	No	The hydraulic line for the bucket of a contractor's excavator failed while the old storm drain system at Building 650 was being removed. Hydraulic fluid leaked onto a concrete pad and soil. A tray was put under the leak and absorbent material was put on the ground. BNL personnel removed the soil and the absorbent material, containerizing them for off-site disposal.
02-14 3/29/02	Diesel fuel > 10 gallons	Yes (CH-BH- BNL-PE- 2002-0001)	During the planned removal of a 275-gal UST at Bldg. 423, rust and holes were seen in the side of the tank and the underlying soil was darker than normal. With a Suffolk County Sanitary Engineer present, contaminated soil was removed until the 12-foot limit of the backhoe was reached, resulting in a hole 11 ft deep and 7 ft wide. Samples taken at this point did not show any contamination. A sheet of plastic was placed to prevent rainwater intrusion and the hole was backfilled. Approximately 15 cubic yards of contaminated soil were removed for off-site disposal.
02-30 7/1/02	Fuel oil (No. 2) < 5 gallons	No	During the planned removal of a 4,000-gal UST at Bldg. T-91, two pin-size holes were seen in the top and bottom of the tank and the soil underneath looked dark. With a Suffolk County Sanitary Engineer present, soil was removed until clean soil was encountered. Nine cubic yards of soil were collected for off-site disposal. The SCDHS engineer was confident all contaminated soil had been removed and no end-point samples were required.
02-32 7/2/02	Fuel oil (No. 2) 100 gallons	Yes (CH-BH- BNL-PE- 2002-0006)	During the planned removal of a 1,000-gal UST on the north side of Building T-90, several holes were seen in the tank. With a Suffolk County Sanitary Engineer present, soil was removed until clean soil was encountered at about 13 ft. The SCDHS engineer was confident all contaminated soil had been removed and no end point samples were required. Thirty cubic yards of soil were containerized for off-site disposal.
02-33 7/11/02	Hydraulic Fluid 2 gallons	No	A seal failed on the lifting arm of a power-screen being used at the glass holes remediation area, releasing 2 gal of hydraulic fluid onto the soil. BNL personnel removed the soil and absorbent material for off-site disposal. Because there is a geotextile under that soil, this was considered a release in a contained area rather than to the environment, so regulatory reporting was unnecessary. However, after the report was written, the geotextile material was discovered to be permeable (i.e., not a geomembrane); therefore, a spill to the environment had occurred and regulatory reporting was necessary.

(continued on next page)

