



## Compliance Status

Brookhaven National Laboratory is subject to more than 50 sets of federal, state, and local environmental regulations and 60 site-specific permits. In 1999 BNL operated in compliance with the vast majority of these regulations, and programs are in place to address areas for improvement.

Emissions that affect global warming and acid rain, such as nitrogen oxides, carbon monoxide, and sulfur dioxide, were within permit limits. Four portable fire extinguishers were taken out of service from which 68 pounds of Halon 1211 was recovered for reuse. Approximately 1,700 pounds of ozone-depleting refrigerants were also recovered for recycling.

With the exception of two minor pH excursions at Outfall 005, all wastewater discharges complied with the effluent limitations specified in BNL's State Pollutant Discharge Elimination System permit. Nine reportable spills of petroleum products occurred; all but one were under 3 gallons, and all were cleaned up to the satisfaction of the New York State Department of Environmental Conservation. No semi-volatile or floating petroleum products were detected in groundwater at the Major Petroleum Facility.

External audits in 1999 included the New York State Department of Environmental Conservation review of petroleum storage, hazardous waste, and air emissions from the Central Steam Plant; the U.S. Environmental Protection Agency audit of air program quality assurance; and the Suffolk County Department of Health Service's quarterly sewage treatment plant, routine site, and annual potable water system inspections. No citations resulted from these 1999 inspections. The BNL potable water system was found to comply with all drinking water requirements.

### 3.1 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

The federal, state, and local environmental statutes and regulations that BNL operates under are summarized in Table 3-1, along with a discussion of BNL's compliance status with regard to each requirement.

### 3.2 ENVIRONMENTAL PERMITS

Many processes and facilities at BNL operate under permits issued by environmental regulatory agencies. These permits include:

- ◆ State Pollutant Discharge Elimination System (SPDES) permit
- ◆ Major Petroleum Facility (MPF) license
- ◆ Resource Conservation and Recovery Act (RCRA) 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
- ◆ NYSDEC certificates for two registered gasoline vapor recovery systems
- ◆ Eight radiological emission authorizations issued under the National Emission Standards for Hazardous Air Pollutants (NESHAPs) by the U.S. Environmental Protection Agency (EPA)
- ◆ Forty-six Certificates to Operate air emission sources from the NYSDEC.

Table 3-2 provides a summary of these permits. The table is organized by building number and then by type of permit. In addition to those listed, the operation of six groundwater pump and treat systems installed under the Interagency Agreement are authorized under SPDES and air emission equivalency permits.

In addition to the operating permits, permits are periodically acquired for construction activities. These include well-point dewatering, Wild Scenic and Recreational River System Act, and freshwater wetland permits. In 1999 a dewatering permit was issued for construction of sewage pumping stations at the Relativistic Heavy Ion Collider (RHIC) and a freshwater wetlands permit was renewed for construction of the RHIC ring.

#### 3.2.1 NEW OR MODIFIED PERMITS

##### 3.2.1.1 STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES)

In July 1999 BNL submitted a request to renew the BNL SPDES permit. This request was approved on September 9, 1999. The renewed

permit is unchanged from the draft permit received in 1998 and authorizes discharges from the BNL Sewage Treatment Plant (STP) to the Peconic River, and discharges of cooling and storm water to recharge basins including those from the Relativistic Heavy Ion Collider (RHIC) facilities. Routine inspections by the SCDHS and monitoring of the STP showed that the facility consistently met effluent criteria and operational requirements.

#### 3.2.1.2 AIR

*Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Operable Unit (OU) I.* In December 1998 the NYSDEC approved an equivalency permit application for operation of a high vacuum thermal desorption unit for processing mercury-contaminated mixed wastes recovered from the OU I Chemical Holes area. The unit did not operate during 1999.

*Clean Air Act Title V.* Under the Clean Air Act (CAA), BNL is defined as a major source of criteria pollutant emissions and is required to obtain a Title V operating permit under the CAA. This permit will consolidate all emission sources and all of the applicable federal and state regulatory requirements into a single document. This permit application was filed in December 1998. Table 3-3 provides a description of the 16 emission units identified in BNL's application, along with a summary of the regulatory requirements that apply.

After completing an initial quality assurance review of the Title V application, NYSDEC forwarded an Administrative Error Report to BNL in June 1999. The report identified administrative errors that BNL needed to address before the application could be considered complete. All of the administrative errors are being addressed, and BNL expects to submit a corrected application to the NYSDEC by February 15, 2000.

### 3.3 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

Provisions in NEPA require federal agencies to follow a prescribed process to evaluate the impacts of proposed major federal activities on the environment before an irreversible commitment of resources is made. During 1999, environmental evaluations were completed for 73 proposed projects. Of these, 54 were considered minor actions requiring no additional documentation, and 19 projects were addressed

through submission of Environmental Evaluation Notification Forms to the U.S. Department of Energy (DOE). In 1999, DOE determined that an Environmental Assessment should be prepared to address proposed upgrades to the National Synchrotron Light Source, Accelerator Test Facility, and the Source Development Lab. Preliminary work on the Environmental Assessment began in 1999 and the document is scheduled for completion late in 2000. In November 1999, DOE decided to permanently close the High Flux Beam Reactor (HFBR), and discontinued the review of the Draft Environmental Impact Statement.

### 3.4 CULTURAL RESOURCE MANAGEMENT

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

The Laboratory currently has three structures or sites that have been either determined to be eligible for listing (the Brookhaven Graphite Research Reactor [BGRR] complex and World War I training trenches associated with Camp Upton), or may be eligible (the Cosmotron). During 1999, activities associated with cultural resource management included the completion of the annual Department of Interior questionnaire regarding historic/cultural resources; the development and submission of a Request for Determination of Eligibility for the BGRR complex; the Determination of Effects Finding for the BGRR; and a draft Memorandum of Agreement (MOA) for Mitigation of the Decommissioning of the BGRR. In November 1999 the New York State Historic Preservation Officer concurred with BNL's determination of eligibility and determination of effects regarding the BGRR. They also agreed that the draft MOA should be negotiated and finalized for the mitigation of effects. The Laboratory also developed a schedule for development of a Cultural Resources Management Plan that was submitted to the DOE Brookhaven Group Office for review. A cultural resource management plan will allow BNL to

efficiently manage historic structures/features located on BNL property and will provide for a standard set of treatments related to historic properties. In 2000, BNL will finalize the MOA regarding the BGRR, begin developing the mitigation packages associated with the MOA, and continue the process of identifying and evaluating BNL properties for their historic value.

### 3.5 CLEAN AIR ACT (CAA)

The objectives of the CAA (administered by the 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 nonradioactive air emissions sources that are subject to federal or state regulations. The following subsections describe the most significant sources and the methods used to comply with the applicable regulatory requirements.

##### 3.5.1.1 REASONABLE AVAILABLE CONTROL TECHNOLOGY (RACT)

New York State RACT requirements establish emission standards for oxides of nitrogen (NO<sub>x</sub>) for boilers with maximum operating heat inputs greater than or equal to 14.5 MW (50 MMBtu/hr). Compliance with these requirements is dependent upon the size of the boilers. Boilers with a maximum operating heat input between 50 and 250 MMBtu/hr can demonstrate compliance using periodic emissions tests or by using continuous emissions monitoring. Emission tests conducted in 1995 confirmed that BNL Boilers 1A and 5, both of which have maximum operating heat inputs less than 250 MMBtu/hr, met the NO<sub>x</sub> emissions standards when burning low nitrogen and sulfur content residual fuel (below 0.3 percent). To ensure continued compliance, an outside contractor laboratory analyzed composite samples of fuel deliveries, collected quarterly, to confirm the fuel-bound nitrogen and sulfur contents. Compliance with the 0.30 lbs/MMBtu NO<sub>x</sub> emissions standards for Boilers 6 and 7 was demonstrated by continuous emission monitoring of flue gas. For the year, NO<sub>x</sub> emissions from Boilers 6 and 7 averaged 0.082 lbs/

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**Table 3-1. Federal and State Environmental Statutes Applicable to BNL.**

Regulator: Statute	Regulatory Program Description	Compliance Status	Report Reference Sections
EPA: 40 CFR 300 40 CFR 302 40 CFR 355 40 CFR 370	The Comprehensive Environmental Response, Compensation & Liability Act ( <b>CERCLA</b> ) provides the regulatory framework for the remediation of releases of hazardous substances and the remediation of inactive hazardous waste disposal sites.	In 1989 BNL entered into a tri-party agreement between EPA, NYSDEC, and DOE. Remediation of the BNL site is conducted by the Environmental Restoration Program in accordance with milestones established under this agreement.	2.6
EPA: 10 CFR 1021 40 CFR 1021 40 CFR 1500-1508	The National Environmental Policy Act ( <b>NEPA</b> ) requires federal agencies to follow a prescribed process to evaluate the impacts of proposed major federal actions and alternatives on the environment before an irreversible commitment of resources is made. DOE codified its implementation of NEPA in 10 CFR 1021.	BNL is in full compliance with the NEPA requirements.	3.3
Advisory Council on Historic Preservation: 36 CFR 60 36 CFR 63 36 CFR 79 36 CFR 800	The National Historic Preservation Act 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 document records or objects.	In April 1991 three locations at BNL (the Brookhaven Graphite Research Reactor, the former Cyclotron Complex, and the World War I experimental foxhole trenches) were identified by the New York State Historic Preservation Office (SHPO) as potentially eligible for inclusion in the National Register of Historic Places. Any activities involving these facilities are identified utilizing the NEPA process and an evaluation is initiated to determine if the proposed action would impact the features that extend eligibility to these facilities. To date, no actions have been proposed which have required additional consultation with the SHPO. Compliance with the intent of these laws has been achieved by BNL, although program implementation has not been fully developed beyond the NEPA process.	3.4
EPA: 40 CFR 50 – 80 40 CFR 82 NYSDEC: 6 NYCRR 200 – 258 6 NYCRR 307	The Clean Air Act ( <b>CAA</b> ) and the New York State Environmental Conservation Law regulate the release of air pollutants through the use of permits and air quality limits.	All air emission sources have permits or have been exempted under the New York State air program. Emissions of radionuclides are regulated by the EPA, under National Emission Standards for Hazardous Air Pollutants ( <b>NESHAPs</b> ) authorizations.	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 Clean Water Act ( <b>CWA</b> ) and corresponding New York State Environmental Conservation Law seek to improve the quality of the waters of the US/State by implementing a permitting program and establishing water quality standards.	Wastewater discharges are permitted by NYSDEC. Permitted discharges include treated sanitary waste, cooling tower, and stormwater discharges. With the exception of two minor excursions, these discharges met the State Pollutant Discharge Elimination System permit limits in 1999.	3.6
EPA: 40 CFR 141 – 149 NYSDOH: 10 NYCRR 5	The Safe Drinking Water Act ( <b>SDWA</b> ) and New York State Department of Health standards for public water supplies establish minimum drinking water standards and monitoring requirements. Safe Drinking Water Act requirements are enforced by the Suffolk County Department of Health Services.	BNL maintains a community water supply. This water supply meets all primary and secondary drinking water standards as well as operational and maintenance requirements.	3.7
EPA: 40 CFR 112 40 CFR 302 40 CFR 370 40 CFR 372	The Oil Pollution Act, Emergency Planning and Community Right to Know Act ( <b>EPCRA</b> ), and the Superfund Amendment Reauthorization Act ( <b>SARA</b> ) require that facilities storing large quantities of petroleum products and/or chemicals prepare emergency planning documents and report this storage to the EPA.	Since facilities at BNL store or use chemicals or petroleum in quantities exceeding de minimus quantities, BNL is subject to these requirements. BNL will be updating the facility Response Plan required by 40 CFR 112.	3.8.1 3.8.2
EPA: 40 CFR 280 NYSDEC: 6 NYCRR 595 – 597 6 NYCRR 611 – 613 SCDHS: SCSC Article 12	Federal, state and local regulations regulate 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. These 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 towards achieving full conformance to county codes.	3.8.3 3.8.4 3.8.5 3.8.6

