Executive Summary

Each year, Brookhaven National Laboratory (BNL) prepares an annual Site Environmental Report (SER) in accordance with DOE Order 231.1A, Environment, Safety and Health Reporting of the U.S. Department of Energy (DOE). The report is written to inform the public, regulators, employees, and other stakeholders of BNL's environmental performance during the calendar year in review. The SER summarizes environmental data; environmental management performance; compliance with applicable DOE, federal, state, and local regulations; and compliance, restoration, and surveillance monitoring program performance. BNL has prepared annual SERs since 1971 and has documented nearly all of its environmental history since the Laboratory's inception in 1947.

The report is available in print and as a downloadable file on the BNL web page at http://www.bnl.gov/ewms/ser/. A summary of the SER is also prepared each year to provide a general overview of the report, and is distributed with a CD of the full report.

BNL is operated and managed for DOE's Office of Science by Brookhaven Science Associates, a nonprofit limited-liability company formed as a 50–50 partnership between Battelle Memorial Institute and The Research Foundation of State University of New York (SUNY) on behalf of Stony Brook University. For more than 50 years, the Laboratory has played a lead role in the DOE Science and Technology mission and continues to contribute to the DOE missions in Energy Resources, Environmental Quality, and National Security. BNL manages its world-class scientific research with particular sensitivity to environmental issues and community concerns. The Laboratory's motto, "Exploring Life's Mysteries…Protecting its Future," and Environmental, Safety, Security and Health Policy reflect BNL's management philosophy to fully integrate environmental stewardship into all facets of its missions and operations.

BNL'S ENVIRONMENTAL MANAGEMENT SYSTEM

One of BNL's highest priorities is ensuring that the Laboratory's environmental performance measures up to its world-class status in science. In 2001, an Environmental Management System (EMS) was established at the Laboratory to ensure that environmental issues are systematically identified, controlled, and monitored. The EMS also provides mechanisms for responding to changing environmental conditions and requirements, reporting on environmental performance, and reinforcing continual environmental improvement. The cornerstone of BNL's EMS is the Laboratory's Environment, Safety, Security, and Health (ESSH) Policy. This policy makes clear BNL's commitments to environmental stewardship, the safety of its employees, and the security of the site. Specific environmental commitments in the policy include compliance, pollution prevention, cleanup, community outreach, and continual improvement. The policy is posted throughout the Laboratory and on the BNL website at http://www.bnl.gov/ESHQ/ESSH.asp and is included in all training programs for new employees, guests, and contractors.

The Laboratory's EMS was designed to meet the rigorous requirements of the glob-

ally recognized International Organization for Standardization (ISO) 14001 Environmental Management Standard. BNL was the first laboratory under the DOE Office of Science to become officially registered to this standard in 2001. Annual independent audits, which are required to maintain the registration, are conducted to validate that the EMS is being maintained and to identify evidence of continual improvement. In 2005, an EMS Surveillance Audit determined that BNL continues to conform to the Standard, which was upgraded in 2004. The Laboratory was also the first DOE facility to be certified to the 2004 Standard. During the 2005 EMS audit, seven examples of BNL's continual improvement were highlighted and three minor nonconformances and four opportunities for improvement were identified. A corrective action plan was prepared to track the minor nonconformances to closure.

A strong Pollution Prevention (P2) Program is an essential element for the successful implementation of BNL's EMS. The Laboratory's P2 Program reflects the national and DOE pollution prevention goals and policies and represents an ongoing effort to make pollution prevention and waste minimization an integral part of the BNL operating philosophy. Pollution prevention and waste reduction goals have been incorporated into the DOE contract with BSA, into BNL's ESSH Policy, and into critical outcomes associated with the Laboratory's operating contract with BSA. The overall goal of the P2 Program is to create a systems approach that integrates pollution prevention and waste minimization, resource conservation, recycling, and affirmative procurement into all planning and decision making. Nineteen P2 proposals were submitted by employees to BNL's P2 Council for funding in 2005. Nine proposals were funded, in addition to four special projects, for a combined investment of approximately $101,000. The anticipated annual savings from these projects is estimated at $102,000, for an average payback period of 1.4 years. Initiatives to reduce, recycle, and reuse 2.8 million pounds of industrial, sanitary, hazardous, and radiological waste through the P2 Program saved over $1 million in 2005.