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

BNL Spill Number and Date	Material and Quantity	ORPS Report*	Source/Cause and Corrective Actions
02-34 7/15/02	Gasoline 2-3 gallons	No	BNL personnel accidentally ran over a fence post behind Bldg. 463, piercing the gasoline tank on their utility vehicle. Approximately 2 to 3 gallons of gasoline were released to the asphalt road and adjoining soil. BNL personnel removed the soil and absorbent material and containerized them for off-site disposal.
02-35 8/1/02	Diesel fuel 2 gallons	No	A portable trailer-mounted emergency generator leaked diesel fuel from a fitting on the fuel ejector line. Diesel fuel leaked into the tray below and onto the asphalt and nearby grass and soil. BNL personnel removed the soil and absorbent material, containerizing them for off-site disposal.
02-36 8/7/02	Hydraulic fluid <1 pint	No	A Payloader at the glass hole remediation area experienced a failure in the hydraulic system, resulting in a spill to the soil. The vehicle was moved onto plastic and BNL personnel removed the soil and containerized it for off-site disposal.
02-38 8/12/02	Hydraulic fluid 2 gallons	No	A BNL Payloader working in the tree recycling area drove over a tree stump that sheared the fitting off the hydraulic line for the front bucket, releasing hydraulic fluid to the cab of the Payloader and soil beneath it. BNL personnel performed on-site repairs to move the Payloader and initiate cleanup. They removed the affected soil and trees and containerized them for off-site disposal.
02/39 8/22/02	Hydraulic fluid 1 quart	No	A hydraulic fitting failed on a BNL forklift during outdoor use near Bldg. 244. The spill created a 20- to 30-ft line of hydraulic fluid along the building's asphalt parking lot, concrete, and across a 4-ft section of deteriorated asphalt where soil was exposed. BNL personnel removed the affected soil and absorbent material and containerized them for off-site disposal.
02-41 8/29/02	Diesel fuel < 1 quart	No	A 5-gal bucket containing used diesel fuel filters in the back of a BNL pickup truck tipped over during a heavy rainstorm, spilling diesel fuel on the truckbed and the asphalt behind Bldg. 452. Rainwater carried petroleum sheen to the nearby stormwater catch basin. Absorbent pigs and pads were put around the catch basin and a section of the road was closed to traffic, to eliminate spread of the material to other areas. Additional absorbent pigs were placed at the cross section of this leg of the stormwater system and the main channel to prevent diesel fuel from reaching the HS recharge basin that collects storm water from this area of the site. The recharge basin was inspected for visual signs of petroleum sheen but none were found. Corrective actions resulting from the spill included a twist-on lid for the bucket and securing the bucket in the truckbed with bungee cords.
02/45 10/9/02	Diesel fuel 2 pints	No	During an asphalt repaving project on Railroad Ave. and associated parking lots/areas, contractor personnel released diesel fuel to the adjacent grass when refueling an asphalt roller truck with their truckbed-mounted fuel tank delivery hose. BNL personnel removed the impacted soil and grass and containerized them for off-site disposal.
02-48 11/7/02	Fuel oil (No. 2) Unknown	Yes (CH-BH- BNL-BNL- 2002-0012)	The Environmental Restoration Division is characterizing the former Hazardous Waste Management Facility in preparation for remediation. A portion of the investigation includes collecting soil samples near a UST formerly used for fuel. Analysis of the samples showed petroleum products above NY State soil action levels. Additional soil samples will be collected to delineate the area of contamination and estimate the amount of fuel oil represented.
02-49 11/19/02	Diesel fuel 4 gallons	No	The fuel line on a BNL tractor-trailer failed near Bldg. 938, resulting in a spill to soil. Cleanup was begun immediately and the impacted soil was excavated based on odor. Nine 55-gal drums of contaminated soil were removed from an area approximately 17 ft in diameter and 2 in. deep. One area in the center of the circle was excavated to approximately 8 in. An SCDHS engineer inspected the remediation on 11/20/02 and agreed that the spill had been satisfactorily remediated; therefore, soil sampling was not needed.

\*ORPS Report: Release is reportable to the Department of Energy under the requirements of DOE Order 232.1A, Occurrence Reporting and Processing of Operations Information.

releases, and three were associated with underground tank removals.

There were two larger spills reported during 2002, each exceeding 10 gallons. Both spills were associated with leaks from underground storage tanks that were discovered during tank removal; one tank stored diesel fuel and the second tank stored fuel oil. 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 environmental consequences 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 (MPF) licensing by NYSDEC. BNL maintains an MPF License for storing and transferring oil at the Central Steam Facility. During 2002, 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. Groundwater monitoring consists of monthly checks for floating products and twice-yearly tests for volatile and semivolatile organic compounds. In 2002, no contaminants or floating products were found in groundwater wells attributable to MPF activities. See Chapter 7 for additional information on groundwater monitoring results.

The petroleum facility is inspected annually by NYSDEC. The 2002 annual inspection was conducted in April. The inspection noted six

conditions that required corrective action, one related to the operations at the MPF and four related to diesel fuel storage at Bldg. 326. At the MPF, the inspection noted that a modification was needed to the rectifiers that provide cathodic protection of the aboveground storage tanks. At Bldg. 326, noted issues included color-coding of fill ports, accumulation of precipitation, repair to rusting tank saddles on one of three tanks, and testing of the secondary containment system. All issues were closed by the end of the year. In followup to issues raised during the 2001 inspection, a meeting was held with NYSDEC in March to discuss the path forward to repairing the secondary containment serving Tank No. 12. As previously documented, the containment for this tank did not meet the permeability rate recommended in New York State guidelines. BNL and NYSDEC agreed to an 18-month repair schedule. A new containment basin will be constructed by September 30, 2003.