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

Regulator: Statute	Regulatory Program Description	Compliance Status	Report Reference Sections
EPA: 40 CFR 260 – 280 NYSDEC: 6 NYCRR 360 – 374	The Resource Conservation and Recovery Act ( <b>RCRA</b> ) and New York State Solid Waste Disposal Act govern the generation storage, handling, and disposal of hazardous wastes.	BNL is defined as a large quantity generator of hazardous waste and has two permitted storage facilities. While almost all wastes are handled and disposed in accordance with all federal and state requirements, audits have identified several violations. These are being addressed by corrective action plans.	3.9
EPA: 40 CFR 700 – 766	The Toxic Substances Control Act ( <b>TSCA</b> ) regulates the manufacture, use, and distribution of all regulated substances.	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 Federal Insecticide, Fungicide, and Rodenticide Act ( <b>FIFRA</b> ) and corresponding New York State regulations govern the manufacture and use of biocides; specifically the use, storage, and disposal of pesticides and herbicides, and pesticide containers and residuals.	BNL maintains certified pesticide applicators for the application of pesticides and herbicides site-wide. Each applicator attends training as needed to maintain all certifications current. Annual reports detailing the quantity and types of pesticides applied are filed by each applicator each year by February 1st.	3.11
U.S. Fish and Wildlife Service: 50 CFR 11 NYSDEC: 6 NYCRR 182	The Endangered Species Act 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 endangered species has been identified onsite (the tiger salamander) and one New York State Species of Special Concern (the banded sunfish). The Laboratory is preparing a Wildlife Management Plan that outlines activities to protect species and enhance their habitats.	3.13

## Notes:

EPA = U.S. Environmental Protection Agency  
 CFR = U.S. Code of Federal Regulations  
 NYSDEC = New York State Department of Environmental Conservation  
 NYCRR = New York Codes, Rules, and Regulations  
 NYSDOH = New York State Department of Health  
 SCDHS = Suffolk County Department of Health Services  
 SCSC = Suffolk County Sanitary Code

MMBtu and 0.122 lbs/MMBtu respectively, and there were no recorded exceedances of the NO<sub>x</sub> emissions standard for either boiler. In 1999 natural gas was the predominant fuel burned in the two boilers.

**3.5.1.2 HALON**

Halon 1211 and 1301 recovery/recycling equipment purchased in 1998 is used to comply with the halon recovery and recycling requirements of 40 CFR 82, Subpart H. These halon recovery/recycling devices are used when portable fire extinguishers or fixed systems are removed from service and during periodic hydrostatic testing of halon cylinders. In 1999 four Halon 1211 portable fire extinguishers were replaced with ABC dry chemical extinguishers. Approximately 68 pounds of Halon 1211 were recovered from these extinguishers and is currently stored in a receiving tank for future use.

**3.5.1.3 OZONE DEPLETING SUBSTANCES**

All refrigerant recovery and recycling equipment used by refrigerant service techni-

cians are certified to meet refrigerant evacuation levels specified by 40 CFR 82.158. Approximately 1,600 pounds of R-11, two pounds of R-12, and 97 pounds of R-22 were recovered and reclaimed for future use from equipment that was serviced during 1999. The R-11 was recovered from a 275-ton centrifugal chiller that was dismantled and replaced with a new 255-ton R-123 unit. Under the preventative maintenance program managed by the BNL Maintenance Management Center, refrigeration and air conditioning equipment containing ozone-depleting substances is regularly inspected and maintained. As a matter of practice, if a refrigerant leak is found, technicians will either immediately repair the leak or will isolate the leak and prepare a work order for the needed repairs. This standard practice exceeds the leak repair provisions of 40 CFR 82.156.

**3.5.2 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS)**

In 1970 the CAA established standards to protect the general public from pollutants which may result in an increase in mortality or

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**Table 3-2. BNL Environmental Permits.**

Bldg. or Facility Designation	Process/Equipment Description	Permitting Agency and Division*	Permit Number	Expiration Date
197	welding shop	NYSDEC-Air Quality	472200 3491 19704	04-01-00
197	epoxy coating/curing exhaust	NYSDEC-Air Quality	472200 3491 19708	06-08-98 <sup>(a)</sup>
206	cyclone G-10	NYSDEC-Air Quality	472200 3491 20601	04-01-00
207	belt sander	NYSDEC-Air Quality	472200 3491 20701	04-01-00
244	cyclone collector	NYSDEC-Air Quality	472200 3491 24401	01-28-99 <sup>(a)</sup>
422	cyclone collector	NYSDEC-Air Quality	472200 3491 42202	11-29-96 <sup>(a)</sup>
422	cyclone collector	NYSDEC-Air Quality	472200 3491 42203	11-29-96 <sup>(a)</sup>
423	stage II vapor recovery	NYSDEC-Air Quality	472200 D365 WG	09-27-95 <sup>(b)</sup>
423	welding hood	NYSDEC-Air Quality	472200 3491 42305	05-15-01
458	paint spray booth	NYSDEC-Air Quality	472200 3491 45801	04-23-97 <sup>(a)</sup>
462	machining, grinding exhaust	NYSDEC-Air Quality	472200 3491 46201	11-29-96 <sup>(a)</sup>
462	machining, grinding exhaust	NYSDEC-Air Quality	472200 3491 46202	11-29-96 <sup>(a)</sup>
473	vapor degreaser/ fume hood	NYSDEC-Air Quality	472200 3491 47301	03-22-96 <sup>(a)</sup>
479	cyclone G-10	NYSDEC-Air Quality	472200 3491 47905	04-01-00
490	Inhalation Toxicology Facility	NYSDEC-NESHAPs	472200 3491 49001	05-15-01
490	Inhalation Toxicology Facility	NYSDEC-Air Quality	472200 3491 49002	05-15-0 <sup>(d)</sup>
490	lead alloy melting	NYSDEC-Air Quality	472200 3491 49003	05-15-01
490	milling machine/block cutter	NYSDEC-Air Quality	472200 3491 49004	05-15-01
510	metal cutting exhaust	NYSDEC-Air Quality	472200 3491 51002	09-30-98 <sup>(a)</sup>
510	calorimeter enclosure	EPA - NESHAPs	BNL-689-01	None
526	polymer mix booth	NYSDEC-Air Quality	472200 3491 52601	04-01-00
526	polymer weighing	NYSDEC-Air Quality	472200 3491 52602	04-01-00
535B	plating tank	NYSDEC-Air Quality	472200 3491 53501	04-01-00
535B	etching machine	NYSDEC-Air Quality	472200 3491 53502	04-01-00
535B	PC board process	NYSDEC-Air Quality	472200 3491 53503	05-15-01
535B	welding hood	NYSDEC-Air Quality	472200 3491 53504	09-30-98 <sup>(a)</sup>
555	scrubber	NYSDEC-Air Quality	472200 3491 55501	04-01-00 <sup>(d)</sup>
555	scrubber	NYSDEC-Air Quality	472200 3491 55502	04-01-00 <sup>(d)</sup>
610	combustion unit	NYSDEC-Air Quality	472200 3491 6101A	05-15-01
610	combustion unit	NYSDEC-Air Quality	472200 3491 61005	05-15-01
610	combustion unit	NYSDEC-Air Quality	472200 3491 61006	05-15-01
610	combustion unit	NYSDEC-Air Quality	472200 3491 61007	12-18-02
630	stage II vapor recovery	NYSDEC-Air Quality	472200 D366 WG	09-27-95 <sup>(b)</sup>
703	machining exhaust	NYSDEC-Air Quality	472200 3491 70301	05-15-01
705	building ventilation	EPA - NESHAPs	BNL-288-01	None
820	accelerator test facility	EPA - NESHAPs	BNL-589-01	None
865	lead melting pot	NYSDEC Air Quality	472200 3491 86501	01-14-03
902	spray booth exhaust	NYSDEC-Air Quality	472200 3491 90201	09-30-98 <sup>(a)</sup>
902	belt sander	NYSDEC-Air Quality	472200 3491 90202	05-15-01
902	sanding, cutting, drilling	NYSDEC-Air Quality	472200 3491 90203	05-15-01
902	brazing/soldering exhaust	NYSDEC-Air Quality	472200 3491 90204	05-15-01
902	painting/soldering exhaust	NYSDEC-Air Quality	472200 3491 90205	05-15-01
903	cyclone G-10	NYSDEC-Air Quality	472200 3491 90302	04-01-00
903	brazing process exhaust	NYSDEC-Air Quality	472200 3491 90303	09-30-98 <sup>(a)</sup>
905	machining exhaust	NYSDEC-Air Quality	472200 3491 90503	05-15-01
919A	solder exhaust	NYSDEC-Air Quality	472200 3491 91903	05-15-01
922	cyclone exhaust	NYSDEC-Air Quality	472200 3491 92201	04-01-00
923	electronic equip. cleaning	NYSDEC-Air Quality	submitted 3-93,	status pending
924	spray booth exhaust	NYSDEC-Air Quality	472200 3491 92401	09-30-98 <sup>(a)</sup>
924	magnet coil production press	NYSDEC-Air Quality	472200 3491 92402	05-15-01
924	machining exhaust	NYSDEC-Air Quality	472200 3491 92403	05-03-98
930	electroplating/acid etching	NYSDEC-Air Quality	472200 3491 93001	05-15-01 <sup>(e)</sup>
930	bead blaster	NYSDEC-Air Quality	472200 3491 93002	05-15-01
AGS Booster <sup>(1)</sup>	accelerator	EPA - NESHAPs	BNL-188-01	None
RHIC <sup>(2)</sup>	accelerator	EPA - NESHAPs	BNL-389-01	None
RTF <sup>(3)</sup>		EPA - NESHAPs	BNL-489-01	None

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

Bldg. or Facility Designation	Process/Equipment Description	Permitting Agency and Division*	Permit Number	Expiration Date
REF/NBF <sup>(4)</sup>		EPA - NESHAPs	BNL-789-01	None
CSF <sup>(5)</sup>	major petroleum facility	NYSDEC-Water Quality	1-1700	03-31-02
STP(c) & RCB <sup>(6)</sup>	sewage plant & recharge basins	NYSDEC-Water Quality	NY-0005835	03-01-00
WMF <sup>(7)</sup>	waste management	NYSDEC-Hazardous Waste	NYS ID No 1-4722-00032/00102-0	07-12-05
BNL Site	chem tanks-HSBSRC <sup>(8)</sup>	NYSDEC	1-000263	07-27-01

## Notes:

\* NYSDEC=New York State Department of Conservation

EPA=U.S. Environmental Protection Agency

NESHAPs=National Emission Standards for Hazardous Air Pollutants

NYSDEC= New York State Department of Environmental Conservation

<sup>(4)</sup> Permits for processes with past due expiration dates have been extended until NYSDEC approves BNL's Title V permit or until NYSDEC reclassifies the processes as exempt and trivial pursuant to 6 NYCRR 201 provisions.<sup>(5)</sup> Renewal submitted 9-6-95, NYSDEC has indicated the process is subject to registration only.<sup>(6)</sup> The vapor/sonic degreaser and fume hood shared a common exhaust stack. The degreaser has been removed. The fume hood is still used for aerosol spray coating and wipe cleaning of parts.<sup>(7)</sup> Process is not in service.<sup>(8)</sup> Process removed from service.<sup>(1)</sup> Alternating Gradient Synchrotron<sup>(2)</sup> Relativistic Heavy Ion Collider<sup>(3)</sup> Radiation Therapy Facility<sup>(4)</sup> Radiation Effects Facility/ Neutral Beam Facility<sup>(5)</sup> Central Steam Facility<sup>(6)</sup> Sewage Treatment Plant & Recharge Basins<sup>(7)</sup> New Waste Management Facility<sup>(8)</sup> Hazardous Substance Bulk Storage Registration Certificate.

an increase in serious irreversible or incapacitating illnesses. These regulations were updated to protect against the effects of these pollutants, a program to limit emissions of 189 toxic air pollutants was developed. This program included: a precise list of regulated contaminants, schedule for implementation of control requirements, aggressive technology based emission standards, industry specific requirements, special permitting provisions, and a program to address accidental releases.

