

Executive Summary

Brookhaven National Laboratory (BNL) is managed on behalf of the Department of Energy (DOE) by Brookhaven Science Associates (BSA), a partnership between the Research Foundation for the State University of New York on behalf of Stony Brook University and Battelle. For almost 70 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 Environmental, Safety, Security and Health (ESSH) Policy reflects the commitment of BNL's management to fully integrate environmental stewardship into all facets of its mission and operations.

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

Volume II of the SER, the Groundwater Status Report, also is prepared annually to report on the status of groundwater protection and restoration efforts. Volume II includes detailed technical summaries of groundwater data and treatment system operations and is intended for regulators and other technically oriented stakeholders. A brief summary of the information contained in Volume II is included in Chapter 7, Groundwater Protection, of this volume.

Both reports are available in print and as downloadable files on the BNL web page at <https://www.bnl.gov/esh/env/ser/>.

ENVIRONMENTAL MANAGEMENT SYSTEM

The Laboratory's Integrated Safety Management System (ISMS) incorporates management of Environment (i.e., environmental protection and pollution prevention), Safety, and Health (ES&H) issues into all work planning. BNL's ISMS ensures that the Laboratory integrates DOE's five Core Functions and seven Guiding Principles into all work processes. These

processes contributed to BNL's achievement of registration under both the International Organization for Standardization (ISO) 14001 Standard (for the Laboratory's Environmental Management System [EMS]) and the Occupational Health and Safety Assessment Series (OHSAS) 18001 Standard (for the Laboratory's Safety and Health Program). Both standards require an organization to develop a policy, create plans to

implement the policy, implement the plans, check progress and take correction actions, and review the system periodically to ensure its continuing suitability, adequacy, and effectiveness.

An EMS was fully established at BNL in 2001 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 the Laboratory's EMS is the ESSH Policy. The policy makes clear the Laboratory's commitment to environmental stewardship, the safety and health of employees, and the security of the site. Specific environmental commitments in the policy include compliance, pollution prevention, conservation, community outreach, and continual improvement. The policy is posted throughout the Laboratory and on the BNL website. It also 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 globally recognized ISO 14001 Environmental Management Standard. BNL was the first DOE Office of Science Laboratory to become officially registered to this standard. BNL was also the first Office of Science Laboratory to achieve registration under the OHSAS 18001 (Occupational Health & Safety) Standard. Each certification requires the Laboratory to undergo annual audits by an accredited registrar to assure that the systems are maintained and to identify evidence of continual improvement. In 2017, EMS assessments determined that BNL remains in conformance with the ISO 14001: 2004 Standard.

Executive Order 13639, *Planning for Federal Sustainability in the Next Decade*, establishes goals for federal agencies and focuses on greenhouse gas (GHG) reduction across the government. In addition to guidance, recommendations, and plans, which must be prepared by specific due dates, EO 13693 has set numerical targets for agencies. DOE Order 436.1, *Departmental Sustainability*, provides requirements and responsibilities for managing sustainability within DOE to ensure facilities are working towards sustainability goals established in its Strategic Sustainability Performance Plan

(SSPP) pursuant to EO 13639. Each DOE facility is required to have a Site Sustainability Plan (SSP) in place detailing the strategy for achieving these long-term goals and due dates and to provide an annual status. The requirements influence the future of the Laboratory's EMS program and have been incorporated into BNL's SSP.

The Laboratory's Pollution Prevention (P2) Program is an essential element for the successful implementation of BNL's EMS. The 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 Laboratory's operating philosophy. Pollution prevention and waste reduction goals have been incorporated as performance measures into the DOE contract with BSA and into BNL's ESSH Policy. 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.

The implementation of pollution prevention opportunities, recycling programs, and conservation initiatives continues to reduce both waste volumes and management costs. In 2017, these efforts resulted in nearly \$3.5 million in cost avoidance or savings and approximately 9.3 million pounds of materials being reduced, recycled, or reused annually. Chapter 2 of this report describes the elements and implementation of BNL's EMS and P2 Program.

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 2017 is provided below.

COMPLIANCE MONITORING PROGRAM

BNL has an extensive program in place to ensure compliance with all applicable regulatory

and permit requirements. The Laboratory must comply with more than 100 sets of federal, state, and local environmental regulations; numerous site-specific permits; 12 equivalency permits for the operation of groundwater remediation systems; and several other binding agreements. In 2017, the Laboratory operated in compliance with most of the requirements, and any instance of noncompliance was reported to regulatory agencies and corrected expeditiously.

Emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide from the Central Steam Facility were all well within permit limits in 2017. There were two recorded excess opacity measurements due to unknown causes, five due to a temporary failure of the transmissometer blower motor, and a single excess opacity reading that occurred during quarterly quality assurance tests of the Boiler 6 and 7 opacity monitors. All of the excursions were documented in quarterly Site-Wide Air Emissions and Monitoring Systems Performance Reports submitted to the New York State Department of Environmental Conservation (NYSDEC).

In 2017, there were no discharges of Halon 1211 from portable fire extinguishers or Halon 1301 from accidental or fire-induced activation of fixed fire suppression systems. Halon-portable fire extinguishers continue to be removed and replaced by dry-chemical or clean agent units as part of an ongoing program to phase out the use of chlorofluorocarbons as extinguishing agents. Monitoring of BNL's potable water system indicated that all drinking water requirements were met during 2017. Most of the liquid effluents discharged to surface water and groundwater also met applicable New York State Pollutant Discharge Elimination System permit requirements. Only two excursions above permit limits were reported for the year: one non-compliance event for Biological Oxygen Demand (BOD5) occurred at the Sewage Treatment Plant, and one non-compliance event was reported for a 1-Hydroxyethylidene-1, 1-diphosphonic acid (HEDP) at Outfall 002 (HN). The permit excursions were reported to NYSDEC and the Suffolk County Department of Health Services and corrective measures were taken. Groundwater monitoring at the Laboratory's Major Petroleum Facility,

Sewage Treatment Plant, and Waste Management Facility continued to demonstrate that current operations at these facilities were not affecting groundwater quality. Efforts to minimize impacts of spills of materials continued in 2017. There were 21 spills and 11 of those spills met regulatory agency reporting criteria. The severity of releases were minor and all releases were cleaned up to the satisfaction of NYSDEC.

BNL participated in ten environmental inspections or reviews by external regulatory agencies in 2017. These inspections included Sewage Treatment Plant operations; hazardous waste management facilities; regulated petroleum bulk storage facilities; and the potable water system. Immediate corrective actions were taken to address all issues raised during these inspections.

The DOE Brookhaven Site Office (BHSO) continued to provide oversight of BNL programs during 2017 and participated as an observer of the BSA Multi-Topic Assessment of BNL's environmental protection programs. BHSO participation comprised of observing BSA's scoping, assessment conduct, and reporting. BHSO also performed a surveillance of Groundwater Treatment System Carbon Replacement at the Operable Unit IV Ethylene Dibromide treatment system. No findings were identified and all operations were observed to be conducted in a safe and environmentally sound manner. 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 its site to ensure compliance with the requirements of the Clean Air Act. Environmental Protection Agency (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; all other facilities capable of delivering any radiation dose require periodic confirmatory sampling.

During 2017, Laboratory facilities released a total of 10,660 curies of short-lived radioactive gases. BNL's Brookhaven Linac Isotope Producer (BLIP) is the only facility subject to EPA's continuous monitoring requirements. Oxygen-15 (half-life: 122 seconds) and Carbon-11 (half-life: 20.4

minutes) emitted from the BLIP constituted more than 99.99 percent of radiological air emissions on site.

The Laboratory conducts ambient radiological air monitoring to verify local air quality and to assess possible environmental and health impacts from BNL operations. Samples collected from air monitoring stations around the perimeter of the site were analyzed for tritium and gross alpha and beta airborne activity. Results for 2017 continued to demonstrate that on-site radiological air quality was consistent with air quality measured at locations in New York State that are not located near radiological facilities.

Various state and federal regulations governing non-radiological releases require facilities to conduct periodic or continuous emissions monitoring to demonstrate compliance with emission limits. The CSF is the only BNL facility that requires monitoring. In 2017, emissions of nitrogen oxides, carbon monoxide, and sulfur dioxide from the CSF were all well within permit limits.

In 2017, residual fuel prices exceeded those of natural gas for most of the year. As a result, natural gas was used to supply 98.3 percent of the heating and cooling needs of BNL's major facilities. By comparison, in 2009, residual fuel satisfied 42.6 percent of the major facility heating and cooling needs. Consequently, 2017 emissions of particulates, NO_x, and sulfur dioxide (SO₂) were 6.7, 25.2, and 43.2 tons less than the respective totals for 2009, when No. 6 oil was used to supply a much higher percent of site heating and cooling needs. Chapter 4 of this report describes BNL's Air Quality Program and monitoring data in further detail.