The completion of the Peconic River cleanup in 2005 resulted in the removal of approximately 6,000 tons of non-hazardous sediment. In addition, remedial activities conducted at the Former Hazardous Waste Management Facility, Waste Concentration Facility, and the Chemical/Glass Holes Projects resulted in the removal of the greatest amount of radiological waste in any single year.

BNL was accepted into the EPA's Performance Track Program in 2004. This program recognizes top environmental performance among participating U.S. facilities of all types and is considered the "gold standard" for facility-based environmental performance. The program requires that facilities commit to several improvement goals for a 3-year period and report on the progress of these goals annually. In 2005, the Laboratory made significant progress in: increasing BNL's land and habitat conservation, reducing radioactive air emissions, and reducing BNL's use of ozone-depleting substances and hazardous materials.

Chapter 2 of this report describes the elements and implementation of BNL's EMS in further detail.

BNL'S ENVIRONMENTAL MANAGEMENT PROGRAM

BNL's Environmental Management Program consists of several Laboratory-wide and facility-specific environmental monitoring and surveillance programs. These programs identify potential pathways of public and environmental exposure and evaluate the impacts BNL activities may have on the environment. An overview of the Laboratory's environmental programs and a summary of performance for 2005 follows.

Compliance Monitoring Program

BNL has an extensive program in place to ensure compliance with all applicable environmental regulatory and permit requirements. BNL must comply with more than 100 sets of federal, state, and local environmental regulations, numerous site-specific permits, equivalency permits for the operation of 12 groundwater remediation systems, and several other binding agreements. In 2005, BNL fully complied with

the majority of these requirements; the Laboratory reported instances of noncompliance to the regulatory agencies and corrected them expeditiously.

Eleven external environmental audits were conducted by regulatory agencies in 2005, including inspections of petroleum and chemical storage, air emissions from the Central Steam Facility (CSF), Sewage Treatment Plant (STP) operations, other regulated outfalls and recharge basins, and the potable water system. No formal notices of violation or enforcement actions were issued, and BNL took immediate corrective actions to address the issues that were identified. Three conditions requiring corrective action were identified during an annual inspection of the Major Petroleum Facility (MPF) and three conditions were found during an inspection of the Chemical Bulk Storage Facilities; all six conditions were corrected in accordance with New York State Department of Environmental Conservation (NYSDEC) directives.

Compliance monitoring in 2005 showed that emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide were all within permit limits. There were 107 periods of excess opacity emissions at the CSF exhaust stack during routine "soot blowing" operations in the first three quarters of 2005. BNL resequenced the soot blowing cycle and the excursions were eliminated in the fourth quarter.

Approximately 873 pounds of ozone-depleting refrigerants were recovered for recycling on site or offered for use by other DOE or federal facilities. In addition, 125 17-pound Halon 1211 extinguishers were removed from service and have been made available to other DOE facilities.

Monitoring of the potable water supply showed that all drinking water requirements were met. Groundwater monitoring at the MPF continued to demonstrate that current oil storage and transfer operations are not affecting groundwater quality. With the exception of eight minor permit excursions at the STP and two at recharge basins, liquid effluents discharged to surface water and groundwater met all applicable New York State Pollutant Discharge Elimination System (SPDES) permit requirements. The 10 SPDES excursions included two each for total nitrogen and ammonia, and one each for iron, zinc, methylene chloride, pH, copper, and oil and grease. These excursions were investigated by BNL staff, corrected where possible, and reported to NYSDEC and the Suffolk County Department of Health Services (SCDHS).