**3.5.2.1 MAXIMUM AVAILABLE CONTROL TECHNOLOGY**

During preparation of the BNL Title V Phase II application, staff examined existing state and federal regulations that are 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 standards are applicable to BNL operations.

**3.5.2.2 ASBESTOS**

As required, BNL provided advance notice to the EPA Region II office for two construction projects involving the removal of regulated asbestos-containing materials. The Laboratory also provided the EPA with an annual notice of unscheduled small renovations for 1999. During

1999, 1,453 linear feet of pipe asbestos insulation and 1,692 square feet of asbestos surface material were removed and disposed of in accordance with applicable requirements.

**3.5.2.3 RADIOACTIVE AIRBORNE EMISSIONS**

In 1999 the maximum offsite dose due to airborne radioactive emissions from the Laboratory continued to be far below the 10 mrem annual dose limit in 40 CFR 61, Subpart H (See Chapter 4 for more information on the estimated dose). The dose to the Maximally Exposed Individual resulting from airborne emissions, calculated using EPA's CAP88-PC (CAA Assessment Package-1999) model was 0.13 mrem. All data pertaining to radiological air emissions and dose calculations were transmitted to the EPA on schedule, in fulfillment of the June 30 annual reporting requirement.

**3.6 CLEAN WATER ACT (CWA)**

The generation and disposal of wastewater effluents by Laboratory operations are regulated under the CWA, as implemented by NYSDEC and under DOE Order 5400.5. The goal of the CWA is to achieve a level of water quality which promotes the propagation of fish, shellfish, and wildlife; provide waters suitable for recreational purposes; and to eliminate the discharge of pollutants. New York State was delegated CWA authority in 1975. The NYSDEC

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**Table 3-3. Title V Permit Application Emission Units.**

Emission Unit ID	Emission Unit Description	Applicable Regulations	Summary of Requirements
U45801	Unit is a paint spray booth used to apply protective and decorative coatings to miscellaneous metal parts and room furnishings.	6 NYCRR 228	Establishes volatile organic compound content limits for coatings based on the type of surfaces coated.
U49001	Unit has three walk-in enclosures used for research on processes to treat fireproofing products by chemically converting asbestos containing material into a non-regulated asbestos-free product. Redundant High Efficiency Particulate Arrestor (HEPA) filters are used in the exhaust system. Caustic and acidic aerosols generated by the process are controlled by a wet scrubber device.	40 CFR 61 Subpart M	Requires the use of HEPA filters certified to remove at least 99.97 percent of 0.3 micron particles and daily visual monitoring of potential source of asbestos emissions including air cleaning devices and process equipment.
U49003	Unit has a lead melting machine, a milling machine, and a block cutter used to fabricate block shielding for patients who receive treatment at the Radiation Therapy Facility. The shielding, is styrofoam and lead alloy used to protect against unwanted radiation. Particulates are collected in a fabric filter.	6 NYCRR 200 6 NYCRR 212	Requires emission control devices to be operated and maintained properly. Limits particulate emissions to 0.05 grains/dry standard cubic foot, for emission sources whose permit to construct was received by the New York State Department of Environmental Conservation after July 1, 1973.
U61005	Unit is two Central Steam Facility, commercial-institutional sized boilers. Boiler 1A, a midsize boiler, has a nominal heat capacity of 16.4 MW (56.7 MMBtu/hr) used for peaking and intermittent loads. Boiler 5, a large boiler with nominal heat capacity of 65.3MW (225 MMBtu/hr), is used to meet winter baseloads. Boiler 5 can burn oil or natural gas.	6 NYCRR 225-1 6 NYCRR 225-2 6 NYCRR 227-1 6 NYCRR 227-2	Limits sulfur content of fuel oils. Limits contaminants in waste oil burned. Establishes opacity limits for boilers. Establishes NOx emission limits for large and midsize boilers that burn natural gas and oil.
U61006	Unit is a commercial-institutional sized boiler with a nominal heat capacity of 42.6 MW (147 MMBtu/hr) located at the Central Steam Facility. Boiler 6 has dual fuel firing capabilities that allow it to burn oil or natural gas.	6 NYCRR 225-1 6 NYCRR 225-2 6 NYCRR 227-1 6 NYCRR 227-2  40 CFR 60 Subpart Db	Limits sulfur content of fuel oils. Limits contaminants in wasteoil burned. Establishes opacity limits for boilers Establishes NOx emission limits for large and midsize boilers burning natural gas and oil. Requires continuous monitoring systems to measure NOx emissions.
U61007	Unit is a Central Steam Facility commercial-institutional sized boiler with a nominal heat capacity of 42.6 MW (147 MMBtu/hr) built in 1996. Constructed after June 19 1986, it requires continuous emission monitoring for opacity. This boiler has dual fuel firing capabilities allowing it to burn oil or natural gas.	6 NYCRR 225-1 6 NYCRR 225-2 6 NYCRR 227-1 6 NYCRR 227-2  40 CFR 60 Subpart Db	Limits sulfur content of fuel oils. Limits contaminants in wasteoil burned. Establishes opacity limits for boilers. Limits NOx emission for large and midsize boilers.  Requires continuous monitoring systems to measure NOx emissions.
UFLEET	Unit is BNL's fleet of vehicles of 244 gasoline powered vehicles with gross vehicle weight ratings (GVWRs) of 8,500 pounds or less, and 46 gasoline powered vehicles with GVWRs greater than 8,500 pounds. The remaining fleet vehicles are exempt from Part 217.	6 NYCRR 217	Sets inspection and maintenance requirements for gasoline and diesel powered vehicles. Emission and safety inspections are done at Building 630; maintenance and repairs at the vehicle maintenance shop.
UFUELS	Unit is two onsite gasoline refueling facilities. Building 630 is contractor operated servicing employee vehicles. The facility has three pumps that dispense low, medium and high octane grades of gasoline. Building 423, is a refueling facility for BNL fleet gasoline powered vehicles with two pumps dispensing low octane gasoline. Underground storage tanks at both facilities have Stage I and Stage II engineering controls.	6 NYCRR 225-3  6 NYCRR 230	Limits the Reid vapor pressure of gasoline from May 1 <sup>st</sup> to September 15 <sup>th</sup> , oxygen content October 1 <sup>st</sup> to April 30 <sup>th</sup> , and re-quires the sale of reformulated gas all year. Specifies Stage I and Stage II engineering controls at all refueling stations that pump more than 120,000 gallons annually.
UHALON	Unit has 589 portable Halon 1211 fire extinguishers, 135 Halon 1301 cylinders with 39 fixed total flooding fire suppression systems and three Halon 1301 reserve tanks.	40 CFR 80 Subpart H	Requires the use of certified technicians and halon recovery equipment to test, service, main-tain, repair, or dispose halon-containing equipment.

continued on next page



**Table 3-3. Title V Permit Application (continued).**

Emission Unit ID	Emission Unit Description	Applicable Regulations	Summary of Requirements
UINSIG	Unit has a magnet coil coating operation, the Printed Circuit Board Laboratory, an operation for etching magnet end blocks, and a small scale printed circuit board etching and electroplating operation.	6 NYCRR 201-6	Requires maintenance of records to verify aggregate emissions of criteria pollutants and hazardous air pollutants from all sources are below levels established in Section 201-6.3.
ULEADM	Unit is a soft metal pot furnace installed at the new Waste Management Facility used to recycle lead shielding.	6 NYCRR 200	Requires emission control devices be operated and maintained properly.
ULITHO	Unit includes two lithographic offset printing machines used to print BNL's published materials.	6 NYCRR 234	Limits the volatile organic compound content of solutions used in printing.
UMETAL	Unit has 16 cold cleaning operations in various site locations to clean metal parts.	6 NYCRR 226	Specifies administrative and operating requirements for this equipment.
UMVACS	Unit covers BNL fleet vehicles equipped with air conditioners.	40 CFR 80 Subpart B	Requires certified technicians to use refrigerant recovery equipment when vehicle air conditioners are serviced or repaired.
URADEF	Unit covers onsite activities and operations that generate radioactive airborne emissions.	40 CFR 61 Subpart H	Sets monitoring requirements for emissions of radionuclides so that public does not receive dose higher than 10 mrem/yr.
URFRIG	Unit includes 21 centrifugal chillers, 38 reciprocating chillers, 4 rotary screw chillers, 193 split air conditioning units, and 245 package air conditioning units.	40 CFR 80 Subpart F	Requires certified technicians to use refrigerant recovery equipment when cooling units are serviced, repaired or disposed.

## Notes:

CFR= U.S. Code of Federal Regulations

NYCRR= New York Codes, Rules, and Regulations

SPDES permit provides the basis for regulating 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. This permit provides monitoring requirements and specifies effluent limits for fourteen outfalls:

- ◆ Outfall 001 is the discharge of treated effluent from the STP to the Peconic River.
- ◆ Outfalls 002 – 005, 002A, 002B, 006A, 006B, 008, 010 and 011 are recharge basins used for the discharge of cooling tower blowdown, once-through cooling water, and/or stormwater. There was no monitoring of Outfalls 002A and 002B in 1999 since these discharges did not operate.
- ◆ Outfall 007 is backwash water from the 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.

The permit renewal is issued for a period of five years and will expire on March 1, 2005.

### 3.6.1 BNL SEWAGE TREATMENT PLANT (STP) OUTFALL 001

Sanitary and process wastewater generated by Laboratory operations are conveyed to the STP for treatment prior to discharge 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. Efforts were extended to maximize nitrogen removal in 1999; however, to improve nitrogen removal, higher concentrations of organic matter would be required to support the organisms that effect this process. Due to the low concentration of organic matter in BNL sewage, only nominal improvements were achieved. Regardless of these achievements, the concentration of nitrogen in the STP discharge has always been below the 10 mg/L limit.

A summary of the monitoring results for the STP discharge at Outfall 001 is provided in Table 3-4. This table shows that the Laboratory

CHAPTER 3: COMPLIANCE STATUS

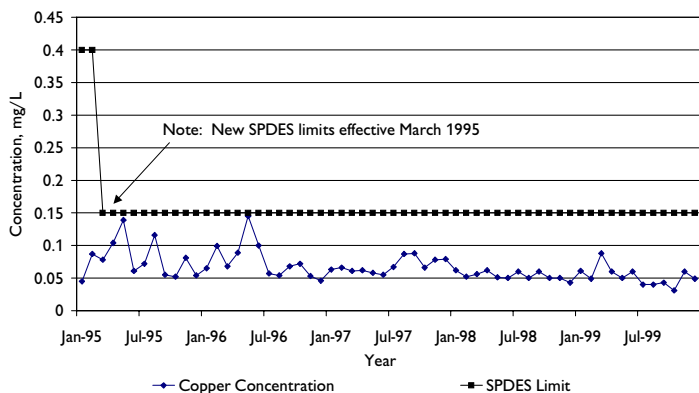
**Table 3-4. 1999 Analytical Results for Wastewater Discharges to Outfall 001 (Sewage Treatment Plant).**