#### **3.8.5 Chemical Bulk Storage**

All underground tanks, and all aboveground tanks larger than 185 gallons that store specific chemical substances listed in 6 NYCRR 597, must be registered with NYSDEC. BNL holds a Hazardous Substance Bulk Storage Registration Certificate. At the start of 2002, BNL had 14 registered tanks: 13 aboveground tanks storing water treatment chemicals (for cooling towers, wastewater, or potable water treatment), and one tank for storing gallium trichloride formerly used in neutrino experiments. The tanks range in size from 200 to 2,000 gallons. During 2002, there were numerous changes to the inventory of tanks storing chemicals. Six of nine 200-gallon tanks storing sodium hypochlorite for potable water disinfection were replaced with tanks storing only 150 gallons, thereby deregulating them under the Chemical Bulk Storage program. These tanks are still regulated under Suffolk County Sanitary Code Article 12 and are managed in accordance with BNL procedures designed to conform to Suffolk County requirements. One of the 200-gallon tanks was removed from service, and a 1,000-gallon hypochlorite storage tank was replaced by two 500-gallon tanks to address fire protection requirements.

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

<p><b>ORPS* ID:</b> CH-BH-BNL-BNL-2002-0001</p> <p>On the weekend of Dec. 8-9, 2001, approximately 8,000 gal of rainwater flooded Bldg. 801's basement. This was caused by excavation damage to the stormwater piping from the Brookhaven Graphite Research Reactor (BGRR) and surrounding areas, coupled with ¾" of rain. Rainwater collected in the F and D waste cells, designated as radiological areas. Samples of water on the floor of these cells just after the flood showed Cs-137 levels between 167 and 219 pCi/L. (The drinking water standard for Cs-137 is 200 pCi/L.) Although the walls and floor in this area are coated with an epoxy-based material to prevent liquids from escaping, it had failed in some areas of the floor. As plans were being developed to manage the water, its level in the waste cells was seen to be decreasing. This was first attributed to evaporation, but investigations showed that up to 3,000 gal of slightly contaminated water might have seeped through the basement floor and walls into the surrounding soil. The contents of the waste tanks were pumped to a tanker trailer on 3/8/02, for off-site disposal as radioactive waste. Analysis of the combined rain- and wastewater found a Cs-137 level of 724 pCi/L and a Sr-90 level of 560 pCi/L. A technical team was formed which processed the data associated with the contaminated rainwater and developed recommendations for assessing the environmental impact and preventing a recurrence. This team determined that the groundwater threat from Cs-137 was unlikely, because Cs-137 is attracted to soil. The Sr-90 does threaten the groundwater, but because Sr-90 migrates slowly, it should be remediated by a groundwater cleanup system to be installed in FY 2004. The potential groundwater contamination from this release will be evaluated as part of the OU III characterization study.</p>	<p><b>Date:</b> 12/14/01  <b>Status:</b> Open: While DOE has accepted the ORPS report, one corrective action remains open: the evaluation of potential groundwater contamination as part of the Operable Unit III characterization study.</p>
<p><b>ORPS* ID:</b> CH-BH-BNL-BNL-2002-0002</p> <p>BNL routinely samples meat from deer killed in vehicular accidents both on and off site. Samples are analyzed for Cs-137 and results are reported in the annual Site Environmental Report. A deer sample from the William Floyd parkway near the laboratory was found to have a Cs-137 concentration of 21.1 pCi/g after confirmatory analysis—twice the highest concentration found to date, from a sample in 1996. Using the New York State Department of Health (NYSDOH) assumptions for annual deer meat consumption, this sample would result in a dose of 30 millirems, exceeding the New York State limit of 10 millirems per year. The Community Advisory Council was informed of this at its monthly meeting on 2/14/02. The sample was submitted to NYSDOH for analysis, where it showed only 8.0 to 8.7 pCi/g of Cs-137. A BNL investigation team was formed and found that the sample had been recounted three times on the same detector at the BNL Analytical Services Laboratory (ASL) using an inappropriate calibration standard. The sample was recounted using a different detector and the results confirmed the lower Cs-137 result obtained by NYSDOH. Corrective actions focused on reducing the potential for deer access to contaminated areas and improving data analysis and quality assurance measures.</p>	<p><b>Date:</b> 1/31/02  <b>Status:</b> Closed: All corrective actions have been completed.</p>
<p><b>ORPS* ID:</b> CH-BH-BNL-BNL-2002-0003</p> <p>Elevated stormwater lead concentrations reported in the 1999 and 2000 Site Environmental Reports, which were above the New York State Groundwater discharge standard of 50 µg/L, prompted an investigation. Soil sampling conducted by BNL and the Suffolk County Department of Health in the Fall of 2001 found soil lead levels as high as 55,000 mg/kg. Historical burning of waste oils and discharge of boiler wash water from the Central Steam Facility to this outfall is thought to be the most likely direct and root cause of the soil contamination. A remedial action plan and cost analysis were developed; the remediation of this area will proceed once funding is obtained.</p>	<p><b>Date:</b> 3/5/02  <b>Status:</b> Closed: All corrective actions have been completed.</p>
<p><b>ORPS* ID:</b> CH-BH-BNL-PE-2002-0002</p> <p>The BNL garbage truck alarmed the vehicle radiation monitor as it drove through. Facility Support technicians surveyed the contents after they were emptied and found that several 24" x 24" x 2" air filters were radiologically contaminated. An investigation revealed that the filters came from air handlers in Bldg. 914. The filter replacement was completed on a general radiation work permit and the technicians did not notice the Activation Check Required exit requirement on the Radiation Area posting outside of Bldg. 914. Future work planning will ensure that location-specific hazards and necessary controls are explicitly conveyed to workers.</p>	<p><b>Date:</b> 4/29/02  <b>Status:</b> Closed: All corrective actions have been completed.</p>
<p><b>ORPS* ID:</b> CH-BH-BNL-BNL-2002-0008</p> <p>A commercial driver making a routine delivery noticed a wet container in the truck. He contacted the material during his inspection. When notifying BNL personnel of the incident, he mentioned numbness in his hands and arms and was taken to a local hospital for observation and treatment. The shipping manifest listed four bottles of dichloromethane, one of which had broken during transit. The shipping company (New Penn) evaluated the incident and found that their loading and bracing procedures had not been followed precisely. New Penn provided BNL with the measures taken to prevent recurrence.</p>	<p><b>Date:</b> 7/1/02  <b>Status:</b> Closed: All corrective actions have been completed.</p>