There were 14 reportable spills of antifreeze, fuel oil, or other small-volume chemical releases in 2005. All releases were cleaned up or addressed to the satisfaction of NYSDEC. The Laboratory has been very successful in reducing the number and severity of spills on site with the implementation of a spill awareness program. In 2005, the total incidence was reduced by 55 percent, compared with 2004.

Chapter 3 of this report describes BNL's Compliance Program and status in further detail.

Air Quality Program

BNL monitors radioactive emissions at three facilities on site to ensure compliance with the requirements of the Clean Air Act. During 2005, BNL facilities released a total of 3,266 curies of radioactive gases with short half-lives (less than 30 minutes). EPA regulations require continuous monitoring of all sources that have the potential to deliver an annual radiation dose greater than 0.1 mrem to a member of the public. Although not required, the Brookhaven Linac Isotope Producer (BLIP) is continuously monitored. Oxygen-15 (half-life: 122 seconds) and carbon-11 (half-life: 20.48 minutes) emitted from the BLIP constituted more than 99.4 percent of radiological air emissions on site in 2005. Facilities capable of delivering radiation doses require periodic, confirmatory monitoring. At BNL, this monitoring is conducted at one active facility, the Target Processing Laboratory (TPL), and one inactive facility, the High Flux Beam Reactor (HFBR). Releases from the TPL in 2005 continued to be very small (0.0771 μCi). Tritium releases from the HFBR in 2005 increased to 17.9 Ci, following the previous downward trend in 2004 to 3.94 Ci. An investigation determined that the probable source for the rise was the evaporation of residual heavy water through a breached vent line, which was immediately repaired. In 2004, BNL filed a petition with EPA to discontinue emissions monitoring

at the Brookhaven Medical Research Reactor (BMRR) because sampling has consistently shown no detectable emissions of radionuclides. The petition was approved in 2005.

The Laboratory conducts ambient radiological air monitoring to verify local air quality and assess possible environmental and health impacts from BNL operations. Air monitoring stations around the perimeter of the site measure tritium and gross alpha and beta airborne activity. Results measured in 2005 demonstrated that on-site radiological air quality was consistent with off-site measurements and with results from locations in New York State that are not located near radiological facilities.

Various state and federal regulations governing nonradiological releases require facilities to conduct periodic or continuous emission monitoring to demonstrate compliance with emission limits. The CSF is the only BNL facility that requires this monitoring. Two of the four boilers at the CSF are equipped with continuous emission monitors to measure nitrogen oxides and opacity. In 2005, these monitors measured no exceedances of nitrogen oxide. The Laboratory reported all opacity exceedances to NYSDEC; all but one occurred during boiler startup or soot blowing operations—times when opacity exceedances are most likely. After the maintenance schedule was resequenced, there were no additional opacity exceedances.

Because natural gas prices were higher than residual fuel prices throughout 2005, BNL used residual fuel for most heating and cooling. As a result, annual facility emissions of particulate matter, nitrogen oxides, and sulfur dioxide were considerably higher than in years when natural gas was the primary fuel.

Chapter 4 of this report describes BNL's Air Quality Program and monitoring data in further detail.

Water Quality Surveillance Program

BNL discharges treated wastewater into the headwaters of the Peconic River via the STP, and to groundwater via recharge basins. Some wastewater may contain very low levels of radiological, organic, or inorganic contaminants. Monitoring, pollution prevention, and careful operation of treatment facilities ensure that these discharges comply with all applicable requirements and that the public, employees, and the environment are protected.