Analyte	Minimum	Maximum	Min. Monitoring Frequency	SPDES Limit	No. of Exceedances	Percent Compliance*
Max. Temperature (°F)	48	78.8	Daily	90	0	100
pH (SU)	6.4	8.2	Continuous Recorder	Min. 5.8 Max. 9.0	0 0	100 100
Avg. 5 day Biological Oxygen Demand (BOD) (mg/L)	< 2	< 5.5	Twice Monthly	Avg. 10	0	100
Max. 5 day BOD (mg/L)	< 2	9	Twice Monthly	Max. 20	0	100
% BOD Removal	> 87	> 98	Monthly	85	0	100
Avg. Total Suspended Solids (TSS) (mg/L)	< 4	< 10	Twice Monthly	Avg.10	0	100
Max. TSS (mg/L)	< 4	< 10	Twice Monthly	Max. 20	0	100
% TSS Removal	> 84	> 99	Monthly	85	0	100
Settleable Solids (ml/L)	0	0	Daily	0.1	0	100
Ammonia Nitrogen (mg/L)	< 0.05	1.3	Twice Monthly	2	0	100
Total Nitrogen (mg/L)	3.9	8.05	Twice Monthly	10	0	100
Total Phosphorus (mg/L) <sup>(1)</sup>	1.1	1.3	Twice Monthly	NA <sup>(2)</sup>	0	100
Cyanide (µg/L)	< 5	< 10	Twice Monthly	100	0	100
Copper (mg/L)	0.031	0.088	Twice Monthly	0.15	0	100
Iron (mg/L)	0.078	0.23	Twice Monthly	0.37	0	100
Lead (mg/L)	< 0.001	0.005	Twice Monthly	0.019	0	100
Nickel (mg/L)	0.002	0.006	Twice Monthly	0.11	0	100
Silver (mg/L)	< 0.0006	0.007	Twice Monthly	0.015	0	100
Zinc (mg/L)	0.025	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)	< 1	< 5	Twice Monthly	50	0	100
PCBs (µg/L) <sup>(3)</sup>	< 0.065	< 0.065	Quarterly	NA	0	100
Max. Flow (MGD)	0.65	2.2	Continuous Recorder	Max. 2.3	0	100
Avg. Flow (MGD)	0.527	0.760	Continuous Recorder	NA	0	100
Avg. Fecal Coliform (MPN/100 ml) <sup>(4)</sup>	<2	12.3	Twice Monthly	200	0	100
Max Fecal Coliform (MPN/100 ml)	<2	30	Twice Monthly	400	0	100

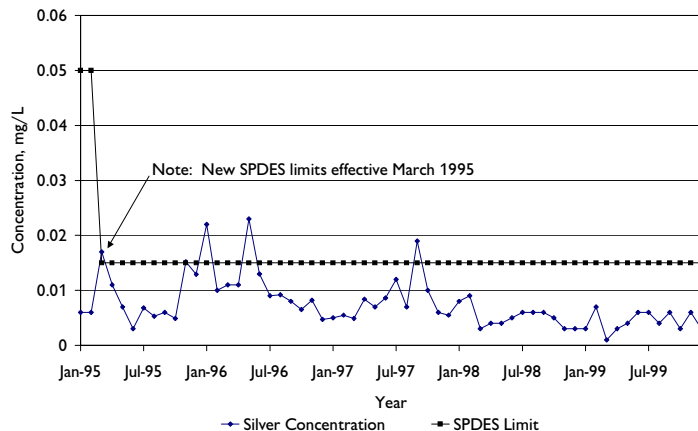
Notes:  
See Figure 5-6 for location of Outfall 001.

$$\text{*Percent Compliance} = \frac{\text{Total No. Samples} - \text{Total No. Exceedances}}{\text{Total No of Samples}} \times 100$$

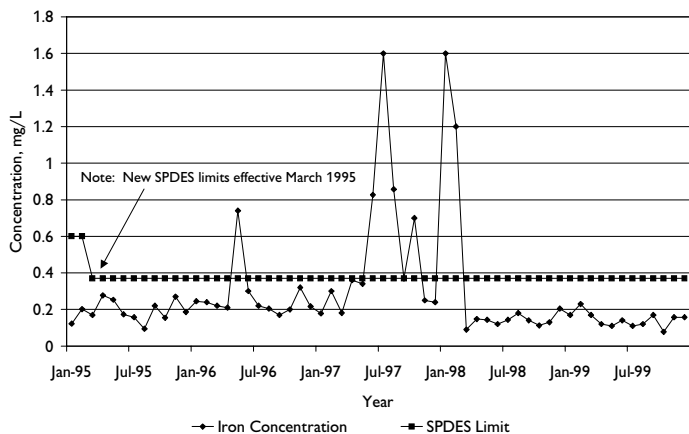
- <sup>(1)</sup> Monitoring started in July
- <sup>(2)</sup> NA=Not Applicable
- <sup>(3)</sup> Monitoring started in September
- <sup>(4)</sup> MPN=Most Probable Number



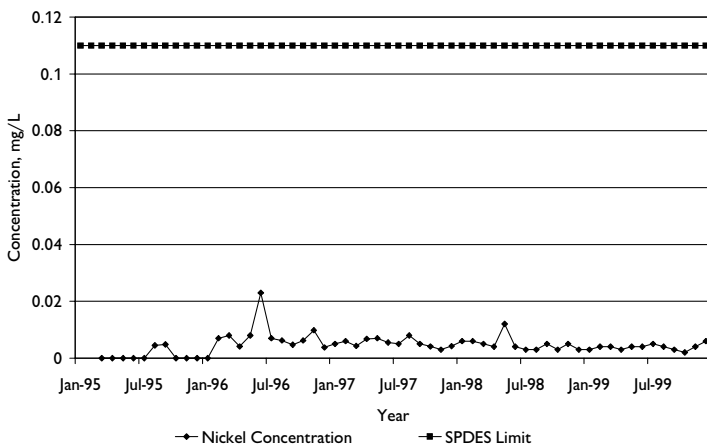
**Figure 3-1. Maximum Concentration of Copper Discharged from the BNL STP, 1995-1999.**



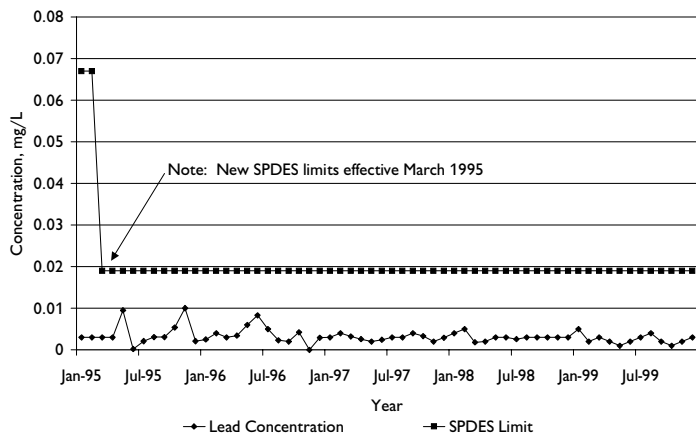
**Figure 3-4. Maximum Concentration of Silver Discharged from the BNL STP, 1995-1999.**



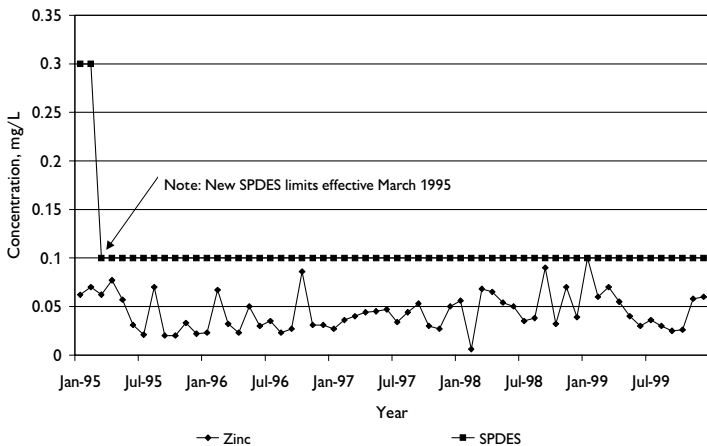
**Figure 3-2. Maximum Concentration of Iron Discharged from the BNL STP, 1995-1999.**



**Figure 3-5. Maximum Concentration of Nickel Discharged from the BNL STP, 1995-1999.**



**Figure 3-3. Maximum Concentration of Lead Discharged from the BNL STP, 1995-1999.**



**Figure 3-6. Maximum Concentration of Zinc Discharged from the BNL STP, 1995-1999.**

was in full compliance with all parameters in 1999. Figures 3-1 through 3-6 plot five-year trends for the maximum monthly concentration of copper, nickel, and zinc in the STP discharge. The relevant SPDES permit limits are also shown.

### 3.6.2 CHRONIC TOXICITY TESTING

The chronic toxicity testing program initiated in 1993 for the STP effluent was continued in 1999. Samples were collected in March, June, September, and December and submitted to a contractor laboratory for testing. As required by the SPDES permit, this program consists of performing seven-day, Tier II chronic toxicity tests of the BNL STP effluent. Two fresh water organisms, water fleas (*Ceriodaphnia dubia*) and fathead minnows (*Pimephales promelas*), were used for testing. Sets of ten animals were 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 animals (i.e., controls). The test results were transmitted to NYSDEC for review.

Review of the toxicity data showed there was no acute toxicity exhibited for either organism, nor were any chronic effects, such as changes in growth weight, noted for the minnow. The rate of reproduction for the water fleas raised in the pure STP effluent was, however, lower than the control group in three of the four tests. A "No Observable Effect Concentration" of 25 percent was reported in two of the tests and 50 percent in the third. There was no chronic toxicity exhibited in the fourth test. Due to the low hardness of the BNL well water, osmotic effects were suspected of contributing to the noted toxicity. Testing conducted in December included treating a sample of the water with a solution of sodium bicarbonate to mitigate these effects. When this was done, there was no significant difference in reproduction rates between the treated and untreated sample. However, it should also be noted that there was no toxicity exhibited in either sample. Due to the variability in the toxicity results, testing will continue through 2000.

### 3.6.3 BNL RECHARGE BASINS AND STORMWATER OUTFALLS 002 - 008 AND 010

Outfalls 002 - 008 and 010 discharge to groundwater, replenishing the underlying

aquifer. Monitoring requirements for each of these discharges vary, depending on the type of wastewater received and the type of cooling water treatment reagents used. There are no monitoring requirements imposed for Outfalls 009 and 011. Monitoring of Outfalls 02A and 002B was not performed in 1999 since the cooling towers contributing to these effluents did not operate. Table 3-5 summarizes the monitoring requirements along with performance results for 1999.

The two pH excursions were recorded at Outfall 005 during the summer months. Elevated pH in the BNL domestic water system and evaporation were the primary contributing causes of these excursions. In 1997, a corrosion control study recommended that to minimize dissolution of lead from soldered joints of plumbing pipes, the pH of the BNL domestic water system should be maintained at 8.0 or higher. To increase the pH, hydroxides (either calcium or sodium) were added to the well water. In 1998 the Laboratory completed a project to divert a significant quantity of once-through cooling water from the sanitary waste system to Outfall 005. The diverted wastewater flows over an asphalt culvert before it reaches the monitoring station. Evaporation of the wastewater as it traverses this culvert results in a higher hydroxide concentration and a subsequent increase in pH. Monitoring of the discharge upstream of the culvert showed the wastewater pH to be consistently less than the limit of 8.5. Inspection of the culvert showed white residue (salt) deposited on the asphalt. This deposit was the hydroxide residue remaining from the evaporated water. These deposits build up until they are washed away by rainwater. Extended periods of drought result in higher hydroxide concentrations and higher pH. Since Long Island groundwater is naturally slightly acidic (pH = 5.5), the discharge of slightly alkaline wastewater would not have a detrimental impact on groundwater quality.

### 3.7 SAFE DRINKING WATER ACT (SDWA)

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 SCDHS. Since BNL provides potable water to more than 15 service connections, it is subject to the requirements for a public water supply.