\* Occurrence Report: Release is reportable to the Department of Energy under the requirements of DOE Order 232.1A, Occurrence Reporting and Processing of Operations Information.



NYSDEC did not inspect the Chemical Bulk Storage facilities in 2002. In followup to open items from the 2001 Chemical Bulk Storage inspection, BNL constructed chemical off-loading pads at four facilities. These pads are constructed of concrete and are designed to contain spillage should it occur from delivery vehicles or transfer hoses. At the end of 2002, all conventional construction was complete, but due to cold weather, coating the containment areas to ensure impermeability was deferred to the spring of 2003.

### 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 with SCDHS in which DOE and BNL agreed to conform to the environmental requirements of Article 12.

BNL has approximately 411 active storage facilities listed in the Suffolk County Tanks Database. Also included in the county database are another 41 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.

At the close of 2002, 175 of the active tanks listed in the Suffolk County database fully conformed with all Article 12 administrative, maintenance, and technical requirements. Approximately 141 active tanks require administrative corrective actions (e.g., corrected registrations, submittal of as-built design plans to SCDHS, proper labeling, etc.) or maintenance (e.g., replacement of light bulbs). Fewer than 5 percent of the active facilities were found to be in

technical nonconformance with Article 12 requirements (e.g., no secondary containment, no high-level detection).