To assess the impact of discharges on the quality of the Peconic River, surface water monitoring is conducted at several locations upstream and downstream of the STP effluent. The Carmans River, located to the west of BNL, is monitored as a geographical control location for comparative purposes, as it is not affected by Laboratory operations. In 2005, the average gross alpha and beta activity levels in the STP discharge were within the typical range of historical levels and were well below drinking water standards. Tritium releases to the Peconic River continued to decline and were the lowest ever recorded; this was a result of the decommissioning and decontaminating at the HFBR. There were no detections of cesium-137 (Cs-137) or other gamma-emitting nuclides in the effluent, and only one detection of strontium-90 (Sr-90) in the STP influent. The Sr-90 detected in a single sample of influent was at levels similar to upstream and other background locations. Very low concentrations of tritium were detected at the STP outfall, most of which were well below the New York State Drinking Water Standard (DWS). Tritium was detected above the minimum detection level (MDL) in samples collected from June through August, when discharges increase due to air conditioning condensate at the HFBR, which contain detectable levels of tritium. Additionally, residual moisture within the HFBR piping systems may have contributed to slightly higher summertime releases of tritium. These levels are expected to continue to decrease even further, provided no additional work is conducted that could expose tritium contained in reactor components.

On-site recharge basins are used for the discharge of "clean" wastewater streams, including once-through cooling water, stormwater runoff, and cooling tower blowdown, and are suitable for direct replenishment of the groundwater aquifer. Radiological analyses in 2005 showed that the low levels of alpha and beta activity detected in most of the basins were attributable to very low levels of naturally occurring radio-

nuclides, such as potassium-40, and not to BNL operations. A very low level of tritium, detected in a single sample, was attributed to inaccuracies of the analytical method.

In 2005, nonradiological analyses of the recharge basins showed low concentrations of volatile organic compounds (VOCs), including disinfection byproducts generated by the use of chlorine used to control algae, acetone, and methylene chloride. In most instances, the detection of acetone and methylene chloride was due to cross-contamination of the samples at the contract analytical laboratory.

Along the Peconic River, several locations are monitored for radiological and nonradiological parameters to access overall water quality. Radiological data from Peconic River surface water sampling in 2005 showed that gross alpha and beta activity was detected at most locations; the highest detection was located downstream and off the Laboratory site. The average concentrations from off-site and control locations were indistinguishable from BNL on-site locations. Monitoring for Sr-90 showed low-level detections, which are consistent with historical levels. All tritium samples collected were below detectable levels except for one sample taken downstream of the STP discharge. All levels were well below the New York State DWS. No VOCs were detected above the MDL in river water samples in 2005.

Chapter 5 of this report describes BNL's Water Quality Surveillance Program and monitoring data in further detail.

Natural and Cultural Resource Management Program

The BNL Natural Resource Management Program was designed to promote stewardship of the natural resources found on site and to integrate natural resource management and protection with BNL's scientific mission. The goals of the program include protecting and monitoring the ecosystem, conducting research, and communicating with the public, stakeholders, and staff members regarding environmental issues. Precautions are taken to protect and enhance habitats and natural resources at the Laboratory. Activities to eliminate or minimize negative effects on sensitive or critical species (such as the eastern tiger salamander, eastern hognose snake, and banded sunfish) are incorporated into BNL procedures or into specific program or project plans. Restoration efforts continue to remove pollutant sources that could contaminate habitats. In some cases, habitats are enhanced to improve survival or increase populations. The Peconic River cleanup project, initiated in 2004 and completed in 2005, required dewatering both the on- and off-site portions of the river. Banded sunfish were captured from the Peconic River and relocated to a protected pond. In 2005, several hundred sunfish were returned to the Peconic River to ensure the species' continued presence there.

BNL also monitors and manages other wildlife populations, such as white-tailed deer and wild turkey, to ensure that they are sustained. In order to better understand the distribution of deer on site, a model of deer density was developed in 2005. This model enables resource managers to track changes in deer density over time. It is also used to detect interactions between components of the ecosystem, and to identify locations for management activities.