**Table 3-5. 1999 Analytical Results for Waste Water Discharges to Outfalls 002 - 008 and 010.**

Analyte		Outfall 002	Outfall 003	Outfall 004	Outfall 005	Outfall 006A	Outfall 006B	Outfall 007	Outfall 008	Outfall 010	SPDES Limit	No. of Exceedances
Flow (MGD)	N	CR	CR <sup>(a)</sup>	CR	CR	CR	CR	CR	11	10	NA	0
	Min.	0.044	0.21	0.008	0.04	0.02	0.02	0	0	0		
	Max.	0.47	3.5	0.75	0.48	0.126	0.4	0.4	3.6	2.2		
pH (SU)	Min.	7.1	5.8	5.8	6.3	7.3	7.0	6.7	6.2	6.0	8.5, 9.0 <sup>(b)</sup>	2
	Max.	8.5	8.1	6.5	8.9	8.7	8.3	8.5	7.7	7.7		
Oil and Grease (mg/L)	N	12	12	NR	12	12	12	NR	11	10		
	Min.	< 5	< 5	NR	< 5	< 5	< 5	NR	< 5	< 5		
	Max.	< 5	5	NR	< 5	< 5	< 5	NR	5	< 5	15	0
Copper (mg/L)	N	NR	NR	NR	4	NR	NR	NR	NR	NR		
	Min.	NR	NR	NR	0.006	NR	NR	NR	NR	NR		
	Max.	NR	NR	NR	0.015	NR	NR	NR	NR	NR	1	0
Zinc (mg/L)	N	NR	4	NR	NR	NR	NR	NR	NR	NR		
	Min.	NR	< 0.006	NR	NR	NR	NR	NR	NR	NR		
	Max.	NR	0.013	NR	NR	NR	NR	NR	NR	NR	5	0
Iron (total) (mg/L)	N	NR	NR	NR	NR	NR	NR	5	NR	NR	NA	0
	Min.	NR	NR	NR	NR	NR	NR	138	NR	NR		
	Max.	NR	NR	NR	NR	NR	NR	762	NR	NR		
Iron (dissolved) (mg/L)	N	NR	NR	NR	NR	NR	NR	5	NR	NR		
	Min.	NR	NR	NR	NR	NR	NR	0.2	NR	NR		
	Max.	NR	NR	NR	NR	NR	NR	2.5	NR	NR	NA	0
Chloroform (mg/L)	N	4	NR	NR	NR	NR	NR	NR	NR	NR		
	Min.	< 1	NR	NR	NR	NR	NR	NR	NR	NR		
	Max.	7	NR	NR	NR	NR	NR	NR	NR	NR	7	0
Bromo- dichloromethane (mg/L)	N	4	NR	NR	NR	NR	NR	NR	NR	NR		
	Min.	< 1	NR	NR	NR	NR	NR	NR	NR	NR		
	Max.	0.006	NR	NR	NR	NR	NR	NR	NR	NR	5	0
1,1,1-trichloroethane (mg/L)	N	4	4	4	NR	NR	NR	NR	11	NR		
	Min.	< 1	< 1	< 1	NR	NR	NR	NR	< 1	NR		
	Max.	< 1	< 1	< 1	NR	NR	NR	NR	< 1	NR	5	0
1,1-dichloroethylene (mg/L)	N	NR	NR	4	NR	NR	NR	NR	11	NR		
	Min.	NR	NR	< 1	NR	NR	NR	NR	< 1	NR		
	Max.	NR	NR	< 1	NR	NR	NR	NR	< 1	NR	5	0
Dibromo-nitrilo- propionimide (mg/L)	N	NR	3	NR	NR	NR	NR	NR	NR	NR		
	Min.	NR	< 0.005	NR	NR	NR	NR	NR	NR	NR		
	Max.	NR	< 0.45	NR	NR	NR	NR	NR	NR	NR	0.5	
Hydroxyethylidene- diphosphonic Acid (mg/L)	N	4	4	NR	4	4	4	NR	NR	NR		
	Min.	< 0.05	< 0.05	NR	< 0.005	< 0.05	< 0.05	NR	NR	NR		
	Max.	0.05	< 0.05	NR	< 0.05	< 0.05	< 0.05	NR	NR	NR	0.5	0
Tolyltriazole (mg/L)	N	4	4	NR	4	4	4	NR	NR	NR		
	Min.	< 0.005	< 0.005	NR	< 0.005	< 0.005	< 0.005	NR	NR	NR		
	Max.	0.09	0.061	NR	< 0.005	0.058	0.131	NR	NR	NR	0.2	0

**Notes:**

See Figure 5-6 for locations of outfalls.

There are no monitoring requirements for Outfall 009.

N=Number of Samples

CR=Continuous Recorder

MGD=Million Gallons per Day

NR=Analysis Is Not Required

SU=Standard Unit

<sup>(a)</sup> Flow estimated for part of year due to problems with continuous chart recorder.<sup>(b)</sup> Permit pH limit was 8.5 for all stations until 6/11/99 when it was raised to 9.0 for Outfalls 002, 003, 006A, 006B, and 007.

Monitoring requirements are prescribed annually by SCDHS, and a Potable Water Sampling and Analysis Plan is prepared to comply with these requirements. With regard to protection of the water system, containment is the desired method of protecting a public water system. This includes the installation of cross-connection control devices at the interface between the facility and the domestic water main to prevent potentially contaminated facility water from entering the distribution system.

### 3.7.1 POTABLE WATER

BNL maintains six wells for the distribution of potable water. All wells are treated with activated carbon or air stripping to remove volatile organic compounds to meet drinking water standards. Three of the six wells are also treated to reduce naturally occurring iron.

BNL monitors potable wells regularly for bacteria, inorganics, organics, and pesticides as required by NYSDOH regulations. BNL also voluntarily monitors drinking water supplies for radiological contaminants. Tables 3-6 and 3-7 provide the potable water supply monitoring data for 1999. Table 3-6 shows that color and iron exceeded drinking water standards in three of the wells at the wellhead prior to distribution. Treatment at the Water Treatment Plant effectively reduced these contaminants below drinking water standards, as evidenced by the distribution system monitoring results. At the point of consumption, all drinking water supplies complied with drinking water standards during 1999. Section 7.3 of Chapter 7 provides additional data on environmental surveillance testing performed on potable wells. The additional testing exceeds 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, including the protection of potable water supply connections to systems containing hazardous substances (i.e., cross-connections). Such practices include the implementation of a rigorous cross-connection control program. Cross-connection control is the preferred method of protecting a public water system and includes the installation of cross-connection control devices at the interface between a

facility and the domestic water main. Installation of cross-connection control devices is required at all facilities where hazardous materials are used in a manner that could result in the introduction of these hazardous substances into the domestic water system under any condition. In addition, cross-connection controls at the point of use are also recommended to protect other users within a specific facility from hazards that might be posed by other facility operations.

BNL has installed and maintains over 150 cross-connection control devices at interfaces to the potable water main and secondary control devices at the point of use. One hundred thirty-five cross-connection control units were tested in 1999. Any problems noted in these units were immediately corrected, and the devices were retested to ensure viability. To ensure that all cross-connection control devices onsite are tested annually, new requirements were imposed through the development of Standards Based Management System Subject Areas.

### 3.7.3 UNDERGROUND INJECTION CONTROL

Underground Injection Control (UIC) is regulated under the SDWA. Proper management of UIC devices is key to the protection of underground sources of drinking water. In New York State, the UIC program is implemented through the EPA, since the NYSDEC did not adopt the new UIC regulatory requirements. The NYSDEC had already implemented a similar program through its CWA initiative. At BNL, UICs consist of drywells, cesspools, septic tanks, and leaching fields, all of which are classified by EPA as Class V injection wells. Under the UIC program, all Class V injection wells must be included in an inventory maintained with the EPA.

During 1999, a rigorous project to inventory and close unnecessary UICs was implemented. Under this project, 29 UICs were officially closed. The closure of the UICs included the collection and analysis of bottom sediment samples and submittal of formal documentation to the EPA requesting closure authorization. Only one of the 29 UICs required mitigation of low-level petroleum contamination prior to closure. Analytical results for the one UIC showed it to contain total petroleum hydrocarbons at levels exceeding background. These were excavated and the UIC successfully closed in 1999. The 94 remaining UICs were subse-

**Table 3-6. Potable Water Wells and Potable Distribution System: 1999 Bacteriological, Inorganic Chemical, and Radiological Analytical Data.**

Compound	Well No. 4 (FD)	Well No. 6 (FF)	Well No. 7 (FG)	Well No. 10 (FO)	Well No. 11 (FP)	Well No. 12 (FQ)	Potable Distribution Sample	NYS DWS
<b>Water Quality Indicators</b>								
Total Coliform	ND	ND	ND	ND	ND	ND	ND	Negative
Color (Units)	* 30	* 60	< 5	< 5	< 5	< 5	< 5	15
Odor (Units)	0	0	0	0	0	0	0	3
Cyanide (µg/L)	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NS
Conductivity (µmhos)	NO	NO	NO	247	252	225	220	NS
Chlorides (mg/L)	12.6	14.6	21.4	15.0	20.6	14.8	18.8	250
Sulfates (mg/L)	7.8	9.1	11.3	11.4	13.0	10.0	10.1	250
Nitrates (mg/L)	0.25	0.27	0.34	0.56	0.59	0.40	0.40	10
Ammonia (mg/L)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NS
pH (SU)	NO	NO	NO	6.6	6.4	6.5	6.7	NS
MBAS (mg/L)	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.04	NS
<b>Metals</b>								
Antimony (µg/L)	< 5.9	< 5.9	< 5.9	< 5.9	< 5.9	< 5.9	< 5.9	6.0
Arsenic (µg/L)	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	50
Barium (mg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2.0
Beryllium (mg/L)	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	4.0
Cadmium (µg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.0
Chromium (mg/L)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1
Fluoride (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	2.2
Iron (mg/L)	*1.7	* 4.4	* 0.70	< 0.02	< 0.02	0.05	0.03	0.3
Lead (µg/L)	< 0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	15
Manganese (mg/L)	0.22	0.10	0.05	12.4	< 0.01	< 0.01	< 0.01	0.3
Mercury (µg/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	2.0
Nickel (mg/L)	< 0.04	0.08	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.1
Selenium (µg/L)	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	10.0
Sodium (mg/L)	9.7	9.6	14.6	12.4	12.9	11.7	21.2	NS
Thallium (µg/L)	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	2.0
Zinc (mg/L)	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	5.0
<b>Radioactivity</b>								
Gross Alpha Activity (pCi/L)	< 0.8	0.9	< 0.86	< 0.86	< 0.86	< 0.86	ANR	15.0
Gross Beta Activity (pCi/L)	< 2.1	7.9	< 2.1	2.64	< 2.1	2.8	ANR	50.0
Tritium (pCi/L)	< 339	< 339	< 339	< 339	< 339	< 339	ANR	20,000
Strontium-90 (pCi/L)	< 2.0	2.74	< 2.0	< 2.0	< 2.0	< 2.0	ANR	8.0
<b>Other</b>								
Asbestos (M.Fibers/L)	ANR	ANR	ANR	ANR	ANR	ANR	< 0.42	7
Calcium (mg/L)	ANR	ANR	ANR	ANR	ANR	ANR	11.6	NS
Alkalinity (mg/L)	ANR	ANR	ANR	ANR	ANR	ANR	60.3	NS

**Notes:**

See Chapter 7, Figure 7-7 for Well locations.

This table contains the maximum concentration (minimum pH value) reported by the analytical laboratory.

ND=Not Detected

NS=DWS Not Specified

NO=Not Operational

MBAS=Methylene Blue Active Substances

ANR=Analysis Not Required

\*Wells are treated at the Water Treatment Plant for color and iron reduction prior to site distribution.

quently inventoried and included in an UIC Area Permit application submitted to the EPA for approval in September 1999.

### 3.8 SPILL PREVENTION, EMERGENCY PLANNING, AND REPORTING

Several federal, state, and local regulations involve the management of storage facilities containing chemicals, petroleum, and other hazardous materials that are applicable to

BNL. These regulations include specifications for storage facilities, release reporting requirements, and release planning document requirements.