BNL has an ongoing program to upgrade or replace existing storage facilities and to meet with representatives of SCDHS regularly to discuss storage issues. In September 2000, BNL initiated a project plan to achieve full conformance with Article 12 requirements by the end of calendar year 2003. This Article 12 Improvements Project is primarily divided into two major tasks. The first task involves designing and constructing modifications to storage facilities that require technical upgrades to bring them into conformance with Article 12. The second task involves preparing as-built design plans for many other existing on-site storage facilities that already conform to Article 12 standards. At the close of 2002, construction activities for those tanks requiring upgrades were completed and final as-built plans for approximately 50 registered storage facilities had been prepared. In 2003, BNL will arrange for final inspections of all storage facilities included in the upgrade project and will prepare various as-built packages for transmittal to SCDHS for review and final approval.

Revisions to the *Storage and Transfer of Toxic or Hazardous Materials* laboratory procedure, which primarily addresses SCDHS Article 12 regulations, were completed in April 2002. In an effort to continuously improve BNL operations and minimize impacts to the environment, the procedure was revised to include measures for handling surface water runoff from outdoor storage or work areas (e.g., excess material storage yards, welding areas, shielding storage areas). In addition, design guidelines and requirements for planning, operating, and dismantling an outdoor storage or work area were included in these revisions.

### 3.9 RESOURCE CONSERVATION AND RECOVERY ACT

The 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 prior to off-site shipment for treatment and disposal. As noted in Chapter 2, BNL has a number of 90-day storage and satellite accumulation areas.

On August 28, 2002, NYSDEC conducted its annual inspection of the BNL hazardous waste management operations and issued a Preliminary Finding and Administrative Complaint for three administrative deficiencies. One item, a missing label, was corrected during the inspection. The two remaining issues deal with the management of CERCLA-derived wastes and preparation of a Land Disposal Restriction for intra-laboratory shipments of waste. These deficiencies are being reviewed by BNL management and counsel to determine the validity of the issues and their applicability to BNL.

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 will be 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.

### 3.10 POLYCHLORINATED BYPHENYLS

The storage, handling, and use of PCBs are regulated under the Toxic Substance and

Control Act (TSCA). Capacitors manufactured prior to 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 2002.

### 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 are also applied to agricultural research fields and in greenhouses on site. Herbicide use is minimized wherever possible (e.g., through spot treatment of weeds). All pesticides are applied by BNL-employed New York State-certified applicators. By February 1, each applicator files an annual report with NYSDEC detailing insecticide and herbicide use for the previous year. BNL is in full compliance with FIFRA requirements.

### 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 System Act. BNL also has six areas regulated as wetlands and a number of vernal (seasonal) pools on site. Construction or modification activities performed within these areas require permits from NYSDEC.

Activities that could require review under the Natural Resource Protection Program are identi-

fied 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 2002, four projects were permitted under this program, two ongoing and two new. The first ongoing project was continuation of the Sewage Treatment Plant upgrades project. This project was completed in early 2002 and the permit closed in July. The second ongoing project was construction of a new recharge basin within the RHIC area. Construction commenced in October 2002 and will be continued in 2003. Due to potential impacts on the tiger salamander, a NYS endangered species, work can only be completed from August through November. The two new projects involved modifications to a liner covering sections of the RHIC tunnel and construction of a new material storage facility. Additionally, an equivalency permit for Peconic River pilot studies was issued by NYSDEC in January 2002. This permit authorizes the demonstration of two techniques being studied for the remediation of contaminated sediments: vacuum guzzling and excavation and wetland restoration. All work under this equivalency permit was completed in summer 2002. A separate permit will be obtained for full-scale remediation of the Peconic River, which is expected to commence in 2003.

### 3.13 ENDANGERED SPECIES ACT

In 1999, NYSDEC revised its list of endangered, threatened, and “species of special concern.” The tiger salamander (*Ambystoma t. tigrinum*) is the only state endangered species found at BNL. 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. BNL

has prepared a *Wildlife Management Plan* (Naidu 1999) that formalizes the strategy and actions needed to protect 14 confirmed tiger salamander breeding locations identified on site. The strategy includes identifying and mapping habitats, monitoring breeding conditions, improving breeding sites, and controlling activities that could negatively affect breeding.