BNL conducts routine monitoring of flora and fauna to assess the impact, if any, of past and present activities on the Laboratory's natural resources. In 2005, deer and fish sampling results were consistent with previous years. Deer sampled on the BNL site contain higher concentrations of Cs-137 than deer sampled from more than 1 mile off site. This is most likely because on-site deer consume small amounts of contaminated soil and graze on vegetation growing in soil where elevated Cs-137 levels are known to exist. Removal of areas of contaminated soil at BNL began in 2000, and all major areas were remediated by the end of 2005. The New York State Department of Health has reviewed the potential public health risk associated with the low levels of Cs-137 in on-site deer and determined that neither hunting restrictions or formal health advisories are warranted.

Because of the Peconic River cleanup project and drought conditions in 2005, on-site fish were not sampled. Off-site sampling of fish found low levels of Cs-137; all levels of Cs-137

appear to be declining, compared with historic values. Low levels of mercury and pesticides were also detected in off-site fish samples, but did not exceed any standards and do not present a health impact to consumers of such fish. With completion of the Peconic River cleanup project, all of these levels are expected to drop. On- and off-site aquatic vegetation and sediments contained low levels of Cs-137, metals, pesticides, and PCBs, in amounts that were consistent with levels detected in previous years.

In June and August 2005, "water column" sampling for mercury and methlymercury was performed in support of the post clean-up monitoring of the Peconic River. Samples taken in June were higher in either mercury or methylmercury, or both, compared to values taken at the same location prior to cleanup. This was most likely due to disturbed sediments that did not have sufficient time to settle and consolidate, and vegetation that had not had time to reestablish. Sediment disturbance may also have occurred during sampling. Long-term post remediation monitoring of the Peconic River cleanup will include annual water column and sediment sampling.

Precipitation samples were collected quarterly at two air monitoring stations and analyzed for radiological content. Samples collected at both stations in 2005 showed gross beta measurements above the MDL, although the values were within the range of those historically reported.

2005 marked the final year of the agreement between DOE and the U.S. Fish and Wildlife Service (FWS) for managing the Upton Ecological and Research Reserve, established on site in 2000. The management transition from FWS to BNL and the Foundation for Ecological Research in the Northeast (FERN) began with FERN setting up 50 permanent monitoring plots to assess the current health of the pine barrens. Educational programs, which were a significant part of the Upton Reserve research, also continued in 2005.

The goal of BNL's Cultural Resource Management Program (CRMP) is to ensure the proper stewardship of BNL and DOE historic resources. Additional goals include maintaining compliance with various historic preservation and archeological laws and regulations, and ensuring the availability of resources to Laboratory personnel and the public for research and interpretation. BNL's Cultural Resource Management Plan (CRMP), submitted to DOE for approval in 2003, was finalized in 2005. The plan will guide the management of all of the Laboratory's cultural resources. In 2005, the CRMP focused primarily on outreach activities, including a drive-by tour of historic Laboratory structures and a Summer Sunday devoted to BNL history.

Chapter 6 of this report describes BNL's Natural and Cultural Resource Management Programs in further detail.

Groundwater Protection Management Program

BNL's extensive groundwater monitoring well network is used to evaluate progress in restoring groundwater quality, to comply with regulatory permit requirements, to monitor active research and support facilities, and to assess the quality of groundwater entering and leaving the site. In 2005, the Laboratory collected groundwater samples from 864 on- and off-site monitoring wells during 2,567 individual sampling events. BNL has not detected any new impacts to groundwater quality since 2001.

Under the environmental surveillance program, 125 groundwater wells at 10 active research and support facilities were monitored during 285 individual sampling events. Although no new impacts to groundwater quality were discovered in 2005, groundwater quality continues to be impacted from past releases at four facilities. Low levels of tritium continue to be routinely detected at concentrations above the 20,000 pCi/L drinking water standard in wells immediately downgradient of the g-2/VQ-12 source area in the Alternating Gradient Synchrotron facility, and periodically above the standard in monitoring wells at the BLIP. Monitoring data suggest that the continued release of tritium from these areas is due to residual tritium being flushed out of the unsaturated zone close to the water table by natural water table fluctuations.