WATER QUALITY SURVEILLANCE PROGRAM

Wastewater generated from BNL operations is treated at the Sewage Treatment Plant (STP) before it is discharged to nearby groundwater recharge basins. Some wastewater may contain very low levels of radiological, organic, or inorganic contaminants. Monitoring, pollution prevention, and vigilant operation of treatment facilities ensure that these discharges comply with all applicable regulatory requirements and that the public, employees, and the environment are protected.

In 2017, the average gross alpha and beta

activity levels in the STP discharge were within the typical range of historical levels and well below New York State Drinking Water Standards (NYS DWS).

Tritium was not detected above method detection limits in the STP discharge during the entire year and no cesium-137, strontium-90, or other gamma-emitting nuclides attributable to Laboratory operations were detected. Non-radiological monitoring of the STP effluent showed that organic and inorganic parameters were within State Pollutant Discharge Elimination System (SPDES) effluent limitations or other applicable standards.

Stormwater and cooling water discharges to recharge basins are sampled throughout the year and analyzed for gross alpha and beta activity, gamma-emitting radionuclides, and tritium. Each recharge basin is a permitted point-source discharge under the Laboratory's SPDES permit. In 2017, the average concentrations of gross alpha and beta activity in stormwater and cooling water discharged to recharge basins were within typical ranges and no gamma-emitting radionuclides were detected. Disinfection byproducts continue to be detected in the discharges at concentrations just above the method detection limit due to the use of chlorine and bromine for the control of algae and bacteria in potable and cooling water systems. Inorganics (i.e., metals) were detected; however, their presence is due primarily to sediment runoff in stormwater discharges.

With the exception of the most upstream sampling location (Station HY), the onsite portions of the Peconic River were dry throughout 2017 due to drought conditions. When available, radiological data from Peconic River surface water sampling show that the average concentrations of gross alpha and gross beta activity from on-site locations (one sample) were indistinguishable from off-site and control locations, and all detected levels were below the applicable NYS DWS. No gamma-emitting radionuclides attributable to Laboratory operations were detected, and tritium was not detected above method detection limits in any of the samples. Samples collected upstream, downstream, and at control locations demonstrated that elevated amounts of aluminum and iron are associated with natural sources.

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 the Laboratory's scientific mission. The goals of the program include protecting and monitoring the ecosystem on site, conducting research, and communicating with the public, stakeholders, and staff members regarding environmental issues.

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. Generally, deer sampled on site or within one mile of the Laboratory contain higher concentrations of cesium-137 (Cs-137) than deer sampled from more than one 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. In 2017, Cs-137 concentrations in deer meat samples were obtained from two deer on site with a range of values from 1.16 pCi/g, wet weight, to 1.34 pCi/g, wet weight, and an arithmetic average of 1.25 pCi/g, wet weight. The wet weight concentration is before a sample is dried for analysis and is the form most likely to be consumed. Dry weight concentrations are typically higher than wet weight values.

The highest on-site sample in 2017 (1.34 pCi/g, wet weight) was about 21 percent lower than the highest on-site sample reported in 2016 (1.69 pCi/g, wet weight) and nearly nine times lower than the highest level ever reported in 1996 (11.74 pCi/g, wet weight). Cs-137 concentrations in off-site deer meat samples are typically separated into two groups: samples taken within one mile of BNL (ten samples) and samples taken farther away (six samples).

Concentrations in meat samples taken within one mile ranged from 0.06 pCi/g, wet weight to 3.33 pCi/g, wet weight, with an arithmetic average of 1.15 pCi/g, wet weight. Because deer on site may routinely travel up to one mile off site,

the arithmetic average for deer taken on site and within one mile of the Laboratory is also calculated; for 2017, this was 1.17 pCi/g, wet weight. The six deer sampled from greater than one mile from BNL had Cs-137 concentrations ranging between 0.02 pCi/g, wet weight, to 2.91 pCi/g, wet weight, with an arithmetic average of 0.67 pCi/g, wet weight.

BNL has periodically conducted population reductions of the white-tailed deer on-site. In 2017, population reductions resulted in the removal of 202 animals. The meat provided by these animals was donated to food pantries. Prior to release, the meat is tested for Cs-137 content. All samples were below BNL administrative release criteria of 1.0 pCi/g, wet weight. The average content was 0.26 pCi/g, wet weight.

During 2017, grassy vegetation samples were collected from 12 locations around the Laboratory and a control location at the NYSDEC hunter check station in Ridge, New York. All samples were analyzed for Cs-137. Cs-137 content in vegetation ranged from non-detectable to 10.00 pCi/g, wet weight. Only one of the 12 samples and the control location sample had detectable levels of Cs-137. All values were consistent with historic monitoring. Monitoring results for grassy vegetation is utilized for the annual dose to biota analysis reported in Chapter 8.