The banded sunfish (*Enneacanthus obesus*) and swamp darter (*Etheostoma fusiforme*) are found in the Peconic River drainage areas on site at BNL. Both are listed as threatened species within New York State. The reason for this status is that the only remaining populations of these fish in New York are on eastern Long Island. 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

The frosted elfin (*Callophrys irus*) is a small, amber-colored butterfly that depends on lupine, a wildflower in the pea family. In the past, a population has utilized an area of lupine on BNL grounds. This habitat still exists and it is assumed that the butterfly is still present. Management of this habitat and surveys for this butterfly have been added to BNL’s Natural and Cultural Resource Management Program.

BNL also has eight species on site 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 marbled salamander (*Ambystoma opacum*), the spotted turtle

(*Clemmys guttata*), the eastern box turtle (*Terrapene carolina*), the eastern hognosed snake (*Heterodon platyrhinos*), the horned lark (*Eremophila alpestris*), the whip-poor-will (*Caprimulgus vociferus*), the vesper sparrow (*Pooecetes gramineus*), and the grasshopper sparrow (*Ammodramus savannarum*). 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 on site. Observations of the eastern hognosed snake were reported on five different occasions in 2002. The only other time this snake has been reported on site was in 1994 (LMS 1995). BNL will be evaluating bird populations as part of the management strategy outlined in the *Wildlife Management Plan*. (Naidu 1999). Data concerning species of special concern are used appropriately in making management decisions regarding those species. In addition to the bird species mentioned above, 19 other bird species listed as species of special concern and two federally threatened species have been observed on site or flying over the site during spring and fall migrations.

BNL has 17 plant species protected under state law. One is a threatened plant, stiff goldenrod (*Solidago rigida*), and one is a rare plant, the narrow-leafed bush clover (*Lespedeza augustifolia*). The other 15 species are considered to be “exploitably vulnerable,” which means 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 will be included in the Natural Resource Management Plan currently under development. 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 12 occasions in 2002. These inspections are summa-

rized in Section 3.14.1. In 2002, the Suffolk County Department of Health Services maintained a full-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 conducted a RCRA/hazardous waste compliance inspection in August 2002. See Section 3.9 for information regarding this inspection.
- *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 in 2002. All sample results were within drinking water standards, except for iron, which occurs naturally. As noted in Section 3.7.1, BNL treats the drinking water supply to remove iron prior to distribution.
- *Sewage Treatment Plant*. SCDHS conducts quarterly inspections of the BNL STP. In 2002, no performance or operational issues were identified during these inspections. Additionally, in January and October, NYSDEC conducted routine inspections of SPDES-permitted outfalls, especially the Sewage Treatment Plant. During these inspections, facility operations were evaluated and effluent samples were collected. No issues were identified.
- *Recharge Basins*. As part of SCDHS oversight, two inspections are conducted annually of recharge basins and other SPDES outfalls. In 2002, SCDHS completed their scheduled inspections and collected samples during the assessments. No issues were identified.
- *Major Petroleum Facility*. The MPF is inspected annually by NYSDEC. This inspection was conducted in April 2002. See Section 3.8.4 for a discussion of this inspection.

### 3.14.2 Inspections by DOE

Neither DOE Headquarters (EH-10) nor the Chicago Operations Office conducted assessments of the Laboratory's environmental programs in 2002. The DOE Brookhaven Area Office (BAO) continued to provide oversight of BNL programs during 2002 and conducted one environmental assessment and observed two environmental assessments conducted by BNL staff. The BAO reviewed the Radioactive Waste Management Program and observed the Air and PCB programmatic assessments. The results of each assessment are summarized below.

#### 3.14.2.1 Air Emissions Programmatic Self-Assessment

The Environmental Services Division (ESD) programmatic assessment of the air emissions program was observed by BAO staff. This assessment was started during the last quarter of 2001 and continued into 2002 and reviewed the Labwide compliance with air regulations or Laboratory requirements. The assessment identified five noteworthy practices, one potential noncompliance, one nonconformance dealing with missing or inadequate review documentation for twelve new or modified emissions sources, and numerous observations dealing with recommended improvements for process-specific operations. A corrective action plan was prepared and all issues but one were closed. The remaining issue deals with missing information on the vendor-supplied bills of lading that should specify detergent content and Reid vapor pressure.