#### 3.8.1 SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC) PLAN

BNL was in full compliance with the SPCC requirements in 1999. The Laboratory must maintain a SPCC Plan as a condition of its

CHAPTER 3: COMPLIANCE STATUS

**Table 3-7. Potable Water Wells: 1999 Principal Organic Compounds, Synthetic Organic Chemicals, and Micro-Extractables Analytical Data.**

Compound	WTP Effluent (F2)	Well No. 4 (FD)	Well No. 6 (FF)	Well No. 7 (FG) µg/L	Well No. 10 (FO)	Well No. 11 (FP)	Well No. 12 (FQ)	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
Dichloromethane	< 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	0.5 <sup>(a)</sup>	0.7 <sup>(a)</sup>	< MDL	0.5	< 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
1,1,2-trichloroethane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
1,2-dichloropropane	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	< MDL	5
Dibromomethane	< MDL	< MDL	< MDL	< MDL	< 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	4.6	1.2	< MDL	5.0	0.6	< MDL	0.6	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	ND	ND	ND	ND	ND	ND	ND	5
2-chlorotoluene	ND	ND	ND	ND	ND	ND	ND	5
4-chlorotoluene	ND	ND	ND	ND	ND	ND	ND	5
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
1,2,4-trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	5
1,2,3-trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	ND	5
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	5
m-xylene	ND	ND	ND	ND	0.7 <sup>(b)</sup>	ND	ND	5
p-xylene	ND	ND	ND	ND	0.7 <sup>(b)</sup>	ND	ND	5
o-xylene	ND	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	5
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	5
n-propylbenzene	ND	ND	ND	ND	ND	ND	ND	5
1,3,5-trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	5
tert-butylbenzene	ND	ND	ND	ND	ND	ND	ND	5
1,2,4-trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	5
sec-butylbenzene	ND	ND	ND	ND	ND	ND	ND	5
p-isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	5
n-butylbenzene	ND	ND	ND	ND	ND	ND	ND	5

continued on next page



**Table 3-7. Potable Water Wells: 1999 Principal Organic Compounds, Synthetic Organic Chemicals, and Micro-Extractables Analytical Data (continued).**

Compound	WTP Effluent (F2)	Well No. 4 (FD)	Well No. 6 (FF)	Well No. 7 (FG)	Well No.10 (FO)	Well No. 11 (FP)	Well No. 12 (FQ)	NYS DWS
methyl tert. Butylether	ND	ND	ND	ND	ND	ND	ND	50
Lindane	ND	ND	ND	ND	ND	ND	ND	0.2
Heptaclor	ND	ND	ND	ND	ND	ND	ND	0.4
Aldrin	ND	ND	ND	ND	ND	ND	ND	5
Heptachlor Epoxide	ND	ND	ND	ND	ND	ND	ND	0.2
Dieldrin	ND	ND	ND	ND	ND	ND	ND	5
Endrin	ND	ND	ND	ND	ND	ND	ND	0.2
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	40
Toxaphene	ND	ND	ND	ND	ND	ND	ND	3
Chlordane	ND	ND	ND	ND	ND	ND	ND	2
Total PCBs	ND	ND	ND	ND	ND	ND	ND	0.5
2,4,5,-TP (Silvex)	ND	ND	ND	ND	ND	ND	ND	10
Dinoseb	ND	ND	ND	ND	ND	ND	ND	50
Dalapon	ND	ND	ND	ND	ND	ND	ND	50
Pichloram	ND	ND	ND	ND	ND	ND	ND	50
Dicamba	ND	ND	ND	ND	ND	ND	ND	50
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	1
Hexachlorocyclopentadiene	ND	ND	ND	ND	ND	ND	ND	5
Di(2-ethylhexyl)Phthalate	ND	ND	ND	ND	ND	ND	ND	50
Di(2-ethylhexyl)Adipate	ND	ND	ND	ND	ND	ND	ND	50
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	5
Benzo(A)Pyrene	ND	ND	ND	ND	ND	ND	ND	50
Aldicarb Sulfone	ND	ND	ND	ND	ND	ND	ND	NS
Aldicarb Sulfoxide	ND	ND	ND	ND	ND	ND	ND	NS
Aldicarb	ND	ND	ND	ND	ND	ND	ND	NS
Oxamyl	ND	ND	ND	ND	ND	ND	ND	50
3-Hydroxycarbofuran	ND	ND	ND	ND	ND	ND	ND	50
Carbofuran	ND	ND	ND	ND	ND	ND	ND	40
Carbaryl	ND	ND	ND	ND	ND	ND	ND	50
Total Aldicarbs	ND	ND	ND	ND	ND	ND	ND	NS
Glyphosate	ND	ND	ND	ND	ND	ND	ND	50
Diquat	ND	ND	ND	ND	ND	ND	ND	50
Ethylene Dibromide	ND	ND	ND	ND	ND	ND	ND	0.05
Dibromochloropropane	ND	ND	ND	ND	ND	ND	ND	0.2
2,4,-D	ND	ND	ND	ND	ND	ND	ND	50
Perchlorate	ND	ND	ND	ND	ND	ND	ND	NS
Alachor	ND	ND	ND	ND	ND	ND	ND	2
Simazine	ND	ND	ND	ND	ND	ND	ND	50
Atrazine	ND	ND	ND	ND	ND	ND	ND	3
Metolachor	ND	ND	ND	ND	ND	ND	ND	50
Metribuzin	ND	ND	ND	ND	ND	ND	ND	50
Butachlor	ND	ND	ND	ND	ND	ND	ND	50
Propachlor	ND	ND	ND	ND	ND	ND	ND	50

## Notes:

For compliance determination with New York State Department of Health standards, potable wells were analyzed quarterly during the year by H2M Labs, Inc., a NYS certified contract laboratory.

The minimum detection limits for Principal Organic Compound analytes are 0.5 µg/L. Minimum detection limits for Synthetic Organic Chemicals, Pesticides and Micro-extractables are compound-specific, and in all cases are less than the New York State Department of Health drinking water standard (NYS DWS).

All concentrations are the maximum values reported by the contractor laboratory.

WTP=Water Treatment Plant

<MDL=Less than the minimum detection limit

ND=Not Detected at the minimum detection limit

NS=Drinking Water Standard Not Specified

<sup>(a)</sup> Water obtained from wells 4, 6, and 7 is treated at the WTP prior to site distribution. The concentration of 1,1,1-trichloroethane in the WTP effluent (F2) met all drinking water standards.

<sup>(b)</sup> Reported Value represents total for both compounds.

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 or remedial actions that would be taken in the event of a petroleum release. The plan also provides information regarding the design of storage facilities, release prevention measures, and provides maps showing the location of all storage facilities. The SPCC Plan is maintained on file with NYSDEC, EPA, and DOE. The plan is updated triennially and is due for updating in 2000.

### 3.8.2 EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT (EPCRA) AND THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III REPORTING REQUIREMENTS

EPCRA and Title III of SARA require reporting of inventories and releases to a local emergency planning committee and the state emergency response commission for certain chemicals that exceed reporting thresholds. BNL fully complied with these requirements in 1999. The Laboratory submitted the required reports under EPCRA Sections 302-303, 304, 311-312. In 1999, there were no chemical releases that were subject to release reporting requirements under Section 313.

### 3.8.3 SPILL RESPONSE, REPORTABLE RELEASES AND OCCURRENCES

If a spill occurs, BNL personnel are required to immediately contact the onsite Fire Rescue Group. The Fire Rescue Group is trained in responding to releases of hazardous materials. The first step in a spill response is to contain and control any release, and to notify additional response personnel (BNL environmental professionals, industrial hygienists, etc.). Environmental professionals reporting to the scene assess the spill for environmental impact and determine reportability. 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 five gallons to outdoor impermeable surfaces or containment areas are also reported.

Spills of chemicals in quantities greater than Comprehensive Environmental Response, Compensation & Liability Act (CERCLA) reportable quantities are reportable to the National Response Center, NYSDEC, and SCDHS. Remediation of the spill is conducted as appropriate. For example, if a piece of heavy

equipment ruptured a hydraulic line resulting in a release of hydraulic oil to the soil, immediate actions would be taken to stop the leak, and then the contaminated soil would be excavated and containerized for offsite disposal.

During 1999, there were 36 spills, of which only nine met external agency reporting criteria. One of these spills was discovered during the demolition of an old petroleum pumping station located at the Major Petroleum Facility. This release most likely did not occur in 1999. All reportable spills were remediated or otherwise addressed to the satisfaction of NYSDEC; and all contaminated residuals were collected, containerized, and disposed. The remainder of the reportable spills was small (typically less than 3 gallons) and were also immediately cleaned up.

Table 3-8 provides information on the reportable spills, including the date of the spill, material involved, and quantity. It also includes a summary of the cause and corrective action taken. In addition, the table notes if the spill was reportable to DOE through the Occurrence Reporting and Processing System (ORPS).

In addition to the one spill noted in Table 3-8 as reported through ORPS, there were six other incidents reported to DOE through ORPS that were environmental in nature. These included a discovery of groundwater contaminated with tritium at the Alternating Gradient Synchrotron facility (at the g-2), water intrusion at RHIC, a short-term release of untreated air emissions from a soil vapor extraction system, the potential release of gasoline to groundwater, a small fire at a remediation site, and a small fire at one of the experimental facilities. All of these incidents were addressed through the identification and implementation of corrective actions geared towards correcting the root cause. A formal investigation was conducted in response to the groundwater discovery at the AGS that is fully described in Chapter 7. There were no onsite or offsite environmental consequences arising from the remaining ORPS incidents. Table 3-9 provides a description of each of these occurrences.

### 3.8.4 MAJOR PETROLEUM FACILITY (MPF)

BNL is in full compliance with its MPF License requirements. The storage of 2.3 million gallons of petroleum products (princi-

Table 3-8. Summary of 1999 Chemical and Oil Spill Reports.

Incident Number	Date	Material	Quantity	ORPS* Report	Source/Cause and Corrective Actions
99-03	03/04/99	Blaso-Cut (Water Soluble Cutting Fluid)	Unknown	No	While performing routine maintenance on a horizontal bridge mill (AWEA PD400), personnel noticed an aluminum drip pan had developed leaks. Inspection of the pan showed that the concrete floor had eroded the aluminum and that a seam weld had cracked. Inspection of the concrete pit beneath the pan showed that oil had seeped into the concrete. Subsequent investigation showed that soils beneath the pit had been impacted by the spill. Soil samples were collected and further evaluation is needed by the NYSDEC before remediation is complete.
99-05	1/17/99	Petroleum	< 1 gallon	No	During an inspection of maintenance work on recharge basin HN, an oily sheen was noted in the water pooled behind the overflow weir. Personnel erected a boom in the v-notched weir and down gradient of the weir to capture the floating oil as it passed over the weir. The sheen was probably the result of snow melt run-off from parking lots and roadways, since inspection of several storm drains that are connected to the basin revealed no apparent point source for the oil.
99-07	03/25/99	Diesel Fuel	~1 Quart	No	An emergency generator was being used to supply power to Bldg. 526/527 during the repair of the main electrical feeder. During operation a fuel injector developed a leak which resulted in the release of diesel fuel to the ground. There were no impacts to any water systems. All contaminated soils were containerized for offsite disposal.
99-08	03/29/99	Hydraulic Oil/ Diesel Fuel	< 3 gal.	No	While responding to a tank alarm at Bldg. 610, personnel noticed an area of dead vegetation along the east side of an above-grade, emergency, generator, storage tank. Further investigation revealed a mild oil odor and oil staining of the soil. All contaminated soils were containerized for offsite disposal.
99-15	05/24/99	Fuel Oil No. 6	~30 gal.	Yes	During excavation of pit to the south of Bldg. 610, water and floating product were discovered. Excavation was performed due to historical information of past operations in this area. All visible water was suctioned out and affected soils were removed and containerized separately for offsite disposal. Historic groundwater contamination from this source is possible.
99-26	09/16/99	Dielectric Fluid	< 1 lb.	No	Dielectric fluid leaked onto the floor of Room 09 in Bldg. 902 when a light ballast burnt out. After discovery, the leaking ballast was removed, containerized, and labeled for disposal for offsite disposal. A 4' x 4' area around the spill was cordoned off and labeled in accordance with 40 CFR Part 761 requirements. The one tile visibly affected by the spill along with three adjacent tiles were also removed for offsite disposal. After the tiles were removed, a wipe sample was taken from the concrete sub-floor to confirm that Part 761 clean-up criteria had been satisfied.
99-28	09/17/99	Diesel Fuel	~1/2 cup	No	In preparation for Hurricane Floyd, a diesel-powered pump was stationed outside Bldg. 911 to remove accumulated water and prevent intrusion into the AGS ring. During inspection, it was noticed that fuel oil was leaking from the fuel tank due to solar heat expansion. Soils affected by the spill were excavated and containerized for offsite disposal.
99-29	09/24/99	Motor oil	2-3 quarts	No	An employee accidentally backed his personal vehicle into an imbedded stake located behind Bldg. 490, which punctured the oil pan. Speedi-dry was used on affected areas of pavement and containerized along with affected soils for offsite disposal.
99-30	10/08/99	Fuel	< 1 gal.	No	A backhoe operated by a contractor company leaked fuel while parked and also after it was moved to a new location. The spills were not reported by the contractor but discovered by BNL personnel. Speedi-dry was used on affected areas of pavement and containerized along with affected soils for offsite disposal.