Soil sampling was conducted at the same 12 locations where the grassy vegetation was collected and analyzed for Cs-137. The area is known to have residual Cs-137 levels below 23 pCi/g, dry weight in soils. This is confirmed as the associated soil contained a concentration of 10.8 pCi/g, dry weight of cesium. Other soil samples had Cs-137 levels from non-detect to 4.31 pCi/g, dry weight. These values were also consistent with past soil monitoring results.

During 2017, precipitation samples were collected quarterly at air monitoring Stations P4 and S5 and analyzed for total mercury. Historically and through 2015, BNL analyzed precipitation for radiological content. However, with no emissions of significantly long-lived radionuclides from Laboratory operations, the monitoring program objectives were modified to remove testing of precipitation for radiological content beginning in 2016. Mercury concentrations in

precipitation have been measured at BNL since 2007. Analysis of mercury in precipitation is conducted to document mercury deposition that is attributable to off-site sources. This information is compared to Peconic River monitoring data and aids in understanding the distribution of mercury within the Peconic River watershed. Mercury was detected in all of the precipitation samples collected at both sampling stations. Mercury ranged from 2.07 ng/L at station S5 in January to 45.1 ng/L at station P4 in July. The 45.1 ng/L concentration is nearly two times higher than the previous high value of 24.6 ng/L, recorded in 2013.

The Laboratory sponsors a variety of educational and outreach activities involving natural resources. These programs are designed to help participants understand the ecosystem and to foster interest in science. Wildlife programs are conducted at BNL in collaboration with local agencies, colleges, and high schools. Ecological research is also conducted on site to update the current natural resource inventory, gain a better understanding of the ecosystem, and guide management planning.

In 2017, BNL hosted 17 student interns and two faculty members within the Natural Resources program (two during the spring, two during the fall, and the remaining 13 during the summer). Two interns worked with a faculty member from the Statue University of New York at Westbury; two interns worked with a faculty member from Hofstra University as part of the BNL Visiting Faculty Program (VFP); three interns worked under a faculty member from Southern University of New Orleans; and 12 interns participated in research associated with various projects including several related to the Long Island Solar Farm (LISF), turtles, and pollinators.

The VFP team from Hofstra University continued a second year of gathering basic information on small mammals, tick loads, and the incidence of Lyme disease in the ticks. This work is being done in preparation for coyotes (*Canis latrans*) migrating to Long Island. Once established, coyotes are expected to alter ecosystems due to competition with other carnivores.

Work associated with the LISF involved tracking 20 eastern box turtles outfitted with transmitters to determine home range sizes. Many of the

turtles were captured in or near the LISF to determine if they utilize habitats found in the facility. Interns also conducted surveys in and around the LISF to study the relationship and impacts of this facility on the local ecosystem. Since 2011, interns have followed a total of 42 turtles; as a result, BNL is building a thorough understanding of their habits. For a detailed description of this and other student-led research projects, see Chapter 6, Section 6.5 Wildlife Programs.

BNL utilizes prescribed fire as part of its forest management. To accurately develop burn plans, data on vegetation and fuel loads is necessary. In 2017, summer interns worked to collect and analyze fuel loads within current and planned burn units. Three growing season fires were conducted and fire effects monitoring on vegetation are planned for 2018.

In 2017, BNL continued to participate in several events in support of ecological education programs on Long Island. On separate days, over 30 partner organizations and agencies, over 40 schools, and over 2,400 students collected scientific information for analysis to be used to portray the status of the rivers and estuary systems. These events provide students hands-on experience with field techniques in catching fish, invertebrate sampling, biodiversity inventory, and water chemistry. In addition, BNL is in the 13th year of the Open Space Stewardship Program (OSSP) and worked with 30 schools and over 3,000 students in 2017. The OSSP enables students to engage in activities to solve problems within their local community through scientific discovery, conservation, and stewardship. Participation in OSSP creates an opportunity for many students to enhance their educational experiences as well as to promote the realization that a career in science and technology is accessible with the proper academic coursework and interaction with teachers and field experts who have a passion for discovery and mentorship.

The Laboratory also hosts the annual New York Wildfire & Incident Management Academy, offered by NYSDEC and the Central Pine Barrens Commission. Using the Incident Command System of wildfire management, this academy trains firefighters in the methods of wildland fire suppression, prescribed fire, and fire analysis.