#### 3.14.2.2 Polychlorinated Biphenyls Programmatic Self-Assessment

The BAO observed the ESD self-assessment of the PCB Management Program, which occurred during March and April 2002. The purpose of the assessment was to evaluate the Labwide PCB management program and assess compliance with applicable regulations and guidance. Operations in the following departments or divisions were assessed: Biology, Chemistry, Collider-Accelerator, Energy Environment & National Security, National Synchrotron Light Source, Instrumentation, Medical, Physics, Plant Engineering, Radiological Control Division,

and Waste Management Division. The DOE observer gave the assessment an Outstanding rating for all phases (approach, deployment, and results). The assessment found that all PCB wastes were being properly handled, and identified five noteworthy practices. The assessment also identified four minor noncompliances, which included too-small labels on large capacitors, missing or incorrect out-of-service dates on manifests or containers, handling of PCB Ballasts as Bulk PCB waste in one case, and federal requirements not clearly reflected in the procedural documentation (the PCB Subject Area). In addition, one nonconformance and six "observations" were noted. A corrective action plan was prepared and all issues were closed.

#### 3.14.2.2 Radioactive Waste Management BAO Assessment

The assessment of five BNL organizations was conducted by evaluating one or two radioactive waste streams or treatment processes from each. Four noteworthy practices, four concerns, five findings, and three observations were noted. Program strengths were identified in the areas of program planning documentation for remediation activities, development of an electronic Radioactive Waste Control Form and tracking system, and proactive radioactive waste minimization and decay-in-storage practices in the Life Sciences Directorate. In all programmatic areas and organizations reviewed, opportunities for improvement were identified, including: waste characterization and certification based on indirect methods, program validation or verification, integrated contingency storage program for liquid waste, 90-day staging limit, noncompliance with Suffolk County Sanitary Code-Article 12, sitewide inconsistencies with BNL's approved Radioactive Waste Management Basis Document, inconsistent implementation of BNL's Subject Areas, and noncompliance with 10 CFR 830 Subpart A. BNL issued ORPS Report No. NTS-CH-BH-BNL-BNL-2002-0003 to report these issues. Corrective actions are in progress.

### 3.14.3 Enforcement Actions and Memos

No new consent orders were issued to BNL in 2002. A notice of violation for administrative



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

Title	Parties	Effective Date	Status
<b>Action</b>			
Preliminary Finding and Administrative Complaint	NYSDEC	1/14/03	A preliminary Finding and Administrative Complaint was issued for three administrative deficiencies identified during the 2002 annual hazardous waste compliance inspection conducted by NYSDEC. One deficiency, a missing label, was corrected at the time. The two remaining issues deal with the management of CERCLA-derived wastes and preparation of a Land Disposal Restriction for intra-laboratory waste shipments. These deficiencies are being reviewed by BNL management and counsel.
<b>Agreements</b>			
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.
Federal Facilities Compliance Agreement (FFCA) on Mixed Wastes	NYSDEC and DOE	1992 (Updated annually)	The 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")	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, RCRA, and the National Environmental Policy Act. All IAG-scheduled milestones were met in 2002.
Memorandum of Agreement (MOA) by and between the Environmental Protection Agency and the Department of Energy	EPA and DOE	03/23/98	In 1998, BNL, DOE, and EPA entered into an MOA requiring the implementation of an EMS. All conditions of the MOA were satisfied in 2002.

## Notes:

EPA = Environmental Protection Agency

DOE = Department of Energy

NYSDEC = New York State Department of Environmental Conservation

SCDHS = Suffolk County Department of Health Services

deficiencies was issued by NYSDEC as a result of the annual RCRA inspection (see discussion in Section 3.9). On March 23, 1998, EPA and DOE signed a voluntary Memorandum of Agreement (MOA). During 2002, BNL continued to be in full compliance with and completed all the terms of the MOA. All existing enforcement actions and MOAs are listed in Table 3-9, along with a summary of their status. BNL believes 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.

## REFERENCES AND BIBLIOGRAPHY

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