\*Occurrence Reporting and Processing System

**Table 3-9. Summary of 1999 Environmental Occurrence Reports.**

ORPS* ID	Date of Occurrence	Occurrence Description	Status
CH-BH-BNL-NSLS-1999-0001	1/25/99	A power supply associated with the NSLS linear accelerator caught fire. The cause of the fire was determined to be a capacitor which did not meet manufacturer's specifications. Failure was due to extended internal arcing and the combustible nature of the capacitor materials.	All corrective actions are complete. The report is awaiting DOE approval.
CH-BH-BNL-BNL-1999-0001	1/04/99	Heavy rains resulted in flooding of an experimental facility at RHIC. Analysis of the incident revealed no impacts to the experiment.	All corrective actions are complete and the report approved by the DOE.
CH-BH-BNL-BNL-1999-0008	3/4/99	During maintenance of a milling machine, the machine operator noticed cutting coolant had leaked outside the secondary containment device. Further inspection showed that the concrete depression containing the containment vessel was cracked. Investigation showed low level oil contamination of the soils around the concrete. There were no impacts to groundwater.	The investigation has been completed and the results forwarded to the New York State Department of Environmental Conservation (NYSDEC) for review.
CH-BH-BNL-BNL-1999-0010	3/30/99	The NYSDEC issued an Notice of Violation for a hazardous waste inspection conducted in 1998. See Section 3.9 for a discussion of this occurrence.	All corrective actions have been completed and the report approved by DOE.
CH-BH-BNL-BNL-1999-0020	10/12/99	Wastes collected from the glass holes project were containerized for offsite disposal. During the containerization process, the waste was shredded. A container containing a mixture of sodium and potassium was shredded and bagged. Once exposed to atmospheric conditions the mixture reacted exothermically with the air resulting in a small fire.	All corrective actions are complete. The report is awaiting DOE approval
CH-BH-BNL-BNL-1999-0026	11/20/99	During dismantlement of the fire extinguisher test stand for the winter, water contained in the apparatus was discharged to a stormwater drywell. Since gasoline is used in the testing, fears that residual gasoline may be present prompted this report. Analysis of soil samples collected from the base of the drywell showed no evidence of gasoline products (i.e., aromatic hydrocarbons).	All corrective actions are complete. The report is awaiting DOE approval.

\*Occurrence Reporting and Processing System

pally No. 6 Fuel Oil) subjects BNL to licensing by NYSDEC. The current license was renewed in 1997. The license requires BNL to monitor groundwater in the vicinity of the seven active storage tanks (ranging in size from 60,000 to 600,000 gallons), which are all aboveground. Monitoring consists of monthly checks for floating products, and twice-yearly tests for semivolatle organic compounds. There were no contaminants or floating products found in the groundwater wells that monitor the MPF in 1999. (See Chapter 7 for additional information on groundwater monitoring results.) An inspection of this facility was conducted by NYSDEC on November 15. This inspection noted four conditions that required immediate corrective actions and one recommendation. All conditions were addressed with NYSDEC concurrence on the corrective actions. The corrective actions included repair of a secondary contain-

ment liner near the base of one of the tanks, performance of a cathodic protection system test, remediation of a petroleum release, and the evaluation of a request to include all petroleum tanks at the site on the MPF license. With regard to the last item, the NYSDEC agreed, after reviewing prior documentation, that all tanks need not be included on the license.

### 3.8.5 CHEMICAL BULK STORAGE

All underground tanks, and all aboveground tanks larger than 185 gallons that store specific chemical substances listed in 6NYCRR Part 597 must be registered with NYSDEC. BNL's registration was renewed in July 1999. Nine tanks used for the storage of sodium hypochlorite for potable water treatment were added to this registration in 1999. In total, BNL has 18 registered tanks: 16 aboveground tanks storing water treatment

chemicals (for cooling towers, wastewater, or potable water treatment) and two for storing gallium trichloride used in neutrino experiments. The tanks range in size from 475 to 2,000 gallons. In 1999, to conform with bulk storage requirements, secondary containment trays were installed at each storage facility for off-loading operations. These trays, in conjunction with standardized procedures, provide containment in the event of a leak or hose failure during the filling of tanks.

### 3.8.6 SUFFOLK COUNTY SANITARY CODE ARTICLE 12

Article 12 of the Suffolk County Sanitary Code, administered by SCDHS, regulates the storage and handling of toxic and hazardous materials in above or underground storage tanks, drum storage facilities, piping systems, and transfer areas. It specifies design criteria to prevent environmental impacts resulting from spills or leaks. It also specifies administrative requirements, such as labeling for identification purposes, registration, and spill reporting procedures. In 1987 BNL entered into a MOA with the SCDHS. In this agreement, DOE and BNL agreed to conform to the environmental requirements of Article 12.

There are 516 BNL storage facilities listed in the Suffolk County tanks database. Another 48 CERCLA tanks are not regulated under Article 12. The database lists active as well as inactive storage tanks, and tanks of unknown status (e.g., whether removed or existing). Storage facilities listed in the database include facilities storing fuel (some of which are also regulated under the MPF license), wastewater, chemicals, and facilities needed to support radiological research.

As of the end of 1999, 70 of the tanks listed in the Suffolk County database fully conformed with all Article 12 administrative, maintenance, and technical requirements. Approximately 374 of the other 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). Less than one-quarter of these facilities were found to be in technical nonconformance with Article 12 requirements (e.g., no secondary containment, high-level detection). BNL is working with SCDHS to establish an acceptable plan to upgrade or close these storage facilities.

BNL has an ongoing program to upgrade and/or replace existing facilities to conform

with Article 12 requirements. During 1999, significant efforts were expended to address many of the administrative nonconformances such as tank labeling and tank “registrations.” In November 1999 registration documents were submitted for 110 storage facilities, and all tanks were inspected for proper labeling. Plans for upgrades to nine former drum storage areas located at cooling tower treatment stations were also submitted for review. Upgrades of the HFBR piping systems were completed and approved by the SCDHS. Upgrades to achieve full conformance to Article 12 requirements will continue through 2003.

### 3.9 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

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 “cradle to grave,” or from the point of generation to final disposal. In New York State, the RCRA program is delegated to NYSDEC by EPA, which still maintains an oversight role. BNL is considered a large quantity generator, and also has a RCRA permit to store hazardous wastes for one year prior to offsite shipment for treatment and disposal. As noted in Chapter 2, BNL has a number of 90-day storage and satellite accumulation areas. During 1999, BNL was inspected by NYSDEC for compliance with the hazardous waste requirements and was not cited for any violations. Some compliance issues were noted during BNL internal assessments, and all were documented and promptly corrected.

On March 29, 1999, NYSDEC issued a consent order for violations of state hazardous waste requirements discovered during the 1998 annual inspection. Three violations were noted: a missing land disposal restriction code on a manifest, missing communication device at a 90-day storage area, and late submittal of closure certificate for the former waste management facility. All violations were immediately corrected. A penalty of \$2,250.00 was assessed by NYSDEC and paid by Brookhaven Science Associates. Additionally, in 1999, BNL continued negotiation of the EPA consent order issued in 1997. The order was finalized and an administrative penalty of \$17,500.00 paid.

## CHAPTER 3: COMPLIANCE STATUS

### 3.9.1 RCRA/TOXIC SUBSTANCES CONTROL ACT (TSCA) WASTE MORATORIUM

On May 17, 1991 DOE instituted a waste moratorium directing all DOE facilities to cease offsite shipments of RCRA/TSCA-regulated wastes that originated in radiologically-controlled areas. To address this DOE-wide issue, BNL developed a DOE-approved waste certification program for all nonradioactive RCRA/TSCA wastes generated by BNL. The program uses process knowledge, analytical procedures, and standard survey techniques to ensure RCRA/TSCA wastes shipped offsite to nonradioactive disposal facilities are free from radioactivity. Generators of waste are required to document and certify all results associated with the program. The moratorium was fully lifted by DOE in 1995 when BNL received final approval of its waste certification program.

### 3.9.2 FEDERAL FACILITIES COMPLIANCE ACT (FFCA) SITE TREATMENT PLAN FOR MIXED WASTE

Mixed wastes are wastes that are both hazardous (under RCRA) and radioactive. The FFCA, issued in 1992, requires DOE to work with local regulators to develop a site treatment plan to manage mixed waste. Development of the plan had two purposes: (1) to identify available treatment technologies and disposal facilities (DOE or commercial) able to manage mixed waste produced at federal facilities; and (2) to develop a schedule for treatment and disposal of these waste streams.

BNL updates its Site Treatment Plan annually and submits it to NYSDEC. The update documents the current mixed waste inventory, and describes efforts BNL has undertaken to seek new commercial treatment and disposal outlets for various waste streams. One initiative that BNL has supported is DOE's Broad Spectrum Procurement. This initiative provides DOE facilities with a mechanism to treat small quantities of mixed waste that might not normally meet treatment facility minimum volume requirements. Treatment and disposal outlets approved under the Broad Spectrum Procurement are available for use throughout the DOE complex.

### 3.10 TOXIC SUBSTANCE CONTROL ACT (TSCA)

The storage, handling, and use of PCBs (Polychlorinated Biphenyls) are regulated under the Toxic Substances Control Act. All equip-

ment containing PCBs must be inventoried, with the exception of small capacitors (less than 3 lbs.) and items where the concentration of the PCB source material is less than 50 ppm. This inventory is updated by July 1st of each year. Capacitors manufactured prior to 1970 that are believed to be oil filled, but where the existence of PCBs cannot be verified through an investigation of manufacturer's records, are handled as if they contain PCBs. All PCB articles and/or PCB-contaminated equipment must be labeled. BNL responds to any PCB spill in accordance with emergency response procedures. BNL was in compliance with TSCA requirements in 1999.

BNL maintains an EPA authorization to conduct research using PCBs. A statement regarding the status of this research is reported to EPA annually. There was no research conducted in 1999.

### 3.11 FEDERAL INSECTICIDE FUNGICIDE AND RODENTICIDE ACT (FIFRA)

BNL is in full compliance with FIFRA requirements. Pesticide storage and application is regulated under FIFRA. (Note: Pesticides include herbicides.) Most 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). Pesticides are also applied to agricultural research fields onsite. Pesticide use is minimized wherever possible (e.g., through spot treatment of weeds). All pesticides are applied by New York State-certified applicators. By February 1, each applicator files an annual report with NYSDEC detailing pesticide use for the previous year.

### 3.12 FLOODPLAINS/WETLANDS AND WILD AND SCENIC RECREATIONAL RIVERS AND OTHER SPECIAL 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 as either scenic or recreational under the Wild, Scenic and Recreational River System Act by NYSDEC. BNL also has six major areas regulated as wetlands and a number of vernal (seasonal) pools onsite. Construction and/or modification activities performed within these areas require permits from the NYSDEC.