BNL has developed and is implementing a Wildland Fire Management Plan that includes the use of prescribed fire for fuel and forest management and worked with NYSDEC to conduct three growing season fires in northern and eastern sections of the BNL property. These first three successful fires provided significant experience and training for fire crews working in Pine Barrens habitat, improving capabilities of these crews to conduct and manage fire within the Long Island Central Pine Barrens. Chapter 6 of this report describes BNL's natural and cultural resources in further detail.

GROUNDWATER PROTECTION MANAGEMENT PROGRAM

BNL has made significant investments in environmental protection programs over the past 25 years and continues to make progress in achieving its goal of preventing new groundwater impacts and remediating previously contaminated groundwater. The Laboratory's extensive groundwater monitoring well network is used to evaluate progress in restoring groundwater quality, comply with regulatory permit requirements, and monitor active research and support facilities where there is a potential for environmental impact.

During 2017, several Per- and Polyfluoroalkyl Substances (PFAS) were detected in water samples collected from three BNL water supply wells. The Suffolk County Department of Health Services conducted the analyses as part of the Safe Drinking Water Act program known as the Third Unregulated Contaminant Monitoring Rule (UCMR3). Preliminary assessment of possible sources for the PFAS contaminants indicates that they were related to the historical use of firefighting foam at the BNL site. The Laboratory will continue efforts to prevent new groundwater impacts and is vigilant in measuring and communicating its performance.

Groundwater quality at BNL is routinely monitored through a network of approximately 650 on- and off-site wells (see SER Volume II, Groundwater Status Report, for details). In addition to water quality assessments, water levels are routinely measured in 725 of the wells to assess variations in the direction and velocity of groundwater flow.

During 2017, the Facility Monitoring program

monitored 93 permanent wells during 121 individual sampling events. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) groundwater monitoring program monitored 558 permanent wells during 1,309 individual groundwater sampling events. Twenty-seven temporary wells were also installed as part of the CERCLA program.

During 2017, the North Street Treatment System, North Street East Treatment System, Operable Unit I South Boundary Treatment System, and the High Flux Beam Reactor Tritium Pump and Recharge System remained in standby mode because they met their active remediation goals for reduction of contaminant concentrations. The Building 452 Freon-11 Groundwater Treatment System, which had been placed in standby mode in March 2016, was reactivated in November 2016 due to a short-term rebound in Freon-11 concentrations. The system was returned to standby mode in March 2017. A period of standby monitoring for the plumes associated with these treatment systems will be performed to detect any rebound of contaminant concentrations.

Chapter 7 of this report provides an overview of this program, and the SER Volume II, *Groundwater Status Report*, provides detailed descriptions, data, and maps relating to all groundwater monitoring and remediation performed in 2017.

RADIOLOGICAL DOSE ASSESSMENT PROGRAM

The Laboratory routinely reviews its operations to ensure that any potential radiological dose to members of the public, workers, and the environment is "As Low As Reasonably Achievable" (ALARA). The potential radiological dose to members of the public is calculated at an off-site location closest to an emission source as the maximum dose that could be received by an off-site individual, defined as the "maximally exposed off-site individual" (MEOSI). The dose to the MEOSI is the sum total from direct and indirect dose pathways via air immersion, inhalation of particulates and gases, and ingestion of local fish and deer meat. In 2017, the total effective dose (TED) of 5.61 mrem (56 μ Sv) from Laboratory operations was well below the EPA and DOE regulatory dose limits for the public, workers, and the environment.

To measure direct radiation from Laboratory

operations, 54 on-site thermo-luminescent dosimeters (TLDs) and 16 off-site TLDs were deployed and showed that there was no external dose contribution from BNL operations distinguishable from the natural background radiation level. An additional nine TLDs were used to measure on-site areas known to have radiation dose slightly above the natural background radiation.

Dose to aquatic and terrestrial biota were also evaluated and found to be well below DOE regulatory limits. In summary, the overall dose impact from all Laboratory activities in 2017 was comparable to that of natural background radiation levels.

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 report are reliable, of high quality, and meet quality assurance and quality control objectives. Samples are collected and analyzed in accordance with EPA methods and BNL

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 2017, the Laboratory used five off-site contract analytical laboratories to analyze environmental samples. All analytical laboratories were certified by the New York State Department of Health for the tests they performed for BNL and were subject to oversight that included state and national performance evaluation testing, review of QA programs, and audits.

Based on the data reviews, data validations, and results of the independent PE assessments, the chemical and radiological results documented in this report are of acceptable quality.

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