As in previous years, VOCs associated with historical petroleum and solvent spills were detected in several monitoring wells directly downgradient of the Motor Pool and Service Station areas. Monitoring of the leak detection systems at both vehicle maintenance facilities indicated that gasoline storage tanks and associated distribution lines were not leaking. Furthermore, BNL's ongoing evaluation of vehicle maintenance operations indicated that all waste oils and used solvents are being properly stored and recycled.

Under the Environmental Restoration Program, on- and off-site contaminant plumes are monitored to track the progress that the groundwater treatment systems are making toward plume remediation. In 2005, 739 groundwater wells were monitored during 2,282 individual sampling events. The peak tritium concentration during 2005, directly downgradient from the HFBR, was 243,000 pCi/L. This concentration was significantly less than the historical peak of 5,034,561 pCi/L, observed in 1999 in this area. Data indicated that the plume had shifted to the east of much of the western downgradient portion of the monitoring well network. The remnants of the high concentration area of the plume (addressed by low-flow pumping remediation in 1999–2000) is currently in the vicinity of the Chilled Water Plant Road. Additional characterization has been scheduled. Monitoring in the Building 96 area indicated that concentrations of VOCs continued to persist in the "silt zone" source area north of treatment well RTW-1. Potassium permanganate injections were implemented in an effort to treat the contamination, and the area will continue to be monitored. Declining carbon tetrachloride concentrations continued in 2005 in samples from wells that monitor the carbon tetrachloride plume and the associated remediation system, which is now in standby mode. Ethylene dibromide (EDB) data from off-site monitoring wells in 2005 indicated that the EDB plume had reached the remediation system extraction wells. VOC concentrations remained stable or declined slightly for the Operable Unit (OU) V VOC plume. Similarly, Sr-90 concentrations remained stable or declined in monitoring wells located at and downgradient from the former Building 650 sump outfall.

The Laboratory's groundwater cleanup goals include minimizing plume growth and reducing contaminant concentrations in the Upper Glacial aquifer to below NYS Maximum Contaminant Level (MCL) standards by 2030. In 2004, BNL prepared a report that identified changes to the Laboratory's OU III cleanup goal time frames for several projects. The report was submitted for public review in December 2004 and was approved by EPA in 2005. For the Sr-90 plumes associated with the Brookhaven Graphite Research Reactor/Waste Concentration Facility and Chemical Holes areas, MCLs must be reached within 70 years and 40 years, respectively. Cleanup of the Magothy aquifer VOC contamination must meet MCLs within 65 years.

The Laboratory continues to make significant progress in restoring groundwater quality on site, with 14 groundwater remediation systems in active operation. During 2005, 472 pounds of VOCs and 4.72 mCi of Sr-90 were removed from the groundwater, and more than 1.7 billion gallons of treated groundwater were returned to the aquifer. To date, approximately 5,280 of the estimated 25,000 to 30,000 pounds of VOCs in the aquifer have been removed.

Chapter 7 of this report provides an overview of the Groundwater Protection Management Program, and the SER Volume II, Groundwater Status Report, provides a detailed description, data, and maps relating to all groundwater monitoring.

Radiological Dose Assessment Program

BNL routinely assesses its operations to ensure that any potential radiological dose to members of the public, BNL workers, and the environment is "As Low As Reasonably Achievable" (ALARA). The potential radiological dose is calculated as the largest possible dose to a hypothetical Maximally Exposed Individual (MEI) at the BNL site boundary. For dose assessment purposes, the pathways include direct radiation exposure, inhalation, ingestion, immersion, and skin absorption. Radiological dose assessments at the Laboratory have con-

sistently shown that the "effective dose equivalent" from operations is well below the EPA and DOE regulatory dose limits for the public and the environment. The dose impact from all BNL activities in 2005 was found to be insignificantly above natural background radiation levels.