Activities that could require review under these natural resource programs are identified

during the NEPA process. 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 impact 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.

Two activities were continued in 1999 that required special permits. The first project was the construction of pumping stations for conveying sanitary waste and stormwater from RHIC facilities to the central collection system. While the majority of the construction was completed in 1998, a modification to the permit was requested in 1999 to permit the construction of a pump station at the eight o'clock station. This modification was approved and the pump station installed. The second project involved the installation of a geomembrane and soil shielding at the RHIC ten o'clock station. This application was approved in April 1999 and the construction was completed. To address other projects within the Peconic River corridor, a meeting was held with NYSDEC to review upcoming projects and regulatory requirements. During this meeting, plans for installing security fences, sewers and stormwater drainage systems, and vertical drainage wells for relieving hydrostatic pressures at RHIC were discussed. The NYSDEC expressed interest in seeing plans and specifications for all projects falling within one-half mile of the Peconic River.

### 3.13 ENDANGERED SPECIES

In 1999, NYSDEC revised its list of endangered, threatened, and 'species of special concern.' The tiger salamander (*Ambystoma tigrinum tigrinum*) is the only state endangered species found at BNL. Tiger salamanders are listed in New York State as endangered because populations have declined as a result of loss of habitat through development, road mortality during breeding migration, introduction of predatory fish into breeding sites, historical collection for bait and pet trade, water level fluctuations, pollution, and general disturbance of breeding sites. BNL has prepared a Wildlife Management Plan to formalize the strategy and actions needed to protect the 13 confirmed tiger salamander breeding locations onsite. The strategy includes identifying and mapping habitats, monitoring,

improving breeding sites, and controlling activities that could impact breeding.

The banded sunfish (*Enneacanthus obesus*) is found in the Peconic River onsite at BNL. The banded sunfish is listed as a state threatened species within New York State. The reason for this status is that the only remaining population of the banded sunfish is located on eastern Long Island. Measures being taken by BNL to protect the banded sunfish and its habitat include

- ◆ eliminating, reducing, or controlling pollutant discharges;
- ◆ upgrading the STP to reduce nitrogen loading in the Peconic (completed in 1998);
- ◆ monitoring populations and water quality;
- ◆ maintaining adequate flow in the river and creating deep pools to enable the fish to survive drought;
- ◆ controlling disturbances; and
- ◆ culling predator species during sampling activities.

BNL also has eight species onsite that are listed as 'species of special concern.' 'Species of special concern' have no protection under the state endangered species laws, but may be protected under other state and federal laws (i.e., Migratory Bird Treaty Act). However, the state monitors 'species of special concern' and manages their populations and habitats, where practical, to ensure that they do not become threatened or endangered. Those 'species of special concern' found at BNL include the marbled salamander (*Ambystoma opacum*), spotted turtle (*Clemmys guttata*), eastern box turtle (*Terrapene carolina*), eastern hognosed snake (*Heterodon platyrhinos*), horned lark (*Eremophila alpestris*), whip-poor-will (*Caprimulgus vociferus*), vesper sparrow (*Pooecetes gramineus*), and 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 onsite. The eastern hognosed snake has only been seen onsite once, in 1994 (LMS 1995). BNL will be evaluating bird populations as part of the management strategy outlined in the Wildlife Management Plan. Data concerning 'species of special concern' will be used appropriately in making management decisions regarding those species. In addition to the above bird species, 19

other bird species listed as ‘species of special concern’ and two federally threatened species have been observed onsite 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, 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 causal factors resulting in population declines continue. These plants are currently protected on BNL due to the large areas of undeveloped pine barrens habitat onsite. Locations of these rare plants must be determined, populations estimated and management requirements established. Management of protected plants will be included in the future revisions of the Wildlife Management Plan. 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 at least nine occasions in 1999. These inspections are summarized below. BNL also has a comprehensive self assessment program as described in section 2.2.1 of Chapter 2. As of 1998, the SCDHS has had two staff members residing at BNL. Personnel from the SCDHS perform routine inspections of facilities and inspect storage facility removals and installations as part of their everyday activities.

#### 3.14.1 INSPECTIONS BY REGULATORY AGENCIES

- ◆ *Hazardous Waste*. NYSDEC conducted a RCRA/hazardous waste compliance inspection in June-July 1999. No deficiencies were noted.
- ◆ *Air Compliance*. NYSDEC conducted an annual inspection of the Central Steam Facility in March 1999. Additionally, the EPA conducted a quality assurance (QA) review of the Central Steam Facility in August 1999. The EPA found the BNL QA program to be complete and commended the Laboratory for its QA practices. There were no findings or issues identified during either of these inspections.
- ◆ *Potable Water*. SCDHS conducts annual inspections of the BNL potable water system to collect samples and ensure that facilities are maintained. There were no findings in 1999, and all sample results were below drinking

water standards, except for iron, which is naturally occurring. As noted in section 3.7.1, BNL treats the drinking water supply prior to consumption to remove iron.

- ◆ *Sewage Treatment Plant (STP)*. SCDHS conducts quarterly inspections of the BNL STP. In 1999 there were no performance or operational issues associated with the treatment plant itself. SCDHS deficiencies included an inoperable high-level alarm and some minor painting needed for a fuel storage tank. All deficiencies were immediately corrected.
- ◆ *Major Petroleum Facility (MPF)*. The MPF is inspected annually by NYSDEC. There were four minor issues identified during this inspection that required corrective actions. All were mitigated within 30 days of the official written notification.

#### 3.14.2 DEPARTMENT OF ENERGY (DOE): DOE-HEADQUARTERS, CHICAGO, AND BROOKHAVEN GROUP OFFICE (BHG)

DOE Headquarters: DOE Headquarters conducted an Integrated Safety Management Evaluation in 1999. The follow-up review focused on the adequacy of current integrated management systems and the adequacy of the efforts to develop safety management systems necessary to meet the DOE requirements. They noted that the DOE Office of Science, BHG, and BNL had demonstrated a commitment to implementing integrated safety management and had made significant improvements to the Laboratory’s environment, safety and health management systems. Particular improvements included clarification of roles, responsibilities, authorities, and accountabilities; balanced priorities; and BHG oversight capabilities.

DOE Brookhaven Group Office: The DOE BHG continued to strengthen their oversight program during 1999 and conducted compliance assessments of the following environment programs: NESHAPs, RCRA, chemical safety, sealed sources, and emergency exercises. Several concerns, areas for improvement, and/or program inadequacies were identified during these assessments. Corrective action plans were prepared and are being implemented for each of the concerns or weaknesses identified.

#### 3.14.3 ENFORCEMENT ACTIONS AND MOA'S

In 1999, the NYSDEC issued a consent order to BNL for violations of RCRA requirements discovered during the 1998 annual



inspection. The order cited three issues of non-compliance: (1) untimely submittal of closure documentation for the former hazardous waste management facility, (2) missing land disposal restriction codes in a manifest, and (3) a missing communication device at a 90-day storage area. The order assessed a penalty of \$2,250.00

against BNL. All issues were corrected and the fee paid in 1999. In 1997, EPA proposed a Consent Order with a proposed penalty as a result of a multi-media compliance inspection conducted in 1997. Negotiations on the terms of this Order continued in 1999 and the Order was finalized in 1999. Also in 1999, the pro-

**Table 3-10. 1999 Status of Existing Agreements and Enforcement Actions Issued to BNL.**

Number	Title	Parties	Effective Date	Status
C1-8975-03-99	Consent Order	NYSDEC and BNL	3/24/99	NYSDEC cited BNL two administrative and one technical noncompliances with hazardous waste regulations. They were: late submittal of a closure certificate for the former Hazardous Waste Management Facility, a missing land disposal restriction code on a manifest, and the unavailability of a communication device in a 90-day storage area. All deficiencies were corrected and a penalty of \$2,250.00 was paid to NYSDEC.
Not Applicable	Federal Facilities Compliance Agreement (FFCA) on mixed waste	NYSDEC and DOE	1992	The FFCA requires that a site treatment plan to manage mixed wastes be written and updated annually. BNL is in compliance with this requirement.
Docket No. II-RCRA-98-0202	EPA Administrative Order Resource Conservation and Recovery Act	DOE and EPA	02/25/98	As a result of negotiations between EPA and BNL representatives (specifically DOE and Associated Universities, Inc.), BNL agreed to conduct several Supplemental Environmental Projects (SEPs) to settle the complaint. The SEPs were initiated in 1998. In 1999 the Order was finalized and settled. An administrative penalty of \$17,500.00 was paid to EPA.
Index No. 113-98-0	Compliance Order — Clean Air Act	EPA and DOE	02/24/98	BNL, DOE, and EPA met in May 1998 to review and clarify the issues presented in this Order. Documentation necessary to support Laboratory operations was submitted to the EPA prior to the issuance of the Order. There was no further activity in 1999.
Not Applicable	Notice of Noncompliance — Toxic Substances Control Act	EPA and DOE	02/12/98	All required information was submitted to EPA on 10/6/98; The Waste Management Division implemented a revised Hazardous Waste Control Form in 1999. There was no additional activity regarding this Notice in 1999.
Docket No. UIC-AO-98-01	Administrative Order on Consent - Safe Drinking Water Act	EPA and DOE	3/4/98	A meeting was held with the EPA in May 1998 to review the Order, associated deliverables and an application for an Area Permit that was filed in December 1997. A second meeting was held in March 1999 to finalize deliverables. This Order was finalized in September 1999. All corrective measures were completed by September 30, 1999.
I-CERCLA-FFA-00201	Federal Facility Agreement under the Comprehensive Environmental Response, Compensation and Liability Act Section 120 (also known as the Interagency Agreement or "IAG" on the Environmental Restoration Program).	EPA, DOE, and NYSDEC	05/26/92	Provides the framework, including schedules, for assessing the extent of contamination and conducting the BNL cleanup. Work is performed either as an operable unit or a removal action. The IAG integrates the requirements of Comprehensive Environmental Response, Compensation and Liability Act, Resource Conservation and Recovery Act, and the National Environmental Policy Act. All IAG scheduled milestones were met in 1999.
Not Applicable	Suffolk County Agreement	SCDHS, DOE, and BNL	Originally signed on 9/23/87	This Agreement was formalized to ensure that the storage and handling of toxic and hazardous materials at BNL is consistent with the technical requirements of Suffolk County codes.
Not Applicable	Memorandum of Agreement (MOA) by and between the U.S. Environmental Protection Agency and the U.S. Department of Energy	EPA and DOE	03/23/98	BNL is currently in full compliance with the terms of the MOA. Phase I of the MOA covered the EPA multimedia inspection. Phase II required an evaluation of processes, and Phase III required implementation of an Environmental Management System and first year of audits. See Chapter 2 for further discussion.

Notes:

EPA= U.S. Environmental Protection Agency  
 NYSDEC = New York State Department of Conservation  
 SCDHS = Suffolk County Department of Health Services

## CHAPTER 3: COMPLIANCE STATUS

posed Administrative Order on UIC compliance was finalized and a schedule for submitting a UIC Area Permit application formalized. No other issues were identified by the EPA in 1999.

EPA and DOE signed a voluntary MOA on March 23, 1998. (See Chapter 2 for a discussion of the MOA.) During 1999, BNL continues to be in full compliance with the terms of the MOA.

All existing enforcement actions and Memorandums of Agreement are listed in Table 3-10, along with a summary of their status.

## REFERENCES

DOE Order 5400.5, 1990. *Radiation Protection of the Public and the Environment*. U.S. Department of Energy, Washington, D.C. Change 2: 1-7-93.

Lawler, Matusky, & Skelly Engineers (LMS). 1995. *Phase II Sitewide Biological Inventory Report*. Prepared for the Office of Environmental Restoration, Brookhaven National Laboratory, Upton, New York.