To measure direct radiation from Laboratory operations, thermoluminescent dosimeters (TLDs) are installed on site and in surrounding communities. In 2005, the average doses from 55 TLDs showed there was no additional contribution to dose from BNL operations above natural background radiation. The annual on-site external dose from all potential sources, including cosmic and terrestrial radiation, was 66 ± 12 mrem (670 ± 120 μSv), and the annual off-site external dose was 64 ± 9 mrem (640 ± 90 μSv).

The effective dose to the MEI from air emissions was 5.30E-2 mrem (0.53 μSv). The ingestion pathway dose was estimated as 0.32 mrem (3.2 μSv) from consumption of deer meat and 0.08 mrem (0.8 μSv) from consumption of fish caught on site. The total annual dose to the MEI from all pathways was estimated as 0.45 mrem (4.5 μSv). The BNL dose from the air inhalation pathway was less than 10 percent of EPA's annual regulatory dose limit of 10 mrem (100 μSv), and the total dose was less than 1 percent of DOE's annual dose limit of 100 mrem (1,000 μSv) from all pathways. Doses to aquatic and terrestrial biota were also evaluated and found to be well below the regulatory limits.

As a part of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) review process at BNL, any source that has the potential to emit radioactive materials is evaluated for regulatory compliance. In 2005, several NESHAPs compliance reviews were performed. The 200-MeV laser electron stripping experiment conducted in the Radiation Effects Facility complied with regulations for emissions; tritium emissions during the pre-cooling of the Alternate Gradient Synchrotron snake magnet were insignificant and in compliance; and BLIP emissions met all compliance requirements and have been significantly reduced due to the installation of a sealed Lucite cover to enclose the cooling water surface and the target holder mechanisms.

Chapter 8 of this report describes the BNL Radiological Dose Assessment Program and monitoring data in further detail.

Quality Assurance Program

The multilayered components of the BNL Quality Assurance (QA) Program ensure that all analytical data reported in this document are reliable and of high quality, and that all environmental monitoring data meet quality assurance and quality control objectives. Samples are collected and analyzed in accordance with EPA methods and standard operating procedures that are designed to ensure samples are representative and the resulting data are reliable and defensible. Quality control in the analytical laboratories is maintained through daily instrument calibrations, efficiency and background checks, and testing for precision and accuracy. Data are verified and validated as required by project-specific quality objectives before being used to support decision making.

In 2005, the Laboratory used five off-site contract analytical laboratories to analyze environmental samples: General Engineering Lab (GEL), H2M Lab, Severn-Trent Lab (STL), Chemtex Lab, and Brooks Rand. All analytical laboratories were certified by New York State for the tests they performed for BNL, and were subject to oversight that included state and national performance evaluation (PE) testing, review of QA programs, and audits.

Four of the contract analytical laboratories participated in several national and state PE testing programs in 2005. Results of the tests provide information on the quality of a laboratory's analytical capabilities. The two contract analytical laboratories performing radiological analyses had "average overall satisfactory" scores (as defined by the independent testing organizations) of 98 and 88 percent. The overall satisfactory scores for nonradiological testing ranged from 93.1 to 99.4 percent. The contract analytical laboratories received an "acceptable" rating for a combined average overall satisfactory score of 93.9 percent on the radiological and nonradiological PE tests performed.

In 2005, STL and GEL were audited as part of DOE's Integrated Contract Procurement Team Program. There were no Priority I ("serious")

findings for either laboratory. The STL audit resulted in 15 Priority II findings and the GEL audit resulted in two Priority II findings. Corrective actions plans were submitted to DOE by the contract analytical laboratories to document that procedures were put in place to correct the findings.

Chapter 9 of this report describes the BNL Quality Assurance/Quality Control Program in further detail.